

The CY91520 series is a Cypress 32-bit microcontroller designed for automotive devices. This series contains the FR81S CPU which is compatible with the FR family.

**Note:** This series is a composition of the end of the above-mentioned each name of articles of presence, According to Presence of sub-clock, CSV initial value and LVD initial value. Please see "Ordering Information" for details.

## Features

### FR81S CPU Core

- 32-bit RISC, load/store architecture, pipeline 5-stage structure
- Maximum operating frequency: 80 MHz (Source oscillation = 4.0 MHz and 20 multiplied (PLL clock multiplication system))
- General-purpose register : 32 bits × 16 sets
- 16-bit fixed length instructions (basic instruction), 1 instruction per cycle
- Instructions appropriate to embedded applications
  - Memory-to-memory transfer instruction
  - Bit processing instruction
  - Barrel shift order etc.
- High-level language support instructions
- Function entry/exit instructions
- Register content multi-load and store instructions
- Bit search instructions
  - Logical 1 detection, 0 detection, and change-point detection
- Branch instructions with delay slot
- Overhead reduction during branch process
- Register interlock function
- Easy assembler writing
- The support at the built-in / instruction level of the multiplier
- Signed 32-bit multiplication: 5 cycles
- Signed 16-bit multiplication: 3 cycles
- Interrupt (PC/PS saving)
  - 6 cycles (16 priority levels)
- The Harvard architecture allows simultaneous execution of program and data access.
- Instruction compatibility with the FR Family
- Built-in memory protection function (MPU)
  - Eight protection areas can be specified commonly for instructions and the data.
  - Control access privilege in both privilege mode and user mode.
- Built-in FPU (floating point arithmetic)
  - IEEE754 compliant
  - Floating-point register 32-bit × 16 sets

### Peripheral Functions

- Clock generation (equipped with SSCG function)
  - Main oscillation (4 MHz to 16 MHz)
  - Sub oscillation (32 kHz) or none sub oscillation
  - PLL multiplication rate : 1 to 20 times
  - Equipped with a 100 kHz CR oscillator
- Built-in program flash memory capacity
  - CY91F522: 256 + 64 KB
  - CY91F523: 384 + 64 KB
  - CY91F524: 512 + 64 KB
  - CY91F525: 768 + 64 KB
  - CY91F526: 1024 + 64 KB
- Flash memory for built-in data (WorkFlash) 64 KB
- Built-in RAM capacity
  - Main RAM
    - CY91F522: 48 KB
    - CY91F523: 48 KB
    - CY91F524: 64 KB
    - CY91F525: 96 KB
    - CY91F526: 128 KB
  - Backup RAM 8 KB
- General-purpose ports:
  - CY91F52xB 44 sets (No sub oscillation), 42 sets (sub oscillation)
  - CY91F52xD 56 sets (No sub oscillation), 54 sets (sub oscillation)
  - CY91F52xF 76 sets (No sub oscillation), 74 sets (sub oscillation)
  - CY91F52xJ 96 sets (No sub oscillation), 94 sets (sub oscillation)
  - CY91F52xK 120 sets (No sub oscillation), 118 sets (sub oscillation)
  - CY91F52xL 152 sets (No sub oscillation), 150 sets (sub oscillation)
  - Included I<sup>2</sup>C open drain corresponding ports: 16 sets
- External bus interface
  - 22-bit address, 16-bit data
- DMA Controller
  - Up to 16 channels can be started simultaneously.
  - 2 transfer factors (Internal peripheral request and software)
- A/D converter (successive approximation type)
  - 12-bit resolution : Max. 48 ch (32 ch + 16 ch)
  - Conversion time : 1.4 μs

- D/A converter (R-2R type)
  - 8-bit resolution : 2 ch
- External interrupt input: 8 channels × 2 units total 16 channels
  - Level ("H" / "L"), or edge detection (rising or falling) enabled
- Multi-function serial communication (built-in transmission/reception FIFO memory) : Max.12 channels
  - 5 V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 CMOS hysteresis input < UART (Asynchronous serial interface) >
  - Full-duplex double buffering system, 64-step transmission FIFO memory, 64-step reception FIFO memory
  - Parity or no parity is selectable.
  - Built-in dedicated baud rate generator
  - An external clock can be used as the transfer clock
  - Parity, frame, and overrun error detection functions provided
  - DMA transfer support <CSIO (Synchronous serial interface) >
  - Full-duplex double buffering system, 64-step transmission FIFO memory, 64-step reception FIFO memory
  - SPI supported; master and slave systems supported; 5 to 16, 20, 24, 32-bit data length can be set.
  - Built-in dedicated baud rate generator (Master operation)
  - An external clock can be entered. (Slave operation)
  - Overrun error detection function is provided
  - DMA transfer support
  - Serial chip select SPI function <LIN (Asynchronous Serial Interface for LIN) >
  - Full-duplex double buffering system, 64-step transmission FIFO memory, 64-step reception FIFO memory
  - LIN protocol revision 2.1 supported
  - Master and slave systems supported
  - Framing error and overrun error detection
  - LIN synch break generation and detection; LIN synch delimiter generation
  - Built-in dedicated baud rate generator
  - An external clock can be adjusted by the reload counter
  - DMA transfer support
  - Hard assist function < I<sup>2</sup>C >
  - 2 channels ch.3 , ch.4 Standard mode/fast mode supported.
  - 6 channels ch.5 to ch.8, ch.10, ch.11 Standard mode supported.
  - Full-duplex double buffering system, 64-step transmission FIFO memory, 64-step reception FIFO memory
  - Standard mode (Max. 100 kbps) / fast mode (Max. 400 kbps) supported
  - DMA transfer supported (for transmission only)
- CAN Controller (CAN) : 3 channels
  - Transfer speed : Up to 1 Mbps
  - 128-transmission/reception message buffering : 1 channel (ch.0), 64-transmission/reception message buffering : 2 channels (ch.1 and ch.2)
- PPG: 16-bit × Max. 48 channels
  - LED drive output 4 channels 11 ch to 14 ch
  - Reload timer : 16-bit × Max.8 channels
  - Free-run timer : 16-bit × 3 channels 32-bit × Max 3 channels
- Input capture :
  - 16-bit × 4 channels (linked to the free-run timer)
  - 32-bit × Max 6 channels (linked to the free-run timer)
- Output compare :
  - 16-bit × 6 channels (linked to the free-run timer)
  - 32-bit × Max 6 channels (linked to the free-run timer)
- Waveform generator : 6 channels
- Up/Down counter
  - 8-/16-bit Up/Down counter × 2 channels
- Real-time clock (RTC) (for day, hours, minutes, seconds)
  - Main or sub oscillation frequency can be selected for the operation clock
- Calibration: Real-time clock (RTC) of the subclock drive
  - The main clock to sub clock ratio can be corrected by setting the real-time clock prescaler
- Clock Supervisor
  - Monitoring abnormality (by damaged quartz, etc.) of suboscillation (32 kHz) (dual clock products) of the outside and main oscillation (4 MHz)
  - When abnormality is detected, it switches to the CR clock.
  - Initial value ON/OFF can be selected by the part number.
- Base timer : Max.2 channels
  - 16-bit timer
  - Any of four PWM/PPG/PWC/reload timer functions can be selected and used
  - As for the PWC function and the reload timer function, a pair of 16-bit timers can be used as one 32-bit timer in the cascade mode
- CRC generation
- Watchdog timer
  - Hardware watchdog
  - Software watchdog (possible to set the valid range for counter clearing)
- NMI (non-maskable interrupt)
- Interrupt controller
- Interrupt request batch read
  - The interrupt existence from two or more peripherals can be read by a series of register.
- I/O relocation
  - Peripheral function pins can be reassigned.
- Low-power consumption mode
  - Sleep / Stop / Watch / Sub RUN mode
  - Stop (power shutdown) / Watch (power shutdown) mode

- Power-on reset
- Low-voltage detection reset (independently monitor the external power supply and the internal power supply)
  - The external power supply can select initial value ON/OFF by the part number.
- Device Package : 176/144/120/100/80/64
- CMOS 90 nm Technology
- Power supplies
  - 5 V Power supply
  - The internal 1.2 V is generated from 5 V with the voltage step-down circuit

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## 1. Product Lineup

**Product Lineup Comparison 64 Pins**

|                                                    | CY91F522B                                        | CY91F523B   | CY91F524B   | CY91F525B   | CY91F526B    |
|----------------------------------------------------|--------------------------------------------------|-------------|-------------|-------------|--------------|
| System Clock                                       | On chip PLL Clock multiple method                |             |             |             |              |
| Minimum instruction execution time                 | 12.5 ns (80 MHz)                                 |             |             |             |              |
| Flash Capacity (Program)                           | (256+64) KB                                      | (384+64) KB | (512+64) KB | (768+64) KB | (1024+64) KB |
| Flash Capacity (Data)                              | 64 KB                                            |             |             |             |              |
| RAM Capacity                                       | (48+8) KB                                        | (64+8) KB   | (96+8) KB   | (128+8) KB  |              |
| External BUS I/F<br>(22 address/16 data/4 cs)      | None                                             |             |             |             |              |
| DMA Transfer                                       | 16 ch                                            |             |             |             |              |
| 16-bit Base Timer                                  | None                                             |             |             |             |              |
| Free-run Timer                                     | 16 bit × 3 ch, 32 bit × 1 ch                     |             |             |             |              |
| Input capture                                      | 16 bit × 4 ch, 32 bit × 5 ch                     |             |             |             |              |
| Output Compare                                     | 16 bit × 6 ch, 32 bit × 4 ch                     |             |             |             |              |
| 16-bit Reload Timer                                | 7 ch                                             |             |             |             |              |
| PPG                                                | 16 bit × 21 ch                                   |             |             |             |              |
| Up/down Counter                                    | 2 ch                                             |             |             |             |              |
| Clock Supervisor                                   | Yes                                              |             |             |             |              |
| External Interrupt                                 | 8 ch × 2 units                                   |             |             |             |              |
| A/D converter                                      | 12 bit × 13 ch (1 unit), 12 bit × 13 ch (1 unit) |             |             |             |              |
| D/A converter (8 bit)                              | 1 ch                                             |             |             |             |              |
| Multi-Function Serial Interface                    | 8 ch <sup>*1</sup>                               |             |             |             |              |
| CAN                                                | 64 msg × 2 ch/128 msg × 1 ch                     |             |             |             |              |
| Hardware Watchdog Timer                            | Yes                                              |             |             |             |              |
| CRC Formation                                      | Yes                                              |             |             |             |              |
| Low-voltage detection reset                        | Yes                                              |             |             |             |              |
| Flash Security                                     | Yes                                              |             |             |             |              |
| ECC Flash/WorkFlash                                | Yes                                              |             |             |             |              |
| ECC RAM                                            | Yes                                              |             |             |             |              |
| Memory Protection Function (MPU)                   | Yes                                              |             |             |             |              |
| Floating point arithmetic (FPU)                    | Yes                                              |             |             |             |              |
| Real Time Clock (RTC)                              | Yes                                              |             |             |             |              |
| General-purpose port (#GPIOs)                      | 44 ports                                         |             |             |             |              |
| SSCG                                               | Yes                                              |             |             |             |              |
| Sub clock                                          | Yes                                              |             |             |             |              |
| CR oscillator                                      | Yes                                              |             |             |             |              |
| OCD (On Chip Debug)                                | Yes                                              |             |             |             |              |
| TPU (Timing Protection Unit)                       | Yes                                              |             |             |             |              |
| Key code register                                  | Yes                                              |             |             |             |              |
| Waveform generator                                 | 6 ch                                             |             |             |             |              |
| NMI request function                               | Yes                                              |             |             |             |              |
| Operation guaranteed temperature (T <sub>A</sub> ) | -40 °C to +125 °C                                |             |             |             |              |
| Power supply                                       | 2.7 V to 5.5 V <sup>*2</sup>                     |             |             |             |              |
| Package                                            | LQD064                                           |             |             |             |              |

\*1: Only channel 5, channel 6 and channel 11 support the I<sup>2</sup>C (standard mode).

\*2: The initial detection voltage of the external low voltage detection is 2.8 V ± 8 % (2.576 V to 3.024 V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

**Product Lineup Comparison 80 Pins**

|                                                       | CY91F522D                                        | CY91F523D   | CY91F524D   | CY91F525D   | CY91F526D    |
|-------------------------------------------------------|--------------------------------------------------|-------------|-------------|-------------|--------------|
| System Clock                                          | On chip PLL Clock multiple method                |             |             |             |              |
| Minimum instruction execution time                    | 12.5 ns (80 MHz)                                 |             |             |             |              |
| Flash Capacity (Program)                              | (256+64) KB                                      | (384+64) KB | (512+64) KB | (768+64) KB | (1024+64) KB |
| Flash Capacity (Data)                                 | 64 KB                                            |             |             |             |              |
| RAM Capacity                                          | (48+8) KB                                        |             | (64+8) KB   | (96+8) KB   | (128+8) KB   |
| External BUS I/F<br>(22 address/16 data/4 cs)         | None                                             |             |             |             |              |
| DMA Transfer                                          | 16 ch                                            |             |             |             |              |
| 16-bit Base Timer                                     | 1 ch                                             |             |             |             |              |
| Free-run Timer                                        | 16 bit × 3 ch, 32 bit × 2 ch                     |             |             |             |              |
| Input capture                                         | 16 bit × 4 ch, 32 bit × 5 ch                     |             |             |             |              |
| Output Compare                                        | 16 bit × 6 ch, 32 bit × 4 ch                     |             |             |             |              |
| 16-bit Reload Timer                                   | 7 ch                                             |             |             |             |              |
| PPG                                                   | 16 bit × 27 ch                                   |             |             |             |              |
| Up/down Counter                                       | 2 ch                                             |             |             |             |              |
| Clock Supervisor                                      | Yes                                              |             |             |             |              |
| External Interrupt                                    | 8 ch × 2 units                                   |             |             |             |              |
| A/D converter                                         | 12 bit × 16 ch (1 unit), 12 bit × 16 ch (1 unit) |             |             |             |              |
| D/A converter (8 bit)                                 | 1 ch                                             |             |             |             |              |
| Multi-Function Serial Interface                       | 9 ch <sup>*1</sup>                               |             |             |             |              |
| CAN                                                   | 64 msg × 2 ch/128 msg × 1 ch                     |             |             |             |              |
| Hardware Watchdog Timer                               | Yes                                              |             |             |             |              |
| CRC Formation                                         | Yes                                              |             |             |             |              |
| Low-voltage detection reset                           | Yes                                              |             |             |             |              |
| Flash Security                                        | Yes                                              |             |             |             |              |
| ECC Flash/WorkFlash                                   | Yes                                              |             |             |             |              |
| ECC RAM                                               | Yes                                              |             |             |             |              |
| Memory Protection Function (MPU)                      | Yes                                              |             |             |             |              |
| Floating point arithmetic (FPU)                       | Yes                                              |             |             |             |              |
| Real Time Clock (RTC)                                 | Yes                                              |             |             |             |              |
| General-purpose port (#GPIOs)                         | 56 ports                                         |             |             |             |              |
| SSCG                                                  | Yes                                              |             |             |             |              |
| Sub clock                                             | Yes                                              |             |             |             |              |
| CR oscillator                                         | Yes                                              |             |             |             |              |
| NMI request function                                  | Yes                                              |             |             |             |              |
| OCD (On Chip Debug)                                   | Yes                                              |             |             |             |              |
| TPU (Timing Protection Unit)                          | Yes                                              |             |             |             |              |
| Key code register                                     | Yes                                              |             |             |             |              |
| Waveform generator                                    | 6 ch                                             |             |             |             |              |
| Operation guaranteed temperature<br>(T <sub>A</sub> ) | -40 °C to +125 °C                                |             |             |             |              |
| Power supply                                          | 2.7 V to 5.5 V <sup>*2</sup>                     |             |             |             |              |
| Package                                               | LQH080                                           |             |             |             |              |

\*1: Only channel 5, channel 6 and channel 11 support the I<sup>2</sup>C (standard mode).

\*2: The initial detection voltage of the external low voltage detection is 2.8 V ± 8 % (2.576 V to 3.024 V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

**Product Lineup Comparison 100 Pins**

|                                                       | CY91F522F                                        | CY91F523F   | CY91F524F   | CY91F525F   | CY91F526F    |
|-------------------------------------------------------|--------------------------------------------------|-------------|-------------|-------------|--------------|
| System Clock                                          | On chip PLL Clock multiple method                |             |             |             |              |
| Minimum instruction execution time                    | 12.5 ns (80 MHz)                                 |             |             |             |              |
| Flash Capacity (Program)                              | (256+64) KB                                      | (384+64) KB | (512+64) KB | (768+64) KB | (1024+64) KB |
| Flash Capacity (Data)                                 | 64 KB                                            |             |             |             |              |
| RAM Capacity                                          | (48+8) KB                                        | (64+8) KB   | (96+8) KB   | (128+8) KB  |              |
| External BUS I/F<br>(22 address/16 data/4 cs)         | None                                             |             |             |             |              |
| DMA Transfer                                          | 16 ch                                            |             |             |             |              |
| 16-bit Base Timer                                     | 1 ch                                             |             |             |             |              |
| Free-run Timer                                        | 16 bit × 3 ch, 32 bit × 3 ch                     |             |             |             |              |
| Input capture                                         | 16 bit × 4 ch, 32 bit × 6 ch                     |             |             |             |              |
| Output Compare                                        | 16 bit × 6 ch, 32 bit × 6 ch                     |             |             |             |              |
| 16-bit Reload Timer                                   | 8 ch                                             |             |             |             |              |
| PPG                                                   | 16 bit × 34 ch                                   |             |             |             |              |
| Up/down Counter                                       | 2 ch                                             |             |             |             |              |
| Clock Supervisor                                      | Yes                                              |             |             |             |              |
| External Interrupt                                    | 8 ch × 2 units                                   |             |             |             |              |
| A/D converter                                         | 12 bit × 21 ch (1 unit), 12 bit × 16 ch (1 unit) |             |             |             |              |
| D/A converter (8 bit)                                 | 2 ch                                             |             |             |             |              |
| Multi-Function Serial Interface                       | 12 ch <sup>*1</sup>                              |             |             |             |              |
| CAN                                                   | 64 msg × 2 ch/128 msg × 1 ch                     |             |             |             |              |
| Hardware Watchdog Timer                               | Yes                                              |             |             |             |              |
| CRC Formation                                         | Yes                                              |             |             |             |              |
| Low-voltage detection reset                           | Yes                                              |             |             |             |              |
| Flash Security                                        | Yes                                              |             |             |             |              |
| ECC Flash/WorkFlash                                   | Yes                                              |             |             |             |              |
| ECC RAM                                               | Yes                                              |             |             |             |              |
| Memory Protection Function (MPU)                      | Yes                                              |             |             |             |              |
| Floating point arithmetic (FPU)                       | Yes                                              |             |             |             |              |
| Real Time Clock (RTC)                                 | Yes                                              |             |             |             |              |
| General-purpose port (#GPIOs)                         | 76 ports                                         |             |             |             |              |
| SSCG                                                  | Yes                                              |             |             |             |              |
| Sub clock                                             | Yes                                              |             |             |             |              |
| CR oscillator                                         | Yes                                              |             |             |             |              |
| NMI request function                                  | Yes                                              |             |             |             |              |
| OCD (On Chip Debug)                                   | Yes                                              |             |             |             |              |
| TPU (Timing Protection Unit)                          | Yes                                              |             |             |             |              |
| Key code register                                     | Yes                                              |             |             |             |              |
| Waveform generator                                    | 6 ch                                             |             |             |             |              |
| Operation guaranteed temperature<br>(T <sub>A</sub> ) | -40 °C to +125 °C                                |             |             |             |              |
| Power supply                                          | 2.7 V to 5.5 V <sup>*2</sup>                     |             |             |             |              |
| Package                                               | LQI100                                           |             |             |             |              |

\*1: Only channel 5, channel 6, channel 7, channel 8 and channel 11 support the I2C (standard mode).

\*2: The initial detection voltage of the external low voltage detection is 2.8 V ± 8 % (2.576 V to 3.024 V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

**Product Lineup Comparison 120 Pins**

|                                                    | CY91F522J                                        | CY91F523J   | CY91F524J   | CY91F525J   | CY91F526J    |
|----------------------------------------------------|--------------------------------------------------|-------------|-------------|-------------|--------------|
| System Clock                                       | On chip PLL Clock multiple method                |             |             |             |              |
| Minimum instruction execution time                 | 12.5 ns (80 MHz)                                 |             |             |             |              |
| Flash Capacity (Program)                           | (256+64) KB                                      | (384+64) KB | (512+64) KB | (768+64) KB | (1024+64) KB |
| Flash Capacity (Data)                              | 64 KB                                            |             |             |             |              |
| RAM Capacity                                       | (48+8) KB                                        |             | (64+8) KB   | (96+8) KB   | (128+8) KB   |
| External BUS I/F<br>(22 address/16 data/4 cs)      | None                                             |             |             |             |              |
| DMA Transfer                                       | 16 ch                                            |             |             |             |              |
| 16-bit Base Timer                                  | 2 ch                                             |             |             |             |              |
| Free-run Timer                                     | 16 bit × 3 ch, 32 bit × 3 ch                     |             |             |             |              |
| Input capture                                      | 16 bit × 4 ch, 32 bit × 6 ch                     |             |             |             |              |
| Output Compare                                     | 16 bit × 6 ch, 32 bit × 6 ch                     |             |             |             |              |
| 16-bit Reload Timer                                | 8 ch                                             |             |             |             |              |
| PPG                                                | 16 bit × 38 ch                                   |             |             |             |              |
| Up/down Counter                                    | 2 ch                                             |             |             |             |              |
| Clock Supervisor                                   | Yes                                              |             |             |             |              |
| External Interrupt                                 | 8 ch × 2 units                                   |             |             |             |              |
| A/D converter                                      | 12 bit × 26 ch (1 unit), 12 bit × 16 ch (1 unit) |             |             |             |              |
| D/A converter (8 bit)                              | 2 ch                                             |             |             |             |              |
| Multi-Function Serial Interface                    | 12 ch <sup>*1</sup>                              |             |             |             |              |
| CAN                                                | 64 msg × 2 ch/128 msg × 1 ch                     |             |             |             |              |
| Hardware Watchdog Timer                            | Yes                                              |             |             |             |              |
| CRC Formation                                      | Yes                                              |             |             |             |              |
| Low-voltage detection reset                        | Yes                                              |             |             |             |              |
| Flash Security                                     | Yes                                              |             |             |             |              |
| ECC Flash/WorkFlash                                | Yes                                              |             |             |             |              |
| ECC RAM                                            | Yes                                              |             |             |             |              |
| Memory Protection Function (MPU)                   | Yes                                              |             |             |             |              |
| Floating point arithmetic (FPU)                    | Yes                                              |             |             |             |              |
| Real Time Clock (RTC)                              | Yes                                              |             |             |             |              |
| General-purpose port (#GPIOs)                      | 96 ports                                         |             |             |             |              |
| SSCG                                               | Yes                                              |             |             |             |              |
| Sub clock                                          | Yes                                              |             |             |             |              |
| CR oscillator                                      | Yes                                              |             |             |             |              |
| NMI request function                               | Yes                                              |             |             |             |              |
| OCD (On Chip Debug)                                | Yes                                              |             |             |             |              |
| TPU (Timing Protection Unit)                       | Yes                                              |             |             |             |              |
| Key code register                                  | Yes                                              |             |             |             |              |
| Waveform generator                                 | 6 ch                                             |             |             |             |              |
| Operation guaranteed temperature (T <sub>A</sub> ) | -40 °C to +125 °C                                |             |             |             |              |
| Power supply                                       | 2.7 V to 5.5 V <sup>*2</sup>                     |             |             |             |              |
| Package                                            | LQM120                                           |             |             |             |              |

\*1: Only channel 3 and channel 4 support the I<sup>2</sup>C (fast mode/standard mode).

Only channel 5, channel 6, channel 7, channel 8 and channel 11 support the I<sup>2</sup>C (standard mode).

\*2: The initial detection voltage of the external low voltage detection is 2.8 V ± 8 % (2.576 V to 3.024 V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

**Product Lineup Comparison 144 Pins**

|                                                    | CY91F522K                                        | CY91F523K   | CY91F524K   | CY91F525K   | CY91F526K    |
|----------------------------------------------------|--------------------------------------------------|-------------|-------------|-------------|--------------|
| System Clock                                       | On chip PLL Clock multiple method                |             |             |             |              |
| Minimum instruction execution time                 | 12.5 ns (80 MHz)                                 |             |             |             |              |
| Flash Capacity (Program)                           | (256+64) KB                                      | (384+64) KB | (512+64) KB | (768+64) KB | (1024+64) KB |
| Flash Capacity (Data)                              | 64 KB                                            |             |             |             |              |
| RAM Capacity                                       | (48+8) KB                                        |             | (64+8) KB   | (96+8) KB   | (128+8) KB   |
| External BUS I/F<br>(22 address/16 data/4 cs)      | Yes                                              |             |             |             |              |
| DMA Transfer                                       | 16 ch                                            |             |             |             |              |
| 16-bit Base Timer                                  | 2 ch                                             |             |             |             |              |
| Free-run Timer                                     | 16 bit × 3 ch, 32 bit × 3 ch                     |             |             |             |              |
| Input capture                                      | 16 bit × 4 ch, 32 bit × 6 ch                     |             |             |             |              |
| Output Compare                                     | 16 bit × 6 ch, 32 bit × 6 ch                     |             |             |             |              |
| 16-bit Reload Timer                                | 8 ch                                             |             |             |             |              |
| PPG                                                | 16 bit × 44 ch                                   |             |             |             |              |
| Up/down Counter                                    | 2 ch                                             |             |             |             |              |
| Clock Supervisor                                   | Yes                                              |             |             |             |              |
| External Interrupt                                 | 8 ch × 2 units                                   |             |             |             |              |
| A/D converter                                      | 12 bit × 32 ch (1 unit), 12 bit × 16 ch (1 unit) |             |             |             |              |
| D/A converter (8 bit)                              | 2 ch                                             |             |             |             |              |
| Multi-Function Serial Interface                    | 12 ch <sup>*1</sup>                              |             |             |             |              |
| CAN                                                | 64 msg × 2 ch/128 msg × 1 ch                     |             |             |             |              |
| Hardware Watchdog Timer                            | Yes                                              |             |             |             |              |
| CRC Formation                                      | Yes                                              |             |             |             |              |
| Low-voltage detection reset                        | Yes                                              |             |             |             |              |
| Flash Security                                     | Yes                                              |             |             |             |              |
| ECC Flash/WorkFlash                                | Yes                                              |             |             |             |              |
| ECC RAM                                            | Yes                                              |             |             |             |              |
| Memory Protection Function (MPU)                   | Yes                                              |             |             |             |              |
| Floating point arithmetic (FPU)                    | Yes                                              |             |             |             |              |
| Real Time Clock (RTC)                              | Yes                                              |             |             |             |              |
| General-purpose port (#GPIOs)                      | 120 ports                                        |             |             |             |              |
| SSCG                                               | Yes                                              |             |             |             |              |
| Sub clock                                          | Yes                                              |             |             |             |              |
| CR oscillator                                      | Yes                                              |             |             |             |              |
| NMI request function                               | Yes                                              |             |             |             |              |
| OCD (On Chip Debug)                                | Yes                                              |             |             |             |              |
| TPU (Timing Protection Unit)                       | Yes                                              |             |             |             |              |
| Key code register                                  | Yes                                              |             |             |             |              |
| Waveform generator                                 | 6 ch                                             |             |             |             |              |
| Operation guaranteed temperature (T <sub>A</sub> ) | -40 °C to +125 °C                                |             |             |             |              |
| Power supply                                       | 2.7 V to 5.5 V <sup>*2</sup>                     |             |             |             |              |
| Package                                            | LQS144, LQN144                                   |             |             |             |              |

\*1: Only channel 3 and channel 4 support the I<sup>2</sup>C (fast mode/standard mode).

Only channel 5, channel 6, channel 7, channel 8, channel 10 and channel 11 support the I<sup>2</sup>C (standard mode).

\*2: The initial detection voltage of the external low voltage detection is 2.8 V ± 8 % (2.576 V to 3.024 V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

**Product Lineup Comparison 176 Pins**

|                                                    | CY91F522L                                        | CY91F523L   | CY91F524L   | CY91F525L   | CY91F526L    |
|----------------------------------------------------|--------------------------------------------------|-------------|-------------|-------------|--------------|
| System Clock                                       | On chip PLL Clock multiple method                |             |             |             |              |
| Minimum instruction execution time                 | 12.5 ns (80 MHz)                                 |             |             |             |              |
| Flash Capacity (Program)                           | (256+64) KB                                      | (384+64) KB | (512+64) KB | (768+64) KB | (1024+64) KB |
| Flash Capacity (Data)                              | 64 KB                                            |             |             |             |              |
| RAM Capacity                                       | (48+8) KB                                        |             | (64+8) KB   | (96+8) KB   | (128+8) KB   |
| External BUS I/F<br>(22 address/16 data/4 cs)      | Yes                                              |             |             |             |              |
| DMA Transfer                                       | 16 ch                                            |             |             |             |              |
| 16-bit Base Timer                                  | 2 ch                                             |             |             |             |              |
| Free-run Timer                                     | 16 bit × 3 ch, 32 bit × 3 ch                     |             |             |             |              |
| Input capture                                      | 16 bit × 4 ch, 32 bit × 6 ch                     |             |             |             |              |
| Output Compare                                     | 16 bit × 6 ch, 32 bit × 6 ch                     |             |             |             |              |
| 16-bit Reload Timer                                | 8 ch                                             |             |             |             |              |
| PPG                                                | 16 bit × 48 ch                                   |             |             |             |              |
| Up/down Counter                                    | 2 ch                                             |             |             |             |              |
| Clock Supervisor                                   | Yes                                              |             |             |             |              |
| External Interrupt                                 | 8 ch × 2 units                                   |             |             |             |              |
| A/D converter                                      | 12 bit × 32 ch (1 unit), 12 bit × 16 ch (1 unit) |             |             |             |              |
| D/A converter (8 bit)                              | 2 ch                                             |             |             |             |              |
| Multi-Function Serial Interface                    | 12 ch <sup>*1</sup>                              |             |             |             |              |
| CAN                                                | 64 msg × 2 ch/128 msg × 1 ch                     |             |             |             |              |
| Hardware Watchdog Timer                            | Yes                                              |             |             |             |              |
| CRC Formation                                      | Yes                                              |             |             |             |              |
| Low-voltage detection reset                        | Yes                                              |             |             |             |              |
| Flash Security                                     | Yes                                              |             |             |             |              |
| ECC Flash/WorkFlash                                | Yes                                              |             |             |             |              |
| ECC RAM                                            | Yes                                              |             |             |             |              |
| Memory Protection Function (MPU)                   | Yes                                              |             |             |             |              |
| Floating point arithmetic (FPU)                    | Yes                                              |             |             |             |              |
| Real Time Clock (RTC)                              | Yes                                              |             |             |             |              |
| General-purpose port (#GPIOs)                      | 152 ports                                        |             |             |             |              |
| SSCG                                               | Yes                                              |             |             |             |              |
| Sub clock                                          | Yes                                              |             |             |             |              |
| CR oscillator                                      | Yes                                              |             |             |             |              |
| NMI request function                               | Yes                                              |             |             |             |              |
| OCD (On Chip Debug)                                | Yes                                              |             |             |             |              |
| TPU (Timing Protection Unit)                       | Yes                                              |             |             |             |              |
| Key code register                                  | Yes                                              |             |             |             |              |
| Waveform generator                                 | 6 ch                                             |             |             |             |              |
| Operation guaranteed temperature (T <sub>A</sub> ) | -40 °C to +125 °C                                |             |             |             |              |
| Power supply                                       | 2.7 V to 5.5 V <sup>*2</sup>                     |             |             |             |              |
| Package                                            | LQP176                                           |             |             |             |              |

\*1: Only channel 3 and channel 4 support the I<sup>2</sup>C (fast mode/standard mode).

Only channel 5, channel 6, channel 7, channel 8, channel 10 and channel 11 support the I<sup>2</sup>C (standard mode).

\*2: The initial detection voltage of the external low voltage detection is 2.8 V ± 8 % (2.576 V to 3.024 V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

**Table for Clock Supervisor and External Low Voltage Detection Reset Initial Value ON/OFF**

| Clock  | CSV Initial Value | LVD Initial Value | Function |
|--------|-------------------|-------------------|----------|
| single | ON                | ON                | S        |
|        |                   | OFF               | U        |
|        | OFF               | ON                | H        |
|        |                   | OFF               | K        |
| Dual   | ON                | ON                | W        |
|        |                   | OFF               | Y        |
|        | OFF               | ON                | J        |
|        |                   | OFF               | L        |

CY91F52X□△○

↳ Revision: B, C, D, E  
 ↳ Function: See the table for clock supervisor and external low voltage detection reset initial value ON/OFF.  
 ↳ PKG Type: B 64 pin  
                   D 80 pin  
                   F 100 pin  
                   J 120 pin  
                   K 144 pin  
                   L 176 pin  
 ↳ Memory Size: 2 256 KB  
                   3 384 KB  
                   4 512 KB  
                   5 768 KB  
                   6 1 MB

## 2. Pin Assignment

### CY91F52xB

CY91F522B, CY91F523B, CY91F524B, CY91F525B, CY91F526B



\* In a single clock product, pin 56 and pin 57 are the general-purpose ports.

**CY91F52xD**

CY91F522D, CY91F523D, CY91F524D, CY91F525D, CY91F526D



\* In a single clock product, pin 70 and pin 71 are the general-purpose ports.

**CY91F52xF**

CY91F522F, CY91F523F, CY91F524F, CY91F525F, CY91F526F



\* In a single clock product, pin 86 and pin 87 are the general-purpose ports.

**CY91F52xJ**

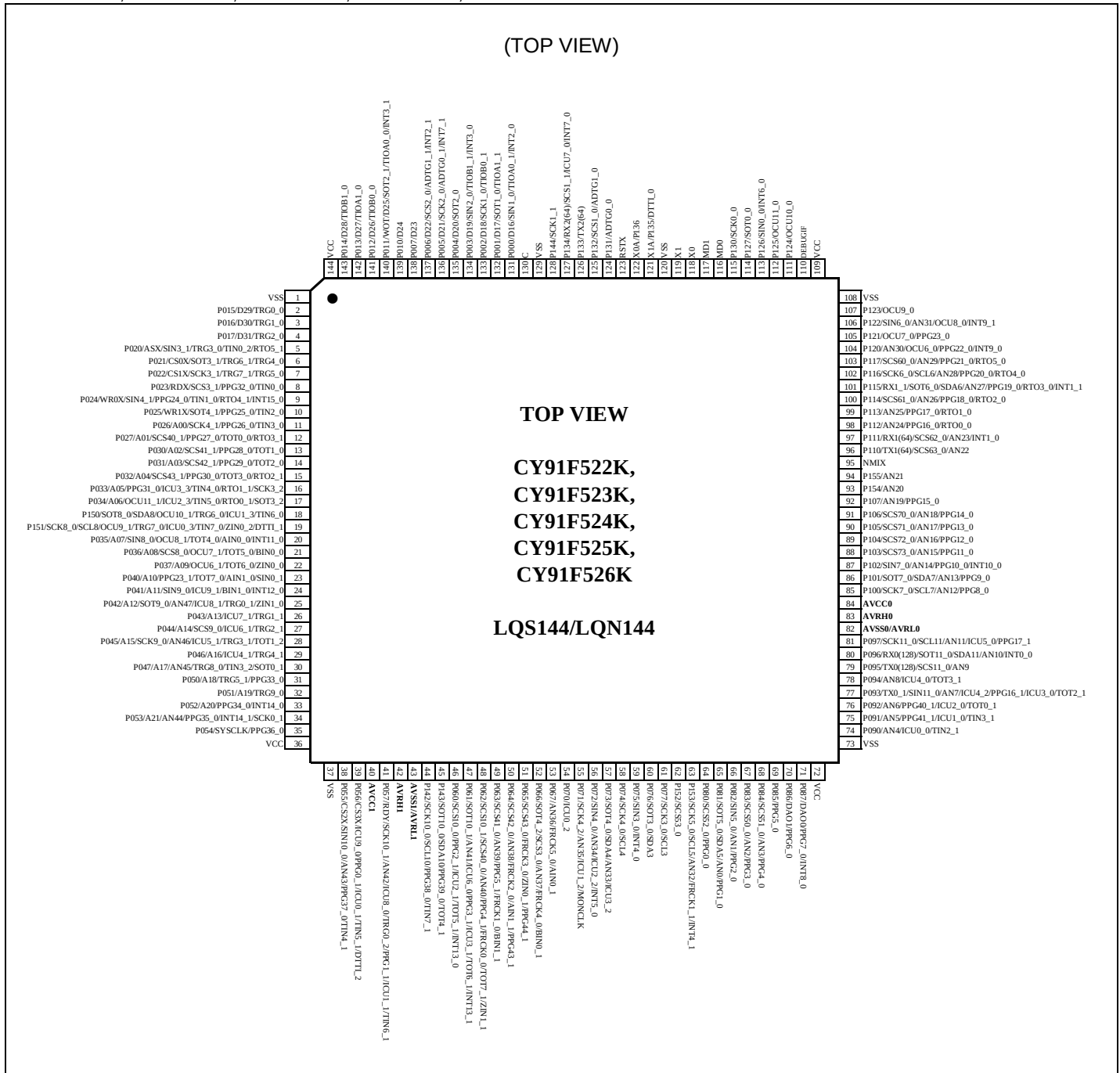
CY91F522J, CY91F523J, CY91F524J, CY91F525J, CY91F526J



\* In a single clock product, pin 102 and pin 103 are the general-purpose ports.

**CY91F52xK**

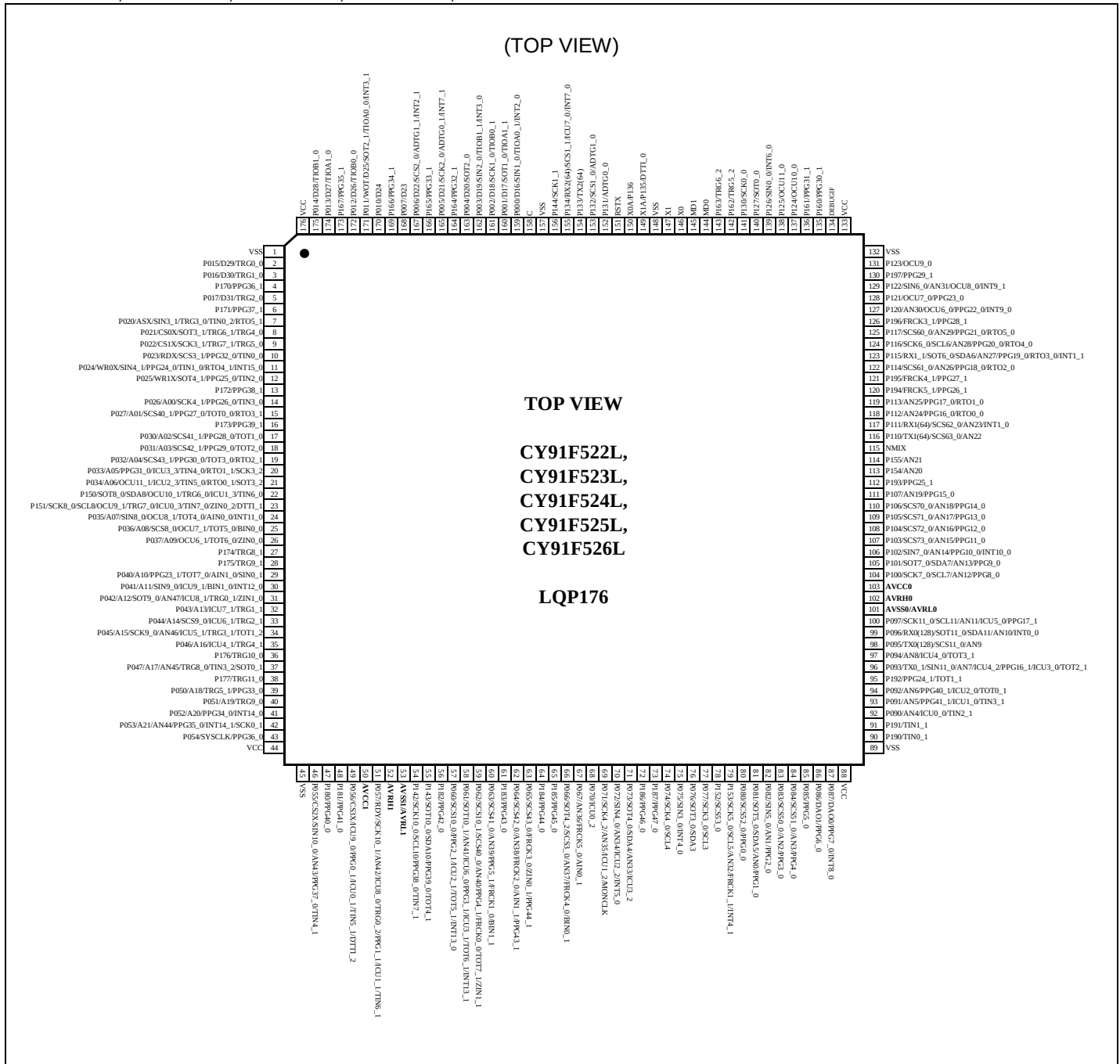
CY91F522K, CY91F523K, CY91F524K, CY91F525K, CY91F526K



\* In a single clock product, pin 121 and pin 122 are the general-purpose ports.

## CY91F52xL

CY91F522L, CY91F523L, CY91F524L, CY91F525L, CY91F526L



\* In a single clock product, pin 149 and pin 150 are the general-purpose ports.

### 3. Pin Description

| Pin No. |     |     |     |     |     | Pin Name          | Polarity | I/O Circuit types*8 | Function*9                                        |
|---------|-----|-----|-----|-----|-----|-------------------|----------|---------------------|---------------------------------------------------|
| 64      | 80  | 100 | 120 | 144 | 176 |                   |          |                     |                                                   |
| -       | -   | -   | -   | 2   | 2   | P015              | -        | A                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | D29               | -        |                     | External bus data bit29 I/O (0)                   |
| -       | -   | -   | -   | -   | -   | TRG0_0            | -        |                     | PPG trigger 0 input (0)                           |
| -       | -   | -   | -   | 3   | 3   | P016              | -        | A                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | D30               | -        |                     | External bus data bit30 I/O (0)                   |
| -       | -   | -   | -   | -   | -   | TRG1_0            | -        |                     | PPG trigger 1 input (0)                           |
| -       | -   | -   | -   | -   | 4   | P170              | -        | A                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | PPG36_1           | -        |                     | PPG ch.36 output (1)                              |
| -       | -   | -   | -   | 4   | 5   | P017              | -        | A                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | D31               | -        |                     | External bus data bit31 I/O (0)                   |
| -       | -   | -   | -   | -   | -   | TRG2_0            | -        |                     | PPG trigger 2 input (0)                           |
| -       | -   | -   | -   | -   | 6   | P171              | -        | A                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | PPG37_1           | -        |                     | PPG ch.37 output (1)                              |
| 2*1     | 2*1 | 2*1 | 2*1 | 5   | 7   | P020              | -        | F                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | ASX*2, *3, *4, *5 | -        |                     | External bus/Address strobe output                |
| -       | -   | -   | -   | -   | -   | SIN3_1            | -        |                     | Multi-function serial ch.3 serial data input (1)  |
| -       | -   | -   | -   | -   | -   | TRG3_0            | -        |                     | PPG trigger 3 input (0)                           |
| -       | -   | -   | -   | -   | -   | TIN0_2            | -        |                     | Reload timer ch.0 event input (2)                 |
| -       | -   | -   | -   | -   | -   | RTO5_1            | -        |                     | Waveform generator ch.5 output pin (1)            |
| -       | -   | -   | 3*1 | 6   | 8   | P021              | -        | A                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | CS0X*5            | -        |                     | External bus chip select 0 output                 |
| -       | -   | -   | -   | -   | -   | SOT3_1            | -        |                     | Multi-function serial ch.3 serial data output (1) |
| -       | -   | -   | -   | -   | -   | TRG6_1            | -        |                     | PPG trigger 6 input (1)                           |
| -       | -   | -   | -   | -   | -   | TRG4_0            | -        |                     | PPG trigger 4 input (0)                           |
| -       | -   | -   | 4*1 | 7   | 9   | P022              | -        | F                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | CS1X*5            | -        |                     | External bus chip select 1 output                 |
| -       | -   | -   | -   | -   | -   | SCK3_1            | -        |                     | Multi-function serial ch.3 clock I/O (1)          |
| -       | -   | -   | -   | -   | -   | TRG7_1            | -        |                     | PPG trigger 7 input (1)                           |
| -       | -   | -   | -   | -   | -   | TRG5_0            | -        |                     | PPG trigger 5 input (0)                           |
| -       | -   | -   | 5*1 | 8   | 10  | P023              | -        | A                   | General-purpose I/O port                          |
| -       | -   | -   | -   | -   | -   | RDX*5             | -        |                     | External bus/Read strobe output                   |
| -       | -   | -   | -   | -   | -   | SCS3_1            | -        |                     | Serial chip select 3 output (1)                   |
| -       | -   | -   | -   | -   | -   | PPG32_0           | -        |                     | PPG ch.32 output (0)                              |
| -       | -   | -   | -   | -   | -   | TIN0_0            | -        |                     | Reload timer ch.0 event input (0)                 |

| Pin No.         |                 |                 |                  |     |     | Pin Name                       | Polarity | I/O Circuit types*8 | Function*9                                        |
|-----------------|-----------------|-----------------|------------------|-----|-----|--------------------------------|----------|---------------------|---------------------------------------------------|
| 64              | 80              | 100             | 120              | 144 | 176 |                                |          |                     |                                                   |
| 3 <sup>*1</sup> | 3 <sup>*1</sup> | 3 <sup>*1</sup> | 6 <sup>*1</sup>  | 9   | 11  | P024                           | -        | F                   | General-purpose I/O port                          |
|                 |                 |                 |                  |     |     | WR0X <sup>*2, *3, *4, *5</sup> | -        |                     | External bus/Write strobe 0 output                |
|                 |                 |                 |                  |     |     | SIN4_1                         | -        |                     | Multi-function serial ch.4 serial data input (1)  |
|                 |                 |                 |                  |     |     | PPG24_0                        | -        |                     | PPG ch.24 output (0)                              |
|                 |                 |                 |                  |     |     | TIN1_0                         | -        |                     | Reload timer ch.1 event input (0)                 |
|                 |                 |                 |                  |     |     | RTO4_1                         | -        |                     | Waveform generator ch.4 output pin (1)            |
|                 |                 |                 |                  |     |     | INT15_0                        | -        |                     | INT15 External interrupt input (0)                |
| -               | -               | 4 <sup>*1</sup> | 7 <sup>*1</sup>  | 10  | 12  | P025                           | -        | A                   | General-purpose I/O port                          |
|                 |                 |                 |                  |     |     | WR1X <sup>*4, *5</sup>         | -        |                     | External bus/Write strobe 1 output                |
|                 |                 |                 |                  |     |     | SOT4_1                         | -        |                     | Multi-function serial ch.4 serial data output (1) |
|                 |                 |                 |                  |     |     | PPG25_0                        | -        |                     | PPG ch.25 output (0)                              |
|                 |                 |                 |                  |     |     | TIN2_0                         | -        |                     | Reload timer ch.2 event input (0)                 |
| -               | -               | -               | -                | -   | 13  | P172                           | -        | A                   | General-purpose I/O port                          |
|                 |                 |                 |                  |     |     | PPG38_1                        | -        |                     | PPG ch.38 output (1)                              |
| -               | 4 <sup>*1</sup> | 5 <sup>*1</sup> | 8 <sup>*1</sup>  | 11  | 14  | P026                           | -        | F                   | General-purpose I/O port                          |
|                 |                 |                 |                  |     |     | A00 <sup>*3, *4, *5</sup>      | -        |                     | External bus/Address bit0 output (0)              |
|                 |                 |                 |                  |     |     | SCK4_1                         | -        |                     | Multi-function serial ch.4 clock I/O (1)          |
|                 |                 |                 |                  |     |     | PPG26_0                        | -        |                     | PPG ch.26 output (0)                              |
|                 |                 |                 |                  |     |     | TIN3_0                         | -        |                     | Reload timer ch.3 event input (0)                 |
| 4 <sup>*1</sup> | 5 <sup>*1</sup> | 6 <sup>*1</sup> | 9 <sup>*1</sup>  | 12  | 15  | P027                           | -        | A                   | General-purpose I/O port                          |
|                 |                 |                 |                  |     |     | A01 <sup>*2, *3, *4, *5</sup>  | -        |                     | External bus/Address bit1 output (0)              |
|                 |                 |                 |                  |     |     | SCS40_1                        | -        |                     | Serial chip select 40 I/O (1)                     |
|                 |                 |                 |                  |     |     | PPG27_0                        | -        |                     | PPG ch.27 output (0)                              |
|                 |                 |                 |                  |     |     | TOT0_0                         | -        |                     | Reload timer ch.0 output (0)                      |
|                 |                 |                 |                  |     |     | RTO3_1                         | -        |                     | Waveform generator ch.3 output pin (1)            |
| -               | -               | -               | -                | -   | 16  | P173                           | -        | A                   | General-purpose I/O port                          |
|                 |                 |                 |                  |     |     | PPG39_1                        | -        |                     | PPG ch.39 output (1)                              |
| -               | -               | 7 <sup>*1</sup> | 10 <sup>*1</sup> | 13  | 17  | P030                           | -        | A                   | General-purpose I/O port                          |
|                 |                 |                 |                  |     |     | A02 <sup>*4, *5</sup>          | -        |                     | External bus/Address bit2 output (0)              |
|                 |                 |                 |                  |     |     | SCS41_1                        | -        |                     | Serial chip select 41 output (1)                  |
|                 |                 |                 |                  |     |     | PPG28_0                        | -        |                     | PPG ch.28 output (0)                              |
|                 |                 |                 |                  |     |     | TOT1_0                         | -        |                     | Reload timer ch.1 output (0)                      |
| -               | 6 <sup>*1</sup> | 8 <sup>*1</sup> | 11 <sup>*1</sup> | 14  | 18  | P031                           | -        | A                   | General-purpose I/O port                          |
|                 |                 |                 |                  |     |     | A03 <sup>*3, *4, *5</sup>      | -        |                     | External bus/Address bit3 output (0)              |
|                 |                 |                 |                  |     |     | SCS42_1                        | -        |                     | Serial chip select 42 output (1)                  |
|                 |                 |                 |                  |     |     | PPG29_0                        | -        |                     | PPG ch.29 output (0)                              |
|                 |                 |                 |                  |     |     | TOT2_0 <sup>*3</sup>           | -        |                     | Reload timer ch.2 output (0)                      |

| Pin No. |      |      |      |     |     | Pin Name              | Polarity | I/O Circuit types*8 | Function*9                                                                              |
|---------|------|------|------|-----|-----|-----------------------|----------|---------------------|-----------------------------------------------------------------------------------------|
| 64      | 80   | 100  | 120  | 144 | 176 |                       |          |                     |                                                                                         |
| 5*1     | 7*1  | 9*1  | 12*1 | 15  | 19  | P032                  | -        | A                   | General-purpose I/O port                                                                |
|         |      |      |      |     |     | A04*2, *3, *4, *5     | -        |                     | External bus/Address bit4 output (0)                                                    |
|         |      |      |      |     |     | SCS43_1               | -        |                     | Serial chip select 43 output (1)                                                        |
|         |      |      |      |     |     | PPG30_0               | -        |                     | PPG ch.30 output (0)                                                                    |
|         |      |      |      |     |     | TOT3_0                | -        |                     | Reload timer ch.3 output (0)                                                            |
|         |      |      |      |     |     | RTO2_1                | -        |                     | Waveform generator ch.2 output pin (1)                                                  |
|         |      |      |      |     |     |                       |          |                     |                                                                                         |
| 6*1     | 8*1  | 10*1 | 13*1 | 16  | 20  | P033                  | -        | A                   | General-purpose I/O port                                                                |
|         |      |      |      |     |     | A05*2, *3, *4, *5     | -        |                     | External bus/Address bit5 output (0)                                                    |
|         |      |      |      |     |     | PPG31_0               | -        |                     | PPG ch.31 output (0)                                                                    |
|         |      |      |      |     |     | ICU3_3                | -        |                     | Input capture ch.3 input (3)                                                            |
|         |      |      |      |     |     | TIN4_0                | -        |                     | Reload timer ch.4 event input (0)                                                       |
|         |      |      |      |     |     | RTO1_1                | -        |                     | Waveform generator ch.1 output pin (1)                                                  |
|         |      |      |      |     |     | SCK3_2                | -        |                     | Multi-function serial ch.3 clock I/O (2)                                                |
| 7*1     | 9*1  | 11*1 | 14*1 | 17  | 21  | P034                  | -        | A                   | General-purpose I/O port                                                                |
|         |      |      |      |     |     | A06*2, *3, *4, *5     | -        |                     | External bus/Address bit6 output (0)                                                    |
|         |      |      |      |     |     | OCU11_1               | -        |                     | Output compare ch.11 output (1)                                                         |
|         |      |      |      |     |     | ICU2_3                | -        |                     | Input capture ch.2 input (3)                                                            |
|         |      |      |      |     |     | TIN5_0                | -        |                     | Reload timer ch.5 event input (0)                                                       |
|         |      |      |      |     |     | RTO0_1                | -        |                     | Waveform generator ch.0 output pin (1)                                                  |
|         |      |      |      |     |     | SOT3_2                | -        |                     | Multi-function serial ch.3 serial data output (2)                                       |
| -       | -    | 12   | 15   | 18  | 22  | P150                  | -        | F                   | General-purpose I/O port                                                                |
|         |      |      |      |     |     | SOT8_0/<br>SDA8       | -        |                     | Multi-function serial ch.8 serial data output (0)/ I <sup>2</sup> C bus serial data I/O |
|         |      |      |      |     |     | OCU10_1               | -        |                     | Output compare ch.10 output (1)                                                         |
|         |      |      |      |     |     | TRG6_0                | -        |                     | PPG trigger 6 input (0)                                                                 |
|         |      |      |      |     |     | ICU1_3                | -        |                     | Input capture ch.1 input (3)                                                            |
|         |      |      |      |     |     | TIN6_0                | -        |                     | Reload timer ch.6 event input (0)                                                       |
| 8*1     | 10*1 | 13   | 16   | 19  | 23  | P151                  | -        | F                   | General-purpose I/O port                                                                |
|         |      |      |      |     |     | SCK8_0/<br>SCL8*2, *3 | -        |                     | Multi-function serial ch.8 clock I/O (0)/ I <sup>2</sup> C bus serial clock I/O         |
|         |      |      |      |     |     | OCU9_1                | -        |                     | Output compare ch.9 output (1)                                                          |
|         |      |      |      |     |     | TRG7_0                | -        |                     | PPG trigger 7 input (0)                                                                 |
|         |      |      |      |     |     | ICU0_3                | -        |                     | Input capture ch.0 input (3)                                                            |
|         |      |      |      |     |     | TIN7_0                | -        |                     | Reload timer ch.7 event input (0)                                                       |
|         |      |      |      |     |     | ZIN0_2                | -        |                     | U/D counter ch.0 ZIN input (2)                                                          |
|         |      |      |      |     |     | DTTI_1                | -        |                     | Waveform generator ch.1 input pin (1)                                                   |

| Pin No.          |                  |                  |                  |     |     | Pin Name                      | Polarity | I/O Circuit types*8 | Function*9                                        |
|------------------|------------------|------------------|------------------|-----|-----|-------------------------------|----------|---------------------|---------------------------------------------------|
| 64               | 80               | 100              | 120              | 144 | 176 |                               |          |                     |                                                   |
| 9 <sup>*1</sup>  | 11 <sup>*1</sup> | 14 <sup>*1</sup> | 17 <sup>*1</sup> | 20  | 24  | P035                          | -        | I                   | General-purpose I/O port                          |
|                  |                  |                  |                  |     |     | A07 <sup>*2, *3, *4, *5</sup> | -        |                     | External bus/Address bit7 output                  |
|                  |                  |                  |                  |     |     | SIN8_0 <sup>*2, *3</sup>      | -        |                     | Multi-function serial ch.8 serial data input (0)  |
|                  |                  |                  |                  |     |     | OCU8_1                        | -        |                     | Output compare ch.8 output (1)                    |
|                  |                  |                  |                  |     |     | TOT4_0                        | -        |                     | Reload timer ch.4 output (0)                      |
|                  |                  |                  |                  |     |     | AIN0_0                        | -        |                     | U/D counter ch.0 AIN input (0)                    |
|                  |                  |                  |                  |     |     | INT11_0                       | -        |                     | INT11 External interrupt input (0)                |
| 10 <sup>*1</sup> | 12 <sup>*1</sup> | 15 <sup>*1</sup> | 18 <sup>*1</sup> | 21  | 25  | P036                          | -        | A                   | General-purpose I/O port                          |
|                  |                  |                  |                  |     |     | A08 <sup>*2, *3, *4, *5</sup> | -        |                     | External bus/Address bit8 output (0)              |
|                  |                  |                  |                  |     |     | SCS8_0 <sup>*2, *3</sup>      | -        |                     | Serial chip select 8 I/O (0)                      |
|                  |                  |                  |                  |     |     | OCU7_1                        | -        |                     | Output compare ch.7 output (1)                    |
|                  |                  |                  |                  |     |     | TOT5_0                        | -        |                     | Reload timer ch.5 output (0)                      |
|                  |                  |                  |                  |     |     | BIN0_0                        | -        |                     | U/D counter ch.0 BIN input (0)                    |
| -                | -                | 16 <sup>*1</sup> | 19 <sup>*1</sup> | 22  | 26  | P037                          | -        | A                   | General-purpose I/O port                          |
|                  |                  |                  |                  |     |     | A09 <sup>*4, *5</sup>         | -        |                     | External bus/Address bit9 output (0)              |
|                  |                  |                  |                  |     |     | OCU6_1                        | -        |                     | Output compare ch.6 output (1)                    |
|                  |                  |                  |                  |     |     | TOT6_0                        | -        |                     | Reload timer ch.6 output (0)                      |
|                  |                  |                  |                  |     |     | ZIN0_0                        | -        |                     | U/D counter ch.0 ZIN input (0)                    |
| -                | -                | -                | -                | -   | 27  | P174                          | -        | A                   | General-purpose I/O port                          |
|                  |                  |                  |                  |     |     | TRG8_1                        | -        |                     | PPG trigger 8 input (1)                           |
| -                | -                | -                | -                | -   | 28  | P175                          | -        | A                   | General-purpose I/O port                          |
|                  |                  |                  |                  |     |     | TRG9_1                        | -        |                     | PPG trigger 9 input (1)                           |
| 11 <sup>*1</sup> | 13 <sup>*1</sup> | 17 <sup>*1</sup> | 20 <sup>*1</sup> | 23  | 29  | P040                          | -        | A                   | General-purpose I/O port                          |
|                  |                  |                  |                  |     |     | A10 <sup>*2, *3, *4, *5</sup> | -        |                     | External bus/Address bit10 output (0)             |
|                  |                  |                  |                  |     |     | PPG23_1                       | -        |                     | PPG ch.23 output (1)                              |
|                  |                  |                  |                  |     |     | TOT7_0                        | -        |                     | Reload timer ch.7 output (0)                      |
|                  |                  |                  |                  |     |     | AIN1_0                        | -        |                     | U/D counter ch.1 AIN input (0)                    |
|                  |                  |                  |                  |     |     | SIN0_1                        | -        |                     | Multi-function serial ch.0 serial data input (1)  |
| 12 <sup>*1</sup> | 14 <sup>*1</sup> | 18 <sup>*1</sup> | 21 <sup>*1</sup> | 24  | 30  | P041                          | -        | I                   | General-purpose I/O port                          |
|                  |                  |                  |                  |     |     | A11 <sup>*2, *3, *4, *5</sup> | -        |                     | External bus/Address bit11 output (0)             |
|                  |                  |                  |                  |     |     | SIN9_0                        | -        |                     | Multi-function serial ch.9 serial data input (0)  |
|                  |                  |                  |                  |     |     | ICU9_1                        | -        |                     | Input capture ch.9 input (1)                      |
|                  |                  |                  |                  |     |     | BIN1_0                        | -        |                     | U/D counter ch.1 BIN input (0)                    |
|                  |                  |                  |                  |     |     | INT12_0                       | -        |                     | INT12 External interrupt input (0)                |
| 13 <sup>*1</sup> | 15 <sup>*1</sup> | 19 <sup>*1</sup> | 22 <sup>*1</sup> | 25  | 31  | P042                          | -        | B                   | General-purpose I/O port                          |
|                  |                  |                  |                  |     |     | A12 <sup>*2, *3, *4, *5</sup> | -        |                     | External bus/Address bit12 output                 |
|                  |                  |                  |                  |     |     | SOT9_0                        | -        |                     | Multi-function serial ch.9 serial data output (0) |
|                  |                  |                  |                  |     |     | AN47                          | -        |                     | ADC analog 47 input                               |
|                  |                  |                  |                  |     |     | ICU8_1                        | -        |                     | Input capture ch.8 input (1)                      |
|                  |                  |                  |                  |     |     | TRG0_1                        | -        |                     | PPG trigger 0 input (1)                           |
|                  |                  |                  |                  |     |     | ZIN1_0                        | -        |                     | U/D counter ch.1 ZIN input (0)                    |

| Pin No. |       |       |       |     |     | Pin Name           | Polarity | I/O Circuit types*8 | Function*9                                        |
|---------|-------|-------|-------|-----|-----|--------------------|----------|---------------------|---------------------------------------------------|
| 64      | 80    | 100   | 120   | 144 | 176 |                    |          |                     |                                                   |
| -       | -     | 20 *1 | 23 *1 | 26  | 32  | P043               | -        | A                   | General-purpose I/O port                          |
|         |       |       |       |     |     | A13 *4, *5         | -        |                     | External bus/Address bit13 output (0)             |
|         |       |       |       |     |     | ICU7_1             | -        |                     | Input capture ch.7 input (1)                      |
|         |       |       |       |     |     | TRG1_1             | -        |                     | PPG trigger 1 input (1)                           |
| -       | 16 *1 | 21 *1 | 24 *1 | 27  | 33  | P044               | -        | A                   | General-purpose I/O port                          |
|         |       |       |       |     |     | A14 *3, *4, *5     | -        |                     | External bus/Address bit14 output (0)             |
|         |       |       |       |     |     | SCS9_0             | -        |                     | Serial chip select 9 I/O (0)                      |
|         |       |       |       |     |     | ICU6_1             | -        |                     | Input capture ch.6 input (1)                      |
|         |       |       |       |     |     | TRG2_1             | -        |                     | PPG trigger 2 input (1)                           |
| 14 *1   | 17 *1 | 22 *1 | 25 *1 | 28  | 34  | P045               | -        | G                   | General-purpose I/O port                          |
|         |       |       |       |     |     | A15 *2, *3, *4, *5 | -        |                     | External bus/Address bit15 output (0)             |
|         |       |       |       |     |     | SCK9_0             | -        |                     | Multi-function serial ch.9 clock I/O (0)          |
|         |       |       |       |     |     | AN46               | -        |                     | ADC analog 46 input                               |
|         |       |       |       |     |     | ICU5_1             | -        |                     | Input capture ch.5 input (1)                      |
|         |       |       |       |     |     | TRG3_1             | -        |                     | PPG trigger 3 input (1)                           |
|         |       |       |       |     |     | TOT1_2             | -        |                     | Reload timer ch.1 output (2)                      |
| -       | -     | -     | 26 *1 | 29  | 35  | P046               | -        | A                   | General-purpose I/O port                          |
|         |       |       |       |     |     | A16 *5             | -        |                     | External bus/Address bit16 output (0)             |
|         |       |       |       |     |     | ICU4_1             | -        |                     | Input capture ch.4 input (1)                      |
|         |       |       |       |     |     | TRG4_1             | -        |                     | PPG trigger 4 input (1)                           |
| -       | -     | -     | -     | -   | 36  | P176               | -        | A                   | General-purpose I/O port                          |
|         |       |       |       |     |     | TRG10_0            | -        |                     | PPG trigger 10 input (0)                          |
| 15 *1   | 18 *1 | 23 *1 | 27 *1 | 30  | 37  | P047               | -        | B                   | General-purpose I/O port                          |
|         |       |       |       |     |     | A17 *2, *3, *4, *5 | -        |                     | External bus/Address bit17 output (0)             |
|         |       |       |       |     |     | AN45               | -        |                     | ADC analog 45 input                               |
|         |       |       |       |     |     | TRG8_0             | -        |                     | PPG trigger 8 input (0)                           |
|         |       |       |       |     |     | TIN3_2             | -        |                     | Reload timer ch.3 event input (2)                 |
|         |       |       |       |     |     | SOT0_1             | -        |                     | Multi-function serial ch.0 serial data output (1) |
| -       | -     | -     | -     | -   | 38  | P177               | -        | A                   | General-purpose I/O port                          |
|         |       |       |       |     |     | TRG11_0            | -        |                     | PPG trigger 11 input (0)                          |
| -       | -     | -     | 28 *1 | 31  | 39  | P050               | -        | A                   | General-purpose I/O port                          |
|         |       |       |       |     |     | A18 *5             | -        |                     | External bus/Address bit18 output                 |
|         |       |       |       |     |     | TRG5_1             | -        |                     | PPG trigger 5 input (1)                           |
|         |       |       |       |     |     | PPG33_0            | -        |                     | PPG ch.33 output (0)                              |
| -       | -     | -     | -     | 32  | 40  | P051               | -        | A                   | General-purpose I/O port                          |
|         |       |       |       |     |     | A19                | -        |                     | External bus/Address bit19 output                 |
|         |       |       |       |     |     | TRG9_0             | -        |                     | PPG trigger 9 input (0)                           |
| -       | -     | -     | -     | 33  | 41  | P052               | -        | A                   | General-purpose I/O port                          |
|         |       |       |       |     |     | A20                | -        |                     | External bus/Address bit20 output                 |
|         |       |       |       |     |     | PPG34_0            | -        |                     | PPG ch.34 output (0)                              |
|         |       |       |       |     |     | INT14_0            | -        |                     | INT14 External interrupt input (0)                |

| Pin No.  |          |          |          |     |     | Pin Name            | Polarity | I/O Circuit types*8 | Function*9                                                                          |
|----------|----------|----------|----------|-----|-----|---------------------|----------|---------------------|-------------------------------------------------------------------------------------|
| 64       | 80       | 100      | 120      | 144 | 176 |                     |          |                     |                                                                                     |
| 16<br>*1 | 19<br>*1 | 24<br>*1 | 29<br>*1 | 34  | 42  | P053                | -        | B                   | General-purpose I/O port                                                            |
|          |          |          |          |     |     | A21 *2, *3, *4, *5  | -        |                     | External bus/Address bit21 output                                                   |
|          |          |          |          |     |     | AN44                | -        |                     | ADC analog 44 input                                                                 |
|          |          |          |          |     |     | PPG35_0             | -        |                     | PPG ch.35 output (0)                                                                |
|          |          |          |          |     |     | INT14_1             | -        |                     | INT14 External interrupt input (1)                                                  |
|          |          |          |          |     |     | SCK0_1              | -        |                     | Multi-function serial ch.0 clock I/O (1)                                            |
| -        | -        | -        | -        | 35  | 43  | P054                | -        | A                   | General-purpose I/O port                                                            |
|          |          |          |          |     |     | SYCLK               | -        |                     | External bus/System clock output                                                    |
|          |          |          |          |     |     | PPG36_0             | -        |                     | PPG ch.36 output (0)                                                                |
| 17<br>*1 | 22<br>*1 | 27<br>*1 | 32<br>*1 | 38  | 46  | P055                | -        | G                   | General-purpose I/O port                                                            |
|          |          |          |          |     |     | CS2X *2, *3, *4, *5 | -        |                     | External bus chip select 2 output                                                   |
|          |          |          |          |     |     | SIN10_0             | -        |                     | Multi-function serial ch.10 serial data input (0)                                   |
|          |          |          |          |     |     | AN43                | -        |                     | ADC analog 43 input                                                                 |
|          |          |          |          |     |     | PPG37_0             | -        |                     | PPG ch.37 output (0)                                                                |
|          |          |          |          |     |     | TIN4_1              | -        |                     | Reload timer ch.4 event input (1)                                                   |
| -        | -        | -        | -        | -   | 47  | P180                | -        | A                   | General-purpose I/O port                                                            |
|          |          |          |          |     |     | PPG40_0             | -        |                     | PPG ch.40 output (0)                                                                |
| -        | -        | -        | -        | -   | 48  | P181                | -        | A                   | General-purpose I/O port                                                            |
|          |          |          |          |     |     | PPG41_0             | -        |                     | PPG ch.41 output (0)                                                                |
| -        | -        | -        | 33<br>*1 | 39  | 49  | P056                | -        | A                   | General-purpose I/O port                                                            |
|          |          |          |          |     |     | CS3X *5             | -        |                     | External bus chip select 3 output                                                   |
|          |          |          |          |     |     | ICU9_0              | -        |                     | Input capture ch.9 input (0)                                                        |
|          |          |          |          |     |     | PPG0_1              | -        |                     | PPG ch.0 output (1)                                                                 |
|          |          |          |          |     |     | ICU0_1              | -        |                     | Input capture ch.0 input (1)                                                        |
|          |          |          |          |     |     | TIN5_1              | -        |                     | Reload timer ch.5 event input (1)                                                   |
|          |          |          |          |     |     | DTTI_2              | -        |                     | Waveform generator ch.0-ch.5 input pin (2)                                          |
|          |          |          |          |     |     |                     |          |                     |                                                                                     |
| 19<br>*1 | 24<br>*1 | 29<br>*1 | 35<br>*1 | 41  | 51  | P057                | -        | G                   | General-purpose I/O port                                                            |
|          |          |          |          |     |     | RDY *2, *3, *4, *5  | -        |                     | External bus/Ready input (0)                                                        |
|          |          |          |          |     |     | SCK10_1             | -        |                     | Multi-function serial ch.10 clock I/O (1)                                           |
|          |          |          |          |     |     | AN42                | -        |                     | ADC analog 42 input                                                                 |
|          |          |          |          |     |     | ICU8_0              | -        |                     | Input capture ch.8 input (0)                                                        |
|          |          |          |          |     |     | TRG0_2              | -        |                     | PPG trigger 0 input (2)                                                             |
|          |          |          |          |     |     | PPG1_1              | -        |                     | PPG ch.1 output (1)                                                                 |
|          |          |          |          |     |     | ICU1_1              | -        |                     | Input capture ch.1 input (1)                                                        |
|          |          |          |          |     |     | TIN6_1              | -        |                     | Reload timer ch.6 event input (1)                                                   |
| -        | -        | -        | -        | 44  | 54  | P142                | -        | F                   | General-purpose I/O port                                                            |
|          |          |          |          |     |     | SCK10_0/<br>SCL10   | -        |                     | Multi-function serial ch.10 clock I/O (0)/<br>I <sup>2</sup> C bus serial clock I/O |
|          |          |          |          |     |     | PPG38_0             | -        |                     | PPG ch.38 output (0)                                                                |
|          |          |          |          |     |     | TIN7_1              | -        |                     | Reload timer ch.7 event input (1)                                                   |

| Pin No. |    |     |     |     |     | Pin Name      | Polarity | I/O Circuit types*8 | Function*9                                                                               |
|---------|----|-----|-----|-----|-----|---------------|----------|---------------------|------------------------------------------------------------------------------------------|
| 64      | 80 | 100 | 120 | 144 | 176 |               |          |                     |                                                                                          |
| -       | -  | -   | -   | 45  | 55  | P143          | -        | F                   | General-purpose I/O port                                                                 |
| -       | -  | -   | -   | -   | -   | SOT10_0/SDA10 | -        |                     | Multi-function serial ch.10 serial data output (0)/ I <sup>2</sup> C bus serial data I/O |
| -       | -  | -   | -   | -   | -   | PPG39_0       | -        |                     | PPG ch.39 output (0)                                                                     |
| -       | -  | -   | -   | -   | -   | TOT4_1        | -        |                     | Reload timer ch.4 output (1)                                                             |
| -       | -  | -   | -   | -   | 56  | P182          | -        | A                   | General-purpose I/O port                                                                 |
| -       | -  | -   | -   | -   | -   | PPG42_0       | -        |                     | PPG ch.42 output (0)                                                                     |
| -       | -  | 32  | 38  | 46  | 57  | P060          | -        | A                   | General-purpose I/O port                                                                 |
| -       | -  | -   | -   | -   | -   | SCS10_0       | -        |                     | Serial chip select 10 I/O (0)                                                            |
| -       | -  | -   | -   | -   | -   | PPG2_1        | -        |                     | PPG ch.2 output (1)                                                                      |
| -       | -  | -   | -   | -   | -   | ICU2_1        | -        |                     | Input capture ch.2 input (1)                                                             |
| -       | -  | -   | -   | -   | -   | TOT5_1        | -        |                     | Reload timer ch.5 output (1)                                                             |
| -       | -  | -   | -   | -   | -   | INT13_0       | -        |                     | INT13 External interrupt input (0)                                                       |
| 22      | 27 | 33  | 39  | 47  | 58  | P061          | -        | B                   | General-purpose I/O port                                                                 |
| -       | -  | -   | -   | -   | -   | SOT10_1       | -        |                     | Multi-function serial ch.10 serial data output (1)                                       |
| -       | -  | -   | -   | -   | -   | AN41          | -        |                     | ADC analog 41 input                                                                      |
| -       | -  | -   | -   | -   | -   | ICU6_0        | -        |                     | Input capture ch.6 input (0)                                                             |
| -       | -  | -   | -   | -   | -   | PPG3_1        | -        |                     | PPG ch.3 output (1)                                                                      |
| -       | -  | -   | -   | -   | -   | ICU3_1        | -        |                     | Input capture ch.3 input (1)                                                             |
| -       | -  | -   | -   | -   | -   | TOT6_1        | -        |                     | Reload timer ch.6 output (1)                                                             |
| -       | -  | -   | -   | -   | -   | INT13_1       | -        |                     | INT13 External interrupt input (1)                                                       |
| 23      | 28 | 34  | 40  | 48  | 59  | P062          | -        | B                   | General-purpose I/O port                                                                 |
| -       | -  | -   | -   | -   | -   | SCS10_1       | -        |                     | Serial chip select 10 I/O (1)                                                            |
| -       | -  | -   | -   | -   | -   | SCS40_0       | -        |                     | Serial chip select 40 I/O (0)                                                            |
| -       | -  | -   | -   | -   | -   | AN40          | -        |                     | ADC analog 40 input                                                                      |
| -       | -  | -   | -   | -   | -   | PPG4_1        | -        |                     | PPG ch.4 output (1)                                                                      |
| -       | -  | -   | -   | -   | -   | FRCK0_0       | -        |                     | Free-run timer 0 clock input (0)                                                         |
| -       | -  | -   | -   | -   | -   | TOT7_1        | -        |                     | Reload timer ch.7 output (1)                                                             |
| -       | -  | -   | -   | -   | -   | ZIN1_1        | -        |                     | U/D counter ch.1 ZIN input (1)                                                           |
| -       | 29 | 35  | 41  | 49  | 60  | P063          | -        | B                   | General-purpose I/O port                                                                 |
| -       | -  | -   | -   | -   | -   | SCS41_0       | -        |                     | Serial chip select 41 output (0)                                                         |
| -       | -  | -   | -   | -   | -   | AN39          | -        |                     | ADC analog 39 input                                                                      |
| -       | -  | -   | -   | -   | -   | PPG5_1        | -        |                     | PPG ch.5 output (1)                                                                      |
| -       | -  | -   | -   | -   | -   | FRCK1_0       | -        |                     | Free-run timer 1 clock input (0)                                                         |
| -       | -  | -   | -   | -   | -   | BIN1_1        | -        |                     | U/D counter ch.1 BIN input (1)                                                           |
| -       | -  | -   | -   | -   | 61  | P183          | -        | A                   | General-purpose I/O port                                                                 |
| -       | -  | -   | -   | -   | -   | PPG43_0       | -        |                     | PPG ch.43 output (0)                                                                     |

| Pin No. |    |     |     |     |     | Pin Name | Polarity | I/O Circuit types*8 | Function*9                                        |
|---------|----|-----|-----|-----|-----|----------|----------|---------------------|---------------------------------------------------|
| 64      | 80 | 100 | 120 | 144 | 176 |          |          |                     |                                                   |
| 24      | 30 | 36  | 42  | 50  | 62  | P064     | -        | B                   | General-purpose I/O port                          |
|         |    |     |     |     |     | SCS42_0  | -        |                     | Serial chip select 42 output (0)                  |
|         |    |     |     |     |     | AN38     | -        |                     | ADC analog 38 input                               |
|         |    |     |     |     |     | FRCK2_0  | -        |                     | Free-run timer 2 clock input (0)                  |
|         |    |     |     |     |     | AIN1_1   | -        |                     | U/D counter ch.1 AIN input (1)                    |
|         |    |     |     |     |     | PPG43_1  | -        |                     | PPG ch.43 output (1)                              |
| -       | -  | 37  | 43  | 51  | 63  | P065     | -        | A                   | General-purpose I/O port                          |
|         |    |     |     |     |     | SCS43_0  | -        |                     | Serial chip select 43 output (0)                  |
|         |    |     |     |     |     | FRCK3_0  | -        |                     | Free-run timer 3 clock input (0)                  |
|         |    |     |     |     |     | ZIN0_1   | -        |                     | U/D counter ch.0 ZIN input (1)                    |
|         |    |     |     |     |     | PPG44_1  | -        |                     | PPG ch.44 output (1)                              |
| -       | -  | -   | -   | -   | 64  | P184     | -        | A                   | General-purpose I/O port                          |
|         |    |     |     |     |     | PPG44_0  | -        |                     | PPG ch.44 output (0)                              |
| -       | -  | -   | -   | -   | 65  | P185     | -        | A                   | General-purpose I/O port                          |
|         |    |     |     |     |     | PPG45_0  | -        |                     | PPG ch.45 output (0)                              |
| 25      | 31 | 38  | 44  | 52  | 66  | P066     | -        | B                   | General-purpose I/O port                          |
|         |    |     |     |     |     | SOT4_2   | -        |                     | Multi-function serial ch.4 serial data output (2) |
|         |    |     |     |     |     | SCS3_0   | -        |                     | Serial chip select 3 I/O (0)                      |
|         |    |     |     |     |     | AN37     | -        |                     | ADC analog 37 input                               |
|         |    |     |     |     |     | FRCK4_0  | -        |                     | Free-run timer 4 clock input (0)                  |
|         |    |     |     |     |     | BIN0_1   | -        |                     | U/D counter ch.0 BIN input (1)                    |
| -       | 32 | 39  | 45  | 53  | 67  | P067     | -        | B                   | General-purpose I/O port                          |
|         |    |     |     |     |     | AN36     | -        |                     | ADC analog 36 input                               |
|         |    |     |     |     |     | FRCK5_0  | -        |                     | Free-run timer 5 clock input (0)                  |
|         |    |     |     |     |     | AIN0_1   | -        |                     | U/D counter ch.0 AIN input (1)                    |
| -       | -  | 40  | 46  | 54  | 68  | P070     | -        | A                   | General-purpose I/O port                          |
|         |    |     |     |     |     | ICU0_2   | -        |                     | Input capture ch.0 input (2)                      |
| 26      | 33 | 41  | 47  | 55  | 69  | P071     | -        | G                   | General-purpose I/O port                          |
|         |    |     |     |     |     | SCK4_2   | -        |                     | Multi-function serial ch.4 clock I/O (2)          |
|         |    |     |     |     |     | AN35     | -        |                     | ADC analog 35 input                               |
|         |    |     |     |     |     | ICU1_2   | -        |                     | Input capture ch.1 input (2)                      |
|         |    |     |     |     |     | MONCLK   | -        |                     | Clock monitor output pin                          |
| 27      | 34 | 42  | 48  | 56  | 70  | P072     | -        | G                   | General-purpose I/O port                          |
|         |    |     |     |     |     | SIN4_0   | -        |                     | Multi-function serial ch.4 serial data input (0)  |
|         |    |     |     |     |     | AN34     | -        |                     | ADC analog 34 input                               |
|         |    |     |     |     |     | ICU2_2   | -        |                     | Input capture ch.2 input (2)                      |
|         |    |     |     |     |     | INT5_0   | -        |                     | INT5 External interrupt input (0)                 |

| Pin No. |          |          |     |     |     | Pin Name               | Polarity | I/O Circuit types*8 | Function*9                                                                             |
|---------|----------|----------|-----|-----|-----|------------------------|----------|---------------------|----------------------------------------------------------------------------------------|
| 64      | 80       | 100      | 120 | 144 | 176 |                        |          |                     |                                                                                        |
| -       | 35<br>*3 | 43<br>*4 | 49  | 57  | 71  | P073                   | -        | D                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SOT4_0/<br>SDA4 *3, *4 | -        |                     | Multi-function serial ch.4 serial data output (0)/I <sup>2</sup> C bus serial data I/O |
|         |          |          |     |     |     | AN33                   | -        |                     | ADC analog 33 input                                                                    |
|         |          |          |     |     |     | ICU3_2                 | -        |                     | Input capture ch.3 input (2)                                                           |
| -       | -        | -        | -   | -   | 72  | P186                   | -        | A                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | PPG46_0                | -        |                     | PPG ch.46 output (0)                                                                   |
| -       | -        | -        | -   | -   | 73  | P187                   | -        | A                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | PPG47_0                | -        |                     | PPG ch.47 output (0)                                                                   |
| -       | -        | -        | 50  | 58  | 74  | P074                   | -        | E                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SCK4_0/<br>SCL4        | -        |                     | Multi-function serial ch.4 clock I/O (0)/<br>I <sup>2</sup> C bus serial clock I/O     |
| -       | -        | -        | 51  | 59  | 75  | P075                   | -        | F                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SIN3_0                 | -        |                     | Multi-function serial ch.3 serial data input (0)                                       |
|         |          |          |     |     |     | INT4_0                 | -        |                     | INT4 External interrupt input (0)                                                      |
| -       | -        | -        | 52  | 60  | 76  | P076                   | -        | E                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SOT3_0/<br>SDA3        | -        |                     | Multi-function serial ch.3 serial data output (0)/I <sup>2</sup> C bus serial data I/O |
| -       | -        | -        | 53  | 61  | 77  | P077                   | -        | E                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SCK3_0/<br>SCL3        | -        |                     | Multi-function serial ch.3 clock I/O (0)/<br>I <sup>2</sup> C bus serial clock I/O     |
| -       | -        | 44       | 54  | 62  | 78  | P152                   | -        | A                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SCS53_0                | -        |                     | Serial chip select 53 output (0)                                                       |
| 28      | 36       | 45       | 55  | 63  | 79  | P153                   | -        | G                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SCK5_0/<br>SCL5        | -        |                     | Multi-function serial ch.5 clock I/O (0)/<br>I <sup>2</sup> C bus serial clock I/O     |
|         |          |          |     |     |     | AN32                   | -        |                     | ADC analog 32 input                                                                    |
|         |          |          |     |     |     | FRCK1_1                | -        |                     | Free-run timer 1 clock input (1)                                                       |
|         |          |          |     |     |     | INT4_1                 | -        |                     | INT4 External interrupt input (1)                                                      |
| -       | -        | -        | -   | 64  | 80  | P080                   | -        | A                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SCS52_0                | -        |                     | Serial chip select 52 output (0)                                                       |
|         |          |          |     |     |     | PPG0_0                 | -        |                     | PPG ch.0 output (0)                                                                    |
| 29      | 37       | 46       | 56  | 65  | 81  | P081                   | -        | G                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SOT5_0/<br>SDA5        | -        |                     | Multi-function serial ch.5 serial data output (0)/I <sup>2</sup> C bus serial data I/O |
|         |          |          |     |     |     | AN0                    | -        |                     | ADC analog 0 input                                                                     |
|         |          |          |     |     |     | PPG1_0                 | -        |                     | PPG ch.1 output (0)                                                                    |
| 30      | 38       | 47       | 57  | 66  | 82  | P082                   | -        | G                   | General-purpose I/O port                                                               |
|         |          |          |     |     |     | SIN5_0                 | -        |                     | Multi-function serial ch.5 serial data input (0)                                       |
|         |          |          |     |     |     | AN1                    | -        |                     | ADC analog 1 input                                                                     |
|         |          |          |     |     |     | PPG2_0                 | -        |                     | PPG ch.2 output (0)                                                                    |

| Pin No. |    |     |     |     |     | Pin Name | Polarity | I/O Circuit types*8 | Function*9                        |
|---------|----|-----|-----|-----|-----|----------|----------|---------------------|-----------------------------------|
| 64      | 80 | 100 | 120 | 144 | 176 |          |          |                     |                                   |
| -       | -  | -   | -   | 67  | 83  | P083     | -        | B                   | General-purpose I/O port          |
|         |    |     |     |     |     | SCS50_0  | -        |                     | Serial chip select 50 I/O (0)     |
|         |    |     |     |     |     | AN2      | -        |                     | ADC analog 2 input                |
|         |    |     |     |     |     | PPG3_0   | -        |                     | PPG ch.3 output (0)               |
| -       | -  | -   | -   | 68  | 84  | P084     | -        | B                   | General-purpose I/O port          |
|         |    |     |     |     |     | SCS51_0  | -        |                     | Serial chip select 51 output (0)  |
|         |    |     |     |     |     | AN3      | -        |                     | ADC analog 3 input                |
|         |    |     |     |     |     | PPG4_0   | -        |                     | PPG ch.4 output (0)               |
| -       | -  | -   | -   | 69  | 85  | P085     | -        | A                   | General-purpose I/O port          |
|         |    |     |     |     |     | PPG5_0   | -        |                     | PPG ch.5 output (0)               |
| -       | -  | 48  | 58  | 70  | 86  | P086     | -        | C                   | General-purpose I/O port          |
|         |    |     |     |     |     | DAO1     | -        |                     | DAC analog 1 output               |
|         |    |     |     |     |     | PPG6_0   | -        |                     | PPG ch.6 output (0)               |
| 31      | 39 | 49  | 59  | 71  | 87  | P087     | -        | C                   | General-purpose I/O port          |
|         |    |     |     |     |     | DAO0     | -        |                     | DAC analog 0 output               |
|         |    |     |     |     |     | PPG7_0   | -        |                     | PPG ch.7 output (0)               |
|         |    |     |     |     |     | INT8_0   | -        |                     | INT8 External interrupt input (0) |
| -       | -  | -   | -   | -   | 90  | P190     | -        | A                   | General-purpose I/O port          |
|         |    |     |     |     |     | TIN0_1   | -        |                     | Reload timer ch.0 event input (1) |
| -       | -  | -   | -   | -   | 91  | P191     | -        | A                   | General-purpose I/O port          |
|         |    |     |     |     |     | TIN1_1   | -        |                     | Reload timer ch.1 event input (1) |
| -       | -  | -   | -   | 74  | 92  | P090     | -        | B                   | General-purpose I/O port          |
|         |    |     |     |     |     | AN4      | -        |                     | ADC analog 4 input                |
|         |    |     |     |     |     | ICU0_0   | -        |                     | Input capture ch.0 input (0)      |
|         |    |     |     |     |     | TIN2_1   | -        |                     | Reload timer ch.2 event input (1) |
| -       | -  | -   | -   | 75  | 93  | P091     | -        | B                   | General-purpose I/O port          |
|         |    |     |     |     |     | AN5      | -        |                     | ADC analog 5 input                |
|         |    |     |     |     |     | PPG41_1  | -        |                     | PPG ch.41 output (1)              |
|         |    |     |     |     |     | ICU1_0   | -        |                     | Input capture ch.1 input (0)      |
|         |    |     |     |     |     | TIN3_1   | -        |                     | Reload timer ch.3 event input (1) |
| -       | -  | -   | -   | 76  | 94  | P092     | -        | B                   | General-purpose I/O port          |
|         |    |     |     |     |     | AN6      | -        |                     | ADC analog 6 input                |
|         |    |     |     |     |     | PPG40_1  | -        |                     | PPG ch.40 output (1)              |
|         |    |     |     |     |     | ICU2_0   | -        |                     | Input capture ch.2 input (0)      |
|         |    |     |     |     |     | TOT0_1   | -        |                     | Reload timer ch.0 output (1)      |
| -       | -  | -   | -   | -   | 95  | P192     | -        | A                   | General-purpose I/O port          |
|         |    |     |     |     |     | PPG24_1  | -        |                     | PPG ch.24 output (1)              |
|         |    |     |     |     |     | TOT1_1   | -        |                     | Reload timer ch.1 output (1)      |

| Pin No.  |          |     |     |     |     | Pin Name           | Polarity | I/O Circuit types*8 | Function*9                                                                              |
|----------|----------|-----|-----|-----|-----|--------------------|----------|---------------------|-----------------------------------------------------------------------------------------|
| 64       | 80       | 100 | 120 | 144 | 176 |                    |          |                     |                                                                                         |
| 34<br>*1 | 42<br>*1 | 52  | 62  | 77  | 96  | P093               | -        | J                   | General-purpose I/O port                                                                |
|          |          |     |     |     |     | TX0_1              | -        |                     | CAN transmission data 0 output (1)                                                      |
|          |          |     |     |     |     | SIN11_0            | -        |                     | Multi-function serial ch.11 serial data input (0)                                       |
|          |          |     |     |     |     | AN7                | -        |                     | ADC analog 7 input                                                                      |
|          |          |     |     |     |     | ICU4_2             | -        |                     | Input capture ch.4 input (2)                                                            |
|          |          |     |     |     |     | PPG16_1            | -        |                     | PPG ch.16 output (1)                                                                    |
|          |          |     |     |     |     | ICU3_0             | -        |                     | Input capture ch.3 input (0)                                                            |
|          |          |     |     |     |     | TOT2_1 *2, *3      | -        |                     | Reload timer ch.2 output (1)                                                            |
| -        | -        | -   | -   | 78  | 97  | P094               | -        | B                   | General-purpose I/O port                                                                |
|          |          |     |     |     |     | AN8                | -        |                     | ADC analog 8 input                                                                      |
|          |          |     |     |     |     | ICU4_0             | -        |                     | Input capture ch.4 input (0)                                                            |
|          |          |     |     |     |     | TOT3_1             | -        |                     | Reload timer ch.3 output (1)                                                            |
| -        | -        | 53  | 63  | 79  | 98  | P095               | -        | B                   | General-purpose I/O port                                                                |
|          |          |     |     |     |     | TX0(128)           | -        |                     | CAN transmission data 0 output                                                          |
|          |          |     |     |     |     | SCS11_0            | -        |                     | Serial chip select 11 I/O (0)                                                           |
|          |          |     |     |     |     | AN9                | -        |                     | ADC analog 9 input                                                                      |
| 35       | 43       | 54  | 64  | 80  | 99  | P096               | -        | G                   | General-purpose I/O port                                                                |
|          |          |     |     |     |     | RX0(128)           | -        |                     | CAN reception data 0 input                                                              |
|          |          |     |     |     |     | SOT11_0/<br>SDA11  | -        |                     | Multi-function serial ch.11 serial data output (0)/I <sup>2</sup> C bus serial data I/O |
|          |          |     |     |     |     | AN10               | -        |                     | ADC analog 10 input                                                                     |
|          |          |     |     |     |     | INT0_0             | -        |                     | INT0 External interrupt input (0)                                                       |
| 36       | 44       | 55  | 65  | 81  | 100 | P097               | -        | G                   | General-purpose I/O port                                                                |
|          |          |     |     |     |     | SCK11_0/<br>SCL11  | -        |                     | Multi-function serial ch.11 clock I/O (0)/<br>I <sup>2</sup> C bus serial clock I/O     |
|          |          |     |     |     |     | AN11               | -        |                     | ADC analog 11 input                                                                     |
|          |          |     |     |     |     | ICU5_0             | -        |                     | Input capture ch.5 input (0)                                                            |
|          |          |     |     |     |     | PPG17_1            | -        |                     | PPG ch.17 output (1)                                                                    |
| -        | 48<br>*1 | 59  | 69  | 85  | 104 | P100               | -        | G                   | General-purpose I/O port                                                                |
|          |          |     |     |     |     | SCK7_0/<br>SCL7 *3 | -        |                     | Multi-function serial ch.7 clock I/O (0)/<br>I <sup>2</sup> C bus serial clock I/O      |
|          |          |     |     |     |     | AN12               | -        |                     | ADC analog 12 input                                                                     |
|          |          |     |     |     |     | PPG8_0             | -        |                     | PPG ch.8 output (0)                                                                     |
| -        | -        | 60  | 70  | 86  | 105 | P101               | -        | G                   | General-purpose I/O port                                                                |
|          |          |     |     |     |     | SOT7_0/<br>SDA7    | -        |                     | Multi-function serial ch.7 serial data output (0)/I <sup>2</sup> C bus serial data I/O  |
|          |          |     |     |     |     | AN13               | -        |                     | ADC analog 13 input                                                                     |
|          |          |     |     |     |     | PPG9_0             | -        |                     | PPG ch.9 output (0)                                                                     |
| 40<br>*1 | 49<br>*1 | 61  | 71  | 87  | 106 | P102               | -        | G                   | General-purpose I/O port                                                                |
|          |          |     |     |     |     | SIN7_0 *2, *3      | -        |                     | Multi-function serial ch.7 serial data input (0)                                        |
|          |          |     |     |     |     | AN14               | -        |                     | ADC analog 14 input                                                                     |
|          |          |     |     |     |     | PPG10_0            | -        |                     | PPG ch.10 output (0)                                                                    |
|          |          |     |     |     |     | INT10_0            | -        |                     | INT10 External interrupt input (0)                                                      |

| Pin No.  |          |     |     |     |     | Pin Name       | Polarity | I/O Circuit types*8 | Function*9                              |
|----------|----------|-----|-----|-----|-----|----------------|----------|---------------------|-----------------------------------------|
| 64       | 80       | 100 | 120 | 144 | 176 |                |          |                     |                                         |
| 41<br>*1 | 50<br>*1 | 62  | 72  | 88  | 107 | P103           | -        | H                   | General-purpose I/O port                |
|          |          |     |     |     |     | SCS73_0 *2, *3 | -        |                     | Serial chip select 73 output (0)        |
|          |          |     |     |     |     | AN15           | -        |                     | ADC analog 15 input                     |
|          |          |     |     |     |     | PPG11_0        | -        |                     | PPG ch.11 output (0)                    |
| 42<br>*1 | 51<br>*1 | 63  | 73  | 89  | 108 | P104           | -        | H                   | General-purpose I/O port                |
|          |          |     |     |     |     | SCS72_0 *2, *3 | -        |                     | Serial chip select 72 output (0)        |
|          |          |     |     |     |     | AN16           | -        |                     | ADC analog 16 input                     |
|          |          |     |     |     |     | PPG12_0        | -        |                     | PPG ch.12 output (0)                    |
| 43<br>*1 | 52<br>*1 | 64  | 74  | 90  | 109 | P105           | -        | H                   | General-purpose I/O port                |
|          |          |     |     |     |     | SCS71_0 *2, *3 | -        |                     | Serial chip select 71 output (0)        |
|          |          |     |     |     |     | AN17           | -        |                     | ADC analog 17 input                     |
|          |          |     |     |     |     | PPG13_0        | -        |                     | PPG ch.13 output (0)                    |
| -        | -        | 65  | 75  | 91  | 110 | P106           | -        | H                   | General-purpose I/O port                |
|          |          |     |     |     |     | SCS70_0        | -        |                     | Serial chip select 70 I/O (0)           |
|          |          |     |     |     |     | AN18           | -        |                     | ADC analog 18 input                     |
|          |          |     |     |     |     | PPG14_0        | -        |                     | PPG ch.14 output (0)                    |
| -        | 53       | 66  | 76  | 92  | 111 | P107           | -        | B                   | General-purpose I/O port                |
|          |          |     |     |     |     | AN19           | -        |                     | ADC analog 19 input                     |
|          |          |     |     |     |     | PPG15_0        | -        |                     | PPG ch.15 output (0)                    |
| -        | -        | -   | -   | -   | 112 | P193           | -        | A                   | General-purpose I/O port                |
|          |          |     |     |     |     | PPG25_1        | -        |                     | PPG ch.25 output (1)                    |
| -        | -        | -   | 77  | 93  | 113 | P154           | -        | B                   | General-purpose I/O port                |
|          |          |     |     |     |     | AN20           | -        |                     | ADC analog 20 input                     |
| -        | -        | -   | 78  | 94  | 114 | P155           | -        | B                   | General-purpose I/O port                |
|          |          |     |     |     |     | AN21           | -        |                     | ADC analog 21 input                     |
| 44       | 54       | 67  | 79  | 95  | 115 | NMIX           | N        | M                   | Non-masking interrupt input             |
| 45       | 55       | 68  | 80  | 96  | 116 | P110           | -        | B                   | General-purpose I/O port                |
|          |          |     |     |     |     | TX1(64)        | -        |                     | CAN transmission data 1 output          |
|          |          |     |     |     |     | SCS63_0        | -        |                     | Serial chip select 63 output (0)        |
|          |          |     |     |     |     | AN22           | -        |                     | ADC analog 22 input                     |
| -        | -        | 69  | 81  | 97  | 117 | P111           | -        | G                   | General-purpose I/O port                |
|          |          |     |     |     |     | RX1(64)        | -        |                     | CAN reception data 1 input              |
|          |          |     |     |     |     | SCS62_0        | -        |                     | Serial chip select 62 output (0)        |
|          |          |     |     |     |     | AN23           | -        |                     | ADC analog 23 input                     |
|          |          |     |     |     |     | INT1_0         | -        |                     | INT1 External interrupt input (0)       |
| -        | -        | -   | 82  | 98  | 118 | P112           | -        | B                   | General-purpose I/O port                |
|          |          |     |     |     |     | AN24           | -        |                     | ADC analog 24 input                     |
|          |          |     |     |     |     | PPG16_0        | -        |                     | PPG ch.16 output (0)                    |
|          |          |     |     |     |     | RTO0_0         | -        |                     | Waveform generator ch. 0 output pin (0) |

| Pin No. |    |     |     |     |     | Pin Name        | Polarity | I/O Circuit types*8 | Function*9                                                                             |
|---------|----|-----|-----|-----|-----|-----------------|----------|---------------------|----------------------------------------------------------------------------------------|
| 64      | 80 | 100 | 120 | 144 | 176 |                 |          |                     |                                                                                        |
| -       | -  | -   | 83  | 99  | 119 | P113            | -        | B                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | AN25            | -        |                     | ADC analog 25 input                                                                    |
|         |    |     |     |     |     | PPG17_0         | -        |                     | PPG ch.17 output (0)                                                                   |
|         |    |     |     |     |     | RTO1_0          | -        |                     | Waveform generator ch. 1 output pin (0)                                                |
| -       | -  | -   | -   | -   | 120 | P194            | -        | A                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | FRCK5_1         | -        |                     | Free-run timer 5 clock input (1)                                                       |
|         |    |     |     |     |     | PPG26_1         | -        |                     | PPG ch.26 output (1)                                                                   |
| -       | -  | -   | -   | -   | 121 | P195            | -        | A                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | FRCK4_1         | -        |                     | Free-run timer 4 clock input (1)                                                       |
|         |    |     |     |     |     | PPG27_1         | -        |                     | PPG ch.27 output (1)                                                                   |
| -       | 56 | 70  | 84  | 100 | 122 | P114            | -        | B                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | SCS61_0         | -        |                     | Serial chip select 61 output (0)                                                       |
|         |    |     |     |     |     | AN26            | -        |                     | ADC analog 26 input                                                                    |
|         |    |     |     |     |     | PPG18_0         | -        |                     | PPG ch.18 output (0)                                                                   |
|         |    |     |     |     |     | RTO2_0          | -        |                     | Waveform generator ch.2 output pin (0)                                                 |
| 46      | 57 | 71  | 85  | 101 | 123 | P115            | -        | G                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | RX1_1           | -        |                     | CAN reception data 1 input (1)                                                         |
|         |    |     |     |     |     | SOT6_0/<br>SDA6 | -        |                     | Multi-function serial ch.6 serial data output (0)/I <sup>2</sup> C bus serial data I/O |
|         |    |     |     |     |     | AN27            | -        |                     | ADC analog 27 input                                                                    |
|         |    |     |     |     |     | PPG19_0         | -        |                     | PPG ch.19 output (0)                                                                   |
|         |    |     |     |     |     | RTO3_0          | -        |                     | Waveform generator ch.3 output pin (0)                                                 |
|         |    |     |     |     |     | INT1_1          | -        |                     | INT1 External interrupt input (1)                                                      |
| 47      | 58 | 72  | 86  | 102 | 124 | P116            | -        | G                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | SCK6_0/<br>SCL6 | -        |                     | Multi-function serial ch.6 clock I/O (0)/<br>I <sup>2</sup> C bus serial clock I/O     |
|         |    |     |     |     |     | AN28            | -        |                     | ADC analog 28 input                                                                    |
|         |    |     |     |     |     | PPG20_0         | -        |                     | PPG ch.20 output (0)                                                                   |
|         |    |     |     |     |     | RTO4_0          | -        |                     | Waveform generator ch.4 output pin (0)                                                 |
| -       | -  | 73  | 87  | 103 | 125 | P117            | -        | B                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | SCS60_0         | -        |                     | Serial chip select 60 I/O (0)                                                          |
|         |    |     |     |     |     | AN29            | -        |                     | ADC analog 29 input                                                                    |
|         |    |     |     |     |     | PPG21_0         | -        |                     | PPG ch.21 output (0)                                                                   |
|         |    |     |     |     |     | RTO5_0          | -        |                     | Waveform generator ch.5 output pin (0)                                                 |
| -       | -  | -   | -   | -   | 126 | P196            | -        | A                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | FRCK3_1         | -        |                     | Free-run timer 3 clock input (1)                                                       |
|         |    |     |     |     |     | PPG28_1         | -        |                     | PPG ch.28 output (1)                                                                   |
| -       | -  | -   | 88  | 104 | 127 | P120            | -        | B                   | General-purpose I/O port                                                               |
|         |    |     |     |     |     | AN30            | -        |                     | ADC analog 30 input                                                                    |
|         |    |     |     |     |     | OCU6_0          | -        |                     | Output compare ch.6 output (0)                                                         |
|         |    |     |     |     |     | PPG22_0         | -        |                     | PPG ch.22 output (0)                                                                   |
|         |    |     |     |     |     | INT9_0          | -        |                     | INT9 External interrupt input (0)                                                      |

| Pin No. |    |     |     |     |     | Pin Name | Polarity | I/O Circuit types*8 | Function*9                                        |
|---------|----|-----|-----|-----|-----|----------|----------|---------------------|---------------------------------------------------|
| 64      | 80 | 100 | 120 | 144 | 176 |          |          |                     |                                                   |
| -       | -  | -   | -   | 105 | 128 | P121     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | OCU7_0   | -        |                     | Output compare ch.7 output (0)                    |
| -       | -  | -   | -   | -   | -   | PPG23_0  | -        |                     | PPG ch.23 output (0)                              |
| 48      | 59 | 74  | 89  | 106 | 129 | P122     | -        | J                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | SIN6_0   | -        |                     | Multi-function serial ch.6 serial data input (0)  |
| -       | -  | -   | -   | -   | -   | AN31     | -        |                     | ADC analog 31 input                               |
| -       | -  | -   | -   | -   | -   | OCU8_0   | -        |                     | Output compare ch.8 output (0)                    |
| -       | -  | -   | -   | -   | -   | INT9_1   | -        |                     | INT9 External interrupt input (1)                 |
| -       | -  | -   | -   | -   | 130 | P197     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | PPG29_1  | -        |                     | PPG ch.29 output (1)                              |
| -       | -  | -   | -   | 107 | 131 | P123     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | OCU9_0   | -        |                     | Output compare ch.9 output (0)                    |
| 49      | 62 | 77  | 92  | 110 | 134 | DEBUGIF  | -        | L                   | MDI I/O for debugger (OCD)                        |
| -       | -  | -   | -   | -   | 135 | P160     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | PPG30_1  | -        |                     | PPG ch.30 output (1)                              |
| -       | -  | -   | -   | -   | 136 | P161     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | PPG31_1  | -        |                     | PPG ch.31 output (1)                              |
| -       | -  | -   | -   | 111 | 137 | P124     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | OCU10_0  | -        |                     | Output compare ch.10 output (0)                   |
| -       | -  | -   | 93  | 112 | 138 | P125     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | OCU11_0  | -        |                     | Output compare ch.11 output (0)                   |
| 50      | 63 | 78  | 94  | 113 | 139 | P126     | -        | F                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | SIN0_0   | -        |                     | Multi-function serial ch.0 serial data input (0)  |
| -       | -  | -   | -   | -   | -   | INT6_0   | -        |                     | INT6 External interrupt input (0)                 |
| -       | 64 | 79  | 95  | 114 | 140 | P127     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | SOT0_0   | -        |                     | Multi-function serial ch.0 serial data output (0) |
| -       | -  | 80  | 96  | 115 | 141 | P130     | -        | F                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | SCK0_0   | -        |                     | Multi-function serial ch.0 clock I/O (0)          |
| -       | -  | -   | -   | -   | 142 | P162     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | TRG5_2   | -        |                     | PPG trigger 5 input (2)                           |
| -       | -  | -   | -   | -   | 143 | P163     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | TRG6_2   | -        |                     | PPG trigger 6 input (2)                           |
| 51      | 65 | 81  | 97  | 116 | 144 | MD0      | -        | K                   | Mode pin 0                                        |
| 52      | 66 | 82  | 98  | 117 | 145 | MD1      | -        | K                   | Mode pin 1                                        |
| 53      | 67 | 83  | 99  | 118 | 146 | X0       | -        | N                   | Main clock oscillation input                      |
| 54      | 68 | 84  | 100 | 119 | 147 | X1       | -        | N                   | Main clock oscillation output                     |
| 56      | 70 | 86  | 102 | 121 | 149 | P135     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | DTTI_0   | -        |                     | Waveform generator ch.0-ch.5 input pin (0)        |
| -       | -  | -   | -   | -   | -   | X1A      | -        | O                   | Sub clock oscillation output                      |
| 57      | 71 | 87  | 103 | 122 | 150 | P136     | -        | A                   | General-purpose I/O port                          |
| -       | -  | -   | -   | -   | -   | X0A      | -        | O                   | Sub clock oscillation input                       |

| Pin No. |       |       |        |     |     | Pin Name       | Polarity | I/O Circuit types*8 | Function*9                                        |
|---------|-------|-------|--------|-----|-----|----------------|----------|---------------------|---------------------------------------------------|
| 64      | 80    | 100   | 120    | 144 | 176 |                |          |                     |                                                   |
| 58      | 72    | 88    | 104    | 123 | 151 | RSTX           | N        | M                   | External reset input                              |
| -       | -     | -     | -      | 124 | 152 | P131           | -        | A                   | General-purpose I/O port                          |
|         |       |       |        |     |     | ADTG0_0        | -        |                     | A/D converter external trigger input 0 (0)        |
| -       | -     | -     | 105    | 125 | 153 | P132           | -        | A                   | General-purpose I/O port                          |
|         |       |       |        |     |     | SCS1_0         | -        |                     | Serial chip select 1 I/O (0)                      |
|         |       |       |        |     |     | ADTG1_0        | -        |                     | A/D converter external trigger input 1 (0)        |
| -       | -     | 89    | 106    | 126 | 154 | P133           | -        | A                   | General-purpose I/O port                          |
|         |       |       |        |     |     | TX2(64)        | -        |                     | CAN transmission data 2 output                    |
| -       | -     | 90    | 107    | 127 | 155 | P134           | -        | F                   | General-purpose I/O port                          |
|         |       |       |        |     |     | RX2(64)        | -        |                     | CAN reception data 2 input                        |
|         |       |       |        |     |     | SCS1_1         | -        |                     | Serial chip select 1 I/O (1)                      |
|         |       |       |        |     |     | ICU7_0         | -        |                     | Input capture ch.7 input (0)                      |
|         |       |       |        |     |     | INT7_0         | -        |                     | INT7 External interrupt input (0)                 |
| -       | -     | 91    | 108    | 128 | 156 | P144           | -        | F                   | General-purpose I/O port                          |
|         |       |       |        |     |     | SCK1_1         | -        |                     | Multi-function serial ch.1 clock I/O (1)          |
| -       | -     | 94 *1 | 111 *1 | 131 | 159 | P000           | -        | F                   | General-purpose I/O port                          |
|         |       |       |        |     |     | D16 *4, *5     | -        |                     | External bus data bit16 I/O (0)                   |
|         |       |       |        |     |     | SIN1_0         | -        |                     | Multi-function serial ch.1 serial data input (0)  |
|         |       |       |        |     |     | TIOA0_1 *4     | -        |                     | TIOA output of Base timer ch.0 (1)                |
|         |       |       |        |     |     | INT2_0         | -        |                     | INT2 External interrupt input (0)                 |
| -       | 75 *1 | 95 *1 | 112 *1 | 132 | 160 | P001           | -        | A                   | General-purpose I/O port                          |
|         |       |       |        |     |     | D17 *3, *4, *5 | -        |                     | External bus data bit17 I/O                       |
|         |       |       |        |     |     | SOT1_0 *3      | -        |                     | Multi-function serial ch.1 serial data output (0) |
|         |       |       |        |     |     | TIOA1_1        | -        |                     | TIOA I/O of Base timer ch.1 (1)                   |
| -       | -     | -     | 113 *1 | 133 | 161 | P002           | -        | F                   | General-purpose I/O port                          |
|         |       |       |        |     |     | D18 *5         | -        |                     | External bus data bit18 I/O                       |
|         |       |       |        |     |     | SCK1_0         | -        |                     | Multi-function serial ch.1 clock I/O (0)          |
|         |       |       |        |     |     | TIOB0_1        | -        |                     | TIOB input of Base timer ch.0 (1)                 |
| -       | 76 *1 | 96 *1 | 114 *1 | 134 | 162 | P003           | -        | F                   | General-purpose I/O port                          |
|         |       |       |        |     |     | D19 *3, *4, *5 | -        |                     | External bus data bit19 I/O                       |
|         |       |       |        |     |     | SIN2_0         | -        |                     | Multi-function serial ch.2 serial data input (0)  |
|         |       |       |        |     |     | TIOB1_1        | -        |                     | TIOB input of Base timer ch.1 (1)                 |
|         |       |       |        |     |     | INT3_0         | -        |                     | INT3 External interrupt input (0)                 |
| -       | -     | -     | -      | 135 | 163 | P004           | -        | A                   | General-purpose I/O port                          |
|         |       |       |        |     |     | D20            | -        |                     | External bus data bit20 I/O (0)                   |
|         |       |       |        |     |     | SOT2_0         | -        |                     | Multi-function serial ch.2 serial data output (0) |
| -       | -     | -     | -      | -   | 164 | P164           | -        | A                   | General-purpose I/O port                          |
|         |       |       |        |     |     | PPG32_1        | -        |                     | PPG ch.32 output (1)                              |

| Pin No.  |          |          |           |           |           | Pin Name               | Polarity | I/O Circuit types*8 | Function*9                                        |
|----------|----------|----------|-----------|-----------|-----------|------------------------|----------|---------------------|---------------------------------------------------|
| 64       | 80       | 100      | 120       | 144       | 176       |                        |          |                     |                                                   |
| 61<br>*1 | 77<br>*1 | 97<br>*1 | 115<br>*1 | 136<br>*1 | 165<br>*1 | P005                   | -        | F                   | General-purpose I/O port                          |
|          |          |          |           |           |           | D21 *2, *3, *4, *5     | -        |                     | External bus data bit21 I/O (0)                   |
|          |          |          |           |           |           | SCK2_0 *2              | -        |                     | Multi-function serial ch.2 clock I/O (0)          |
|          |          |          |           |           |           | ADTG0_1                | -        |                     | A/D converter external trigger input 0 (1)        |
|          |          |          |           |           |           | INT7_1                 | -        |                     | INT7 External interrupt input (1)                 |
|          |          |          |           |           |           | RX2(64) *4, *5, *6, *7 | -        |                     | CAN reception data 2 input                        |
| 62<br>*1 | 78<br>*1 | 98<br>*1 | 116<br>*1 | 137<br>*1 | 167<br>*1 | P165                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | PPG33_1                | -        |                     | PPG ch.33 output (1)                              |
|          |          |          |           |           |           | P006                   | -        |                     | General-purpose I/O port                          |
|          |          |          |           |           |           | D22 *2, *3, *4, *5     | -        |                     | External bus data bit22 I/O (0)                   |
|          |          |          |           |           |           | SCS2_0 *2              | -        |                     | Serial chip select 2 I/O (0)                      |
|          |          |          |           |           |           | ADTG1_1                | -        |                     | A/D converter external trigger input 1 (1)        |
| -        | -        | -        | 117<br>*1 | 138       | 168       | INT2_1                 | -        | A                   | INT2 External interrupt input (1)                 |
|          |          |          |           |           |           | TX2(64) *4, *5, *6, *7 | -        |                     | CAN transmission data 2 output                    |
| -        | -        | -        | 118<br>*1 | 139       | 170       | P007                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | D23 *5                 | -        |                     | External bus data bit23 I/O                       |
| -        | -        | -        | 119<br>*1 | 140       | 171       | P166                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | PPG34_1                | -        |                     | PPG ch.34 output (1)                              |
| -        | -        | -        | 120<br>*1 | 141       | 172       | P010                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | D24 *5                 | -        |                     | External bus data bit24 I/O                       |
| 63<br>*1 | 79<br>*1 | 99<br>*1 | 119<br>*1 | 140       | 171       | P011                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | WOT                    | -        |                     | RTC output signal                                 |
|          |          |          |           |           |           | D25 *2, *3, *4, *5     | -        |                     | External bus data bit25 I/O                       |
|          |          |          |           |           |           | SOT2_1 *2              | -        |                     | Multi-function serial ch.2 serial data output (1) |
|          |          |          |           |           |           | TIOA0_0 *2, *3, *4     | -        |                     | TIOA output of Base timer ch.0 (0)                |
|          |          |          |           |           |           | INT3_1                 | -        |                     | INT3 External interrupt input (1)                 |
| -        | -        | -        | 121<br>*1 | 142       | 173       | P012                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | D26                    | -        |                     | External bus data bit26 I/O                       |
|          |          |          |           |           |           | TIOB0_0                | -        |                     | TIOB input of Base timer ch.0 (0)                 |
| -        | -        | -        | 122<br>*1 | 143       | 174       | P167                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | PPG35_1                | -        |                     | PPG ch.35 output (1)                              |
| -        | -        | -        | 123<br>*1 | 144       | 175       | P013                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | D27                    | -        |                     | External bus data bit27 I/O                       |
|          |          |          |           |           |           | TIOA1_0                | -        |                     | TIOA I/O of Base timer ch.1 (0)                   |
| -        | -        | -        | 124<br>*1 | 145       | 176       | P014                   | -        | A                   | General-purpose I/O port                          |
|          |          |          |           |           |           | D28                    | -        |                     | External bus data bit28 I/O                       |
|          |          |          |           |           |           | TIOB1_0                | -        |                     | TIOB input of Base timer ch.1 (0)                 |
| 18       | 23       | 28       | 34        | 40        | 50        | AVCC1                  | -        | -                   | Analog power supply for AD/DA convertor unit1     |
| 39       | 47       | 58       | 68        | 84        | 103       | AVCC0                  | -        | -                   | Analog power supply for AD/DA convertor unit0     |

| Pin No. |    |     |     |     |     | Pin Name        | Polarity | I/O Circuit types*8 | Function*9                                                                            |
|---------|----|-----|-----|-----|-----|-----------------|----------|---------------------|---------------------------------------------------------------------------------------|
| 64      | 80 | 100 | 120 | 144 | 176 |                 |          |                     |                                                                                       |
| 20      | 25 | 30  | 36  | 42  | 52  | AVRH1           | -        | -                   | Upper limit reference voltage for AD convertor unit1                                  |
| 38      | 46 | 57  | 67  | 83  | 102 | AVRH0           | -        | -                   | Upper limit reference voltage for AD convertor unit0                                  |
| 21      | 26 | 31  | 37  | 43  | 53  | AVSS1/<br>AVRL1 | -        | -                   | GND for AD/DA convertor unit1<br>Lower limit reference voltage for AD convertor unit1 |
| 37      | 45 | 56  | 66  | 82  | 101 | AVSS0/<br>AVRL0 | -        | -                   | GND for AD/DA convertor unit0<br>Lower limit reference voltage for AD convertor unit0 |
| 60      | 74 | 93  | 110 | 130 | 158 | C               | -        | -                   | External capacity connection output                                                   |
| -       | 20 | 25  | 30  | 36  | 44  | VCC             | -        | -                   | +5.0V power supply                                                                    |
| 32      | 40 | 50  | 60  | 72  | 88  |                 |          |                     |                                                                                       |
| -       | 61 | 76  | 91  | 109 | 133 |                 |          |                     |                                                                                       |
| 64      | 80 | 100 | 120 | 144 | 176 |                 |          |                     |                                                                                       |
| 1       | 1  | 1   | 1   | 1   | 1   | VSS             | -        | -                   | GND                                                                                   |
| -       | 21 | 26  | 31  | 37  | 45  |                 |          |                     |                                                                                       |
| 33      | 41 | 51  | 61  | 73  | 89  |                 |          |                     |                                                                                       |
| -       | 60 | 75  | 90  | 108 | 132 |                 |          |                     |                                                                                       |
| 55      | 69 | 85  | 101 | 120 | 148 |                 |          |                     |                                                                                       |
| 59      | 73 | 92  | 109 | 129 | 157 |                 |          |                     |                                                                                       |

\*1: There is a restriction of pin functions. See "Pin Name" of this table.

\*2: not supported in 64 pin

\*3: not supported in 80 pin

\*4: not supported in 100 pin

\*5: not supported in 120 pin

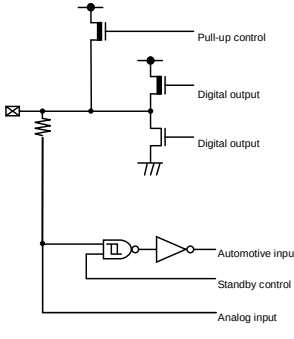
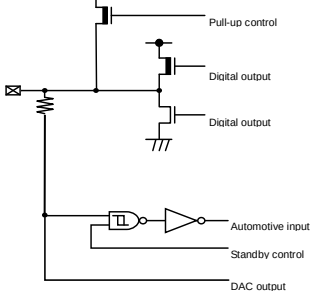
\*6: not supported in 144 pin

\*7: not supported in 176 pin

\*8: For the I/O circuit types, see [I/O Circuit Type](#).

\*9: For switching, see "I/O Port" in HARDWARE MANUAL.

#### 4. I/O Circuit Type

| Type | Circuit                                                                             | Remarks                                                                                                                                                                             |
|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A    |    | <ul style="list-style-type: none"> <li>•General-purpose I/O port</li> <li>•Output 4 mA</li> <li>•Pull-up resistor control 50 kΩ</li> <li>•Automotive input</li> </ul>               |
| B    |   | <ul style="list-style-type: none"> <li>•Analog input, General-purpose I/O port</li> <li>•Output 4 mA</li> <li>•Pull-up resistor control 50 kΩ</li> <li>•Automotive input</li> </ul> |
| C    |  | <ul style="list-style-type: none"> <li>•DAC output, General-purpose I/O port</li> <li>•Output 4 mA</li> <li>•Pull-up resistor control 50 kΩ</li> <li>•Automotive input</li> </ul>   |

| Type | Circuit                                                                             | Remarks                                                                                                                                                                                                           |
|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D    |    | <ul style="list-style-type: none"> <li>•I<sup>2</sup>C Analog input, General-purpose I/O port</li> <li>•Output 3 mA</li> <li>•Pull-up resistor control 50 kΩ</li> <li>•I<sup>2</sup>C hysteresis input</li> </ul> |
| E    |   | <ul style="list-style-type: none"> <li>•I<sup>2</sup>C, General-purpose I/O port</li> <li>•Output 3 mA</li> <li>•Pull-up resistor control 50 kΩ</li> <li>•I<sup>2</sup>C hysteresis input</li> </ul>              |
| F    |  | <ul style="list-style-type: none"> <li>•General-purpose I/O port</li> <li>•Output 4 mA</li> <li>•Pull-up resistor control 50 kΩ</li> <li>•CMOS hysteresis input</li> </ul>                                        |

| Type | Circuit                                                                             | Remarks                                                                                                                                                                                                        |
|------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| G    |    | <ul style="list-style-type: none"> <li>• Analog input, General-purpose I/O port</li> <li>• Output 4 mA</li> <li>• Pull-up resistor control 50 k<math>\Omega</math></li> <li>• CMOS hysteresis input</li> </ul> |
| H    |   | <ul style="list-style-type: none"> <li>• Analog input, General-purpose I/O port</li> <li>• Output 12 mA</li> <li>• Pull-up resistor control 50 k<math>\Omega</math></li> <li>• Automotive input</li> </ul>     |
| I    |  | <ul style="list-style-type: none"> <li>• General-purpose I/O port (5 V tolerant)</li> <li>• Output 4 mA</li> <li>• CMOS hysteresis input</li> </ul>                                                            |

| Type | Circuit                                                                             | Remarks                                                                                                                                                           |
|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| J    |    | <ul style="list-style-type: none"> <li>• Analog input, General-purpose I/O port (5 V tolerant)</li> <li>• Output 4 mA</li> <li>• CMOS hysteresis input</li> </ul> |
| K    |   | <ul style="list-style-type: none"> <li>• Mode I/O</li> <li>• CMOS hysteresis input</li> </ul>                                                                     |
| L    |  | <ul style="list-style-type: none"> <li>• Open-drain I/O</li> <li>• Output 25 mA (Nch open-drain)</li> <li>• TTL input</li> </ul>                                  |
| M    |  | <ul style="list-style-type: none"> <li>• CMOS hysteresis input</li> <li>• Pull-up resistor 50 kΩ</li> </ul>                                                       |
| N    |  | <ul style="list-style-type: none"> <li>• Main oscillation I/O</li> </ul>                                                                                          |

| Type | Circuit                                                                           | Remarks                                                                |
|------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------|
| O    |  | <ul style="list-style-type: none"> <li>•Sub oscillation I/O</li> </ul> |

## 5. Handling Precautions

Any semiconductor devices have inherently a certain rate of failure. The possibility of failure is greatly affected by the conditions in which they are used (circuit conditions, environmental conditions, etc.). This page describes precautions that must be observed to minimize the chance of failure and to obtain higher reliability from your Cypress semiconductor devices.

### 1. Precautions for Product Design

This section describes precautions when designing electronic equipment using semiconductor devices.

#### ■ Absolute Maximum Ratings

Semiconductor devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of certain established limits, called absolute maximum ratings. Do not exceed these ratings.

#### ■ Recommended Operating Conditions

Recommended operating conditions are normal operating ranges for the semiconductor device. All the device's electrical characteristics are warranted when operated within these ranges.

Always use semiconductor devices within the recommended operating conditions. Operation outside these ranges may adversely affect reliability and could result in device failure.

No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their sales representative beforehand.

#### ■ Processing and Protection of Pins

These precautions must be followed when handling the pins which connect semiconductor devices to power supply and input/output functions.

#### (1) Preventing Over-Voltage and Over-Current Conditions

Exposure to voltage or current levels in excess of maximum ratings at any pin is likely to cause deterioration within the device, and in extreme cases leads to permanent damage of the device. Try to prevent such overvoltage or over-current conditions at the design stage.

#### (2) Protection of Output Pins

Shorting of output pins to supply pins or other output pins, or connection to large capacitance can cause large current flows. Such conditions if present for extended periods of time can damage the device. Therefore, avoid this type of connection.

#### (3) Handling of Unused Input Pins

Unconnected input pins with very high impedance levels can adversely affect stability of operation. Such pins should be connected through an appropriate resistance to a power supply pin or ground pin.

#### ■ Latch-up

Semiconductor devices are constructed by the formation of P-type and N-type areas on a substrate. When subjected to abnormally high voltages, internal parasitic PNP junctions (called thyristor structures) may be formed, causing large current levels in excess of several hundred mA to flow continuously at the power supply pin. This condition is called latch-up.

**CAUTION:** The occurrence of latch-up not only causes loss of reliability in the semiconductor device, but can cause injury or damage from high heat, smoke or flame. To prevent this from happening, do the following:

- (1) Be sure that voltages applied to pins do not exceed the absolute maximum ratings. This should include attention to abnormal noise, surge levels, etc.
- (2) Be sure that abnormal current flows do not occur during the power-on sequence.

#### ■ Observance of Safety Regulations and Standards

Most countries in the world have established standards and regulations regarding safety, protection from electromagnetic interference, etc. Customers are requested to observe applicable regulations and standards in the design of products.

#### ■ Fail-Safe Design

Any semiconductor devices have inherently a certain rate of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

#### ■ Precautions Related to Usage of Devices

Cypress semiconductor devices are intended for use in standard applications (computers, office automation and other office equipment, industrial, communications, and measurement equipment, personal or household devices, etc.).

**CAUTION:** Customers considering the use of our products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage, or where extremely high levels of reliability are demanded (such as aerospace systems, atomic energy controls, sea floor repeaters, vehicle operating controls, medical devices for life support, etc.) are requested to consult with sales representatives before such use. The company will not be responsible for damages arising from such use without prior approval.

### 2. Precautions for Package Mounting

Package mounting may be either lead insertion type or surface mount type. In either case, for heat resistance during soldering, you should only mount under Cypress's recommended conditions. For detailed information about mount conditions, contact your sales representative.

#### ■ Lead Insertion Type

Mounting of lead insertion type packages onto printed circuit boards may be done by two methods: direct soldering on the board, or mounting by using a socket.

Direct mounting onto boards normally involves processes for inserting leads into through-holes on the board and using the flow soldering (wave soldering) method of applying liquid solder. In this case, the soldering process usually causes leads to be subjected to thermal stress in excess of the absolute ratings for storage temperature. Mounting processes should conform to Cypress recommended mounting conditions.

If socket mounting is used, differences in surface treatment of the socket contacts and IC lead surfaces can lead to contact deterioration after long periods. For this reason it is recommended that the surface treatment of socket contacts and IC leads be verified before mounting.

#### ■ Surface Mount Type

Surface mount packaging has longer and thinner leads than lead-insertion packaging, and therefore leads are more easily deformed or bent. The use of packages with higher pin counts and narrower pin pitch results in increased susceptibility to open connections caused by deformed pins, or shorting due to solder bridges.

You must use appropriate mounting techniques. Cypress recommends the solder reflow method, and has established a ranking of mounting conditions for each product. Users are advised to mount packages in accordance with Cypress ranking of recommended conditions.

#### ■ Lead-Free Packaging

**CAUTION:** When ball grid array (BGA) packages with Sn-Ag-Cu balls are mounted using Sn-Pb eutectic soldering, junction strength may be reduced under some conditions of use.

#### ■ Storage of Semiconductor Devices

Because plastic chip packages are formed from plastic resins, exposure to natural environmental conditions will cause

absorption of moisture. During mounting, the application of heat to a package that has absorbed moisture can cause surfaces to peel, reducing moisture resistance and causing packages to crack. To prevent, do the following:

- (1) Avoid exposure to rapid temperature changes, which cause moisture to condense inside the product. Store products in locations where temperature changes are slight.
- (2) Use dry boxes for product storage. Products should be stored below 70 % relative humidity, and at temperatures between 5 °C and 30 °C.  
When you open Dry Package that recommends humidity 40 % to 70 % relative humidity.
- (3) When necessary, Cypress packages semiconductor devices in highly moisture-resistant aluminum laminate bags, with a silica gel desiccant. Devices should be sealed in their aluminum laminate bags for storage.
- (4) Avoid storing packages where they are exposed to corrosive gases or high levels of dust.

#### ■ Baking

Packages that have absorbed moisture may be de-moisturized by baking (heat drying). Follow the Cypress recommended conditions for baking.

Condition: 125 °C/24 h

#### ■ Static Electricity

Because semiconductor devices are particularly susceptible to damage by static electricity, you must take the following precautions:

- (1) Maintain relative humidity in the working environment between 40 % and 70 %. Use of an apparatus for ion generation may be needed to remove electricity.
- (2) Electrically ground all conveyors, solder vessels, soldering irons and peripheral equipment.
- (3) Eliminate static body electricity by the use of rings or bracelets connected to ground through high resistance (on the level of 1 MΩ).  
Wearing of conductive clothing and shoes, use of conductive floor mats and other measures to minimize shock loads is recommended.
- (4) Ground all fixtures and instruments, or protect with anti-static measures.
- (5) Avoid the use of styrofoam or other highly static-prone materials for storage of completed board assemblies.

### 3. Precautions for Use Environment

Reliability of semiconductor devices depends on ambient temperature and other conditions as described above.

For reliable performance, do the following:

#### (1) Humidity

Prolonged use in high humidity can lead to leakage in devices as well as printed circuit boards. If high humidity levels are anticipated, consider anti-humidity processing.

#### (2) Discharge of Static Electricity

When high-voltage charges exist close to semiconductor devices, discharges can cause abnormal operation. In such cases, use anti-static measures or processing to prevent discharges.

#### (3) Corrosive Gases, Dust, or Oil

Exposure to corrosive gases or contact with dust or oil may lead to chemical reactions that will adversely affect the device. If you use devices in such conditions, consider ways to prevent such exposure or to protect the devices.

#### (4) Radiation, Including Cosmic Radiation

Most devices are not designed for environments involving exposure to radiation or cosmic radiation. Users should provide shielding as appropriate.

#### (5) Smoke, Flame

CAUTION: Plastic molded devices are flammable, and therefore should not be used near combustible substances. If devices begin to smoke or burn, there is danger of the release of toxic gases.

Customers considering the use of Cypress products in other special environmental conditions should consult with sales representatives.

## 6. Handling Devices

This section explains the latch-up prevention and pin processing.

### ■ For latch-up prevention

If a voltage higher than VCC or a voltage lower than VSS is applied to an I/O pin, or if a voltage exceeding the ratings is applied between VCC and VSS pins, a latch-up may occur in CMOS IC. If the latch-up occurs, the power supply current increases excessively and device elements may be damaged by heat. Take care to prevent any voltage from exceeding the maximum ratings in device application.

Also, the analog power supply (AVCC, AVRH) and analog input must not be exceed the digital power supply (VCC) when the power supply to the analog system is turned on or off.

In the correct power-on sequence of the microcontroller, turn on the digital power supply (VCC) and analog power supplies (AVCC, AVRH) simultaneously. Or, turn on the digital power supply (VCC), and then turn on analog power supplies (AVCC, AVRH).

### ■ Treatment of unused pins

If unused input pins are left open, they may cause a permanent damage to the device due to malfunction or latch-up. Connect at least a 2 k $\Omega$  resistor to each of the unused pins for pull-up or pull-down processing.

Also, if I/O pins are not used, they must be set to the output state for releasing or they must be set to the input state and treated in the same way as for the input pins.

### ■ Power supply pins

The device is designed to ensure that if the device contains multiple VCC or VSS pins, the pins that should be at the same potential are interconnected to prevent latch-up or other malfunctions. Further, connect these pins to an external power supply or ground to reduce unwanted radiation, prevent strobe signals from malfunctioning due to a raised ground level, and fulfill the total output current standard, etc. As shown in figure 1, all Vss power supply pins must be treated in the similar way. If multiple Vcc or Vss systems are connected, the device cannot operate correctly even within the guaranteed operating range.

Figure 1 Power Supply Input Pins



The power supply pins should be connected to VCC and VSS pins of this device at the low impedance from the power supply source.

In the area close to this device, a ceramic capacitor having the capacitance larger than the capacitor of C pin is recommended to use as a bypass capacitor between VCC and VSS pins.

■ Crystal oscillation circuit

An external noise to the X0 or X1 pin may cause a device malfunction. The printed circuit board must be designed to lay out X0 and X1 pins, crystal oscillator (or ceramic resonator), and the bypass capacitor to be grounded to the close position to the device.

The printed circuit board artwork is recommended to surround the X0 and X1 pins by ground circuits.

■ Mode pins (MD1, MD0)

Connect the MD1 and MD0 mode pins to the VCC or VSS pin directly. To prevent an erroneous selection of test mode caused by the noise, reduce the pattern length between each mode pin and VCC or VSS pin on the printed circuit board. Also, use the low-impedance pin connection.

■ During power-on

To prevent a malfunction of the voltage step-down circuit built in the device, the voltage rising must be monotonic during power-on.

■ Notes during PLL clock operation

When the PLL clock is selected and if the oscillator is disconnected or if the input is stopped, this clock may continue to operate at the free running frequency of the self-oscillator circuit built in the PLL clock. This operation is not guaranteed.

■ Treatment of A/D converter power supply pins

Connect the pins to have  $AVCC = AVRH = VCC$  and  $AVSS/AVRL = VSS$  even if the A/D converter is not used.

■ Notes on using external clock

An external clock is not supported. None of the external direct clock input can be used for both main clock and sub clock.

■ Power-on sequence of A/D converter analog inputs

Be sure to turn on the digital power supply (Vcc) first, and then turn on the A/D converter power supplies (AVcc, AVRH, AVRL) and analog inputs (AN0 to AN47). Also, turn off the A/D converter power supplies and analog inputs first, and then turn off the digital power supply (Vcc). When the AVRH pin voltage is turned on or off, it must not exceed AVCC. Even if a common analog input pin is used as an input port, its input voltage must not exceed AVcc. (However, the analog power supply and digital power supply can be turned on or off simultaneously.)

■ Treatment of C pin

This device contains a voltage step-down circuit. A capacitor must always be connected to the C pin to assure the internal stabilization of the device. For the standard values, see the "Recommended Operating Conditions" of the latest data sheet.

**Note:** Please see the latest data sheet for a detailed specification of the operation voltage.

■ Function switching of a multiplexed port

To switch between the port function and the multiplexed pin function, use the PFR (port function register). However, if a pin is also used for an external bus, its function is switched by the external bus setting. For details, see "I/O PORTS" in the hardware manual.

■ Low-power consumption mode

To transit to the sleep mode, watch mode, stop mode, watch mode(power-off) or stop mode(power-off), follow the procedure explained in "Activating the sleep mode, watch mode, or stop mode" or "Activating the watch mode (power-off) or stop mode(power-off)" of "POWER CONSUMPTION CONTROL" in the hardware manual.

Take the following notes when using a monitor debugger.

- Do not set a break point for the low-power consumption transition program.
- Do not execute an operation step for the low-power consumption transition program.

■ Notes When Writing Data in a Register Having the Status Flag

When writing data in the register that has a status flag (especially, an interrupt request flag) to control function, taking care not to clear its status flag erroneously must be followed.

The program must be written not to clear the flag to the status bit, and then to set the control bits to have the desired value.

Especially, if multiple control bits are used, the bit instruction cannot be used. (The bit instruction can access to a single bit only.) By the Byte, Half-word, or Word access, data is written to the control bits and status flag simultaneously. During this time, take care not to clear other bits (in this case, the bits of status flag) erroneously.

**Note:** These points can be ignored because the bit instructions are already taken the points into consideration.

## 7. Block Diagram

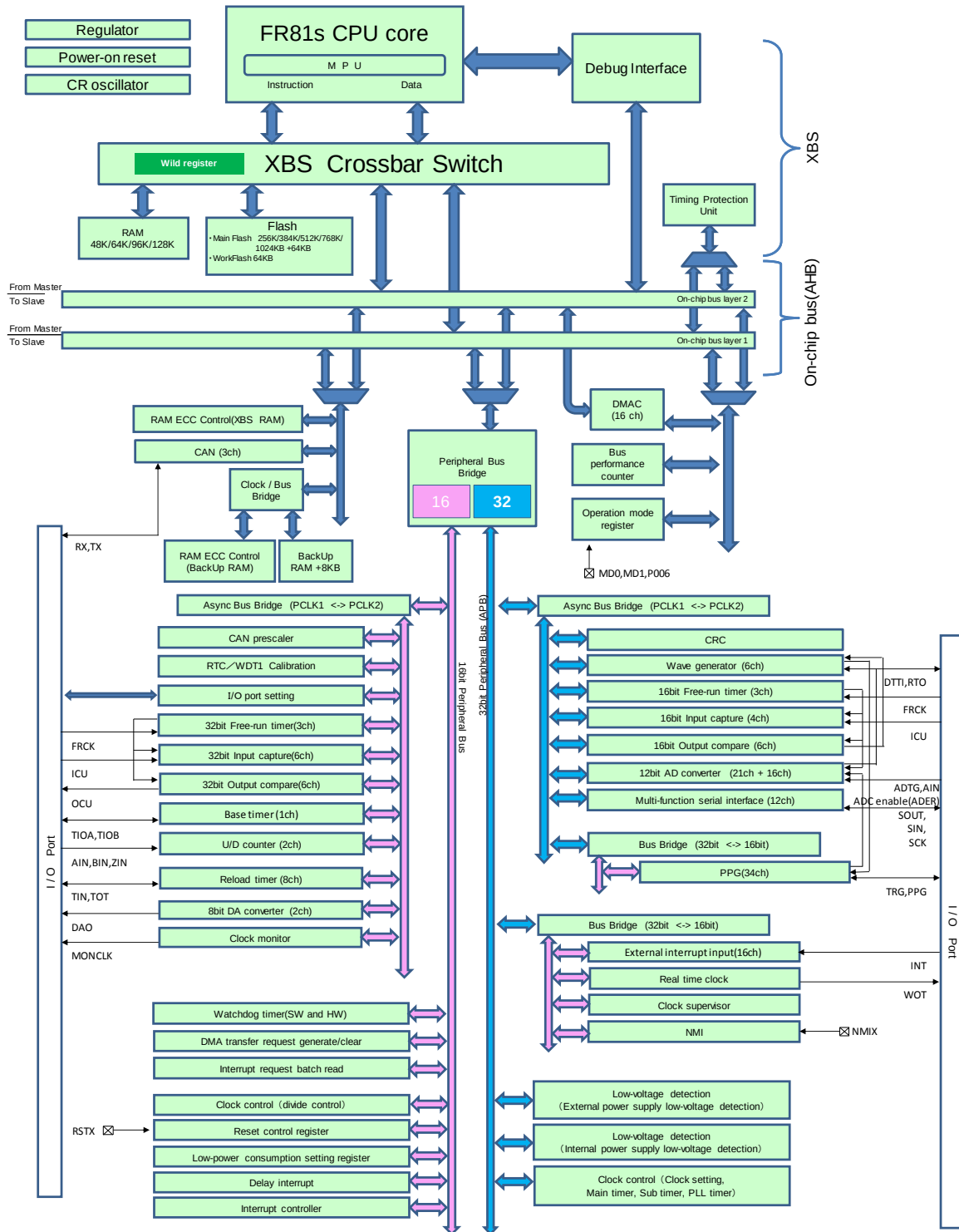
CY91F522B, CY91F523B, CY91F524B, CY91F525B, CY91F526B

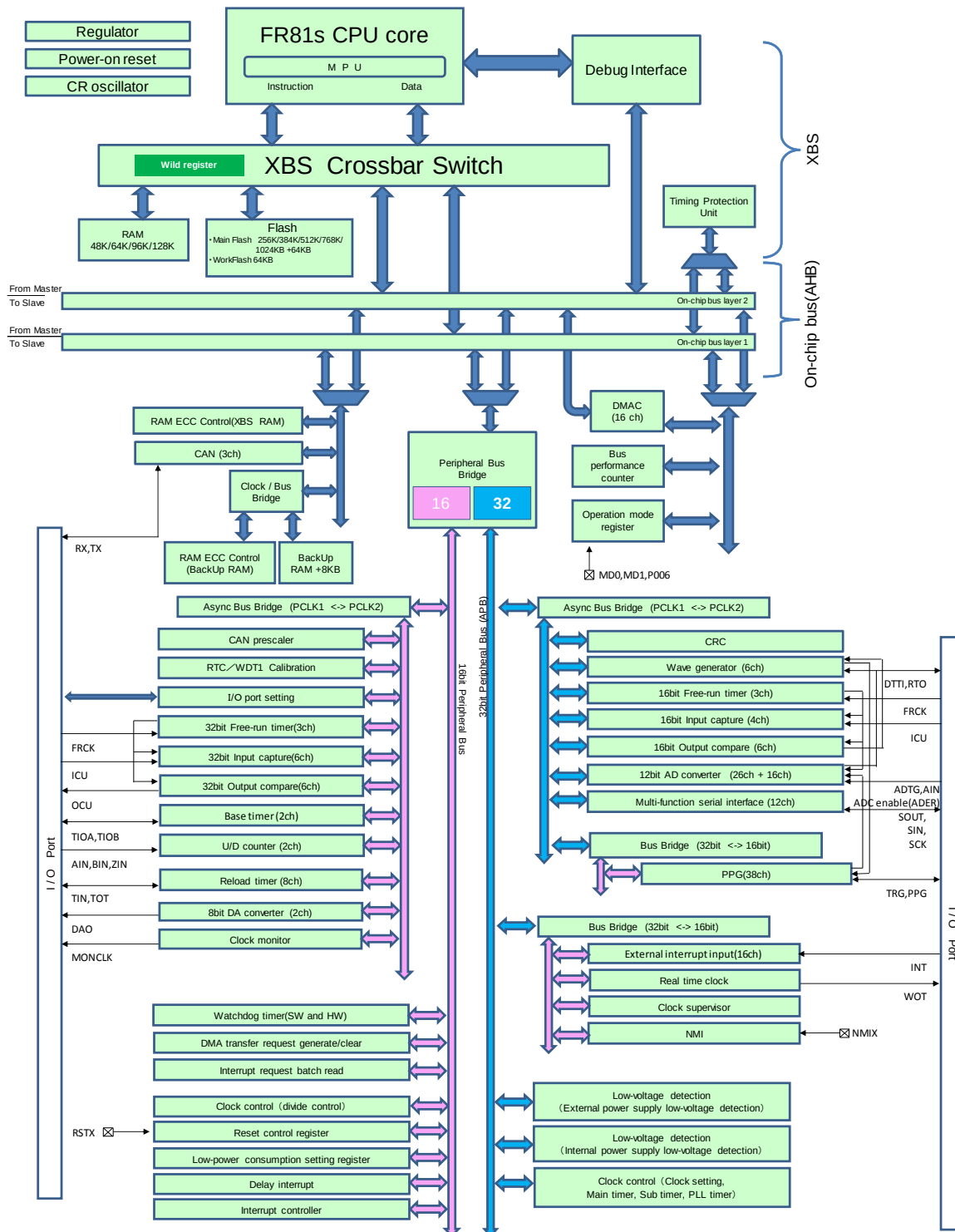


**CY91F522D, CY91F523D, CY91F524D, CY91F525D, CY91F526D**



**CY91F522F, CY91F523F, CY91F524F, CY91F525F, CY91F526F**



**CY91F522J, CY91F523J, CY91F524J, CY91F525J, CY91F526J**




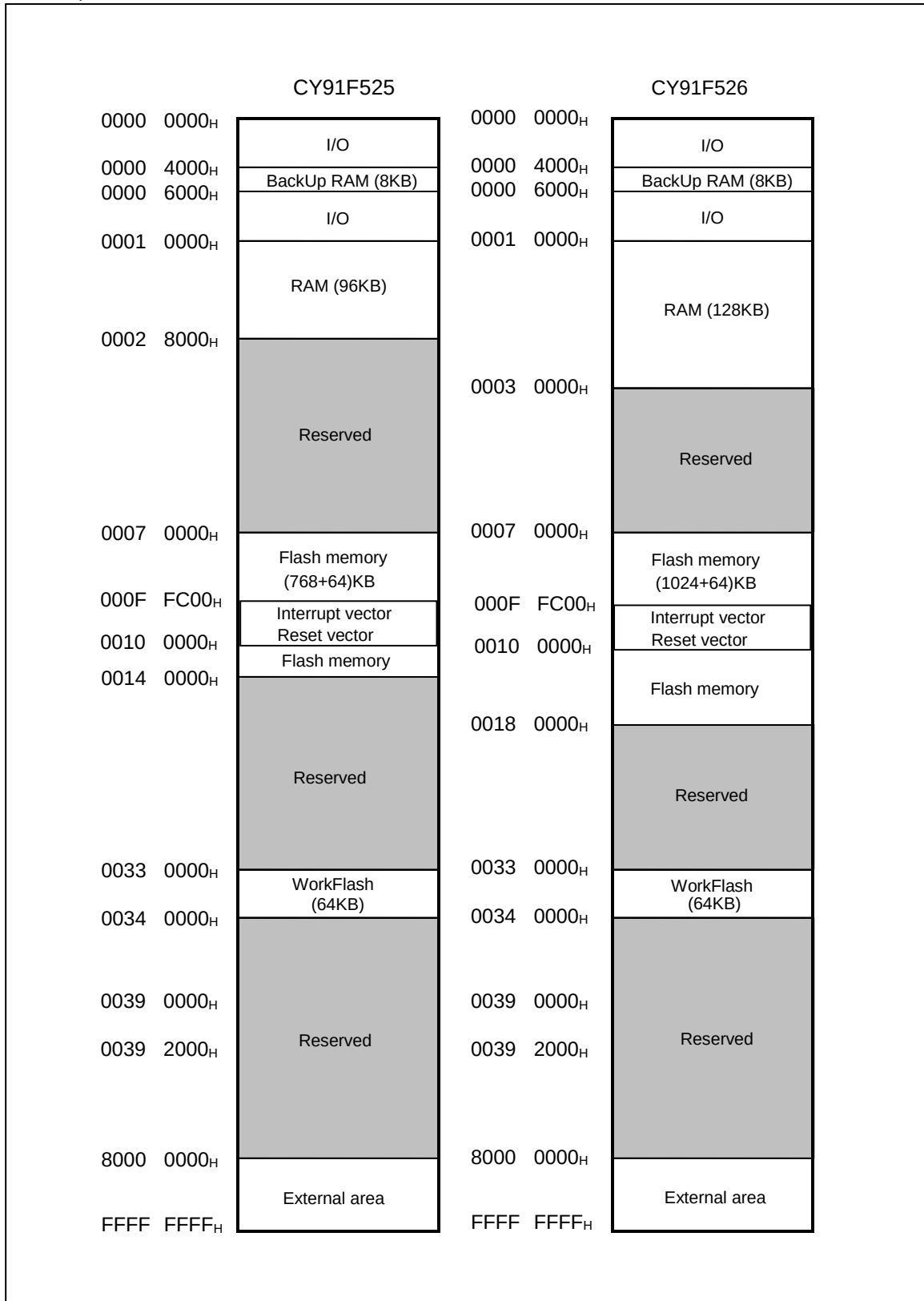
**CY91F522L, CY91F523L, CY91F524L, CY91F525L, CY91F526L**



## 8. Memory Map

CY91F522, CY91F523, CY91F524

| CY91F522 |                                  | CY91F523 |                                  | CY91F524 |                                  |
|----------|----------------------------------|----------|----------------------------------|----------|----------------------------------|
| 0000     | 0000 <sub>H</sub>                | 0000     | 0000 <sub>H</sub>                | 0000     | 0000 <sub>H</sub>                |
| 0000     | 4000 <sub>H</sub>                | 0000     | 4000 <sub>H</sub>                | 0000     | 4000 <sub>H</sub>                |
| 0000     | 6000 <sub>H</sub>                | 0000     | 6000 <sub>H</sub>                | 0000     | 6000 <sub>H</sub>                |
| 0001     | 0000 <sub>H</sub>                | 0001     | 0000 <sub>H</sub>                | 0001     | 0000 <sub>H</sub>                |
| 0001     | C000 <sub>H</sub>                | 0001     | C000 <sub>H</sub>                | 0002     | 0000 <sub>H</sub>                |
|          | I/O                              |          | I/O                              |          | I/O                              |
|          | BackUp RAM (8KB)                 |          | BackUp RAM (8KB)                 |          | BackUp RAM (8KB)                 |
|          | I/O                              |          | I/O                              |          | I/O                              |
|          | RAM (48KB)                       |          | RAM (48KB)                       |          | RAM (64KB)                       |
|          | Reserved                         |          | Reserved                         |          | Reserved                         |
| 0007     | 0000 <sub>H</sub>                | 0007     | 0000 <sub>H</sub>                | 0007     | 0000 <sub>H</sub>                |
| 000C     | 0000 <sub>H</sub>                | 000E     | 0000 <sub>H</sub>                |          | Flash memory (512+64)KB          |
|          | Flash memory (256+64)KB          |          | Flash memory (384+64)KB          |          | Flash memory (512+64)KB          |
|          | Reserved                         |          | Reserved                         |          | Reserved                         |
| 000F     | FC00 <sub>H</sub>                | 000F     | FC00 <sub>H</sub>                | 000F     | FC00 <sub>H</sub>                |
| 0010     | 0000 <sub>H</sub>                | 0010     | 0000 <sub>H</sub>                | 0010     | 0000 <sub>H</sub>                |
|          | Interrupt vector<br>Reset vector |          | Interrupt vector<br>Reset vector |          | Interrupt vector<br>Reset vector |
|          | Reserved                         |          | Reserved                         |          | Reserved                         |
| 0033     | 0000 <sub>H</sub>                | 0033     | 0000 <sub>H</sub>                | 0033     | 0000 <sub>H</sub>                |
| 0034     | 0000 <sub>H</sub>                | 0034     | 0000 <sub>H</sub>                | 0034     | 0000 <sub>H</sub>                |
|          | WorkFlash (64KB)                 |          | WorkFlash (64KB)                 |          | WorkFlash (64KB)                 |
|          | Reserved                         |          | Reserved                         |          | Reserved                         |
| 8000     | 0000 <sub>H</sub>                | 8000     | 0000 <sub>H</sub>                | 8000     | 0000 <sub>H</sub>                |
| FFFF     | FFFF <sub>H</sub>                | FFFF     | FFFF <sub>H</sub>                | FFFF     | FFFF <sub>H</sub>                |
|          | External area                    |          | External area                    |          | External area                    |

**CY91F525, CY91F526**


## 9. I/O Map

The following I/O map shows the relationship between memory space and registers for peripheral resources.

Legend of I/O Map

| Address             | Address offset value/ register name        |                                |                                                     |                                | Block         |
|---------------------|--------------------------------------------|--------------------------------|-----------------------------------------------------|--------------------------------|---------------|
|                     | +0                                         | +1                             | +2                                                  | +3                             |               |
| 000090 <sub>H</sub> | BT1TMR[R] H<br>0000000000000000            |                                | BT1TMCR[R/W]B,H,W<br>00000000 00000000              |                                | Base timer 1  |
| 000094 <sub>H</sub> | -                                          | BT1STC[R/W] B<br>00000000      | -                                                   | -                              |               |
| 000098 <sub>H</sub> | BT1PCSR/BT1PRL[R /W] H<br>0000000000000000 |                                | BT1PDU T/BT1PRLH/BT1DTBF[R/W] H<br>0000000000000000 |                                |               |
| 00009C <sub>H</sub> | BTSEL[R/W] B<br>----000 0                  | -                              | BTSSSR[W] B,H<br>-----11                            |                                |               |
| 0000A0 <sub>H</sub> | ADERH [R/W]B, H, W<br>00000000 00000000    |                                | ADERL [R/W]B, H, W<br>00000000 00000000             |                                | A/D converter |
| 0000A4 <sub>H</sub> | ADCS1 [R/W] B, H,W<br>00000000             | ADCS0 [R/W] B, H,W<br>00000000 | ADCR1 [R] B, H,W<br>-----XX                         | ADCR0 [R] B, H,W<br>XXXXX XXX  |               |
| 0000A8 <sub>H</sub> | ADCT1 [R/W] B, H,W<br>00010000             | ADCT0 [R/W] B, H,W<br>00101100 | ADSCH [R/W] B, H,W<br>---00000                      | ADECH [R/W] B, H,W<br>---00000 |               |

Read/Write attribute (R: Read W: Write)

Initial register value after reset

Data access attribute  
B: Byte  
H: Half-word  
W: Word  
(Note)The access by the data  
access attribute not described  
is disabled.

The initial register value after reset indicates as follows:

- "1": Initial value "1"
- "0": Initial value "0"
- "X": Initial value undefined
- "-": Reserved bit/Undefined bit
- "\*": Initial value "0" or "1" according to the setting

**Note:** The access to addresses not described is disabled.

| Address                                          | Address offset value / Register name |                                                |                                         |                                   | Block                                  |
|--------------------------------------------------|--------------------------------------|------------------------------------------------|-----------------------------------------|-----------------------------------|----------------------------------------|
|                                                  | +0                                   | +1                                             | +2                                      | +3                                |                                        |
| 000000 <sub>H</sub>                              | PDR00 [R/W] B,H,W<br>XXXXXXXX        | PDR01 [R/W] B,H,W<br>XXXXXXXX                  | PDR02 [R/W] B,H,W<br>XXXXXXXX           | PDR03 [R/W] B,H,W<br>XXXXXXXX     | Port Data Register                     |
| 000004 <sub>H</sub>                              | PDR04 [R/W] B,H,W<br>XXXXXXXX        | PDR05 [R/W] B,H,W<br>XXXXXXXX                  | PDR06 [R/W] B,H,W<br>XXXXXXXX           | PDR07 [R/W] B,H,W<br>XXXXXXXX     |                                        |
| 000008 <sub>H</sub>                              | PDR08 [R/W] B,H,W<br>XXXXXXXX        | PDR09 [R/W] B,H,W<br>XXXXXXXX                  | PDR10 [R/W] B,H,W<br>XXXXXXXX           | PDR11 [R/W] B,H,W<br>XXXXXXXX     |                                        |
| 00000C <sub>H</sub>                              | PDR12 [R/W] B,H,W<br>XXXXXXXX        | PDR13 [R/W] B,H,W<br>-XXXXXXXX                 | PDR14 [R/W] B,H,W<br>---XXX--           | PDR15 [R/W] B,H,W<br>--XXXXXX     |                                        |
| 000010 <sub>H</sub>                              | —                                    | —                                              | —                                       | —                                 |                                        |
| 000014 <sub>H</sub>                              | —                                    | —                                              | —                                       | —                                 |                                        |
| 000018 <sub>H</sub>                              | PDR16 [R/W] B,H,W<br>XXXXXXXX        | PDR17 [R/W] B,H,W<br>XXXXXXXX                  | PDR18 [R/W] B,H,W<br>XXXXXXXX           | PDR19 [R/W] B,H,W<br>XXXXXXXX     |                                        |
| 00001C <sub>H</sub><br>to<br>000034 <sub>H</sub> | —                                    | —                                              | —                                       | —                                 | Reserved                               |
| 000038 <sub>H</sub>                              | WDTECR0 [R/W]<br>B,H,W<br>---00000   | —                                              | —                                       | —                                 | Watchdog Timer<br>[S]                  |
| 00003C <sub>H</sub>                              | WDTCR0 [R/W]<br>B,H,W<br>-0--0000    | WDTCPR0 [W]<br>B,H,W<br>00000000               | WDTCR1 [R]<br>B,H,W<br>----0110         | WDTCPR1 [W]<br>B,H,W<br>00000000  |                                        |
| 000040 <sub>H</sub>                              | —                                    | —                                              | —                                       | —                                 | Reserved                               |
| 000044 <sub>H</sub>                              | DICR [R/W]<br>B,H,W<br>-----0        | —                                              | —                                       | —                                 | Delayed Interrupt                      |
| 000048 <sub>H</sub><br>to<br>00005C <sub>H</sub> | —                                    | —                                              | —                                       | —                                 | Reserved                               |
| 000060 <sub>H</sub>                              | TMRLRA0 [R/W] H<br>XXXXXXXX XXXXXXXX |                                                | TMR0 [R] H<br>XXXXXXXX XXXXXXXX         |                                   | Reload Timer 0                         |
| 000064 <sub>H</sub>                              | TMRLRB0 [R/W] H<br>XXXXXXXX XXXXXXXX |                                                | TMCSR0 [R/W] B,H,W<br>00000000 0-000000 |                                   |                                        |
| 000068 <sub>H</sub>                              | TMRLRA7 [R/W] H<br>XXXXXXXX XXXXXXXX |                                                | TMR7 [R] H<br>XXXXXXXX XXXXXXXX         |                                   | Reload Timer 7                         |
| 00006C <sub>H</sub>                              | TMRLRB7 [R/W] H<br>XXXXXXXX XXXXXXXX |                                                | TMCSR7 [R/W] B,H,W<br>00000000 0-000000 |                                   |                                        |
| 000070 <sub>H</sub>                              | —                                    | FRS8 [R/W] B,H,W<br>--00--00 --00--00 --00--00 |                                         |                                   | Free-run timer selection<br>register 8 |
| 000074 <sub>H</sub>                              | —                                    | FRS9 [R/W] B,H,W<br>--00--00 --00--00 --00--00 |                                         |                                   | Free-run timer selection<br>register 9 |
| 000078 <sub>H</sub>                              | —                                    | —                                              | —                                       | OCLS67 [R/W]<br>B,H,W<br>----0000 | OCU67 Output level control<br>register |
| 00007C <sub>H</sub>                              | —                                    | —                                              | —                                       | OCLS89 [R/W]<br>B,H,W<br>----0000 | OCU89 Output level control<br>register |
| 000080 <sub>H</sub>                              | BT0TMR [R] H<br>00000000 00000000    |                                                | BT0TMCR [R/W] H<br>-000--00 -000-000    |                                   | Base Timer 0                           |

| Address                                          | Address offset value / Register name                 |                            |                                                      |                                   | Block                                                      |
|--------------------------------------------------|------------------------------------------------------|----------------------------|------------------------------------------------------|-----------------------------------|------------------------------------------------------------|
|                                                  | +0                                                   | +1                         | +2                                                   | +3                                |                                                            |
| 000084 <sub>H</sub>                              | BT0TMCR2 [R/W] B<br>-----0                           | BT0STC [R/W] B<br>-0-0-0-0 | —                                                    | —                                 |                                                            |
| 000088 <sub>H</sub>                              | BT0PCSR/BT0PRL [R/W] H<br>00000000 00000000          |                            | BT0PDUT/BT0PRLH/BT0DTBF [R/W] H<br>00000000 00000000 |                                   |                                                            |
| 00008C <sub>H</sub>                              | —                                                    | —                          | —                                                    | —                                 |                                                            |
| 000090 <sub>H</sub>                              | BT1TMR [R] H<br>00000000 00000000                    |                            | BT1TMCR [R/W] H<br>-000--00 -000-000                 |                                   | Base Timer 1                                               |
| 000094 <sub>H</sub>                              | BT1TMCR2 [R/W] B<br>-----0                           | BT1STC [R/W] B<br>-0-0-0-0 | —                                                    | —                                 |                                                            |
| 000098 <sub>H</sub>                              | BT1PCSR/BT1PRL [R/W] H<br>00000000 00000000          |                            | BT1PDUT/BT1PRLH/BT1DTBF [R/W] H<br>00000000 00000000 |                                   |                                                            |
| 00009C <sub>H</sub>                              | BTSEL01 [R/W] B<br>----0000                          | —                          | BTSSSR [W] B,H<br>-----11                            |                                   | Base Timer 0,1                                             |
| 0000A0 <sub>H</sub><br>to<br>0000FC <sub>H</sub> | —                                                    | —                          | —                                                    | —                                 | Reserved                                                   |
| 000100 <sub>H</sub>                              | TMRLRA1 [R/W] H<br>XXXXXXXX XXXXXXXX                 |                            | TMR1 [R] H<br>XXXXXXXX XXXXXXXX                      |                                   | Reload Timer 1                                             |
| 000104 <sub>H</sub>                              | TMRLRB1 [R/W] H<br>XXXXXXXX XXXXXXXX                 |                            | TMCSR1 [R/W] B, H,W<br>00000000 0-000000             |                                   |                                                            |
| 000108 <sub>H</sub>                              | TMRLRA2 [R/W] H<br>XXXXXXXX XXXXXXXX                 |                            | TMR2 [R] H<br>XXXXXXXX XXXXXXXX                      |                                   | Reload Timer 2                                             |
| 00010C <sub>H</sub>                              | TMRLRB2 [R/W] H<br>XXXXXXXX XXXXXXXX                 |                            | TMCSR2 [R/W] B,H,W<br>00000000 0-000000              |                                   |                                                            |
| 000110 <sub>H</sub>                              | TMRLRA3 [R/W] H<br>XXXXXXXX XXXXXXXX                 |                            | TMR3 [R] H<br>XXXXXXXX XXXXXXXX                      |                                   | Reload Timer 3                                             |
| 000114 <sub>H</sub>                              | TMRLRB3 [R/W] H<br>XXXXXXXX XXXXXXXX                 |                            | TMCSR3 [R/W] B,H,W<br>00000000 0-000000              |                                   |                                                            |
| 000118 <sub>H</sub>                              | MSCY4 [R] H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                            |                                                      |                                   | Input Capture 4,5<br>Cycle measurement data<br>register 45 |
| 00011C <sub>H</sub>                              | MSCY5 [R] H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                            |                                                      |                                   |                                                            |
| 000120 <sub>H</sub>                              | OCCP6 [R/W] W<br>00000000 00000000 00000000 00000000 |                            |                                                      |                                   | Output<br>Compare 6,7<br>32-bit OCU                        |
| 000124 <sub>H</sub>                              | OCCP7 [R/W] W<br>00000000 00000000 00000000 00000000 |                            |                                                      |                                   |                                                            |
| 000128 <sub>H</sub>                              | —                                                    | —                          | OCSH67 [R/W]<br>B,H,W<br>---0--00                    | OCSL67 [R/W]<br>B,H,W<br>0000--00 |                                                            |
| 00012C <sub>H</sub>                              | OCCP8 [R/W] W<br>00000000 00000000 00000000 00000000 |                            |                                                      |                                   | Output<br>Compare 8,9<br>32-bit OCU                        |
| 000130 <sub>H</sub>                              | OCCP9 [R/W] W<br>00000000 00000000 00000000 00000000 |                            |                                                      |                                   |                                                            |
| 000134 <sub>H</sub>                              | —                                                    | —                          | OCSH89 [R/W]<br>B,H,W<br>---0--00                    | OCSL89 [R/W]<br>B,H,W<br>0000--00 |                                                            |
| 000138 <sub>H</sub><br>to<br>0001B4 <sub>H</sub> | —                                                    | —                          | —                                                    | —                                 | Reserved                                                   |

| Address                                          | Address offset value / Register name                  |                                   |                                          |                                   | Block                           |
|--------------------------------------------------|-------------------------------------------------------|-----------------------------------|------------------------------------------|-----------------------------------|---------------------------------|
|                                                  | +0                                                    | +1                                | +2                                       | +3                                |                                 |
| 0001B8 <sub>H</sub>                              | EPFR64 [R/W]<br>B,H,W<br>-----00-                     | EPFR65 [R/W]<br>B,H,W<br>0000-000 | EPFR66 [R/W]<br>B,H,W<br>--000000        | EPFR67 [R/W]<br>B,H,W<br>----0000 | Extended port function register |
| 0001BC <sub>H</sub>                              | EPFR68 [R/W]<br>B,H,W<br>----0000                     | EPFR69 [R/W]<br>B,H,W<br>----0000 | EPFR70 [R/W]<br>B,H,W<br>---00000        | EPFR71 [R/W]<br>B,H,W<br>-0-0-0-0 |                                 |
| 0001C0 <sub>H</sub>                              | EPFR72 [R/W]<br>B,H,W<br>000000-0                     | EPFR73 [R/W]<br>B,H,W<br>00000000 | EPFR74 [R/W]<br>B,H,W<br>00000000        | EPFR75 [R/W]<br>B,H,W<br>00000000 |                                 |
| 0001C4 <sub>H</sub>                              | EPFR76 [R/W]<br>B,H,W<br>00000000                     | EPFR77 [R/W]<br>B,H,W<br>--000000 | EPFR78 [R/W]<br>B,H,W<br>-----00         | EPFR79 [R/W]<br>B,H,W<br>00000000 |                                 |
| 0001C8 <sub>H</sub>                              | EPFR80 [R/W]<br>B,H,W<br>---00000                     | EPFR81 [R/W]<br>B,H,W<br>00000000 | EPFR82 [R/W]<br>B,H,W<br>00000000        | EPFR83 [R/W]<br>B,H,W<br>-0000000 |                                 |
| 0001CC <sub>H</sub>                              | EPFR84 [R/W]<br>B,H,W<br>00000000                     | EPFR85 [R/W]<br>B,H,W<br>--000000 | EPFR86 [R/W]<br>B,H,W<br>---00000        | EPFR87 [R/W]<br>B,H,W<br>-----00  |                                 |
| 0001D0 <sub>H</sub>                              | EPFR88 [R/W]<br>B,H,W<br>-----0                       | —                                 | —                                        | —                                 |                                 |
| 0001D4 <sub>H</sub>                              | —                                                     | —                                 | —                                        | —                                 | Reserved                        |
| 0001D8 <sub>H</sub>                              | TMRLRA4 [R/W] H<br>XXXXXXXXXX XXXXXXXXXX              |                                   | TMR4 [R] H<br>XXXXXXXXXX XXXXXXXXXX      |                                   | Reload Timer 4                  |
| 0001DC <sub>H</sub>                              | TMRLRB4 [R/W] H<br>XXXXXXXXXX XXXXXXXXXX              |                                   | TMCSR4 [R/W] B, H,W<br>00000000 0-000000 |                                   |                                 |
| 0001E0 <sub>H</sub><br>to<br>0001EC <sub>H</sub> | —                                                     | —                                 | —                                        | —                                 | Reserved                        |
| 0001F0 <sub>H</sub>                              | TMRLRA5 [R/W] H<br>XXXXXXXXXX XXXXXXXXXX              |                                   | TMR5 [R] H<br>XXXXXXXXXX XXXXXXXXXX      |                                   | Reload Timer 5                  |
| 0001F4 <sub>H</sub>                              | TMRLRB5 [R/W] H<br>XXXXXXXXXX XXXXXXXXXX              |                                   | TMCSR5 [R/W] B, H,W<br>00000000 0-000000 |                                   |                                 |
| 0001F8 <sub>H</sub>                              | TMRLRA6 [R/W] H<br>XXXXXXXXXX XXXXXXXXXX              |                                   | TMR6 [R] H<br>XXXXXXXXXX XXXXXXXXXX      |                                   | Reload Timer 6                  |
| 0001FC <sub>H</sub>                              | TMRLRB6 [R/W] H<br>XXXXXXXXXX XXXXXXXXXX              |                                   | TMCSR6 [R/W] B, H,W<br>00000000 0-000000 |                                   |                                 |
| 000200 <sub>H</sub><br>to<br>000238 <sub>H</sub> | —                                                     | —                                 | —                                        | —                                 | Reserved                        |
| 00023C <sub>H</sub>                              | DACR0 [R/W] B,H,W<br>-----0                           | DADR0 [R/W] B,H,W<br>XXXXXXXXXX   | DACR1 [R/W] B,H,W<br>-----0              | DADR1 [R/W] B,H,W<br>XXXXXXXXXX   | DA Converter                    |
| 000240 <sub>H</sub>                              | CPCLR3 [R/W] W<br>11111111 11111111 11111111 11111111 |                                   |                                          |                                   | Free-run Timer 3<br>32-bit FRT  |
| 000244 <sub>H</sub>                              | TCDT3 [R/W] W<br>00000000 00000000 00000000 00000000  |                                   |                                          |                                   |                                 |
| 000248 <sub>H</sub>                              | TCCSH3 [R/W]<br>B,H,W<br>0----00                      | TCCSL3 [R/W]<br>B,H,W<br>-1-00000 | —                                        | —                                 |                                 |
| 00024C <sub>H</sub>                              | CPCLR4 [R/W] W<br>11111111 11111111 11111111 11111111 |                                   |                                          |                                   | Free-run Timer 4<br>32-bit FRT  |
| 000250 <sub>H</sub>                              | TCDT4 [R/W] W<br>00000000 00000000 00000000 00000000  |                                   |                                          |                                   |                                 |
| 000254 <sub>H</sub>                              | TCCSH4 [R/W]<br>B,H,W<br>0----00                      | TCCSL4 [R/W]<br>B,H,W<br>-1-00000 | —                                        | —                                 |                                 |

| Address                                          | Address offset value / Register name                 |    |                                    |    | Block                                              |
|--------------------------------------------------|------------------------------------------------------|----|------------------------------------|----|----------------------------------------------------|
|                                                  | +0                                                   | +1 | +2                                 | +3 |                                                    |
| 000258 <sub>H</sub><br>to<br>0002C0 <sub>H</sub> | —                                                    | —  | —                                  | —  | Reserved                                           |
| 0002C4 <sub>H</sub><br>to<br>0002FC <sub>H</sub> | —                                                    | —  | —                                  | —  | Reserved                                           |
| 000300 <sub>H</sub><br>to<br>00030C <sub>H</sub> | —                                                    | —  | —                                  | —  | Reserved                                           |
| 000310 <sub>H</sub>                              | —                                                    | —  | MPUCR [R/W] H<br>000000-0 ----0100 |    | MPU [S]<br>(Only CPU core can access<br>this area) |
| 000314 <sub>H</sub>                              | —                                                    | —  | —                                  | —  |                                                    |
| 000318 <sub>H</sub>                              | —                                                    |    |                                    |    |                                                    |
| 00031C <sub>H</sub>                              | —                                                    | —  | —                                  |    |                                                    |
| 000320 <sub>H</sub>                              | DPVAR [R] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX   |    |                                    |    |                                                    |
| 000324 <sub>H</sub>                              | —                                                    | —  | DPVSR [R/W] H<br>----- 00000--0    |    |                                                    |
| 000328 <sub>H</sub>                              | DEAR [R] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    |    |                                    |    |                                                    |
| 00032C <sub>H</sub>                              | —                                                    | —  | DESR [R/W] H<br>----- 00000--0     |    |                                                    |
| 000330 <sub>H</sub>                              | PABR0 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXX0000 |    |                                    |    |                                                    |
| 000334 <sub>H</sub>                              | —                                                    | —  | PACR0 [R/W] H<br>000000-0 00000--0 |    |                                                    |
| 000338 <sub>H</sub>                              | PABR1 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXX0000 |    |                                    |    |                                                    |
| 00033C <sub>H</sub>                              | —                                                    | —  | PACR1 [R/W] H<br>000000-0 00000--0 |    |                                                    |
| 000340 <sub>H</sub>                              | PABR2 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXX0000 |    |                                    |    |                                                    |
| 000344 <sub>H</sub>                              | —                                                    | —  | PACR2 [R/W] H<br>000000-0 00000--0 |    |                                                    |
| 000348 <sub>H</sub>                              | PABR3 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXX0000 |    |                                    |    |                                                    |
| 00034C <sub>H</sub>                              | —                                                    | —  | PACR3 [R/W] H<br>000000-0 00000--0 |    |                                                    |
| 000350 <sub>H</sub>                              | PABR4 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXX0000 |    |                                    |    |                                                    |
| 000354 <sub>H</sub>                              | —                                                    | —  | PACR4 [R/W] H<br>000000-0 00000--0 |    |                                                    |
| 000358 <sub>H</sub>                              | PABR5 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXX0000 |    |                                    |    |                                                    |
| 00035C <sub>H</sub>                              | —                                                    | —  | PACR5 [R/W] H<br>000000-0 00000--0 |    |                                                    |
| 000360 <sub>H</sub>                              | PABR6 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXX0000 |    |                                    |    |                                                    |
| 000364 <sub>H</sub>                              | —                                                    | —  | PACR6 [R/W] H<br>000000-0 00000--0 |    |                                                    |

| Address                                          | Address offset value / Register name                 |                                    |                                    |                                    | Block                                           |
|--------------------------------------------------|------------------------------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------------------|
|                                                  | +0                                                   | +1                                 | +2                                 | +3                                 |                                                 |
| 000368 <sub>H</sub>                              | PABR7 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXX0000 |                                    |                                    |                                    | MPU [S]<br>(Only CPU core can access this area) |
| 00036C <sub>H</sub>                              | —                                                    | —                                  | PACR7 [R/W] H<br>000000-0 00000--0 |                                    |                                                 |
| 000370 <sub>H</sub><br>to<br>0003AC <sub>H</sub> | —                                                    |                                    |                                    |                                    | Reserved [S]                                    |
| 0003B0 <sub>H</sub><br>to<br>0003FC <sub>H</sub> | —                                                    | —                                  | —                                  | —                                  | Reserved [S]                                    |
| 000400 <sub>H</sub>                              | ICSEL0 [R/W] B,H,W<br>-----000                       | ICSEL1 [R/W] B,H,W<br>-----000     | ICSEL2 [R/W] B,H,W<br>-----0       | ICSEL3 [R/W] B,H,W<br>-----0       | DMA request generation<br>and clear             |
| 000404 <sub>H</sub>                              | —                                                    | ICSEL5 [R/W] B,H,W<br>-----000     | ICSEL6 [R/W] B,H,W<br>----0000     | ICSEL7 [R/W] B,H,W<br>---0000      |                                                 |
| 000408 <sub>H</sub>                              | ICSEL8 [R/W] B,H,W<br>-----00                        | ICSEL9 [R/W] B,H,W<br>-----00      | ICSEL10 [R/W]<br>B,H,W<br>-----00  | ICSEL11 [R/W]<br>B,H,W<br>-----000 |                                                 |
| 00040C <sub>H</sub>                              | —                                                    | ICSEL13 [R/W]<br>B,H,W<br>-----00  | ICSEL14 [R/W]<br>B,H,W<br>-----00  | ICSEL15 [R/W]<br>B,H,W<br>-----00  |                                                 |
| 000410 <sub>H</sub>                              | ICSEL16 [R/W]<br>B,H,W<br>---0000                    | ICSEL17 [R/W]<br>B,H,W<br>-----00  | ICSEL18 [R/W]<br>B,H,W<br>---00000 | ICSEL19 [R/W]<br>B,H,W<br>-----000 |                                                 |
| 000414 <sub>H</sub>                              | ICSEL20 [R/W]<br>B,H,W<br>-----000                   | ICSEL21 [R/W]<br>B,H,W<br>-----00  | ICSEL22 [R/W]<br>B,H,W<br>-----00  | ICSEL23 [R/W]<br>B,H,W<br>-----00  |                                                 |
| 000418 <sub>H</sub>                              | IRPR0H [R] B,H,W<br>00-----                          | IRPR0L [R] B,H,W<br>00-----        | IRPR1H [R] B,H,W<br>00-----        | IRPR1L [R] B,H,W<br>00-----        | Interrupt Request Batch<br>Reading Register     |
| 00041C <sub>H</sub>                              | —                                                    | —                                  | IRPR3H [R] B,H,W<br>000000--       | IRPR3L [R] B,H,W<br>000000--       |                                                 |
| 000420 <sub>H</sub>                              | IRPR4H [R] B,H,W<br>0000----                         | IRPR4L [R] B,H,W<br>0000----       | IRPR5H [R] B,H,W<br>0000----       | IRPR5L [R] B,H,W<br>000-----       |                                                 |
| 000424 <sub>H</sub>                              | IRPR6H [R] B,H,W<br>--00----                         | IRPR6L [R] B,H,W<br>0000----       | IRPR7H [R] B,H,W<br>-0-00--        | IRPR7L [R] B,H,W<br>-----00        |                                                 |
| 000428 <sub>H</sub>                              | IRPR8H [R] B,H,W<br>--0-----                         | IRPR8L [R] B,H,W<br>-00-----       | IRPR9H [R] B,H,W<br>-0-----        | IRPR9L [R] B,H,W<br>-0-----        |                                                 |
| 00042C <sub>H</sub>                              | IRPR10H [R] B,H,W<br>-0-----                         | IRPR10L [R] B,H,W<br>-0-----       | IRPR11H [R] B,H,W<br>0-----        | IRPR11L [R] B,H,W<br>0-----        |                                                 |
| 000430 <sub>H</sub>                              | IRPR12H [R] B,H,W<br>--0000--                        | IRPR12L [R] B,H,W<br>----00--      | IRPR13H [R] B,H,W<br>00-----       | IRPR13L [R] B,H,W<br>00-----       |                                                 |
| 000434 <sub>H</sub>                              | IRPR14H [R] B,H,W<br>00000000                        | IRPR14L [R] B,H,W<br>00000000      | IRPR15H [R] B,H,W<br>000-----      | IRPR15L [R] B,H,W<br>0000000-      |                                                 |
| 000438 <sub>H</sub>                              | ICSEL24 [R/W]<br>B,H,W<br>-----00                    | ICSEL25 [R/W]<br>B,H,W<br>---00000 | ICSEL26 [R/W]<br>B,H,W<br>-----0   | ICSEL27 [R/W]<br>B,H,W<br>-----0   | DMA request generation<br>and clear             |
| 00043C <sub>H</sub>                              | —                                                    | —                                  | —                                  | —                                  | Reserved [S]                                    |

| Address                                          | Address offset value / Register name |                                  |                                      |                                | Block                                                                          |
|--------------------------------------------------|--------------------------------------|----------------------------------|--------------------------------------|--------------------------------|--------------------------------------------------------------------------------|
|                                                  | +0                                   | +1                               | +2                                   | +3                             |                                                                                |
| 000440 <sub>H</sub>                              | ICR00 [R/W] B,H,W<br>---11111        | ICR01 [R/W] B,H,W<br>---11111    | ICR02 [R/W] B,H,W<br>---11111        | ICR03 [R/W] B,H,W<br>---11111  | Interrupt Controller [S]                                                       |
| 000444 <sub>H</sub>                              | ICR04 [R/W] B,H,W<br>---11111        | ICR05 [R/W] B,H,W<br>---11111    | ICR06 [R/W] B,H,W<br>---11111        | ICR07 [R/W] B,H,W<br>---11111  |                                                                                |
| 000448 <sub>H</sub>                              | ICR08 [R/W] B,H,W<br>---11111        | ICR09 [R/W] B,H,W<br>---11111    | ICR10 [R/W] B,H,W<br>---11111        | ICR11 [R/W] B,H,W<br>---11111  |                                                                                |
| 00044C <sub>H</sub>                              | ICR12 [R/W] B,H,W<br>---11111        | ICR13 [R/W] B,H,W<br>---11111    | ICR14 [R/W] B,H,W<br>---11111        | ICR15 [R/W] B,H,W<br>---11111  |                                                                                |
| 000450 <sub>H</sub>                              | ICR16 [R/W] B,H,W<br>---11111        | ICR17 [R/W] B,H,W<br>---11111    | ICR18 [R/W] B,H,W<br>---11111        | ICR19 [R/W] B,H,W<br>---11111  |                                                                                |
| 000454 <sub>H</sub>                              | ICR20 [R/W] B,H,W<br>---11111        | ICR21 [R/W] B,H,W<br>---11111    | ICR22 [R/W] B,H,W<br>---11111        | ICR23 [R/W] B,H,W<br>---11111  |                                                                                |
| 000458 <sub>H</sub>                              | ICR24 [R/W] B,H,W<br>---11111        | ICR25 [R/W] B,H,W<br>---11111    | ICR26 [R/W] B,H,W<br>---11111        | ICR27 [R/W] B,H,W<br>---11111  |                                                                                |
| 00045C <sub>H</sub>                              | ICR28 [R/W] B,H,W<br>---11111        | ICR29 [R/W] B,H,W<br>---11111    | ICR30 [R/W] B,H,W<br>---11111        | ICR31 [R/W] B,H,W<br>---11111  |                                                                                |
| 000460 <sub>H</sub>                              | ICR32 [R/W] B,H,W<br>---11111        | ICR33 [R/W] B,H,W<br>---11111    | ICR34 [R/W] B,H,W<br>---11111        | ICR35 [R/W] B,H,W<br>---11111  |                                                                                |
| 000464 <sub>H</sub>                              | ICR36 [R/W] B,H,W<br>---11111        | ICR37 [R/W] B,H,W<br>---11111    | ICR38 [R/W] B,H,W<br>---11111        | ICR39 [R/W] B,H,W<br>---11111  |                                                                                |
| 000468 <sub>H</sub>                              | ICR40 [R/W] B,H,W<br>---11111        | ICR41 [R/W] B,H,W<br>---11111    | ICR42 [R/W] B,H,W<br>---11111        | ICR43 [R/W] B,H,W<br>---11111  |                                                                                |
| 00046C <sub>H</sub>                              | ICR44 [R/W] B,H,W<br>---11111        | ICR45 [R/W] B,H,W<br>---11111    | ICR46 [R/W] B,H,W<br>---11111        | ICR47 [R/W] B,H,W<br>---11111  |                                                                                |
| 000470 <sub>H</sub><br>to<br>00047C <sub>H</sub> | —                                    | —                                | —                                    | —                              | Reserved [S]                                                                   |
| 000480 <sub>H</sub>                              | RSTR [R]<br>B,H,W<br>XXXX--XX        | RSTCR [R/W]<br>B,H,W<br>111----0 | STBCR [R/W]<br>B,H,W *<br>000---11   | —                              | Reset Control [S]<br>Power Control [S]<br>*: Writing STBCR by DMA is forbidden |
| 000484 <sub>H</sub>                              | —                                    | —                                | —                                    | —                              | Reserved [S]                                                                   |
| 000488 <sub>H</sub>                              | DIVR0 [R/W] B,H,W<br>000-----        | DIVR1 [R/W] B,H,W<br>0001----    | DIVR2 [R/W] B,H,W<br>0011----        | —                              | Clock Control [S]                                                              |
| 00048C <sub>H</sub>                              | —                                    | —                                | —                                    | —                              | Reserved [S]                                                                   |
| 000490 <sub>H</sub>                              | IORR0 [R/W] B,H,W<br>-0000000        | IORR1 [R/W] B,H,W<br>-0000000    | IORR2 [R/W] B,H,W<br>-0000000        | IORR3 [R/W] B,H,W<br>-0000000  | DMA request by peripheral [S]                                                  |
| 000494 <sub>H</sub>                              | IORR4 [R/W] B,H,W<br>-0000000        | IORR5 [R/W] B,H,W<br>-0000000    | IORR6 [R/W] B,H,W<br>-0000000        | IORR7 [R/W] B,H,W<br>-0000000  |                                                                                |
| 000498 <sub>H</sub>                              | IORR8 [R/W] B,H,W<br>-0000000        | IORR9 [R/W] B,H,W<br>-0000000    | IORR10 [R/W] B,H,W<br>-0000000       | IORR11 [R/W] B,H,W<br>-0000000 |                                                                                |
| 00049C <sub>H</sub>                              | IORR12 [R/W] B,H,W<br>-0000000       | IORR13 [R/W] B,H,W<br>-0000000   | IORR14 [R/W] B,H,W<br>-0000000       | IORR15 [R/W] B,H,W<br>-0000000 | DMA request by peripheral [S]                                                  |
| 0004A0 <sub>H</sub>                              | —                                    | —                                | —                                    | —                              | Reserved                                                                       |
| 0004A4 <sub>H</sub>                              | CANPRE [R/W]<br>B,H,W<br>---00000    | —                                | —                                    | —                              | CAN prescaler                                                                  |
| 0004A8 <sub>H</sub>                              | —                                    | —                                | CSCFG[R/W]B,H,W<br>---0----          | CMCFG[R/W]B,H,W<br>00000000    | Clock monitor control register                                                 |
| 0004AC <sub>H</sub>                              | ADERH0[R/W] B,H<br>11111111 11111111 |                                  | ADERL0[R/W] B,H<br>11111111 11111111 |                                | Analog input control register<br>0                                             |

| Address                                          | Address offset value / Register name                |                                     |                                        |                                     | Block                              |
|--------------------------------------------------|-----------------------------------------------------|-------------------------------------|----------------------------------------|-------------------------------------|------------------------------------|
|                                                  | +0                                                  | +1                                  | +2                                     | +3                                  |                                    |
| 0004B0 <sub>H</sub>                              | —                                                   |                                     | ADERL1[R/W] B,H<br>11111111 11111111   |                                     | Analog input control register<br>1 |
| 0004B4 <sub>H</sub>                              | —                                                   | —                                   | —                                      | —                                   | Reserved                           |
| 0004B8 <sub>H</sub>                              | CUCR0 [R/W] B,H,W<br>----- 0--00                    |                                     | CUTD0 [R/W] B,H,W<br>10000000 00000000 |                                     | RTC/WDT1 calibration               |
| 0004BC <sub>H</sub>                              | CUTR0 [R] B,H,W<br>----- 00000000 00000000 00000000 |                                     |                                        |                                     |                                    |
| 0004C0 <sub>H</sub>                              | —                                                   | —                                   | —                                      | —                                   |                                    |
| 0004C4 <sub>H</sub>                              | CUCR1 [R/W] B,H,W<br>----- 0--00                    |                                     | CUTD1 [R/W] B,H,W<br>11000011 01010000 |                                     |                                    |
| 0004C8 <sub>H</sub>                              | CUTR1 [R] B,H,W<br>----- 00000000 00000000 00000000 |                                     |                                        |                                     |                                    |
| 0004CC <sub>H</sub><br>to<br>00050C <sub>H</sub> | —                                                   | —                                   | —                                      | —                                   | Reserved                           |
| 000510 <sub>H</sub>                              | CSELR [R/W] B,H,W<br>001---00                       | CMONR [R] B,H,W<br>001---00         | MTMCR [R/W]<br>B,H,W<br>00001111       | STMCR [R/W] B,H,W<br>0000-111       | Clock Control [S]                  |
| 000514 <sub>H</sub>                              | PLLCR [R/W] B,H,W<br>----- 11110000                 |                                     | CSTBR [R/W] B,H,W<br>-0000000          | PTMCR [R/W] B,H,W<br>00-----        |                                    |
| 000518 <sub>H</sub>                              | —                                                   | —                                   | CPUAR [R/W] B,H,W<br>0---XXX           | —                                   | Reset Control [S]                  |
| 00051C <sub>H</sub>                              | —                                                   | —                                   | —                                      | —                                   | Reserved [S]                       |
| 000520 <sub>H</sub>                              | CCPSSELR [R/W]<br>B,H,W<br>-----0                   | —                                   | —                                      | CCPSDIVR [R/W]<br>B,H,W<br>-000-000 | Clock Control 2 [S]                |
| 000524 <sub>H</sub>                              | —                                                   | CCPLLFBR [R/W]<br>B,H,W<br>-0000000 | CCSSFBR0 [R/W]<br>B,H,W<br>--000000    | CCSSFBR1 [R/W]<br>B,H,W<br>---00000 |                                    |
| 000528 <sub>H</sub>                              | —                                                   | CCSSCCR0 [R/W]<br>B,H,W<br>----0000 | CCSSCCR1 [R/W] H,W<br>000----          |                                     |                                    |
| 00052C <sub>H</sub>                              | —                                                   | CCCGRCR0 [R/W]<br>B,H,W<br>00----00 | CCCGRCR1 [R/W]<br>B,H,W<br>00000000    | CCCGRCR2 [R/W]<br>B,H,W<br>00000000 | Clock Control 2 [S]                |
| 000530 <sub>H</sub>                              | CCRTSELR [R/W]<br>B,H,W<br>0-----0                  | —                                   | CCPMUCR0 [R/W]<br>B,H,W<br>0-----00    | CCPMUCR1 [R/W]<br>B,H,W<br>0--00000 |                                    |
| 000534 <sub>H</sub><br>to<br>00054C <sub>H</sub> | —                                                   | —                                   | —                                      | —                                   | Reserved                           |
| 000550 <sub>H</sub>                              | EIRR0 [R/W] B,H,W<br>XXXXXXXXXX                     | ENIR0 [R/W] B,H,W<br>00000000       | ELVR0 [R/W] B,H,W<br>00000000 00000000 |                                     | External Interrupt<br>(INT0 to 7)  |
| 000554 <sub>H</sub>                              | EIRR1 [R/W] B,H,W<br>XXXXXXXXXX                     | ENIR1 [R/W] B,H,W<br>00000000       | ELVR1 [R/W] B,H,W<br>00000000 00000000 |                                     | External Interrupt<br>(INT8 to 15) |
| 000558 <sub>H</sub>                              | —                                                   | —                                   | —                                      | —                                   | Reserved                           |

| Address                                          | Address offset value / Register name               |                                     |                                     |                             | Block                                        |
|--------------------------------------------------|----------------------------------------------------|-------------------------------------|-------------------------------------|-----------------------------|----------------------------------------------|
|                                                  | +0                                                 | +1                                  | +2                                  | +3                          |                                              |
| 00055C <sub>H</sub>                              | —                                                  | —                                   | WTDR [R/W] H<br>00000000 00000000   |                             | Real Time Clock (RTC)                        |
| 000560 <sub>H</sub>                              | —                                                  | WTCRH [R/W] B<br>-----00            | WTCRM [R/W] B,H<br>00000000         | WTCRL [R/W] B,H<br>----00-0 |                                              |
| 000564 <sub>H</sub>                              | —                                                  | WTBRH [R/W] B<br>--XXXXXX           | WTBRM [R/W] B<br>XXXXXXXXXX         | WTBRL [R/W] B<br>XXXXXXXXXX |                                              |
| 000568 <sub>H</sub>                              | WTHR [R/W] B,H<br>---00000                         | WTMR [R/W] B,H<br>--000000          | WTSR [R/W] B<br>--000000            | —                           |                                              |
| 00056C <sub>H</sub>                              | —                                                  | CSVCR [R/W] B<br>000111--           | —                                   | —                           | Clock Supervisor                             |
| 000570 <sub>H</sub><br>to<br>00057C <sub>H</sub> | —                                                  | —                                   | —                                   | —                           | Reserved                                     |
| 000580 <sub>H</sub>                              | REGSEL [R/W]<br>B,H,W<br>0110011-                  | —                                   | —                                   | —                           | Regulator Control / Low<br>Voltage Detection |
| 000584 <sub>H</sub>                              | LVD5R [R/W]<br>B,H,W<br>-----1                     | LVD5F [R/W]<br>B,H,W<br>00000001    | LVD [R/W]<br>B,H,W<br>01000--0      | —                           |                                              |
| 000588 <sub>H</sub><br>to<br>00058C <sub>H</sub> | —                                                  | —                                   | —                                   | —                           | Reserved                                     |
| 000590 <sub>H</sub>                              | PMUSTR [R/W]<br>B,H,W<br>0-----1X                  | PMUCTLR [R/W]<br>B,H,W<br>0-00----  | PWRTMCTL [R/W]<br>B,H,W<br>----011  | —                           | PMU                                          |
| 000594 <sub>H</sub>                              | PMUINTF0 [R/W]<br>B,H,W<br>00000000                | PMUINTF1 [R/W]<br>B,H,W<br>00000000 | PMUINTF2 [R/W]<br>B,H,W<br>0000---- | —                           |                                              |
| 000598 <sub>H</sub>                              | —                                                  | —                                   | —                                   | —                           |                                              |
| 00059C <sub>H</sub><br>to<br>0005BC <sub>H</sub> | —                                                  | —                                   | —                                   | —                           | Reserved                                     |
| 0005C0 <sub>H</sub><br>to<br>0005FC <sub>H</sub> | —                                                  | —                                   | —                                   | —                           | Reserved                                     |
| 000600 <sub>H</sub>                              | ASR0 [R/W] W<br>00000000 00000000 ----- 1111-001   |                                     |                                     |                             | External Bus<br>Interface [S]                |
| 000604 <sub>H</sub>                              | ASR1 [R/W] W<br>XXXXXXXXXX XXXXXXXX ----- XXXX-XX0 |                                     |                                     |                             |                                              |
| 000608 <sub>H</sub>                              | ASR2 [R/W] W<br>XXXXXXXXXX XXXXXXXX ----- XXXX-XX0 |                                     |                                     |                             |                                              |
| 00060C <sub>H</sub>                              | ASR3 [R/W] W<br>XXXXXXXXXX XXXXXXXX ----- XXXX-XX0 |                                     |                                     |                             |                                              |
| 000610 <sub>H</sub><br>to<br>00063C <sub>H</sub> | —                                                  | —                                   | —                                   | —                           | Reserved [S]                                 |

| Address                                          | Address offset value / Register name                   |                             |                                   |                          | Block                      |
|--------------------------------------------------|--------------------------------------------------------|-----------------------------|-----------------------------------|--------------------------|----------------------------|
|                                                  | +0                                                     | +1                          | +2                                | +3                       |                            |
| 000640 <sub>H</sub>                              | ACR0 [R/W] W<br>----- 01--00--                         |                             |                                   |                          | External Bus Interface [S] |
| 000644 <sub>H</sub>                              | ACR1 [R/W] W<br>----- XX--XX--                         |                             |                                   |                          |                            |
| 000648 <sub>H</sub>                              | ACR2 [R/W] W<br>----- XX--XX--                         |                             |                                   |                          |                            |
| 00064C <sub>H</sub>                              | ACR3 [R/W] W<br>----- XX--XX--                         |                             |                                   |                          |                            |
| 000650 <sub>H</sub><br>to<br>00067C <sub>H</sub> | —                                                      | —                           | —                                 | —                        | Reserved [S]               |
| 000680 <sub>H</sub>                              | AWR0 [R/W] W<br>----1111 00000000 11110000 00000-0-    |                             |                                   |                          | External Bus Interface [S] |
| 000684 <sub>H</sub>                              | AWR1 [R/W] W<br>----XXXX XXXXXXXXXX XXXXXXXX XXXXXX-X- |                             |                                   |                          |                            |
| 000688 <sub>H</sub>                              | AWR2 [R/W] W<br>----XXXX XXXXXXXXXX XXXXXXXX XXXXXX-X- |                             |                                   |                          | External Bus Interface [S] |
| 00068C <sub>H</sub>                              | AWR3 [R/W] W<br>----XXXX XXXXXXXXXX XXXXXXXX XXXXXX-X- |                             |                                   |                          |                            |
| 000690 <sub>H</sub><br>to<br>0006FC <sub>H</sub> | —                                                      | —                           | —                                 | —                        | Reserved [S]               |
| 000700 <sub>H</sub><br>to<br>00070C <sub>H</sub> | —                                                      | —                           | —                                 | —                        | Reserved                   |
| 000710 <sub>H</sub>                              | BPC CRA [R/W] B<br>00000000                            | BPC CRB [R/W] B<br>00000000 | BPC CRC [R/W] B<br>00000000       | —                        | Bus Performance Counter    |
| 000714 <sub>H</sub>                              | BPC TRA [R/W] W<br>00000000 00000000 00000000 00000000 |                             |                                   |                          |                            |
| 000718 <sub>H</sub>                              | BPC TRB [R/W] W<br>00000000 00000000 00000000 00000000 |                             |                                   |                          |                            |
| 00071C <sub>H</sub>                              | BPC TRC [R/W] W<br>00000000 00000000 00000000 00000000 |                             |                                   |                          |                            |
| 000720 <sub>H</sub><br>to<br>0007F8 <sub>H</sub> | —                                                      | —                           | —                                 | —                        | Reserved                   |
| 0007FC <sub>H</sub>                              | BMODR [R] B, H, W<br>XXXXXXXX                          | —                           | —                                 | —                        | Mode Register              |
| 000800 <sub>H</sub><br>to<br>00083C <sub>H</sub> | —                                                      | —                           | —                                 | —                        | Reserved [S]               |
| 000840 <sub>H</sub>                              | FCTL R [R/W] H<br>-0--1000 0--0----                    |                             | —                                 | FSTR [R/W] B<br>-----001 | Flash Memory Register [S]  |
| 000844 <sub>H</sub><br>to<br>000854 <sub>H</sub> | —                                                      | —                           | —                                 | —                        | Reserved [S]               |
| 000858 <sub>H</sub>                              | —                                                      | —                           | WREN [R/W] H<br>00000000 00000000 |                          | Wild Register [S]          |
| 00085C <sub>H</sub><br>to<br>00087C <sub>H</sub> | —                                                      | —                           | —                                 | —                        | Reserved [S]               |

| Address             | Address offset value / Register name                          |    |    |    | Block             |
|---------------------|---------------------------------------------------------------|----|----|----|-------------------|
|                     | +0                                                            | +1 | +2 | +3 |                   |
| 000880 <sub>H</sub> | WRAR00 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    | Wild Register [S] |
| 000884 <sub>H</sub> | WRDR00 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 000888 <sub>H</sub> | WRAR01 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 00088C <sub>H</sub> | WRDR01 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 000890 <sub>H</sub> | WRAR02 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    | Wild Register [S] |
| 000894 <sub>H</sub> | WRDR02 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 000898 <sub>H</sub> | WRAR03 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 00089C <sub>H</sub> | WRDR03 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008A0 <sub>H</sub> | WRAR04 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 0008A4 <sub>H</sub> | WRDR04 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008A8 <sub>H</sub> | WRAR05 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 0008AC <sub>H</sub> | WRDR05 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008B0 <sub>H</sub> | WRAR06 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 0008B4 <sub>H</sub> | WRDR06 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008B8 <sub>H</sub> | WRAR07 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 0008BC <sub>H</sub> | WRDR07 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008C0 <sub>H</sub> | WRAR08 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 0008C4 <sub>H</sub> | WRDR08 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008C8 <sub>H</sub> | WRAR09 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 0008CC <sub>H</sub> | WRDR09 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008D0 <sub>H</sub> | WRAR10 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 0008D4 <sub>H</sub> | WRDR10 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008D8 <sub>H</sub> | WRAR11 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |
| 0008DC <sub>H</sub> | WRDR11 [R/W] W<br>XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX XXXXXXXXXX |    |    |    |                   |
| 0008E0 <sub>H</sub> | WRAR12 [R/W] W<br>----- --XXXXXXX XXXXXXXXXX XXXXXX--         |    |    |    |                   |

| Address                                          | Address offset value / Register name                        |    |                                   |    | Block                    |
|--------------------------------------------------|-------------------------------------------------------------|----|-----------------------------------|----|--------------------------|
|                                                  | +0                                                          | +1 | +2                                | +3 |                          |
| 0008E4 <sub>H</sub>                              | WRDR12 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX       |    |                                   |    | Wild Register [S]        |
| 0008E8 <sub>H</sub>                              | WRAR13 [R/W] W<br>----- --XXXXXX XXXXXXXX XXXXXX--          |    |                                   |    |                          |
| 0008EC <sub>H</sub>                              | WRDR13 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX       |    |                                   |    |                          |
| 0008F0 <sub>H</sub>                              | WRAR14 [R/W] W<br>----- --XXXXXX XXXXXXXX XXXXXX--          |    |                                   |    |                          |
| 0008F4 <sub>H</sub>                              | WRDR14 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX       |    |                                   |    | Wild Register [S]        |
| 0008F8 <sub>H</sub>                              | WRAR15 [R/W] W<br>----- --XXXXXX XXXXXXXX XXXXXX--          |    |                                   |    |                          |
| 0008FC <sub>H</sub>                              | WRDR15 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX       |    |                                   |    |                          |
| 000900 <sub>H</sub>                              | TPUUNLOCK [R/W] W<br>00000000 00000000 00000000 00000000    |    |                                   |    | Time Protection Unit [S] |
| 000904 <sub>H</sub>                              | TPULST [R] B,H,W<br>-----0                                  | —  | TPUVST [R/W]<br>B,H,W<br>-----000 | —  |                          |
| 000908 <sub>H</sub>                              | TPUCFG [R/W] B,H,W<br>-----0 0-000000 -----0                |    |                                   |    |                          |
| 00090C <sub>H</sub>                              | TPUTIR [R] B,H,W<br>00000000                                | —  | —                                 | —  |                          |
| 000910 <sub>H</sub>                              | TPUTST [R] B,H,W<br>00000000                                | —  | —                                 | —  |                          |
| 000914 <sub>H</sub>                              | TPUTIE [R/W] B,H,W<br>00000000                              | —  | —                                 | —  |                          |
| 000918 <sub>H</sub>                              | TPUTMID [R] B,H,W<br>00000000 00000000 00000000 00000000    |    |                                   |    |                          |
| 00091C <sub>H</sub><br>to<br>00092C <sub>H</sub> | —                                                           | —  | —                                 | —  |                          |
| 000930 <sub>H</sub>                              | TPUTCN00 [R/W] B,H,W<br>000000-- 00000000 00000000 00000000 |    |                                   |    |                          |
| 000934 <sub>H</sub>                              | TPUTCN01 [R/W] B,H,W<br>000000-- 00000000 00000000 00000000 |    |                                   |    |                          |
| 000938 <sub>H</sub>                              | TPUTCN02 [R/W] B,H,W<br>000000-- 00000000 00000000 00000000 |    |                                   |    |                          |
| 00093C <sub>H</sub>                              | TPUTCN03 [R/W] B,H,W<br>000000-- 00000000 00000000 00000000 |    |                                   |    |                          |
| 000940 <sub>H</sub>                              | TPUTCN04 [R/W] B,H,W<br>000000-- 00000000 00000000 00000000 |    |                                   |    |                          |
| 000944 <sub>H</sub>                              | TPUTCN05 [R/W] B,H,W<br>000000-- 00000000 00000000 00000000 |    |                                   |    |                          |
| 000948 <sub>H</sub>                              | TPUTCN06 [R/W] B,H,W<br>000000-- 00000000 00000000 00000000 |    |                                   |    |                          |
| 00094C <sub>H</sub>                              | TPUTCN07 [R/W] B,H,W<br>000000-- 00000000 00000000 00000000 |    |                                   |    |                          |
| 000950 <sub>H</sub>                              | TPUTCN10 [R/W]<br>B,H,W<br>---00000                         | —  | —                                 | —  |                          |

| Address                                          | Address offset value / Register name                  |    |                                      |    | Block                       |
|--------------------------------------------------|-------------------------------------------------------|----|--------------------------------------|----|-----------------------------|
|                                                  | +0                                                    | +1 | +2                                   | +3 |                             |
| 000954 <sub>H</sub>                              | TPUTCN11 [R/W]<br>B,H,W<br>---00000                   | —  | —                                    | —  | Time Protection<br>Unit [S] |
| 000958 <sub>H</sub>                              | TPUTCN12 [R/W]<br>B,H,W<br>---00000                   | —  | —                                    | —  |                             |
| 00095C <sub>H</sub>                              | TPUTCN13 [R/W]<br>B,H,W<br>---00000                   | —  | —                                    | —  |                             |
| 000960 <sub>H</sub>                              | TPUTCN14 [R/W]<br>B,H,W<br>---00000                   | —  | —                                    | —  |                             |
| 000964 <sub>H</sub>                              | TPUTCN15 [R/W]<br>B,H,W<br>---00000                   | —  | —                                    | —  |                             |
| 000968 <sub>H</sub>                              | TPUTCN16 [R/W]<br>B,H,W<br>---00000                   | —  | —                                    | —  |                             |
| 00096C <sub>H</sub>                              | TPUTCN17 [R/W]<br>B,H,W<br>---00000                   | —  | —                                    | —  |                             |
| 000970 <sub>H</sub>                              | TPUTCC0 [R] B,H,W<br>----- 00000000 00000000 00000000 |    |                                      |    |                             |
| 000974 <sub>H</sub>                              | TPUTCC1 [R] B,H,W<br>----- 00000000 00000000 00000000 |    |                                      |    |                             |
| 000978 <sub>H</sub>                              | TPUTCC2 [R] B,H,W<br>----- 00000000 00000000 00000000 |    |                                      |    |                             |
| 00097C <sub>H</sub>                              | TPUTCC3 [R] B,H,W<br>----- 00000000 00000000 00000000 |    |                                      |    |                             |
| 000980 <sub>H</sub>                              | TPUTCC4 [R] B,H,W<br>----- 00000000 00000000 00000000 |    |                                      |    |                             |
| 000984 <sub>H</sub>                              | TPUTCC5 [R] B,H,W<br>----- 00000000 00000000 00000000 |    |                                      |    |                             |
| 000988 <sub>H</sub>                              | TPUTCC6 [R] B,H,W<br>----- 00000000 00000000 00000000 |    |                                      |    |                             |
| 00098C <sub>H</sub>                              | TPUTCC7 [R] B,H,W<br>----- 00000000 00000000 00000000 |    |                                      |    |                             |
| 000990 <sub>H</sub><br>to<br>0009FC <sub>H</sub> | —                                                     | —  | —                                    | —  |                             |
| 000A00 <sub>H</sub><br>to<br>000BEC <sub>H</sub> | —                                                     | —  | —                                    | —  | Reserved                    |
| 000BF0 <sub>H</sub>                              | HSCFR [R/W] B,H,W<br>-----00 00000000 00000000        |    |                                      |    | OCDU                        |
| 000BF4 <sub>H</sub>                              | —                                                     | —  | —                                    | —  |                             |
| 000BF8 <sub>H</sub>                              | —                                                     | —  | MBR [R/W] B,H,W<br>00----- XXXXXXXXX |    | OCDU                        |
| 000BFC <sub>H</sub>                              | —                                                     | —  | UER [W] B,H,W<br>-----X              |    |                             |

| Address             | Address offset value / Register name                 |    |                                    |    | Block                    |
|---------------------|------------------------------------------------------|----|------------------------------------|----|--------------------------|
|                     | +0                                                   | +1 | +2                                 | +3 |                          |
| 000C00 <sub>H</sub> | DCCR0 [R/W] W<br>0----000 --00--00 00000000 0-000000 |    |                                    |    | DMA<br>Controller<br>[S] |
| 000C04 <sub>H</sub> | DCSR0 [R/W] H<br>0----- ----000                      |    | DTCR0 [R/W] H<br>00000000 00000000 |    |                          |
| 000C08 <sub>H</sub> | DSAR0 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C0C <sub>H</sub> | DDAR0 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C10 <sub>H</sub> | DCCR1 [R/W] W<br>0----000 --00--00 00000000 0-000000 |    |                                    |    |                          |
| 000C14 <sub>H</sub> | DCSR1 [R/W] H<br>0----- ----000                      |    | DTCR1 [R/W] H<br>00000000 00000000 |    |                          |
| 000C18 <sub>H</sub> | DSAR1 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C1C <sub>H</sub> | DDAR1 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C20 <sub>H</sub> | DCCR2 [R/W] W<br>0----000 --00--00 00000000 0-000000 |    |                                    |    |                          |
| 000C24 <sub>H</sub> | DCSR2 [R/W] H<br>0----- ----000                      |    | DTCR2 [R/W] H<br>00000000 00000000 |    |                          |
| 000C28 <sub>H</sub> | DSAR2 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C2C <sub>H</sub> | DDAR2 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C30 <sub>H</sub> | DCCR3 [R/W] W<br>0----000 --00--00 00000000 0-000000 |    |                                    |    |                          |
| 000C34 <sub>H</sub> | DCSR3 [R/W] H<br>0----- ----000                      |    | DTCR3 [R/W] H<br>00000000 00000000 |    |                          |
| 000C38 <sub>H</sub> | DSAR3 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C3C <sub>H</sub> | DDAR3 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C40 <sub>H</sub> | DCCR4 [R/W] W<br>0----000 --00--00 00000000 0-000000 |    |                                    |    |                          |
| 000C44 <sub>H</sub> | DCSR4 [R/W] H<br>0----- ----000                      |    | DTCR4 [R/W] H<br>00000000 00000000 |    |                          |
| 000C48 <sub>H</sub> | DSAR4 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C4C <sub>H</sub> | DDAR4 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C50 <sub>H</sub> | DCCR5 [R/W] W<br>0----000 --00--00 00000000 0-000000 |    |                                    |    |                          |
| 000C54 <sub>H</sub> | DCSR5 [R/W] H<br>0----- ----000                      |    | DTCR5 [R/W] H<br>00000000 00000000 |    |                          |
| 000C58 <sub>H</sub> | DSAR5 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C5C <sub>H</sub> | DDAR5 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                    |    |                          |
| 000C60 <sub>H</sub> | DCCR6 [R/W] W<br>0----000 --00--00 00000000 0-000000 |    |                                    |    |                          |

| Address             | Address offset value / Register name                  |    |                                     |    | Block                    |
|---------------------|-------------------------------------------------------|----|-------------------------------------|----|--------------------------|
|                     | +0                                                    | +1 | +2                                  | +3 |                          |
| 000C64 <sub>H</sub> | DCSR6 [R/W] H<br>0-----000                            |    | DTCR6 [R/W] H<br>00000000 00000000  |    | DMA<br>Controller<br>[S] |
| 000C68 <sub>H</sub> | DSAR6 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                     |    |                          |
| 000C6C <sub>H</sub> | DDAR6 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                     |    |                          |
| 000C70 <sub>H</sub> | DCCR7 [R/W] W<br>0---000 --00--00 00000000 0-000000   |    |                                     |    |                          |
| 000C74 <sub>H</sub> | DCSR7 [R/W] H<br>0-----000                            |    | DTCR7 [R/W] H<br>00000000 00000000  |    |                          |
| 000C78 <sub>H</sub> | DSAR7 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                     |    |                          |
| 000C7C <sub>H</sub> | DDAR7 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                     |    |                          |
| 000C80 <sub>H</sub> | DCCR8 [R/W] W<br>0---000 --00--00 00000000 0-000000   |    |                                     |    |                          |
| 000C84 <sub>H</sub> | DCSR8 [R/W] H<br>0-----000                            |    | DTCR8 [R/W] H<br>00000000 00000000  |    |                          |
| 000C88 <sub>H</sub> | DSAR8 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                     |    |                          |
| 000C8C <sub>H</sub> | DDAR8 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                     |    |                          |
| 000C90 <sub>H</sub> | DCCR9 [R/W] W<br>0---000 --00--00 00000000 0-000000   |    |                                     |    |                          |
| 000C94 <sub>H</sub> | DCSR9 [R/W] H<br>0-----000                            |    | DTCR9 [R/W] H<br>00000000 00000000  |    |                          |
| 000C98 <sub>H</sub> | DSAR9 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                     |    |                          |
| 000C9C <sub>H</sub> | DDAR9 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                     |    |                          |
| 000CA0 <sub>H</sub> | DCCR10 [R/W] W<br>0---000 --00--00 00000000 0-000000  |    |                                     |    |                          |
| 000CA4 <sub>H</sub> | DCSR10 [R/W] H<br>0-----000                           |    | DTCR10 [R/W] H<br>00000000 00000000 |    |                          |
| 000CA8 <sub>H</sub> | DSAR10 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                     |    |                          |
| 000CAC <sub>H</sub> | DDAR10 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                     |    |                          |
| 000CB0 <sub>H</sub> | DCCR11 [R/W] W<br>0---000 --00--00 00000000 0-000000  |    |                                     |    |                          |
| 000CB4 <sub>H</sub> | DCSR11 [R/W] H<br>0-----000                           |    | DTCR11 [R/W] H<br>00000000 00000000 |    |                          |
| 000CB8 <sub>H</sub> | DSAR11 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                     |    |                          |
| 000CBC <sub>H</sub> | DDAR11 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                     |    |                          |
| 000CC0 <sub>H</sub> | DCCR12 [R/W] W<br>0---000 --00--00 00000000 0-000000  |    |                                     |    |                          |
| 000CC4 <sub>H</sub> | DCSR12 [R/W] H<br>0-----000                           |    | DTCR12 [R/W] H<br>00000000 00000000 |    |                          |

| Address                                          | Address offset value / Register name                  |                               |                                     |                               | Block                      |
|--------------------------------------------------|-------------------------------------------------------|-------------------------------|-------------------------------------|-------------------------------|----------------------------|
|                                                  | +0                                                    | +1                            | +2                                  | +3                            |                            |
| 000CC8 <sub>H</sub>                              | DSAR12 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                               |                                     |                               | DMA<br>Controller<br>[S]   |
| 000CCC <sub>H</sub>                              | DDAR12 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                               |                                     |                               |                            |
| 000CD0 <sub>H</sub>                              | DCCR13 [R/W] W<br>0---000 --00--00 00000000 0-000000  |                               |                                     |                               |                            |
| 000CD4 <sub>H</sub>                              | DCSR13 [R/W] H<br>0-----000                           |                               | DTCR13 [R/W] H<br>00000000 00000000 |                               |                            |
| 000CD8 <sub>H</sub>                              | DSAR13 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                               |                                     |                               |                            |
| 000CDC <sub>H</sub>                              | DDAR13 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                               |                                     |                               |                            |
| 000CE0 <sub>H</sub>                              | DCCR14 [R/W] W<br>0---000 --00--00 00000000 0-000000  |                               |                                     |                               |                            |
| 000CE4 <sub>H</sub>                              | DCSR14 [R/W] H<br>0-----000                           |                               | DTCR14 [R/W] H<br>00000000 00000000 |                               |                            |
| 000CE8 <sub>H</sub>                              | DSAR14 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                               |                                     |                               |                            |
| 000CEC <sub>H</sub>                              | DDAR14 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                               |                                     |                               |                            |
| 000CF0 <sub>H</sub>                              | DCCR15 [R/W] W<br>0---000 --00--00 00000000 0-000000  |                               |                                     |                               |                            |
| 000CF4 <sub>H</sub>                              | DCSR15 [R/W] H<br>0-----000                           |                               | DTCR15 [R/W] H<br>00000000 00000000 |                               |                            |
| 000CF8 <sub>H</sub>                              | DSAR15 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                               |                                     |                               |                            |
| 000CFC <sub>H</sub>                              | DDAR15 [R/W] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |                               |                                     |                               |                            |
| 000D00 <sub>H</sub><br>to<br>000DF0 <sub>H</sub> | —                                                     | —                             | —                                   | —                             | Reserved [S]               |
| 000DF4 <sub>H</sub>                              | —                                                     | —                             | DNMIR [R/W] B<br>0-----0            | DILVR [R/W] B<br>---1111      | DMA<br>Controller<br>[S]   |
| 000DF8 <sub>H</sub>                              | DMACR[R/W] W<br>0-----00000000 0-----00000000         |                               |                                     |                               |                            |
| 000DFC <sub>H</sub>                              | —                                                     | —                             | —                                   | —                             | Reserved [S]               |
| 000E00 <sub>H</sub>                              | DDR00 [R/W] B,H,W<br>00000000                         | DDR01 [R/W] B,H,W<br>00000000 | DDR02 [R/W] B,H,W<br>00000000       | DDR03 [R/W] B,H,W<br>00000000 | Data Direction<br>Register |
| 000E04 <sub>H</sub>                              | DDR04 [R/W] B,H,W<br>00000000                         | DDR05 [R/W] B,H,W<br>00000000 | DDR06 [R/W] B,H,W<br>00000000       | DDR07 [R/W] B,H,W<br>00000000 |                            |
| 000E08 <sub>H</sub>                              | DDR08 [R/W] B,H,W<br>00000000                         | DDR09 [R/W] B,H,W<br>00000000 | DDR10 [R/W] B,H,W<br>00000000       | DDR11 [R/W] B,H,W<br>00000000 | Data Direction<br>Register |
| 000E0C <sub>H</sub>                              | DDR12 [R/W] B,H,W<br>00000000                         | DDR13 [R/W] B,H,W<br>-0000000 | DDR14 [R/W] B,H,W<br>---000--       | DDR15 [R/W] B,H,W<br>--000000 |                            |
| 000E10 <sub>H</sub>                              | —                                                     | —                             | —                                   | —                             |                            |
| 000E14 <sub>H</sub>                              | —                                                     | —                             | —                                   | —                             |                            |
| 000E18 <sub>H</sub>                              | DDR16 [R/W] B,H,W<br>00000000                         | DDR17 [R/W] B,H,W<br>00000000 | DDR18 [R/W] B,H,W<br>00000000       | DDR19 [R/W] B,H,W<br>00000000 |                            |
| 000E1C <sub>H</sub>                              | —                                                     | —                             | —                                   | —                             | Reserved                   |

| Address             | Address offset value / Register name |                                   |                                   |                                   | Block                           |
|---------------------|--------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------------------------|
|                     | +0                                   | +1                                | +2                                | +3                                |                                 |
| 000E20 <sub>H</sub> | PFR00 [R/W] B,H,W<br>00000000        | PFR01 [R/W] B,H,W<br>00000000     | PFR02 [R/W] B,H,W<br>00000000     | PFR03 [R/W] B,H,W<br>00000000     | Port Function Register          |
| 000E24 <sub>H</sub> | PFR04 [R/W] B,H,W<br>00000000        | PFR05 [R/W] B,H,W<br>00000000     | PFR06 [R/W] B,H,W<br>00000000     | PFR07 [R/W] B,H,W<br>00000000     |                                 |
| 000E28 <sub>H</sub> | PFR08 [R/W] B,H,W<br>00000000        | PFR09 [R/W] B,H,W<br>00000000     | PFR10 [R/W] B,H,W<br>00000000     | PFR11 [R/W] B,H,W<br>00000000     |                                 |
| 000E2C <sub>H</sub> | PFR12 [R/W] B,H,W<br>00000000        | PFR13 [R/W] B,H,W<br>-0000000     | PFR14 [R/W] B,H,W<br>---000--     | PFR15 [R/W] B,H,W<br>--000000     |                                 |
| 000E30 <sub>H</sub> | —                                    | —                                 | —                                 | —                                 |                                 |
| 000E34 <sub>H</sub> | —                                    | —                                 | —                                 | —                                 |                                 |
| 000E38 <sub>H</sub> | PFR16 [R/W] B,H,W<br>00000000        | PFR17 [R/W] B,H,W<br>00000000     | PFR18 [R/W] B,H,W<br>00000000     | PFR19 [R/W] B,H,W<br>00000000     |                                 |
| 000E3C <sub>H</sub> | —                                    | —                                 | —                                 | —                                 | Reserved                        |
| 000E40 <sub>H</sub> | PDDR00 [R] B,H,W<br>XXXXXXXXXX       | PDDR01 [R] B,H,W<br>XXXXXXXXXX    | PDDR02 [R] B,H,W<br>XXXXXXXXXX    | PDDR03 [R] B,H,W<br>XXXXXXXXXX    | Port Direct Read Register       |
| 000E44 <sub>H</sub> | PDDR04 [R] B,H,W<br>XXXXXXXXXX       | PDDR05 [R] B,H,W<br>XXXXXXXXXX    | PDDR06 [R] B,H,W<br>XXXXXXXXXX    | PDDR07 [R] B,H,W<br>XXXXXXXXXX    |                                 |
| 000E48 <sub>H</sub> | PDDR08 [R] B,H,W<br>XXXXXXXXXX       | PDDR09 [R] B,H,W<br>XXXXXXXXXX    | PDDR10 [R] B,H,W<br>XXXXXXXXXX    | PDDR11 [R] B,H,W<br>XXXXXXXXXX    |                                 |
| 000E4C <sub>H</sub> | PDDR12 [R] B,H,W<br>XXXXXXXXXX       | PDDR13 [R] B,H,W<br>-XXXXXXXXX    | PDDR14 [R] B,H,W<br>---XXX--      | PDDR15 [R] B,H,W<br>--XXXXXX      |                                 |
| 000E50 <sub>H</sub> | —                                    | —                                 | —                                 | —                                 |                                 |
| 000E54 <sub>H</sub> | —                                    | —                                 | —                                 | —                                 |                                 |
| 000E58 <sub>H</sub> | PDDR16 [R] B,H,W<br>XXXXXXXXXX       | PDDR17 [R] B,H,W<br>XXXXXXXXXX    | PDDR18 [R] B,H,W<br>XXXXXXXXXX    | PDDR19 [R] B,H,W<br>XXXXXXXXXX    |                                 |
| 000E5C <sub>H</sub> | —                                    | —                                 | —                                 | —                                 | Reserved                        |
| 000E60 <sub>H</sub> | EPFR00 [R/W]<br>B,H,W<br>00000000    | EPFR01 [R/W]<br>B,H,W<br>-0-0-000 | EPFR02 [R/W]<br>B,H,W<br>----0000 | EPFR03 [R/W]<br>B,H,W<br>---000-0 | Extended Port Function Register |
| 000E64 <sub>H</sub> | EPFR04 [R/W]<br>B,H,W<br>----00-0    | EPFR05 [R/W]<br>B,H,W<br>----0000 | EPFR06 [R/W]<br>B,H,W<br>----000- | EPFR07 [R/W]<br>B,H,W<br>---00000 |                                 |
| 000E68 <sub>H</sub> | EPFR08 [R/W]<br>B,H,W<br>---00000    | EPFR09 [R/W]<br>B,H,W<br>----00-  | EPFR10 [R/W]<br>B,H,W<br>----0000 | EPFR11 [R/W]<br>B,H,W<br>----0000 |                                 |
| 000E6C <sub>H</sub> | EPFR12 [R/W]<br>B,H,W<br>----0000    | EPFR13 [R/W]<br>B,H,W<br>-----00  | EPFR14 [R/W]<br>B,H,W<br>-----00  | EPFR15 [R/W]<br>B,H,W<br>-----000 |                                 |
| 000E70 <sub>H</sub> | —                                    | —                                 | —                                 | —                                 |                                 |
| 000E74 <sub>H</sub> | —                                    | —                                 | —                                 | —                                 |                                 |
| 000E78 <sub>H</sub> | —                                    | —                                 | EPFR26 [R/W]<br>B,H,W<br>00000000 | EPFR27 [R/W]<br>B,H,W<br>---0---- |                                 |
| 000E7C <sub>H</sub> | EPFR28 [R/W]<br>B,H,W<br>--000-0-    | EPFR29 [R/W]<br>B,H,W<br>00000000 | —                                 | —                                 |                                 |
| 000E80 <sub>H</sub> | —                                    | EPFR33 [R/W]<br>B,H,W<br>-----00- | EPFR34 [R/W]<br>B,H,W<br>-----00- | EPFR35 [R/W]<br>B,H,W<br>---00000 |                                 |

| Address                                          | Address offset value / Register name |                                   |                                   |                                   | Block                                |
|--------------------------------------------------|--------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|--------------------------------------|
|                                                  | +0                                   | +1                                | +2                                | +3                                |                                      |
| 000E84 <sub>H</sub>                              | EPFR36 [R/W]<br>B,H,W<br>----000-    | —                                 | —                                 | —                                 | Extended Port<br>Function Register   |
| 000E88 <sub>H</sub>                              | —                                    | —                                 | EPFR42 [R/W]<br>B,H,W<br>-----00  | EPFR43 [R/W]<br>B,H,W<br>0--0000- |                                      |
| 000E8C <sub>H</sub>                              | EPFR44 [R/W]<br>B,H,W<br>-00---0-    | EPFR45 [R/W]<br>B,H,W<br>-0000000 | —                                 | —                                 |                                      |
| 000E90 <sub>H</sub>                              | —                                    | —                                 | —                                 | —                                 |                                      |
| 000E94 <sub>H</sub>                              | —                                    | —                                 | —                                 | —                                 |                                      |
| 000E98 <sub>H</sub>                              | EPFR56 [R/W]<br>B,H,W<br>----0-0     | EPFR57 [R/W]<br>B,H,W<br>----00-0 | EPFR58 [R/W]<br>B,H,W<br>----00-0 | EPFR59 [R/W]<br>B,H,W<br>----00-0 |                                      |
| 000E9C <sub>H</sub>                              | EPFR60 [R/W]<br>B,H,W<br>----00-0    | EPFR61 [R/W]<br>B,H,W<br>----00-  | EPFR62 [R/W]<br>B,H,W<br>----00-  | EPFR63 [R/W]<br>B,H,W<br>---0000- | Reserved                             |
| 000EA0 <sub>H</sub><br>to<br>000EBC <sub>H</sub> | —                                    | —                                 | —                                 | —                                 |                                      |
| 000EC0 <sub>H</sub>                              | PPER00 [R/W]<br>B,H,W<br>00000000    | PPER01 [R/W]<br>B,H,W<br>00000000 | PPER02 [R/W]<br>B,H,W<br>00000000 | PPER03 [R/W]<br>B,H,W<br>00000000 | Port Pull-up/down<br>Enable Register |
| 000EC4 <sub>H</sub>                              | PPER04 [R/W]<br>B,H,W<br>00000000    | PPER05 [R/W]<br>B,H,W<br>00000000 | PPER06 [R/W]<br>B,H,W<br>00000000 | PPER07 [R/W]<br>B,H,W<br>00000000 |                                      |
| 000EC8 <sub>H</sub>                              | PPER08 [R/W]<br>B,H,W<br>00000000    | PPER09 [R/W]<br>B,H,W<br>00000000 | PPER10 [R/W]<br>B,H,W<br>00000000 | PPER11 [R/W]<br>B,H,W<br>00000000 |                                      |
| 000ECC <sub>H</sub>                              | PPER12 [R/W]<br>B,H,W<br>00000000    | PPER13 [R/W]<br>B,H,W<br>-0000000 | PPER14 [R/W]<br>B,H,W<br>---000-- | PPER15 [R/W]<br>B,H,W<br>--000000 |                                      |
| 000ED0 <sub>H</sub>                              | —                                    | —                                 | —                                 | —                                 |                                      |
| 000ED4 <sub>H</sub>                              | —                                    | —                                 | —                                 | —                                 |                                      |
| 000ED8 <sub>H</sub>                              | PPER16 [R/W]<br>B,H,W<br>00000000    | PPER17 [R/W]<br>B,H,W<br>00000000 | PPER18 [R/W]<br>B,H,W<br>00000000 | PPER19 [R/W]<br>B,H,W<br>00000000 | Reserved                             |
| 000EDC <sub>H</sub><br>to<br>000F3C <sub>H</sub> | —                                    | —                                 | —                                 | —                                 |                                      |
| 000F40 <sub>H</sub>                              | PORTEN [R/W]<br>B,H,W<br>-----0      | —                                 | —                                 | —                                 | Port Enable Register                 |
| 000F44 <sub>H</sub>                              | KEYCDR [R/W] H<br>00000000 00000000  |                                   | —                                 | —                                 | KeyCodeRegister                      |
| 000F48 <sub>H</sub><br>to<br>000F64 <sub>H</sub> | —                                    | —                                 | —                                 | —                                 | Reserved                             |

| Address                                          | Address offset value / Register name                  |                               |                                     |                                     | Block                                                                           |
|--------------------------------------------------|-------------------------------------------------------|-------------------------------|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------|
|                                                  | +0                                                    | +1                            | +2                                  | +3                                  |                                                                                 |
| 000F68 <sub>H</sub>                              | MSCY6 [R] H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |                               |                                     |                                     | Input Capture 6,7<br>Cycle measurement data register 67                         |
| 000F6C <sub>H</sub>                              | MSCY7 [R] H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |                               |                                     |                                     |                                                                                 |
| 000F70 <sub>H</sub>                              | RCRH0 [W] H,W<br>XXXXXXXX                             | RCRL0 [W] B,H,W<br>XXXXXXXX   | UDCRH0 [R] H,W<br>00000000          | UDCRL0 [R] B,H,W<br>00000000        | Up/Down Counter 0                                                               |
| 000F74 <sub>H</sub>                              | CCR0 [R/W] B,H<br>00000000 -0001000                   |                               | —                                   | CSR0 [R/W] B<br>00000000            |                                                                                 |
| 000F78 <sub>H</sub><br>to<br>000F7C <sub>H</sub> | —                                                     | —                             | —                                   | —                                   | Reserved                                                                        |
| 000F80 <sub>H</sub>                              | RCRH1 [W] H,W<br>XXXXXXXX                             | RCRL1 [W] B,H,W<br>XXXXXXXX   | UDCRH1 [R] H,W<br>00000000          | UDCRL1 [R] B,H,W<br>00000000        | Up/Down Counter 1                                                               |
| 000F84 <sub>H</sub>                              | CCR1 [R/W] B,H<br>00000000 -0001000                   |                               | —                                   | CSR1 [R/W] B<br>00000000            |                                                                                 |
| 000F88 <sub>H</sub>                              | —                                                     | —                             | MSCH45 [R]<br>B,H,W<br>00000000     | MSCL45 [R/W]<br>B,H,W<br>-----00    | Input Capture 4,5<br>32-bit ICU<br>Cycle and pulse width measurement control 45 |
| 000F8C <sub>H</sub>                              | —                                                     | —                             | MSCH67 [R]<br>B,H,W<br>00000000     | MSCL67 [R/W]<br>B,H,W<br>-----00    | Input Capture 6,7<br>32-bit ICU<br>Cycle and pulse width measurement control 67 |
| 000F90 <sub>H</sub>                              | OCCP10 [R/W] W<br>00000000 00000000 00000000 00000000 |                               |                                     |                                     | Output Compare 10,11<br>32-bit OCU                                              |
| 000F94 <sub>H</sub>                              | OCCP11 [R/W] W<br>00000000 00000000 00000000 00000000 |                               |                                     |                                     |                                                                                 |
| 000F98 <sub>H</sub>                              | —                                                     | —                             | OCSH1011 [R/W]<br>B,H,W<br>---0--00 | OCSL1011 [R/W]<br>B,H,W<br>0000--00 | Output Compare 10,11<br>32-bit OCU                                              |
| 000F9C <sub>H</sub>                              | —                                                     | —                             | —                                   | OCLS1011 [R/W]<br>B,H,W<br>----0000 | OCU1011<br>Output level control register                                        |
| 000FA0 <sub>H</sub>                              | CPCLR5 [R/W] W<br>11111111 11111111 11111111 11111111 |                               |                                     |                                     | Free-run Timer 5<br>32-bit FRT                                                  |
| 000FA4 <sub>H</sub>                              | TCDT5 [R/W] W<br>00000000 00000000 00000000 00000000  |                               |                                     |                                     |                                                                                 |
| 000FA8 <sub>H</sub>                              | TCCSH5 [R/W]B,H,W<br>0-----00                         | TCCSL5 [R/W]B,H,W<br>-1-00000 | —                                   | —                                   |                                                                                 |
| 000FAC <sub>H</sub><br>to<br>000FCC <sub>H</sub> | —                                                     | —                             | —                                   | —                                   | Reserved                                                                        |
| 000FD0 <sub>H</sub>                              | IPCP4 [R] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    |                               |                                     |                                     | Input Capture 4,5<br>32-bit ICU                                                 |
| 000FD4 <sub>H</sub>                              | IPCP5 [R] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    |                               |                                     |                                     |                                                                                 |
| 000FD8 <sub>H</sub>                              | —                                                     | —                             | LSYNS1 [R/W]<br>B,H,W<br>00000000   | ICS45 [R/W] B,H,W<br>00000000       |                                                                                 |

| Address                                          | Address offset value / Register name                       |                              |                                      |                                  | Block                                                                       |
|--------------------------------------------------|------------------------------------------------------------|------------------------------|--------------------------------------|----------------------------------|-----------------------------------------------------------------------------|
|                                                  | +0                                                         | +1                           | +2                                   | +3                               |                                                                             |
| 000FDC <sub>H</sub>                              | IPCP6 [R] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX         |                              |                                      |                                  | Input<br>Capture 6,7<br>32-bit ICU                                          |
| 000FE0 <sub>H</sub>                              | IPCP7 [R] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX         |                              |                                      |                                  |                                                                             |
| 000FE4 <sub>H</sub>                              | —                                                          | —                            | —                                    | ICS67 [R/W] B,H,W<br>00000000    |                                                                             |
| 000FE8 <sub>H</sub>                              | IPCP8 [R] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX         |                              |                                      |                                  | Input<br>Capture 8,9<br>32-bit ICU                                          |
| 000FEC <sub>H</sub>                              | IPCP9 [R] W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX         |                              |                                      |                                  |                                                                             |
| 000FF0 <sub>H</sub>                              | —                                                          | —                            | —                                    | ICS89 [R/W] B,H,W<br>00000000    |                                                                             |
| 000FF4 <sub>H</sub>                              | MSCY8 [R] H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX       |                              |                                      |                                  | Input<br>Capture 8,9<br>32-bit ICU<br>Cycle measurement data<br>register 89 |
| 000FF8 <sub>H</sub>                              | MSCY9 [R] H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX       |                              |                                      |                                  |                                                                             |
| 000FFC <sub>H</sub>                              | —                                                          | —                            | MSCH89 [R] B,H,W<br>00000000         | MSCL89 [R/W]<br>B,H,W<br>-----00 | Cycle and pulse width<br>measurement control 89                             |
| 001000 <sub>H</sub>                              | SACR [R/W] B,H,W<br>-----0                                 | PICD [R/W] B,H,W<br>----0011 | —                                    | —                                | Clock Control                                                               |
| 001004 <sub>H</sub><br>to<br>00112C <sub>H</sub> | —                                                          | —                            | —                                    | —                                | Reserved                                                                    |
| 001130 <sub>H</sub>                              | —                                                          | —                            | —                                    | CRCCR [R/W] B,H,W<br>-0000000    | CRC calculation unit                                                        |
| 001134 <sub>H</sub>                              | CRCINIT [R/W] B,H,W<br>11111111 11111111 11111111 11111111 |                              |                                      |                                  |                                                                             |
| 001138 <sub>H</sub>                              | CRCIN [R/W] B,H,W<br>00000000 00000000 00000000 00000000   |                              |                                      |                                  |                                                                             |
| 00113C <sub>H</sub>                              | CRCR [R] B,H,W<br>11111111 11111111 11111111 11111111      |                              |                                      |                                  |                                                                             |
| 001140 <sub>H</sub><br>to<br>0011FC <sub>H</sub> | —                                                          | —                            | —                                    | —                                | Reserved                                                                    |
| 001200 <sub>H</sub>                              | TCGS [R/W] B,H,W<br>-----00                                | —                            | —                                    | TCGSE [R/W] B,H,W<br>-----000    | 16-bit Free-run timer<br>synchronous activation                             |
| 001204 <sub>H</sub>                              | CPCLRB0/CPCLR0 [W] H,W<br>11111111 11111111                |                              | TCDT0 [R/W] H,W<br>00000000 00000000 |                                  | 16-bit Free-run Timer 0                                                     |
| 001208 <sub>H</sub>                              | TCCS0 [R/W] B,H,W<br>00000000 01000000 ----0000 -----      |                              |                                      |                                  |                                                                             |
| 00120C <sub>H</sub>                              | CPCLRB1/CPCLR1 [W] H,W<br>11111111 11111111                |                              | TCDT1 [R/W] H,W<br>00000000 00000000 |                                  | 16-bit Free-run Timer 1                                                     |
| 001210 <sub>H</sub>                              | TCCS1 [R/W] B,H,W<br>00000000 01000000 ----0000 -----      |                              |                                      |                                  |                                                                             |
| 001214 <sub>H</sub>                              | CPCLRB2/CPCLR2 [W] H,W<br>11111111 11111111                |                              | TCDT2 [R/W] H,W<br>00000000 00000000 |                                  | 16-bit Free-run Timer 2                                                     |
| 001218 <sub>H</sub>                              | TCCS2 [R/W] B,H,W<br>00000000 01000000 ----0000 -----      |                              |                                      |                                  |                                                                             |

| Address                                          | Address offset value / Register name                    |    |                                             |                                   | Block                              |
|--------------------------------------------------|---------------------------------------------------------|----|---------------------------------------------|-----------------------------------|------------------------------------|
|                                                  | +0                                                      | +1 | +2                                          | +3                                |                                    |
| 00121C <sub>H</sub><br>to<br>001230 <sub>H</sub> | —                                                       | —  | —                                           | —                                 | Reserved                           |
| 001234 <sub>H</sub>                              | FRS0 [R/W] B,H,W<br>----- --00--00 --00--00 --00--00    |    |                                             |                                   | 16-bit Free-run timer<br>selection |
| 001238 <sub>H</sub>                              | —                                                       |    | FRS1 [R/W] B,H,W<br>--00--00 --00--00       |                                   |                                    |
| 00123C <sub>H</sub>                              | FRS2 [R/W] B,H,W<br>--00--00 --00--00 --00--00 --00--00 |    |                                             |                                   |                                    |
| 001240 <sub>H</sub>                              | FRS3 [R/W] B,H,W<br>--00--00 --00--00 --00--00 --00--00 |    |                                             |                                   |                                    |
| 001244 <sub>H</sub>                              | FRS4 [R/W] B,H,W<br>--00--00 --00--00 --00--00 --00--00 |    |                                             |                                   |                                    |
| 001248 <sub>H</sub>                              | —                                                       | —  | —                                           | —                                 | Reserved                           |
| 00124C <sub>H</sub>                              | OCCPB0/OCCP0 [R/W] H,W<br>00000000 00000000             |    | OCCPB1/OCCP1 [R/W] H,W<br>00000000 00000000 |                                   | 16-bit Output compare 0/1          |
| 001250 <sub>H</sub>                              | OCS01 [R/W] B,H,W<br>-110--00 00001100                  |    | —                                           | OCMOD01 [R/W]<br>B,H,W<br>-----00 |                                    |
| 001254 <sub>H</sub>                              | OCCPB2/OCCP2 [R/W] H,W<br>00000000 00000000             |    | OCCPB3/OCCP3 [R/W] H,W<br>00000000 00000000 |                                   | 16-bit Output compare 2/3          |
| 001258 <sub>H</sub>                              | OCS23 [R/W] B,H,W<br>-110--00 00001100                  |    | —                                           | OCMOD23 [R/W]<br>B,H,W<br>-----00 |                                    |
| 00125C <sub>H</sub>                              | OCCPB4/OCCP4 [R/W] H,W<br>00000000 00000000             |    | OCCPB5/OCCP5 [R/W] H,W<br>00000000 00000000 |                                   | 16-bit Output compare 4/5          |
| 001260 <sub>H</sub>                              | OCS45 [R/W] B,H,W<br>-110--00 00001100                  |    | —                                           | OCMOD45 [R/W]<br>B,H,W<br>-----00 |                                    |
| 001264 <sub>H</sub><br>to<br>001278 <sub>H</sub> | —                                                       | —  | —                                           | —                                 | Reserved                           |
| 00127C <sub>H</sub>                              | IPCP0 [R] H,W<br>00000000 00000000                      |    | IPCP1 [R] H,W<br>00000000 00000000          |                                   | 16-bit Input capture 0/1           |
| 001280 <sub>H</sub>                              | ICS01 [R/W] B,H,W<br>-----00 00000000                   |    | —                                           | LSYNS [R/W] B,H,W<br>----0000     |                                    |
| 001284 <sub>H</sub>                              | IPCP2 [R] H,W<br>00000000 00000000                      |    | IPCP3 [R] H,W<br>00000000 00000000          |                                   | 16-bit Input capture 2/3           |
| 001288 <sub>H</sub>                              | ICS23 [R/W] B,H,W<br>-----00 00000000                   |    | —                                           | —                                 |                                    |
| 00128C <sub>H</sub><br>to<br>001298 <sub>H</sub> | —                                                       | —  | —                                           | —                                 | Reserved                           |
| 00129C <sub>H</sub>                              | —                                                       | —  | —                                           | —                                 | Reserved                           |

| Address                                          | Address offset value / Register name                     |                                    |                                                  |                                    | Block                                                        |
|--------------------------------------------------|----------------------------------------------------------|------------------------------------|--------------------------------------------------|------------------------------------|--------------------------------------------------------------|
|                                                  | +0                                                       | +1                                 | +2                                               | +3                                 |                                                              |
| 0012A0 <sub>H</sub>                              | TMRR0 [R/W] H,W<br>00000000 00000001                     |                                    | TMRR1 [R/W] H,W<br>00000000 00000001             |                                    | Waveform generator<br>0/1/2                                  |
| 0012A4 <sub>H</sub>                              | TMRR2 [R/W] H,W<br>00000000 00000001                     |                                    | —                                                | —                                  |                                                              |
| 0012A8 <sub>H</sub>                              | DTSCR0 [R/W]<br>B,H,W<br>00000000                        | DTSCR1 [R/W]<br>B,H,W<br>00000000  | DTSCR2 [R/W]<br>B,H,W<br>00000000                | —                                  |                                                              |
| 0012AC <sub>H</sub>                              | —                                                        | DTIR0 [R/W] B,H,W<br>000000--      | —                                                | DTMNS0 [R/W]<br>B,H,W<br>00---000  |                                                              |
| 0012B0 <sub>H</sub>                              | —                                                        | SIGCR10 [R/W]<br>B,H,W<br>00000000 | —                                                | SIGCR20 [R/W]<br>B,H,W<br>000000-1 |                                                              |
| 0012B4 <sub>H</sub>                              | PICS0 [R/W] B,H,W<br>000000-- -----                      |                                    |                                                  |                                    |                                                              |
| 0012B8 <sub>H</sub><br>to<br>0012CC <sub>H</sub> | —                                                        | —                                  | —                                                | —                                  | Reserved                                                     |
| 0012D0 <sub>H</sub>                              | FRS5 [R/W] B,H,W<br>--00--00 --00--00 --00--00 --00--00  |                                    |                                                  |                                    | 16-bit Free-run timer<br>selection<br>A/D activation compare |
| 0012D4 <sub>H</sub>                              | FRS6 [R/W] B,H,W<br>--00--00 --00--00 --00--00 --00--00  |                                    |                                                  |                                    | 16-bit Free-run timer<br>selection<br>A/D activation compare |
| 0012D8 <sub>H</sub>                              | FRS7 [R/W] B,H,W<br>--00--00 --00--00 --00--00 --00--00  |                                    |                                                  |                                    |                                                              |
| 0012DC <sub>H</sub><br>to<br>0012FC <sub>H</sub> | —                                                        | —                                  | —                                                | —                                  | Reserved                                                     |
| 001300 <sub>H</sub>                              | —                                                        |                                    |                                                  |                                    | Reserved                                                     |
| 001304 <sub>H</sub>                              | ADTSS0[R/W]<br>B,H,W<br>-----0                           | —                                  | —                                                | —                                  | 12-bit A/D converter 1/2 unit                                |
| 001308 <sub>H</sub>                              | ADTSE0[R/W] B,H,W<br>00000000 00000000 00000000 00000000 |                                    |                                                  |                                    |                                                              |
| 00130C <sub>H</sub>                              | ADCOMP0/ADCOMPB0[R/W] H,W<br>00000000 00000000           |                                    | ADCOMP1/ADCOMPB1[R/W] H,W<br>00000000 00000000   |                                    |                                                              |
| 001310 <sub>H</sub>                              | ADCOMP2/ADCOMPB2[R/W] H,W<br>00000000 00000000           |                                    | ADCOMP3/ADCOMPB3[R/W] H,W<br>00000000 00000000   |                                    |                                                              |
| 001314 <sub>H</sub>                              | ADCOMP4/ADCOMPB4[R/W] H,W<br>00000000 00000000           |                                    | ADCOMP5/ADCOMPB5[R/W] H,W<br>00000000 00000000   |                                    |                                                              |
| 001318 <sub>H</sub>                              | ADCOMP6/ADCOMPB6[R/W] H,W<br>00000000 00000000           |                                    | ADCOMP7/ADCOMPB7[R/W] H,W<br>00000000 00000000   |                                    |                                                              |
| 00131C <sub>H</sub>                              | ADCOMP8/ADCOMPB8[R/W] H,W<br>00000000 00000000           |                                    | ADCOMP9/ADCOMPB9[R/W] H,W<br>00000000 00000000   |                                    |                                                              |
| 001320 <sub>H</sub>                              | ADCOMP10/ADCOMPB10[R/W] H,W<br>00000000 00000000         |                                    | ADCOMP11/ADCOMPB11[R/W] H,W<br>00000000 00000000 |                                    |                                                              |
| 001324 <sub>H</sub>                              | ADCOMP12/ADCOMPB12[R/W] H,W<br>00000000 00000000         |                                    | ADCOMP13/ADCOMPB13[R/W] H,W<br>00000000 00000000 |                                    |                                                              |
| 001328 <sub>H</sub>                              | ADCOMP14/ADCOMPB14[R/W] H,W<br>00000000 00000000         |                                    | ADCOMP15/ADCOMPB15[R/W] H,W<br>00000000 00000000 |                                    |                                                              |

| Address             | Address offset value / Register name             |    |                                                  |    | Block                         |
|---------------------|--------------------------------------------------|----|--------------------------------------------------|----|-------------------------------|
|                     | +0                                               | +1 | +2                                               | +3 |                               |
| 00132C <sub>H</sub> | ADCOMP16/ADCOMPB16[R/W] H,W<br>00000000 00000000 |    | ADCOMP17/ADCOMPB17[R/W] H,W<br>00000000 00000000 |    | 12-bit A/D converter 1/2 unit |
| 001330 <sub>H</sub> | ADCOMP18/ADCOMPB18[R/W] H,W<br>00000000 00000000 |    | ADCOMP19/ADCOMPB19[R/W] H,W<br>00000000 00000000 |    |                               |
| 001334 <sub>H</sub> | ADCOMP20/ADCOMPB20[R/W] H,W<br>00000000 00000000 |    | ADCOMP21/ADCOMPB21[R/W] H,W<br>00000000 00000000 |    |                               |
| 001338 <sub>H</sub> | ADCOMP22/ADCOMPB22[R/W] H,W<br>00000000 00000000 |    | ADCOMP23/ADCOMPB23[R/W] H,W<br>00000000 00000000 |    |                               |
| 00133C <sub>H</sub> | ADCOMP24/ADCOMPB24[R/W] H,W<br>00000000 00000000 |    | ADCOMP25/ADCOMPB25[R/W] H,W<br>00000000 00000000 |    |                               |
| 001340 <sub>H</sub> | ADCOMP26/ADCOMPB26[R/W] H,W<br>00000000 00000000 |    | ADCOMP27/ADCOMPB27[R/W] H,W<br>00000000 00000000 |    |                               |
| 001344 <sub>H</sub> | ADCOMP28/ADCOMPB28[R/W] H,W<br>00000000 00000000 |    | ADCOMP29/ADCOMPB29[R/W] H,W<br>00000000 00000000 |    |                               |
| 001348 <sub>H</sub> | ADCOMP30/ADCOMPB30[R/W] H,W<br>00000000 00000000 |    | ADCOMP31/ADCOMPB31[R/W] H,W<br>00000000 00000000 |    |                               |
| 00134C <sub>H</sub> | ADTCS0[R/W] B,H,W<br>00000000 0010----           |    | ADTCS1[R/W] B,H,W<br>00000000 0010----           |    |                               |
| 001350 <sub>H</sub> | ADTCS2[R/W] B,H,W<br>00000000 0010----           |    | ADTCS3[R/W] B,H,W<br>00000000 0010----           |    |                               |
| 001354 <sub>H</sub> | ADTCS4[R/W] B,H,W<br>00000000 0010----           |    | ADTCS5[R/W] B,H,W<br>00000000 0010----           |    |                               |
| 001358 <sub>H</sub> | ADTCS6[R/W] B,H,W<br>00000000 0010----           |    | ADTCS7[R/W] B,H,W<br>00000000 0010----           |    |                               |
| 00135C <sub>H</sub> | ADTCS8[R/W] B,H,W<br>00000000 0010----           |    | ADTCS9[R/W] B,H,W<br>00000000 0010----           |    |                               |
| 001360 <sub>H</sub> | ADTCS10[R/W] B,H,W<br>00000000 0010----          |    | ADTCS11[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 001364 <sub>H</sub> | ADTCS12[R/W] B,H,W<br>00000000 0010----          |    | ADTCS13[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 001368 <sub>H</sub> | ADTCS14[R/W] B,H,W<br>00000000 0010----          |    | ADTCS15[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 00136C <sub>H</sub> | ADTCS16[R/W] B,H,W<br>00000000 0010----          |    | ADTCS17[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 001370 <sub>H</sub> | ADTCS18[R/W] B,H,W<br>00000000 0010----          |    | ADTCS19[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 001374 <sub>H</sub> | ADTCS20[R/W] B,H,W<br>00000000 0010----          |    | ADTCS21[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 001378 <sub>H</sub> | ADTCS22[R/W] B,H,W<br>00000000 0010----          |    | ADTCS23[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 00137C <sub>H</sub> | ADTCS24[R/W] B,H,W<br>00000000 0010----          |    | ADTCS25[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 001380 <sub>H</sub> | ADTCS26[R/W] B,H,W<br>00000000 0010----          |    | ADTCS27[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 001384 <sub>H</sub> | ADTCS28[R/W] B,H,W<br>00000000 0010----          |    | ADTCS29[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 001388 <sub>H</sub> | ADTCS30[R/W] B,H,W<br>00000000 0010----          |    | ADTCS31[R/W] B,H,W<br>00000000 0010----          |    |                               |
| 00138C <sub>H</sub> | ADTCD0[R] B,H,W<br>10--0000 00000000             |    | ADTCD1[R] B,H,W<br>10--0000 00000000             |    |                               |

| Address             | Address offset value / Register name   |    |                                        |    | Block                         |
|---------------------|----------------------------------------|----|----------------------------------------|----|-------------------------------|
|                     | +0                                     | +1 | +2                                     | +3 |                               |
| 001390 <sub>H</sub> | ADTCD2[R] B,H,W<br>10--0000 00000000   |    | ADTCD3[R] B,H,W<br>10--0000 00000000   |    | 12-bit A/D converter 1/2 unit |
| 001394 <sub>H</sub> | ADTCD4[R] B,H,W<br>10--0000 00000000   |    | ADTCD5[R] B,H,W<br>10--0000 00000000   |    |                               |
| 001398 <sub>H</sub> | ADTCD6[R] B,H,W<br>10--0000 00000000   |    | ADTCD7[R] B,H,W<br>10--0000 00000000   |    |                               |
| 00139C <sub>H</sub> | ADTCD8[R] B,H,W<br>10--0000 00000000   |    | ADTCD9[R] B,H,W<br>10--0000 00000000   |    |                               |
| 0013A0 <sub>H</sub> | ADTCD10[R] B,H,W<br>10--0000 00000000  |    | ADTCD11[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013A4 <sub>H</sub> | ADTCD12[R] B,H,W<br>10--0000 00000000  |    | ADTCD13[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013A8 <sub>H</sub> | ADTCD14[R] B,H,W<br>10--0000 00000000  |    | ADTCD15[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013AC <sub>H</sub> | ADTCD16[R] B,H,W<br>10--0000 00000000  |    | ADTCD17[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013B0 <sub>H</sub> | ADTCD18[R] B,H,W<br>10--0000 00000000  |    | ADTCD19[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013B4 <sub>H</sub> | ADTCD20[R] B,H,W<br>10--0000 00000000  |    | ADTCD21[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013B8 <sub>H</sub> | ADTCD22[R] B,H,W<br>10--0000 00000000  |    | ADTCD23[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013BC <sub>H</sub> | ADTCD24[R] B,H,W<br>10--0000 00000000  |    | ADTCD25[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013C0 <sub>H</sub> | ADTCD26[R] B,H,W<br>10--0000 00000000  |    | ADTCD27[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013C4 <sub>H</sub> | ADTCD28[R] B,H,W<br>10--0000 00000000  |    | ADTCD29[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013C8 <sub>H</sub> | ADTCD30[R] B,H,W<br>10--0000 00000000  |    | ADTCD31[R] B,H,W<br>10--0000 00000000  |    |                               |
| 0013CC <sub>H</sub> | ADTECS0[R/W] B,H,W<br>-----0 ---00000  |    | ADTECS1[R/W] B,H,W<br>-----0 ---00000  |    |                               |
| 0013D0 <sub>H</sub> | ADTECS2[R/W] B,H,W<br>-----0 ---00000  |    | ADTECS3[R/W] B,H,W<br>-----0 ---00000  |    |                               |
| 0013D4 <sub>H</sub> | ADTECS4[R/W] B,H,W<br>-----0 ---00000  |    | ADTECS5[R/W] B,H,W<br>-----0 ---00000  |    |                               |
| 0013D8 <sub>H</sub> | ADTECS6[R/W] B,H,W<br>-----0 ---00000  |    | ADTECS7[R/W] B,H,W<br>-----0 ---00000  |    |                               |
| 0013DC <sub>H</sub> | ADTECS8[R/W] B,H,W<br>-----0 ---00000  |    | ADTECS9[R/W] B,H,W<br>-----0 ---00000  |    |                               |
| 0013E0 <sub>H</sub> | ADTECS10[R/W] B,H,W<br>-----0 ---00000 |    | ADTECS11[R/W] B,H,W<br>-----0 ---00000 |    |                               |
| 0013E4 <sub>H</sub> | ADTECS12[R/W] B,H,W<br>-----0 ---00000 |    | ADTECS13[R/W] B,H,W<br>-----0 ---00000 |    |                               |
| 0013E8 <sub>H</sub> | ADTECS14[R/W] B,H,W<br>-----0 ---00000 |    | ADTECS15[R/W] B,H,W<br>-----0 ---00000 |    |                               |
| 0013EC <sub>H</sub> | ADTECS16[R/W] B,H,W<br>-----0 ---00000 |    | ADTECS17[R/W] B,H,W<br>-----0 ---00000 |    |                               |
| 0013F0 <sub>H</sub> | ADTECS18[R/W] B,H,W<br>-----0 ---00000 |    | ADTECS19[R/W] B,H,W<br>-----0 ---00000 |    |                               |

| Address             | Address offset value / Register name                      |                                    |                                         |                                    | Block                         |
|---------------------|-----------------------------------------------------------|------------------------------------|-----------------------------------------|------------------------------------|-------------------------------|
|                     | +0                                                        | +1                                 | +2                                      | +3                                 |                               |
| 0013F4 <sub>H</sub> | ADTECS20[R/W] B,H,W<br>-----0 ---00000                    |                                    | ADTECS21[R/W] B,H,W<br>-----0 ---00000  |                                    | 12-bit A/D converter 1/2 unit |
| 0013F8 <sub>H</sub> | ADTECS22[R/W] B,H,W<br>-----0 ---00000                    |                                    | ADTECS23[R/W] B,H,W<br>-----0 ---00000  |                                    |                               |
| 0013FC <sub>H</sub> | ADTECS24[R/W] B,H,W<br>-----0 ---00000                    |                                    | ADTECS25[R/W] B,H,W<br>-----0 ---00000  |                                    |                               |
| 001400 <sub>H</sub> | ADTECS26[R/W] B,H,W<br>-----0 ---00000                    |                                    | ADTECS27[R/W] B,H,W<br>-----0 ---00000  |                                    |                               |
| 001404 <sub>H</sub> | ADTECS28[R/W] B,H,W<br>-----0 ---00000                    |                                    | ADTECS29[R/W] B,H,W<br>-----0 ---00000  |                                    |                               |
| 001408 <sub>H</sub> | ADTECS30[R/W] B,H,W<br>-----0 ---00000                    |                                    | ADTECS31[R/W] B,H,W<br>-----0 ---00000  |                                    |                               |
| 00140C <sub>H</sub> | ADRCUT0[R/W] B,H,W<br>----0000 00000000                   |                                    | ADRCLT0[R/W] B,H,W<br>----0000 00000000 |                                    |                               |
| 001410 <sub>H</sub> | ADRCUT1[R/W] B,H,W<br>----0000 00000000                   |                                    | ADRCLT1[R/W] B,H,W<br>----0000 00000000 |                                    |                               |
| 001414 <sub>H</sub> | ADRCUT2[R/W] B,H,W<br>----0000 00000000                   |                                    | ADRCLT2[R/W] B,H,W<br>----0000 00000000 |                                    |                               |
| 001418 <sub>H</sub> | ADRCUT3[R/W] B,H,W<br>----0000 00000000                   |                                    | ADRCLT3[R/W] B,H,W<br>----0000 00000000 |                                    |                               |
| 00141C <sub>H</sub> | ADRCCS0[R/W]<br>B,H,W<br>00000000                         | ADRCCS1[R/W]<br>B,H,W<br>00000000  | ADRCCS2[R/W]<br>B,H,W<br>00000000       | ADRCCS3[R/W]<br>B,H,W<br>00000000  |                               |
| 001420 <sub>H</sub> | ADRCCS4[R/W]<br>B,H,W<br>00000000                         | ADRCCS5[R/W]<br>B,H,W<br>00000000  | ADRCCS6[R/W]<br>B,H,W<br>00000000       | ADRCCS7[R/W]<br>B,H,W<br>00000000  |                               |
| 001424 <sub>H</sub> | ADRCCS8[R/W]<br>B,H,W<br>00000000                         | ADRCCS9[R/W]<br>B,H,W<br>00000000  | ADRCCS10[R/W]<br>B,H,W<br>00000000      | ADRCCS11[R/W]<br>B,H,W<br>00000000 |                               |
| 001428 <sub>H</sub> | ADRCCS12[R/W]<br>B,H,W<br>00000000                        | ADRCCS13[R/W]<br>B,H,W<br>00000000 | ADRCCS14[R/W]<br>B,H,W<br>00000000      | ADRCCS15[R/W]<br>B,H,W<br>00000000 |                               |
| 00142C <sub>H</sub> | ADRCCS16[R/W]<br>B,H,W<br>00000000                        | ADRCCS17[R/W]<br>B,H,W<br>00000000 | ADRCCS18[R/W]<br>B,H,W<br>00000000      | ADRCCS19[R/W]<br>B,H,W<br>00000000 |                               |
| 001430 <sub>H</sub> | ADRCCS20[R/W]<br>B,H,W<br>00000000                        | ADRCCS21[R/W]<br>B,H,W<br>00000000 | ADRCCS22[R/W]<br>B,H,W<br>00000000      | ADRCCS23[R/W]<br>B,H,W<br>00000000 |                               |
| 001434 <sub>H</sub> | ADRCCS24[R/W]<br>B,H,W<br>00000000                        | ADRCCS25[R/W]<br>B,H,W<br>00000000 | ADRCCS26[R/W]<br>B,H,W<br>00000000      | ADRCCS27[R/W]<br>B,H,W<br>00000000 |                               |
| 001438 <sub>H</sub> | ADRCCS28[R/W]<br>B,H,W<br>00000000                        | ADRCCS29[R/W]<br>B,H,W<br>00000000 | ADRCCS30[R/W]<br>B,H,W<br>00000000      | ADRCCS31[R/W]<br>B,H,W<br>00000000 |                               |
| 00143C <sub>H</sub> | ADRCOT0[R] B,H,W<br>00000000 00000000 00000000 00000000   |                                    |                                         |                                    |                               |
| 001440 <sub>H</sub> | ADRCIF0[R,W] B,H,W<br>00000000 00000000 00000000 00000000 |                                    |                                         |                                    |                               |
| 001444 <sub>H</sub> | ADSCANS0[R/W]<br>B,H,W<br>000-----                        | —                                  | —                                       | —                                  |                               |

| Address                                          | Address offset value / Register name                    |                                    |                                                  |                                    | Block                         |
|--------------------------------------------------|---------------------------------------------------------|------------------------------------|--------------------------------------------------|------------------------------------|-------------------------------|
|                                                  | +0                                                      | +1                                 | +2                                               | +3                                 |                               |
| 001448 <sub>H</sub>                              | ADNCS0[R/W]<br>B,H,W<br>0-000-00                        | ADNCS1[R/W]<br>B,H,W<br>0-000-00   | ADNCS2[R/W]<br>B,H,W<br>0-000-00                 | ADNCS3[R/W]<br>B,H,W<br>0-000-00   | 12-bit A/D converter 1/2 unit |
| 00144C <sub>H</sub>                              | ADNCS4[R/W]<br>B,H,W<br>0-000-00                        | ADNCS5[R/W]<br>B,H,W<br>0-000-00   | ADNCS6[R/W]<br>B,H,W<br>0-000-00                 | ADNCS7[R/W]<br>B,H,W<br>0-000-00   |                               |
| 001450 <sub>H</sub>                              | ADNCS8[R/W]<br>B,H,W<br>0-000-00                        | ADNCS9[R/W]<br>B,H,W<br>0-000-00   | ADNCS10[R/W]<br>B,H,W<br>0-000-00                | ADNCS11[R/W]<br>B,H,W<br>0-000-00  |                               |
| 001454 <sub>H</sub>                              | ADNCS12[R/W]<br>B,H,W<br>0-000-00                       | ADNCS13[R/W]<br>B,H,W<br>0-000-00  | ADNCS14[R/W]<br>B,H,W<br>0-000-00                | ADNCS15[R/W]<br>B,H,W<br>0-000-00  |                               |
| 001458 <sub>H</sub>                              | ADPRTF0[R] B,H,W<br>00000000 00000000 00000000 00000000 |                                    |                                                  |                                    |                               |
| 00145C <sub>H</sub>                              | ADEOCF0[R] B,H,W<br>11111111 11111111 11111111 11111111 |                                    |                                                  |                                    |                               |
| 001460 <sub>H</sub>                              | ADCS0[R] B,H,W<br>0-----                                |                                    | ADCH0[R] B,H,W<br>---00000                       | ADMD0[R/W] B,H,W<br>0---0000       |                               |
| 001464 <sub>H</sub>                              | ADSTPCS0[R/W]<br>B,H,W<br>00000000                      | ADSTPCS1[R/W]<br>B,H,W<br>00000000 | ADSTPCS2[R/W]<br>B,H,W<br>00000000               | ADSTPCS3[R/W]<br>B,H,W<br>00000000 |                               |
| 001468 <sub>H</sub>                              | ADSTPCS4[R/W]<br>B,H,W<br>00000000                      | ADSTPCS5[R/W]<br>B,H,W<br>00000000 | ADSTPCS6[R/W]<br>B,H,W<br>00000000               | ADSTPCS7[R/W]<br>B,H,W<br>00000000 |                               |
| 00146C <sub>H</sub>                              | —                                                       |                                    |                                                  |                                    |                               |
| 001470 <sub>H</sub>                              | ADTSS1[R/W]<br>B,H,W<br>-----0                          | —                                  | —                                                | —                                  | 12-bit A/D converter 2/2 unit |
| 001474 <sub>H</sub>                              | ADTSE1[R/W] B,H,W<br>----- 00000000 00000000            |                                    |                                                  |                                    |                               |
| 001478 <sub>H</sub>                              | ADCOMP32/ADCOMPB32[R/W] H,W<br>00000000 00000000        |                                    | ADCOMP33/ADCOMPB33[R/W] H,W<br>00000000 00000000 |                                    |                               |
| 00147C <sub>H</sub>                              | ADCOMP34/ADCOMPB34[R/W] H,W<br>00000000 00000000        |                                    | ADCOMP35/ADCOMPB35[R/W] H,W<br>00000000 00000000 |                                    |                               |
| 001480 <sub>H</sub>                              | ADCOMP36/ADCOMPB36[R/W] H,W<br>00000000 00000000        |                                    | ADCOMP37/ADCOMPB37[R/W] H,W<br>00000000 00000000 |                                    | 12-bit A/D converter 2/2 unit |
| 001484 <sub>H</sub>                              | ADCOMP38/ADCOMPB38[R/W] H,W<br>00000000 00000000        |                                    | ADCOMP39/ADCOMPB39[R/W] H,W<br>00000000 00000000 |                                    |                               |
| 001488 <sub>H</sub>                              | ADCOMP40/ADCOMPB40[R/W] H,W<br>00000000 00000000        |                                    | ADCOMP41/ADCOMPB41[R/W] H,W<br>00000000 00000000 |                                    |                               |
| 00148C <sub>H</sub>                              | ADCOMP42/ADCOMPB42[R/W] H,W<br>00000000 00000000        |                                    | ADCOMP43/ADCOMPB43[R/W] H,W<br>00000000 00000000 |                                    |                               |
| 001490 <sub>H</sub>                              | ADCOMP44/ADCOMPB44[R/W] H,W<br>00000000 00000000        |                                    | ADCOMP45/ADCOMPB45[R/W] H,W<br>00000000 00000000 |                                    |                               |
| 001494 <sub>H</sub>                              | ADCOMP46/ADCOMPB46[R/W] H,W<br>00000000 00000000        |                                    | ADCOMP47/ADCOMPB47[R/W] H,W<br>00000000 00000000 |                                    |                               |
| 001498 <sub>H</sub><br>to<br>0014B4 <sub>H</sub> | —                                                       | —                                  | —                                                | —                                  | Reserved                      |

| Address                                          | Address offset value / Register name    |    |                                         |    | Block                         |
|--------------------------------------------------|-----------------------------------------|----|-----------------------------------------|----|-------------------------------|
|                                                  | +0                                      | +1 | +2                                      | +3 |                               |
| 0014B8 <sub>H</sub>                              | ADTCS32[R/W] B,H,W<br>00000000 0010---- |    | ADTCS33[R/W] B,H,W<br>00000000 0010---- |    | 12-bit A/D converter 2/2 unit |
| 0014BC <sub>H</sub>                              | ADTCS34[R/W] B,H,W<br>00000000 0010---- |    | ADTCS35[R/W] B,H,W<br>00000000 0010---- |    |                               |
| 0014C0 <sub>H</sub>                              | ADTCS36[R/W] B,H,W<br>00000000 0010---- |    | ADTCS37[R/W] B,H,W<br>00000000 0010---- |    |                               |
| 0014C4 <sub>H</sub>                              | ADTCS38[R/W] B,H,W<br>00000000 0010---- |    | ADTCS39[R/W] B,H,W<br>00000000 0010---- |    |                               |
| 0014C8 <sub>H</sub>                              | ADTCS40[R/W] B,H,W<br>00000000 0010---- |    | ADTCS41[R/W] B,H,W<br>00000000 0010---- |    |                               |
| 0014CC <sub>H</sub>                              | ADTCS42[R/W] B,H,W<br>00000000 0010---- |    | ADTCS43[R/W] B,H,W<br>00000000 0010---- |    |                               |
| 0014D0 <sub>H</sub>                              | ADTCS44[R/W] B,H,W<br>00000000 0010---- |    | ADTCS45[R/W] B,H,W<br>00000000 0010---- |    |                               |
| 0014D4 <sub>H</sub>                              | ADTCS46[R/W] B,H,W<br>00000000 0010---- |    | ADTCS47[R/W] B,H,W<br>00000000 0010---- |    |                               |
| 0014D8 <sub>H</sub><br>to<br>0014F4 <sub>H</sub> | —                                       | —  | —                                       | —  | Reserved                      |
| 0014F8 <sub>H</sub>                              | ADTCD32[R] B,H,W<br>10--0000 00000000   |    | ADTCD33[R] B,H,W<br>10--0000 00000000   |    | 12-bit A/D converter 2/2 unit |
| 0014FC <sub>H</sub>                              | ADTCD34[R] B,H,W<br>10--0000 00000000   |    | ADTCD35[R] B,H,W<br>10--0000 00000000   |    |                               |
| 001500 <sub>H</sub>                              | ADTCD36[R] B,H,W<br>10--0000 00000000   |    | ADTCD37[R] B,H,W<br>10--0000 00000000   |    | 12-bit A/D converter 2/2 unit |
| 001504 <sub>H</sub>                              | ADTCD38[R] B,H,W<br>10--0000 00000000   |    | ADTCD39[R] B,H,W<br>10--0000 00000000   |    |                               |
| 001508 <sub>H</sub>                              | ADTCD40[R] B,H,W<br>10--0000 00000000   |    | ADTCD41[R] B,H,W<br>10--0000 00000000   |    |                               |
| 00150C <sub>H</sub>                              | ADTCD42[R] B,H,W<br>10--0000 00000000   |    | ADTCD43[R] B,H,W<br>10--0000 00000000   |    |                               |
| 001510 <sub>H</sub>                              | ADTCD44[R] B,H,W<br>10--0000 00000000   |    | ADTCD45[R] B,H,W<br>10--0000 00000000   |    |                               |
| 001514 <sub>H</sub>                              | ADTCD46[R] B,H,W<br>10--0000 00000000   |    | ADTCD47[R] B,H,W<br>10--0000 00000000   |    |                               |
| 001518 <sub>H</sub><br>to<br>001534 <sub>H</sub> | —                                       | —  | —                                       | —  | Reserved                      |

| Address                                          | Address offset value / Register name          |                                    |                                         |                                    | Block                         |
|--------------------------------------------------|-----------------------------------------------|------------------------------------|-----------------------------------------|------------------------------------|-------------------------------|
|                                                  | +0                                            | +1                                 | +2                                      | +3                                 |                               |
| 001538 <sub>H</sub>                              | ADTECS32[R/W] B,H,W<br>-----0 ----0000        |                                    | ADTECS33[R/W] B,H,W<br>-----0 ----0000  |                                    | 12-bit A/D converter 2/2 unit |
| 00153C <sub>H</sub>                              | ADTECS34[R/W] B,H,W<br>-----0 ----0000        |                                    | ADTECS35[R/W] B,H,W<br>-----0 ----0000  |                                    |                               |
| 001540 <sub>H</sub>                              | ADTECS36[R/W] B,H,W<br>-----0 ----0000        |                                    | ADTECS37[R/W] B,H,W<br>-----0 ----0000  |                                    |                               |
| 001544 <sub>H</sub>                              | ADTECS38[R/W] B,H,W<br>-----0 ----0000        |                                    | ADTECS39[R/W] B,H,W<br>-----0 ----0000  |                                    |                               |
| 001548 <sub>H</sub>                              | ADTECS40[R/W] B,H,W<br>-----0 ----0000        |                                    | ADTECS41[R/W] B,H,W<br>-----0 ----0000  |                                    |                               |
| 00154C <sub>H</sub>                              | ADTECS42[R/W] B,H,W<br>-----0 ----0000        |                                    | ADTECS43[R/W] B,H,W<br>-----0 ----0000  |                                    |                               |
| 001550 <sub>H</sub>                              | ADTECS44[R/W] B,H,W<br>-----0 ----0000        |                                    | ADTECS45[R/W] B,H,W<br>-----0 ----0000  |                                    |                               |
| 001554 <sub>H</sub>                              | ADTECS46[R/W] B,H,W<br>-----0 ----0000        |                                    | ADTECS47[R/W] B,H,W<br>-----0 ----0000  |                                    |                               |
| 001558 <sub>H</sub><br>to<br>001574 <sub>H</sub> | —                                             | —                                  | —                                       | —                                  | Reserved                      |
| 001578 <sub>H</sub>                              | ADRCUT4[R/W] B,H,W<br>----0000 00000000       |                                    | ADRCLT4[R/W] B,H,W<br>----0000 00000000 |                                    | 12-bit A/D converter 2/2 unit |
| 00157C <sub>H</sub>                              | ADRCUT5[R/W] B,H,W<br>----0000 00000000       |                                    | ADRCLT5[R/W] B,H,W<br>----0000 00000000 |                                    |                               |
| 001580 <sub>H</sub>                              | ADRCUT6[R/W] B,H,W<br>----0000 00000000       |                                    | ADRCLT6[R/W] B,H,W<br>----0000 00000000 |                                    |                               |
| 001584 <sub>H</sub>                              | ADRCUT7[R/W] B,H,W<br>----0000 00000000       |                                    | ADRCLT7[R/W] B,H,W<br>----0000 00000000 |                                    |                               |
| 001588 <sub>H</sub>                              | ADRCCS32[R/W]<br>B,H,W<br>00000000            | ADRCCS33[R/W]<br>B,H,W<br>00000000 | ADRCCS34[R/W]<br>B,H,W<br>00000000      | ADRCCS35[R/W]<br>B,H,W<br>00000000 | 12-bit A/D converter 2/2 unit |
| 00158C <sub>H</sub>                              | ADRCCS36[R/W]<br>B,H,W<br>00000000            | ADRCCS37[R/W]<br>B,H,W<br>00000000 | ADRCCS38[R/W]<br>B,H,W<br>00000000      | ADRCCS39[R/W]<br>B,H,W<br>00000000 |                               |
| 001590 <sub>H</sub>                              | ADRCCS40[R/W]<br>B,H,W<br>00000000            | ADRCCS41[R/W]<br>B,H,W<br>00000000 | ADRCCS42[R/W]<br>B,H,W<br>00000000      | ADRCCS43[R/W]<br>B,H,W<br>00000000 |                               |
| 001594 <sub>H</sub>                              | ADRCCS44[R/W]<br>B,H,W<br>00000000            | ADRCCS45[R/W]<br>B,H,W<br>00000000 | ADRCCS46[R/W]<br>B,H,W<br>00000000      | ADRCCS47[R/W]<br>B,H,W<br>00000000 |                               |
| 001598 <sub>H</sub><br>to<br>0015A4 <sub>H</sub> | —                                             | —                                  | —                                       | —                                  | Reserved                      |
| 0015A8 <sub>H</sub>                              | ADRCOT1 [R] B,H,W<br>-----00000000 00000000   |                                    |                                         |                                    | 12-bit A/D converter 2/2 unit |
| 0015AC <sub>H</sub>                              | ADRCIF1 [R,W] B,H,W<br>-----00000000 00000000 |                                    |                                         |                                    |                               |
| 0015B0 <sub>H</sub>                              | ADSCANS1 [R/W]<br>B,H,W<br>000-----           | —                                  | —                                       | —                                  |                               |

| Address                                          | Address offset value / Register name                 |                                                      |                                                      |                                                                | Block                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | +0                                                   | +1                                                   | +2                                                   | +3                                                             |                                                                                                                                                                                                                                                                                                                                                 |
| 0015B4 <sub>H</sub>                              | ADNCS16 [R/W]<br>B,H,W<br>0-000-00                   | ADNCS17 [R/W]<br>B,H,W<br>0-000-00                   | ADNCS18 [R/W]<br>B,H,W<br>0-000-00                   | ADNCS19 [R/W]<br>B,H,W<br>0-000-00                             | 12-bit A/D converter 2/2 unit                                                                                                                                                                                                                                                                                                                   |
| 0015B8 <sub>H</sub>                              | ADNCS20 [R/W]<br>B,H,W<br>0-000-00                   | ADNCS21 [R/W]<br>B,H,W<br>0-000-00                   | ADNCS22 [R/W]<br>B,H,W<br>0-000-00                   | ADNCS23 [R/W]<br>B,H,W<br>0-000-00                             |                                                                                                                                                                                                                                                                                                                                                 |
| 0015BC <sub>H</sub>                              | —                                                    | —                                                    | —                                                    | —                                                              |                                                                                                                                                                                                                                                                                                                                                 |
| 0015C0 <sub>H</sub>                              | —                                                    | —                                                    | —                                                    | —                                                              |                                                                                                                                                                                                                                                                                                                                                 |
| 0015C4 <sub>H</sub>                              | ADPRTF1 [R] B,H,W<br>----- 00000000 00000000         |                                                      |                                                      |                                                                |                                                                                                                                                                                                                                                                                                                                                 |
| 0015C8 <sub>H</sub>                              | ADEOCF1 [R] B,H,W<br>----- 11111111 11111111         |                                                      |                                                      |                                                                |                                                                                                                                                                                                                                                                                                                                                 |
| 0015CC <sub>H</sub>                              | ADCS1 [R] B,H,W<br>0-----                            |                                                      | ADCH1 [R] B,H,W<br>---00000                          | ADMD1 [R/W] B,H,W<br>0---0000                                  |                                                                                                                                                                                                                                                                                                                                                 |
| 0015D0 <sub>H</sub>                              | ADSTPCS8 [R/W]<br>B,H,W<br>00000000                  | ADSTPCS9 [R/W]<br>B,H,W<br>00000000                  | ADSTPCS10 [R/W]<br>B,H,W<br>00000000                 | ADSTPCS11 [R/W]<br>B,H,W<br>00000000                           |                                                                                                                                                                                                                                                                                                                                                 |
| 0015D4 <sub>H</sub><br>to<br>00174C <sub>H</sub> | —                                                    | —                                                    | —                                                    | —                                                              | Reserved                                                                                                                                                                                                                                                                                                                                        |
| 001750 <sub>H</sub>                              | SCR0/(IBCR0)[R/W]<br>B,H,W<br>0--00000               | SMR0[R/W]<br>B,H,W<br>000-00-0                       | SSR0[R/W]<br>B,H,W<br>0-000011                       | ESCR0/(IBSR0)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART0<br>*1: Byte access is possible<br>only for access to lower 8<br>bits.<br><br>*2: Reserved because I <sup>2</sup> C<br>mode is not set immediately<br>after reset.<br><br>*3: Reserved because CSIO<br>mode is not set immediately<br>after reset.<br><br>*4: Reserved because<br>LIN2.1 mode is not set<br>immediately after reset. |
| 001754 <sub>H</sub>                              | — /(RDR10/(TDR10))[R/W] B,H,W<br>----- *3            |                                                      | RDR00/(TDR00)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                |                                                                                                                                                                                                                                                                                                                                                 |
| 001758 <sub>H</sub>                              | SACSR0[R/W] B,H,W<br>0---000 00000000                |                                                      | STMR0[R] B,H,W<br>00000000 00000000                  |                                                                |                                                                                                                                                                                                                                                                                                                                                 |
| 00175C <sub>H</sub>                              | STMCR0[R/W] B,H,W<br>00000000 00000000               |                                                      | — /(SCSCR0/SFUR0)[R/W] B,H,W<br>----- *3 *4          |                                                                |                                                                                                                                                                                                                                                                                                                                                 |
| 001760 <sub>H</sub>                              | — /(SCSTR30)/<br>(LAMSR0)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR20)/<br>(LAMCR0)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR10)<br>/(SFLR10)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR00)/<br>(SFLR00)<br>[R/W] B,H,W<br>----- *3           |                                                                                                                                                                                                                                                                                                                                                 |
| 001764 <sub>H</sub>                              | —                                                    | — /(SCSFR20)<br>[R/W] B,H,W<br>----- *3              | — /(SCSFR10)<br>[R/W] B,H,W<br>----- *3              | — /(SCSFR00)<br>[R/W] B,H,W<br>----- *3                        |                                                                                                                                                                                                                                                                                                                                                 |
| 001768 <sub>H</sub>                              | —/(TBYTE30)/<br>(LAMESR0)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE20)<br>/(LAMERT0)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE10)/<br>(LAMIER0)<br>[R/W] B,H,W<br>----- *3 | TBYTE00/(LAMRID0)<br>/<br>(LAMTID0)<br>[R/W] B,H,W<br>00000000 |                                                                                                                                                                                                                                                                                                                                                 |
| 00176C <sub>H</sub>                              | BGR0[R/W] H, W<br>00000000 00000000                  |                                                      | — /(ISMK0)<br>[R/W] B,H,W<br>----- *2                | — /(ISBA0)<br>[R/W] B,H,W<br>----- *2                          |                                                                                                                                                                                                                                                                                                                                                 |
| 001770 <sub>H</sub>                              | FCR10[R/W]<br>B,H,W<br>---00100                      | FCR00[R/W]<br>B,H,W<br>-0000000                      | FBYTE0[R/W] B,H,W<br>00000000 00000000               |                                                                |                                                                                                                                                                                                                                                                                                                                                 |
| 001774 <sub>H</sub>                              | FTICR0[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |                                                                                                                                                                                                                                                                                                                                                 |

| Address             | Address offset value / Register name                 |                                                      |                                                      |                                                                | Block                                                                                                                                                          |
|---------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | +0                                                   | +1                                                   | +2                                                   | +3                                                             |                                                                                                                                                                |
| 001778 <sub>H</sub> | SCR1/(IBCR1) [R/W]<br>B,H,W<br>0--00000              | SMR1[R/W] B,H,W<br>000-00-0                          | SSR1[R/W] B,H,W<br>0-000011                          | ESCR1/(IBSR1)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART1                                                                                                                                                    |
| 00177C <sub>H</sub> | —/(RDR11/(TDR11))[R/W] B,H,W<br>----- *3             |                                                      | RDR01/(TDR01)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                |                                                                                                                                                                |
| 001780 <sub>H</sub> | SACSR1[R/W] B,H,W<br>0---000 00000000                |                                                      | STMR1[R] B,H,W<br>00000000 00000000                  |                                                                | Multi-UART1                                                                                                                                                    |
| 001784 <sub>H</sub> | STMCR1[R/W] B,H,W<br>00000000 00000000               |                                                      | —/(SCSCR1/SFUR1)[R/W] B,H,W<br>----- *3 *4           |                                                                |                                                                                                                                                                |
| 001788 <sub>H</sub> | —/(SCSTR31)/<br>(LAMSR1)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR21)/<br>(LAMCR1)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR11)/<br>(SFLR11)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR01)/<br>(SFLR01)<br>[R/W] B,H,W<br>----- *3            | *1: Byte access is possible<br>only for access to lower 8<br>bits.<br><br>*2: Reserved because I <sup>2</sup> C<br>mode is not set immediately<br>after reset. |
| 00178C <sub>H</sub> | —                                                    | —/(SCSFR21)[R/W]<br>B,H,W<br>----- *3                | —/(SCSFR11)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR01)<br>[R/W] B,H,W<br>----- *3                         |                                                                                                                                                                |
| 001790 <sub>H</sub> | —/(TBYTE31)/<br>(LAMESR1)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE21)/<br>(LAMERT1)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE11)/<br>(LAMIER1)<br>[R/W] B,H,W<br>----- *3 | TBYTE01/(LAMRID1)<br>/<br>(LAMTID1)<br>[R/W] B,H,W<br>00000000 | Multi-UART1                                                                                                                                                    |
| 001794 <sub>H</sub> | BGR1[R/W] H,W<br>00000000 00000000                   |                                                      | —/(ISMK1)[R/W]<br>B,H,W<br>----- *2                  | —/(ISBA1)[R/W]<br>B,H,W<br>----- *2                            |                                                                                                                                                                |
| 001798 <sub>H</sub> | FCR11[R/W]<br>B,H,W<br>---00100                      | FCR01[R/W]<br>B,H,W<br>-0000000                      | FBYTE1[R/W] B,H,W<br>00000000 00000000               |                                                                | *4: Reserved because<br>LIN2.1 mode is not set<br>immediately after reset.                                                                                     |
| 00179C <sub>H</sub> | FTICR1[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |                                                                                                                                                                |

| Address             | Address offset value / Register name                 |                                                      |                                                      |                                                                | Block                                                                                                                                                                                                                                                                                                                       |
|---------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | +0                                                   | +1                                                   | +2                                                   | +3                                                             |                                                                                                                                                                                                                                                                                                                             |
| 0017A0 <sub>H</sub> | SCR2/(IBCR2)[R/W]<br>B,H,W<br>0--00000               | SMR2[R/W] B,H,W<br>000-00-0                          | SSR2[R/W] B,H,W<br>0-000011                          | ESCR2/(IBSR2)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART2<br><br>*1: Byte access is possible only for access to lower 8 bits.<br><br>*2: Reserved because I <sup>2</sup> C mode is not set immediately after reset.<br><br>*3: Reserved because CSIO mode is not set immediately after reset.<br><br>*4: Reserved because LIN2.1 mode is not set immediately after reset. |
| 0017A4 <sub>H</sub> | —/(RDR12/(TDR12))[R/W] B,H,W<br>----- *3             |                                                      | RDR02/(TDR02)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017A8 <sub>H</sub> | SACSR2[R/W] B,H,W<br>0----000 00000000               |                                                      | STMR2[R] B,H,W<br>00000000 00000000                  |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017AC <sub>H</sub> | STMCR2[R/W] B,H,W<br>00000000 00000000               |                                                      | —/(SCSCR2/SFUR2)[R/W] B,H,W<br>----- *3 *4           |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017B0 <sub>H</sub> | —/(SCSTR32)/<br>(LAMSR2)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR22)/<br>(LAMCR2)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR12)/<br>(SFLR12)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR02)/<br>(SFLR02)<br>[R/W] B,H,W<br>----- *3            |                                                                                                                                                                                                                                                                                                                             |
| 0017B4 <sub>H</sub> | —                                                    | —/(SCSFR22)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR12)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR02)<br>[R/W] B,H,W<br>----- *3                         |                                                                                                                                                                                                                                                                                                                             |
| 0017B8 <sub>H</sub> | —/(TBYTE32)/<br>(LAMESR2)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE22)/<br>(LAMERT2)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE12)/<br>(LAMIER2)<br>[R/W] B,H,W<br>----- *3 | TBYTE02/(LAMRID2)<br>/<br>(LAMTID2)<br>[R/W] B,H,W<br>00000000 |                                                                                                                                                                                                                                                                                                                             |
| 0017BC <sub>H</sub> | BGR2[R/W] H, W<br>00000000 00000000                  |                                                      | —/(ISMK2)[R/W]<br>B,H,W<br>----- *2                  | —/(ISBA2)[R/W]<br>B,H,W<br>----- *2                            |                                                                                                                                                                                                                                                                                                                             |
| 0017C0 <sub>H</sub> | FCR12[R/W]<br>B,H,W<br>---00100                      | FCR02[R/W]<br>B,H,W<br>-0000000                      | FBYTE2[R/W] B,H,W<br>00000000 00000000               |                                                                | Multi-UART2                                                                                                                                                                                                                                                                                                                 |
| 0017C4 <sub>H</sub> | FTICR2[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |                                                                                                                                                                                                                                                                                                                             |

| Address             | Address offset value / Register name                 |                                                      |                                                      |                                                                | Block                                                                                                                                                                                                                                                                                                                       |
|---------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | +0                                                   | +1                                                   | +2                                                   | +3                                                             |                                                                                                                                                                                                                                                                                                                             |
| 0017C8 <sub>H</sub> | SCR3/(IBCR3) [R/W]<br>B,H,W<br>0--00000              | SMR3[R/W] B,H,W<br>000-00-0                          | SSR3[R/W] B,H,W<br>0-000011                          | ESCR3/(IBSR3)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART3<br><br>*1: Byte access is possible only for access to lower 8 bits.<br><br>*2: Reserved because I <sup>2</sup> C mode is not set immediately after reset.<br><br>*3: Reserved because CSIO mode is not set immediately after reset.<br><br>*4: Reserved because LIN2.1 mode is not set immediately after reset. |
| 0017CC <sub>H</sub> | —/(RDR13/(TDR13))[R/W] B,H,W<br>----- *3             |                                                      | RDR03/(TDR03)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017D0 <sub>H</sub> | SACSR3[R/W] B,H,W<br>0---000 00000000                |                                                      | STMR3[R] B,H,W<br>00000000 00000000                  |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017D4 <sub>H</sub> | STMCR3[R/W] B,H,W<br>00000000 00000000               |                                                      | —/(SCSCR3/SFUR3)[R/W] B,H,W<br>----- *3 *4           |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017D8 <sub>H</sub> | —/(SCSTR33)/<br>(LAMSR3)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR23)/<br>(LAMCR3)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR13)/<br>(SFLR13)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR03)/<br>(SFLR03)<br>[R/W] B,H,W<br>----- *3            |                                                                                                                                                                                                                                                                                                                             |
| 0017DC <sub>H</sub> | —                                                    | —/(SCSFR23)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR13)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR03)<br>[R/W] B,H,W<br>----- *3                         |                                                                                                                                                                                                                                                                                                                             |
| 0017E0 <sub>H</sub> | —/(TBYTE33)/<br>(LAMESR3)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE23)/<br>(LAMERT3)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE13)/<br>(LAMIER3)<br>[R/W] B,H,W<br>----- *3 | TBYTE03/(LAMRID3)<br>/<br>(LAMTID3)<br>[R/W] B,H,W<br>00000000 |                                                                                                                                                                                                                                                                                                                             |
| 0017E4 <sub>H</sub> | BGR3[R/W] H, W<br>00000000 00000000                  |                                                      | —/(ISMK3)[R/W]<br>B,H,W<br>----- *2                  | —/(ISBA3)[R/W]<br>B,H,W<br>----- *2                            |                                                                                                                                                                                                                                                                                                                             |
| 0017E8 <sub>H</sub> | FCR13[R/W]<br>B,H,W<br>---00100                      | FCR03[R/W]<br>B,H,W<br>-0000000                      | FBYTE3[R/W] B,H,W<br>00000000 00000000               |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017EC <sub>H</sub> | FTICR3[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |                                                                                                                                                                                                                                                                                                                             |
| 0017F0 <sub>H</sub> | SCR4/(IBCR4) [R/W]<br>B,H,W<br>0--00000              | SMR4[R/W] B,H,W<br>000-00-0                          | SSR4[R/W] B,H,W<br>0-000011                          | ESCR4/(IBSR4)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART4<br><br>*1: Byte access is possible only for access to lower 8 bits.<br><br>*2: Reserved because I <sup>2</sup> C mode is not set immediately after reset.                                                                                                                                                       |
| 0017F4 <sub>H</sub> | —/(RDR14/(TDR14))[R/W] B,H,W<br>----- *3             |                                                      | RDR04/(TDR04)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017F8 <sub>H</sub> | SACSR4[R/W] B,H,W<br>0---000 00000000                |                                                      | STMR4[R] B,H,W<br>00000000 00000000                  |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 0017FC <sub>H</sub> | STMCR4[R/W] B,H,W<br>00000000 00000000               |                                                      | —/(SCSCR4/SFUR4)[R/W] B,H,W<br>----- *3 *4           |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 001800 <sub>H</sub> | —/(SCSTR34)/<br>(LAMSR4)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR24)/<br>(LAMCR4)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR14)/<br>(SFLR14)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR04)/<br>(SFLR04)<br>[R/W] B,H,W<br>----- *3            |                                                                                                                                                                                                                                                                                                                             |

| Address             | Address offset value / Register name                 |                                                      |                                                      |                                                                | Block                                                                                                                                                                                                                                                                                                                       |
|---------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | +0                                                   | +1                                                   | +2                                                   | +3                                                             |                                                                                                                                                                                                                                                                                                                             |
| 001804 <sub>H</sub> | —                                                    | —/(SCSFR24)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR14)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR04)<br>[R/W] B,H,W<br>----- *3                         | Multi-UART4<br><br>*3: Reserved because CSIO mode is not set immediately after reset.<br><br>*4: Reserved because LIN2.1 mode is not set immediately after reset.                                                                                                                                                           |
| 001808 <sub>H</sub> | —/(TBYTE34)/<br>(LAMESR4)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE24)/<br>(LAMERT4)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE14)/<br>(LAMIER4)<br>[R/W] B,H,W<br>----- *3 | TBYTE04/(LAMRID4)<br>/<br>(LAMTID4)<br>[R/W] B,H,W<br>00000000 |                                                                                                                                                                                                                                                                                                                             |
| 00180C <sub>H</sub> | BGR4[R/W] H, W<br>00000000 00000000                  |                                                      | —/(ISMK4)[R/W]<br>B,H,W<br>----- *2                  | —/(ISBA4)[R/W]<br>B,H,W<br>----- *2                            |                                                                                                                                                                                                                                                                                                                             |
| 001810 <sub>H</sub> | FCR14[R/W]<br>B,H,W<br>---00100                      | FCR04[R/W]<br>B,H,W<br>-0000000                      | FBYTE4[R/W] B,H,W<br>00000000 00000000               |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 001814 <sub>H</sub> | FTICR4[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |                                                                                                                                                                                                                                                                                                                             |
| 001818 <sub>H</sub> | SCR5/(IBCR5) [R/W]<br>B,H,W<br>0--00000              | SMR5[R/W] B,H,W<br>000-00-0                          | SSR5[R/W] B,H,W<br>0-000011                          | ESCR5/(IBSR5)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART5<br><br>*1: Byte access is possible only for access to lower 8 bits.<br><br>*2: Reserved because I <sup>2</sup> C mode is not set immediately after reset.<br><br>*3: Reserved because CSIO mode is not set immediately after reset.<br><br>*4: Reserved because LIN2.1 mode is not set immediately after reset. |
| 00181C <sub>H</sub> | —/(RDR15/(TDR15))[R/W] B,H,W<br>----- *3             |                                                      | RDR05/(TDR05)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 001820 <sub>H</sub> | SACSR5[R/W] B,H,W<br>0---000 00000000                |                                                      | STMR5[R] B,H,W<br>00000000 00000000                  |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 001824 <sub>H</sub> | STMCR5[R/W] B,H,W<br>00000000 00000000               |                                                      | —/(SCSCR5/SFUR5)[R/W] B,H,W<br>----- *3 *4           |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 001828 <sub>H</sub> | —/(SCSTR35)/<br>(LAMSR5)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR25)/<br>(LAMCR5)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR15)/<br>(SFLR15)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR05)/<br>(SFLR05)<br>[R/W] B,H,W<br>----- *3            |                                                                                                                                                                                                                                                                                                                             |
| 00182C <sub>H</sub> | —                                                    | —/(SCSFR25)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR15)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR05)<br>[R/W] B,H,W<br>----- *3                         |                                                                                                                                                                                                                                                                                                                             |
| 001830 <sub>H</sub> | —/(TBYTE35)/<br>(LAMESR5)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE25)/<br>(LAMERT5)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE15)/<br>(LAMIER5)<br>[R/W] B,H,W<br>----- *3 | TBYTE05/(LAMRID5)<br>/<br>(LAMTID5)<br>[R/W] B,H,W<br>00000000 |                                                                                                                                                                                                                                                                                                                             |
| 001834 <sub>H</sub> | BGR5[R/W] H, W<br>00000000 00000000                  |                                                      | —/(ISMK5)[R/W]<br>B,H,W<br>----- *2                  | —/(ISBA5)[R/W]<br>B,H,W<br>----- *2                            |                                                                                                                                                                                                                                                                                                                             |
| 001838 <sub>H</sub> | FCR15[R/W]<br>B,H,W<br>---00100                      | FCR05[R/W]<br>B,H,W<br>-0000000                      | FBYTE5[R/W] B,H,W<br>00000000 00000000               |                                                                |                                                                                                                                                                                                                                                                                                                             |
| 00183C <sub>H</sub> | FTICR5[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |                                                                                                                                                                                                                                                                                                                             |
| 001840 <sub>H</sub> | SCR6/(IBCR6) [R/W]<br>B,H,W<br>0--00000              | SMR6[R/W] B,H,W<br>000-00-0                          | SSR6[R/W] B,H,W<br>0-000011                          | ESCR6/(IBSR6)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART6                                                                                                                                                                                                                                                                                                                 |

| Address             | Address offset value / Register name                 |                                                      |                                                      |                                                                | Block                                                                                                                                              |
|---------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | +0                                                   | +1                                                   | +2                                                   | +3                                                             |                                                                                                                                                    |
| 001844 <sub>H</sub> | — /(RDR16/(TDR16))[R/W] B,H,W<br>----- *3            |                                                      | RDR06/(TDR06)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                | Multi-UART6                                                                                                                                        |
| 001848 <sub>H</sub> | SACSR6[R/W] B,H,W<br>0----000 00000000               |                                                      | STMR6[R] B,H,W<br>00000000 00000000                  |                                                                |                                                                                                                                                    |
| 00184C <sub>H</sub> | STMCR6[R/W] B,H,W<br>00000000 00000000               |                                                      | — /(SCSCR6/SFUR6)[R/W] B,H,W<br>----- *3 *4          |                                                                |                                                                                                                                                    |
| 001850 <sub>H</sub> | — /(SCSTR36)/<br>(LAMSR6)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR26)/<br>(LAMCR6)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR16)/<br>(SFLR16)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR06)/<br>(SFLR06)<br>[R/W] B,H,W<br>----- *3           |                                                                                                                                                    |
| 001854 <sub>H</sub> | —                                                    | — /(SCSFR26)<br>[R/W] B,H,W<br>----- *3              | — /(SCSFR16)<br>[R/W] B,H,W<br>----- *3              | — /(SCSFR06)<br>[R/W] B,H,W<br>----- *3                        |                                                                                                                                                    |
| 001858 <sub>H</sub> | —/(TBYTE36)/<br>(LAMESR6)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE26)/<br>(LAMERT6)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE16)/<br>(LAMIER6)<br>[R/W] B,H,W<br>----- *3 | TBYTE06/(LAMRID6)<br>/<br>(LAMTID6)<br>[R/W] B,H,W<br>00000000 |                                                                                                                                                    |
| 00185C <sub>H</sub> | BGR6[R/W] H, W<br>00000000 00000000                  |                                                      | — /(ISMK6)[R/W]<br>B,H,W<br>----- *2                 | — /(ISBA6)[R/W]<br>B,H,W<br>----- *2                           |                                                                                                                                                    |
| 001860 <sub>H</sub> | FCR16[R/W]<br>B,H,W<br>---00100                      | FCR06[R/W]<br>B,H,W<br>-0000000                      | FBYTE6[R/W] B,H,W<br>00000000 00000000               |                                                                |                                                                                                                                                    |
| 001864 <sub>H</sub> | FTICR6[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |                                                                                                                                                    |
| 001868 <sub>H</sub> | SCR7/(IBCR7) [R/W]<br>B,H,W<br>0--00000              | SMR7[R/W] B,H,W<br>000-00-0                          | SSR7[R/W] B,H,W<br>0-000011                          | ESCR7/(IBSR7)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART7                                                                                                                                        |
| 00186C <sub>H</sub> | — /(RDR17/(TDR17))[R/W] B,H,W<br>----- *3            |                                                      | RDR07/(TDR07)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                | *1: Byte access is possible only for access to lower 8 bits.<br><br>*2: Reserved because I <sup>2</sup> C mode is not set immediately after reset. |
| 001870 <sub>H</sub> | SACSR7[R/W] B,H,W<br>0----000 00000000               |                                                      | STMR7[R] B,H,W<br>00000000 00000000                  |                                                                |                                                                                                                                                    |
| 001874 <sub>H</sub> | STMCR7[R/W] B,H,W<br>00000000 00000000               |                                                      | — /(SCSCR7/SFUR7)[R/W] B,H,W<br>----- *3 *4          |                                                                |                                                                                                                                                    |
| 001878 <sub>H</sub> | — /(SCSTR37)/<br>(LAMSR7)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR27)/<br>(LAMCR7)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR17)/<br>(SFLR17)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR07)/<br>(SFLR07)<br>[R/W] B,H,W<br>----- *3           | *3: Reserved because CSIO mode is not set immediately after reset.<br><br>*4: Reserved because LIN2.1 mode is not set immediately after reset.     |
| 00187C <sub>H</sub> | —                                                    | — /(SCSFR27)<br>[R/W] B,H,W<br>----- *3              | — /(SCSFR17)<br>[R/W] B,H,W<br>----- *3              | — /(SCSFR07)<br>[R/W] B,H,W<br>----- *3                        |                                                                                                                                                    |
| 001880 <sub>H</sub> | —/(TBYTE37)/<br>(LAMESR7)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE27)/<br>(LAMERT7)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE17)/<br>(LAMIER7)<br>[R/W] B,H,W<br>----- *3 | TBYTE07/(LAMRID7)<br>/<br>(LAMTID7)<br>[R/W] B,H,W<br>00000000 |                                                                                                                                                    |

\*1: Byte access is possible only for access to lower 8 bits.

\*2: Reserved because I2C mode is not set immediately after reset.

\*3: Reserved because CSIO mode is not set immediately after reset.

\*4: Reserved because LIN2.1 mode is not set immediately after reset.

\*1: Byte access is possible only for access to lower 8 bits.

\*2: Reserved because I2C mode is not set immediately after reset.

\*3: Reserved because CSIO mode is not set immediately after reset.

\*4: Reserved because LIN2.1 mode is not set immediately after reset.

| Address             | Address offset value / Register name                 |                                                      |                                                      |                                                                | Block       |
|---------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|-------------|
|                     | +0                                                   | +1                                                   | +2                                                   | +3                                                             |             |
| 001884 <sub>H</sub> | BGR7[R/W] H, W<br>00000000 00000000                  |                                                      | — /(ISMK7)[R/W]<br>B,H,W<br>----- *2                 | — /(ISBA7)[R/W]<br>B,H,W<br>----- *2                           | Multi-UART7 |
| 001888 <sub>H</sub> | FCR17[R/W]<br>B,H,W<br>---00100                      | FCR07[R/W]<br>B,H,W<br>-0000000                      | FBYTE7[R/W] B,H,W<br>00000000 00000000               |                                                                |             |
| 00188C <sub>H</sub> | FTICR7[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |             |
| 001890 <sub>H</sub> | SCR8/(IBCR8) [R/W]<br>B,H,W<br>0--00000              | SMR8[R/W] B,H,W<br>000-00-0                          | SSR8[R/W] B,H,W<br>0-000011                          | ESCR8/(IBSR8)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART8 |
| 001894 <sub>H</sub> | — /(RDR18/(TDR18))[R/W] B,H,W<br>----- *3            |                                                      | RDR08/(TDR08)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                |             |
| 001898 <sub>H</sub> | SACSR8[R/W] B,H,W<br>0---000 00000000                |                                                      | STMR8[R] B,H,W<br>00000000 00000000                  |                                                                |             |
| 00189C <sub>H</sub> | STMCR8[R/W] B,H,W<br>00000000 00000000               |                                                      | — /(SCSCR8/SFUR8)[R/W] B,H,W<br>----- *3 *4          |                                                                |             |
| 0018A0 <sub>H</sub> | — /(SCSTR38)/<br>(LAMSR8)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR28)/<br>(LAMCR8)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR18)/<br>(SFLR18)<br>[R/W] B,H,W<br>----- *3 | — /(SCSTR08)/<br>(SFLR08)<br>[R/W] B,H,W<br>----- *3           |             |
| 0018A4 <sub>H</sub> | —                                                    | — /(SCSFR28)<br>[R/W] B,H,W<br>----- *3              | — /(SCSFR18)<br>[R/W] B,H,W<br>----- *3              | — /(SCSFR08)<br>[R/W] B,H,W<br>----- *3                        |             |
| 0018A8 <sub>H</sub> | —/(TBYTE38)/<br>(LAMESR8)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE28)/<br>(LAMERT8)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE18)/<br>(LAMIER8)<br>[R/W] B,H,W<br>----- *3 | TBYTE08/(LAMRID8)<br>/<br>(LAMTID8)<br>[R/W] B,H,W<br>00000000 |             |
| 0018AC <sub>H</sub> | BGR8[R/W] H,W<br>00000000 00000000                   |                                                      | — /(ISMK8)[R/W]<br>B,H,W<br>----- *2                 | — /(ISBA8)[R/W]<br>B,H,W<br>----- *2                           |             |
| 0018B0 <sub>H</sub> | FCR18[R/W]<br>B,H,W<br>---00100                      | FCR08[R/W]<br>B,H,W<br>-0000000                      | FBYTE8[R/W] B,H,W<br>00000000 00000000               |                                                                | Multi-UART8 |
| 0018B4 <sub>H</sub> | FTICR8[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |             |

\*1: Byte access is possible only for access to lower 8 bits.

\*2: Reserved because I<sup>2</sup>C mode is not set immediately after reset.

\*3: Reserved because CSIO mode is not set immediately after reset.

\*4: Reserved because LIN2.1 mode is not set immediately after reset.

| Address             | Address offset value / Register name                 |                                                      |                                                      |                                                                | Block                                                                                                                                                                                                                                                                                                                   |
|---------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | +0                                                   | +1                                                   | +2                                                   | +3                                                             |                                                                                                                                                                                                                                                                                                                         |
| 0018B8 <sub>H</sub> | SCR9/(IBCR9) [R/W]<br>B,H,W<br>0--00000              | SMR9[R/W] B,H,W<br>000-00-0                          | SSR9[R/W] B,H,W<br>0-000011                          | ESCR9/(IBSR9)[R/W]<br>] B,H,W<br>00000000                      | Multi-UART9<br>*1: Byte access is possible only for access to lower 8 bits.<br><br>*2: Reserved because I <sup>2</sup> C mode is not set immediately after reset.<br><br>*3: Reserved because CSIO mode is not set immediately after reset.<br><br>*4: Reserved because LIN2.1 mode is not set immediately after reset. |
| 0018BC <sub>H</sub> | —/(RDR19/(TDR19))[R/W] B,H,W<br>----- *3             |                                                      | RDR09/(TDR09)[R/W] B,H,W<br>-----0 00000000 *1       |                                                                |                                                                                                                                                                                                                                                                                                                         |
| 0018C0 <sub>H</sub> | SACSR9[R/W] B,H,W<br>0---000 00000000                |                                                      | STMR9[R] B,H,W<br>00000000 00000000                  |                                                                |                                                                                                                                                                                                                                                                                                                         |
| 0018C4 <sub>H</sub> | STMCR9[R/W] B,H,W<br>00000000 00000000               |                                                      | —/(SCSCR9/SFUR9)[R/W] B,H,W<br>----- *3 *4           |                                                                |                                                                                                                                                                                                                                                                                                                         |
| 0018C8 <sub>H</sub> | —/(SCSTR39)/<br>(LAMSR9)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR29)/<br>(LAMCR9)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR19)/<br>(SFLR19)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR09)/<br>(SFLR09)<br>[R/W] B,H,W<br>----- *3            |                                                                                                                                                                                                                                                                                                                         |
| 0018CC <sub>H</sub> | —                                                    | —/(SCSFR29)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR19)<br>[R/W] B,H,W<br>----- *3               | —/(SCSFR09)<br>[R/W] B,H,W<br>----- *3                         |                                                                                                                                                                                                                                                                                                                         |
| 0018D0 <sub>H</sub> | —/(TBYTE39)/<br>(LAMESR9)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE29)/<br>(LAMERT9)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE19)/<br>(LAMIER9)<br>[R/W] B,H,W<br>----- *3 | TBYTE09/(LAMRID9)<br>/<br>(LAMTID9)<br>[R/W] B,H,W<br>00000000 |                                                                                                                                                                                                                                                                                                                         |
| 0018D4 <sub>H</sub> | BGR9[R/W] H, W<br>00000000 00000000                  |                                                      | —/(ISMK9)[R/W]<br>B,H,W<br>----- *2                  | —/(ISBA9)[R/W]<br>B,H,W<br>----- *2                            |                                                                                                                                                                                                                                                                                                                         |
| 0018D8 <sub>H</sub> | FCR19[R/W]<br>B,H,W<br>---00100                      | FCR09[R/W]<br>B,H,W<br>-0000000                      | FBYTE9[R/W] B,H,W<br>00000000 00000000               |                                                                |                                                                                                                                                                                                                                                                                                                         |
| 0018DC <sub>H</sub> | FTICR9[R/W] B,H,W<br>00000000 00000000               |                                                      | —                                                    | —                                                              |                                                                                                                                                                                                                                                                                                                         |
| 0018E0 <sub>H</sub> | SCR10/(IBCR10)<br>[R/W] B,H,W<br>0--00000            | SMR10[R/W] B,H,W<br>000-00-0                         | SSR10[R/W] B,H,W<br>0-000011                         | ESCR10/(IBSR10)<br>[R/W] B,H,W<br>00000000                     | Multi-UART10<br>*1: Byte access is possible only for access to lower 8 bits.<br><br>*2: Reserved because I <sup>2</sup> C mode is not set immediately after reset.                                                                                                                                                      |
| 0018E4 <sub>H</sub> | —/(RDR110/(TDR110))[R/W] B,H,W<br>----- *3           |                                                      | RDR010/(TDR010)[R/W] B,H,W<br>-----0 00000000 *1     |                                                                |                                                                                                                                                                                                                                                                                                                         |
| 0018E8 <sub>H</sub> | SACSR10[R/W] B,H,W<br>0---000 00000000               |                                                      | STMR10[R] B,H,W<br>00000000 00000000                 |                                                                |                                                                                                                                                                                                                                                                                                                         |
| 0018EC <sub>H</sub> | STMCR10[R/W] B,H,W<br>00000000 00000000              |                                                      | —/(SCSCR10/SFUR10)[R/W] B,H,W<br>----- *3 *4         |                                                                |                                                                                                                                                                                                                                                                                                                         |

| Address                                          | Address offset value / Register name                   |                                                        |                                                        |                                                               | Block        |                                                                            |
|--------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|--------------|----------------------------------------------------------------------------|
|                                                  | +0                                                     | +1                                                     | +2                                                     | +3                                                            |              |                                                                            |
| 0018F0 <sub>H</sub>                              | —/(SCSTR310)/<br>(LAMSR10)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR210)/<br>(LAMCR10)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR110)/<br>(SFLR110)[R/W]<br>B,H,W<br>----- *3   | —/(SCSTR010)/<br>(SFLR010)[R/W]<br>B,H,W<br>----- *3          | Multi-UART10 |                                                                            |
| 0018F4 <sub>H</sub>                              | —                                                      | —/(SCSFR210)<br>[R/W] B,H,W<br>----- *3                | —/(SCSFR110)<br>[R/W] B,H,W<br>----- *3                | —/(SCSFR010)<br>[R/W] B,H,W<br>----- *3                       |              |                                                                            |
| 0018F8 <sub>H</sub>                              | —/(TBYTE310)/<br>(LAMESR10)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE210)/<br>(LAMERT10)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE110)/<br>(LAMIER10)<br>[R/W] B,H,W<br>----- *3 | TBYTE010/(LAMRID<br>10)/(LAMTID10)<br>[R/W] B,H,W<br>00000000 |              | *3: Reserved because CSIO<br>mode is not set immediately<br>after reset.   |
| 0018FC <sub>H</sub>                              | BGR10[R/W] H, W<br>00000000 00000000                   |                                                        | —/(ISMK10)[R/W]<br>B,H,W<br>----- *2                   | —/(ISBA10)[R/W]<br>B,H,W<br>----- *2                          |              | *4: Reserved because<br>LIN2.1 mode is not set<br>immediately after reset. |
| 001900 <sub>H</sub>                              | FCR110[R/W]<br>B,H,W<br>---00100                       | FCR010[R/W]<br>B,H,W<br>-0000000                       | FBYTE10[R/W] B,H,W<br>00000000 00000000                |                                                               |              |                                                                            |
| 001904 <sub>H</sub>                              | FTICR10[R/W] B,H,W<br>00000000 00000000                |                                                        | —                                                      | —                                                             |              |                                                                            |
| 001908 <sub>H</sub>                              | SCR11/(IBCR11)<br>[R/W] B,H,W<br>0--00000              | SMR11[R/W] B,H,W<br>000-00-0                           | SSR11[R/W] B,H,W<br>0-000011                           | ESCR11/(IBSR11)<br>[R/W] B,H,W<br>00000000                    | Multi-UART11 |                                                                            |
| 00190C <sub>H</sub>                              | —/(RDR111/(TDR111))[R/W] B,H,W<br>----- *3             |                                                        | RDR011/(TDR011)[R/W] B,H,W<br>-----0 00000000 *1       |                                                               |              |                                                                            |
| 001910 <sub>H</sub>                              | SACSR11[R/W] B,H,W<br>0---000 00000000                 |                                                        | STMCR11[R] B,H,W<br>00000000 00000000                  |                                                               |              |                                                                            |
| 001914 <sub>H</sub>                              | STMCR11[R/W] B,H,W<br>00000000 00000000                |                                                        | —/(SCSCR11/SFUR11)[R/W] B,H,W<br>----- *3 *4           |                                                               |              |                                                                            |
| 001918 <sub>H</sub>                              | —/(SCSTR311)/<br>(LAMSR11)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR211)/<br>(LAMCR11)<br>[R/W] B,H,W<br>----- *3  | —/(SCSTR111)/<br>(SFLR111)[R/W]<br>B,H,W<br>----- *3   | —/(SCSTR011)/<br>(SFLR011)[R/W]<br>B,H,W<br>----- *3          |              |                                                                            |
| 00191C <sub>H</sub>                              | —                                                      | —/(SCSFR211)<br>[R/W] B,H,W<br>----- *3                | —/(SCSFR111)<br>[R/W] B,H,W<br>----- *3                | —/(SCSFR011)<br>[R/W] B,H,W<br>----- *3                       |              |                                                                            |
| 001920 <sub>H</sub>                              | —/(TBYTE311)/<br>(LAMESR11)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE211)/<br>(LAMERT11)<br>[R/W] B,H,W<br>----- *3 | —/(TBYTE111)/<br>(LAMIER11)<br>[R/W] B,H,W<br>----- *3 | TBYTE011/(LAMRID<br>11)/(LAMTID11)<br>[R/W] B,H,W<br>00000000 |              |                                                                            |
| 001924 <sub>H</sub>                              | BGR11[R/W] H, W<br>00000000 00000000                   |                                                        | —/(ISMK11)[R/W]<br>B,H,W<br>----- *2                   | —/(ISBA11)[R/W]<br>B,H,W<br>----- *2                          |              |                                                                            |
| 001928 <sub>H</sub>                              | FCR111[R/W]<br>B,H,W<br>---00100                       | FCR011[R/W]<br>B,H,W<br>-0000000                       | FBYTE11[R/W] B,H,W<br>00000000 00000000                |                                                               | Multi-UART11 |                                                                            |
| 00192C <sub>H</sub>                              | FTICR11[R/W] B,H,W<br>00000000 00000000                |                                                        | —                                                      | —                                                             |              |                                                                            |
| 001930 <sub>H</sub><br>to<br>0019D8 <sub>H</sub> | —                                                      | —                                                      | —                                                      | —                                                             | Reserved     |                                                                            |

\*3: Reserved because CSIO mode is not set immediately after reset.

\*4: Reserved because LIN2.1 mode is not set immediately after reset.

\*1: Byte access is possible only for access to lower 8 bits.

\*2: Reserved because I<sup>2</sup>C mode is not set immediately after reset.

\*3: Reserved because CSIO mode is not set immediately after reset.

\*4: Reserved because LIN2.1 mode is not set immediately after reset.

| Address                                          | Address offset value / Register name    |                                  |                                         |                                  | Block                       |
|--------------------------------------------------|-----------------------------------------|----------------------------------|-----------------------------------------|----------------------------------|-----------------------------|
|                                                  | +0                                      | +1                               | +2                                      | +3                               |                             |
| 0019DC <sub>H</sub>                              | —                                       | GATEC0 [R/W]<br>B,H,W<br>-----00 | —                                       | GATEC2 [R/W]<br>B,H,W<br>-----00 | PPG GATE control            |
| 0019E0 <sub>H</sub>                              | —                                       | GATEC4 [R/W]<br>B,H,W<br>-----00 | —                                       | —                                |                             |
| 0019E4 <sub>H</sub>                              | —                                       | —                                | —                                       | —                                | Reserved                    |
| 0019E8 <sub>H</sub>                              | GTRS0 [R/W] B,H,W<br>-0000000 -0000000  |                                  | GTRS1 [R/W] B,H,W<br>-0000000 -0000000  |                                  | PPG controller              |
| 0019EC <sub>H</sub>                              | GTRS2 [R/W] B,H,W<br>-0000000 -0000000  |                                  | GTRS3 [R/W] B,H,W<br>-0000000 -0000000  |                                  |                             |
| 0019F0 <sub>H</sub>                              | GTRS4 [R/W] B,H,W<br>-0000000 -0000000  |                                  | GTRS5 [R/W] B,H,W<br>-0000000 -0000000  |                                  |                             |
| 0019F4 <sub>H</sub>                              | GTRS6 [R/W] B,H,W<br>-0000000 -0000000  |                                  | GTRS7 [R/W] B,H,W<br>-0000000 -0000000  |                                  |                             |
| 0019F8 <sub>H</sub>                              | GTRS8 [R/W] B,H,W<br>-0000000 -0000000  |                                  | GTRS9 [R/W] B,H,W<br>-0000000 -0000000  |                                  | PPG controller              |
| 0019FC <sub>H</sub>                              | GTRS10 [R/W] B,H,W<br>-0000000 -0000000 |                                  | GTRS11 [R/W] B,H,W<br>-0000000 -0000000 |                                  |                             |
| 001A00 <sub>H</sub>                              | GTRS12 [R/W] B,H,W<br>-0000000 -0000000 |                                  | GTRS13 [R/W] B,H,W<br>-0000000 -0000000 |                                  |                             |
| 001A04 <sub>H</sub>                              | GTRS14 [R/W] B,H,W<br>-0000000 -0000000 |                                  | GTRS15 [R/W] B,H,W<br>-0000000 -0000000 |                                  |                             |
| 001A08 <sub>H</sub>                              | GTRS16 [R/W] B,H,W<br>-0000000 -0000000 |                                  | GTRS17 [R/W] B,H,W<br>-0000000 -0000000 |                                  |                             |
| 001A0C <sub>H</sub>                              | GTRS18 [R/W] B,H,W<br>-0000000 -0000000 |                                  | GTRS19 [R/W] B,H,W<br>-0000000 -0000000 |                                  |                             |
| 001A10 <sub>H</sub>                              | GTRS20 [R/W] B,H,W<br>-0000000 -0000000 |                                  | GTRS21 [R/W] B,H,W<br>-0000000 -0000000 |                                  |                             |
| 001A14 <sub>H</sub>                              | GTRS22 [R/W] B,H,W<br>-0000000 -0000000 |                                  | GTRS23 [R/W] B,H,W<br>-0000000 -0000000 |                                  |                             |
| 001A18 <sub>H</sub><br>to<br>001A2C <sub>H</sub> | —                                       | —                                | —                                       | —                                | Reserved                    |
| 001A30 <sub>H</sub>                              | —                                       | —                                | —                                       | —                                | Reserved                    |
| 001A34 <sub>H</sub>                              | —                                       | —                                | —                                       | —                                |                             |
| 001A38 <sub>H</sub>                              | GTREN0 [R/W] H,W<br>00000000 00000000   |                                  | GTREN1 [R/W] H,W<br>00000000 00000000   |                                  | PPG controller              |
| 001A3C <sub>H</sub>                              | GTREN2 [R/W] H,W<br>00000000 00000000   |                                  | —                                       | —                                |                             |
| 001A40 <sub>H</sub>                              | PCN0 [R/W] B,H,W<br>00000000 000000-0   |                                  | PCSR0 [W] H,W<br>XXXXXXXX XXXXXXXX      |                                  | PPG0<br>* for communication |
| 001A44 <sub>H</sub>                              | PDUT0 [W] H,W<br>XXXXXXXX XXXXXXXX      |                                  | PTMR0 [R] H,W<br>11111111 11111111      |                                  |                             |
| 001A48 <sub>H</sub>                              | PCN200 [R/W] B,H,W<br>--000000 ----110  |                                  | PSDR0 [R/W] H,W<br>00000000 00000000    |                                  |                             |
| 001A4C <sub>H</sub>                              | PTPC0 [R/W] H,W<br>00000000 00000000    |                                  | PCMDWD0 [R/W] B,H,W<br>----- ----0000   |                                  |                             |
| 001A50 <sub>H</sub>                              | PHCSR0 [W] H,W<br>XXXXXXXX XXXXXXXX     |                                  | PLCSR0 [W] H,W<br>XXXXXXXX XXXXXXXX     |                                  |                             |

| Address             | Address offset value / Register name   |    |                                       |    | Block                       |
|---------------------|----------------------------------------|----|---------------------------------------|----|-----------------------------|
|                     | +0                                     | +1 | +2                                    | +3 |                             |
| 001A54 <sub>H</sub> | PHDUT0 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PLDUT0 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG0<br>* for communication |
| 001A58 <sub>H</sub> | PCMDDT0 [R/W] H,W<br>00000000 00000000 |    | —                                     | —  |                             |
| 001A5C <sub>H</sub> | PCN1 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR1 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PPG1<br>* for communication |
| 001A60 <sub>H</sub> | PDUT1 [W] H,W<br>XXXXXXXX XXXXXXXX     |    | PTMR1 [R] H,W<br>11111111 11111111    |    |                             |
| 001A64 <sub>H</sub> | PCN201 [R/W] B,H,W<br>--000000 ----110 |    | PSDR1 [R/W] H,W<br>00000000 00000000  |    | PPG1<br>* for communication |
| 001A68 <sub>H</sub> | PTPC1 [R/W] H,W<br>00000000 00000000   |    | PCMDWD1 [R/W] B,H,W<br>----- ----0000 |    |                             |
| 001A6C <sub>H</sub> | PHCSR1 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PLCSR1 [W] H,W<br>XXXXXXXX XXXXXXXX   |    |                             |
| 001A70 <sub>H</sub> | PHDUT1 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PLDUT1 [W] H,W<br>XXXXXXXX XXXXXXXX   |    |                             |
| 001A74 <sub>H</sub> | PCMDDT1 [R/W] H,W<br>00000000 00000000 |    | —                                     | —  |                             |
| 001A78 <sub>H</sub> | PCN2 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR2 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PPG2<br>* for communication |
| 001A7C <sub>H</sub> | PDUT2 [W] H,W<br>XXXXXXXX XXXXXXXX     |    | PTMR2 [R] H,W<br>11111111 11111111    |    |                             |
| 001A80 <sub>H</sub> | PCN202 [R/W] B,H,W<br>--000000 ----110 |    | PSDR2 [R/W] H,W<br>00000000 00000000  |    | PPG2<br>* for communication |
| 001A84 <sub>H</sub> | PTPC2 [R/W] H,W<br>00000000 00000000   |    | PCMDWD2 [R/W] B,H,W<br>----- ----0000 |    |                             |
| 001A88 <sub>H</sub> | PHCSR2 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PLCSR2 [W] H,W<br>XXXXXXXX XXXXXXXX   |    |                             |
| 001A8C <sub>H</sub> | PHDUT2 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PLDUT2 [W] H,W<br>XXXXXXXX XXXXXXXX   |    |                             |
| 001A90 <sub>H</sub> | PCMDDT2 [R/W] H,W<br>00000000 00000000 |    | —                                     | —  |                             |
| 001A94 <sub>H</sub> | PCN3 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR3 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PPG3<br>* for communication |
| 001A98 <sub>H</sub> | PDUT3 [W] H,W<br>XXXXXXXX XXXXXXXX     |    | PTMR3 [R] H,W<br>11111111 11111111    |    |                             |
| 001A9C <sub>H</sub> | PCN203 [R/W] B,H,W<br>--000000 ----110 |    | PSDR3 [R/W] H,W<br>00000000 00000000  |    |                             |
| 001AA0 <sub>H</sub> | PTPC3 [R/W] H,W<br>00000000 00000000   |    | PCMDWD3 [R/W] B,H,W<br>----- ----0000 |    |                             |
| 001AA4 <sub>H</sub> | PHCSR3 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PLCSR3 [W] H,W<br>XXXXXXXX XXXXXXXX   |    |                             |
| 001AA8 <sub>H</sub> | PHDUT3 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PLDUT3 [W] H,W<br>XXXXXXXX XXXXXXXX   |    |                             |
| 001AAC <sub>H</sub> | PCMDDT3 [R/W] H,W<br>00000000 00000000 |    | —                                     | —  |                             |
| 001AB0 <sub>H</sub> | PCN4 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR4 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PPG4                        |
| 001AB4 <sub>H</sub> | PDUT4 [W] H,W<br>XXXXXXXX XXXXXXXX     |    | PTMR4 [R] H,W<br>11111111 11111111    |    |                             |

| Address             | Address offset value / Register name    |    |                                      |    | Block |
|---------------------|-----------------------------------------|----|--------------------------------------|----|-------|
|                     | +0                                      | +1 | +2                                   | +3 |       |
| 001AB8 <sub>H</sub> | PCN204 [R/W] B,H,W<br>--000000 -----110 |    | PSDR4 [R/W] H,W<br>00000000 00000000 |    | PPG4  |
| 001ABC <sub>H</sub> | PTPC4 [R/W] H,W<br>00000000 00000000    |    | —                                    | —  |       |
| 001AC0 <sub>H</sub> | PCN5 [R/W] B,H,W<br>00000000 000000-0   |    | PCSR5 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG5  |
| 001AC4 <sub>H</sub> | PDUT5 [W] H,W<br>XXXXXXXX XXXXXXXX      |    | PTMR5 [R] H,W<br>11111111 11111111   |    |       |
| 001AC8 <sub>H</sub> | PCN205 [R/W] B,H,W<br>--000000 -----110 |    | PSDR5 [R/W] H,W<br>00000000 00000000 |    |       |
| 001ACC <sub>H</sub> | PTPC5 [R/W] H,W<br>00000000 00000000    |    | —                                    | —  |       |
| 001AD0 <sub>H</sub> | PCN6 [R/W] B,H,W<br>00000000 000000-0   |    | PCSR6 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG6  |
| 001AD4 <sub>H</sub> | PDUT6 [W] H,W<br>XXXXXXXX XXXXXXXX      |    | PTMR6 [R] H,W<br>11111111 11111111   |    |       |
| 001AD8 <sub>H</sub> | PCN206 [R/W] B,H,W<br>--000000 -----110 |    | PSDR6 [R/W] H,W<br>00000000 00000000 |    |       |
| 001ADC <sub>H</sub> | PTPC6 [R/W] H,W<br>00000000 00000000    |    | —                                    | —  |       |
| 001AE0 <sub>H</sub> | PCN7 [R/W] B,H,W<br>00000000 000000-0   |    | PCSR7 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG7  |
| 001AE4 <sub>H</sub> | PDUT7 [W] H,W<br>XXXXXXXX XXXXXXXX      |    | PTMR7 [R] H,W<br>11111111 11111111   |    |       |
| 001AE8 <sub>H</sub> | PCN207 [R/W] B,H,W<br>--000000 -----110 |    | PSDR7 [R/W] H,W<br>00000000 00000000 |    |       |
| 001AEC <sub>H</sub> | PTPC7 [R/W] H,W<br>00000000 00000000    |    | —                                    | —  |       |
| 001AF0 <sub>H</sub> | PCN8 [R/W] B,H,W<br>00000000 000000-0   |    | PCSR8 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG8  |
| 001AF4 <sub>H</sub> | PDUT8 [W] H,W<br>XXXXXXXX XXXXXXXX      |    | PTMR8 [R] H,W<br>11111111 11111111   |    |       |
| 001AF8 <sub>H</sub> | PCN208 [R/W] B,H,W<br>--000000 -----110 |    | PSDR8 [R/W] H,W<br>00000000 00000000 |    |       |
| 001AFC <sub>H</sub> | PTPC8 [R/W] H,W<br>00000000 00000000    |    | —                                    | —  |       |
| 001B00 <sub>H</sub> | PCN9 [R/W] B,H,W<br>00000000 000000-0   |    | PCSR9 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG9  |
| 001B04 <sub>H</sub> | PDUT9 [W] H,W<br>XXXXXXXX XXXXXXXX      |    | PTMR9 [R] H,W<br>11111111 11111111   |    |       |
| 001B08 <sub>H</sub> | PCN209 [R/W] B,H,W<br>--000000 -----110 |    | PSDR9 [R/W] H,W<br>00000000 00000000 |    |       |
| 001B0C <sub>H</sub> | PTPC9 [R/W] H,W<br>00000000 00000000    |    | —                                    | —  |       |
| 001B10 <sub>H</sub> | PCN10 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR10 [W] H,W<br>XXXXXXXX XXXXXXXX  |    | PPG10 |
| 001B14 <sub>H</sub> | PDUT10 [W] H,W<br>XXXXXXXX XXXXXXXX     |    | PTMR10 [R] H,W<br>11111111 11111111  |    |       |

| Address             | Address offset value / Register name   |    |                                       |    | Block |
|---------------------|----------------------------------------|----|---------------------------------------|----|-------|
|                     | +0                                     | +1 | +2                                    | +3 |       |
| 001B18 <sub>H</sub> | PCN210 [R/W] B,H,W<br>--000000 ----110 |    | PSDR10 [R/W] H,W<br>00000000 00000000 |    | PPG10 |
| 001B1C <sub>H</sub> | PTPC10 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001B20 <sub>H</sub> | PCN11 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR11 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG11 |
| 001B24 <sub>H</sub> | PDUT11 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR11 [R] H,W<br>11111111 11111111   |    | PPG11 |
| 001B28 <sub>H</sub> | PCN211 [R/W] B,H,W<br>--000000 ----110 |    | PSDR11 [R/W] H,W<br>00000000 00000000 |    |       |
| 001B2C <sub>H</sub> | PTPC11 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001B30 <sub>H</sub> | PCN12 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR12 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG12 |
| 001B34 <sub>H</sub> | PDUT12 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR12 [R] H,W<br>11111111 11111111   |    |       |
| 001B38 <sub>H</sub> | PCN212 [R/W] B,H,W<br>--000000 ----110 |    | PSDR12 [R/W] H,W<br>00000000 00000000 |    |       |
| 001B3C <sub>H</sub> | PTPC12 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001B40 <sub>H</sub> | PCN13 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR13 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG13 |
| 001B44 <sub>H</sub> | PDUT13 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR13 [R] H,W<br>11111111 11111111   |    |       |
| 001B48 <sub>H</sub> | PCN213 [R/W] B,H,W<br>--000000 ----110 |    | PSDR13 [R/W] H,W<br>00000000 00000000 |    |       |
| 001B4C <sub>H</sub> | PTPC13 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001B50 <sub>H</sub> | PCN14 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR14 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG14 |
| 001B54 <sub>H</sub> | PDUT14 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR14 [R] H,W<br>11111111 11111111   |    |       |
| 001B58 <sub>H</sub> | PCN214 [R/W] B,H,W<br>--000000 ----110 |    | PSDR14 [R/W] H,W<br>00000000 00000000 |    |       |
| 001B5C <sub>H</sub> | PTPC14 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001B60 <sub>H</sub> | PCN15 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR15 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG15 |
| 001B64 <sub>H</sub> | PDUT15 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR15 [R] H,W<br>11111111 11111111   |    |       |
| 001B68 <sub>H</sub> | PCN215 [R/W] B,H,W<br>--000000 ----110 |    | PSDR15 [R/W] H,W<br>00000000 00000000 |    |       |
| 001B6C <sub>H</sub> | PTPC15 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001B70 <sub>H</sub> | PCN16 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR16 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG16 |
| 001B74 <sub>H</sub> | PDUT16 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR16 [R] H,W<br>11111111 11111111   |    |       |

| Address             | Address offset value / Register name   |    |                                       |    | Block |
|---------------------|----------------------------------------|----|---------------------------------------|----|-------|
|                     | +0                                     | +1 | +2                                    | +3 |       |
| 001B78 <sub>H</sub> | PCN216 [R/W] B,H,W<br>--000000 ----110 |    | PSDR16 [R/W] H,W<br>00000000 00000000 |    | PPG16 |
| 001B7C <sub>H</sub> | PTPC16 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001B80 <sub>H</sub> | PCN17 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR17 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG17 |
| 001B84 <sub>H</sub> | PDUT17 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR17 [R] H,W<br>11111111 11111111   |    |       |
| 001B88 <sub>H</sub> | PCN217 [R/W] B,H,W<br>--000000 ----110 |    | PSDR17 [R/W] H,W<br>00000000 00000000 |    |       |
| 001B8C <sub>H</sub> | PTPC17 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001B90 <sub>H</sub> | PCN18 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR18 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG18 |
| 001B94 <sub>H</sub> | PDUT18 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR18 [R] H,W<br>11111111 11111111   |    |       |
| 001B98 <sub>H</sub> | PCN218 [R/W] B,H,W<br>--000000 ----110 |    | PSDR18 [R/W] H,W<br>00000000 00000000 |    |       |
| 001B9C <sub>H</sub> | PTPC18 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001BA0 <sub>H</sub> | PCN19 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR19 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG19 |
| 001BA4 <sub>H</sub> | PDUT19 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR19 [R] H,W<br>11111111 11111111   |    |       |
| 001BA8 <sub>H</sub> | PCN219 [R/W] B,H,W<br>--000000 ----110 |    | PSDR19 [R/W] H,W<br>00000000 00000000 |    |       |
| 001BAC <sub>H</sub> | PTPC19 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001BB0 <sub>H</sub> | PCN20 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR20 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG20 |
| 001BB4 <sub>H</sub> | PDUT20 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR20 [R] H,W<br>11111111 11111111   |    |       |
| 001BB8 <sub>H</sub> | PCN220 [R/W] B,H,W<br>--000000 ----110 |    | PSDR20 [R/W] H,W<br>00000000 00000000 |    |       |
| 001BBC <sub>H</sub> | PTPC20 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  |       |
| 001BC0 <sub>H</sub> | PCN21 [R/W] B,H,W<br>00000000 000000-0 |    | PCSR21 [W] H,W<br>XXXXXXXX XXXXXXXX   |    | PPG21 |
| 001BC4 <sub>H</sub> | PDUT21 [W] H,W<br>XXXXXXXX XXXXXXXX    |    | PTMR21 [R] H,W<br>11111111 11111111   |    |       |
| 001BC8 <sub>H</sub> | PCN221 [R/W] B,H,W<br>--000000 ----110 |    | PSDR21 [R/W] H,W<br>00000000 00000000 |    |       |
| 001BCC <sub>H</sub> | PTPC21 [R/W] H,W<br>00000000 00000000  |    | —                                     | —  | PPG21 |

| Address             | Address offset value / Register name    |    |                                         |    | Block |
|---------------------|-----------------------------------------|----|-----------------------------------------|----|-------|
|                     | +0                                      | +1 | +2                                      | +3 |       |
| 001BD0 <sub>H</sub> | PCN22 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR22 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG22 |
| 001BD4 <sub>H</sub> | PDUT22 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR22 [R] H,W<br>11111111 11111111     |    |       |
| 001BD8 <sub>H</sub> | PCN222 [R/W] B,H,W<br>--000000 -----110 |    | PSDR22 [R/W] H,W<br>00000000 00000000   |    |       |
| 001BDC <sub>H</sub> | PTPC22 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001BE0 <sub>H</sub> | PCN23 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR23 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG23 |
| 001BE4 <sub>H</sub> | PDUT23 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR23 [R] H,W<br>11111111 11111111     |    |       |
| 001BE8 <sub>H</sub> | PCN223 [R/W] B,H,W<br>--000000 -----110 |    | PSDR23 [R/W] H,W<br>00000000 00000000   |    |       |
| 001BEC <sub>H</sub> | PTPC23 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001BF0 <sub>H</sub> | PCN24 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR24 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG24 |
| 001BF4 <sub>H</sub> | PDUT24 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR24 [R] H,W<br>11111111 11111111     |    |       |
| 001BF8 <sub>H</sub> | PCN224 [R/W] B,H,W<br>--000000 -----110 |    | PSDR24 [R/W] H,W<br>00000000 00000000   |    |       |
| 001BFC <sub>H</sub> | PTPC24 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001C00 <sub>H</sub> | PCN25 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR25 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG25 |
| 001C04 <sub>H</sub> | PDUT25 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR25 [R] H,W<br>11111111 11111111     |    |       |
| 001C08 <sub>H</sub> | PCN225 [R/W] B,H,W<br>--000000 -----110 |    | PSDR25 [R/W] H,W<br>00000000 00000000   |    |       |
| 001C0C <sub>H</sub> | PTPC25 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001C10 <sub>H</sub> | PCN26 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR26 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG26 |
| 001C14 <sub>H</sub> | PDUT26 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR26 [R] H,W<br>11111111 11111111     |    |       |
| 001C18 <sub>H</sub> | PCN226 [R/W] B,H,W<br>--000000 -----110 |    | PSDR26 [R/W] H,W<br>00000000 00000000   |    |       |
| 001C1C <sub>H</sub> | PTPC26 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001C20 <sub>H</sub> | PCN27 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR27 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG27 |
| 001C24 <sub>H</sub> | PDUT27 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR27 [R] H,W<br>11111111 11111111     |    | PPG27 |
| 001C28 <sub>H</sub> | PCN227 [R/W] B,H,W<br>--000000 -----110 |    | PSDR27 [R/W] H,W<br>00000000 00000000   |    |       |
| 001C2C <sub>H</sub> | PTPC27 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  | PPG27 |

| Address             | Address offset value / Register name    |    |                                         |    | Block |
|---------------------|-----------------------------------------|----|-----------------------------------------|----|-------|
|                     | +0                                      | +1 | +2                                      | +3 |       |
| 001C30 <sub>H</sub> | PCN28 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR28 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG28 |
| 001C34 <sub>H</sub> | PDUT28 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR28 [R] H,W<br>11111111 11111111     |    |       |
| 001C38 <sub>H</sub> | PCN228 [R/W] B,H,W<br>--000000 -----110 |    | PSDR28 [R/W] H,W<br>00000000 00000000   |    |       |
| 001C3C <sub>H</sub> | PTPC28 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001C40 <sub>H</sub> | PCN29 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR29 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG29 |
| 001C44 <sub>H</sub> | PDUT29 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR29 [R] H,W<br>11111111 11111111     |    |       |
| 001C48 <sub>H</sub> | PCN229 [R/W] B,H,W<br>--000000 -----110 |    | PSDR29 [R/W] H,W<br>00000000 00000000   |    |       |
| 001C4C <sub>H</sub> | PTPC29 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001C50 <sub>H</sub> | PCN30 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR30 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG30 |
| 001C54 <sub>H</sub> | PDUT30 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR30 [R] H,W<br>11111111 11111111     |    |       |
| 001C58 <sub>H</sub> | PCN230 [R/W] B,H,W<br>--000000 -----110 |    | PSDR30 [R/W] H,W<br>00000000 00000000   |    |       |
| 001C5C <sub>H</sub> | PTPC30 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001C60 <sub>H</sub> | PCN31 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR31 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG31 |
| 001C64 <sub>H</sub> | PDUT31 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR31 [R] H,W<br>11111111 11111111     |    |       |
| 001C68 <sub>H</sub> | PCN231 [R/W] B,H,W<br>--000000 -----110 |    | PSDR31 [R/W] H,W<br>00000000 00000000   |    |       |
| 001C6C <sub>H</sub> | PTPC31 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001C70 <sub>H</sub> | PCN32 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR32 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG32 |
| 001C74 <sub>H</sub> | PDUT32 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR32 [R] H,W<br>11111111 11111111     |    |       |
| 001C78 <sub>H</sub> | PCN232 [R/W] B,H,W<br>--000000 -----110 |    | PSDR32 [R/W] H,W<br>00000000 00000000   |    | PPG32 |
| 001C7C <sub>H</sub> | PTPC32 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001C80 <sub>H</sub> | PCN33 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR33 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG33 |
| 001C84 <sub>H</sub> | PDUT33 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR33 [R] H,W<br>11111111 11111111     |    |       |
| 001C88 <sub>H</sub> | PCN233 [R/W] B,H,W<br>--000000 -----110 |    | PSDR33 [R/W] H,W<br>00000000 00000000   |    | PPG33 |
| 001C8C <sub>H</sub> | PTPC33 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |

| Address             | Address offset value / Register name    |    |                                         |    | Block |
|---------------------|-----------------------------------------|----|-----------------------------------------|----|-------|
|                     | +0                                      | +1 | +2                                      | +3 |       |
| 001C90 <sub>H</sub> | PCN34 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR34 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG34 |
| 001C94 <sub>H</sub> | PDUT34 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR34 [R] H,W<br>11111111 11111111     |    |       |
| 001C98 <sub>H</sub> | PCN234 [R/W] B,H,W<br>--000000 -----110 |    | PSDR34 [R/W] H,W<br>00000000 00000000   |    |       |
| 001C9C <sub>H</sub> | PTPC34 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001CA0 <sub>H</sub> | PCN35 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR35 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG35 |
| 001CA4 <sub>H</sub> | PDUT35 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR35 [R] H,W<br>11111111 11111111     |    |       |
| 001CA8 <sub>H</sub> | PCN235 [R/W] B,H,W<br>--000000 -----110 |    | PSDR35 [R/W] H,W<br>00000000 00000000   |    |       |
| 001CAC <sub>H</sub> | PTPC35 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001CB0 <sub>H</sub> | PCN36 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR36 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG36 |
| 001CB4 <sub>H</sub> | PDUT36 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR36 [R] H,W<br>11111111 11111111     |    |       |
| 001CB8 <sub>H</sub> | PCN236 [R/W] B,H,W<br>--000000 -----110 |    | PSDR36 [R/W] H,W<br>00000000 00000000   |    |       |
| 001CBC <sub>H</sub> | PTPC36 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001CC0 <sub>H</sub> | PCN37 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR37 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG37 |
| 001CC4 <sub>H</sub> | PDUT37 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR37 [R] H,W<br>11111111 11111111     |    |       |
| 001CC8 <sub>H</sub> | PCN237 [R/W] B,H,W<br>--000000 -----110 |    | PSDR37 [R/W] H,W<br>00000000 00000000   |    |       |
| 001CCC <sub>H</sub> | PTPC37 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  | PPG37 |
| 001CD0 <sub>H</sub> | PCN38 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR38 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG38 |
| 001CD4 <sub>H</sub> | PDUT38 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR38 [R] H,W<br>11111111 11111111     |    |       |
| 001CD8 <sub>H</sub> | PCN238 [R/W] B,H,W<br>--000000 -----110 |    | PSDR38 [R/W] H,W<br>00000000 00000000   |    |       |
| 001CDC <sub>H</sub> | PTPC38 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001CE0 <sub>H</sub> | PCN39 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR39 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG39 |
| 001CE4 <sub>H</sub> | PDUT39 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR39 [R] H,W<br>11111111 11111111     |    | PPG39 |
| 001CE8 <sub>H</sub> | PCN239 [R/W] B,H,W<br>--000000 -----110 |    | PSDR39 [R/W] H,W<br>00000000 00000000   |    |       |
| 001CEC <sub>H</sub> | PTPC39 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |

| Address             | Address offset value / Register name    |    |                                         |    | Block |
|---------------------|-----------------------------------------|----|-----------------------------------------|----|-------|
|                     | +0                                      | +1 | +2                                      | +3 |       |
| 001CF0 <sub>H</sub> | PCN40 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR40 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG40 |
| 001CF4 <sub>H</sub> | PDUT40 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR40 [R] H,W<br>11111111 11111111     |    |       |
| 001CF8 <sub>H</sub> | PCN240 [R/W] B,H,W<br>--000000 -----110 |    | PSDR40 [R/W] H,W<br>00000000 00000000   |    |       |
| 001CFC <sub>H</sub> | PTPC40 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001D00 <sub>H</sub> | PCN41 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR41 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG41 |
| 001D04 <sub>H</sub> | PDUT41 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR41 [R] H,W<br>11111111 11111111     |    |       |
| 001D08 <sub>H</sub> | PCN241 [R/W] B,H,W<br>--000000 -----110 |    | PSDR41 [R/W] H,W<br>00000000 00000000   |    |       |
| 001D0C <sub>H</sub> | PTPC41 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001D10 <sub>H</sub> | PCN42 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR42 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG42 |
| 001D14 <sub>H</sub> | PDUT42 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR42 [R] H,W<br>11111111 11111111     |    |       |
| 001D18 <sub>H</sub> | PCN242 [R/W] B,H,W<br>--000000 -----110 |    | PSDR42 [R/W] H,W<br>00000000 00000000   |    |       |
| 001D1C <sub>H</sub> | PTPC42 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001D20 <sub>H</sub> | PCN43 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR43 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG43 |
| 001D24 <sub>H</sub> | PDUT43 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR43 [R] H,W<br>11111111 11111111     |    |       |
| 001D28 <sub>H</sub> | PCN243 [R/W] B,H,W<br>--000000 -----110 |    | PSDR43 [R/W] H,W<br>00000000 00000000   |    |       |
| 001D2C <sub>H</sub> | PTPC43 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001D30 <sub>H</sub> | PCN44 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR44 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG44 |
| 001D34 <sub>H</sub> | PDUT44 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR44 [R] H,W<br>11111111 11111111     |    |       |
| 001D38 <sub>H</sub> | PCN244 [R/W] B,H,W<br>--000000 -----110 |    | PSDR44 [R/W] H,W<br>00000000 00000000   |    |       |
| 001D3C <sub>H</sub> | PTPC44 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |
| 001D40 <sub>H</sub> | PCN45 [R/W] B,H,W<br>00000000 000000-0  |    | PCSR45 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PPG45 |
| 001D44 <sub>H</sub> | PDUT45 [W] H,W<br>XXXXXXXXXX XXXXXXXXXX |    | PTMR45 [R] H,W<br>11111111 11111111     |    |       |
| 001D48 <sub>H</sub> | PCN245 [R/W] B,H,W<br>--000000 -----110 |    | PSDR45 [R/W] H,W<br>00000000 00000000   |    |       |
| 001D4C <sub>H</sub> | PTPC45 [R/W] H,W<br>00000000 00000000   |    | —                                       | —  |       |

| Address                                          | Address offset value / Register name      |    |                                           |    | Block            |
|--------------------------------------------------|-------------------------------------------|----|-------------------------------------------|----|------------------|
|                                                  | +0                                        | +1 | +2                                        | +3 |                  |
| 001D50 <sub>H</sub>                              | PCN46 [R/W] B,H,W<br>00000000 000000-0    |    | PCSR46 [W] H,W<br>XXXXXXXX XXXXXXXX       |    | PPG46            |
| 001D54 <sub>H</sub>                              | PDUT46 [W] H,W<br>XXXXXXXX XXXXXXXX       |    | PTMR46 [R] H,W<br>11111111 11111111       |    |                  |
| 001D58 <sub>H</sub>                              | PCN246 [R/W] B,H,W<br>--000000 ----110    |    | PSDR46 [R/W] H,W<br>00000000 00000000     |    |                  |
| 001D5C <sub>H</sub>                              | PTPC46 [R/W] H,W<br>00000000 00000000     |    | —                                         | —  |                  |
| 001D60 <sub>H</sub>                              | PCN47 [R/W] B,H,W<br>00000000 000000-0    |    | PCSR47 [W] H,W<br>XXXXXXXX XXXXXXXX       |    | PPG47            |
| 001D64 <sub>H</sub>                              | PDUT47 [W] H,W<br>XXXXXXXX XXXXXXXX       |    | PTMR47 [R] H,W<br>11111111 11111111       |    |                  |
| 001D68 <sub>H</sub>                              | PCN247 [R/W] B,H,W<br>--000000 ----110    |    | PSDR47 [R/W] H,W<br>00000000 00000000     |    |                  |
| 001D6C <sub>H</sub>                              | PTPC47 [R/W] H,W<br>00000000 00000000     |    | —                                         | —  |                  |
| 001D70 <sub>H</sub><br>to<br>001FFC <sub>H</sub> | —                                         | —  | —                                         | —  | Reserved         |
| 002000 <sub>H</sub>                              | CTRLR0 [R/W] B,H,W<br>----- 000-0001      |    | STATR0 [R/W] B,H,W<br>----- 00000000      |    | CAN0<br>(128msb) |
| 002004 <sub>H</sub>                              | ERRCNT0 [R] B,H,W<br>00000000 00000000    |    | BTR0 [R/W] B,H,W<br>-0100011 00000001     |    |                  |
| 002008 <sub>H</sub>                              | INTR0 [R] B,H,W<br>00000000 00000000      |    | TESTR0 [R/W] B,H,W<br>----- X00000--      |    |                  |
| 00200C <sub>H</sub>                              | BRPER0 [R/W] B,H,W<br>----- ----0000      |    | —                                         | —  |                  |
| 002010 <sub>H</sub>                              | IF1CREQ0 [R/W] B,H,W<br>0----- 00000001   |    | IF1CMSK0 [R/W] B,H,W<br>----- 00000000    |    |                  |
| 002014 <sub>H</sub>                              | IF1MSK20 [R/W] B,H,W<br>11-11111 11111111 |    | IF1MSK10 [R/W] B,H,W<br>11111111 11111111 |    |                  |
| 002018 <sub>H</sub>                              | IF1ARB20 [R/W] B,H,W<br>00000000 00000000 |    | IF1ARB10 [R/W] B,H,W<br>00000000 00000000 |    |                  |
| 00201C <sub>H</sub>                              | IF1MCTR0 [R/W] B,H,W<br>00000000 0---0000 |    | —                                         | —  |                  |
| 002020 <sub>H</sub>                              | IF1DTA10 [R/W] B,H,W<br>00000000 00000000 |    | IF1DTA20 [R/W] B,H,W<br>00000000 00000000 |    |                  |
| 002024 <sub>H</sub>                              | IF1DTB10 [R/W] B,H,W<br>00000000 00000000 |    | IF1DTB20 [R/W] B,H,W<br>00000000 00000000 |    |                  |
| 002028 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                  |
| 00202C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                  |
| 002030 <sub>H</sub> ,<br>002034 <sub>H</sub>     | Reserved(IF1 data mirror)                 |    |                                           |    |                  |
| 002038 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                  |
| 00203C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                  |
| 002040 <sub>H</sub>                              | IF2CREQ0 [R/W] B,H,W<br>0----- 00000001   |    | IF2CMSK0 [R/W] B,H,W<br>----- 00000000    |    |                  |
| 002044 <sub>H</sub>                              | IF2MSK20 [R/W] B,H,W<br>11-11111 11111111 |    | IF2MSK10 [R/W] B,H,W<br>11111111 11111111 |    |                  |
| 002048 <sub>H</sub>                              | IF2ARB20 [R/W] B,H,W<br>00000000 00000000 |    | IF2ARB10 [R/W] B,H,W<br>00000000 00000000 |    |                  |

| Address                                          | Address offset value / Register name      |    |                                           |    | Block            |
|--------------------------------------------------|-------------------------------------------|----|-------------------------------------------|----|------------------|
|                                                  | +0                                        | +1 | +2                                        | +3 |                  |
| 00204C <sub>H</sub>                              | IF2MCTR0 [R/W] B,H,W<br>00000000 0---0000 |    | —                                         | —  | CAN0<br>(128msb) |
| 002050 <sub>H</sub>                              | IF2DTA10 [R/W] B,H,W<br>00000000 00000000 |    | IF2DTA20 [R/W] B,H,W<br>00000000 00000000 |    |                  |
| 002054 <sub>H</sub>                              | IF2DTB10 [R/W] B,H,W<br>00000000 00000000 |    | IF2DTB20 [R/W] B,H,W<br>00000000 00000000 |    |                  |
| 002058 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                  |
| 00205C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                  |
| 002060 <sub>H</sub> ,<br>002064 <sub>H</sub>     | Reserved(IF2 data mirror)                 |    |                                           |    |                  |
| 002068 <sub>H</sub><br>to<br>00207C <sub>H</sub> | —                                         |    |                                           |    |                  |
| 002080 <sub>H</sub>                              | TREQR20 [R] B,H,W<br>00000000 00000000    |    | TREQR10 [R] B,H,W<br>00000000 00000000    |    |                  |
| 002084 <sub>H</sub>                              | TREQR40 [R] B,H,W<br>00000000 00000000    |    | TREQR30 [R] B,H,W<br>00000000 00000000    |    |                  |
| 002088 <sub>H</sub>                              | TREQR60 [R] B,H,W<br>00000000 00000000    |    | TREQR50 [R] B,H,W<br>00000000 00000000    |    |                  |
| 00208C <sub>H</sub>                              | TREQR80 [R] B,H,W<br>00000000 00000000    |    | TREQR70 [R] B,H,W<br>00000000 00000000    |    |                  |
| 002090 <sub>H</sub>                              | NEWDT20 [R] B,H,W<br>00000000 00000000    |    | NEWDT10 [R] B,H,W<br>00000000 00000000    |    |                  |
| 002094 <sub>H</sub>                              | NEWDT40 [R] B,H,W<br>00000000 00000000    |    | NEWDT30 [R] B,H,W<br>00000000 00000000    |    |                  |
| 002098 <sub>H</sub>                              | NEWDT60 [R] B,H,W<br>00000000 00000000    |    | NEWDT50 [R] B,H,W<br>00000000 00000000    |    |                  |
| 00209C <sub>H</sub>                              | NEWDT80 [R] B,H,W<br>00000000 00000000    |    | NEWDT70 [R] B,H,W<br>00000000 00000000    |    |                  |
| 0020A0 <sub>H</sub>                              | INTPND20 [R] B,H,W<br>00000000 00000000   |    | INTPND10 [R] B,H,W<br>00000000 00000000   |    |                  |
| 0020A4 <sub>H</sub>                              | INTPND40 [R] B,H,W<br>00000000 00000000   |    | INTPND30 [R] B,H,W<br>00000000 00000000   |    |                  |
| 0020A8 <sub>H</sub>                              | INTPND60 [R] B,H,W<br>00000000 00000000   |    | INTPND50 [R] B,H,W<br>00000000 00000000   |    |                  |
| 0020AC <sub>H</sub>                              | INTPND80 [R] B,H,W<br>00000000 00000000   |    | INTPND70 [R] B,H,W<br>00000000 00000000   |    |                  |
| 0020B0 <sub>H</sub>                              | MSGVAL20 [R] B,H,W<br>00000000 00000000   |    | MSGVAL10 [R] B,H,W<br>00000000 00000000   |    |                  |
| 0020B4 <sub>H</sub>                              | MSGVAL40 [R] B,H,W<br>00000000 00000000   |    | MSGVAL30 [R] B,H,W<br>00000000 00000000   |    |                  |
| 0020B8 <sub>H</sub>                              | MSGVAL60 [R] B,H,W<br>00000000 00000000   |    | MSGVAL50 [R] B,H,W<br>00000000 00000000   |    |                  |
| 0020BC <sub>H</sub>                              | MSGVAL80 [R] B,H,W<br>00000000 00000000   |    | MSGVAL70 [R] B,H,W<br>00000000 00000000   |    | CAN0<br>(128msb) |
| 0020C0 <sub>H</sub><br>to<br>0020FC <sub>H</sub> | —                                         |    |                                           |    |                  |

| Address                                          | Address offset value / Register name      |    |                                           |    | Block           |
|--------------------------------------------------|-------------------------------------------|----|-------------------------------------------|----|-----------------|
|                                                  | +0                                        | +1 | +2                                        | +3 |                 |
| 002100 <sub>H</sub>                              | CTRLR1 [R/W] B,H,W<br>----- 000-0001      |    | STATR1 [R/W] B,H,W<br>----- 00000000      |    | CAN1<br>(64msb) |
| 002104 <sub>H</sub>                              | ERRCNT1 [R] B,H,W<br>00000000 00000000    |    | BTR1 [R/W] B,H,W<br>-0100011 00000001     |    |                 |
| 002108 <sub>H</sub>                              | INTR1 [R] B,H,W<br>00000000 00000000      |    | TESTR1 [R/W] B,H,W<br>----- X00000--      |    |                 |
| 00210C <sub>H</sub>                              | BRPER1 [R/W] B,H,W<br>----- ----0000      |    | —                                         | —  |                 |
| 002110 <sub>H</sub>                              | IF1CREQ1 [R/W] B,H,W<br>0----- 00000001   |    | IF1CMSK1 [R/W] B,H,W<br>----- 00000000    |    |                 |
| 002114 <sub>H</sub>                              | IF1MSK21 [R/W] B,H,W<br>11-11111 11111111 |    | IF1MSK11 [R/W] B,H,W<br>11111111 11111111 |    |                 |
| 002118 <sub>H</sub>                              | IF1ARB21 [R/W] B,H,W<br>00000000 00000000 |    | IF1ARB11 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 00211C <sub>H</sub>                              | IF1MCTR1 [R/W] B,H,W<br>00000000 0---0000 |    | —                                         | —  |                 |
| 002120 <sub>H</sub>                              | IF1DTA11 [R/W] B,H,W<br>00000000 00000000 |    | IF1DTA21 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 002124 <sub>H</sub>                              | IF1DTB11 [R/W] B,H,W<br>00000000 00000000 |    | IF1DTB21 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 002128 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 00212C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 002130 <sub>H</sub> ,<br>002134 <sub>H</sub>     | Reserved (IF1 data mirror)                |    |                                           |    | CAN1<br>(64msb) |
| 002138 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 00213C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 002140 <sub>H</sub>                              | IF2CREQ1 [R/W] B,H,W<br>0----- 00000001   |    | IF2CMSK1 [R/W] B,H,W<br>----- 00000000    |    |                 |
| 002144 <sub>H</sub>                              | IF2MSK21 [R/W] B,H,W<br>11-11111 11111111 |    | IF2MSK11 [R/W] B,H,W<br>11111111 11111111 |    |                 |
| 002148 <sub>H</sub>                              | IF2ARB21 [R/W] B,H,W<br>00000000 00000000 |    | IF2ARB11 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 00214C <sub>H</sub>                              | IF2MCTR1 [R/W] B,H,W<br>00000000 0---0000 |    | —                                         | —  |                 |
| 002150 <sub>H</sub>                              | IF2DTA11 [R/W] B,H,W<br>00000000 00000000 |    | IF2DTA21 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 002154 <sub>H</sub>                              | IF2DTB11 [R/W] B,H,W<br>00000000 00000000 |    | IF2DTB21 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 002158 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 00215C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 002160 <sub>H</sub> ,<br>002164 <sub>H</sub>     | Reserved (IF2 data mirror)                |    |                                           |    |                 |
| 002168 <sub>H</sub><br>to<br>00217C <sub>H</sub> | —                                         |    |                                           |    |                 |
| 002180 <sub>H</sub>                              | TREQR21 [R] B,H,W<br>00000000 00000000    |    | TREQR11 [R] B,H,W<br>00000000 00000000    |    |                 |
| 002184 <sub>H</sub>                              | TREQR41 [R] B,H,W<br>00000000 00000000    |    | TREQR31 [R] B,H,W<br>00000000 00000000    |    |                 |
| 002188 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 00218C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |

| Address                                          | Address offset value / Register name      |    |                                           |    | Block           |
|--------------------------------------------------|-------------------------------------------|----|-------------------------------------------|----|-----------------|
|                                                  | +0                                        | +1 | +2                                        | +3 |                 |
| 002190 <sub>H</sub>                              | NEWDT21 [R] B,H,W<br>00000000 00000000    |    | NEWDT11 [R] B,H,W<br>00000000 00000000    |    | CAN1<br>(64msb) |
| 002194 <sub>H</sub>                              | NEWDT41 [R] B,H,W<br>00000000 00000000    |    | NEWDT31 [R] B,H,W<br>00000000 00000000    |    |                 |
| 002198 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 00219C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 0021A0 <sub>H</sub>                              | INTPND21 [R] B,H,W<br>00000000 00000000   |    | INTPND11 [R] B,H,W<br>00000000 00000000   |    |                 |
| 0021A4 <sub>H</sub>                              | INTPND41 [R] B,H,W<br>00000000 00000000   |    | INTPND31 [R] B,H,W<br>00000000 00000000   |    |                 |
| 0021A8 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 0021AC <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 0021B0 <sub>H</sub>                              | MSGVAL21 [R] B,H,W<br>00000000 00000000   |    | MSGVAL11 [R] B,H,W<br>00000000 00000000   |    |                 |
| 0021B4 <sub>H</sub>                              | MSGVAL41 [R] B,H,W<br>00000000 00000000   |    | MSGVAL31 [R] B,H,W<br>00000000 00000000   |    |                 |
| 0021B8 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 0021BC <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 0021C0 <sub>H</sub><br>to<br>0021FC <sub>H</sub> | —                                         |    |                                           |    |                 |
| 002200 <sub>H</sub>                              | CTRLR2 [R/W] B,H,W<br>----- 000-0001      |    | STATR2 [R/W] B,H,W<br>----- 00000000      |    | CAN2<br>(64msb) |
| 002204 <sub>H</sub>                              | ERRCNT2 [R] B,H,W<br>00000000 00000000    |    | BTR2 [R/W] B,H,W<br>-0100011 00000001     |    |                 |
| 002208 <sub>H</sub>                              | INTR2 [R] B,H,W<br>00000000 00000000      |    | TESTR2 [R/W] B,H,W<br>----- X00000--      |    |                 |
| 00220C <sub>H</sub>                              | BRPER2 [R/W] B,H,W<br>----- ----0000      |    | —                                         |    |                 |
| 002210 <sub>H</sub>                              | IF1CREQ2 [R/W] B,H,W<br>0----- 00000001   |    | IF1CMSK2 [R/W] B,H,W<br>----- 00000000    |    |                 |
| 002214 <sub>H</sub>                              | IF1MSK22 [R/W] B,H,W<br>11-11111 11111111 |    | IF1MSK12 [R/W] B,H,W<br>11111111 11111111 |    |                 |
| 002218 <sub>H</sub>                              | IF1ARB22 [R/W] B,H,W<br>00000000 00000000 |    | IF1ARB12 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 00221C <sub>H</sub>                              | IF1MCTR2 [R/W] B,H,W<br>00000000 0---0000 |    | —                                         |    |                 |
| 002220 <sub>H</sub>                              | IF1DTA12 [R/W] B,H,W<br>00000000 00000000 |    | IF1DTA22 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 002224 <sub>H</sub>                              | IF1DTB12 [R/W] B,H,W<br>00000000 00000000 |    | IF1DTB22 [R/W] B,H,W<br>00000000 00000000 |    |                 |
| 002228 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 00222C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 002230 <sub>H</sub> ,<br>002234 <sub>H</sub>     | Reserved (IF1 data mirror)                |    |                                           |    |                 |
| 002238 <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 00223C <sub>H</sub>                              | —                                         | —  | —                                         | —  |                 |
| 002240 <sub>H</sub>                              | IF2CREQ2 [R/W] B,H,W<br>0----- 00000001   |    | IF2CMSK2 [R/W] B,H,W<br>----- 00000000    |    |                 |

| Address                                          | Address offset value / Register name      |    |                                           |                                  | Block             |
|--------------------------------------------------|-------------------------------------------|----|-------------------------------------------|----------------------------------|-------------------|
|                                                  | +0                                        | +1 | +2                                        | +3                               |                   |
| 002244 <sub>H</sub>                              | IF2MSK22 [R/W] B,H,W<br>11-11111 11111111 |    | IF2MSK12 [R/W] B,H,W<br>11111111 11111111 |                                  | CAN2<br>(64msb)   |
| 002248 <sub>H</sub>                              | IF2ARB22 [R/W] B,H,W<br>00000000 00000000 |    | IF2ARB12 [R/W] B,H,W<br>00000000 00000000 |                                  |                   |
| 00224C <sub>H</sub>                              | IF2MCTR2 [R/W] B,H,W<br>00000000 0---0000 |    | —                                         |                                  |                   |
| 002250 <sub>H</sub>                              | IF2DTA12 [R/W] B,H,W<br>00000000 00000000 |    | IF2DTA22 [R/W] B,H,W<br>00000000 00000000 |                                  |                   |
| 002254 <sub>H</sub>                              | IF2DTB12 [R/W] B,H,W<br>00000000 00000000 |    | IF2DTB22 [R/W] B,H,W<br>00000000 00000000 |                                  |                   |
| 002258 <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 00225C <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 002260 <sub>H</sub> ,<br>002264 <sub>H</sub>     | Reserved (IF2 data mirror)                |    |                                           |                                  |                   |
| 002268 <sub>H</sub><br>to<br>00227C <sub>H</sub> | —                                         |    |                                           |                                  |                   |
| 002280 <sub>H</sub>                              | TREQR22 [R] B,H,W<br>00000000 00000000    |    | TREQR12 [R] B,H,W<br>00000000 00000000    |                                  |                   |
| 002284 <sub>H</sub>                              | TREQR42 [R] B,H,W<br>00000000 00000000    |    | TREQR32 [R] B,H,W<br>00000000 00000000    |                                  |                   |
| 002288 <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 00228C <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 002290 <sub>H</sub>                              | NEWDT22 [R] B,H,W<br>00000000 00000000    |    | NEWDT12 [R] B,H,W<br>00000000 00000000    |                                  |                   |
| 002294 <sub>H</sub>                              | NEWDT42 [R] B,H,W<br>00000000 00000000    |    | NEWDT32 [R] B,H,W<br>00000000 00000000    |                                  |                   |
| 002298 <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 00229C <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 0022A0 <sub>H</sub>                              | INTPND22 [R] B,H,W<br>00000000 00000000   |    | INTPND12 [R] B,H,W<br>00000000 00000000   |                                  |                   |
| 0022A4 <sub>H</sub>                              | INTPND42 [R] B,H,W<br>00000000 00000000   |    | INTPND32 [R] B,H,W<br>00000000 00000000   |                                  |                   |
| 0022A8 <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 0022AC <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 0022B0 <sub>H</sub>                              | MSGVAL22 [R] B,H,W<br>00000000 00000000   |    | MSGVAL12 [R] B,H,W<br>00000000 00000000   |                                  |                   |
| 0022B4 <sub>H</sub>                              | MSGVAL42 [R] B,H,W<br>00000000 00000000   |    | MSGVAL32 [R] B,H,W<br>00000000 00000000   |                                  |                   |
| 0022B8 <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 0022BC <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 0022C0 <sub>H</sub><br>to<br>0022FC <sub>H</sub> | —                                         |    |                                           |                                  |                   |
| 002300 <sub>H</sub>                              | DFCTLR [R/W] B,H,W<br>-0-----             |    | —                                         | DFSTR [R/W] B,H,W<br>-----001    | WorkFlash         |
| 002304 <sub>H</sub>                              | —                                         | —  | —                                         | —                                |                   |
| 002308 <sub>H</sub>                              | FLIFCTLR [R/W]<br>B,H,W<br>---0--00       | —  | FLIFFER1 [R/W]<br>B,H,W<br>-----          | FLIFFER2 [R/W]<br>B,H,W<br>----- | Flash / WorkFlash |

| Address                                          | Address offset value / Register name          |                                                |                                         |                                               | Block                        |
|--------------------------------------------------|-----------------------------------------------|------------------------------------------------|-----------------------------------------|-----------------------------------------------|------------------------------|
|                                                  | +0                                            | +1                                             | +2                                      | +3                                            |                              |
| 00230C <sub>H</sub><br>to<br>0023FC <sub>H</sub> | —                                             |                                                |                                         |                                               | Reserved                     |
| 002400 <sub>H</sub>                              | SEEARX [R] B,H,W<br>-0000000 00000000         |                                                | DEEARX [R] B,H,W<br>-0000000 00000000   |                                               | XBS RAM<br>ECC control       |
| 002404 <sub>H</sub>                              | EECSR <sub>X</sub> [R/W]<br>B,H,W<br>----00-- | —                                              | EFEARX [R/W] B,H,W<br>-0000000 00000000 |                                               |                              |
| 002408 <sub>H</sub>                              | —                                             | EFECRX [R/W] B,H,W<br>-----0 00000000 00000000 |                                         |                                               |                              |
| 00240C <sub>H</sub><br>to<br>002FFC <sub>H</sub> | —                                             |                                                |                                         |                                               | Reserved                     |
| 003000 <sub>H</sub>                              | SEEARA [R] B,H,W<br>-----000 00000000         |                                                | DEEARA [R] B,H,W<br>-----000 00000000   |                                               | Backup RAM<br>ECC control    |
| 003004 <sub>H</sub>                              | EECSRA [R/W]<br>B,H,W<br>----00--             | —                                              | EFEARA [R/W] B,H,W<br>-----000 00000000 |                                               |                              |
| 003008 <sub>H</sub>                              | —                                             | EFECRA [R/W] B,H,W<br>-----0 00000000 00000000 |                                         |                                               |                              |
| 00300C <sub>H</sub>                              | TEAR0X[R] B,H,W<br>000----- -0000000 00000000 |                                                |                                         |                                               | RAM/ diagnosis<br>XBS RAM    |
| 003010 <sub>H</sub>                              | TEAR1X[R] B,H,W<br>000----- -0000000 00000000 |                                                |                                         |                                               |                              |
| 003014 <sub>H</sub>                              | TEAR2X[R] B,H,W<br>000----- -0000000 00000000 |                                                |                                         |                                               |                              |
| 003018 <sub>H</sub>                              | TAEARX [R/W] B,H,W<br>-1111111 11111111       |                                                | TASARX [R/W] B,H,W<br>-0000000 00000000 |                                               |                              |
| 00301C <sub>H</sub>                              | TFECRX [R/W]<br>B,H,W<br>----0000             | TICRX [R/W]<br>B,H,W<br>----0000               | TTCRX [R/W] B,H,W<br>-----00 00001100   |                                               |                              |
| 003020 <sub>H</sub>                              | TSRCRX [W]<br>B,H,W<br>0-----                 | —                                              | —                                       | TKCCR <sub>X</sub> [R/W]<br>B,H,W<br>00----00 |                              |
| 003024 <sub>H</sub><br>to<br>00302C <sub>H</sub> | —                                             |                                                |                                         |                                               | Reserved                     |
| 003030 <sub>H</sub>                              | TEAR0A[R] B,H,W<br>000----- -000 00000000     |                                                |                                         |                                               | RAM/ diagnosis<br>Backup RAM |
| 003034 <sub>H</sub>                              | TEAR1A[R] B,H,W<br>000----- -000 00000000     |                                                |                                         |                                               |                              |
| 003038 <sub>H</sub>                              | TEAR2A[R] B,H,W<br>000----- -000 00000000     |                                                |                                         |                                               |                              |
| 00303C <sub>H</sub>                              | TAEARA[R/W] B,H,W<br>-----111 11111111        |                                                | TASARA[R/W] B,H,W<br>-----000 00000000  |                                               |                              |
| 003040 <sub>H</sub>                              | TFECRA [R/W]<br>B,H,W<br>----0000             | TICRA [R/W]<br>B,H,W<br>----0000               | TTCRA [R/W] B,H,W<br>-----00 00001100   |                                               | RAM/ diagnosis<br>Backup RAM |
| 003044 <sub>H</sub>                              | TSRCRA [R/W]<br>B,H,W<br>0-----               | —                                              | —                                       | TKCCRA [R/W]<br>B,H,W<br>00----00             |                              |

| Address                                          | Address offset value / Register name                    |    |                                         |    | Block           |
|--------------------------------------------------|---------------------------------------------------------|----|-----------------------------------------|----|-----------------|
|                                                  | +0                                                      | +1 | +2                                      | +3 |                 |
| 003048 <sub>H</sub><br>to<br>0030FC <sub>H</sub> | —                                                       |    |                                         |    | Reserved        |
| 003100 <sub>H</sub>                              | BUSDIGSR0[R/W] H,W<br>00000000 0-----00                 |    | BUSDIGSR1[R/W] H,W<br>00000000 0-----00 |    | BUS diagnosis   |
| 003104 <sub>H</sub>                              | BUSDIGSR2[R/W] H,W<br>00000000 0-----00                 |    | BUSTSTR0[R/W] H,W<br>00--0000 00000000  |    |                 |
| 003108 <sub>H</sub>                              | BUSADR0 [R] W<br>00000000 00000000 00000000 00000000    |    |                                         |    |                 |
| 00310C <sub>H</sub>                              | BUSADR1 [R] W<br>00000000 00000000 00000000 00000000    |    |                                         |    |                 |
| 003110 <sub>H</sub>                              | BUSADR2 [R] W<br>00000000 00000000 00000000 00000000    |    |                                         |    |                 |
| 003114 <sub>H</sub>                              | —                                                       | —  | BUSDIGSR3[R/W] H,W<br>00000000 0-----00 |    |                 |
| 003118 <sub>H</sub>                              | BUSDIGSR4[R/W] H,W<br>00000000 0-----00                 |    | BUSTSTR1[R/W] H,W<br>00--000- 00000000  |    |                 |
| 00311C <sub>H</sub>                              | —                                                       | —  | —                                       | —  |                 |
| 003120 <sub>H</sub>                              | BUSADR3 [R] W<br>00000000 00000000 00000000 00000000    |    |                                         |    |                 |
| 003124 <sub>H</sub>                              | BUSADR4 [R] W<br>00000000 00000000 00000000 00000000    |    |                                         |    |                 |
| 003128 <sub>H</sub><br>to<br>003FFC <sub>H</sub> | —                                                       |    |                                         |    | Reserved        |
| 004000 <sub>H</sub><br>to<br>005FFC <sub>H</sub> | Backup-RAM                                              |    |                                         |    | Backup RAM area |
| 006000 <sub>H</sub><br>to<br>00EFFC <sub>H</sub> | —                                                       | —  | —                                       | —  | Reserved        |
| 00F000 <sub>H</sub><br>to<br>00FEFC <sub>H</sub> | —                                                       | —  | —                                       | —  | Reserved [S]    |
| 00FF00 <sub>H</sub>                              | DSUCR [R/W] B,H,W<br>----- 0                            |    | —                                       | —  | OCDU [S]        |
| 00FF04 <sub>H</sub><br>to<br>00FF0C <sub>H</sub> | —                                                       |    |                                         |    | Reserved [S]    |
| 00FF10 <sub>H</sub>                              | PCSR [R/W] B,H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                         |    | OCDU [S]        |
| 00FF14 <sub>H</sub>                              | PSSR [R/W] B,H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX |    |                                         |    | OCDU [S]        |
| 00FF18 <sub>H</sub><br>to<br>00FFF4 <sub>H</sub> | —                                                       |    |                                         |    | Reserved [S]    |
| 00FFF8 <sub>H</sub>                              | EDIR1 [R] B,H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                         |    | OCDU [S]        |
| 00FFFC <sub>H</sub>                              | EDIR0 [R] B,H,W<br>XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX  |    |                                         |    |                 |

[S]: It is a system register. The illegal instruction exception (data access error) is generated in these registers in the user mode when reading and writing to it.

## 10. Interrupt Vector Table

This list shows the assignments of interrupt factors and interrupt vectors/interrupt control registers.

### Interrupt Vector 64 Pins

| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level               | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-------------------------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                               |                  |                         |                  |
| Reset                                                         | 0                | 0            | -                             | 3FC <sub>H</sub> | 000FFFFC <sub>H</sub>   | -                |
| System reserved                                               | 1                | 1            | -                             | 3F8 <sub>H</sub> | 000FFFF8 <sub>H</sub>   | -                |
| System reserved                                               | 2                | 2            | -                             | 3F4 <sub>H</sub> | 000FFFF4 <sub>H</sub>   | -                |
| System reserved                                               | 3                | 3            | -                             | 3F0 <sub>H</sub> | 000FFFF0 <sub>H</sub>   | -                |
| System reserved                                               | 4                | 4            | -                             | 3EC <sub>H</sub> | 000FFFE <sub>C</sub>    | -                |
| FPU exception                                                 | 5                | 5            | -                             | 3E8 <sub>H</sub> | 000FFFE8 <sub>H</sub>   | -                |
| Exception of instruction access protection violation          | 6                | 6            | -                             | 3E4 <sub>H</sub> | 000FFFE4 <sub>H</sub>   | -                |
| Exception of data access protection violation                 | 7                | 7            | -                             | 3E0 <sub>H</sub> | 000FFFE0 <sub>H</sub>   | -                |
| Data access error interrupt                                   | 8                | 8            | -                             | 3DC <sub>H</sub> | 000FFFD <sub>C</sub>    | -                |
| INTE instruction                                              | 9                | 9            | -                             | 3D8 <sub>H</sub> | 000FFFD8 <sub>H</sub>   | -                |
| Instruction break                                             | 10               | 0A           | -                             | 3D4 <sub>H</sub> | 000FFFD4 <sub>H</sub>   | -                |
| System reserved                                               | 11               | 0B           | -                             | 3D0 <sub>H</sub> | 000FFFD0 <sub>H</sub>   | -                |
| System reserved                                               | 12               | 0C           | -                             | 3CC <sub>H</sub> | 000FFFC <sub>C</sub>    | -                |
| System reserved                                               | 13               | 0D           | -                             | 3C8 <sub>H</sub> | 000FFFC8 <sub>H</sub>   | -                |
| Exception of invalid instruction                              | 14               | 0E           | -                             | 3C4 <sub>H</sub> | 000FFFC4 <sub>H</sub>   | -                |
| NMI request                                                   | 15               | 0F           | 15 (F <sub>H</sub> )<br>Fixed | 3C0 <sub>H</sub> | 000FFFC0 <sub>H</sub>   | -                |
| Error generation during internal bus diagnosis                |                  |              |                               |                  |                         |                  |
| XBS RAM double-bit error generation                           |                  |              |                               |                  |                         |                  |
| Backup RAM double-bit error generation                        |                  |              |                               |                  |                         |                  |
| TPU violation                                                 |                  |              |                               |                  |                         |                  |
| External interrupt 0-7                                        | 16               | 10           | ICR00                         | 3BC <sub>H</sub> | 000FFFB <sub>C</sub>    | 0                |
| External interrupt 8-15                                       | 17               | 11           | ICR01                         | 3B8 <sub>H</sub> | 000FFFB8 <sub>H</sub>   | 1* <sup>7</sup>  |
| External low-voltage detection interrupt                      |                  |              |                               |                  |                         |                  |
| Reload timer 0/1/4/5                                          | 18               | 12           | ICR02                         | 3B4 <sub>H</sub> | 000FFFB4 <sub>H</sub>   | 2* <sup>2</sup>  |
| Reload timer 3/6/7                                            | 19               | 13           | ICR03                         | 3B0 <sub>H</sub> | 000FFFB0 <sub>H</sub>   | 3* <sup>2</sup>  |
| Multi-function serial interface ch.0 (reception completed)    | 20               | 14           | ICR04                         | 3AC <sub>H</sub> | 000FFFAC <sub>H</sub>   | 4* <sup>1</sup>  |
| Multi-function serial interface ch.0 (status)                 |                  |              |                               |                  |                         |                  |
| Multi-function serial interface ch.0 (transmission completed) | 21               | 15           | ICR05                         | 3A8 <sub>H</sub> | 000FFFA8 <sub>H</sub>   | 5* <sup>1</sup>  |
| -                                                             | 22               | 16           | ICR06                         | 3A4 <sub>H</sub> | 000FFFA4 <sub>H</sub>   | _* <sup>6</sup>  |
| -                                                             | 23               | 17           | ICR07                         | 3A0 <sub>H</sub> | 000FFFA0 <sub>H</sub>   | _* <sup>6</sup>  |
| -                                                             | 24               | 18           | ICR08                         | 39C <sub>H</sub> | 000FFF9C <sub>H</sub>   | _* <sup>6</sup>  |
| -                                                             | 25               | 19           | ICR09                         | 398 <sub>H</sub> | 000FFF98 <sub>H</sub>   | _* <sup>6</sup>  |
| Multi-function serial interface ch.3 (reception completed)    | 26               | 1A           | ICR10                         | 394 <sub>H</sub> | 000FFF94 <sub>H</sub>   | 10* <sup>1</sup> |
| Multi-function serial interface ch.3 (status)                 |                  |              |                               |                  |                         |                  |
| Multi-function serial interface ch.3 (transmission completed) | 27               | 1B           | ICR11                         | 390 <sub>H</sub> | 000FFF90 <sub>H</sub>   | 11               |

| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                 |                  |                         |                  |
| Multi-function serial interface ch.4 (reception completed)    | 28               | 1C           | ICR12           | 38C <sub>H</sub> | 000FFF8C <sub>H</sub>   | 12* <sup>1</sup> |
| Multi-function serial interface ch.4 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.4 (transmission completed) | 29               | 1D           | ICR13           | 388 <sub>H</sub> | 000FFF88 <sub>H</sub>   | 13               |
| Multi-function serial interface ch.5 (reception completed)    | 30               | 1E           | ICR14           | 384 <sub>H</sub> | 000FFF84 <sub>H</sub>   | 14* <sup>1</sup> |
| Multi-function serial interface ch.5 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.5 (transmission completed) | 31               | 1F           | ICR15           | 380 <sub>H</sub> | 000FFF80 <sub>H</sub>   | 15               |
| Multi-function serial interface ch.6 (reception completed)    | 32               | 20           | ICR16           | 37C <sub>H</sub> | 000FFF7C <sub>H</sub>   | 16* <sup>1</sup> |
| Multi-function serial interface ch.6 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.6 (transmission completed) | 33               | 21           | ICR17           | 378 <sub>H</sub> | 000FFF78 <sub>H</sub>   | 17               |
| CAN0                                                          | 34               | 22           | ICR18           | 374 <sub>H</sub> | 000FFF74 <sub>H</sub>   | -                |
| CAN1                                                          | 35               | 23           | ICR19           | 370 <sub>H</sub> | 000FFF70 <sub>H</sub>   | -                |
| RAM diagnosis end                                             |                  |              |                 |                  |                         |                  |
| RAM initialization completion                                 |                  |              |                 |                  |                         |                  |
| Error generation during RAM diagnosis                         |                  |              |                 |                  |                         |                  |
| Backup RAM diagnosis end                                      |                  |              |                 |                  |                         |                  |
| Backup RAM initialization completion                          |                  |              |                 |                  |                         |                  |
| Error generation during Backup RAM diagnosis                  |                  |              |                 |                  |                         |                  |
| CAN2                                                          | 36               | 24           | ICR20           | 36C <sub>H</sub> | 000FFF6C <sub>H</sub>   | -                |
| Up/down counter 0                                             |                  |              |                 |                  |                         |                  |
| Up/down counter 1                                             |                  |              |                 |                  |                         |                  |
| Real time clock                                               | 37               | 25           | ICR21           | 368 <sub>H</sub> | 000FFF68 <sub>H</sub>   | -                |
| -                                                             | 38               | 26           | ICR22           | 364 <sub>H</sub> | 000FFF64 <sub>H</sub>   | _* <sup>6</sup>  |
| 16-bit Free-run timer 0 (0 detection) / (compare clear)       | 39               | 27           | ICR23           | 360 <sub>H</sub> | 000FFF60 <sub>H</sub>   | 23               |
| PPG 1/10/11/20/30/31                                          | 40               | 28           | ICR24           | 35C <sub>H</sub> | 000FFF5C <sub>H</sub>   | 24* <sup>3</sup> |
| 16-bit Free-run timer 1 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 2/3/12/13/23/43                                           | 41               | 29           | ICR25           | 358 <sub>H</sub> | 000FFF58 <sub>H</sub>   | 25* <sup>3</sup> |
| 16-bit Free-run timer 2 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 4/24/35                                                   | 42               | 2A           | ICR26           | 354 <sub>H</sub> | 000FFF54 <sub>H</sub>   | 26* <sup>3</sup> |
| PPG 7/16/17/27/37                                             | 43               | 2B           | ICR27           | 350 <sub>H</sub> | 000FFF50 <sub>H</sub>   | 27* <sup>3</sup> |
| PPG 19                                                        | 44               | 2C           | ICR28           | 34C <sub>H</sub> | 000FFF4C <sub>H</sub>   | 28* <sup>3</sup> |
| 16-bit ICU 0 (fetching) / 16-bit ICU 1 (fetching)             | 45               | 2D           | ICR29           | 348 <sub>H</sub> | 000FFF48 <sub>H</sub>   | 29               |
| Main timer                                                    | 46               | 2E           | ICR30           | 344 <sub>H</sub> | 000FFF44 <sub>H</sub>   | 30               |
| Sub timer                                                     |                  |              |                 |                  |                         |                  |
| PLL timer                                                     |                  |              |                 |                  |                         |                  |
| 16-bit ICU 2 (fetching) / 16-bit ICU 3 (fetching)             |                  |              |                 |                  |                         |                  |

| Interrupt Factor                                               | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN                  |
|----------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|---------------------|
|                                                                | Decimal          | Hexa Decimal |                 |                  |                         |                     |
| Clock calibration unit (sub oscillation)                       | 47               | 2F           | ICR31           | 340 <sub>H</sub> | 000FFF40 <sub>H</sub>   | 31 <sup>*1,*4</sup> |
| Multi-function serial interface ch.9 (reception completed)     |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.9 (status)                  |                  |              |                 |                  |                         |                     |
| A/D converter<br>0/1/7/10/11/14/15/16/17/22/27/28/31           | 48               | 30           | ICR32           | 33C <sub>H</sub> | 000FFF3C <sub>H</sub>   | 32                  |
| Clock calibration unit (CR oscillation)                        | 49               | 31           | ICR33           | 338 <sub>H</sub> | 000FFF38 <sub>H</sub>   | 33                  |
| Multi-function serial interface ch.9 (transmission completed)  |                  |              |                 |                  |                         |                     |
| 16-bit OCU 0 (match) / 16-bit OCU 1 (match)                    |                  |              |                 |                  |                         |                     |
| 32-bit Free-run timer 4                                        | 50               | 32           | ICR34           | 334 <sub>H</sub> | 000FFF34 <sub>H</sub>   | 34 <sup>*5</sup>    |
| 16-bit OCU 2 (match) / 16-bit OCU 3 (match)                    |                  |              |                 |                  |                         |                     |
| 16-bit OCU 4 (match) / 16-bit OCU 5 (match)                    |                  |              |                 |                  |                         |                     |
| 32-bit ICU6 (fetching/measurement)                             | 51               | 33           | ICR35           | 330 <sub>H</sub> | 000FFF30 <sub>H</sub>   | 35                  |
| Multi-function serial interface ch.10 (reception completed)    |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.10 (status)                 |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.10 (transmission completed) | 52               | 34           | ICR36           | 32C <sub>H</sub> | 000FFF2C <sub>H</sub>   | 36 <sup>*1</sup>    |
| 32-bit ICU8 (fetching/measurement)                             | 53               | 35           | ICR37           | 328 <sub>H</sub> | 000FFF28 <sub>H</sub>   | 37                  |
| Multi-function serial interface ch.11 (reception completed)    |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.11 (status)                 |                  |              |                 |                  |                         |                     |
| 32-bit ICU9 (fetching/measurement)                             | 54               | 36           | ICR38           | 324 <sub>H</sub> | 000FFF24 <sub>H</sub>   | 38 <sup>*1</sup>    |
| WG dead timer underflow 0 / 1/ 2                               |                  |              |                 |                  |                         |                     |
| WG dead timer reload 0 / 1/ 2                                  |                  |              |                 |                  |                         |                     |
| WG DTTI 0                                                      | 55               | 37           | ICR39           | 320 <sub>H</sub> | 000FFF20 <sub>H</sub>   | 39                  |
| 32-bit ICU4 (fetching/measurement)                             |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.11 (transmission completed) |                  |              |                 |                  |                         |                     |
| 32-bit ICU5 (fetching/measurement)                             | 56               | 38           | ICR40           | 31C <sub>H</sub> | 000FFF1C <sub>H</sub>   | 40                  |
| A/D converter<br>32/34/35/37/38/40/41/42/43/44/45/46/47        |                  |              |                 |                  |                         |                     |
| 32-bit OCU7/11 (match)                                         |                  |              |                 |                  |                         |                     |
| 32-bit OCU8/9 (match)                                          | 57               | 39           | ICR41           | 318 <sub>H</sub> | 000FFF18 <sub>H</sub>   | 41                  |
| -                                                              | 58               | 3A           | ICR42           | 314 <sub>H</sub> | 000FFF14 <sub>H</sub>   | 42                  |
| -                                                              | 59               | 3B           | ICR43           | 310 <sub>H</sub> | 000FFF10 <sub>H</sub>   | 43                  |
| -                                                              | 60               | 3C           | ICR44           | 30C <sub>H</sub> | 000FFF0C <sub>H</sub>   | - <sup>*6</sup>     |
| -                                                              | 61               | 3D           | ICR45           | 308 <sub>H</sub> | 000FFF08 <sub>H</sub>   | -                   |
| -                                                              |                  |              |                 |                  |                         |                     |
| -                                                              |                  |              |                 |                  |                         |                     |
| DMAC0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15                      | 62               | 3E           | ICR46           | 304 <sub>H</sub> | 000FFF04 <sub>H</sub>   | -                   |
| Delay interrupt                                                | 63               | 3F           | ICR47           | 300 <sub>H</sub> | 000FFF00 <sub>H</sub>   | -                   |
| System reserved<br>(Used for REALOS™*8)                        | 64               | 40           | -               | 2FC <sub>H</sub> | 000FFEFC <sub>H</sub>   | -                   |
| System reserved<br>(Used for REALOS)                           | 65               | 41           | -               | 2F8 <sub>H</sub> | 000FFE8 <sub>H</sub>    | -                   |

| Interrupt Factor              | Interrupt Number |               | Interrupt Level | Offset                                    | Default Address for TBR                            | RN |
|-------------------------------|------------------|---------------|-----------------|-------------------------------------------|----------------------------------------------------|----|
|                               | Decimal          | Hexa Decimal  |                 |                                           |                                                    |    |
| Used with the INT instruction | 66<br> <br>255   | 42<br> <br>FF | -               | 2F4 <sub>H</sub><br> <br>000 <sub>H</sub> | 000FFE4 <sub>H</sub><br> <br>000FFC00 <sub>H</sub> | -  |

**Note:** It does not support a DMA transfer request caused by an interrupt generated from a peripheral to which no RN (Resource Number) is assigned.

\*1: It does not support a DMA transfer by the status of the multi-function serial interface and I<sup>2</sup>C reception.

\*2: Reload timer ch.4 to ch.7 do not support a DMA transfer by the interrupt.

\*3: PPG ch.24 to ch.47 do not support a DMA transfer by the interrupt.

\*4: The clock calibration unit does not support a DMA transfer by the interrupt.

\*5: 32-bit Free-run timer ch.3, ch.4 and ch.5 do not support a DMA transfer by the interrupt.

\*6: There is no resource corresponding to the interrupt level.

\*7: It does not support a DMA transfer by the external low-voltage detection interrupt.

\*8: REALOS is a trademark of Cypress.

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| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level               | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-------------------------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                               |                  |                         |                  |
| Reset                                                         | 0                | 0            | -                             | 3FC <sub>H</sub> | 000FFFFC <sub>H</sub>   | -                |
| System reserved                                               | 1                | 1            | -                             | 3F8 <sub>H</sub> | 000FFFF8 <sub>H</sub>   | -                |
| System reserved                                               | 2                | 2            | -                             | 3F4 <sub>H</sub> | 000FFFF4 <sub>H</sub>   | -                |
| System reserved                                               | 3                | 3            | -                             | 3F0 <sub>H</sub> | 000FFFF0 <sub>H</sub>   | -                |
| System reserved                                               | 4                | 4            | -                             | 3EC <sub>H</sub> | 000FFFE <sub>C</sub>    | -                |
| FPU exception                                                 | 5                | 5            | -                             | 3E8 <sub>H</sub> | 000FFFE8 <sub>H</sub>   | -                |
| Exception of instruction access protection violation          | 6                | 6            | -                             | 3E4 <sub>H</sub> | 000FFFE4 <sub>H</sub>   | -                |
| Exception of data access protection violation                 | 7                | 7            | -                             | 3E0 <sub>H</sub> | 000FFFE0 <sub>H</sub>   | -                |
| Data access error interrupt                                   | 8                | 8            | -                             | 3DC <sub>H</sub> | 000FFFD <sub>C</sub>    | -                |
| INTE instruction                                              | 9                | 9            | -                             | 3D8 <sub>H</sub> | 000FFFD8 <sub>H</sub>   | -                |
| Instruction break                                             | 10               | 0A           | -                             | 3D4 <sub>H</sub> | 000FFFD4 <sub>H</sub>   | -                |
| System reserved                                               | 11               | 0B           | -                             | 3D0 <sub>H</sub> | 000FFFD0 <sub>H</sub>   | -                |
| System reserved                                               | 12               | 0C           | -                             | 3CC <sub>H</sub> | 000FFFC <sub>C</sub>    | -                |
| System reserved                                               | 13               | 0D           | -                             | 3C8 <sub>H</sub> | 000FFFC8 <sub>H</sub>   | -                |
| Exception of invalid instruction                              | 14               | 0E           | -                             | 3C4 <sub>H</sub> | 000FFFC4 <sub>H</sub>   | -                |
| NMI request                                                   | 15               | 0F           | 15 (F <sub>H</sub> )<br>Fixed | 3C0 <sub>H</sub> | 000FFFC0 <sub>H</sub>   | -                |
| Error generation during internal bus diagnosis                |                  |              |                               |                  |                         |                  |
| XBS RAM double-bit error generation                           |                  |              |                               |                  |                         |                  |
| Backup RAM double-bit error generation                        |                  |              |                               |                  |                         |                  |
| TPU violation                                                 | 16               | 10           | ICR00                         | 3BC <sub>H</sub> | 000FFFB <sub>C</sub>    | 0                |
| External interrupt 0-7                                        |                  |              |                               |                  |                         |                  |
| External interrupt 8-15                                       |                  |              |                               |                  |                         |                  |
| External low-voltage detection interrupt                      |                  |              |                               |                  |                         |                  |
| Reload timer 0/1/4/5                                          | 17               | 11           | ICR01                         | 3B8 <sub>H</sub> | 000FFFB8 <sub>H</sub>   | 1* <sup>7</sup>  |
| Reload timer 3/6/7                                            | 18               | 12           | ICR02                         | 3B4 <sub>H</sub> | 000FFFB4 <sub>H</sub>   | 2* <sup>2</sup>  |
|                                                               | 19               | 13           | ICR03                         | 3B0 <sub>H</sub> | 000FFFB0 <sub>H</sub>   | 3* <sup>2</sup>  |
| Multi-function serial interface ch.0 (reception completed)    | 20               | 14           | ICR04                         | 3AC <sub>H</sub> | 000FFFA <sub>C</sub>    | 4* <sup>1</sup>  |
| Multi-function serial interface ch.0 (status)                 |                  |              |                               |                  |                         |                  |
| Multi-function serial interface ch.0 (transmission completed) | 21               | 15           | ICR05                         | 3A8 <sub>H</sub> | 000FFFA8 <sub>H</sub>   | 5* <sup>1</sup>  |
| -                                                             | 22               | 16           | ICR06                         | 3A4 <sub>H</sub> | 000FFFA4 <sub>H</sub>   | _* <sup>6</sup>  |
| -                                                             | 23               | 17           | ICR07                         | 3A0 <sub>H</sub> | 000FFFA0 <sub>H</sub>   | _* <sup>6</sup>  |
| Multi-function serial interface ch.2 (reception completed)    | 24               | 18           | ICR08                         | 39C <sub>H</sub> | 000FFF9 <sub>C</sub>    | 8* <sup>1</sup>  |
| Multi-function serial interface ch.2 (status)                 |                  |              |                               |                  |                         |                  |
| Multi-function serial interface ch.2 (transmission completed) | 25               | 19           | ICR09                         | 398 <sub>H</sub> | 000FFF98 <sub>H</sub>   | 9* <sup>1</sup>  |
| Multi-function serial interface ch.3 (reception completed)    | 26               | 1A           | ICR10                         | 394 <sub>H</sub> | 000FFF94 <sub>H</sub>   | 10* <sup>1</sup> |
| Multi-function serial interface ch.3 (status)                 |                  |              |                               |                  |                         |                  |
| Multi-function serial interface ch.3 (transmission completed) | 27               | 1B           | ICR11                         | 390 <sub>H</sub> | 000FFF90 <sub>H</sub>   | 11               |

| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                 |                  |                         |                  |
| Multi-function serial interface ch.4 (reception completed)    | 28               | 1C           | ICR12           | 38C <sub>H</sub> | 000FFF8C <sub>H</sub>   | 12* <sup>1</sup> |
| Multi-function serial interface ch.4 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.4 (transmission completed) | 29               | 1D           | ICR13           | 388 <sub>H</sub> | 000FFF88 <sub>H</sub>   | 13               |
| Multi-function serial interface ch.5 (reception completed)    | 30               | 1E           | ICR14           | 384 <sub>H</sub> | 000FFF84 <sub>H</sub>   | 14* <sup>1</sup> |
| Multi-function serial interface ch.5 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.5 (transmission completed) | 31               | 1F           | ICR15           | 380 <sub>H</sub> | 000FFF80 <sub>H</sub>   | 15               |
| Multi-function serial interface ch.6 (reception completed)    | 32               | 20           | ICR16           | 37C <sub>H</sub> | 000FFF7C <sub>H</sub>   | 16* <sup>1</sup> |
| Multi-function serial interface ch.6 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.6 (transmission completed) | 33               | 21           | ICR17           | 378 <sub>H</sub> | 000FFF78 <sub>H</sub>   | 17               |
| CAN0                                                          | 34               | 22           | ICR18           | 374 <sub>H</sub> | 000FFF74 <sub>H</sub>   | -                |
| CAN1                                                          | 35               | 23           | ICR19           | 370 <sub>H</sub> | 000FFF70 <sub>H</sub>   | -                |
| RAM diagnosis end                                             |                  |              |                 |                  |                         |                  |
| RAM initialization completion                                 |                  |              |                 |                  |                         |                  |
| Error generation during RAM diagnosis                         |                  |              |                 |                  |                         |                  |
| Backup RAM diagnosis end                                      |                  |              |                 |                  |                         |                  |
| Backup RAM initialization completion                          |                  |              |                 |                  |                         |                  |
| Error generation during Backup RAM diagnosis                  |                  |              |                 |                  |                         |                  |
| CAN2                                                          | 36               | 24           | ICR20           | 36C <sub>H</sub> | 000FFF6C <sub>H</sub>   | -                |
| Up/down counter 0                                             |                  |              |                 |                  |                         |                  |
| Up/down counter 1                                             |                  |              |                 |                  |                         |                  |
| Real time clock                                               | 37               | 25           | ICR21           | 368 <sub>H</sub> | 000FFF68 <sub>H</sub>   | -                |
| -                                                             | 38               | 26           | ICR22           | 364 <sub>H</sub> | 000FFF64 <sub>H</sub>   | -* <sup>6</sup>  |
| 16-bit Free-run timer 0 (0 detection) / (compare clear)       | 39               | 27           | ICR23           | 360 <sub>H</sub> | 000FFF60 <sub>H</sub>   | 23               |
| PPG 1/10/11/20/30/31                                          | 40               | 28           | ICR24           | 35C <sub>H</sub> | 000FFF5C <sub>H</sub>   | 24* <sup>3</sup> |
| 16-bit Free-run timer 1 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 2/3/12/13/23/43                                           | 41               | 29           | ICR25           | 358 <sub>H</sub> | 000FFF58 <sub>H</sub>   | 25* <sup>3</sup> |
| 16-bit Free-run timer 2 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 4/5/15/24/35                                              | 42               | 2A           | ICR26           | 354 <sub>H</sub> | 000FFF54 <sub>H</sub>   | 26* <sup>3</sup> |
| PPG 7/16/17/26/27/37                                          | 43               | 2B           | ICR27           | 350 <sub>H</sub> | 000FFF50 <sub>H</sub>   | 27* <sup>3</sup> |
| PPG 8/18/19/29                                                | 44               | 2C           | ICR28           | 34C <sub>H</sub> | 000FFF4C <sub>H</sub>   | 28* <sup>3</sup> |
| 16-bit ICU 0 (fetching) / 16-bit ICU 1 (fetching)             | 45               | 2D           | ICR29           | 348 <sub>H</sub> | 000FFF48 <sub>H</sub>   | 29               |
| Main timer                                                    | 46               | 2E           | ICR30           | 344 <sub>H</sub> | 000FFF44 <sub>H</sub>   | 30               |
| Sub timer                                                     |                  |              |                 |                  |                         |                  |
| PLL timer                                                     |                  |              |                 |                  |                         |                  |
| 16-bit ICU 2 (fetching) /16-bit ICU 3 (fetching)              |                  |              |                 |                  |                         |                  |

| Interrupt Factor                                                 | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN                  |
|------------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|---------------------|
|                                                                  | Decimal          | Hexa Decimal |                 |                  |                         |                     |
| Clock calibration unit (sub oscillation)                         | 47               | 2F           | ICR31           | 340 <sub>H</sub> | 000FFF40 <sub>H</sub>   | 31 <sup>*1,*4</sup> |
| Multi-function serial interface ch.9 (reception completed)       |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.9 (status)                    |                  |              |                 |                  |                         |                     |
| A/D converter<br>0/1/7/10/11/12/14/15/16/17/19/22/26/27/28/31    | 48               | 30           | ICR32           | 33C <sub>H</sub> | 000FFF3C <sub>H</sub>   | 32                  |
| Clock calibration unit (CR oscillation)                          | 49               | 31           | ICR33           | 338 <sub>H</sub> | 000FFF38 <sub>H</sub>   | 33                  |
| Multi-function serial interface ch.9 (transmission completed)    |                  |              |                 |                  |                         |                     |
| 16-bit OCU 0 (match) / 16-bit OCU 1 (match)                      |                  |              |                 |                  |                         |                     |
| 32-bit Free-run timer 4                                          | 50               | 32           | ICR34           | 334 <sub>H</sub> | 000FFF34 <sub>H</sub>   | 34 <sup>*5</sup>    |
| 16-bit OCU 2 (match) / 16-bit OCU 3 (match)                      |                  |              |                 |                  |                         |                     |
| 32-bit Free-run timer 5                                          | 51               | 33           | ICR35           | 330 <sub>H</sub> | 000FFF30 <sub>H</sub>   | 35 <sup>*5</sup>    |
| 16-bit OCU 4 (match) / 16-bit OCU 5 (match)                      |                  |              |                 |                  |                         |                     |
| 32-bit ICU6 (fetching/measurement)                               | 52               | 34           | ICR36           | 32C <sub>H</sub> | 000FFF2C <sub>H</sub>   | 36 <sup>*1</sup>    |
| Multi-function serial interface ch.10 (reception completed)      |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.10 (status)                   |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.10 (transmission completed)   | 53               | 35           | ICR37           | 328 <sub>H</sub> | 000FFF28 <sub>H</sub>   | 37                  |
| 32-bit ICU8 (fetching/measurement)                               | 54               | 36           | ICR38           | 324 <sub>H</sub> | 000FFF24 <sub>H</sub>   | 38 <sup>*1</sup>    |
| Multi-function serial interface ch.11 (reception completed)      |                  |              |                 |                  |                         |                     |
| Multi-function serial interface ch.11 (status)                   |                  |              |                 |                  |                         |                     |
| 32-bit ICU9 (fetching/measurement)                               | 55               | 37           | ICR39           | 320 <sub>H</sub> | 000FFF20 <sub>H</sub>   | 39                  |
| WG dead timer underflow 0 / 1/ 2                                 |                  |              |                 |                  |                         |                     |
| WG dead timer reload 0 / 1/ 2                                    |                  |              |                 |                  |                         |                     |
| WG DTTI 0                                                        |                  |              |                 |                  |                         |                     |
| 32-bit ICU4 (fetching/measurement)                               | 56               | 38           | ICR40           | 31C <sub>H</sub> | 000FFF1C <sub>H</sub>   | 40                  |
| Multi-function serial interface ch.11 (transmission completed)   |                  |              |                 |                  |                         |                     |
| 32-bit ICU5 (fetching/measurement)                               | 57               | 39           | ICR41           | 318 <sub>H</sub> | 000FFF18 <sub>H</sub>   | 41                  |
| A/D converter<br>32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47 |                  |              |                 |                  |                         |                     |
| 32-bit OCU7/11 (match)                                           |                  |              |                 |                  |                         |                     |
| 32-bit OCU8/9 (match)                                            | 59               | 3B           | ICR43           | 310 <sub>H</sub> | 000FFF10 <sub>H</sub>   | 43                  |
| -                                                                | 60               | 3C           | ICR44           | 30C <sub>H</sub> | 000FFF0C <sub>H</sub>   | - <sup>*6</sup>     |
| Base timer 1 IRQ0                                                | 61               | 3D           | ICR45           | 308 <sub>H</sub> | 000FFF08 <sub>H</sub>   | 45                  |
| Base timer 1 IRQ1                                                |                  |              |                 |                  |                         |                     |
| -                                                                |                  |              |                 |                  |                         |                     |
| -                                                                |                  |              |                 |                  |                         |                     |
| DMAC<br>0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15                    | 62               | 3E           | ICR46           | 304 <sub>H</sub> | 000FFF04 <sub>H</sub>   | -                   |
| Delay interrupt                                                  | 63               | 3F           | ICR47           | 300 <sub>H</sub> | 000FFF00 <sub>H</sub>   | -                   |

| Interrupt Factor                     | Interrupt Number |              | Interrupt Level | Offset               | Default Address for TBR   | RN |
|--------------------------------------|------------------|--------------|-----------------|----------------------|---------------------------|----|
|                                      | Decimal          | Hexa Decimal |                 |                      |                           |    |
| System reserved<br>(Used for REALOS) | 64               | 40           | -               | 2FC <sub>H</sub>     | 000FFEFC <sub>H</sub>     | -  |
| System reserved<br>(Used for REALOS) | 65               | 41           | -               | 2F8 <sub>H</sub>     | 000FFE8 <sub>H</sub>      | -  |
| Used with the INT instruction        | 66               | 42           | -               | 2F4 <sub>H</sub>     | 000FEF4 <sub>H</sub>      | -  |
|                                      | <br>255          | <br>FF       |                 | <br>000 <sub>H</sub> | <br>000FFC00 <sub>H</sub> |    |

Note: It does not support a DMA transfer request caused by an interrupt generated from a peripheral to which no RN (Resource Number) is assigned.

\*1: It does not support a DMA transfer by the status of the multi-function serial interface and I<sup>2</sup>C reception.

\*2: Reload timer ch.4 to ch.7 do not support a DMA transfer by the interrupt.

\*3: PPG ch.24 to ch.47 do not support a DMA transfer by the interrupt.

\*4: The clock calibration unit does not support a DMA transfer by the interrupt.

\*5: 32-bit Free-run timer ch.3, ch.4 and ch.5 do not support a DMA transfer by the interrupt.

\*6: There is no resource corresponding to the interrupt level.

\*7: It does not support a DMA transfer by the external low-voltage detection interrupt.

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| Interrupt Factor                                              | Interrupt number |              | Interrupt Level               | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-------------------------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                               |                  |                         |                  |
| Reset                                                         | 0                | 0            | -                             | 3FC <sub>H</sub> | 000FFFFC <sub>H</sub>   | -                |
| System reserved                                               | 1                | 1            | -                             | 3F8 <sub>H</sub> | 000FFFF8 <sub>H</sub>   | -                |
| System reserved                                               | 2                | 2            | -                             | 3F4 <sub>H</sub> | 000FFFF4 <sub>H</sub>   | -                |
| System reserved                                               | 3                | 3            | -                             | 3F0 <sub>H</sub> | 000FFFF0 <sub>H</sub>   | -                |
| System reserved                                               | 4                | 4            | -                             | 3EC <sub>H</sub> | 000FFFE4 <sub>H</sub>   | -                |
| FPU exception                                                 | 5                | 5            | -                             | 3E8 <sub>H</sub> | 000FFFE8 <sub>H</sub>   | -                |
| Exception of instruction access protection violation          | 6                | 6            | -                             | 3E4 <sub>H</sub> | 000FFFE4 <sub>H</sub>   | -                |
| Exception of data access protection violation                 | 7                | 7            | -                             | 3E0 <sub>H</sub> | 000FFFE0 <sub>H</sub>   | -                |
| Data access error interrupt                                   | 8                | 8            | -                             | 3DC <sub>H</sub> | 000FFFD4 <sub>H</sub>   | -                |
| INTE instruction                                              | 9                | 9            | -                             | 3D8 <sub>H</sub> | 000FFFD8 <sub>H</sub>   | -                |
| Instruction break                                             | 10               | 0A           | -                             | 3D4 <sub>H</sub> | 000FFFD4 <sub>H</sub>   | -                |
| System reserved                                               | 11               | 0B           | -                             | 3D0 <sub>H</sub> | 000FFFD0 <sub>H</sub>   | -                |
| System reserved                                               | 12               | 0C           | -                             | 3CC <sub>H</sub> | 000FFFC4 <sub>H</sub>   | -                |
| System reserved                                               | 13               | 0D           | -                             | 3C8 <sub>H</sub> | 000FFFC8 <sub>H</sub>   | -                |
| Exception of invalid instruction                              | 14               | 0E           | -                             | 3C4 <sub>H</sub> | 000FFFC4 <sub>H</sub>   | -                |
| NMI request                                                   | 15               | 0F           | 15 (F <sub>H</sub> )<br>Fixed | 3C0 <sub>H</sub> | 000FFFC0 <sub>H</sub>   | -                |
| Error generation during internal bus diagnosis                |                  |              |                               |                  |                         |                  |
| XBS RAM double-bit error generation                           |                  |              |                               |                  |                         |                  |
| Backup RAM double-bit error generation                        |                  |              |                               |                  |                         |                  |
| TPU violation                                                 | 16               | 10           | ICR00                         | 3BC <sub>H</sub> | 000FFFB4 <sub>H</sub>   | 0                |
| External interrupt 0-7                                        |                  |              |                               |                  |                         |                  |
| External interrupt 8-15                                       |                  |              |                               |                  |                         |                  |
| External low-voltage detection interrupt                      |                  |              |                               |                  |                         |                  |
| Reload timer 0/1/4/5                                          | 17               | 11           | ICR01                         | 3B8 <sub>H</sub> | 000FFFB8 <sub>H</sub>   | 1* <sup>7</sup>  |
| Reload timer 2/3/6/7                                          | 18               | 12           | ICR02                         | 3B4 <sub>H</sub> | 000FFFB4 <sub>H</sub>   | 2* <sup>2</sup>  |
| Multi-function serial interface ch.0 (reception completed)    | 19               | 13           | ICR03                         | 3B0 <sub>H</sub> | 000FFFB0 <sub>H</sub>   | 3* <sup>2</sup>  |
| Multi-function serial interface ch.0 (status)                 | 20               | 14           | ICR04                         | 3AC <sub>H</sub> | 000FFFA4 <sub>H</sub>   | 4* <sup>1</sup>  |
| Multi-function serial interface ch.0 (transmission completed) | 21               | 15           | ICR05                         | 3A8 <sub>H</sub> | 000FFFA8 <sub>H</sub>   | 5* <sup>1</sup>  |
| Multi-function serial interface ch.1 (reception completed)    | 22               | 16           | ICR06                         | 3A4 <sub>H</sub> | 000FFFA4 <sub>H</sub>   | 6* <sup>1</sup>  |
| Multi-function serial interface ch.1 (status)                 | 23               | 17           | ICR07                         | 3A0 <sub>H</sub> | 000FFFA0 <sub>H</sub>   | 7* <sup>1</sup>  |
| Multi-function serial interface ch.1 (transmission completed) | 24               | 18           | ICR08                         | 39C <sub>H</sub> | 000FFF9C <sub>H</sub>   | 8* <sup>1</sup>  |
| Multi-function serial interface ch.2 (reception completed)    | 25               | 19           | ICR09                         | 398 <sub>H</sub> | 000FFF98 <sub>H</sub>   | 9* <sup>1</sup>  |
| Multi-function serial interface ch.2 (status)                 | 26               | 1A           | ICR10                         | 394 <sub>H</sub> | 000FFF94 <sub>H</sub>   | 10* <sup>1</sup> |
| Multi-function serial interface ch.3 (reception completed)    | 26               | 1A           | ICR10                         | 394 <sub>H</sub> | 000FFF94 <sub>H</sub>   | 10* <sup>1</sup> |
| Multi-function serial interface ch.3 (status)                 |                  |              |                               |                  |                         |                  |

| Interrupt Factor                                              | Interrupt number |              | Interrupt Level | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                 |                  |                         |                  |
| Multi-function serial interface ch.3 (transmission completed) | 27               | 1B           | ICR11           | 390 <sub>H</sub> | 000FFF90 <sub>H</sub>   | 11               |
| Multi-function serial interface ch.4 (reception completed)    | 28               | 1C           | ICR12           | 38C <sub>H</sub> | 000FFF8C <sub>H</sub>   | 12* <sup>1</sup> |
| Multi-function serial interface ch.4 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.4 (transmission completed) | 29               | 1D           | ICR13           | 388 <sub>H</sub> | 000FFF88 <sub>H</sub>   | 13               |
| Multi-function serial interface ch.5 (reception completed)    | 30               | 1E           | ICR14           | 384 <sub>H</sub> | 000FFF84 <sub>H</sub>   | 14* <sup>1</sup> |
| Multi-function serial interface ch.5 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.5 (transmission completed) | 31               | 1F           | ICR15           | 380 <sub>H</sub> | 000FFF80 <sub>H</sub>   | 15               |
| Multi-function serial interface ch.6 (reception completed)    | 32               | 20           | ICR16           | 37C <sub>H</sub> | 000FFF7C <sub>H</sub>   | 16* <sup>1</sup> |
| Multi-function serial interface ch.6 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.6 (transmission completed) | 33               | 21           | ICR17           | 378 <sub>H</sub> | 000FFF78 <sub>H</sub>   | 17               |
| CAN0                                                          | 34               | 22           | ICR18           | 374 <sub>H</sub> | 000FFF74 <sub>H</sub>   | -                |
| CAN1                                                          | 35               | 23           | ICR19           | 370 <sub>H</sub> | 000FFF70 <sub>H</sub>   | -                |
| RAM diagnosis end                                             |                  |              |                 |                  |                         |                  |
| RAM initialization completion                                 |                  |              |                 |                  |                         |                  |
| Error generation during RAM diagnosis                         |                  |              |                 |                  |                         |                  |
| Backup RAM diagnosis end                                      |                  |              |                 |                  |                         |                  |
| Backup RAM initialization completion                          |                  |              |                 |                  |                         |                  |
| Error generation during Backup RAM diagnosis                  |                  |              |                 |                  |                         |                  |
| CAN2                                                          | 36               | 24           | ICR20           | 36C <sub>H</sub> | 000FFF6C <sub>H</sub>   | -                |
| Up/down counter 0                                             |                  |              |                 |                  |                         |                  |
| Up/down counter 1                                             |                  |              |                 |                  |                         |                  |
| Real time clock                                               | 37               | 25           | ICR21           | 368 <sub>H</sub> | 000FFF68 <sub>H</sub>   | -                |
| Multi-function serial interface ch.7 (reception completed)    | 38               | 26           | ICR22           | 364 <sub>H</sub> | 000FFF64 <sub>H</sub>   | 22* <sup>1</sup> |
| Multi-function serial interface ch.7 (status)                 |                  |              |                 |                  |                         |                  |
| 16-bit Free-running timer 0 (0 detection) / (compare clear)   | 39               | 27           | ICR23           | 360 <sub>H</sub> | 000FFF60 <sub>H</sub>   | 23               |
| Multi-function serial interface ch.7 (transmission completed) |                  |              |                 |                  |                         |                  |
| PPG 1/10/11/20/21/30/31                                       | 40               | 28           | ICR24           | 35C <sub>H</sub> | 000FFF5C <sub>H</sub>   | 24* <sup>3</sup> |
| 16-bit Free-run timer 1 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 2/3/12/13/23/32/43                                        | 41               | 29           | ICR25           | 358 <sub>H</sub> | 000FFF58 <sub>H</sub>   | 25* <sup>3</sup> |
| 16-bit Free-run timer 2 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 4/5/14/15/24/25/35/44                                     | 42               | 2A           | ICR26           | 354 <sub>H</sub> | 000FFF54 <sub>H</sub>   | 26* <sup>3</sup> |
| PPG 6/7/16/17/26/27/37                                        | 43               | 2B           | ICR27           | 350 <sub>H</sub> | 000FFF50 <sub>H</sub>   | 27* <sup>3</sup> |
| PPG 8/9/18/19/28/29                                           | 44               | 2C           | ICR28           | 34C <sub>H</sub> | 000FFF4C <sub>H</sub>   | 28* <sup>3</sup> |

| Interrupt Factor                                                         | Interrupt number |              | Interrupt Level | Offset           | Default Address for TBR | RN       |
|--------------------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|----------|
|                                                                          | Decimal          | Hexa Decimal |                 |                  |                         |          |
| Multi-function serial interface ch.8 (reception completed)               | 45               | 2D           | ICR29           | 348 <sub>H</sub> | 000FFF48 <sub>H</sub>   | 29*1     |
| Multi-function serial interface ch.8 (status)                            |                  |              |                 |                  |                         |          |
| 16-bit ICU 0 (fetching) / 16-bit ICU 1 (fetching)                        |                  |              |                 |                  |                         |          |
| Main timer                                                               | 46               | 2E           | ICR30           | 344 <sub>H</sub> | 000FFF44 <sub>H</sub>   | 30       |
| Sub timer                                                                |                  |              |                 |                  |                         |          |
| PLL timer                                                                |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.8 (transmission completed)            |                  |              |                 |                  |                         |          |
| 16-bit ICU 2 (fetching) / 16-bit ICU 3 (fetching)                        |                  |              |                 |                  |                         |          |
| Clock calibration unit (sub oscillation)                                 | 47               | 2F           | ICR31           | 340 <sub>H</sub> | 000FFF40 <sub>H</sub>   | 31*1, *4 |
| Multi-function serial interface ch.9 (reception completed)               |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.9 (status)                            |                  |              |                 |                  |                         |          |
| A/D converter 0/1/7/9/10/11/12/13/14/15/16 17/18/19/22/23/26/27/28/29/31 | 48               | 30           | ICR32           | 33C <sub>H</sub> | 000FFF3C <sub>H</sub>   | 32       |
| Clock calibration unit (CR oscillation)                                  | 49               | 31           | ICR33           | 338 <sub>H</sub> | 000FFF38 <sub>H</sub>   | 33       |
| Multi-function serial interface ch.9 (transmission completed)            |                  |              |                 |                  |                         |          |
| 16-bit OCU 0 (match) / 16-bit OCU 1 (match)                              |                  |              |                 |                  |                         |          |
| 32-bit Free-run timer 4                                                  | 50               | 32           | ICR34           | 334 <sub>H</sub> | 000FFF34 <sub>H</sub>   | 34*5     |
| 16-bit OCU 2 (match) / 16-bit OCU 3 (match)                              |                  |              |                 |                  |                         |          |
| 32-bit Free-run timer 3/5                                                | 51               | 33           | ICR35           | 330 <sub>H</sub> | 000FFF30 <sub>H</sub>   | 35*5     |
| 16-bit OCU 4 (match) / 16-bit OCU 5 (match)                              |                  |              |                 |                  |                         |          |
| 32-bit ICU6 (fetching/measurement)                                       | 52               | 34           | ICR36           | 32C <sub>H</sub> | 000FFF2C <sub>H</sub>   | 36*1     |
| Multi-function serial interface ch.10 (reception completed)              |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.10 (status)                           |                  |              |                 |                  |                         |          |
| 32-bit ICU7 (fetching/measurement)                                       | 53               | 35           | ICR37           | 328 <sub>H</sub> | 000FFF28 <sub>H</sub>   | 37       |
| Multi-function serial interface ch.10 (transmission completed)           |                  |              |                 |                  |                         |          |
| 32-bit ICU8 (fetching/measurement)                                       | 54               | 36           | ICR38           | 324 <sub>H</sub> | 000FFF24 <sub>H</sub>   | 38*1     |
| Multi-function serial interface ch.11 (reception completed)              |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.11 (status)                           |                  |              |                 |                  |                         |          |
| 32-bit ICU9 (fetching/measurement)                                       | 55               | 37           | ICR39           | 320 <sub>H</sub> | 000FFF20 <sub>H</sub>   | 39       |
| WG dead timer underflow 0/1/2                                            |                  |              |                 |                  |                         |          |
| WG dead timer reload 0/1/2                                               |                  |              |                 |                  |                         |          |
| WG DTTI 0                                                                |                  |              |                 |                  |                         |          |
| 32-bit ICU4 (fetching/measurement)                                       | 56               | 38           | ICR40           | 31C <sub>H</sub> | 000FFF1C <sub>H</sub>   | 40       |
| Multi-function serial interface ch.11 (transmission completed)           |                  |              |                 |                  |                         |          |

| Interrupt Factor                                | Interrupt number |              | Interrupt Level | Offset               | Default Address for TBR   | RN |
|-------------------------------------------------|------------------|--------------|-----------------|----------------------|---------------------------|----|
|                                                 | Decimal          | Hexa Decimal |                 |                      |                           |    |
| 32-bit ICU5 (fetching/measurement)              | 57               | 39           | ICR41           | 318 <sub>H</sub>     | 000FFF18 <sub>H</sub>     | 41 |
| A/D converter                                   |                  |              |                 |                      |                           |    |
| 32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47 |                  |              |                 |                      |                           |    |
| 32-bit OCU 6/7/10/11 (match)                    |                  |              |                 |                      |                           |    |
| 32-bit OCU 8/9 (match)                          | 58               | 3A           | ICR42           | 314 <sub>H</sub>     | 000FFF14 <sub>H</sub>     | 42 |
| -                                               | 59               | 3B           | ICR43           | 310 <sub>H</sub>     | 000FFF10 <sub>H</sub>     | 43 |
| -                                               | 60               | 3C           | ICR44           | 30C <sub>H</sub>     | 000FFF0C <sub>H</sub>     | 44 |
| -                                               |                  |              |                 |                      |                           |    |
| Base timer 1 IRQ0                               | 61               | 3D           | ICR45           | 308 <sub>H</sub>     | 000FFF08 <sub>H</sub>     | 45 |
| Base timer 1 IRQ1                               |                  |              |                 |                      |                           |    |
| -                                               |                  |              |                 |                      |                           |    |
| -                                               |                  |              |                 |                      |                           |    |
| DMAC 0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15      | 62               | 3E           | ICR46           | 304 <sub>H</sub>     | 000FFF04 <sub>H</sub>     | -  |
| Delay interrupt                                 | 63               | 3F           | ICR47           | 300 <sub>H</sub>     | 000FFF00 <sub>H</sub>     | -  |
| System reserved<br>(Used for REALOS)            | 64               | 40           | -               | 2FC <sub>H</sub>     | 000FFEFC <sub>H</sub>     | -  |
| System reserved<br>(Used for REALOS)            | 65               | 41           | -               | 2F8 <sub>H</sub>     | 000FFE8 <sub>H</sub>      | -  |
| Used with the INT instruction                   | 66               | 42           | -               | 2F4 <sub>H</sub>     | 000FFE4 <sub>H</sub>      | -  |
|                                                 | <br>255          | <br>FF       |                 | <br>000 <sub>H</sub> | <br>000FFC00 <sub>H</sub> |    |

Note: It does not support a DMA transfer request caused by an interrupt generated from a peripheral to which no RN (Resource Number) is assigned.

\*1: It does not support a DMA transfer by the status of the multi-function serial interface and I<sup>2</sup>C reception.

\*2: Reload timer ch.4 to ch.7 do not support a DMA transfer by the interrupt.

\*3: PPG ch.24 to ch.47 do not support a DMA transfer by the interrupt.

\*4: The clock calibration unit does not support a DMA transfer by the interrupt.

\*5: 32-bit Free-run timer ch.3, ch.4 and ch.5 do not support a DMA transfer by the interrupt.

\*6: There is no resource corresponding to the interrupt level.

\*7: It does not support a DMA transfer by the external low-voltage detection interrupt.

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| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level               | Offset           | Default Address for TBR | RN   |
|---------------------------------------------------------------|------------------|--------------|-------------------------------|------------------|-------------------------|------|
|                                                               | Decimal          | Hexa Decimal |                               |                  |                         |      |
| Reset                                                         | 0                | 0            | -                             | 3FC <sub>H</sub> | 000FFFFC <sub>H</sub>   | -    |
| System reserved                                               | 1                | 1            | -                             | 3F8 <sub>H</sub> | 000FFFF8 <sub>H</sub>   | -    |
| System reserved                                               | 2                | 2            | -                             | 3F4 <sub>H</sub> | 000FFFF4 <sub>H</sub>   | -    |
| System reserved                                               | 3                | 3            | -                             | 3F0 <sub>H</sub> | 000FFFF0 <sub>H</sub>   | -    |
| System reserved                                               | 4                | 4            | -                             | 3EC <sub>H</sub> | 000FFFE4 <sub>H</sub>   | -    |
| FPU exception                                                 | 5                | 5            | -                             | 3E8 <sub>H</sub> | 000FFFE8 <sub>H</sub>   | -    |
| Exception of instruction access protection violation          | 6                | 6            | -                             | 3E4 <sub>H</sub> | 000FFFE4 <sub>H</sub>   | -    |
| Exception of data access protection violation                 | 7                | 7            | -                             | 3E0 <sub>H</sub> | 000FFFE0 <sub>H</sub>   | -    |
| Data access error interrupt                                   | 8                | 8            | -                             | 3DC <sub>H</sub> | 000FFFD4 <sub>H</sub>   | -    |
| INTE instruction                                              | 9                | 9            | -                             | 3D8 <sub>H</sub> | 000FFFD8 <sub>H</sub>   | -    |
| Instruction break                                             | 10               | 0A           | -                             | 3D4 <sub>H</sub> | 000FFFD4 <sub>H</sub>   | -    |
| System reserved                                               | 11               | 0B           | -                             | 3D0 <sub>H</sub> | 000FFFD0 <sub>H</sub>   | -    |
| System reserved                                               | 12               | 0C           | -                             | 3CC <sub>H</sub> | 000FFFC4 <sub>H</sub>   | -    |
| System reserved                                               | 13               | 0D           | -                             | 3C8 <sub>H</sub> | 000FFFC8 <sub>H</sub>   | -    |
| Exception of invalid instruction                              | 14               | 0E           | -                             | 3C4 <sub>H</sub> | 000FFFC4 <sub>H</sub>   | -    |
| NMI request                                                   | 15               | 0F           | 15 (F <sub>H</sub> )<br>Fixed | 3C0 <sub>H</sub> | 000FFFC0 <sub>H</sub>   | -    |
| Error generation during internal bus diagnosis                |                  |              |                               |                  |                         |      |
| XBS RAM double-bit error generation                           |                  |              |                               |                  |                         |      |
| Backup RAM double-bit error generation                        |                  |              |                               |                  |                         |      |
| TPU violation                                                 |                  |              |                               |                  |                         |      |
| External interrupt 0-7                                        | 16               | 10           | ICR00                         | 3BC <sub>H</sub> | 000FFFB4 <sub>H</sub>   | 0    |
| External interrupt 8-15                                       | 17               | 11           | ICR01                         | 3B8 <sub>H</sub> | 000FFFB8 <sub>H</sub>   | 1*7  |
| External low-voltage detection interrupt                      |                  |              |                               |                  |                         |      |
| Reload timer 0/1/4/5                                          | 18               | 12           | ICR02                         | 3B4 <sub>H</sub> | 000FFFB4 <sub>H</sub>   | 2*2  |
| Reload timer 2/3/6/7                                          | 19               | 13           | ICR03                         | 3B0 <sub>H</sub> | 000FFFB0 <sub>H</sub>   | 3*2  |
| Multi-function serial interface ch.0 (reception completed)    | 20               | 14           | ICR04                         | 3AC <sub>H</sub> | 000FFFAC <sub>H</sub>   | 4*1  |
| Multi-function serial interface ch.0 (status)                 |                  |              |                               |                  |                         |      |
| Multi-function serial interface ch.0 (transmission completed) | 21               | 15           | ICR05                         | 3A8 <sub>H</sub> | 000FFFA8 <sub>H</sub>   | 5*1  |
| Multi-function serial interface ch.1 (reception completed)    | 22               | 16           | ICR06                         | 3A4 <sub>H</sub> | 000FFFA4 <sub>H</sub>   | 6*1  |
| Multi-function serial interface ch.1 (status)                 |                  |              |                               |                  |                         |      |
| Multi-function serial interface ch.1 (transmission completed) | 23               | 17           | ICR07                         | 3A0 <sub>H</sub> | 000FFFA0 <sub>H</sub>   | 7*1  |
| Multi-function serial interface ch.2 (reception completed)    | 24               | 18           | ICR08                         | 39C <sub>H</sub> | 000FFF9C <sub>H</sub>   | 8*1  |
| Multi-function serial interface ch.2 (status)                 |                  |              |                               |                  |                         |      |
| Multi-function serial interface ch.2 (transmission completed) | 25               | 19           | ICR09                         | 398 <sub>H</sub> | 000FFF98 <sub>H</sub>   | 9*1  |
| Multi-function serial interface ch.3 (reception completed)    | 26               | 1A           | ICR10                         | 394 <sub>H</sub> | 000FFF94 <sub>H</sub>   | 10*1 |
| Multi-function serial interface ch.3 (status)                 |                  |              |                               |                  |                         |      |

| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                 |                  |                         |                  |
| Multi-function serial interface ch.3 (transmission completed) | 27               | 1B           | ICR11           | 390 <sub>H</sub> | 000FFF90 <sub>H</sub>   | 11               |
| Multi-function serial interface ch.4 (reception completed)    | 28               | 1C           | ICR12           | 38C <sub>H</sub> | 000FFF8C <sub>H</sub>   | 12* <sup>1</sup> |
| Multi-function serial interface ch.4 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.4 (transmission completed) | 29               | 1D           | ICR13           | 388 <sub>H</sub> | 000FFF88 <sub>H</sub>   | 13               |
| Multi-function serial interface ch.5 (reception completed)    | 30               | 1E           | ICR14           | 384 <sub>H</sub> | 000FFF84 <sub>H</sub>   | 14* <sup>1</sup> |
| Multi-function serial interface ch.5 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.5 (transmission completed) | 31               | 1F           | ICR15           | 380 <sub>H</sub> | 000FFF80 <sub>H</sub>   | 15               |
| Multi-function serial interface ch.6 (reception completed)    | 32               | 20           | ICR16           | 37C <sub>H</sub> | 000FFF7C <sub>H</sub>   | 16* <sup>1</sup> |
| Multi-function serial interface ch.6 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.6 (transmission completed) | 33               | 21           | ICR17           | 378 <sub>H</sub> | 000FFF78 <sub>H</sub>   | 17               |
| CAN0                                                          | 34               | 22           | ICR18           | 374 <sub>H</sub> | 000FFF74 <sub>H</sub>   | -                |
| CAN1                                                          | 35               | 23           | ICR19           | 370 <sub>H</sub> | 000FFF70 <sub>H</sub>   | -                |
| RAM diagnosis end                                             |                  |              |                 |                  |                         |                  |
| RAM initialization completion                                 |                  |              |                 |                  |                         |                  |
| Error generation during RAM diagnosis                         |                  |              |                 |                  |                         |                  |
| Backup RAM diagnosis end                                      |                  |              |                 |                  |                         |                  |
| Backup RAM initialization completion                          |                  |              |                 |                  |                         |                  |
| Error generation during Backup RAM diagnosis                  |                  |              |                 |                  |                         |                  |
| CAN2                                                          | 36               | 24           | ICR20           | 36C <sub>H</sub> | 000FFF6C <sub>H</sub>   | -                |
| Up/down counter 0                                             |                  |              |                 |                  |                         |                  |
| Up/down counter 1                                             |                  |              |                 |                  |                         |                  |
| Real time clock                                               | 37               | 25           | ICR21           | 368 <sub>H</sub> | 000FFF68 <sub>H</sub>   | -                |
| Multi-function serial interface ch.7 (reception completed)    | 38               | 26           | ICR22           | 364 <sub>H</sub> | 000FFF64 <sub>H</sub>   | 22* <sup>1</sup> |
| Multi-function serial interface ch.7 (status)                 |                  |              |                 |                  |                         |                  |
| 16-bit Free-run timer 0 (0 detection) / (compare clear)       | 39               | 27           | ICR23           | 360 <sub>H</sub> | 000FFF60 <sub>H</sub>   | 23               |
| Multi-function serial interface ch.7 (transmission completed) |                  |              |                 |                  |                         |                  |
| PPG 0/1/10/11/20/21/30/31                                     | 40               | 28           | ICR24           | 35C <sub>H</sub> | 000FFF5C <sub>H</sub>   | 24* <sup>3</sup> |
| 16-bit Free-run timer 1 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 2/3/12/13/22/23/32/33/43                                  | 41               | 29           | ICR25           | 358 <sub>H</sub> | 000FFF58 <sub>H</sub>   | 25* <sup>3</sup> |
| 16-bit Free-run timer 2 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 4/5/14/15/24/25/35/44                                     | 42               | 2A           | ICR26           | 354 <sub>H</sub> | 000FFF54 <sub>H</sub>   | 26* <sup>3</sup> |
| PPG 6/7/16/17/26/27/37                                        | 43               | 2B           | ICR27           | 350 <sub>H</sub> | 000FFF50 <sub>H</sub>   | 27* <sup>3</sup> |
| PPG 8/9/18/19/28/29                                           | 44               | 2C           | ICR28           | 34C <sub>H</sub> | 000FFF4C <sub>H</sub>   | 28* <sup>3</sup> |

| Interrupt Factor                                                                        | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN                                |
|-----------------------------------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|-----------------------------------|
|                                                                                         | Decimal          | Hexa Decimal |                 |                  |                         |                                   |
| Multi-function serial interface ch.8 (reception completed)                              | 45               | 2D           | ICR29           | 348 <sub>H</sub> | 000FFF48 <sub>H</sub>   | 29* <sup>1</sup>                  |
| Multi-function serial interface ch.8 (status)                                           |                  |              |                 |                  |                         |                                   |
| 16-bit ICU 0 (fetching) / 16-bit ICU 1 (fetching)                                       |                  |              |                 |                  |                         |                                   |
| Main timer                                                                              | 46               | 2E           | ICR30           | 344 <sub>H</sub> | 000FFF44 <sub>H</sub>   | 30                                |
| Sub timer                                                                               |                  |              |                 |                  |                         |                                   |
| PLL timer                                                                               |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.8 (transmission completed)                           |                  |              |                 |                  |                         |                                   |
| 16-bit ICU 2 (fetching) / 16-bit ICU 3 (fetching)                                       | 47               | 2F           | ICR31           | 340 <sub>H</sub> | 000FFF40 <sub>H</sub>   | 31* <sup>1</sup> , * <sup>4</sup> |
| Clock calibration unit (sub oscillation)                                                |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.9 (reception completed)                              |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.9 (status)                                           | 48               | 30           | ICR32           | 33C <sub>H</sub> | 000FFF3C <sub>H</sub>   | 32                                |
| A/D converter 0/1/7/9/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31 |                  |              |                 |                  |                         |                                   |
| Clock calibration unit ( CR oscillation)                                                |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.9 (transmission completed)                           | 49               | 31           | ICR33           | 338 <sub>H</sub> | 000FFF38 <sub>H</sub>   | 33                                |
| 16-bit OCU 0 (match) / 16-bit OCU 1 (match)                                             |                  |              |                 |                  |                         |                                   |
| 32-bit Free-run timer 4                                                                 | 50               | 32           | ICR34           | 334 <sub>H</sub> | 000FFF34 <sub>H</sub>   | 34* <sup>5</sup>                  |
| 16-bit OCU 2 (match) / 16-bit OCU 3 (match)                                             |                  |              |                 |                  |                         |                                   |
| 32-bit Free-run timer 3/5                                                               | 51               | 33           | ICR35           | 330 <sub>H</sub> | 000FFF30 <sub>H</sub>   | 35* <sup>5</sup>                  |
| 16-bit OCU 4 (match) / 16-bit OCU 5 (match)                                             |                  |              |                 |                  |                         |                                   |
| 32-bit ICU6 (fetching/measurement)                                                      | 52               | 34           | ICR36           | 32C <sub>H</sub> | 000FFF2C <sub>H</sub>   | 36* <sup>1</sup>                  |
| Multi-function serial interface ch.10 (reception completed)                             |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.10 (status)                                          |                  |              |                 |                  |                         |                                   |
| 32-bit ICU7 (fetching/measurement)                                                      | 53               | 35           | ICR37           | 328 <sub>H</sub> | 000FFF28 <sub>H</sub>   | 37                                |
| Multi-function serial interface ch.10 (transmission completed)                          |                  |              |                 |                  |                         |                                   |
| 32-bit ICU8 (fetching/measurement)                                                      | 54               | 36           | ICR38           | 324 <sub>H</sub> | 000FFF24 <sub>H</sub>   | 38* <sup>1</sup>                  |
| Multi-function serial interface ch.11 (reception completed)                             |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.11 (status)                                          |                  |              |                 |                  |                         |                                   |
| 32-bit ICU9 (fetching/measurement)                                                      | 55               | 37           | ICR39           | 320 <sub>H</sub> | 000FFF20 <sub>H</sub>   | 39                                |
| WG dead timer underflow 0/1/2                                                           |                  |              |                 |                  |                         |                                   |
| WG dead timer reload 0/1/2                                                              |                  |              |                 |                  |                         |                                   |
| WG DTTI 0                                                                               |                  |              |                 |                  |                         |                                   |
| 32-bit ICU4 (fetching/measurement)                                                      | 56               | 38           | ICR40           | 31C <sub>H</sub> | 000FFF1C <sub>H</sub>   | 40                                |
| Multi-function serial interface ch.11 (transmission completed)                          |                  |              |                 |                  |                         |                                   |

| Interrupt Factor                                | Interrupt Number |              | Interrupt Level | Offset               | Default Address for TBR   | RN |
|-------------------------------------------------|------------------|--------------|-----------------|----------------------|---------------------------|----|
|                                                 | Decimal          | Hexa Decimal |                 |                      |                           |    |
| 32-bit ICU5 (fetching/measurement)              | 57               | 39           | ICR41           | 318 <sub>H</sub>     | 000FFF18 <sub>H</sub>     | 41 |
| A/D converter                                   |                  |              |                 |                      |                           |    |
| 32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47 | 58               | 3A           | ICR42           | 314 <sub>H</sub>     | 000FFF14 <sub>H</sub>     | 42 |
| 32-bit OCU 6/7/10/11 (match)                    | 59               | 3B           | ICR43           | 310 <sub>H</sub>     | 000FFF10 <sub>H</sub>     | 43 |
| 32-bit OCU 8/9 (match)                          | 60               | 3C           | ICR44           | 30C <sub>H</sub>     | 000FFF0C <sub>H</sub>     | 44 |
| -                                               |                  |              |                 |                      |                           |    |
| -                                               | 61               | 3D           | ICR45           | 308 <sub>H</sub>     | 000FFF08 <sub>H</sub>     | 45 |
| Base timer 1 IRQ0                               |                  |              |                 |                      |                           |    |
| Base timer 1 IRQ1                               |                  |              |                 |                      |                           |    |
| -                                               |                  |              |                 |                      |                           |    |
| -                                               | 62               | 3E           | ICR46           | 304 <sub>H</sub>     | 000FFF04 <sub>H</sub>     | -  |
| DMAC0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15       |                  |              |                 |                      |                           |    |
| Delay interrupt                                 | 63               | 3F           | ICR47           | 300 <sub>H</sub>     | 000FFF00 <sub>H</sub>     | -  |
| System reserved<br>(Used for REALOS)            | 64               | 40           | -               | 2FC <sub>H</sub>     | 000FFEFC <sub>H</sub>     | -  |
| System reserved<br>(Used for REALOS)            | 65               | 41           | -               | 2F8 <sub>H</sub>     | 000FFE8 <sub>H</sub>      | -  |
| Used with the INT instruction                   | 66               | 42           | -               | 2F4 <sub>H</sub>     | 000FFE4 <sub>H</sub>      | -  |
|                                                 | <br>255          | <br>FF       |                 | <br>000 <sub>H</sub> | <br>000FFC00 <sub>H</sub> |    |

**Note:** It does not support a DMA transfer request caused by an interrupt generated from a peripheral to which no RN (Resource Number) is assigned.

- \*1: It does not support a DMA transfer by the status of the multi-function serial interface and I<sup>2</sup>C reception.
- \*2: Reload timer ch.4 to ch.7 do not support a DMA transfer by the interrupt.
- \*3: PPG ch.24 to ch.47 do not support a DMA transfer by the interrupt.
- \*4: The clock calibration unit does not support a DMA transfer by the interrupt.
- \*5: 32-bit Free-run timer ch.3, ch.4 and ch.5 do not support a DMA transfer by the interrupt.
- \*6: There is no resource corresponding to the interrupt level.
- \*7: It does not support a DMA transfer by the external low-voltage detection interrupt.

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| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level               | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-------------------------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                               |                  |                         |                  |
| Reset                                                         | 0                | 0            | -                             | 3FC <sub>H</sub> | 000FFFFC <sub>H</sub>   | -                |
| System reserved                                               | 1                | 1            | -                             | 3F8 <sub>H</sub> | 000FFFF8 <sub>H</sub>   | -                |
| System reserved                                               | 2                | 2            | -                             | 3F4 <sub>H</sub> | 000FFFF4 <sub>H</sub>   | -                |
| System reserved                                               | 3                | 3            | -                             | 3F0 <sub>H</sub> | 000FFFF0 <sub>H</sub>   | -                |
| System reserved                                               | 4                | 4            | -                             | 3EC <sub>H</sub> | 000FFFE <sub>C</sub>    | -                |
| FPU exception                                                 | 5                | 5            | -                             | 3E8 <sub>H</sub> | 000FFFE8 <sub>H</sub>   | -                |
| Exception of instruction access protection violation          | 6                | 6            | -                             | 3E4 <sub>H</sub> | 000FFFE4 <sub>H</sub>   | -                |
| Exception of data access protection violation                 | 7                | 7            | -                             | 3E0 <sub>H</sub> | 000FFFE0 <sub>H</sub>   | -                |
| Data access error interrupt                                   | 8                | 8            | -                             | 3DC <sub>H</sub> | 000FFFD <sub>C</sub>    | -                |
| INTE instruction                                              | 9                | 9            | -                             | 3D8 <sub>H</sub> | 000FFFD8 <sub>H</sub>   | -                |
| Instruction break                                             | 10               | 0A           | -                             | 3D4 <sub>H</sub> | 000FFFD4 <sub>H</sub>   | -                |
| System reserved                                               | 11               | 0B           | -                             | 3D0 <sub>H</sub> | 000FFFD0 <sub>H</sub>   | -                |
| System reserved                                               | 12               | 0C           | -                             | 3CC <sub>H</sub> | 000FFFC <sub>C</sub>    | -                |
| System reserved                                               | 13               | 0D           | -                             | 3C8 <sub>H</sub> | 000FFFC8 <sub>H</sub>   | -                |
| Exception of invalid instruction                              | 14               | 0E           | -                             | 3C4 <sub>H</sub> | 000FFFC4 <sub>H</sub>   | -                |
| NMI request                                                   | 15               | 0F           | 15 (F <sub>H</sub> )<br>Fixed | 3C0 <sub>H</sub> | 000FFFC0 <sub>H</sub>   | -                |
| Error generation during internal bus diagnosis                |                  |              |                               |                  |                         |                  |
| XBS RAM double-bit error generation                           |                  |              |                               |                  |                         |                  |
| Backup RAM double-bit error generation                        |                  |              |                               |                  |                         |                  |
| TPU violation                                                 |                  |              |                               |                  |                         |                  |
| External interrupt 0-7                                        | 16               | 10           | ICR00                         | 3BC <sub>H</sub> | 000FFFBC <sub>H</sub>   | 0                |
| External interrupt 8-15                                       | 17               | 11           | ICR01                         | 3B8 <sub>H</sub> | 000FFFB8 <sub>H</sub>   | 1* <sup>7</sup>  |
| External low-voltage detection interrupt                      |                  |              |                               |                  |                         |                  |
| Reload timer 0/1/4/5                                          | 18               | 12           | ICR02                         | 3B4 <sub>H</sub> | 000FFFB4 <sub>H</sub>   | 2* <sup>2</sup>  |
| Reload timer 2/3/6/7                                          | 19               | 13           | ICR03                         | 3B0 <sub>H</sub> | 000FFFB0 <sub>H</sub>   | 3* <sup>2</sup>  |
| Multi-function serial interface ch.0 (reception completed)    | 20               | 14           | ICR04                         | 3AC <sub>H</sub> | 000FFFAC <sub>H</sub>   | 4* <sup>1</sup>  |
| Multi-function serial interface ch.0 (status)                 |                  |              |                               |                  |                         |                  |
| Multi-function serial interface ch.0 (transmission completed) | 21               | 15           | ICR05                         | 3A8 <sub>H</sub> | 000FFFA8 <sub>H</sub>   | 5* <sup>1</sup>  |
| Multi-function serial interface ch.1 (reception completed)    | 22               | 16           | ICR06                         | 3A4 <sub>H</sub> | 000FFFA4 <sub>H</sub>   | 6* <sup>1</sup>  |
| Multi-function serial interface ch.1 (status)                 |                  |              |                               |                  |                         |                  |
| Multi-function serial interface ch.1 (transmission completed) | 23               | 17           | ICR07                         | 3A0 <sub>H</sub> | 000FFFA0 <sub>H</sub>   | 7* <sup>1</sup>  |
| Multi-function serial interface ch.2 (reception completed)    | 24               | 18           | ICR08                         | 39C <sub>H</sub> | 000FFF9C <sub>H</sub>   | 8* <sup>1</sup>  |
| Multi-function serial interface ch.2 (status)                 |                  |              |                               |                  |                         |                  |
| Multi-function serial interface ch.2 (transmission completed) | 25               | 19           | ICR09                         | 398 <sub>H</sub> | 000FFF98 <sub>H</sub>   | 9* <sup>1</sup>  |
| Multi-function serial interface ch.3 (reception completed)    | 26               | 1A           | ICR10                         | 394 <sub>H</sub> | 000FFF94 <sub>H</sub>   | 10* <sup>1</sup> |
| Multi-function serial interface ch.3 (status)                 |                  |              |                               |                  |                         |                  |

| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                 |                  |                         |                  |
| Multi-function serial interface ch.3 (transmission completed) | 27               | 1B           | ICR11           | 390 <sub>H</sub> | 000FFF90 <sub>H</sub>   | 11               |
| Multi-function serial interface ch.4 (reception completed)    | 28               | 1C           | ICR12           | 38C <sub>H</sub> | 000FFF8C <sub>H</sub>   | 12* <sup>1</sup> |
| Multi-function serial interface ch.4 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.4 (transmission completed) | 29               | 1D           | ICR13           | 388 <sub>H</sub> | 000FFF88 <sub>H</sub>   | 13               |
| Multi-function serial interface ch.5 (reception completed)    | 30               | 1E           | ICR14           | 384 <sub>H</sub> | 000FFF84 <sub>H</sub>   | 14* <sup>1</sup> |
| Multi-function serial interface ch.5 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.5 (transmission completed) | 31               | 1F           | ICR15           | 380 <sub>H</sub> | 000FFF80 <sub>H</sub>   | 15               |
| Multi-function serial interface ch.6 (reception completed)    | 32               | 20           | ICR16           | 37C <sub>H</sub> | 000FFF7C <sub>H</sub>   | 16* <sup>1</sup> |
| Multi-function serial interface ch.6 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.6 (transmission completed) | 33               | 21           | ICR17           | 378 <sub>H</sub> | 000FFF78 <sub>H</sub>   | 17               |
| CAN0                                                          | 34               | 22           | ICR18           | 374 <sub>H</sub> | 000FFF74 <sub>H</sub>   | -                |
| CAN1                                                          | 35               | 23           | ICR19           | 370 <sub>H</sub> | 000FFF70 <sub>H</sub>   | -                |
| RAM diagnosis end                                             |                  |              |                 |                  |                         |                  |
| RAM initialization completion                                 |                  |              |                 |                  |                         |                  |
| Error generation during RAM diagnosis                         |                  |              |                 |                  |                         |                  |
| Backup RAM diagnosis end                                      |                  |              |                 |                  |                         |                  |
| Backup RAM initialization completion                          |                  |              |                 |                  |                         |                  |
| Error generation during Backup RAM diagnosis                  |                  |              |                 |                  |                         |                  |
| CAN2                                                          | 36               | 24           | ICR20           | 36C <sub>H</sub> | 000FFF6C <sub>H</sub>   | -                |
| Up/down counter 0                                             |                  |              |                 |                  |                         |                  |
| Up/down counter 1                                             |                  |              |                 |                  |                         |                  |
| Real time clock                                               | 37               | 25           | ICR21           | 368 <sub>H</sub> | 000FFF68 <sub>H</sub>   | -                |
| Multi-function serial interface ch.7 (reception completed)    | 38               | 26           | ICR22           | 364 <sub>H</sub> | 000FFF64 <sub>H</sub>   | 22* <sup>1</sup> |
| Multi-function serial interface ch.7 (status)                 |                  |              |                 |                  |                         |                  |
| 16-bit Free-run timer 0 (0 detection) / (compare clear)       | 39               | 27           | ICR23           | 360 <sub>H</sub> | 000FFF60 <sub>H</sub>   | 23               |
| Multi-function serial interface ch.7 (transmission completed) |                  |              |                 |                  |                         |                  |
| PPG 0/1/10/11/20/21/30/31/40/41                               | 40               | 28           | ICR24           | 35C <sub>H</sub> | 000FFF5C <sub>H</sub>   | 24* <sup>3</sup> |
| 16-bit Free-run timer 1 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 2/3/12/13/22/23/32/33/43                                  | 41               | 29           | ICR25           | 358 <sub>H</sub> | 000FFF58 <sub>H</sub>   | 25* <sup>3</sup> |
| 16-bit Free-run timer 2 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 4/5/14/15/24/25/34/35/44                                  | 42               | 2A           | ICR26           | 354 <sub>H</sub> | 000FFF54 <sub>H</sub>   | 26* <sup>3</sup> |
| PPG 6/7/16/17/26/27/36/37                                     | 43               | 2B           | ICR27           | 350 <sub>H</sub> | 000FFF50 <sub>H</sub>   | 27* <sup>3</sup> |
| PPG 8/9/18/19/28/29/38/39                                     | 44               | 2C           | ICR28           | 34C <sub>H</sub> | 000FFF4C <sub>H</sub>   | 28* <sup>3</sup> |

| Interrupt Factor                                                                                    | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN       |
|-----------------------------------------------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|----------|
|                                                                                                     | Decimal          | Hexa Decimal |                 |                  |                         |          |
| Multi-function serial interface ch.8 (reception completed)                                          | 45               | 2D           | ICR29           | 348 <sub>H</sub> | 000FFF48 <sub>H</sub>   | 29*1     |
| Multi-function serial interface ch.8 (status)                                                       |                  |              |                 |                  |                         |          |
| 16-bit ICU 0 (fetching) / 16-bit ICU 1 (fetching)                                                   |                  |              |                 |                  |                         |          |
| Main timer                                                                                          | 46               | 2E           | ICR30           | 344 <sub>H</sub> | 000FFF44 <sub>H</sub>   | 30       |
| Sub timer                                                                                           |                  |              |                 |                  |                         |          |
| PLL timer                                                                                           |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.8 (transmission completed)                                       |                  |              |                 |                  |                         |          |
| 16-bit ICU 2 (fetching) / 16-bit ICU 3 (fetching)                                                   | 47               | 2F           | ICR31           | 340 <sub>H</sub> | 000FFF40 <sub>H</sub>   | 31*1, *4 |
| Clock calibration unit (sub oscillation)                                                            |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.9 (reception completed)                                          |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.9 (status)                                                       |                  |              |                 |                  |                         |          |
| A/D converter 0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15/16 17/18/19/20/21/22/23/24/25/26/27/28/29/30/31 | 48               | 30           | ICR32           | 33C <sub>H</sub> | 000FFF3C <sub>H</sub>   | 32       |
| Clock calibration unit ( CR oscillation)                                                            | 49               | 31           | ICR33           | 338 <sub>H</sub> | 000FFF38 <sub>H</sub>   | 33       |
| Multi-function serial interface ch.9 (transmission completed)                                       |                  |              |                 |                  |                         |          |
| 16-bit OCU 0 (match) / 16-bit OCU 1 (match)                                                         |                  |              |                 |                  |                         |          |
| 32-bit Free-run timer 4                                                                             | 50               | 32           | ICR34           | 334 <sub>H</sub> | 000FFF34 <sub>H</sub>   | 34*5     |
| 16-bit OCU 2 (match) / 16-bit OCU 3 (match)                                                         |                  |              |                 |                  |                         |          |
| 32-bit Free-run timer 3/5                                                                           | 51               | 33           | ICR35           | 330 <sub>H</sub> | 000FFF30 <sub>H</sub>   | 35*5     |
| 16-bit OCU 4 (match) / 16-bit OCU 5 (match)                                                         |                  |              |                 |                  |                         |          |
| 32-bit ICU 6 (fetching/measurement)                                                                 | 52               | 34           | ICR36           | 32C <sub>H</sub> | 000FFF2C <sub>H</sub>   | 36*1     |
| Multi-function serial interface ch.10 (reception completed)                                         |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.10 (status)                                                      |                  |              |                 |                  |                         |          |
| 32-bit ICU7 (fetching/measurement)                                                                  | 53               | 35           | ICR37           | 328 <sub>H</sub> | 000FFF28 <sub>H</sub>   | 37       |
| Multi-function serial interface ch.10 (transmission completed)                                      |                  |              |                 |                  |                         |          |
| 32-bit ICU8 (fetching/measurement)                                                                  | 54               | 36           | ICR38           | 324 <sub>H</sub> | 000FFF24 <sub>H</sub>   | 38*1     |
| Multi-function serial interface ch.11 (reception completed)                                         |                  |              |                 |                  |                         |          |
| Multi-function serial interface ch.11 (status)                                                      |                  |              |                 |                  |                         |          |
| 32-bit ICU9 (fetching/measurement)                                                                  | 55               | 37           | ICR39           | 320 <sub>H</sub> | 000FFF20 <sub>H</sub>   | 39       |
| WG dead timer underflow 0 / 1/ 2                                                                    |                  |              |                 |                  |                         |          |
| WG dead timer reload 0 / 1/ 2                                                                       |                  |              |                 |                  |                         |          |
| WG DTTI 0                                                                                           |                  |              |                 |                  |                         |          |
| 32-bit ICU4 (fetching/measurement)                                                                  | 56               | 38           | ICR40           | 31C <sub>H</sub> | 000FFF1C <sub>H</sub>   | 40       |
| Multi-function serial interface ch.11 (transmission completed)                                      |                  |              |                 |                  |                         |          |

| Interrupt Factor                                                 | Interrupt Number |              | Interrupt Level | Offset               | Default Address for TBR   | RN |
|------------------------------------------------------------------|------------------|--------------|-----------------|----------------------|---------------------------|----|
|                                                                  | Decimal          | Hexa Decimal |                 |                      |                           |    |
| 32-bit ICU5 (fetching/measurement)                               | 57               | 39           | ICR41           | 318 <sub>H</sub>     | 000FFF18 <sub>H</sub>     | 41 |
| A/D converter<br>32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47 |                  |              |                 |                      |                           |    |
| 32-bit OCU 6/7/10/11 (match)                                     | 58               | 3A           | ICR42           | 314 <sub>H</sub>     | 000FFF14 <sub>H</sub>     | 42 |
| 32-bit OCU8/9 (match)                                            | 59               | 3B           | ICR43           | 310 <sub>H</sub>     | 000FFF10 <sub>H</sub>     | 43 |
| Base timer 0 IRQ0                                                | 60               | 3C           | ICR44           | 30C <sub>H</sub>     | 000FFF0C <sub>H</sub>     | 44 |
| Base timer 0 IRQ1                                                |                  |              |                 |                      |                           |    |
| Base timer 1 IRQ0                                                | 61               | 3D           | ICR45           | 308 <sub>H</sub>     | 000FFF08 <sub>H</sub>     | 45 |
| Base timer 1 IRQ1                                                |                  |              |                 |                      |                           |    |
| -                                                                |                  |              |                 |                      |                           |    |
| -                                                                |                  |              |                 |                      |                           |    |
| DMAC 0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15                       | 62               | 3E           | ICR46           | 304 <sub>H</sub>     | 000FFF04 <sub>H</sub>     | -  |
| Delay interrupt                                                  | 63               | 3F           | ICR47           | 300 <sub>H</sub>     | 000FFF00 <sub>H</sub>     | -  |
| System reserved<br>(Used for REALOS)                             | 64               | 40           | -               | 2FC <sub>H</sub>     | 000FFEFC <sub>H</sub>     | -  |
| System reserved<br>(Used for REALOS)                             | 65               | 41           | -               | 2F8 <sub>H</sub>     | 000FFE8 <sub>H</sub>      | -  |
| Used with the INT instruction                                    | 66               | 42           | -               | 2F4 <sub>H</sub>     | 000FFE4 <sub>H</sub>      | -  |
|                                                                  | <br>255          | <br>FF       |                 | <br>000 <sub>H</sub> | <br>000FFC00 <sub>H</sub> |    |

**Note:** It does not support a DMA transfer request caused by an interrupt generated from a peripheral to which no RN (Resource Number) is assigned.

- \*1: It does not support a DMA transfer by the status of the multi-function serial interface and I<sup>2</sup>C reception.
- \*2: Reload timer ch.4 to ch.7 do not support a DMA transfer by the interrupt.
- \*3: PPG ch.24 to ch.47 do not support a DMA transfer by the interrupt.
- \*4: The clock calibration unit does not support a DMA transfer by the interrupt.
- \*5: 32-bit Free-run timer ch.3, ch.4 and ch.5 do not support a DMA transfer by the interrupt.
- \*6: There is no resource corresponding to the interrupt level.
- \*7: It does not support a DMA transfer by the external low-voltage detection interrupt.

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| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level               | Offset           | Default Address for TBR | RN   |
|---------------------------------------------------------------|------------------|--------------|-------------------------------|------------------|-------------------------|------|
|                                                               | Decimal          | Hexa Decimal |                               |                  |                         |      |
| Reset                                                         | 0                | 0            | -                             | 3FC <sub>H</sub> | 000FFFFC <sub>H</sub>   | -    |
| System reserved                                               | 1                | 1            | -                             | 3F8 <sub>H</sub> | 000FFFF8 <sub>H</sub>   | -    |
| System reserved                                               | 2                | 2            | -                             | 3F4 <sub>H</sub> | 000FFFF4 <sub>H</sub>   | -    |
| System reserved                                               | 3                | 3            | -                             | 3F0 <sub>H</sub> | 000FFFF0 <sub>H</sub>   | -    |
| System reserved                                               | 4                | 4            | -                             | 3EC <sub>H</sub> | 000FFFE <sub>C</sub>    | -    |
| FPU exception                                                 | 5                | 5            | -                             | 3E8 <sub>H</sub> | 000FFFE8 <sub>H</sub>   | -    |
| Exception of instruction access protection violation          | 6                | 6            | -                             | 3E4 <sub>H</sub> | 000FFFE4 <sub>H</sub>   | -    |
| Exception of data access protection violation                 | 7                | 7            | -                             | 3E0 <sub>H</sub> | 000FFFE0 <sub>H</sub>   | -    |
| Data access error interrupt                                   | 8                | 8            | -                             | 3DC <sub>H</sub> | 000FFFD <sub>C</sub>    | -    |
| INTE instruction                                              | 9                | 9            | -                             | 3D8 <sub>H</sub> | 000FFFD8 <sub>H</sub>   | -    |
| Instruction break                                             | 10               | 0A           | -                             | 3D4 <sub>H</sub> | 000FFFD4 <sub>H</sub>   | -    |
| System reserved                                               | 11               | 0B           | -                             | 3D0 <sub>H</sub> | 000FFFD0 <sub>H</sub>   | -    |
| System reserved                                               | 12               | 0C           | -                             | 3CC <sub>H</sub> | 000FFFC <sub>C</sub>    | -    |
| System reserved                                               | 13               | 0D           | -                             | 3C8 <sub>H</sub> | 000FFFC8 <sub>H</sub>   | -    |
| Exception of invalid instruction                              | 14               | 0E           | -                             | 3C4 <sub>H</sub> | 000FFFC4 <sub>H</sub>   | -    |
| NMI request                                                   | 15               | 0F           | 15 (F <sub>H</sub> )<br>Fixed | 3C0 <sub>H</sub> | 000FFFC0 <sub>H</sub>   | -    |
| Error generation during internal bus diagnosis                |                  |              |                               |                  |                         |      |
| XBS RAM double-bit error generation                           |                  |              |                               |                  |                         |      |
| Backup RAM double-bit error generation                        |                  |              |                               |                  |                         |      |
| TPU violation                                                 | 16               | 10           | ICR00                         | 3BC <sub>H</sub> | 000FFFB <sub>C</sub>    | 0    |
| External interrupt 0-7                                        |                  |              |                               |                  |                         |      |
| External interrupt 8-15                                       |                  |              |                               |                  |                         |      |
| External low-voltage detection interrupt                      |                  |              |                               |                  |                         |      |
| Reload timer 0/1/4/5                                          | 17               | 11           | ICR01                         | 3B8 <sub>H</sub> | 000FFFB8 <sub>H</sub>   | 1*7  |
| Reload timer 2/3/6/7                                          | 18               | 12           | ICR02                         | 3B4 <sub>H</sub> | 000FFFB4 <sub>H</sub>   | 2*2  |
| Multi-function serial interface ch.0 (reception completed)    | 19               | 13           | ICR03                         | 3B0 <sub>H</sub> | 000FFFB0 <sub>H</sub>   | 3*2  |
| Multi-function serial interface ch.0 (status)                 | 20               | 14           | ICR04                         | 3AC <sub>H</sub> | 000FFFA <sub>C</sub>    | 4*1  |
| Multi-function serial interface ch.0 (transmission completed) | 21               | 15           | ICR05                         | 3A8 <sub>H</sub> | 000FFFA8 <sub>H</sub>   | 5*1  |
| Multi-function serial interface ch.1 (reception completed)    | 22               | 16           | ICR06                         | 3A4 <sub>H</sub> | 000FFFA4 <sub>H</sub>   | 6*1  |
| Multi-function serial interface ch.1 (status)                 | 23               | 17           | ICR07                         | 3A0 <sub>H</sub> | 000FFFA0 <sub>H</sub>   | 7*1  |
| Multi-function serial interface ch.1 (transmission completed) | 24               | 18           | ICR08                         | 39C <sub>H</sub> | 000FFF9 <sub>C</sub>    | 8*1  |
| Multi-function serial interface ch.2 (reception completed)    | 25               | 19           | ICR09                         | 398 <sub>H</sub> | 000FFF98 <sub>H</sub>   | 9*1  |
| Multi-function serial interface ch.2 (status)                 | 26               | 1A           | ICR10                         | 394 <sub>H</sub> | 000FFF94 <sub>H</sub>   | 10*1 |
| Multi-function serial interface ch.3 (reception completed)    | 26               | 1A           | ICR10                         | 394 <sub>H</sub> | 000FFF94 <sub>H</sub>   | 10*1 |
| Multi-function serial interface ch.3 (status)                 |                  |              |                               |                  |                         |      |

| Interrupt Factor                                              | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN               |
|---------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|------------------|
|                                                               | Decimal          | Hexa Decimal |                 |                  |                         |                  |
| Multi-function serial interface ch.3 (transmission completed) | 27               | 1B           | ICR11           | 390 <sub>H</sub> | 000FFF90 <sub>H</sub>   | 11               |
| Multi-function serial interface ch.4 (reception completed)    | 28               | 1C           | ICR12           | 38C <sub>H</sub> | 000FFF8C <sub>H</sub>   | 12* <sup>1</sup> |
| Multi-function serial interface ch.4 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.4 (transmission completed) | 29               | 1D           | ICR13           | 388 <sub>H</sub> | 000FFF88 <sub>H</sub>   | 13               |
| Multi-function serial interface ch.5 (reception completed)    | 30               | 1E           | ICR14           | 384 <sub>H</sub> | 000FFF84 <sub>H</sub>   | 14* <sup>1</sup> |
| Multi-function serial interface ch.5 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.5 (transmission completed) | 31               | 1F           | ICR15           | 380 <sub>H</sub> | 000FFF80 <sub>H</sub>   | 15               |
| Multi-function serial interface ch.6 (reception completed)    | 32               | 20           | ICR16           | 37C <sub>H</sub> | 000FFF7C <sub>H</sub>   | 16* <sup>1</sup> |
| Multi-function serial interface ch.6 (status)                 |                  |              |                 |                  |                         |                  |
| Multi-function serial interface ch.6 (transmission completed) | 33               | 21           | ICR17           | 378 <sub>H</sub> | 000FFF78 <sub>H</sub>   | 17               |
| CAN0                                                          | 34               | 22           | ICR18           | 374 <sub>H</sub> | 000FFF74 <sub>H</sub>   | -                |
| CAN1                                                          | 35               | 23           | ICR19           | 370 <sub>H</sub> | 000FFF70 <sub>H</sub>   | -                |
| RAM diagnosis end                                             |                  |              |                 |                  |                         |                  |
| RAM initialization completion                                 |                  |              |                 |                  |                         |                  |
| Error generation during RAM diagnosis                         |                  |              |                 |                  |                         |                  |
| Backup RAM diagnosis end                                      |                  |              |                 |                  |                         |                  |
| Backup RAM initialization completion                          |                  |              |                 |                  |                         |                  |
| Error generation during Backup RAM diagnosis                  |                  |              |                 |                  |                         |                  |
| CAN2                                                          | 36               | 24           | ICR20           | 36C <sub>H</sub> | 000FFF6C <sub>H</sub>   | -                |
| Up/down counter 0                                             |                  |              |                 |                  |                         |                  |
| Up/down counter 1                                             |                  |              |                 |                  |                         |                  |
| Real time clock                                               | 37               | 25           | ICR21           | 368 <sub>H</sub> | 000FFF68 <sub>H</sub>   | -                |
| Multi-function serial interface ch.7 (reception completed)    | 38               | 26           | ICR22           | 364 <sub>H</sub> | 000FFF64 <sub>H</sub>   | 22* <sup>1</sup> |
| Multi-function serial interface ch.7 (status)                 |                  |              |                 |                  |                         |                  |
| 16-bit Free-run timer 0 (0 detection) / (compare clear)       | 39               | 27           | ICR23           | 360 <sub>H</sub> | 000FFF60 <sub>H</sub>   | 23               |
| Multi-function serial interface ch.7 (transmission completed) |                  |              |                 |                  |                         |                  |
| PPG 0/1/10/11/20/21/30/31/40/41                               | 40               | 28           | ICR24           | 35C <sub>H</sub> | 000FFF5C <sub>H</sub>   | 24* <sup>3</sup> |
| 16-bit Free-run timer 1 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 2/3/12/13/22/23/32/33/43                                  | 41               | 29           | ICR25           | 358 <sub>H</sub> | 000FFF58 <sub>H</sub>   | 25* <sup>3</sup> |
| 16-bit Free-run timer 2 (0 detection) / (compare clear)       |                  |              |                 |                  |                         |                  |
| PPG 4/5/14/15/24/25/34/35/44/45                               | 42               | 2A           | ICR26           | 354 <sub>H</sub> | 000FFF54 <sub>H</sub>   | 26* <sup>3</sup> |
| PPG 6/7/16/17/26/27/36/37/46/47                               | 43               | 2B           | ICR27           | 350 <sub>H</sub> | 000FFF50 <sub>H</sub>   | 27* <sup>3</sup> |
| PPG 8/9/18/19/28/29/38/39                                     | 44               | 2C           | ICR28           | 34C <sub>H</sub> | 000FFF4C <sub>H</sub>   | 28* <sup>3</sup> |

| Interrupt Factor                                                                                    | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN                                |
|-----------------------------------------------------------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|-----------------------------------|
|                                                                                                     | Decimal          | Hexa Decimal |                 |                  |                         |                                   |
| Multi-function serial interface ch.8 (reception completed)                                          | 45               | 2D           | ICR29           | 348 <sub>H</sub> | 000FFF48 <sub>H</sub>   | 29* <sup>1</sup>                  |
| Multi-function serial interface ch.8 (status)                                                       |                  |              |                 |                  |                         |                                   |
| 16-bit ICU 0 (fetching) / 16-bit ICU 1 (fetching)                                                   |                  |              |                 |                  |                         |                                   |
| Main timer                                                                                          | 46               | 2E           | ICR30           | 344 <sub>H</sub> | 000FFF44 <sub>H</sub>   | 30                                |
| Sub timer                                                                                           |                  |              |                 |                  |                         |                                   |
| PLL timer                                                                                           |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.8 (transmission completed)                                       |                  |              |                 |                  |                         |                                   |
| 16-bit ICU 2 (fetching) / 16-bit ICU 3 (fetching)                                                   | 47               | 2F           | ICR31           | 340 <sub>H</sub> | 000FFF40 <sub>H</sub>   | 31* <sup>1</sup> , * <sup>4</sup> |
| Clock calibration unit (sub oscillation)                                                            |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.9 (reception completed)                                          |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.9 (status)                                                       | 48               | 30           | ICR32           | 33C <sub>H</sub> | 000FFF3C <sub>H</sub>   | 32                                |
| A/D converter 0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15/16 17/18/19/20/21/22/23/24/25/26/27/28/29/30/31 |                  |              |                 |                  |                         |                                   |
| Clock calibration unit (CR oscillation)                                                             |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.9 (transmission completed)                                       | 49               | 31           | ICR33           | 338 <sub>H</sub> | 000FFF38 <sub>H</sub>   | 33                                |
| 16-bit OCU 0 (match) / 16-bit OCU 1 (match)                                                         |                  |              |                 |                  |                         |                                   |
| 32-bit Free-run timer 4                                                                             |                  |              |                 |                  |                         |                                   |
| 16-bit OCU 2 (match) / 16-bit OCU 3 (match)                                                         | 50               | 32           | ICR34           | 334 <sub>H</sub> | 000FFF34 <sub>H</sub>   | 34* <sup>5</sup>                  |
| 32-bit Free-run timer 3/5                                                                           |                  |              |                 |                  |                         |                                   |
| 16-bit OCU 4 (match) / 16-bit OCU 5 (match)                                                         |                  |              |                 |                  |                         |                                   |
| 32-bit ICU6 (fetching/measurement)                                                                  | 51               | 33           | ICR35           | 330 <sub>H</sub> | 000FFF30 <sub>H</sub>   | 35* <sup>5</sup>                  |
| Multi-function serial interface ch.10 (reception completed)                                         |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.10 (status)                                                      |                  |              |                 |                  |                         |                                   |
| 32-bit ICU7 (fetching/measurement)                                                                  | 52               | 34           | ICR36           | 32C <sub>H</sub> | 000FFF2C <sub>H</sub>   | 36* <sup>1</sup>                  |
| Multi-function serial interface ch.10 (transmission completed)                                      |                  |              |                 |                  |                         |                                   |
| 32-bit ICU8 (fetching/measurement)                                                                  |                  |              |                 |                  |                         |                                   |
| Multi-function serial interface ch.11 (reception completed)                                         | 53               | 35           | ICR37           | 328 <sub>H</sub> | 000FFF28 <sub>H</sub>   | 37                                |
| Multi-function serial interface ch.11 (status)                                                      |                  |              |                 |                  |                         |                                   |
| 32-bit ICU9 (fetching/measurement)                                                                  |                  |              |                 |                  |                         |                                   |
| WG dead timer underflow 0/1/2                                                                       | 54               | 36           | ICR38           | 324 <sub>H</sub> | 000FFF24 <sub>H</sub>   | 38* <sup>1</sup>                  |
| WG dead timer reload 0/1/2                                                                          |                  |              |                 |                  |                         |                                   |
| WG DTTI 0                                                                                           |                  |              |                 |                  |                         |                                   |
| 32-bit ICU4 (fetching/measurement)                                                                  | 55               | 37           | ICR39           | 320 <sub>H</sub> | 000FFF20 <sub>H</sub>   | 39                                |
| Multi-function serial interface ch.11 (transmission completed)                                      |                  |              |                 |                  |                         |                                   |
|                                                                                                     | 56               | 38           | ICR40           | 31C <sub>H</sub> | 000FFF1C <sub>H</sub>   | 40                                |
|                                                                                                     |                  |              |                 |                  |                         |                                   |

| Interrupt Factor                                | Interrupt Number |              | Interrupt Level | Offset           | Default Address for TBR | RN |
|-------------------------------------------------|------------------|--------------|-----------------|------------------|-------------------------|----|
|                                                 | Decimal          | Hexa Decimal |                 |                  |                         |    |
| 32-bit ICU5 (fetching/measurement)              | 57               | 39           | ICR41           | 318 <sub>H</sub> | 000FFF18 <sub>H</sub>   | 41 |
| A/D converter                                   |                  |              |                 |                  |                         |    |
| 32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47 |                  |              |                 |                  |                         |    |
| 32-bit OCU 6/7/10/11 (match)                    |                  |              |                 |                  |                         |    |
| 32-bit OCU 8/9 (match)                          | 58               | 3A           | ICR42           | 314 <sub>H</sub> | 000FFF14 <sub>H</sub>   | 42 |
| Base timer 0 IRQ0                               | 59               | 3B           | ICR43           | 310 <sub>H</sub> | 000FFF10 <sub>H</sub>   | 43 |
| Base timer 0 IRQ1                               |                  |              |                 |                  |                         |    |
| Base timer 1 IRQ0                               | 60               | 3C           | ICR44           | 30C <sub>H</sub> | 000FFF0C <sub>H</sub>   | 44 |
| Base timer 1 IRQ1                               |                  |              |                 |                  |                         |    |
| -                                               |                  |              |                 |                  |                         |    |
| -                                               |                  |              |                 |                  |                         |    |
| DMAC 0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15      | 61               | 3D           | ICR45           | 308 <sub>H</sub> | 000FFF08 <sub>H</sub>   | 45 |
| Delay interrupt                                 | 62               | 3E           | ICR46           | 304 <sub>H</sub> | 000FFF04 <sub>H</sub>   | -  |
| System reserved (Used for REALOS)               | 63               | 3F           | ICR47           | 300 <sub>H</sub> | 000FFF00 <sub>H</sub>   | -  |
| System reserved (Used for REALOS)               | 64               | 40           | -               | 2FC <sub>H</sub> | 000FFEFC <sub>H</sub>   | -  |
| System reserved (Used for REALOS)               | 65               | 41           | -               | 2F8 <sub>H</sub> | 000FFEFC <sub>H</sub>   | -  |
| Used with the INT instruction                   | 66               | 42           | -               | 2F4 <sub>H</sub> | 000FFEFC <sub>H</sub>   | -  |
|                                                 |                  |              | -               |                  |                         | -  |
|                                                 | 255              | FF           |                 | 000 <sub>H</sub> | 000FFC00 <sub>H</sub>   |    |

**Note:** It does not support a DMA transfer request caused by an interrupt generated from a peripheral to which no RN (Resource Number) is assigned.

- \*1: It does not support a DMA transfer by the status of the multi-function serial interface and I<sup>2</sup>C reception.
- \*2: Reload timer ch.4 to ch.7 do not support a DMA transfer by the interrupt.
- \*3: PPG ch.24 to ch.47 do not support a DMA transfer by the interrupt.
- \*4: The clock calibration unit does not support a DMA transfer by the interrupt.
- \*5: 32-bit Free-run timer ch.3, ch.4 and ch.5 do not support a DMA transfer by the interrupt.
- \*6: There is no resource corresponding to the interrupt level.
- \*7: It does not support a DMA transfer by the external low-voltage detection interrupt.

## 11. Electrical Characteristics

### Absolute Maximum Ratings

| Parameter                           | Symbol                             | Rating               |                      | Unit | Remarks                                   |
|-------------------------------------|------------------------------------|----------------------|----------------------|------|-------------------------------------------|
|                                     |                                    | Min                  | Max                  |      |                                           |
| Power supply voltage *1,*2          | V <sub>CC</sub>                    | V <sub>SS</sub> -0.3 | V <sub>SS</sub> +6.0 | V    |                                           |
| Analog power supply voltage *1,*2   | AV <sub>CC</sub>                   | V <sub>SS</sub> -0.3 | V <sub>SS</sub> +6.0 | V    | AVRH ≤ AV <sub>CC</sub> ≤ V <sub>CC</sub> |
| Analog reference voltage *1         | AVRH                               | V <sub>SS</sub> -0.3 | V <sub>SS</sub> +6.0 | V    | AVRH ≤ AV <sub>CC</sub>                   |
| Input voltage *1                    | V <sub>I</sub>                     | V <sub>SS</sub> -0.3 | V <sub>CC</sub> +0.3 | V    |                                           |
| Analog pin input voltage *1         | V <sub>IA5</sub>                   | V <sub>SS</sub> -0.3 | V <sub>CC</sub> +0.3 | V    |                                           |
| Output voltage *1                   | V <sub>O</sub>                     | V <sub>SS</sub> -0.3 | V <sub>CC</sub> +0.3 | V    |                                           |
| Maximum clamp current               | I <sub>CLAMP</sub>                 | -                    | 4.0                  | mA   | *6                                        |
| Total maximum clamp current         | Σ I <sub>CLAMP</sub>               | -                    | 20                   | mA   | *6                                        |
| "L" level maximum output current *3 | I <sub>OL1</sub>                   | -                    | 15                   | mA   |                                           |
|                                     | I <sub>OL2</sub>                   | -                    | 30                   | mA   |                                           |
| "L" level average output current *4 | I <sub>OLAV1</sub>                 | -                    | 4                    | mA   | *9                                        |
|                                     | I <sub>OLAV2</sub>                 | -                    | 12                   | mA   | *10                                       |
| "L" level total output current *5   | ΣI <sub>OL1</sub>                  | -                    | 100                  | mA   |                                           |
|                                     | ΣI <sub>OL2</sub>                  | -                    | 120                  | mA   |                                           |
| "H" level maximum output current*3  | I <sub>OH1</sub>                   | -                    | -15                  | mA   |                                           |
|                                     | I <sub>OH2</sub>                   | -                    | -30                  | mA   |                                           |
| "H" level average output current*4  | I <sub>OHAV1</sub>                 | -                    | -4                   | mA   | *9                                        |
|                                     | I <sub>OHAV2</sub>                 | -                    | -12                  | mA   | *10                                       |
| "H" level total output current *5   | ΣI <sub>OH1</sub>                  | -                    | -100                 | mA   |                                           |
|                                     | ΣI <sub>OH2</sub>                  | -                    | -120                 | mA   |                                           |
| Power consumption                   | T <sub>A</sub> : -40 °C to +105 °C | P <sub>D</sub>       | -                    | 882  | mW *8                                     |
|                                     | T <sub>A</sub> : -40 °C to +125 °C |                      | -                    | 675  | mW *8                                     |
| Operating temperature               | T <sub>A</sub>                     | -40                  | +105                 | °C   |                                           |
|                                     |                                    | -40                  | +125                 | °C   | *7                                        |
| Storage temperature                 | T <sub>stg</sub>                   | -55                  | +150                 | °C   |                                           |

\*1: These parameters are based on the condition that V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V

\*2: Caution must be taken that AV<sub>CC</sub>, AVRH do not exceed V<sub>CC</sub> upon power-on and under other circumstances.

\*3: The maximum output current is defined as the value of the peak current flowing through any one of the corresponding pins.

\*4: The average output current is defined as the value of the average current flowing through any one of the corresponding pins for a 10 ms period. The average value is the operation current × the operation ratio.

\*5: The total output current is defined as the maximum current value flowing through all of corresponding pins.

\*6: · Corresponding pins: all general-purpose ports except P035, 041, 093, 122.

· Use within recommended operating conditions.

· Use at DC voltage (current).

· The + B signal should always be applied by connecting a limiting resistor between the + B signal and the microcontroller.

· The value of the limiting resistor should be set so that the current input to the microcontroller pin does not exceed rated values at any time regardless of instantaneously or constantly when the + B signal is input.

· Note that when the microcontroller drive current is low, such as in the low power consumption modes, the + B input potential can increase the potential at the V<sub>CC</sub> pin via a protective diode, possibly affecting other devices.

· Note that if the + B signal is input when the microcontroller is off (not fixed at 0 V), since the power is supplied through the pin, the microcontroller may operate incompletely.

· Note that if the +B signal is input at power-on, since the power is supplied through the pin, the power-on reset may not function in the power supply voltage.

· Do not leave + B input pins open.

\*7: When it is used under this condition, contact your sales representative.

\*8: It is a standard when four-layer substrate is used.

\*9: Corresponding pins: General-purpose ports other than those of P103, P104, P105 and P106.

\*10: Corresponding pins: General-purpose ports of P103, P104, P105 and P106.

Sample Recommended Circuit



#### <WARNING>

Semiconductor devices may be permanently damaged by application of stress (including, without limitation, voltage, current or temperature) in excess of absolute maximum ratings. Do not exceed any of these ratings.

#### Recommended Operating Conditions

( $V_{SS} = AV_{SS} = 0.0\text{ V}$ )

| Parameter                         | Symbol               | Value                                 |      | Unit               | Remarks                                                                                                                                                                                 |
|-----------------------------------|----------------------|---------------------------------------|------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   |                      | Min                                   | Max  |                    |                                                                                                                                                                                         |
| Power supply voltage              | $V_{CC}$ , $AV_{CC}$ | 4.5                                   | 5.5  | V                  | Recommended operation guarantee range (When 5.0 V is used)                                                                                                                              |
|                                   |                      | 3.0                                   | 3.6  | V                  | Recommended operation guarantee range (When 3.3 V is used)                                                                                                                              |
|                                   |                      | 2.7                                   | 5.5  | V                  | Operation guarantee range <sup>*1</sup>                                                                                                                                                 |
| Smoothing capacitor <sup>*2</sup> | $C_S$                | 4.7<br>(tolerance within $\pm 50\%$ ) |      | $\mu\text{F}$      | Use a ceramic capacitor or a capacitor that has the similar frequency characteristics. Use a capacitor with a capacitance greater than $C_S$ as the smoothing capacitor on the VCC pin. |
| Operating temperature             | $T_A$                | -40                                   | +105 | $^{\circ}\text{C}$ |                                                                                                                                                                                         |
|                                   |                      | -40                                   | +125 | $^{\circ}\text{C}$ | <sup>*3</sup>                                                                                                                                                                           |

\*1: When it is used outside recommended operation guarantee range (range of the operation guarantee), contact your sales representative.

The initial detection voltage of the external low voltage detection is  $2.8\text{ V} \pm 8\%$  (2.576 V to 3.024 V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the

minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

\*2: See the following diagram for details on the connection of smoothing capacitor  $C_s$ .

\*3: When it is used under this condition, contact your sales representative.

· C Pin Connection Diagram



#### <WARNING>

The recommended operating conditions are required in order to ensure the normal operation of the semiconductor device. All of the device's electrical characteristics are warranted when the device is operated under these conditions.

Any use of semiconductor devices will be under their recommended operating condition. Operation under any conditions other than these conditions may adversely affect reliability of device and could result in device failure. No warranty is made with respect to any use, operating conditions or combinations not represented on this data sheet. If you are considering application under any conditions other than listed herein, please contact sales representatives beforehand.

**DC Characteristics**

 (T<sub>A</sub>: -40 °C to +105 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter            | Symbol             | Pin Name | Conditions                                                                                   |                                                                | Value |      |      | Unit | Remarks                                       |
|----------------------|--------------------|----------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------|------|------|------|-----------------------------------------------|
|                      |                    |          |                                                                                              |                                                                | Min   | Typ  | Max  |      |                                               |
| Power supply current | I <sub>CC5</sub>   | VCC      | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>Cpp</sub> = 40 MHz, at normal operation |                                                                | -     | 60   | 80   | mA   |                                               |
|                      |                    |          | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>Cpp</sub> = 40 MHz, at Flash write      |                                                                | -     | 70   | 90   | mA   |                                               |
|                      |                    |          | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>Cpp</sub> = 40 MHz, at Flash erase      |                                                                | -     | 70   | 90   | mA   |                                               |
|                      |                    |          | Operating frequency F <sub>CP</sub> = 64 MHz, F <sub>Cpp</sub> = 32 MHz, at normal operation |                                                                | -     | 54   | 71   | mA   |                                               |
|                      |                    |          | Operating frequency F <sub>CP</sub> = 64 MHz, F <sub>Cpp</sub> = 32 MHz, at Flash write      |                                                                | -     | 64   | 81   | mA   |                                               |
|                      |                    |          | Operating frequency F <sub>CP</sub> = 64 MHz, F <sub>Cpp</sub> = 32 MHz, at Flash erase      |                                                                | -     | 64   | 81   | mA   |                                               |
|                      |                    |          | Operating frequency F <sub>CP</sub> = 48 MHz, F <sub>Cpp</sub> = 24 MHz, at normal operation |                                                                | -     | 46   | 62   | mA   |                                               |
|                      |                    |          | Operating frequency F <sub>CP</sub> = 48 MHz, F <sub>Cpp</sub> = 24 MHz, at Flash write      |                                                                | -     | 56   | 72   | mA   |                                               |
|                      |                    |          | Operating frequency F <sub>CP</sub> = 48 MHz, F <sub>Cpp</sub> = 24 MHz, at Flash erase      |                                                                | -     | 56   | 72   | mA   |                                               |
|                      | I <sub>CCS5</sub>  |          | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>Cpp</sub> = 40 MHz, at CPU sleep mode   |                                                                | -     | 45   | 61   | mA   |                                               |
|                      | I <sub>CCBS5</sub> |          | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>Cpp</sub> = 40 MHz, at bus sleep mode   |                                                                | -     | 23   | 51   | mA   |                                               |
|                      | I <sub>CCt5</sub>  |          | Watch mode                                                                                   | When using crystal 4 MHz T <sub>A</sub> = +25 °C*              | -     | 1500 | 2610 | μA   |                                               |
|                      |                    |          |                                                                                              | When using built-in CR clock 50 kHz T <sub>A</sub> = +25 °C*   | -     | 450  | 2000 |      |                                               |
|                      |                    |          |                                                                                              | When using sub clock 32 kHz T <sub>A</sub> = +25 °C*           | -     | 460  | 2000 |      |                                               |
|                      | I <sub>CCH5</sub>  |          | Stop mode                                                                                    | T <sub>A</sub> = +25 °C*                                       | -     | 450  | 2000 | μA   |                                               |
|                      | I <sub>CCt52</sub> |          | Watch mode (power off)                                                                       | When using crystal 4 MHz T <sub>A</sub> = +25 °C*              | -     | 1100 | 1300 | μA   | LVD/ RTC operation, Backup RAM 8 KB retention |
|                      |                    |          |                                                                                              | When using built-in CR clock 50 kHz , T <sub>A</sub> = +25 °C* | -     | 77   | 267  |      |                                               |
|                      |                    |          |                                                                                              | When using sub clock 32 kHz T <sub>A</sub> = +25 °C*           | -     | 100  | 285  |      |                                               |
|                      | I <sub>CCH52</sub> |          | Stop mode (power off)                                                                        | T <sub>A</sub> = +25 °C*                                       | -     | 74   | 265  | μA   | Backup RAM 8 KB retention                     |

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter            | Symbol             | Pin Name               | Conditions                                                                                   |   | Value |      |     | Unit                                          | Remarks |
|----------------------|--------------------|------------------------|----------------------------------------------------------------------------------------------|---|-------|------|-----|-----------------------------------------------|---------|
|                      |                    |                        |                                                                                              |   | Min   | Typ  | Max |                                               |         |
| Power supply current | I <sub>CC5</sub>   | VCC                    | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>cpp</sub> = 40 MHz, at normal operation |   | -     | 60   | 102 | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>cpp</sub> = 40 MHz, at Flash write      |   | -     | 70   | 115 | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>cpp</sub> = 40 MHz, at Flash erase      |   | -     | 70   | 115 | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 64 MHz, F <sub>cpp</sub> = 32 MHz, at normal operation |   | -     | 54   | 92  | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 64 MHz, F <sub>cpp</sub> = 32 MHz, at Flash write      |   | -     | 64   | 105 | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 64 MHz, F <sub>cpp</sub> = 32 MHz, at Flash erase      |   | -     | 64   | 105 | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 48 MHz, F <sub>cpp</sub> = 24 MHz, at normal operation |   | -     | 46   | 82  | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 48 MHz, F <sub>cpp</sub> = 24 MHz, at Flash write      |   | -     | 56   | 95  | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 48 MHz, F <sub>cpp</sub> = 24 MHz, at Flash erase      |   | -     | 56   | 95  | mA                                            |         |
|                      |                    |                        | Operating frequency F <sub>CP</sub> = 80 MHz, F <sub>cpp</sub> = 40 MHz, at CPU sleep mode   |   | -     | 45   | 82  | mA                                            |         |
|                      | I <sub>CCS5</sub>  |                        |                                                                                              | - | 45    | 82   | mA  |                                               |         |
|                      | I <sub>CCBS5</sub> |                        |                                                                                              | - | 23    | 72   | mA  |                                               |         |
|                      | I <sub>CCt5</sub>  | Watch mode             | When using crystal 4 MHz T <sub>A</sub> = +25 °C*                                            | - | 1500  | 2610 | μA  |                                               |         |
|                      |                    |                        | When using built-in CR clock 50 kHz T <sub>A</sub> = +25 °C*                                 | - | 450   | 2000 |     |                                               |         |
|                      |                    |                        | When using sub clock 32 kHz T <sub>A</sub> = +25 °C*                                         | - | 460   | 2000 |     |                                               |         |
|                      | I <sub>CCH5</sub>  | Stop mode              | T <sub>A</sub> = +25 °C*                                                                     | - | 450   | 2000 | μA  |                                               |         |
|                      | I <sub>CCt52</sub> | Watch mode (power off) | When using crystal 4 MHz T <sub>A</sub> = +25 °C*                                            | - | 1100  | 1300 | μA  | LVD/ RTC operation, Backup RAM 8 KB retention |         |
|                      |                    |                        | When using built-in CR clock 50 kHz , T <sub>A</sub> = +25 °C*                               | - | 77    | 267  |     |                                               |         |
|                      |                    |                        | When using sub clock 32 kHz T <sub>A</sub> = +25 °C*                                         | - | 100   | 285  |     |                                               |         |
|                      | I <sub>CCH52</sub> | Stop mode (power off)  | T <sub>A</sub> = +25 °C*                                                                     | - | 74    | 265  | μA  | Backup RAM 8 KB retention                     |         |

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                | Symbol           | Pin Name                                                                               | Conditions                                                                                       | Value                   |     |                 | Unit | Remarks                     |
|--------------------------|------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------|-----|-----------------|------|-----------------------------|
|                          |                  |                                                                                        |                                                                                                  | Min                     | Typ | Max             |      |                             |
| Input leak current       | I <sub>IL</sub>  | All input pins                                                                         | V <sub>CC</sub> = AV <sub>CC</sub> = 5.5 V<br>V <sub>SS</sub> < V <sub>I</sub> < V <sub>CC</sub> | -5                      | -   | 5               | μA   |                             |
| Input capacitance 1      | C <sub>IN1</sub> | Other than V <sub>CC</sub> , V <sub>SS</sub> , AV <sub>CC</sub> , AV <sub>SS</sub> , C | -                                                                                                | -                       | 5   | 15              | pF   |                             |
| Pull-up resistance       | R <sub>UP1</sub> | RSTX, NMIX                                                                             | V <sub>CC</sub> = 5.0 V ± 10 %                                                                   | 25                      | -   | 100             | kΩ   |                             |
|                          |                  |                                                                                        | V <sub>CC</sub> = 3.3 V ± 0.3 V                                                                  | 45                      | -   | 140             |      |                             |
|                          | R <sub>UP2</sub> | P073,074<br>076,077                                                                    | V <sub>CC</sub> = 5.0 V ± 10 %                                                                   | 25                      | -   | 60              |      |                             |
|                          |                  |                                                                                        | V <sub>CC</sub> = 3.3 V ± 0.3 V                                                                  | 33                      | -   | 90              |      |                             |
|                          | R <sub>UP3</sub> | Port pin other than P035,<br>041,073,074,<br>076,077,093,<br>122                       | V <sub>CC</sub> = 5.0 V ± 10 %                                                                   | 25                      | -   | 100             | kΩ   |                             |
|                          |                  |                                                                                        | V <sub>CC</sub> = 3.3 V ± 0.3 V                                                                  | 45                      | -   | 140             |      |                             |
| “H” level output voltage | V <sub>OH1</sub> | Normal output pin                                                                      | V <sub>CC</sub> = 4.5 V<br>I <sub>OH</sub> = -4.0 mA                                             | V <sub>CC</sub><br>-0.5 | -   | V <sub>CC</sub> | V    |                             |
|                          |                  |                                                                                        | V <sub>CC</sub> = 3.0 V<br>I <sub>OH</sub> = -2.0 mA                                             |                         |     |                 |      |                             |
|                          | V <sub>OH2</sub> | P073,074,076,<br>077                                                                   | V <sub>CC</sub> = 4.5 V<br>I <sub>OH</sub> = -3.0 mA                                             | V <sub>CC</sub><br>-0.5 | -   | V <sub>CC</sub> | V    | I <sup>2</sup> C pin output |
|                          | V <sub>OH3</sub> | P103 to 106                                                                            | V <sub>CC</sub> = 4.5 V<br>I <sub>OH</sub> = -12.0 mA                                            | V <sub>CC</sub><br>-0.5 | -   | V <sub>CC</sub> | V    |                             |
|                          |                  |                                                                                        | V <sub>CC</sub> = 3.0 V<br>I <sub>OH</sub> = -8.0 mA                                             |                         |     |                 |      |                             |
|                          | V <sub>OH3</sub> | P103 to 106                                                                            | V <sub>CC</sub> = 3.0 V<br>I <sub>OH</sub> = -8.0 mA                                             | V <sub>CC</sub><br>-0.5 | -   | V <sub>CC</sub> | V    |                             |
| “L” level output voltage | V <sub>OL1</sub> | Normal output pin                                                                      | V <sub>CC</sub> = 4.5 V<br>I <sub>OL</sub> = 4.0 mA                                              | 0                       | -   | 0.4             | V    |                             |
|                          |                  |                                                                                        | V <sub>CC</sub> = 3.0 V<br>I <sub>OL</sub> = 2.0 mA                                              |                         |     |                 |      |                             |
|                          | V <sub>OL2</sub> | P073,074,076,<br>077                                                                   | V <sub>CC</sub> = 4.5 V<br>I <sub>OL</sub> = 3.0 mA                                              | 0                       | -   | 0.4             | V    | I <sup>2</sup> C pin output |
|                          | V <sub>OL3</sub> | P103 to 106                                                                            | V <sub>CC</sub> = 4.5 V<br>I <sub>OL</sub> = 12.0 mA                                             | 0                       | -   | 0.4             | V    |                             |
|                          |                  |                                                                                        | V <sub>CC</sub> = 3.0 V<br>I <sub>OL</sub> = 8.0 mA                                              |                         |     |                 |      |                             |
|                          | V <sub>OL3</sub> | P103 to 106                                                                            | V <sub>CC</sub> = 3.0 V<br>I <sub>OL</sub> = 8.0 mA                                              | 0                       | -   | 0.4             | V    |                             |

| Parameter               | Symbol    | Pin Name                                                                                                                                                | Conditions                  | Value               |     |                     | Unit | Remarks |
|-------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------|-----|---------------------|------|---------|
|                         |           |                                                                                                                                                         |                             | Min                 | Typ | Max                 |      |         |
| “H” level input voltage | $V_{IH1}$ | P000,002,003, 005,020,022, 024,026,150, 151,035,041, 045,055,057, 071-077,081, 082,093,096, 097,100-102, 111,115,116, 122,126,130, 134,142,143, 144,153 | CMOS hysteresis input level | $0.7 \times V_{CC}$ | -   | $V_{CC}$            | V    |         |
|                         | $V_{IH3}$ | Port other than $V_{IH1}$                                                                                                                               | Automotive input level      | $0.8 \times V_{CC}$ | -   | $V_{CC}$            | V    |         |
|                         | $V_{IH5}$ | RSTX,NMIX,MD 0,MD1                                                                                                                                      | CMOS hysteresis input level | $0.8 \times V_{CC}$ | -   | $V_{CC}$            | V    |         |
|                         | $V_{IHT}$ | DEBUGIF                                                                                                                                                 | TTL input level             | 2                   | -   | $V_{CC}$            | V    |         |
| “L” level input voltage | $V_{IL1}$ | P000,002,003, 005,020,022, 024,026,150, 151,035,041, 045,055,057, 071-077,081, 082,093,096, 097,100-102, 111,115,116, 122,126,130, 134,142,143, 144,153 | CMOS hysteresis input level | $V_{SS}$            | -   | $0.3 \times V_{CC}$ | V    |         |
|                         | $V_{IL3}$ | Port other than $V_{IH1}$                                                                                                                               | Automotive input level      | $V_{SS}$            | -   | $0.5 \times V_{CC}$ | V    |         |
|                         | $V_{IL5}$ | RSTX,NMIX,MD 0,MD1                                                                                                                                      | CMOS hysteresis input level | $V_{SS}$            | -   | $0.2 \times V_{CC}$ | V    |         |
|                         | $V_{ILT}$ | DEBUGIF                                                                                                                                                 | TTL input level             | $V_{SS}$            | -   | 0.8                 | V    |         |

\*: It is a standard in BRAMSC (Backup RAM sleep control bit) = 1 (Enter the state of the sleep at the standby mode) condition.

**AC Characteristics**
**(1) Main Clock Timing**

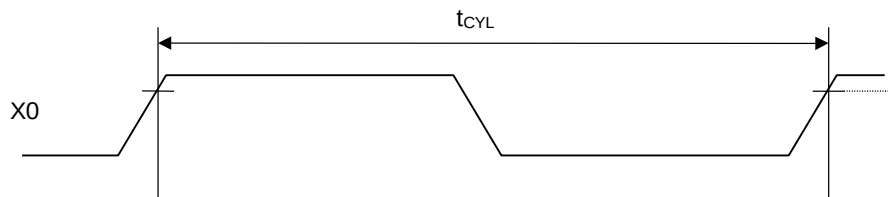
(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                                         | Symbol           | Pin Name | Conditions | Value |     |      | Unit                                                 | Remarks                                                                 |
|---------------------------------------------------|------------------|----------|------------|-------|-----|------|------------------------------------------------------|-------------------------------------------------------------------------|
|                                                   |                  |          |            | Min   | Typ | Max  |                                                      |                                                                         |
| Source oscillation clock frequency                | F <sub>C</sub>   | X0, X1   | -          | -     | 4   | 16   | MHz                                                  |                                                                         |
| Source oscillation clock cycle time               | t <sub>CYL</sub> | X0, X1   |            | 62.5  | 250 | -    | ns                                                   |                                                                         |
| Internal operating clock frequency <sup>*1</sup>  | F <sub>CP</sub>  | -        |            | 2     | -   | 80   | MHz                                                  | CPU clock                                                               |
|                                                   | F <sub>CPP</sub> |          |            | 1     |     | 40   |                                                      | Peripheral bus clock                                                    |
|                                                   | F <sub>CPT</sub> |          |            | 1     |     | 40   |                                                      | External bus clock (When V <sub>CC</sub> = 5.0 V is used) <sup>*2</sup> |
|                                                   |                  |          |            | 1     |     | 32   |                                                      | External bus clock (When V <sub>CC</sub> = 3.3 V is used)               |
| Internal operating clock cycle time <sup>*1</sup> | t <sub>CP</sub>  | -        |            | 12.5  | -   | 500  | ns                                                   | CPU clock                                                               |
|                                                   | t <sub>CPP</sub> |          |            | 25    |     | 1000 |                                                      | Peripheral bus clock                                                    |
|                                                   | t <sub>CPT</sub> |          |            | 25    |     | 1000 |                                                      | External bus clock (When V <sub>CC</sub> = 5.0 V is used)               |
|                                                   |                  |          |            | 31.25 |     | 1000 |                                                      | External bus clock (When V <sub>CC</sub> = 3.3 V is used)               |
| CAN PLL jitter (during lock)                      | t <sub>PJ</sub>  | -        | -10        | -     | 10  | ns   | F <sub>CP</sub> = 80 MHz<br>(4 MHz×Multiplied by 20) |                                                                         |
| Built-in CR oscillation frequency                 | F <sub>CCR</sub> | -        | 50         | 100   | 150 | kHz  |                                                      |                                                                         |

\*1: The maximum / minimum value is defined when using the main clock and PLL clock.

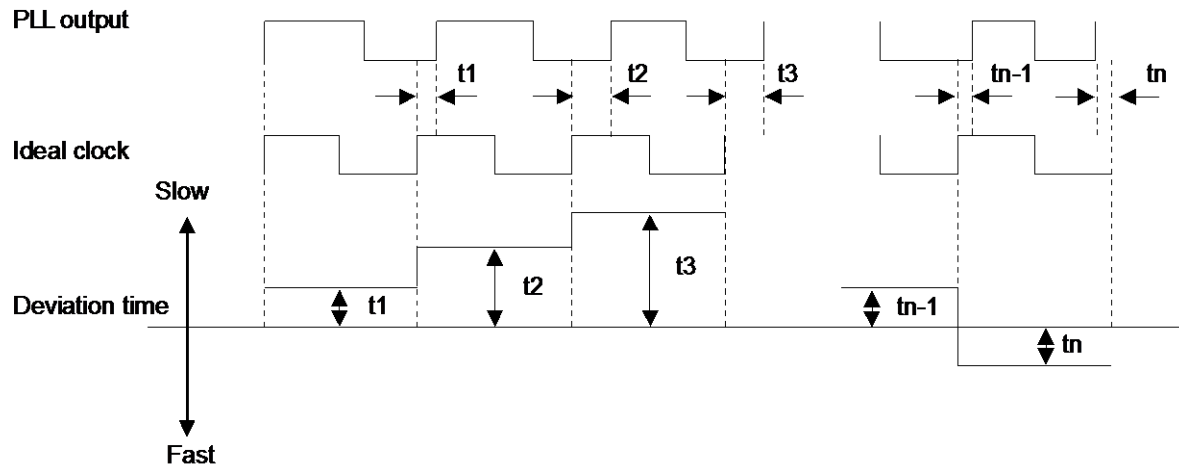
\*2: Please use it with external load capacity 12 pF or less for V<sub>CC</sub> = 3.3 V ± 0.3 V (40 MHz operation).

• X0,X1 clock timing



• CAN PLL jitter

Deviation time from the ideal clock is assured per cycle out of 20, 000 cycles.



**(1-2) Sub clock timing**

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                           | Symbol            | Pin Name | Conditions | Value |        |     | Unit | Remarks |
|-------------------------------------|-------------------|----------|------------|-------|--------|-----|------|---------|
|                                     |                   |          |            | Min   | Typ    | Max |      |         |
| Source oscillation clock frequency  | F <sub>CL</sub>   | X0A, X1A | -          | -     | 32.768 | -   | kHz  |         |
| Source oscillation clock cycle time | t <sub>LCYL</sub> | X0A, X1A |            | -     | 30.52  | -   | μs   |         |

· X0A,X1A clock timing



• Guaranteed operation range

Internal operation clock frequency vs. Power supply voltage



**Note:** The power supply voltage, which is the low-voltage detection setting voltage or lower, is in the reset state.

Oscillation clock frequency vs. Internal operation clock frequency

|                             |       | Internal operation clock frequency |                 |                 |                 |                 |     |                  |                  |
|-----------------------------|-------|------------------------------------|-----------------|-----------------|-----------------|-----------------|-----|------------------|------------------|
|                             |       | Main Clock                         | PLL clock       |                 |                 |                 |     |                  |                  |
|                             |       |                                    | Multiplied by 1 | Multiplied by 2 | Multiplied by 3 | Multiplied by 4 | ... | Multiplied by 19 | Multiplied by 20 |
| Oscillation clock frequency | 4 MHz | 2 MHz                              | 4 MHz           | 8 MHz           | 12 MHz          | 16 MHz          | ... | 76 MHz           | 80 MHz           |

• Example of oscillation circuit



**Note:** As to the product with its clock supervisor's initial value is "ON", when the oscillator is unable to start within 20 ms from the stop state the clock supervisor will detect the oscillation stop. As a result, the CPU moves to the fail safe operation.

Design your print circuit board so that the oscillator can start oscillation within 20 ms. Moreover, it is recommended to be designed after the match evaluation of the circuit is requested to the departure pendulum maker when the oscillation circuit is composed.

AC characteristics are specified by the following measurement reference voltage values.



## (2) Reset Input

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                     | Symbol            | Pin Name | Conditions | Value                                |     | Unit | Remarks                              |
|-------------------------------|-------------------|----------|------------|--------------------------------------|-----|------|--------------------------------------|
|                               |                   |          |            | Min                                  | Max |      |                                      |
| Reset input time              | t <sub>RSTL</sub> | RSTX     | —          | 10                                   | —   | μs   | When normal operation                |
|                               |                   |          |            | Oscillation time of oscillator* +100 | —   | μs   | At Stop mode<br><b>At Power-on*2</b> |
|                               |                   |          |            | 100                                  | —   | μs   | At Watch mode                        |
| Width for reset input removal |                   |          |            | 1                                    | —   | μs   |                                      |

\*1: The oscillation time of the oscillator is the time it takes for the amplitude of the oscillations to reach 90 %. For crystal oscillators, this time is between several ms and several tens of ms, for ceramic oscillators the time is between several hundred μs and several ms, and for an external clock, the time is 0 ms.

\*2: In case of using CY91F52xxxD or CY91F52xxxE and corresponding to note in (3) Power-on Conditions of next subsection, assert RSTX with power-on.



### (3) Power-on Conditions

(3-1) [CY9152xxxB/CY9152xxxC/CY9152xxxD]

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>SS</sub> = 0.0 V)

| Parameter                        | Symbol           | Pin Name        | Conditions                            | Value |     |       | Unit  | Remarks |
|----------------------------------|------------------|-----------------|---------------------------------------|-------|-----|-------|-------|---------|
|                                  |                  |                 |                                       | Min   | Typ | Max   |       |         |
| Level detection voltage          | —                | V <sub>CC</sub> | —                                     | 2.024 | 2.2 | 2.376 | V     |         |
| Level detection hysteresis width | —                | V <sub>CC</sub> | —                                     | —     | 100 | —     | mV    |         |
| Level detection time             | —                | —               | —                                     | —     | —   | 30    | μs    | *1      |
| Power off time                   | t <sub>OFF</sub> | V <sub>CC</sub> | —                                     | 50    | —   | —     | ms    | *2      |
| Power ramp rate                  | dV/dt            | V <sub>CC</sub> | V <sub>CC</sub> :<br>0.2 V to 2.376 V | —     | —   | 4     | mV/μs | *3      |
| C pin voltage at Power-on        | —                | C               | —                                     | —     | —   | 60    | mV    | *4      |

\*1: This spec is at 4 mV/μs of power ramp rate. If the power ramp rate is faster than 4mV/μs, there is the possibility to generate or release after the power supply voltage has exceeded the detection voltage range.

\*2: V<sub>CC</sub> must be held below 0.2 V for a minimum period of t<sub>OFF</sub>.

\*3: Power-on can detect by satisfying power ramp rate when power off time is not satisfied.

\*4: C-pin voltage is below 60 mV when V<sub>CC</sub> is turned on again.

#### Note:

When using CY91F52xxxB/C, either \*2 or \*3 or \*4 must be satisfied. When neither \*2 nor \*3 nor \*4 can be satisfied, use CY91F52xxxD and assert external reset (RSTX) at power-up and at any brownout event.

#### • Power off time, Power ramp rate, C pin voltage at Power-on



(3-2) [CY9152xxxE]

 (T<sub>A</sub>: -40 °C to +125 °C, V<sub>SS</sub> = 0.0 V)

| Parameter                                                   | Symbol            | Pin Name        | Conditions                                                            | Value |     |       | Unit  | Remarks |
|-------------------------------------------------------------|-------------------|-----------------|-----------------------------------------------------------------------|-------|-----|-------|-------|---------|
|                                                             |                   |                 |                                                                       | Min   | Typ | Max   |       |         |
| Level detection voltage                                     | –                 | V <sub>CC</sub> | –                                                                     | 2.024 | 2.2 | 2.376 | V     |         |
| Level detection hysteresis width                            | –                 | V <sub>CC</sub> | –                                                                     | –     | 100 | –     | mV    |         |
| Level detection time                                        | –                 | –               | –                                                                     | –     | –   | 30    | μs    | *1      |
| Power off time                                              | t <sub>OFF1</sub> | V <sub>CC</sub> | V <sub>CC</sub> ≤ 0.2 V                                               | 50    | –   | –     | ms    | *2      |
|                                                             | t <sub>OFF2</sub> | V <sub>CC</sub> | V <sub>CC</sub> ≤ 1.3 V                                               | 100   | –   | –     | μs    | *4      |
| Power ramp rate                                             | dV/dt             | V <sub>CC</sub> | V <sub>CC</sub> :<br>0.2 V to 2.376 V<br>(t <sub>OFF1</sub> < 50 ms)  | –     | –   | 50    | mV/μs | *3      |
|                                                             | dV/dt             | V <sub>CC</sub> | V <sub>CC</sub> :<br>1.3 V to 2.376 V<br>(t <sub>OFF2</sub> ≥ 100 μs) | –     | –   | 1000  | mV/μs | *4      |
| C pin voltage at Power-on                                   | –                 | C               | –                                                                     | –     | –   | 60    | mV    | *5      |
| Maximum ramp rate guaranteed to not generate power-on reset | dV/dt             | V <sub>CC</sub> | V <sub>CC</sub> :<br>Between 2.4 V and 4.5 V                          | –     | –   | 50    | mV/μs | *6      |

\*1: The specified level detection time applies only for power ramp rate of 1000 mV/μs or less.

\*2: V<sub>CC</sub> must be held below 0.2 V for a minimum period of t<sub>OFF1</sub>.

\*3: Power-on can detect by satisfying power ramp rate when t<sub>OFF1</sub> is not satisfied.

\*4: V<sub>CC</sub> must be held below 1.3 V for a minimum period of t<sub>OFF2</sub>.

Power ramp rate must be 1000 mV/μs or less from 1.3 V to 2.376 V.

Power-on can detect by satisfying power ramp rate and power off time.

\*5: C-pin voltage is below 60 mV when V<sub>CC</sub> is turned on again.

\*6: This specification is specified the power supply fluctuation after power on detection. When V<sub>CC</sub> voltage is between 2.4 V and 4.5 V, the power supply fluctuation is below 50 mV/μs, the detection of power-on is suppressed. The power-on does not detect in any power fluctuation between 4.5 V and 5.5 V.

Note: When using CY91F52xxxE, either \*2 or \*3 or \*4 or \*5 must be satisfied. When neither \*2 nor \*3 nor \*4 nor \*5 can be satisfied, assert external reset (RSTX) at power-up and at any brownout event.

• Power off time, Power ramp rate, C pin voltage at Power-on



- Maximum ramp rate guaranteed to not generate power-on reset



#### (4) Multi-function Serial

##### (4-1) CSIO timing

(4-1-1) Bit setting: SMR: MD2 = 0, SMR: MD1 = 1, SMR : MD0 = 0, SMR: SCINV = 0, SCR:SPI = 0

(TA: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V±0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                    | Symbol             | Pin Name                                                   | Conditions | Value                 |     | Unit | Remarks                                                       |
|------------------------------|--------------------|------------------------------------------------------------|------------|-----------------------|-----|------|---------------------------------------------------------------|
|                              |                    |                                                            |            | Min                   | Max |      |                                                               |
| Serial clock cycle time      | t <sub>SCYC</sub>  | SCK0 to SCK11                                              | -          | 4t <sub>CPP</sub>     | -   | ns   | Internal shift clock mode output pin : C <sub>L</sub> = 50 pF |
| SCK ↓ → SOT delay time       | t <sub>SLOVI</sub> | SCK0 to SCK2, SCK5 to SCK11<br>SOT0 to SOT2, SOT5 to SOT11 |            | -30                   | 30  | ns   |                                                               |
|                              |                    | SCK3 , SCK4<br>SOT3 , SOT4                                 |            | -300                  | 300 | ns   |                                                               |
| Valid SIN → SCK ↑ setup time | t <sub>IVSHI</sub> | SCK0 to SCK2, SCK5 to SCK11<br>SIN0 to SIN2, SIN5 to SIN11 |            | 34                    | -   | ns   |                                                               |
|                              |                    | SCK3 , SCK4<br>SIN3 , SIN4                                 |            | 300                   | -   | ns   |                                                               |
| SCK ↑ → Valid SIN hold time  | t <sub>SHIXI</sub> | SCK0 to SCK11<br>SIN0 to SIN11                             |            | 0                     | -   | ns   |                                                               |
| Serial clock "H" pulse width | t <sub>SHSL</sub>  | SCK0 to SCK11                                              | -          | t <sub>CPP</sub> +10  | -   | ns   | External shift clock mode output pin: C <sub>L</sub> = 50 pF  |
| Serial clock "L" pulse width | t <sub>SLSH</sub>  |                                                            |            | 2t <sub>CPP</sub> -10 | -   | ns   |                                                               |
| SCK ↓ → SOT delay time       | t <sub>SLOVE</sub> | SCK0 to SCK2, SCK5 to SCK11<br>SOT0 to SOT2, SOT5 to SOT11 |            | -                     | 33  | ns   |                                                               |
|                              |                    | SCK3 , SCK4<br>SOT3 , SOT4                                 |            | -                     | 300 | ns   |                                                               |
| Valid SIN → SCK ↑ setup time | t <sub>IVSHE</sub> | SCK0 to SCK11<br>SIN0 to SIN11                             |            | 10                    | -   | ns   |                                                               |
| SCK ↑ → Valid SIN hold time  | t <sub>SHIXE</sub> |                                                            |            | 20                    | -   | ns   |                                                               |
| SCK fall time                | t <sub>F</sub>     | SCK0 to SCK11                                              |            | -                     | 5   | ns   |                                                               |
| SCK rise time                | t <sub>R</sub>     | SCK0 to SCK11                                              |            | -                     | 5   | ns   |                                                               |

#### Notes:

AC characteristic in CLK synchronized mode.

C<sub>L</sub> is the load capacitance applied to pins during testing.

The maximum baud rate is limited by internal operation clock used and other parameters. Please use ch.3 and ch.4 with maximum baud rate 400 kbps or less.

See Hardware Manual for details.

• Internal shift clock mode



• External shift clock mode



(4-1-2) Bit setting: SMR: MD2 = 0, SMR: MD1 = 1, SMR : MD0 = 0, SMR: SCINV = 1, SCR:SPI = 0

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                    | Symbol             | Pin Name                                                   | Conditions | Value                 |     | Unit | Remarks                                                       |
|------------------------------|--------------------|------------------------------------------------------------|------------|-----------------------|-----|------|---------------------------------------------------------------|
|                              |                    |                                                            |            | Min                   | Max |      |                                                               |
| Serial clock cycle time      | t <sub>SCYC</sub>  | SCK0 to SCK11                                              | -          | 4t <sub>CPP</sub>     | -   | ns   | Internal shift clock mode output pin : C <sub>L</sub> = 50 pF |
| SCK ↑ → SOT delay time       | t <sub>SHOVI</sub> | SCK0 to SCK2, SCK5 to SCK11<br>SOT0 to SOT2, SOT5 to SOT11 |            | -30                   | 30  | ns   |                                                               |
|                              |                    | SCK3 , SCK4<br>SOT3 , SOT4                                 |            | -300                  | 300 | ns   |                                                               |
| Valid SIN → SCK ↓ setup time | t <sub>IVSLI</sub> | SCK0 to SCK2, SCK5 to SCK11<br>SIN0 to SIN2, SIN5 to SIN11 |            | 34                    | -   | ns   |                                                               |
|                              |                    | SCK3 , SCK4<br>SIN3, SIN4                                  |            | 300                   | -   | ns   |                                                               |
| SCK ↓ → Valid SIN hold time  | t <sub>SLIXI</sub> | SCK0 to SCK11<br>SIN0 to SIN11                             | 0          | -                     | ns  |      |                                                               |
| Serial clock "H" pulse width | t <sub>SHSL</sub>  | SCK0 to SCK11                                              | -          | t <sub>CPP</sub> +10  | -   | ns   | External shift clock mode output pin: C <sub>L</sub> = 50 pF  |
| Serial clock "L" pulse width | t <sub>SLSH</sub>  |                                                            |            | 2t <sub>CPP</sub> -10 | -   | ns   |                                                               |
| SCK ↑ → SOT delay time       | t <sub>SHOVE</sub> | SCK0 to SCK2, SCK5 to SCK11<br>SOT0 to SOT2, SOT5 to SOT11 |            | -                     | 33  | ns   |                                                               |
|                              |                    | SCK3 , SCK4<br>SOT3 , SOT4                                 |            | -                     | 300 | ns   |                                                               |
| Valid SIN → SCK ↓ setup time | t <sub>IVSLE</sub> | SCK0 to SCK11<br>SIN0 to SIN11                             |            | 10                    | -   | ns   |                                                               |
| SCK ↓ → Valid SIN hold time  | t <sub>SLIXE</sub> |                                                            |            | 20                    | -   | ns   |                                                               |
| SCK fall time                | t <sub>F</sub>     |                                                            |            | SCK0 to SCK11         | -   | 5    | ns                                                            |
| SCK rise time                | t <sub>R</sub>     | SCK0 to SCK11                                              |            | -                     | 5   | ns   |                                                               |

#### Notes:

AC characteristic in CLK synchronized mode.

C<sub>L</sub> is the load capacitance applied to pins during testing.

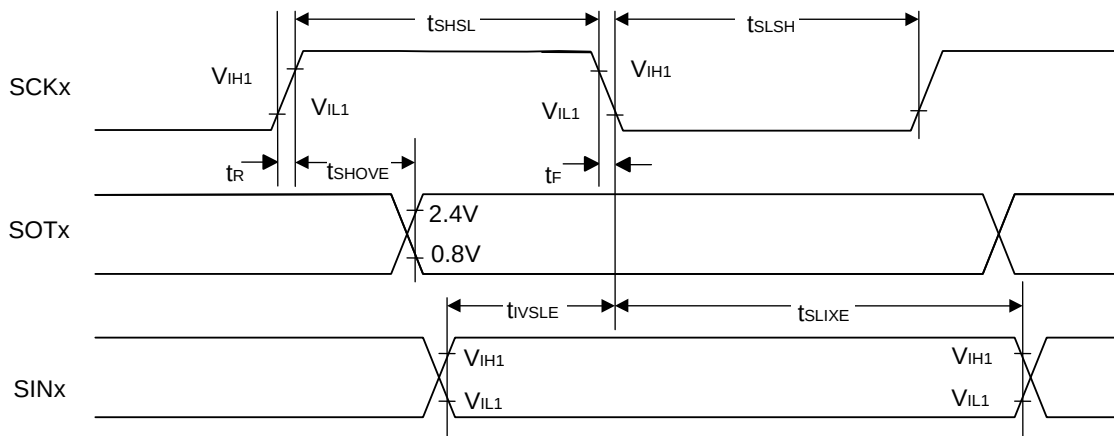
The maximum baud rate is limited by internal operation clock used and other parameters. Please use ch.3 and ch.4 with maximum baud rate 400 kbps or less.

See Hardware Manual for details.

□ Internal shift clock mode



• External shift clock mode



(4-1-3) Bit setting: SMR : MD2 = 0, SMR:MD1 = 1, SMR : MD0 = 0, SMR:SCINV = 0, SCR:SPI = 1

(TA: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0V)

| Parameter                       | Symbol             | Pin Name                                                         | Conditions | Value                    |     | Unit | Remarks                                                          |
|---------------------------------|--------------------|------------------------------------------------------------------|------------|--------------------------|-----|------|------------------------------------------------------------------|
|                                 |                    |                                                                  |            | Min                      | Max |      |                                                                  |
| Serial clock cycle time         | t <sub>SCYC</sub>  | SCK0 to SCK11                                                    | -          | 4t <sub>CPP</sub>        | -   | ns   | Internal shift clock mode output pin :<br>C <sub>L</sub> = 50 pF |
| SCK ↑ →<br>SOT delay time       | t <sub>SHOVI</sub> | SCK0 to SCK2,<br>SCK5 to SCK11<br>SOT0 to SOT2,<br>SOT5 to SOT11 |            | -30                      | 30  | ns   |                                                                  |
|                                 |                    | SCK3 , SCK4<br>SOT3 , SOT4                                       |            | -300                     | 300 | ns   |                                                                  |
| Valid SIN →<br>SCK ↓ setup time | t <sub>IVSLI</sub> | SCK0 to SCK2,<br>SCK5 to SCK11<br>SIN0 to SIN2,<br>SIN5 to SIN11 |            | 34                       | -   | ns   |                                                                  |
|                                 |                    | SCK3 , SCK4<br>SIN3 , SIN4                                       |            | 300                      | -   | ns   |                                                                  |
| SCK ↓ →<br>Valid SIN hold time  | t <sub>SLIXI</sub> | SCK0 to SCK11<br>SIN0 to SIN11                                   |            | 0                        | -   | ns   |                                                                  |
| SOT→SCK↓<br>delay time          | t <sub>SOVLI</sub> | SCK0 to SCK11<br>SOT0 to SOT11                                   |            | 2t <sub>CPP</sub><br>-30 | -   | ns   |                                                                  |
| Serial clock<br>"H"pulse width  | t <sub>SHSL</sub>  | SCK0 to SCK11                                                    | -          | t <sub>CPP+</sub><br>10  | -   | ns   | External shift clock mode output pin:<br>C <sub>L</sub> = 50 pF  |
| Serial clock<br>"L" pulse width | t <sub>SLSH</sub>  |                                                                  |            | 2t <sub>CPP</sub><br>-10 | -   | ns   |                                                                  |
| SCK ↑ →<br>SOT delay time       | t <sub>SHOVE</sub> | SCK0 to SCK2,<br>SCK5 to SCK11<br>SOT0 to SOT2,<br>SOT5 to SOT11 |            | -                        | 33  | ns   |                                                                  |
|                                 |                    | SCK3 , SCK4<br>SOT3 , SOT4                                       |            | -                        | 300 | ns   |                                                                  |
| Valid SIN →<br>SCK ↓ setup time | t <sub>IVSHE</sub> | SCK0 to SCK11<br>SIN0 to SIN11                                   |            | 10                       | -   | ns   |                                                                  |
| SCK ↓ →<br>Valid SIN hold time  | t <sub>SLIXE</sub> |                                                                  |            | 20                       | -   | ns   |                                                                  |
| SCK fall time                   | t <sub>F</sub>     | SCK0 to SCK11                                                    |            | -                        | 5   | ns   |                                                                  |
| SCK rise time                   | t <sub>R</sub>     | SCK0 to SCK11                                                    |            | -                        | 5   | ns   |                                                                  |

**Notes:**

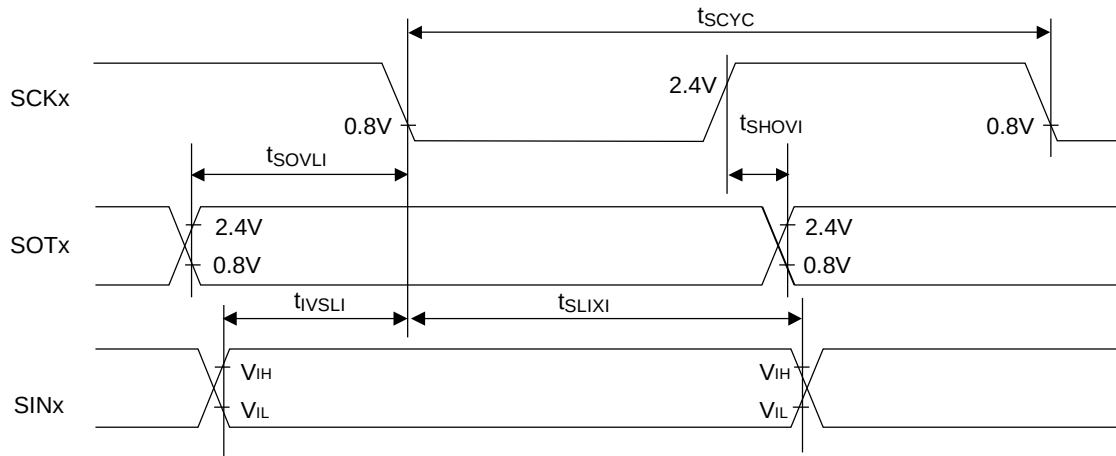
AC characteristic in CLK synchronized mode.

C<sub>L</sub> is the load capacitance applied to pins during testing.

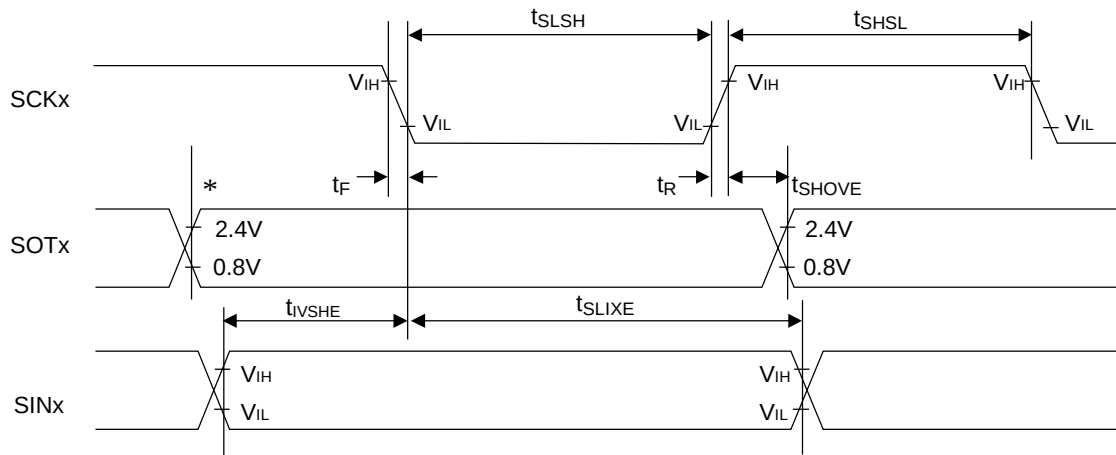
The maximum baud rate is limited by internal operation clock used and other parameters. Please use ch.3 and ch.4 with maximum baud rate 400 kbps or less.

See Hardware Manual for details.

□ Internal shift clock mode



• External shift clock mode



\*: It writes in the TDR register and, then, it changes.

(4-1-4) Bit setting: SMR : MD2 = 0, SMR:MD1 = 1, SMR : MD0 = 0, SMR:SCINV = 1, SCR:SPI = 1

(TA: -40 °C to +125 °C, V<sub>CC</sub> = A V<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0V)

| Parameter                       | Symbol             | Pin Name                                                         | Conditions | Value                 |     | Unit | Remarks                                                          |
|---------------------------------|--------------------|------------------------------------------------------------------|------------|-----------------------|-----|------|------------------------------------------------------------------|
|                                 |                    |                                                                  |            | Min                   | Max |      |                                                                  |
| Serial clock cycle time         | t <sub>SCYC</sub>  | SCK0 to SCK11                                                    | -          | 4t <sub>CPP</sub>     | -   | ns   | Internal shift clock mode output pin :<br>C <sub>L</sub> = 50 pF |
| SCK↓→<br>SOT delay time         | t <sub>SLOVI</sub> | SCK0 to SCK2,<br>SCK5 to SCK11<br>SOT0 to SOT2,<br>SOT5 to SOT11 |            | -30                   | 30  | ns   |                                                                  |
|                                 |                    | SCK3 , SCK4<br>SOT3 , SOT4                                       |            | -300                  | 300 | ns   |                                                                  |
| Valid SIN →<br>SCK↑setup time   | t <sub>IVSHI</sub> | SCK0 to SCK2,<br>SCK5 to SCK11<br>SIN0 to SIN2,<br>SIN5 to SIN11 |            | 34                    | -   | ns   |                                                                  |
|                                 |                    | SCK3 , SCK4<br>SIN3 , SIN4                                       |            | 300                   | -   | ns   |                                                                  |
| SCK↑→<br>Valid SIN hold time    | t <sub>SHIXI</sub> | SCK0 to SCK11<br>SIN0 to SIN11                                   |            | 0                     | -   | ns   |                                                                  |
| SOT→SCK↑<br>delay time          | t <sub>SOVHI</sub> | SCK0 to SCK11<br>SOT0 to SOT11                                   |            | 2t <sub>CPP</sub> -30 | -   | ns   |                                                                  |
| Serial clock<br>"H"pulse width  | t <sub>SHSL</sub>  | SCK0 to SCK11                                                    | -          | t <sub>CPP</sub> +10  | -   | ns   | External shift clock mode output pin:<br>C <sub>L</sub> = 50 pF  |
| Serial clock<br>"L" pulse width | t <sub>SLSH</sub>  |                                                                  |            | 2t <sub>CPP</sub> -10 | -   | ns   |                                                                  |
| SCK↓→<br>SOT delay time         | t <sub>SLOVE</sub> | SCK0 to SCK2,<br>SCK5 to SCK11<br>SOT0 to SOT2,<br>SOT5 to SOT11 |            | -                     | 33  | ns   |                                                                  |
|                                 |                    | SCK3 , SCK4<br>SOT3 , SOT4                                       |            | -                     | 300 | ns   |                                                                  |
| Valid SIN →<br>SCK↑setup time   | t <sub>IVSHE</sub> | SCK0 to SCK11<br>SIN0 to SIN11                                   |            | 10                    | -   | ns   |                                                                  |
| SCK↑→<br>Valid SIN hold time    | t <sub>SHIXE</sub> |                                                                  |            | 20                    | -   | ns   |                                                                  |
| SCK fall time                   | t <sub>F</sub>     | SCK0 to SCK11                                                    |            | -                     | 5   | ns   |                                                                  |
| SCK rise time                   | t <sub>R</sub>     | SCK0 to SCK11                                                    |            | -                     | 5   | ns   |                                                                  |

**Notes:**

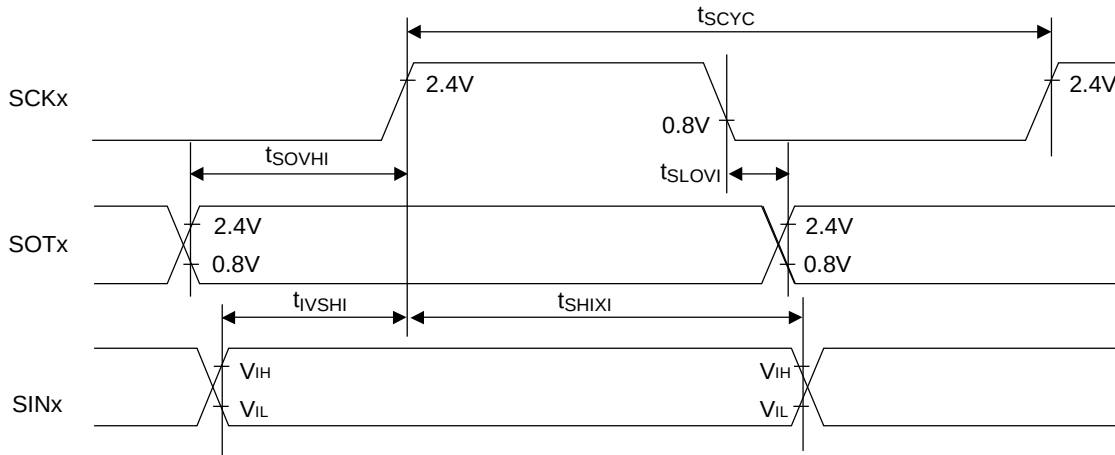
AC characteristic in CLK synchronized mode.

C<sub>L</sub> is the load capacitance applied to pins during testing.

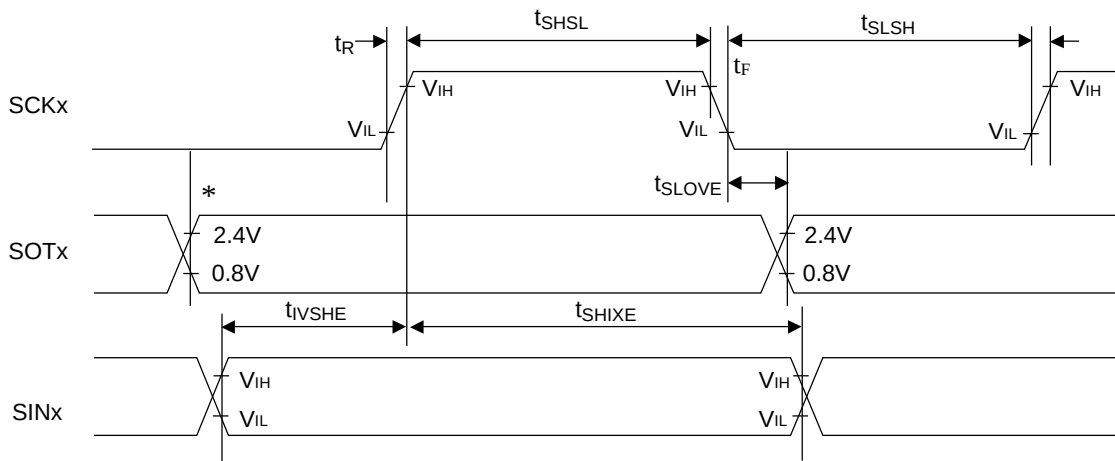
The maximum baud rate is limited by internal operation clock used and other parameters. Please use ch.3 and ch.4 with maximum baud rate 400 kbps or less.

See Hardware Manual for details.

• Internal shift clock mode



• External shift clock mode



\*: It writes in the TDR register and, then, it changes.

(4-1-5) Bit setting: SMR:MD2 = 0, SMR:MD1 = 1, SMR:MD0 = 0,

When Serial chip select is used : SCSCR:CSEN = 1,

Serial clock output mark level "H" : SMR,SCSFR:SCINV = 0,

Serial chip select Inactive level "H" : SCSCR,SCSFR:CSLVL = 1

(TA: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V±0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0V)

| Parameter               | Symbol            | Pin Name                                                                                                              | Conditions | Value                        |                              | Unit | Remarks                                                                |
|-------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------|------------|------------------------------|------------------------------|------|------------------------------------------------------------------------|
|                         |                   |                                                                                                                       |            | Min                          | Max                          |      |                                                                        |
| SCS↓→SCK↓<br>setup time | t <sub>CSSI</sub> | SCK1, SCK2,<br>SCK5 to SCK11<br>SCS1, SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 | -          | t <sub>CSSU</sub> -50<br>*1  | t <sub>CSSU</sub> +0<br>*1   | ns   | Internal shift<br>clock mode<br>output pin :<br>C <sub>L</sub> = 50 pF |
|                         |                   | SCK3, SCK4<br>SCS3,<br>SCS40 to SCS43                                                                                 |            | t <sub>CSSU</sub> -50<br>*1  | t <sub>CSSU</sub> +300<br>*1 | ns   |                                                                        |
| SCK↑→SCS↑<br>hold time  | t <sub>CSHI</sub> | SCK1, SCK2,<br>SCK5 to SCK11<br>SCS1, SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 |            | t <sub>CSHD</sub> -10<br>*2  | t <sub>CSHD</sub> +50<br>*2  | ns   |                                                                        |
|                         |                   | SCK3, SCK4<br>SCS3,<br>SCS40 to SCS43                                                                                 |            | t <sub>CSHD</sub> -300<br>*2 | t <sub>CSHD</sub> +50<br>*2  | ns   |                                                                        |
| SCS<br>deselect time    | t <sub>CSDI</sub> | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11            |            | t <sub>CSDS</sub> -50<br>*3  | t <sub>CSDS</sub> +50<br>*3  | ns   |                                                                        |

| Parameter                                                  | Symbol     | Pin Name                                                                                                                    | Conditions | Value          |               | Unit | Remarks                                                                                |
|------------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------|------------|----------------|---------------|------|----------------------------------------------------------------------------------------|
|                                                            |            |                                                                                                                             |            | Min            | Max           |      |                                                                                        |
| SCS $\downarrow$ →SCK $\downarrow$<br>setup time           | $t_{CSSE}$ | SCK1 to SCK11<br>SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 | -          | $3t_{CPP}+30$  | -             | ns   | External shift<br>clock mode<br>output pin:<br>$C_L = 50\text{ pF}$                    |
| SCK $\uparrow$ →SCS $\uparrow$<br>hold time                | $t_{CSHE}$ | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11                  |            | +0             | -             | ns   |                                                                                        |
| SCS<br>deselect time                                       | $t_{CSDE}$ | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11                  |            | $3t_{CPP}+30$  | -             | ns   |                                                                                        |
| SCS $\downarrow$ →SOT<br>delay time                        | $t_{DSE}$  | SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11<br>SOT1 , SOT2 ,<br>SOT5 to SOT11    |            | -              | 40            | ns   |                                                                                        |
|                                                            |            | SCS3,<br>SCS40 to SCS43<br>SOT3 , SOT4                                                                                      |            | -              | 300           | ns   |                                                                                        |
| SCS $\uparrow$ →SOT<br>delay time                          | $t_{DEE}$  | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11<br>SOT1 to SOT11 | -          | +0             | -             | ns   | External shift<br>clock mode<br>output pin:<br>$C_L = 50\text{ pF}$                    |
| SCK $\downarrow$ →SCS $\downarrow$<br>clock switch<br>time | $t_{SCC}$  | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11     | -          | $3t_{CPP}-10$  | $3t_{CPP}+50$ | ns   | Internal shift<br>clock mode<br>Round operation<br>output pin:<br>$C_L = 50\text{ pF}$ |
|                                                            |            | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                     |            | $3t_{CPP}-300$ | $3t_{CPP}+50$ | ns   |                                                                                        |

\*1:  $t_{CSSU} = \text{SCSTR:CSSU7-0} \times \text{Serial chip select timing operating clock}$

\*2:  $t_{CSHD} = \text{SCSTR:CSHD7-0} \times \text{Serial chip select timing operating clock}$

\*3:  $t_{CSDS} = \text{SCSTR:CSDS15-0} \times \text{Serial chip select timing operating clock}$

Regardless of the deselect time setting, once after the serial chip select pin becomes inactive, it will take at least five peripheral bus clock cycles to be active again

Please see the hardware manual for details of above-mentioned \*1,\*2, and \*3.





(4-1-6) Bit setting: SMR:MD2 = 0, SMR:MD1 = 1, SMR:MD0 = 0,

When Serial chip select is used : SCSCR:CSEN = 1,

Serial clock output mark level "L" : SMR,SCSFR:SCINV = 1,

Serial chip select Inactive level "H" : SCSCR,SCSFR:CSLVL = 1

(TA: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0V)

| Parameter               | Symbol            | Pin Name                                                                                                                | Conditions | Value                        |                              | Unit | Remarks                                                                |
|-------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------|------------|------------------------------|------------------------------|------|------------------------------------------------------------------------|
|                         |                   |                                                                                                                         |            | Min                          | Max                          |      |                                                                        |
| SCS↓→SCK↑<br>setup time | t <sub>CSSt</sub> | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 | -          | t <sub>CSSt</sub> -50<br>*1  | t <sub>CSSt</sub> +0<br>*1   | ns   | Internal shift<br>clock mode<br>output pin :<br>C <sub>L</sub> = 50 pF |
|                         |                   | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                 |            | t <sub>CSSt</sub> -50<br>*1  | t <sub>CSSt</sub> +300<br>*1 | ns   |                                                                        |
| SCK↓→SCS↑<br>hold time  | t <sub>CSHt</sub> | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 |            | t <sub>CSHt</sub> -10<br>*2  | t <sub>CSHt</sub> +50<br>*2  | ns   |                                                                        |
|                         |                   | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                 |            | t <sub>CSHt</sub> -300<br>*2 | t <sub>CSHt</sub> +50<br>*2  | ns   |                                                                        |
| SCS<br>deselect time    | t <sub>CSDt</sub> | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11              |            | t <sub>CSDt</sub> -50<br>*3  | t <sub>CSDt</sub> +50<br>*3  | ns   |                                                                        |

| Parameter                         | Symbol            | Pin Name                                                                                                                    | Conditions | Value                  |                       | Unit | Remarks                                                                                     |
|-----------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------|------------|------------------------|-----------------------|------|---------------------------------------------------------------------------------------------|
|                                   |                   |                                                                                                                             |            | Min                    | Max                   |      |                                                                                             |
| SCS↓→SCK↑<br>setup time           | t <sub>CSSE</sub> | SCK1 to SCK11<br>SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 | -          | 3t <sub>CPP</sub> +30  | -                     | ns   | External shift<br>clock mode<br>output pin:<br>C <sub>L</sub> = 50 pF                       |
| SCK↓→SCS↑<br>hold time            | t <sub>CSHE</sub> |                                                                                                                             |            | +0                     | -                     | ns   |                                                                                             |
| SCS<br>deselect time              | t <sub>CSDE</sub> | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11                  |            | 3t <sub>CPP</sub> +30  | -                     | ns   |                                                                                             |
| SCS↓→SOT<br>delay time            | t <sub>DSE</sub>  | SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11<br>SOT1 , SOT2,<br>SOT5 to SOT11     |            | -                      | 40                    | ns   |                                                                                             |
|                                   |                   | SCS3,<br>SCS40 to SCS43<br>SOT3 , SOT4                                                                                      |            | -                      | 300                   | ns   |                                                                                             |
| SCS↑→SOT<br>delay time            | t <sub>DEE</sub>  | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11<br>SOT1 to SOT11 | -          | +0                     | -                     | ns   | External shift<br>clock mode<br>output pin:<br>C <sub>L</sub> = 50 pF                       |
| SCK↑→SCS↓<br>clock switch<br>time | t <sub>SCC</sub>  | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11     | -          | 3t <sub>CPP</sub> -10  | 3t <sub>CPP</sub> +50 | ns   | Internal shift<br>clock mode<br>Round<br>operation<br>output pin:<br>C <sub>L</sub> = 50 pF |
|                                   |                   | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                     |            | 3t <sub>CPP</sub> -300 | 3t <sub>CPP</sub> +50 | ns   |                                                                                             |

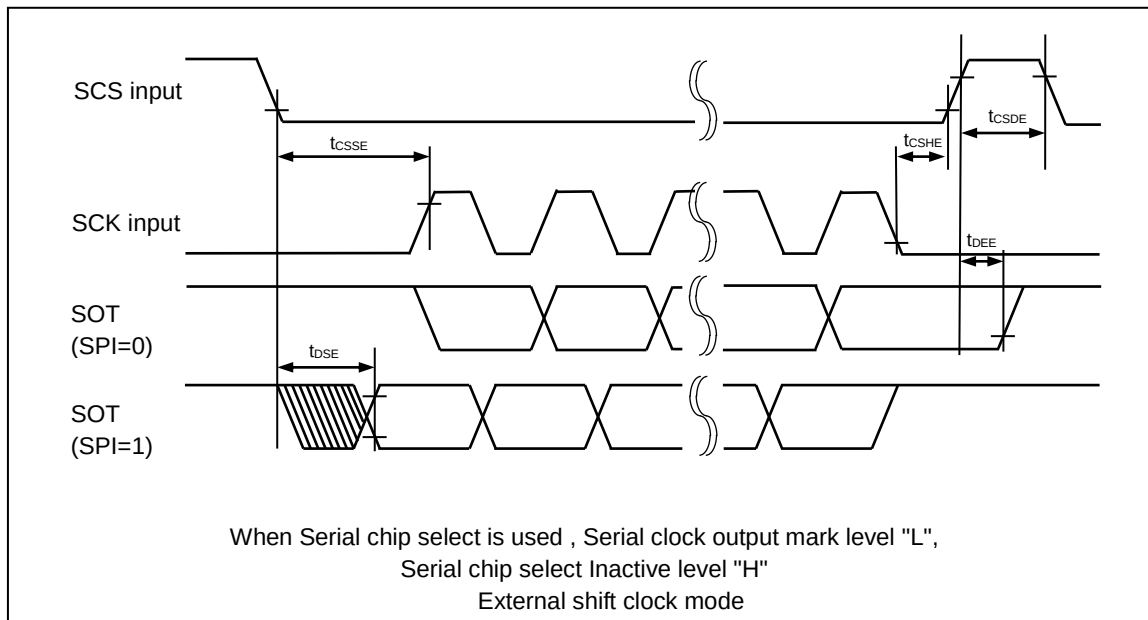
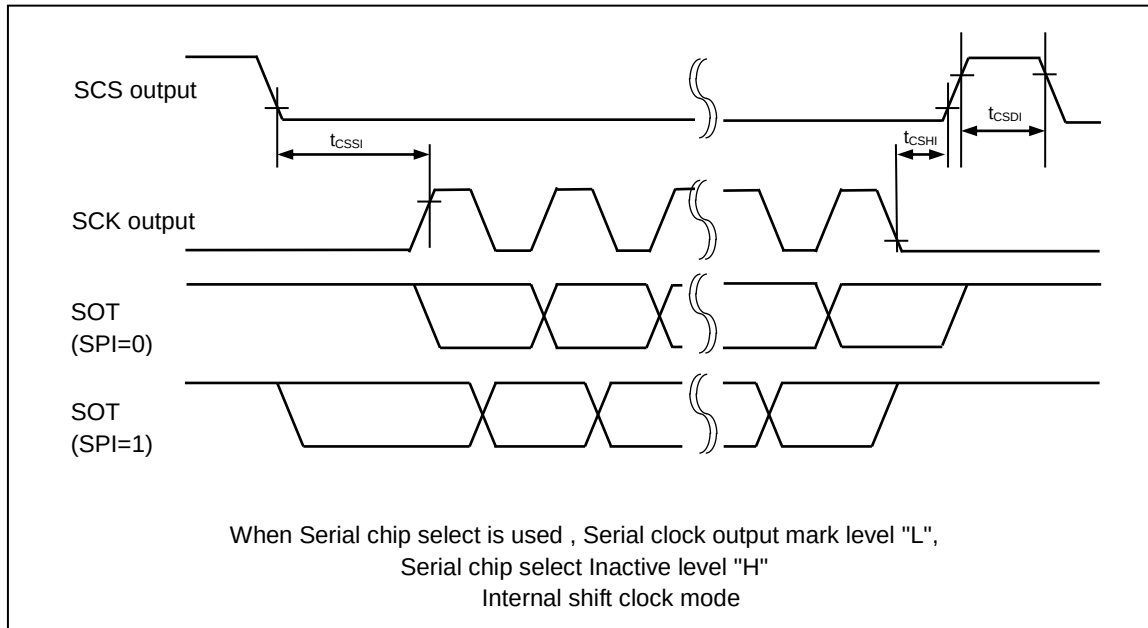
\*1: t<sub>CSSU</sub> = SCSTR:CSSU7-0 × Serial chip select timing operating clock

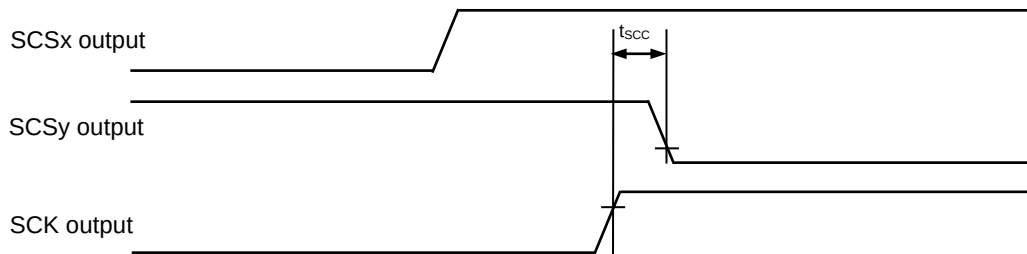
\*2: t<sub>CSHD</sub> = SCSTR:CSHD7-0 × Serial chip select timing operating clock

\*3: t<sub>CSDS</sub> = SCSTR:CSDS15-0 × Serial chip select timing operating clock

Regardless of the deselect time setting, once after the serial chip select pin becomes inactive, it will take at least five peripheral bus clock cycles to be active again

Please see the hardware manual for details of above-mentioned \*1,\*2, and \*3





When Serial chip select is used , Serial clock output mark level "L",  
 Serial chip select Inactive level "H"  
 Internal shift clock mode , Example of switching clock by round operation (x,y=0,1,2,3)

(4-1-7) Bit setting: SMR:MD2 = 0, SMR:MD1 = 1, SMR:MD0 = 0,

When Serial chip select is used : SCSCR:CSEN = 1,

Serial clock output mark level "H" : SMR,SCSFR:SCINV = 0,

Serial chip select Inactive level "L" : SCSCR,SCSFR:CSLVL = 0

(TA: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3V±0.3V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0V)

| Parameter               | Symbol            | Pin Name                                                                                                                 | Conditions | Value                        |                                 | Unit | Remarks                                                                |
|-------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------|------------|------------------------------|---------------------------------|------|------------------------------------------------------------------------|
|                         |                   |                                                                                                                          |            | Min                          | Max                             |      |                                                                        |
| SCS↑→SCK↓<br>setup time | t <sub>CSSI</sub> | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11  | -          | t <sub>CSSU</sub> -50<br>*1  | t <sub>CSSU</sub> +0<br>*1      | ns   | Internal shift<br>clock mode<br>output pin :<br>C <sub>L</sub> = 50 pF |
|                         |                   | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                  |            | t <sub>CSSU</sub> -50<br>*1  | t <sub>CSSU</sub><br>+300<br>*1 | ns   |                                                                        |
| SCK↑→SCS↓<br>hold time  | t <sub>CSHI</sub> | SCK1 to SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 |            | t <sub>CSHD</sub> -10<br>*2  | t <sub>CSHD</sub> +50<br>*2     | ns   |                                                                        |
|                         |                   | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                  |            | t <sub>CSHD</sub> -300<br>*2 | t <sub>CSHD</sub> +50<br>*2     | ns   |                                                                        |
| SCS<br>deselect time    | t <sub>CSDI</sub> | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11               |            | t <sub>CSDS</sub> -50<br>*3  | t <sub>CSDS</sub> +50<br>*3     | ns   |                                                                        |

| Parameter                                                | Symbol     | Pin Name                                                                                                                     | Conditions | Value              |                   | Unit | Remarks                                                                                |
|----------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|-------------------|------|----------------------------------------------------------------------------------------|
|                                                          |            |                                                                                                                              |            | Min                | Max               |      |                                                                                        |
| SCS $\uparrow$ →SCK $\downarrow$<br>setup time           | $t_{CSSE}$ | SCK1 to SCK11<br>SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11  | -          | $3t_{CPP}+3$<br>0  | -                 | ns   | External shift<br>clock mode<br>output pin:<br>$C_L = 50\text{ pF}$                    |
| SCK $\uparrow$ →SCS $\downarrow$<br>hold time            | $t_{CSHE}$ |                                                                                                                              |            | +0                 | -                 | ns   |                                                                                        |
| SCS<br>deselect time                                     | $t_{CSDE}$ | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11                   |            | $3t_{CPP}+3$<br>0  | -                 | ns   |                                                                                        |
| SCS $\uparrow$ →SOT<br>delay time                        | $t_{DSE}$  | SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11<br>SOT1 , SOT2,<br>SOT5 to SOT11      |            | -                  | 40                | ns   |                                                                                        |
|                                                          |            | SCS3 ,<br>SCS40 to SCS43<br>SOT3 , SOT4                                                                                      |            | -                  | 300               | ns   |                                                                                        |
| SCS $\downarrow$ →SOT<br>delay time                      | $t_{DEE}$  | SCS1 to ~SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11<br>SOT1 to SOT11 | -          | +0                 | -                 | ns   | External shift<br>clock mode<br>output pin:<br>$C_L = 50\text{ pF}$                    |
| SCK $\downarrow$ →SCS $\uparrow$<br>clock switch<br>time | $t_{SCC}$  | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11      | -          | $3t_{CPP}-10$      | $3t_{CPP}+5$<br>0 | ns   | Internal shift<br>clock mode<br>Round operation<br>output pin:<br>$C_L = 50\text{ pF}$ |
|                                                          |            | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                      |            | $3t_{CPP}-30$<br>0 | $3t_{CPP}+5$<br>0 | ns   |                                                                                        |

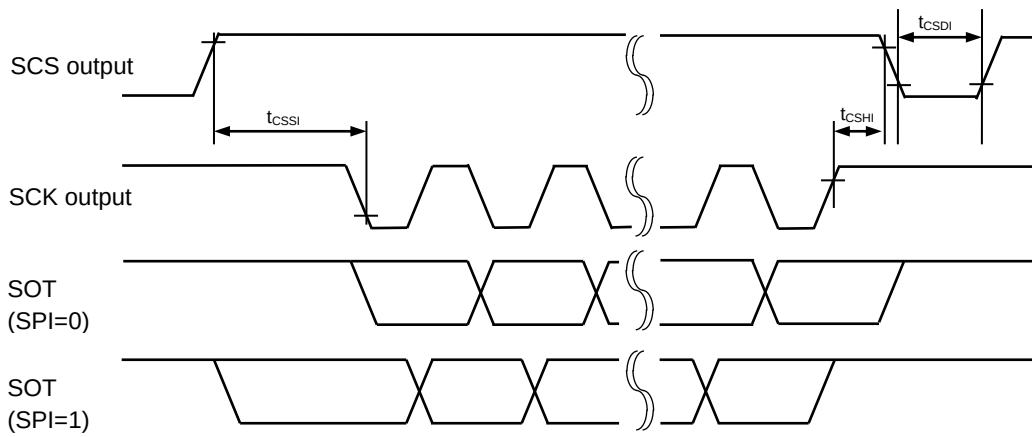
\*1:  $t_{CSSU} = \text{SCSTR:CSSU7-0} \times \text{Serial chip select timing operating clock}$

\*2:  $t_{CSHD} = \text{SCSTR:CSHD7-0} \times \text{Serial chip select timing operating clock}$

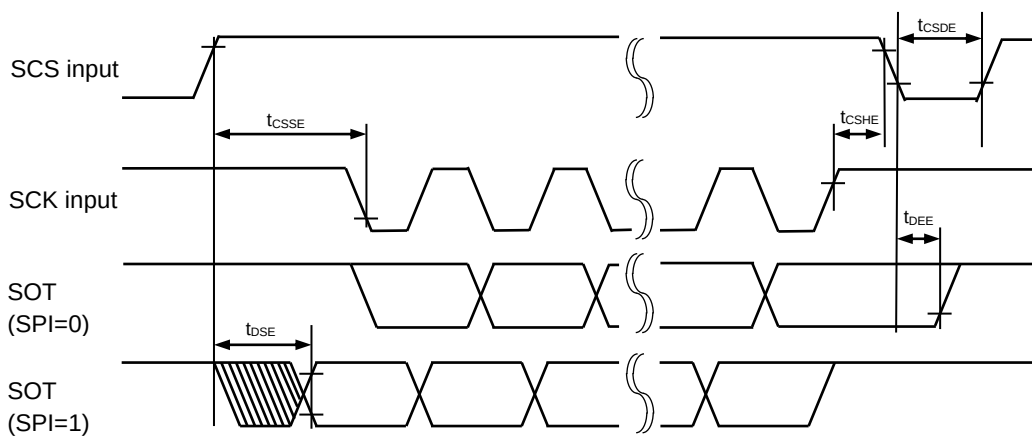
\*3:  $t_{CSDS} = \text{SCSTR:CSDS15-0} \times \text{Serial chip select timing operating clock}$

Regardless of the deselect time setting, once after the serial chip select pin becomes inactive, it will take at least five peripheral bus clock cycles to be active again

Please see the hardware manual for details of above-mentioned \*1,\*2, and \*3.



When Serial chip select is used , Serial clock output mark level "H",  
Serial chip select Inactive level "L"  
Internal shift clock mode



When Serial chip select is used , Serial clock output mark level "H",  
Serial chip select Inactive level "L"  
External shift clock mode



When Serial chip select is used , Serial clock output mark level "H",  
 Serial chip select Inactive level "L"  
 Internal shift clock mode , Example of switching clock by round operation (x,y=0,1,2,3)

(4-1-8) Bit setting: SMR:MD2 = 0, SMR:MD1 = 1, SMR:MD0 = 0,

When Serial chip select is used: SCSCR:CSEN = 1,

Serial clock output mark level "L" : SMR,SCSFR:SCINV = 1,

Serial chip select Inactive level "L" : SCSCR,SCSFR:CSLVL = 0

(TA: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter               | Symbol           | Pin Name                                                                                                                | Conditions | Value                        |                             | Unit | Remarks                                                                |
|-------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------|------------|------------------------------|-----------------------------|------|------------------------------------------------------------------------|
|                         |                  |                                                                                                                         |            | Min                          | Max                         |      |                                                                        |
| SCS↑→SCK↑<br>setup time | t <sub>CSU</sub> | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 | -          | t <sub>CSU</sub> -50<br>*1   | t <sub>CSU</sub> +0<br>*1   | ns   | Internal shift<br>clock mode<br>output pin :<br>C <sub>L</sub> = 50 pF |
|                         |                  | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                 |            | t <sub>CSU</sub> -50<br>*1   | t <sub>CSU</sub> +300<br>*1 | ns   |                                                                        |
| SCK↓→SCS↓<br>hold time  | t <sub>CSH</sub> | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 |            | t <sub>CSHD</sub> -10<br>*2  | t <sub>CSHD</sub> +50<br>*2 | ns   |                                                                        |
|                         |                  | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                 |            | t <sub>CSHD</sub> -300<br>*2 | t <sub>CSHD</sub> +50<br>*2 | ns   |                                                                        |
| SCS<br>deselect time    | t <sub>CSD</sub> | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11              |            | t <sub>CSDS</sub> -50<br>*3  | t <sub>CSDS</sub> +50<br>*3 | ns   |                                                                        |

| Parameter                                              | Symbol     | Pin Name                                                                                                                    | Conditions | Value          |               | Unit | Remarks                                                                                |
|--------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------|------------|----------------|---------------|------|----------------------------------------------------------------------------------------|
|                                                        |            |                                                                                                                             |            | Min            | Max           |      |                                                                                        |
| SCS $\uparrow$ →SCK $\uparrow$<br>setup time           | $t_{CSSE}$ | SCK1 to SCK11<br>SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11 | -          | $3t_{CPP}+30$  | -             | ns   | External shift<br>clock mode<br>output pin:<br>$C_L = 50\text{ pF}$                    |
| SCK $\downarrow$ →SCS $\downarrow$<br>hold time        | $t_{CSHE}$ |                                                                                                                             |            | +0             | -             | ns   |                                                                                        |
| SCS<br>deselect time                                   | $t_{CSDE}$ | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11                  |            | $3t_{CPP}+30$  | -             | ns   |                                                                                        |
| SCS $\uparrow$ →SOT<br>delay time                      | $t_{DSE}$  | SCS1 , SCS2,<br>SCS50~SCS53,<br>SCS60~SCS63,<br>SCS70~SCS73,<br>SCS8~SCS11<br>SOT1 , SOT2,<br>SOT5~SOT11                    |            | -              | 40            | ns   |                                                                                        |
|                                                        |            | SCS3 ,<br>SCS40~SCS43<br>SOT3 ,SOT4                                                                                         |            | -              | 300           | ns   |                                                                                        |
| SCS $\downarrow$ →SOT<br>delay time                    | $t_{DEE}$  | SCS1 to SCS3,<br>SCS40 to SCS43,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11<br>SOT1 to SOT11 | -          | +0             | -             | ns   | External shift<br>clock mode<br>output pin:<br>$C_L = 50\text{ pF}$                    |
| SCK $\uparrow$ →SCS $\uparrow$<br>clock switch<br>time | $t_{SCC}$  | SCK1 , SCK2,<br>SCK5 to SCK11<br>SCS1 , SCS2,<br>SCS50 to SCS53,<br>SCS60 to SCS63,<br>SCS70 to SCS73,<br>SCS8 to SCS11     | -          | $3t_{CPP}-10$  | $3t_{CPP}+50$ | ns   | Internal shift<br>clock mode<br>Round operation<br>output pin:<br>$C_L = 50\text{ pF}$ |
|                                                        |            | SCK3 , SCK4<br>SCS3 ,<br>SCS40 to SCS43                                                                                     |            | $3t_{CPP}-300$ | $3t_{CPP}+50$ |      |                                                                                        |

\*1:  $t_{CSSU} = \text{SCSTR:CSSU7-0} \times \text{Serial chip select timing operating clock}$

\*2:  $t_{CSHD} = \text{SCSTR:CSHD7-0} \times \text{Serial chip select timing operating clock}$

\*3:  $t_{CSDS} = \text{SCSTR:CSDS15-0} \times \text{Serial chip select timing operating clock}$

Regardless of the deselect time setting, once after the serial chip select pin becomes inactive, it will take at least five peripheral bus clock cycles to be active again

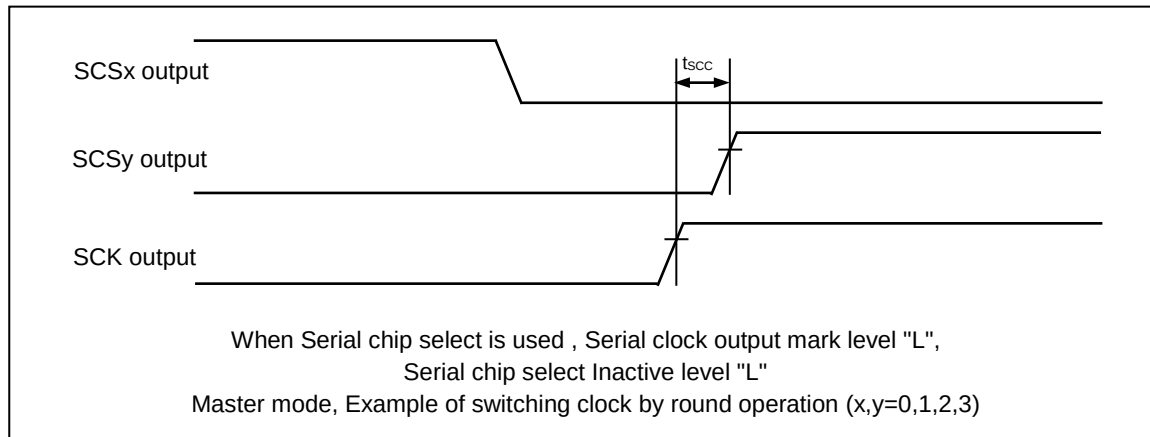
Please see the hardware manual for details of above-mentioned \*1,\*2, and \*3.



When Serial chip select is used , Serial clock output mark level "L",  
Serial chip select Inactive level "L"  
Master mode



When Serial chip select is used , Serial clock output mark level "L",  
Serial chip select Inactive level "L"  
Slave mode



#### (4-2) UART (Asynchronous serial interface) timing

Bit setting: SMR : MD2 = 0, SMR:MD1 = 0, SMR : MD0 = 0

Bit setting: SMR : MD2 = 0, SMR:MD1 = 0, SMR : MD0 = 1

When external clock is selected (BGR:EXT = 1)

(T<sub>A</sub>: -40 °C to +125°C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0V)

| Parameter                       | Symbol            | Pin Name      | Conditions | Value                |     | Unit | Remarks                               |
|---------------------------------|-------------------|---------------|------------|----------------------|-----|------|---------------------------------------|
|                                 |                   |               |            | Min                  | Max |      |                                       |
| Serial clock<br>"L" pulse width | t <sub>SLSH</sub> | SCK0 to SCK11 | -          | t <sub>CPP</sub> +10 | -   | ns   | output pin:<br>C <sub>L</sub> = 50 pF |
| Serial clock<br>"H" pulse width | t <sub>SHSL</sub> |               |            | t <sub>CPP</sub> +10 | -   | ns   |                                       |
| SCK fall time                   | t <sub>F</sub>    |               |            | -                    | 5   | ns   |                                       |
| SCK rise time                   | t <sub>R</sub>    |               |            | -                    | 5   | ns   |                                       |

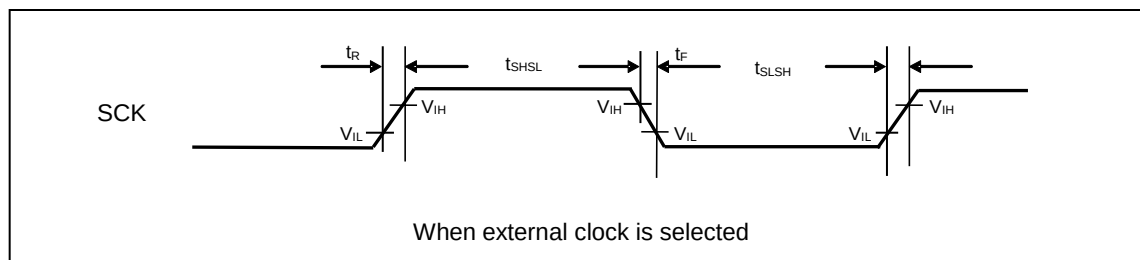


#### (4-3) LIN Interface (v2.1)( Asynchronous Serial Interface for LIN (v2.1)) timing

Bit setting: SMR : MD2 = 0, SMR:MD1 = 1, SMR : MD0 = 1

(TA: -40°C to +125°C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                       | Symbol            | Pin Name      | Conditions | Value                |     | Unit | Remarks                               |
|---------------------------------|-------------------|---------------|------------|----------------------|-----|------|---------------------------------------|
|                                 |                   |               |            | Min                  | Max |      |                                       |
| Serial clock<br>"L" pulse width | t <sub>SLSH</sub> | SCK0 to SCK11 | -          | t <sub>CPP</sub> +10 | -   | ns   | output pin:<br>C <sub>L</sub> = 50 pF |
| Serial clock<br>"H" pulse width | t <sub>SHSL</sub> |               |            | t <sub>CPP</sub> +10 | -   | ns   |                                       |
| SCK fall time                   | t <sub>F</sub>    |               |            | -                    | 5   | ns   |                                       |
| SCK rise time                   | t <sub>R</sub>    |               |            | -                    | 5   | ns   |                                       |



**(4-4) I<sup>2</sup>C timing**

 (TA: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                                                    | Symbol             | Pin Name                                     | Conditions                                                                      | Standard Mode                    |                    | Fast Mode* <sup>3</sup>          |                   | Unit | Remarks |
|--------------------------------------------------------------|--------------------|----------------------------------------------|---------------------------------------------------------------------------------|----------------------------------|--------------------|----------------------------------|-------------------|------|---------|
|                                                              |                    |                                              |                                                                                 | Min                              | Max                | Min                              | Max               |      |         |
| SCL clock frequency                                          | f <sub>SCL</sub>   | SCK3 to SCK11                                | C <sub>L</sub> = 50 pF<br>R = (V <sub>P</sub> /I <sub>OL</sub> ) * <sup>1</sup> | 0                                | 100                | 0                                | 400               | kHz  |         |
| Repeat "start" condition hold time<br>SDA ↓ → SCL ↓          | t <sub>HDSTA</sub> | SOT3 to SOT11, (SDA)<br>SCK3 to SCK11, (SCL) |                                                                                 | 4.0                              | –                  | 0.6                              | –                 | μs   |         |
| Period of "L" for SCL clock                                  | t <sub>LOW</sub>   | SCK3 to SCK11, (SCL)                         |                                                                                 | 4.7                              | –                  | 1.3                              | –                 | μs   |         |
| Period of "H" for SCL clock                                  | t <sub>HIGH</sub>  | SCK3 to SCK11, (SCL)                         |                                                                                 | 4.0                              | –                  | 0.6                              | –                 | μs   |         |
| Repeat "start" condition setup time<br>SCL ↑ → SDA ↓         | t <sub>SUSTA</sub> | SCK3 to SCK11, (SCL)                         |                                                                                 | 4.7                              | –                  | 0.6                              | –                 | μs   |         |
| Data hold time<br>SCL ↓ → SDA ↓ ↑                            | t <sub>HDDAT</sub> | SOT3 to SOT11, (SDA)<br>SCK3 to SCK11, (SCL) |                                                                                 | 0                                | 3.45* <sup>2</sup> | 0                                | 0.9* <sup>3</sup> | μs   |         |
| Data setup time<br>SDA ↓ ↑ → SCL ↑                           | t <sub>SUDAT</sub> | SOT3 to SOT11, (SDA)<br>SCK3 to SCK11, (SCL) |                                                                                 | 250                              | –                  | 100                              | –                 | ns   |         |
| "Stop" condition setup time<br>SCL ↑ → SDA ↑                 | t <sub>SUSTO</sub> | SOT3 to SOT11, (SDA)<br>SCK3 to SCK11, (SCL) |                                                                                 | 4.0                              | –                  | 0.6                              | –                 | μs   |         |
| Bus-free time between "stop" condition and "start" condition | t <sub>BUF</sub>   | –                                            |                                                                                 | 4.7                              | –                  | 1.3                              | –                 | μs   |         |
| Noise filter                                                 | t <sub>SP</sub>    | –                                            | –                                                                               | 2t <sub>CPP</sub> * <sup>4</sup> | –                  | 2t <sub>CPP</sub> * <sup>4</sup> | –                 | ns   |         |

Notes: Only ch.3 and ch.4 are standard mode/fast mode correspondence. In ch.5-ch.8, ch.10, and ch.11, only a standard mode is correspondences.

 \*1: R and C<sub>L</sub> represent the pull-up resistance and load capacitance of the SCL and SDA output lines, respectively.

 V<sub>P</sub> shows that the power-supply voltage of the pull-up resistor and I<sub>OL</sub> shows the V<sub>OL</sub> guarantee current.

 \*2: The maximum t<sub>HDDAT</sub> only has to be met if the device does not extend the "L" width (t<sub>LOW</sub>) of the SCL signal.

 \*3: A fast mode I<sup>2</sup>C bus device can be used on a standard mode I<sup>2</sup>C bus system as long as the device satisfies the requirement of

" $t_{SUDAT} \geq 250 \text{ ns}$ ".

\*4:  $t_{CPP}$  is the peripheral clock cycle time. Adjust the clock of the bus in the surrounding to 8 MHz or more when use I<sup>2</sup>C.

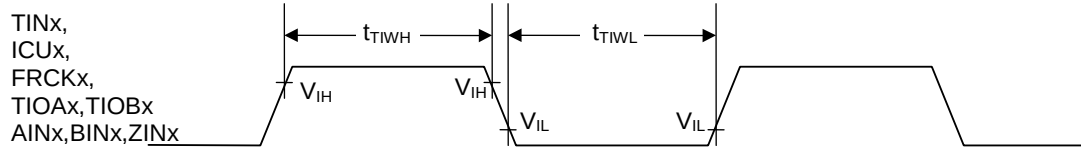
• I<sup>2</sup>C timing



**(5) Timer input timing**

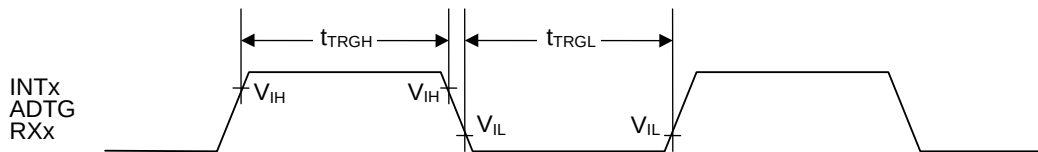
(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter         | Symbol                                   | Pin Name                                                                                                                     | Conditions | Value             |     | Unit | Remarks |
|-------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------|-------------------|-----|------|---------|
|                   |                                          |                                                                                                                              |            | Min               | Max |      |         |
| Input pulse width | t <sub>TIWH</sub> ,<br>t <sub>TIWL</sub> | TIN0 to TIN7<br>ICU0 to ICU9<br>FRCK0 to FRCK5<br>TIOA0, TIOA1,<br>TIOB0, TIOB1,<br>AIN0, AIN1,<br>BIN0, BIN1,<br>ZIN0, ZIN1 | —          | 4t <sub>CPP</sub> | —   | ns   |         |

**• Timer input timing**

**(6) Trigger input timing**

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

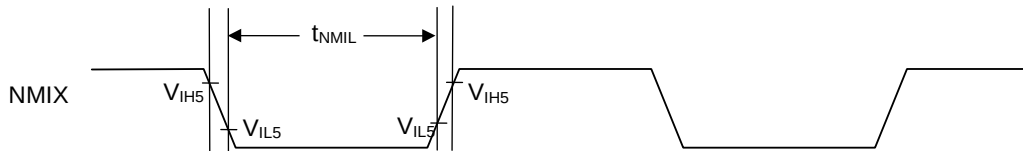
| Parameter         | Symbol                                   | Pin Name                                       | Conditions | Value             |     | Unit | Remarks      |
|-------------------|------------------------------------------|------------------------------------------------|------------|-------------------|-----|------|--------------|
|                   |                                          |                                                |            | Min               | Max |      |              |
| Input pulse width | t <sub>TRGH</sub> ,<br>t <sub>TRGL</sub> | INT0 to INT15,<br>ADTG,<br>RX0,<br>RX1,<br>RX2 | —          | 5t <sub>CPP</sub> | —   | ns   |              |
|                   |                                          |                                                |            | 1                 | —   | μs   | At stop mode |

**• Trigger input timing**


**(7) NMI input timing**

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter         | Symbol            | Pin Name | Conditions | Value             |     | Unit | Remarks |
|-------------------|-------------------|----------|------------|-------------------|-----|------|---------|
|                   |                   |          |            | Min               | Max |      |         |
| Input pulse width | t <sub>NMIL</sub> | NMIX     | —          | 4t <sub>CPP</sub> | —   | ns   |         |

**• NMIX input timing**

**(8) Low voltage detection (External low-voltage detection)**

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                       | Symbol           | Pin Name | Conditions | Value |                |     | Unit | Remarks                                                        |
|---------------------------------|------------------|----------|------------|-------|----------------|-----|------|----------------------------------------------------------------|
|                                 |                  |          |            | Min   | Typ            | Max |      |                                                                |
| Power supply voltage range      | V <sub>DP5</sub> | VCC      | -          | 2.7   | -              | 5.5 | V    |                                                                |
| Detection voltage*3             | V <sub>DL</sub>  |          | *1         | -8%   | LVD5F_SEL[3:0] | +8% | V    | LVD5F_SEL[3:0] are programmable. Refer to the hardware manual. |
| Hysteresis width                | V <sub>HYS</sub> |          | -          | -     | 0.1            | -   | V    | When power-supply voltage rises                                |
| Low voltage detection time      | T <sub>d</sub>   | -        | -          | -     | -              | 30  | μs   |                                                                |
| Power supply voltage regulation | -                | VCC      | -          | -2    | -              | 2   | V/ms | *2                                                             |

\*1: If the fluctuation of the power supply is faster than the low voltage detection time, there is a possibility to generate or release after the power supply voltage has exceeded the detection voltage range.

\*2: Please suppress the change of the power supply within the range of the power-supply voltage regulation to do a low voltage detection by detecting voltage (V<sub>DL</sub>).

\*3: The initial detection voltage of the external low voltage detection is 2.8 V ± 8 % (2.576 V to 3.024 V).

This LVD setting cannot be used to reliably generate a reset before voltage dips below minimum guaranteed MCU operation voltage, as this detection level is below the minimum guaranteed MCU operation voltage (2.7 V).

Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

**(9) Low voltage detection (Internal low-voltage detection)**

(TA: -40 °C to +125 °C, VSS = AVSS = 0.0 V)

| Parameter                  | Symbol            | Pin Name | Conditions | Value |     |     | Unit | Remarks                         |
|----------------------------|-------------------|----------|------------|-------|-----|-----|------|---------------------------------|
|                            |                   |          |            | Min   | Typ | Max |      |                                 |
| Power supply voltage range | V <sub>RDP5</sub> | -        | -          | 0.6   | -   | 1.4 | V    |                                 |
| Detection voltage*2        | V <sub>RDL</sub>  |          | *1         | 0.8   | 0.9 | 1.0 | V    | When power-supply voltage falls |
| Hysteresis width           | V <sub>RHYS</sub> |          | -          | -     | 0.1 | -   | V    | When power-supply voltage rises |
| Low voltage detection time | -                 | -        | -          | -     | -   | 30  | μs   |                                 |

\*1: If the fluctuation of the power supply is faster than the low voltage detection time, there is a possibility to generate or release after the power supply voltage has exceeded the detection voltage range.

\*2: The detection voltage of the internal low voltage detection is 0.9 V ± 0.1 V.

This LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed MCU operation voltage, as this detection level is below the minimum guaranteed MCU operation voltage.

Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

**(10) External bus I/F (synchronous mode) timing**

(TA: -40 °C to +105 °C, VCC = AVCC = 5.0 V ± 10 %/VCC = AVCC = 3.3 V ± 0.3 V, VSS = AVSS = 0.0 V)

(external load capacitance 50 pF)

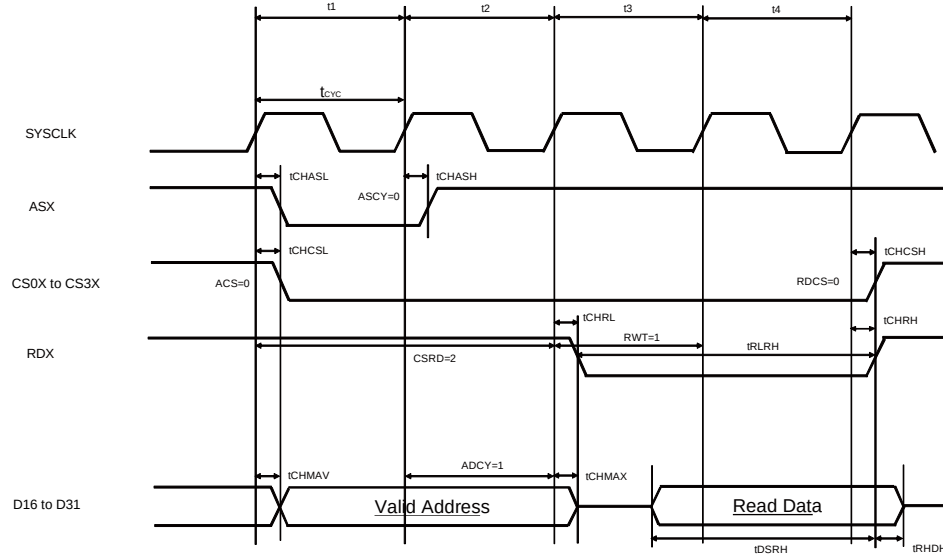
| Parameter                | Symbol                                     | Pin Name                  | Value                        |     | Unit | Remarks                          |
|--------------------------|--------------------------------------------|---------------------------|------------------------------|-----|------|----------------------------------|
|                          |                                            |                           | Min                          | Max |      |                                  |
| Cycle time               | t <sub>CYC</sub>                           | SYSCLK                    | 25                           | -   | ns   | V <sub>CC</sub> = 5.0 V ± 10 %*1 |
|                          |                                            |                           | 31.25                        |     |      | V <sub>CC</sub> = 3.3 V ± 0.3 V  |
| ASX delay time           | t <sub>CHASL</sub> ,<br>t <sub>CHASH</sub> | SYSCLK<br>ASX             | 0.5                          | 18  | ns   |                                  |
| CS0X to CS3X delay time  | t <sub>CHCSL</sub> ,<br>t <sub>CHCSH</sub> | SYSCLK<br>CS0X to<br>CS3X | 0.5                          | 18  | ns   |                                  |
| A00 to A21 delay time    | t <sub>CHAV</sub> ,<br>t <sub>CHAX</sub>   | SYSCLK<br>A00 to A21      | 0.5                          | 18  | ns   |                                  |
| RDX delay time           | t <sub>CHRL</sub> ,<br>t <sub>CHRH</sub>   | SYSCLK<br>RDX             | 0.5                          | 18  | ns   |                                  |
| RDX minimum pulse        | t <sub>RLRH</sub>                          | RDX                       | t <sub>CYC</sub> ×<br>2 - 20 | -   | ns   | RWT = 1, set RWT to 1 or more.*2 |
| Data setup →<br>RDX↑time | t <sub>DSRH</sub>                          | RDX<br>D16 to D31         | 18+t <sub>CYC</sub>          | -   | ns   | Same as above                    |
| RDX↑→<br>data hold       | t <sub>RHDH</sub>                          |                           | 0                            | -   | ns   |                                  |

| Parameter                                         | Symbol               | Pin Name                | Value          |     | Unit | Remarks                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------|----------------------|-------------------------|----------------|-----|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                   |                      |                         | Min            | Max |      |                                                                                                                                                                                                                                                                                                                                                                                                       |
| WRnX delay time                                   | $t_{CHWL}, t_{CHWH}$ | SYSCLK<br>WR0X,<br>WR1X | 0.5            | 18  | ns   |                                                                                                                                                                                                                                                                                                                                                                                                       |
| WRnX minimum pulse                                | $t_{WLWH}$           | WR0X,<br>WR1X           | $t_{CYC} - 10$ | -   | ns   | WWT = 0 *2                                                                                                                                                                                                                                                                                                                                                                                            |
| SYSCLK $\uparrow \rightarrow$ data output time    | $t_{CHDV}$           | SYSCLK<br>D16 to D31    | 0.5            | 18  | ns   |                                                                                                                                                                                                                                                                                                                                                                                                       |
| SYSCLK $\uparrow \rightarrow$ data hold time      | $t_{CHDX}$           |                         | -              | 18  | ns   | Set WRCS to 1 or more.                                                                                                                                                                                                                                                                                                                                                                                |
| SYSCLK $\uparrow \rightarrow$ address output time | $t_{CHMAV}$          | SYSCLK<br>D16 to D31    | 0.5            | 18  | ns   |                                                                                                                                                                                                                                                                                                                                                                                                       |
| SYSCLK $\uparrow \rightarrow$ address hold time   | $t_{CHMAX}$          |                         | -              | 18  | ns   | In multiplex mode, set as follows:<br><input type="checkbox"/> Set CSWR and CSRD to 2 or more.<br><input type="checkbox"/> ASCY must satisfy the following conditions because of setting $ADCY > ASCY$ and protocol violation prevention.<br>$ADCY + 1 \leq ACS + CSRD$<br>$ADCY + 1 \leq ACS + CSWR$<br>$ASCY + 1 \leq ACS + CSRD$<br>$ASCY + 1 \leq ACS + CSWR$<br>See Hardware Manual for details. |

\*1: Please use it with external load capacity 12 pF or less for  $VCC = 3.3 V \pm 0.3 V$  (40 MHz operation).

\*2: If the bus is expanded by automatic wait insertion or RDY input, add time ( $t_{CYC} \times$  the number of expanded cycles) to the rated value.

External bus I/F (synchronous mode, read operation, and multiplex mode) timing



External bus I/F (synchronous mode, read operation, and split mode) timing



External bus I/F (synchronous mode, write operation, and multiplex mode) timing



External bus I/F (synchronous mode, write operation, and split mode) timing



**(11) External bus I/F (asynchronous mode) timing**

 (TA: -40 °C to +105 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

(external load capacitance 50pF)

| Parameter                | Symbol              | Pin Name                      | Value                   |                         | Unit | Remarks                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|---------------------|-------------------------------|-------------------------|-------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          |                     |                               | Min                     | Max                     |      |                                                                                                                                                                                                                                                                                                                                                                                 |
| Cycle time               | t <sub>CYC</sub>    | SYSCLK                        | 25                      | -                       | ns   | V <sub>CC</sub> = 5.0 V ± 10 % <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                    |
|                          |                     |                               | 31.25                   |                         |      | V <sub>CC</sub> = 3.3 V ± 0.3 V                                                                                                                                                                                                                                                                                                                                                 |
| Address setup → RDX↑time | t <sub>ASRH</sub>   | RDX<br>A00 to A21             | 2×t <sub>CYC</sub> - 12 | 2×t <sub>CYC</sub> + 12 | ns   | RWT = 1,<br>set RWT to 1 or more. <sup>*2</sup>                                                                                                                                                                                                                                                                                                                                 |
| RDX↑→ Address hold       | t <sub>RHAH</sub>   |                               | t <sub>CYC</sub> - 12   | t <sub>CYC</sub> + 12   | ns   | Set RDCS to 1 or more.                                                                                                                                                                                                                                                                                                                                                          |
| Data setup→ RDX↑time     | t <sub>DSRH</sub>   | RDX<br>D16 to D31             | 18 + t <sub>CYC</sub>   | -                       | ns   | RWT = 1,<br>set RWT to 1 or more.                                                                                                                                                                                                                                                                                                                                               |
| RDX↑→ Data hold          | t <sub>RHDH</sub>   |                               | 0                       | -                       | ns   |                                                                                                                                                                                                                                                                                                                                                                                 |
| Address setup→ WRnX↑time | t <sub>ASWH</sub>   | WR0X to<br>WR1X<br>A00 to A21 | t <sub>CYC</sub> - 12   | t <sub>CYC</sub> + 12   | ns   | WWT = 0 <sup>*2</sup>                                                                                                                                                                                                                                                                                                                                                           |
| WRnX↑→ Address hold      | t <sub>WHAH</sub>   |                               | t <sub>CYC</sub> - 12   | t <sub>CYC</sub> + 12   | ns   | Set WRCS to 1 or more.                                                                                                                                                                                                                                                                                                                                                          |
| Data setup→ WRnX↑time    | t <sub>DSWH</sub>   | WR0X to<br>WR1X<br>D16 to D31 | t <sub>CYC</sub> - 16   | t <sub>CYC</sub> + 16   | ns   | WWT = 0 <sup>*2</sup>                                                                                                                                                                                                                                                                                                                                                           |
| WRnX↑→ Data hold         | t <sub>WHDH</sub>   |                               | t <sub>CYC</sub> - 16   | t <sub>CYC</sub> + 16   | ns   | Set WRCS to 1 or more.                                                                                                                                                                                                                                                                                                                                                          |
| Address setup → ASX↑time | t <sub>MASASH</sub> | ASX<br>D16 to D31             | t <sub>CYC</sub> -16    | t <sub>CYC</sub> + 16   | ns   | ASCY = 0                                                                                                                                                                                                                                                                                                                                                                        |
| ASX↑→Address hold        | t <sub>MASHAH</sub> |                               | t <sub>CYC</sub> -16    | t <sub>CYC</sub> + 16   | ns   | In multiplex mode, set as follows:<br><input type="checkbox"/> Set CSWR and CSRD to 2 or more.<br><input type="checkbox"/> ASCY must satisfy the following conditions because of setting ADCY > ASCY and protocol violation prevention.<br>ADCY + 1 ≤ ACS + CSRD<br>ADCY + 1 ≤ ACS + CSWR<br>ASCY + 1 ≤ ACS + CSRD<br>ASCY + 1 ≤ ACS + CSWR<br>See Hardware Manual for details. |

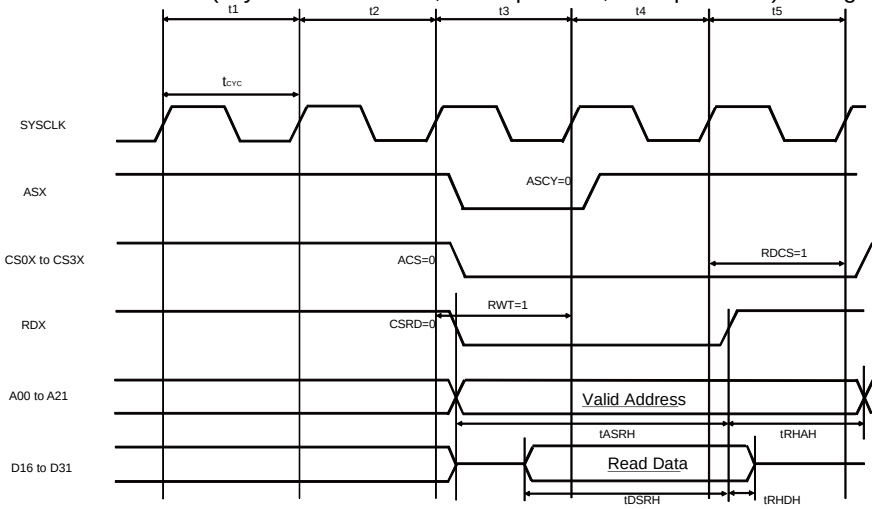
<sup>\*1</sup>: Please use it with external load capacity 12 pF or less for V<sub>CC</sub> = 3.3 V ± 0.3 V (40 MHz operation).

<sup>\*2</sup>: If the bus is expanded by automatic wait insertion or RDY input, add time (t<sub>CYC</sub> × the number of expanded cycles) to the rated value.

External bus I/F (asynchronous mode, read operation, and multiplex mode) Timing



External bus I/F (asynchronous mode, read operation, and split mode) Timing



External bus I/F (asynchronous mode, write operation, and multiplex mode) Timing



External bus I/F (Asynchronous mode, write operation, and split mode) Timing

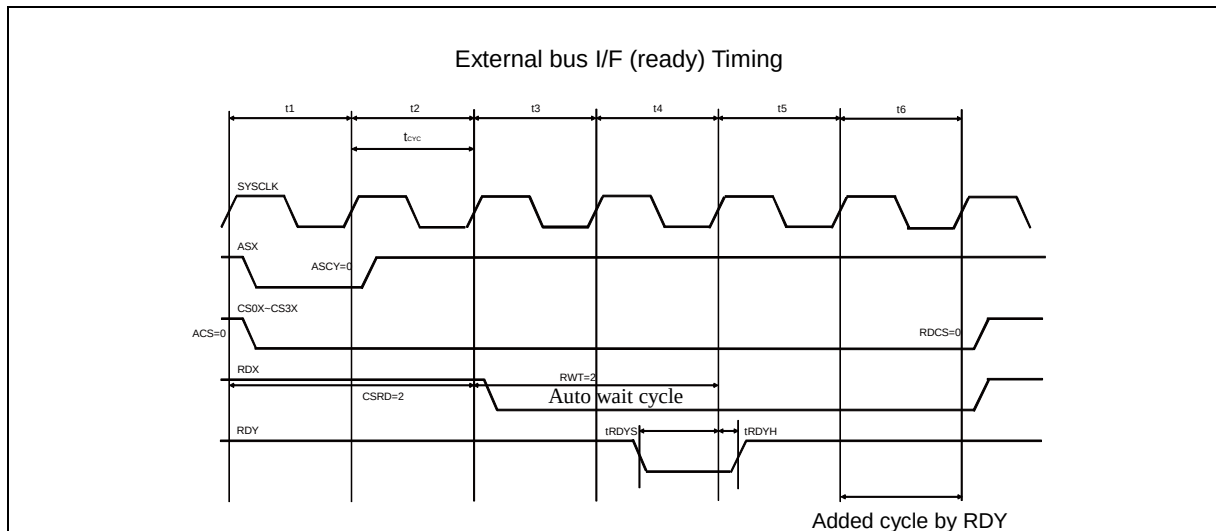


**(12) External bus I/F (ready) Timing**

(T<sub>A</sub>: -40 °C to +105 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

(external load capacitance 50 pF)

| Parameter                | Symbol            | Pin Name    | Value |     | Unit | Remarks                                     |
|--------------------------|-------------------|-------------|-------|-----|------|---------------------------------------------|
|                          |                   |             | Min   | Max |      |                                             |
| Cycle time               | t <sub>CYC</sub>  | SYSCLK      | 50    | -   | ns   | If using RDY, set SYSCLK to 20 MHz or less. |
| RDY setup time → SYSCLK↑ | t <sub>RDYS</sub> | SYSCLK, RDY | 28    | -   | ns   |                                             |
| SYSCLK↑ → RDY hold time  | t <sub>RDYH</sub> | SYSCLK, RDY | 0     | -   | ns   |                                             |



**A/D Converter**
**(1) 12-bit A/D Converter Electrical Characteristics**

(TA: -40 °C to +125 °C, VCC = AVCC = 5.0 V ± 10 %/VCC = AVCC = 3.3 V ± 0.3 V, VSS = AVSS = 0.0 V)

| Parameter                     | Symbol | Pin Name    | Value        |      |              | Unit | Remarks                 |
|-------------------------------|--------|-------------|--------------|------|--------------|------|-------------------------|
|                               |        |             | Min          | Typ  | Max          |      |                         |
| Resolution                    | -      | -           | -            | -    | 12           | bit  |                         |
| Total error                   | -      | -           | -            | -    | ±12          | LSB  |                         |
| Linearity error               | -      | -           | -            | -    | ± 4.0        | LSB  |                         |
| Differential linearity error  | -      | -           | -            | -    | ± 1.9        | LSB  |                         |
| Zero transition voltage       | VOT    | AN0 to AN47 | AVRL-11.5LSB | -    | AVRL+12.5LSB | V    | 1LSB = (VFST-VOT)/4094  |
| Full-scale transition voltage | VFST   | AN0 to AN47 | AVRH-13.5LSB | -    | AVRH+10.5LSB | V    |                         |
| Sampling time                 | tSMP   | -           | 0.7          | -    | -            | µs   | *1                      |
| Compare time                  | tCMP   | -           | 0.7          | -    | -            | µs   | *1                      |
| A/D conversion time           | tCNV   | -           | 1.4          | -    | -            | µs   | *1                      |
| Analog port input current     | IAIN   | AN0 to AN47 | -1.0         | -    | +1.0         | µA   | VAVSS ≤ VAIN ≤ VAVCC    |
| Analog input voltage          | VAIN   | AN0 to AN47 | AVRL         | -    | AVRH         | V    |                         |
| Reference voltage             | AVRH   | AVRH        | 3.0          | -    | 5.5          | V    |                         |
|                               | AVRL   | AVSS/AVRL   | -            | 0.0  | -            | V    |                         |
| Power supply current          | IA     | AVCC*3      | -            | 0.47 | 0.63         | mA   | Per unit<br>TA: +105 °C |
|                               |        |             | -            | 0.47 | 0.7          | mA   | Per unit<br>TA: +125 °C |
|                               | IAH    | AVRH        | -            | -    | 2.5          | µA   | *2                      |
|                               | IR     |             | -            | 1    | 1.96         | mA   | Per unit                |
|                               | IRH    |             | -            | -    | 1.6          | µA   | *2                      |
| Variation between channels    | -      | AN0 to AN47 | -            | -    | 4            | LSB  |                         |

\*1: Time for each channel.

\*2: Power supply current (VCC = AVCC = 5.0 V) is specified if A/D converter is not operating and CPU is stopped.

\*3: The power supply current described only current value on A/D converter.

The total AVCC current value must be calculated the power supply current for A/D converter and D/A converter.

(Note) Please use the clock of 0.5 MHz-20 MHz for the output clock of A/D converter to guarantee accuracy.

## (2) Definition of A/D Converter Terms

- Resolution** : Analog variation that is recognized by an A/D converter.
- Linearity error** : Deviation of the actual conversion characteristics from a straight line that connects the zero transition point ("0000 0000 0000" ← → "0000 0000 0001") to the full-scale transition point ("1111 1111 1110" ← → "1111 1111 1111").
- Differential linearity error** : Deviation of the input voltage from the ideal value that is required to change the output code by 1LSB.

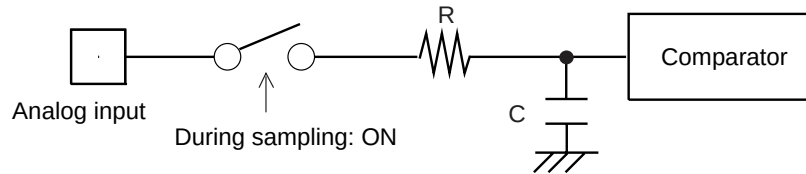


### (3) Notes on Using A/D Converter

<About the output impedance of the analog input of external circuit>

When the external impedance is too high, the sampling period for analog voltages may not be sufficient. In this case, it is recommended to connect the capacitor (approx. 0.1  $\mu\text{F}$ ) to the analog input pin.

- Analog input circuit model



|            | R                    | C             |                                              |
|------------|----------------------|---------------|----------------------------------------------|
| 12-bit A/D | 1.9 k $\Omega$ (Max) | 8.30 pF (Max) | (4.5 V $\leq$ AV <sub>CC</sub> $\leq$ 5.5 V) |
|            | 4.3 k $\Omega$ (Max) | 8.30 pF (Max) | (3.0 V $\leq$ AV <sub>CC</sub> $\leq$ 3.6 V) |

**Note:** Listed values must be considered as reference values.

**Flash Memory**
**(1) Electrical Characteristics**

| Parameter                                       | Value                                                                                   |     |      | Unit | Remarks                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------------------------------|-----|------|------|-------------------------------------------------------------------------|
|                                                 | Min                                                                                     | Typ | Max  |      |                                                                         |
| Sector erase time                               | –                                                                                       | 200 | 800  | ms   | 8 Kbytes sector* <sup>1</sup> , excluding internal preprogramming time  |
|                                                 | –                                                                                       | 300 | 1100 | ms   | 8 Kbytes sector* <sup>1</sup> , including internal preprogramming time  |
|                                                 | –                                                                                       | 400 | 2000 | ms   | 64 Kbytes sector* <sup>1</sup> , excluding internal preprogramming time |
|                                                 | –                                                                                       | 700 | 3700 | ms   | 64 Kbytes sector* <sup>1</sup> , including internal preprogramming time |
| 8-bit writing time                              | –                                                                                       | 9   | 288  | μs   | Exclusive of overhead time at system level* <sup>1</sup>                |
| 16-bit writing time                             | –                                                                                       | 12  | 384  | μs   | Exclusive of overhead time at system level* <sup>1</sup>                |
| ECC writing time                                | –                                                                                       | 9   | 288  | μs   | Exclusive of overhead time at system level* <sup>1</sup>                |
| Erase cycle* <sup>2</sup> /<br>Data retain time | 1,000 cycles/<br>20 years,<br>10,000 cycles/<br>10 years,<br>100,000 cycles/<br>5 years | –   | –    | –    | Average T <sub>A</sub> = +85 °C* <sup>3</sup>                           |

\*1: The guaranteed value for erasure up to 100,000 cycles.

\*2: Number of erase cycles for each sector.

\*3: This value comes from the technology qualification (using Arrhenius equation to translate high temperature measurements into normalized value at + 85 °C).

**(2) Notes**

While the Flash memory is written or erased, shutdown of the external power (V<sub>CC</sub>) is prohibited.

In the application system where V<sub>CC</sub> might be shut down while writing or erasing, be sure to turn the power off by using an external voltage detection function.

To put it concretely, after the external power supply voltage falls below the detection voltage (V<sub>DL</sub>\*), hold V<sub>CC</sub> at 2.7 V or more within the duration calculated by the following expression:

$$Td^*[\mu s] + (\text{period of PCLK} [\mu s] \times 257) + 50 [\mu s]$$

\*: See "4.AC Characteristics (8) Low-voltage detection (External low-voltage detection) "

**D/A Converter**

(T<sub>A</sub>: -40 °C to +125 °C, V<sub>CC</sub> = AV<sub>CC</sub> = 5.0 V ± 10 %/V<sub>CC</sub> = AV<sub>CC</sub> = 3.3 V ± 0.3 V, V<sub>SS</sub> = AV<sub>SS</sub> = 0.0 V)

| Parameter                    | Symbol          | Pin Name | Condition | Value |      |       | Unit | Remarks                        |
|------------------------------|-----------------|----------|-----------|-------|------|-------|------|--------------------------------|
|                              |                 |          |           | Min   | Typ  | Max   |      |                                |
| Resolution                   | -               | -        | —         | —     | —    | 8     | bit  |                                |
| Differential linearity error | -               | -        | —         | —     | —    | ± 3.0 | LSB  |                                |
| Conversion time              | -               | -        | —         | 0.47  | 0.58 | 0.69  | μs   | C <sub>L</sub> = 20            |
|                              |                 |          | —         | 2.37  | 2.90 | 3.43  | μs   | C <sub>L</sub> = 100           |
| Output impedance             | R <sub>O</sub>  | DA0, DA1 | —         | 3.1   | 3.8  | 4.5   | kΩ   |                                |
| Power supply current<br>*1   | I <sub>A</sub>  | AVCC     | —         | —     | 475  | 580   | μA   | Each channel                   |
|                              | I <sub>AH</sub> | AVCC     | —         | —     | —    | 7.5   | μA   | When powerdown<br>Each channel |

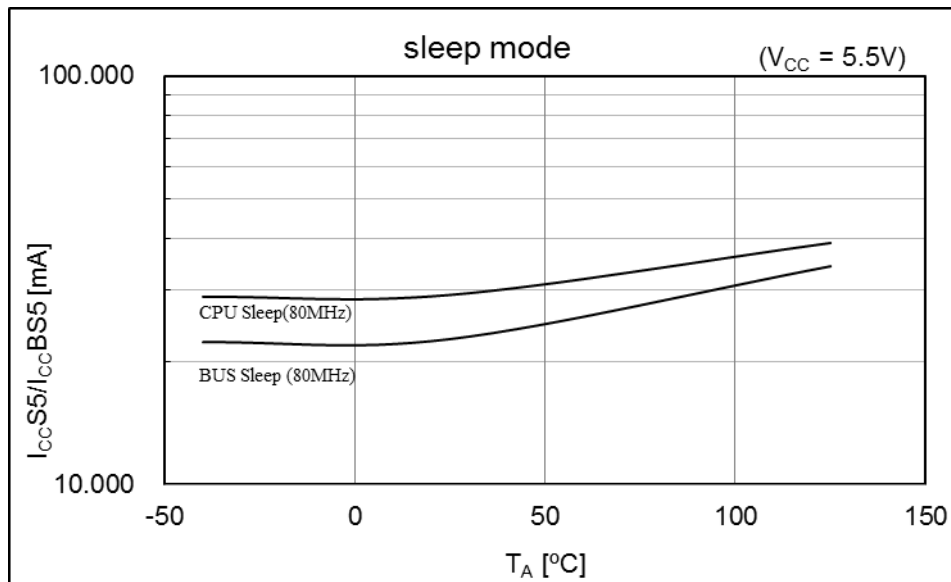
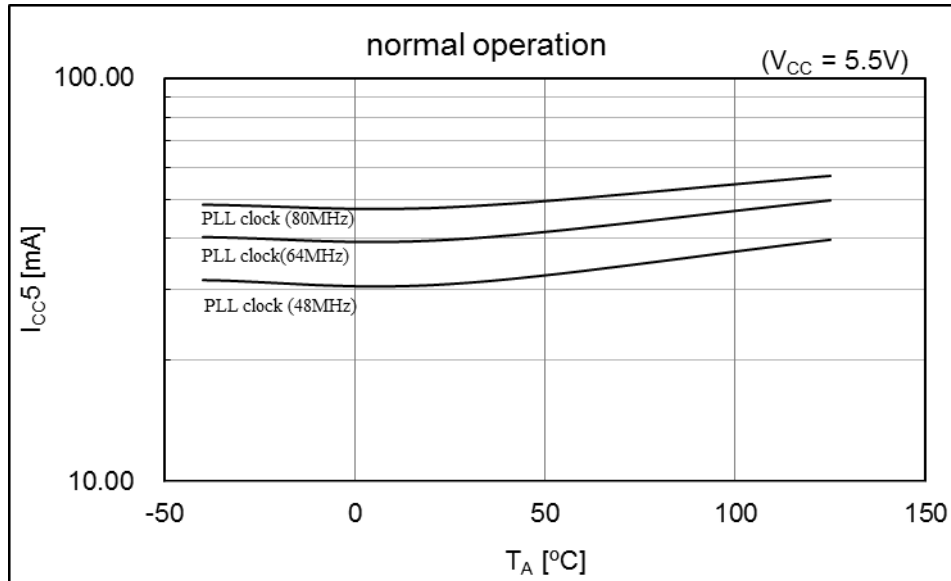
\*1: The power supply current described only current value on D/A converter.

The total AV<sub>CC</sub> current value must be calculated the power supply current for D/A converter and A/D converter.

## 12. Example Characteristics

This characteristic is an actual value of the arbitrary sample. It is not the guaranteed value.

CY91F526



CY91F526



CY91F526



**13. Ordering Information CY91F52xxxB\*<sup>1</sup>**

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package* <sup>2</sup>     |
|----------------|-----------|-------------------|-------------------|---------------------------|
| CY91F526LWBPMC | Yes       | ON                | ON                | LQP • 176 pin,<br>Plastic |
| CY91F526LYBPMC |           |                   | OFF               |                           |
| CY91F526LJBPMC |           | OFF               | ON                |                           |
| CY91F526LLBPMC |           |                   | OFF               |                           |
| CY91F525LWBPMC |           | ON                | ON                |                           |
| CY91F525LYBPMC |           |                   | OFF               |                           |
| CY91F525LJBPMC |           | OFF               | ON                |                           |
| CY91F525LLBPMC |           |                   | OFF               |                           |
| CY91F524LWBPMC |           | ON                | ON                |                           |
| CY91F524LYBPMC |           |                   | OFF               |                           |
| CY91F524LJBPMC |           | OFF               | ON                |                           |
| CY91F524LLBPMC |           |                   | OFF               |                           |
| CY91F523LWBPMC |           | ON                | ON                |                           |
| CY91F523LYBPMC |           |                   | OFF               |                           |
| CY91F523LJBPMC |           | OFF               | ON                |                           |
| CY91F523LLBPMC |           |                   | OFF               |                           |
| CY91F522LWBPMC |           | ON                | ON                |                           |
| CY91F522LYBPMC |           |                   | OFF               |                           |
| CY91F522LJBPMC |           | OFF               | ON                |                           |
| CY91F522LLBPMC |           |                   | OFF               |                           |
| CY91F526LSBPMC | None      | ON                | ON                |                           |
| CY91F526LUBPMC |           |                   | OFF               |                           |
| CY91F526LHBPMC |           | OFF               | ON                |                           |
| CY91F526LKBPMC |           |                   | OFF               |                           |
| CY91F525LSBPMC |           | ON                | ON                |                           |
| CY91F525LUBPMC |           |                   | OFF               |                           |
| CY91F525LHBPMC |           | OFF               | ON                |                           |
| CY91F525LKBPMC |           |                   | OFF               |                           |
| CY91F524LSBPMC |           | ON                | ON                |                           |
| CY91F524LUBPMC |           |                   | OFF               |                           |
| CY91F524LHBPMC |           | OFF               | ON                |                           |
| CY91F524LKBPMC |           |                   | OFF               |                           |
| CY91F523LSBPMC |           | ON                | ON                |                           |
| CY91F523LUBPMC |           |                   | OFF               |                           |
| CY91F523LHBPMC |           | OFF               | ON                |                           |
| CY91F523LKBPMC |           |                   | OFF               |                           |
| CY91F522LSBPMC |           | ON                | ON                |                           |
| CY91F522LUBPMC |           |                   | OFF               |                           |
| CY91F522LHBPMC |           | OFF               | ON                |                           |
| CY91F522LKBPMC |           |                   | OFF               |                           |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package*2                                        |
|----------------|-----------|-------------------|-------------------|--------------------------------------------------|
| CY91F526KWBPMC | Yes       | ON                | ON                | LQS • 144 pin,<br>(Lead pitch 0.5 mm)<br>Plastic |
| CY91F526KYBPMC |           |                   | OFF               |                                                  |
| CY91F526KJBPMC |           | OFF               | ON                |                                                  |
| CY91F526KLBPMC |           |                   | OFF               |                                                  |
| CY91F525KWBPMC |           | ON                | ON                |                                                  |
| CY91F525KYBPMC |           |                   | OFF               |                                                  |
| CY91F525KJBPMC |           | OFF               | ON                |                                                  |
| CY91F525KLBPMC |           |                   | OFF               |                                                  |
| CY91F524KWBPMC |           | ON                | ON                |                                                  |
| CY91F524KYBPMC |           |                   | OFF               |                                                  |
| CY91F524KJBPMC |           | OFF               | ON                |                                                  |
| CY91F524KLBPMC |           |                   | OFF               |                                                  |
| CY91F523KWBPMC |           | ON                | ON                |                                                  |
| CY91F523KYBPMC |           |                   | OFF               |                                                  |
| CY91F523KJBPMC |           | OFF               | ON                |                                                  |
| CY91F523KLBPMC |           |                   | OFF               |                                                  |
| CY91F522KWBPMC |           | ON                | ON                |                                                  |
| CY91F522KYBPMC |           |                   | OFF               |                                                  |
| CY91F522KJBPMC |           | OFF               | ON                |                                                  |
| CY91F522KLBPMC |           |                   | OFF               |                                                  |
| CY91F526KSBPMC | None      | ON                | ON                |                                                  |
| CY91F526KUBPMC |           |                   | OFF               |                                                  |
| CY91F526KHBPMC |           | OFF               | ON                |                                                  |
| CY91F526KKBPMC |           |                   | OFF               |                                                  |
| CY91F525KSBPMC |           | ON                | ON                |                                                  |
| CY91F525KUBPMC |           |                   | OFF               |                                                  |
| CY91F525KHBPMC |           | OFF               | ON                |                                                  |
| CY91F525KKBPMC |           |                   | OFF               |                                                  |
| CY91F524KSBPMC |           | ON                | ON                |                                                  |
| CY91F524KUBPMC |           |                   | OFF               |                                                  |
| CY91F524KHBPMC |           | OFF               | ON                |                                                  |
| CY91F524KKBPMC |           |                   | OFF               |                                                  |
| CY91F523KSBPMC |           | ON                | ON                |                                                  |
| CY91F523KUBPMC |           |                   | OFF               |                                                  |
| CY91F523KHBPMC |           | OFF               | ON                |                                                  |
| CY91F523KKBPMC |           |                   | OFF               |                                                  |
| CY91F522KSBPMC |           | ON                | ON                |                                                  |
| CY91F522KUBPMC |           |                   | OFF               |                                                  |
| CY91F522KHBPMC |           | OFF               | ON                |                                                  |
| CY91F522KKBPMC |           |                   | OFF               |                                                  |

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package*2                                        |
|-----------------|-----------|-------------------|-------------------|--------------------------------------------------|
| CY91F526KWBPMP1 | Yes       | ON                | ON                | LQN • 144 pin,<br>(Lead pitch 0.4 mm)<br>Plastic |
| CY91F526KYBPMP1 |           |                   | OFF               |                                                  |
| CY91F526KJBPM1  |           | OFF               | ON                |                                                  |
| CY91F526KLBPM1  |           |                   | OFF               |                                                  |
| CY91F525KWBPMP1 |           | ON                | ON                |                                                  |
| CY91F525KYBPMP1 |           |                   | OFF               |                                                  |
| CY91F525KJBPM1  |           | OFF               | ON                |                                                  |
| CY91F525KLBPM1  |           |                   | OFF               |                                                  |
| CY91F524KWBPMP1 |           | ON                | ON                |                                                  |
| CY91F524KYBPMP1 |           |                   | OFF               |                                                  |
| CY91F524KJBPM1  |           | OFF               | ON                |                                                  |
| CY91F524KLBPM1  |           |                   | OFF               |                                                  |
| CY91F523KWBPMP1 |           | ON                | ON                |                                                  |
| CY91F523KYBPMP1 |           |                   | OFF               |                                                  |
| CY91F523KJBPM1  |           | OFF               | ON                |                                                  |
| CY91F523KLBPM1  |           |                   | OFF               |                                                  |
| CY91F522KWBPMP1 |           | ON                | ON                |                                                  |
| CY91F522KYBPMP1 |           |                   | OFF               |                                                  |
| CY91F522KJBPM1  |           | OFF               | ON                |                                                  |
| CY91F522KLBPM1  |           |                   | OFF               |                                                  |
| CY91F526KSBPM1  | None      | ON                | ON                |                                                  |
| CY91F526KUBPM1  |           |                   | OFF               |                                                  |
| CY91F526KHBPM1  |           | OFF               | ON                |                                                  |
| CY91F526KKBPM1  |           |                   | OFF               |                                                  |
| CY91F525KSBPM1  |           | ON                | ON                |                                                  |
| CY91F525KUBPM1  |           |                   | OFF               |                                                  |
| CY91F525KHBPM1  |           | OFF               | ON                |                                                  |
| CY91F525KKBPM1  |           |                   | OFF               |                                                  |
| CY91F524KSBPM1  |           | ON                | ON                |                                                  |
| CY91F524KUBPM1  |           |                   | OFF               |                                                  |
| CY91F524KHBPM1  |           | OFF               | ON                |                                                  |
| CY91F524KKBPM1  |           |                   | OFF               |                                                  |
| CY91F523KSBPM1  |           | ON                | ON                |                                                  |
| CY91F523KUBPM1  |           |                   | OFF               |                                                  |
| CY91F523KHBPM1  |           | OFF               | ON                |                                                  |
| CY91F523KKBPM1  |           |                   | OFF               |                                                  |
| CY91F522KSBPM1  |           | ON                | ON                |                                                  |
| CY91F522KUBPM1  |           |                   | OFF               |                                                  |
| CY91F522KHBPM1  |           | OFF               | ON                |                                                  |
| CY91F522KKBPM1  |           |                   | OFF               |                                                  |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package*2                 |
|----------------|-----------|-------------------|-------------------|---------------------------|
| CY91F526JWBPMC | Yes       | ON                | ON                | LQM • 120 pin,<br>Plastic |
| CY91F526JYBPMC |           |                   | OFF               |                           |
| CY91F526JJBPMC |           | OFF               | ON                |                           |
| CY91F526JLBPMC |           |                   | OFF               |                           |
| CY91F525JWBPMC |           | ON                | ON                |                           |
| CY91F525JYBPMC |           |                   | OFF               |                           |
| CY91F525JJBPMC |           | OFF               | ON                |                           |
| CY91F525JLBPMC |           |                   | OFF               |                           |
| CY91F524JWBPMC |           | ON                | ON                |                           |
| CY91F524JYBPMC |           |                   | OFF               |                           |
| CY91F524JJBPMC |           | OFF               | ON                |                           |
| CY91F524JLBPMC |           |                   | OFF               |                           |
| CY91F523JWBPMC |           | ON                | ON                |                           |
| CY91F523JYBPMC |           |                   | OFF               |                           |
| CY91F523JJBPMC |           | OFF               | ON                |                           |
| CY91F523JLBPMC |           |                   | OFF               |                           |
| CY91F522JWBPMC |           | ON                | ON                |                           |
| CY91F522JYBPMC |           |                   | OFF               |                           |
| CY91F522JJBPMC |           | OFF               | ON                |                           |
| CY91F522JLBPMC |           |                   | OFF               |                           |
| CY91F526JSBPMC | None      | ON                | ON                |                           |
| CY91F526JUBPMC |           |                   | OFF               |                           |
| CY91F526JHBPMC |           | OFF               | ON                |                           |
| CY91F526JKBPMC |           |                   | OFF               |                           |
| CY91F525JSBPMC |           | ON                | ON                |                           |
| CY91F525JUBPMC |           |                   | OFF               |                           |
| CY91F525JHBPMC |           | OFF               | ON                |                           |
| CY91F525JKBPMC |           |                   | OFF               |                           |
| CY91F524JSBPMC |           | ON                | ON                |                           |
| CY91F524JUBPMC |           |                   | OFF               |                           |
| CY91F524JHBPMC |           | OFF               | ON                |                           |
| CY91F524JKBPMC |           |                   | OFF               |                           |
| CY91F523JSBPMC |           | ON                | ON                |                           |
| CY91F523JUBPMC |           |                   | OFF               |                           |
| CY91F523JHBPMC |           | OFF               | ON                |                           |
| CY91F523JKBPMC |           |                   | OFF               |                           |
| CY91F522JSBPMC |           | ON                | ON                |                           |
| CY91F522JUBPMC |           |                   | OFF               |                           |
| CY91F522JHBPMC |           | OFF               | ON                |                           |
| CY91F522JKBPMC |           |                   | OFF               |                           |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package*2                 |
|----------------|-----------|-------------------|-------------------|---------------------------|
| CY91F526FWBPMC | Yes       | ON                | ON                | LQI • 100 pin,<br>Plastic |
| CY91F526FYBPMC |           |                   | OFF               |                           |
| CY91F526FJBPMC |           | OFF               | ON                |                           |
| CY91F526FLBPMC |           |                   | OFF               |                           |
| CY91F525FWBPMC |           | ON                | ON                |                           |
| CY91F525FYBPMC |           |                   | OFF               |                           |
| CY91F525FJBPMC |           | OFF               | ON                |                           |
| CY91F525FLBPMC |           |                   | OFF               |                           |
| CY91F524FWBPMC |           | ON                | ON                |                           |
| CY91F524FYBPMC |           |                   | OFF               |                           |
| CY91F524FJBPMC |           | OFF               | ON                |                           |
| CY91F524FLBPMC |           |                   | OFF               |                           |
| CY91F523FWBPMC |           | ON                | ON                |                           |
| CY91F523FYBPMC |           |                   | OFF               |                           |
| CY91F523FJBPMC |           | OFF               | ON                |                           |
| CY91F523FLBPMC |           |                   | OFF               |                           |
| CY91F522FWBPMC |           | ON                | ON                |                           |
| CY91F522FYBPMC |           |                   | OFF               |                           |
| CY91F522FJBPMC |           | OFF               | ON                |                           |
| CY91F522FLBPMC |           |                   | OFF               |                           |
| CY91F526FSBPMC | None      | ON                | ON                |                           |
| CY91F526FUBPMC |           |                   | OFF               |                           |
| CY91F526FHBPMC |           | OFF               | ON                |                           |
| CY91F526FKBPMC |           |                   | OFF               |                           |
| CY91F525FSBPMC |           | ON                | ON                |                           |
| CY91F525FUBPMC |           |                   | OFF               |                           |
| CY91F525FHBPMC |           | OFF               | ON                |                           |
| CY91F525FKBPMC |           |                   | OFF               |                           |
| CY91F524FSBPMC |           | ON                | ON                |                           |
| CY91F524FUBPMC |           |                   | OFF               |                           |
| CY91F524FHBPMC |           | OFF               | ON                |                           |
| CY91F524FKBPMC |           |                   | OFF               |                           |
| CY91F523FSBPMC |           | ON                | ON                |                           |
| CY91F523FUBPMC |           |                   | OFF               |                           |
| CY91F523FHBPMC |           | OFF               | ON                |                           |
| CY91F523FKBPMC |           |                   | OFF               |                           |
| CY91F522FSBPMC |           | ON                | ON                |                           |
| CY91F522FUBPMC |           |                   | OFF               |                           |
| CY91F522FHBPMC |           | OFF               | ON                |                           |
| CY91F522FKBPMC |           |                   | OFF               |                           |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package*2                |
|----------------|-----------|-------------------|-------------------|--------------------------|
| CY91F526DWBPMC | Yes       | ON                | ON                | LQH • 80 pin,<br>Plastic |
| CY91F526DYBPMC |           |                   | OFF               |                          |
| CY91F526DJBPMC |           | OFF               | ON                |                          |
| CY91F526DLBPMC |           |                   | OFF               |                          |
| CY91F525DWBPMC |           | ON                | ON                |                          |
| CY91F525DYBPMC |           |                   | OFF               |                          |
| CY91F525DJBPMC |           | OFF               | ON                |                          |
| CY91F525DLBPMC |           |                   | OFF               |                          |
| CY91F524DWBPMC |           | ON                | ON                |                          |
| CY91F524DYBPMC |           |                   | OFF               |                          |
| CY91F524DJBPMC |           | OFF               | ON                |                          |
| CY91F524DLBPMC |           |                   | OFF               |                          |
| CY91F523DWBPMC |           | ON                | ON                |                          |
| CY91F523DYBPMC |           |                   | OFF               |                          |
| CY91F523DJBPMC |           | OFF               | ON                |                          |
| CY91F523DLBPMC |           |                   | OFF               |                          |
| CY91F522DWBPMC |           | ON                | ON                |                          |
| CY91F522DYBPMC |           |                   | OFF               |                          |
| CY91F522DJBPMC |           | OFF               | ON                |                          |
| CY91F522DLBPMC |           |                   | OFF               |                          |
| CY91F526DSBPMC | None      | ON                | ON                |                          |
| CY91F526DUBPMC |           |                   | OFF               |                          |
| CY91F526DHBPMC |           | OFF               | ON                |                          |
| CY91F526DKBPMC |           |                   | OFF               |                          |
| CY91F525DSBPMC |           | ON                | ON                |                          |
| CY91F525DUBPMC |           |                   | OFF               |                          |
| CY91F525DHBPMC |           | OFF               | ON                |                          |
| CY91F525DKBPMC |           |                   | OFF               |                          |
| CY91F524DSBPMC |           | ON                | ON                |                          |
| CY91F524DUBPMC |           |                   | OFF               |                          |
| CY91F524DHBPMC |           | OFF               | ON                |                          |
| CY91F524DKBPMC |           |                   | OFF               |                          |
| CY91F523DSBPMC |           | ON                | ON                |                          |
| CY91F523DUBPMC |           |                   | OFF               |                          |
| CY91F523DHBPMC |           | OFF               | ON                |                          |
| CY91F523DKBPMC |           |                   | OFF               |                          |
| CY91F522DSBPMC |           | ON                | ON                |                          |
| CY91F522DUBPMC |           |                   | OFF               |                          |
| CY91F522DHBPMC |           | OFF               | ON                |                          |
| CY91F522DKBPMC |           |                   | OFF               |                          |

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package*2                |
|-----------------|-----------|-------------------|-------------------|--------------------------|
| CY91F526BWBPMC1 | Yes       | ON                | ON                | LQD • 64 pin,<br>Plastic |
| CY91F526BYBPMC1 |           |                   | OFF               |                          |
| CY91F526BJBPMC1 |           | OFF               | ON                |                          |
| CY91F526BLBPMC1 |           |                   | OFF               |                          |
| CY91F525BWBPMC1 |           | ON                | ON                |                          |
| CY91F525BYBPMC1 |           |                   | OFF               |                          |
| CY91F525BJBPMC1 |           | OFF               | ON                |                          |
| CY91F525BLBPMC1 |           |                   | OFF               |                          |
| CY91F524BWBPMC1 |           | ON                | ON                |                          |
| CY91F524BYBPMC1 |           |                   | OFF               |                          |
| CY91F524BJBPMC1 |           | OFF               | ON                |                          |
| CY91F524BLBPMC1 |           |                   | OFF               |                          |
| CY91F523BWBPMC1 |           | ON                | ON                |                          |
| CY91F523BYBPMC1 |           |                   | OFF               |                          |
| CY91F523BJBPMC1 |           | OFF               | ON                |                          |
| CY91F523BLBPMC1 |           |                   | OFF               |                          |
| CY91F522BWBPMC1 |           | ON                | ON                |                          |
| CY91F522BYBPMC1 |           |                   | OFF               |                          |
| CY91F522BJBPMC1 |           | OFF               | ON                |                          |
| CY91F522BLBPMC1 |           |                   | OFF               |                          |
| CY91F526BSBPMC1 | None      | ON                | ON                |                          |
| CY91F526BUBPMC1 |           |                   | OFF               |                          |
| CY91F526BHBPMC1 |           | OFF               | ON                |                          |
| CY91F526BKBPMC1 |           |                   | OFF               |                          |
| CY91F525BSBPMC1 |           | ON                | ON                |                          |
| CY91F525BUBPMC1 |           |                   | OFF               |                          |
| CY91F525BHBPMC1 |           | OFF               | ON                |                          |
| CY91F525BKBPMC1 |           |                   | OFF               |                          |
| CY91F524BSBPMC1 |           | ON                | ON                |                          |
| CY91F524BUBPMC1 |           |                   | OFF               |                          |
| CY91F524BHBPMC1 |           | OFF               | ON                |                          |
| CY91F524BKBPMC1 |           |                   | OFF               |                          |
| CY91F523BSBPMC1 |           | ON                | ON                |                          |
| CY91F523BUBPMC1 |           |                   | OFF               |                          |
| CY91F523BHBPMC1 |           | OFF               | ON                |                          |
| CY91F523BKBPMC1 |           |                   | OFF               |                          |
| CY91F522BSBPMC1 |           | ON                | ON                |                          |
| CY91F522BUBPMC1 |           |                   | OFF               |                          |
| CY91F522BHBPMC1 |           | OFF               | ON                |                          |
| CY91F522BKBPMC1 |           |                   | OFF               |                          |

\*1: It is only supported for customers who have already adopted it now. We do not recommend adopting new products.

\*2: For details of the package, see [Package Dimensions](#).

**14. Ordering Information CY91F52xxxC\*<sup>1</sup>**

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package* <sup>2</sup>     |
|----------------|-----------|-------------------|-------------------|---------------------------|
| CY91F526LWCPMC | Yes       | ON                | ON                | LQP • 176 pin,<br>Plastic |
| CY91F526LYCPMC |           |                   | OFF               |                           |
| CY91F526LJCPMC |           | OFF               | ON                |                           |
| CY91F526LLCPMC |           |                   | OFF               |                           |
| CY91F525LWCPMC |           | ON                | ON                |                           |
| CY91F525LYCPMC |           |                   | OFF               |                           |
| CY91F525LJCPMC |           | OFF               | ON                |                           |
| CY91F525LLCPMC |           |                   | OFF               |                           |
| CY91F524LWCPMC |           | ON                | ON                |                           |
| CY91F524LYCPMC |           |                   | OFF               |                           |
| CY91F524LJCPMC |           | OFF               | ON                |                           |
| CY91F524LLCPMC |           |                   | OFF               |                           |
| CY91F523LWCPMC |           | ON                | ON                |                           |
| CY91F523LYCPMC |           |                   | OFF               |                           |
| CY91F523LJCPMC |           | OFF               | ON                |                           |
| CY91F523LLCPMC |           |                   | OFF               |                           |
| CY91F522LWCPMC |           | ON                | ON                |                           |
| CY91F522LYCPMC |           |                   | OFF               |                           |
| CY91F522LJCPMC |           | OFF               | ON                |                           |
| CY91F522LLCPMC |           |                   | OFF               |                           |
| CY91F526LSCPMC | None      | ON                | ON                |                           |
| CY91F526LUCPMC |           |                   | OFF               |                           |
| CY91F526LHCPMC |           | OFF               | ON                |                           |
| CY91F526LKCPMC |           |                   | OFF               |                           |
| CY91F525LSCPMC |           | ON                | ON                |                           |
| CY91F525LUCPMC |           |                   | OFF               |                           |
| CY91F525LHCPMC |           | OFF               | ON                |                           |
| CY91F525LKCPMC |           |                   | OFF               |                           |
| CY91F524LSCPMC |           | ON                | ON                |                           |
| CY91F524LUCPMC |           |                   | OFF               |                           |
| CY91F524LHCPMC |           | OFF               | ON                |                           |
| CY91F524LKCPMC |           |                   | OFF               |                           |
| CY91F523LSCPMC |           | ON                | ON                |                           |
| CY91F523LUCPMC |           |                   | OFF               |                           |
| CY91F523LHCPMC |           | OFF               | ON                |                           |
| CY91F523LKCPMC |           |                   | OFF               |                           |
| CY91F522LSCPMC |           | ON                | ON                |                           |
| CY91F522LUCPMC |           |                   | OFF               |                           |
| CY91F522LHCPMC |           | OFF               | ON                |                           |
| CY91F522LKCPMC |           |                   | OFF               |                           |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package <sup>*2</sup>                            |
|----------------|-----------|-------------------|-------------------|--------------------------------------------------|
| CY91F526KWCPMC | Yes       | ON                | ON                | LQS • 144 pin,<br>(Lead pitch 0.5 mm)<br>Plastic |
| CY91F526KYCPMC |           |                   | OFF               |                                                  |
| CY91F526KJCPMC |           | OFF               | ON                |                                                  |
| CY91F526KLCPMC |           |                   | OFF               |                                                  |
| CY91F525KWCPMC |           | ON                | ON                |                                                  |
| CY91F525KYCPMC |           |                   | OFF               |                                                  |
| CY91F525KJCPMC |           | OFF               | ON                |                                                  |
| CY91F525KLCPMC |           |                   | OFF               |                                                  |
| CY91F524KWCPMC |           | ON                | ON                |                                                  |
| CY91F524KYCPMC |           |                   | OFF               |                                                  |
| CY91F524KJCPMC |           | OFF               | ON                |                                                  |
| CY91F524KLCPMC |           |                   | OFF               |                                                  |
| CY91F523KWCPMC |           | ON                | ON                |                                                  |
| CY91F523KYCPMC |           |                   | OFF               |                                                  |
| CY91F523KJCPMC |           | OFF               | ON                |                                                  |
| CY91F523KLCPMC |           |                   | OFF               |                                                  |
| CY91F522KWCPMC |           | ON                | ON                |                                                  |
| CY91F522KYCPMC |           |                   | OFF               |                                                  |
| CY91F522KJCPMC |           | OFF               | ON                |                                                  |
| CY91F522KLCPMC |           |                   | OFF               |                                                  |
| CY91F526KSCPMC | None      | ON                | ON                |                                                  |
| CY91F526KUCPMC |           |                   | OFF               |                                                  |
| CY91F526KHCPMC |           | OFF               | ON                |                                                  |
| CY91F526KKCPMC |           |                   | OFF               |                                                  |
| CY91F525KSCPMC |           | ON                | ON                |                                                  |
| CY91F525KUCPMC |           |                   | OFF               |                                                  |
| CY91F525KHCPMC |           | OFF               | ON                |                                                  |
| CY91F525KKCPMC |           |                   | OFF               |                                                  |
| CY91F524KSCPMC |           | ON                | ON                |                                                  |
| CY91F524KUCPMC |           |                   | OFF               |                                                  |
| CY91F524KHCPMC |           | OFF               | ON                |                                                  |
| CY91F524KKCPMC |           |                   | OFF               |                                                  |
| CY91F523KSCPMC |           | ON                | ON                |                                                  |
| CY91F523KUCPMC |           |                   | OFF               |                                                  |
| CY91F523KHCPMC |           | OFF               | ON                |                                                  |
| CY91F523KKCPMC |           |                   | OFF               |                                                  |
| CY91F522KSCPMC |           | ON                | ON                |                                                  |
| CY91F522KUCPMC |           |                   | OFF               |                                                  |
| CY91F522KHCPMC |           | OFF               | ON                |                                                  |
| CY91F522KKCPMC |           |                   | OFF               |                                                  |

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package <sup>*2</sup>                            |
|-----------------|-----------|-------------------|-------------------|--------------------------------------------------|
| CY91F526KWCPMC1 | Yes       | ON                | ON                | LQN • 144 pin,<br>(Lead pitch 0.4 mm)<br>Plastic |
| CY91F526KYCPMC1 |           |                   | OFF               |                                                  |
| CY91F526KJCPMC1 |           | OFF               | ON                |                                                  |
| CY91F526KLCPMC1 |           |                   | OFF               |                                                  |
| CY91F525KWCPMC1 |           | ON                | ON                |                                                  |
| CY91F525KYCPMC1 |           |                   | OFF               |                                                  |
| CY91F525KJCPMC1 |           | OFF               | ON                |                                                  |
| CY91F525KLCPMC1 |           |                   | OFF               |                                                  |
| CY91F524KWCPMC1 |           | ON                | ON                |                                                  |
| CY91F524KYCPMC1 |           |                   | OFF               |                                                  |
| CY91F524KJCPMC1 |           | OFF               | ON                |                                                  |
| CY91F524KLCPMC1 |           |                   | OFF               |                                                  |
| CY91F523KWCPMC1 |           | ON                | ON                |                                                  |
| CY91F523KYCPMC1 |           |                   | OFF               |                                                  |
| CY91F523KJCPMC1 |           | OFF               | ON                |                                                  |
| CY91F523KLCPMC1 |           |                   | OFF               |                                                  |
| CY91F522KWCPMC1 |           | ON                | ON                |                                                  |
| CY91F522KYCPMC1 |           |                   | OFF               |                                                  |
| CY91F522KJCPMC1 |           | OFF               | ON                |                                                  |
| CY91F522KLCPMC1 |           |                   | OFF               |                                                  |
| CY91F526KSCPMC1 | None      | ON                | ON                |                                                  |
| CY91F526KUCPMC1 |           |                   | OFF               |                                                  |
| CY91F526KHCPMC1 |           | OFF               | ON                |                                                  |
| CY91F526KKCPMC1 |           |                   | OFF               |                                                  |
| CY91F525KSCPMC1 |           | ON                | ON                |                                                  |
| CY91F525KUCPMC1 |           |                   | OFF               |                                                  |
| CY91F525KHCPMC1 |           | OFF               | ON                |                                                  |
| CY91F525KKCPMC1 |           |                   | OFF               |                                                  |
| CY91F524KSCPMC1 |           | ON                | ON                |                                                  |
| CY91F524KUCPMC1 |           |                   | OFF               |                                                  |
| CY91F524KHCPMC1 |           | OFF               | ON                |                                                  |
| CY91F524KKCPMC1 |           |                   | OFF               |                                                  |
| CY91F523KSCPMC1 |           | ON                | ON                |                                                  |
| CY91F523KUCPMC1 |           |                   | OFF               |                                                  |
| CY91F523KHCPMC1 |           | OFF               | ON                |                                                  |
| CY91F523KKCPMC1 |           |                   | OFF               |                                                  |
| CY91F522KSCPMC1 |           | ON                | ON                |                                                  |
| CY91F522KUCPMC1 |           |                   | OFF               |                                                  |
| CY91F522KHCPMC1 |           | OFF               | ON                |                                                  |
| CY91F522KKCPMC1 |           |                   | OFF               |                                                  |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package* <sup>2</sup>     |
|----------------|-----------|-------------------|-------------------|---------------------------|
| CY91F526JWCPMC | Yes       | ON                | ON                | LQM • 120 pin,<br>Plastic |
| CY91F526JYCPMC |           |                   | OFF               |                           |
| CY91F526JJCPMC |           | OFF               | ON                |                           |
| CY91F526JLCPMC |           |                   | OFF               |                           |
| CY91F525JWCPMC |           | ON                | ON                |                           |
| CY91F525JYCPMC |           |                   | OFF               |                           |
| CY91F525JJCPMC |           | OFF               | ON                |                           |
| CY91F525JLCPMC |           |                   | OFF               |                           |
| CY91F524JWCPMC |           | ON                | ON                |                           |
| CY91F524JYCPMC |           |                   | OFF               |                           |
| CY91F524JJCPMC |           | OFF               | ON                |                           |
| CY91F524JLCPMC |           |                   | OFF               |                           |
| CY91F523JWCPMC |           | ON                | ON                |                           |
| CY91F523JYCPMC |           |                   | OFF               |                           |
| CY91F523JJCPMC |           | OFF               | ON                |                           |
| CY91F523JLCPMC |           |                   | OFF               |                           |
| CY91F522JWCPMC |           | ON                | ON                |                           |
| CY91F522JYCPMC |           |                   | OFF               |                           |
| CY91F522JJCPMC |           | OFF               | ON                |                           |
| CY91F522JLCPMC |           |                   | OFF               |                           |
| CY91F526JSCPMC | None      | ON                | ON                |                           |
| CY91F526JUCPMC |           |                   | OFF               |                           |
| CY91F526JHCPMC |           | OFF               | ON                |                           |
| CY91F526JKCPMC |           |                   | OFF               |                           |
| CY91F525JSCPMC |           | ON                | ON                |                           |
| CY91F525JUCPMC |           |                   | OFF               |                           |
| CY91F525JHCPMC |           | OFF               | ON                |                           |
| CY91F525JKCPMC |           |                   | OFF               |                           |
| CY91F524JSCPMC |           | ON                | ON                |                           |
| CY91F524JUCPMC |           |                   | OFF               |                           |
| CY91F524JHCPMC |           | OFF               | ON                |                           |
| CY91F524JKCPMC |           |                   | OFF               |                           |
| CY91F523JSCPMC |           | ON                | ON                |                           |
| CY91F523JUCPMC |           |                   | OFF               |                           |
| CY91F523JHCPMC |           | OFF               | ON                |                           |
| CY91F523JKCPMC |           |                   | OFF               |                           |
| CY91F522JSCPMC |           | ON                | ON                |                           |
| CY91F522JUCPMC |           |                   | OFF               |                           |
| CY91F522JHCPMC |           | OFF               | ON                |                           |
| CY91F522JKCPMC |           |                   | OFF               |                           |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package* <sup>2</sup>     |
|----------------|-----------|-------------------|-------------------|---------------------------|
| CY91F526FWCPMC | Yes       | ON                | ON                | LQI • 100 pin,<br>Plastic |
| CY91F526FYCPMC |           |                   | OFF               |                           |
| CY91F526FJCPMC |           | OFF               | ON                |                           |
| CY91F526FLCPMC |           |                   | OFF               |                           |
| CY91F525FWCPMC |           | ON                | ON                |                           |
| CY91F525FYCPMC |           |                   | OFF               |                           |
| CY91F525FJCPMC |           | OFF               | ON                |                           |
| CY91F525FLCPMC |           |                   | OFF               |                           |
| CY91F524FWCPMC |           | ON                | ON                |                           |
| CY91F524FYCPMC |           |                   | OFF               |                           |
| CY91F524FJCPMC |           | OFF               | ON                |                           |
| CY91F524FLCPMC |           |                   | OFF               |                           |
| CY91F523FWCPMC |           | ON                | ON                |                           |
| CY91F523FYCPMC |           |                   | OFF               |                           |
| CY91F523FJCPMC |           | OFF               | ON                |                           |
| CY91F523FLCPMC |           |                   | OFF               |                           |
| CY91F522FWCPMC |           | ON                | ON                |                           |
| CY91F522FYCPMC |           |                   | OFF               |                           |
| CY91F522FJCPMC |           | OFF               | ON                |                           |
| CY91F522FLCPMC |           |                   | OFF               |                           |
| CY91F526FSCPMC | None      | ON                | ON                |                           |
| CY91F526FUCPMC |           |                   | OFF               |                           |
| CY91F526FHCPMC |           | OFF               | ON                |                           |
| CY91F526FKCPMC |           |                   | OFF               |                           |
| CY91F525FSCPMC |           | ON                | ON                |                           |
| CY91F525FUCPMC |           |                   | OFF               |                           |
| CY91F525FHCPMC |           | OFF               | ON                |                           |
| CY91F525FKCPMC |           |                   | OFF               |                           |
| CY91F524FSCPMC |           | ON                | ON                |                           |
| CY91F524FUCPMC |           |                   | OFF               |                           |
| CY91F524FHCPMC |           | OFF               | ON                |                           |
| CY91F524FKCPMC |           |                   | OFF               |                           |
| CY91F523FSCPMC |           | ON                | ON                |                           |
| CY91F523FUCPMC |           |                   | OFF               |                           |
| CY91F523FHCPMC |           | OFF               | ON                |                           |
| CY91F523FKCPMC |           |                   | OFF               |                           |
| CY91F522FSCPMC |           | ON                | ON                |                           |
| CY91F522FUCPMC |           |                   | OFF               |                           |
| CY91F522FHCPMC |           | OFF               | ON                |                           |
| CY91F522FKCPMC |           |                   | OFF               |                           |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package* <sup>2</sup>    |
|----------------|-----------|-------------------|-------------------|--------------------------|
| CY91F526DWCPMC | Yes       | ON                | ON                | LQH • 80 pin,<br>Plastic |
| CY91F526DYCPMC |           |                   | OFF               |                          |
| CY91F526DJCPMC |           | OFF               | ON                |                          |
| CY91F526DLCPMC |           |                   | OFF               |                          |
| CY91F525DWCPMC |           | ON                | ON                |                          |
| CY91F525DYCPMC |           |                   | OFF               |                          |
| CY91F525DJCPMC |           | OFF               | ON                |                          |
| CY91F525DLCPMC |           |                   | OFF               |                          |
| CY91F524DWCPMC |           | ON                | ON                |                          |
| CY91F524DYCPMC |           |                   | OFF               |                          |
| CY91F524DJCPMC |           | OFF               | ON                |                          |
| CY91F524DLCPMC |           |                   | OFF               |                          |
| CY91F523DWCPMC |           | ON                | ON                |                          |
| CY91F523DYCPMC |           |                   | OFF               |                          |
| CY91F523DJCPMC |           | OFF               | ON                |                          |
| CY91F523DLCPMC |           |                   | OFF               |                          |
| CY91F522DWCPMC |           | ON                | ON                |                          |
| CY91F522DYCPMC |           |                   | OFF               |                          |
| CY91F522DJCPMC |           | OFF               | ON                |                          |
| CY91F522DLCPMC |           |                   | OFF               |                          |
| CY91F526DSCPMC | None      | ON                | ON                |                          |
| CY91F526DUCPMC |           |                   | OFF               |                          |
| CY91F526DHCPMC |           | OFF               | ON                |                          |
| CY91F526DKCPMC |           |                   | OFF               |                          |
| CY91F525DSCPMC |           | ON                | ON                |                          |
| CY91F525DUCPMC |           |                   | OFF               |                          |
| CY91F525DHCPMC |           | OFF               | ON                |                          |
| CY91F525DKCPMC |           |                   | OFF               |                          |
| CY91F524DSCPMC |           | ON                | ON                |                          |
| CY91F524DUCPMC |           |                   | OFF               |                          |
| CY91F524DHCPMC |           | OFF               | ON                |                          |
| CY91F524DKCPMC |           |                   | OFF               |                          |
| CY91F523DSCPMC |           | ON                | ON                |                          |
| CY91F523DUCPMC |           |                   | OFF               |                          |
| CY91F523DHCPMC |           | OFF               | ON                |                          |
| CY91F523DKCPMC |           |                   | OFF               |                          |
| CY91F522DSCPMC |           | ON                | ON                |                          |
| CY91F522DUCPMC |           |                   | OFF               |                          |
| CY91F522DHCPMC |           | OFF               | ON                |                          |
| CY91F522DKCPMC |           |                   | OFF               |                          |

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package <sup>*2</sup>    |
|-----------------|-----------|-------------------|-------------------|--------------------------|
| CY91F526BWCPMC1 | Yes       | ON                | ON                | LQD • 64 pin,<br>Plastic |
| CY91F526BYCPMC1 |           |                   | OFF               |                          |
| CY91F526BJCPMC1 |           | OFF               | ON                |                          |
| CY91F526BLCPMC1 |           |                   | OFF               |                          |
| CY91F525BWCPMC1 |           | ON                | ON                |                          |
| CY91F525BYCPMC1 |           |                   | OFF               |                          |
| CY91F525BJCPMC1 |           | OFF               | ON                |                          |
| CY91F525BLCPMC1 |           |                   | OFF               |                          |
| CY91F524BWCPMC1 |           | ON                | ON                |                          |
| CY91F524BYCPMC1 |           |                   | OFF               |                          |
| CY91F524BJCPMC1 |           | OFF               | ON                |                          |
| CY91F524BLCPMC1 |           |                   | OFF               |                          |
| CY91F523BWCPMC1 |           | ON                | ON                |                          |
| CY91F523BYCPMC1 |           |                   | OFF               |                          |
| CY91F523BJCPMC1 |           | OFF               | ON                |                          |
| CY91F523BLCPMC1 |           |                   | OFF               |                          |
| CY91F522BWCPMC1 |           | ON                | ON                |                          |
| CY91F522BYCPMC1 |           |                   | OFF               |                          |
| CY91F522BJCPMC1 |           | OFF               | ON                |                          |
| CY91F522BLCPMC1 |           |                   | OFF               |                          |
| CY91F526BSCPMC1 | None      | ON                | ON                |                          |
| CY91F526BUCPMC1 |           |                   | OFF               |                          |
| CY91F526BHCPMC1 |           | OFF               | ON                |                          |
| CY91F526BKCPMC1 |           |                   | OFF               |                          |
| CY91F525BSCPMC1 |           | ON                | ON                |                          |
| CY91F525BUCPMC1 |           |                   | OFF               |                          |
| CY91F525BHCPMC1 |           | OFF               | ON                |                          |
| CY91F525BKCPMC1 |           |                   | OFF               |                          |
| CY91F524BSCPMC1 |           | ON                | ON                |                          |
| CY91F524BUCPMC1 |           |                   | OFF               |                          |
| CY91F524BHCPMC1 |           | OFF               | ON                |                          |
| CY91F524BKCPMC1 |           |                   | OFF               |                          |
| CY91F523BSCPMC1 |           | ON                | ON                |                          |
| CY91F523BUCPMC1 |           |                   | OFF               |                          |
| CY91F523BHCPMC1 |           | OFF               | ON                |                          |
| CY91F523BKCPMC1 |           |                   | OFF               |                          |
| CY91F522BSCPMC1 |           | ON                | ON                |                          |
| CY91F522BUCPMC1 |           |                   | OFF               |                          |
| CY91F522BHCPMC1 |           | OFF               | ON                |                          |
| CY91F522BKCPMC1 |           |                   | OFF               |                          |

\*1: It is only supported for customers who have already adopted it now. We do not recommend adopting new products.

\*2: For details of the package, see [Package Dimensions](#).

**15. Ordering Information CY91F52xxxD**

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package*                                         |
|----------------|-----------|-------------------|-------------------|--------------------------------------------------|
| CY91F526LWDPMC | Yes       | ON                | ON                | LQP • 176 pin,<br>Plastic                        |
| CY91F526LJDPMC |           | OFF               | ON                |                                                  |
| CY91F525LWDPMC |           | ON                | ON                |                                                  |
| CY91F525LJDPMC |           | OFF               | ON                |                                                  |
| CY91F524LWDPMC |           | ON                | ON                |                                                  |
| CY91F524LJDPMC |           | OFF               | ON                |                                                  |
| CY91F523LWDPMC |           | ON                | ON                |                                                  |
| CY91F523LJDPMC |           | OFF               | ON                |                                                  |
| CY91F522LWDPMC |           | ON                | ON                |                                                  |
| CY91F522LJDPMC |           | OFF               | ON                |                                                  |
| CY91F526LSDPMC | None      | ON                | ON                |                                                  |
| CY91F526LHDPMC |           | OFF               | ON                |                                                  |
| CY91F525LSDPMC |           | ON                | ON                |                                                  |
| CY91F525LHDPMC |           | OFF               | ON                |                                                  |
| CY91F524LSDPMC |           | ON                | ON                |                                                  |
| CY91F524LHDPMC |           | OFF               | ON                |                                                  |
| CY91F523LSDPMC |           | ON                | ON                |                                                  |
| CY91F523LHDPMC |           | OFF               | ON                |                                                  |
| CY91F522LSDPMC |           | ON                | ON                |                                                  |
| CY91F522LHDPMC |           | OFF               | ON                |                                                  |
| CY91F526KWDPMC | Yes       | ON                | ON                | LQS • 144 pin,<br>(Lead pitch 0.5 mm)<br>Plastic |
| CY91F526KJDPMC |           | OFF               | ON                |                                                  |
| CY91F525KWDPMC |           | ON                | ON                |                                                  |
| CY91F525KJDPMC |           | OFF               | ON                |                                                  |
| CY91F524KWDPMC |           | ON                | ON                |                                                  |
| CY91F524KJDPMC |           | OFF               | ON                |                                                  |
| CY91F523KWDPMC |           | ON                | ON                |                                                  |
| CY91F523KJDPMC |           | OFF               | ON                |                                                  |
| CY91F522KWDPMC |           | ON                | ON                |                                                  |
| CY91F522KJDPMC |           | OFF               | ON                |                                                  |
| CY91F526KSDPMC | None      | ON                | ON                |                                                  |
| CY91F526KHDPMC |           | OFF               | ON                |                                                  |
| CY91F525KSDPMC |           | ON                | ON                |                                                  |
| CY91F525KHDPMC |           | OFF               | ON                |                                                  |
| CY91F524KSDPMC |           | ON                | ON                |                                                  |
| CY91F524KHDPMC |           | OFF               | ON                |                                                  |
| CY91F523KSDPMC |           | ON                | ON                |                                                  |
| CY91F523KHDPMC |           | OFF               | ON                |                                                  |
| CY91F522KSDPMC |           | ON                | ON                |                                                  |
| CY91F522KHDPMC |           | OFF               | ON                |                                                  |

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package*                                         |
|-----------------|-----------|-------------------|-------------------|--------------------------------------------------|
| CY91F526KWDPMC1 | Yes       | ON                | ON                | LQN • 144 pin,<br>(Lead pitch 0.4 mm)<br>Plastic |
| CY91F526KJDPMC1 |           | OFF               | ON                |                                                  |
| CY91F525KWDPMC1 |           | ON                | ON                |                                                  |
| CY91F525KJDPMC1 |           | OFF               | ON                |                                                  |
| CY91F524KWDPMC1 |           | ON                | ON                |                                                  |
| CY91F524KJDPMC1 |           | OFF               | ON                |                                                  |
| CY91F523KWDPMC1 |           | ON                | ON                |                                                  |
| CY91F523KJDPMC1 |           | OFF               | ON                |                                                  |
| CY91F522KWDPMC1 |           | ON                | ON                |                                                  |
| CY91F522KJDPMC1 |           | OFF               | ON                |                                                  |
| CY91F526KSDPMC1 | None      | ON                | ON                |                                                  |
| CY91F526KHDPMC1 |           | OFF               | ON                |                                                  |
| CY91F525KSDPMC1 |           | ON                | ON                |                                                  |
| CY91F525KHDPMC1 |           | OFF               | ON                |                                                  |
| CY91F524KSDPMC1 |           | ON                | ON                |                                                  |
| CY91F524KHDPMC1 |           | OFF               | ON                |                                                  |
| CY91F523KSDPMC1 |           | ON                | ON                |                                                  |
| CY91F523KHDPMC1 |           | OFF               | ON                |                                                  |
| CY91F522KSDPMC1 |           | ON                | ON                |                                                  |
| CY91F522KHDPMC1 |           | OFF               | ON                |                                                  |
| CY91F526JWDPMC  | Yes       | ON                | ON                | LQM • 120 pin,<br>Plastic                        |
| CY91F526JJDPMC  |           | OFF               | ON                |                                                  |
| CY91F525JWDPMC  |           | ON                | ON                |                                                  |
| CY91F525JJDPMC  |           | OFF               | ON                |                                                  |
| CY91F524JWDPMC  |           | ON                | ON                |                                                  |
| CY91F524JJDPMC  |           | OFF               | ON                |                                                  |
| CY91F523JWDPMC  |           | ON                | ON                |                                                  |
| CY91F523JJDPMC  |           | OFF               | ON                |                                                  |
| CY91F522JWDPMC  |           | ON                | ON                |                                                  |
| CY91F522JJDPMC  |           | OFF               | ON                |                                                  |
| CY91F526JSDPMC  | None      | ON                | ON                |                                                  |
| CY91F526JHDPMC  |           | OFF               | ON                |                                                  |
| CY91F525JSDPMC  |           | ON                | ON                |                                                  |
| CY91F525JHDPMC  |           | OFF               | ON                |                                                  |
| CY91F524JSDPMC  |           | ON                | ON                |                                                  |
| CY91F524JHDPMC  |           | OFF               | ON                |                                                  |
| CY91F523JSDPMC  |           | ON                | ON                |                                                  |
| CY91F523JHDPMC  |           | OFF               | ON                |                                                  |
| CY91F522JSDPMC  |           | ON                | ON                |                                                  |
| CY91F522JHDPMC  |           | OFF               | ON                |                                                  |

| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package*                  |
|----------------|-----------|-------------------|-------------------|---------------------------|
| CY91F526FWDPMC | Yes       | ON                | ON                | LQI • 100 pin,<br>Plastic |
| CY91F526FJDPMC |           | OFF               | ON                |                           |
| CY91F525FWDPMC |           | ON                | ON                |                           |
| CY91F525FJDPMC |           | OFF               | ON                |                           |
| CY91F524FWDPMC |           | ON                | ON                |                           |
| CY91F524FJDPMC |           | OFF               | ON                |                           |
| CY91F523FWDPMC |           | ON                | ON                |                           |
| CY91F523FJDPMC |           | OFF               | ON                |                           |
| CY91F522FWDPMC |           | ON                | ON                |                           |
| CY91F522FJDPMC |           | OFF               | ON                |                           |
| CY91F526FSDPMC | None      | ON                | ON                |                           |
| CY91F526FHDPMC |           | OFF               | ON                |                           |
| CY91F525FSDPMC |           | ON                | ON                |                           |
| CY91F525FHDPMC |           | OFF               | ON                |                           |
| CY91F524FSDPMC |           | ON                | ON                |                           |
| CY91F524FHDPMC |           | OFF               | ON                |                           |
| CY91F523FSDPMC |           | ON                | ON                |                           |
| CY91F523FHDPMC |           | OFF               | ON                |                           |
| CY91F522FSDPMC |           | ON                | ON                |                           |
| CY91F522FHDPMC |           | OFF               | ON                |                           |
| CY91F526DWDPMC | Yes       | ON                | ON                | LQH • 80 pin,<br>Plastic  |
| CY91F526DJDPMC |           | OFF               | ON                |                           |
| CY91F525DWDPMC |           | ON                | ON                |                           |
| CY91F525DJDPMC |           | OFF               | ON                |                           |
| CY91F524DWDPMC |           | ON                | ON                |                           |
| CY91F524DJDPMC |           | OFF               | ON                |                           |
| CY91F523DWDPMC |           | ON                | ON                |                           |
| CY91F523DJDPMC |           | OFF               | ON                |                           |
| CY91F522DWDPMC |           | ON                | ON                |                           |
| CY91F522DJDPMC |           | OFF               | ON                |                           |
| CY91F526DSDPMC | None      | ON                | ON                |                           |
| CY91F526DHDPMC |           | OFF               | ON                |                           |
| CY91F525DSDPMC |           | ON                | ON                |                           |
| CY91F525DHDPMC |           | OFF               | ON                |                           |
| CY91F524DSDPMC |           | ON                | ON                |                           |
| CY91F524DHDPMC |           | OFF               | ON                |                           |
| CY91F523DSDPMC |           | ON                | ON                |                           |
| CY91F523DHDPMC |           | OFF               | ON                |                           |
| CY91F522DSDPMC |           | ON                | ON                |                           |
| CY91F522DHDPMC |           | OFF               | ON                |                           |

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package*                 |
|-----------------|-----------|-------------------|-------------------|--------------------------|
| CY91F526BWDPMC1 | Yes       | ON                | ON                | LQD • 64 pin,<br>Plastic |
| CY91F526BJDPMC1 |           | OFF               | ON                |                          |
| CY91F525BWDPMC1 |           | ON                | ON                |                          |
| CY91F525BJDPMC1 |           | OFF               | ON                |                          |
| CY91F524BWDPMC1 |           | ON                | ON                |                          |
| CY91F524BJDPMC1 |           | OFF               | ON                |                          |
| CY91F523BWDPMC1 |           | ON                | ON                |                          |
| CY91F523BJDPMC1 |           | OFF               | ON                |                          |
| CY91F522BWDPMC1 |           | ON                | ON                |                          |
| CY91F522BJDPMC1 |           | OFF               | ON                |                          |
| CY91F526BSDPMC1 | None      | ON                | ON                |                          |
| CY91F526BHDPMC1 |           | OFF               | ON                |                          |
| CY91F525BSDPMC1 |           | ON                | ON                |                          |
| CY91F525BHDPMC1 |           | OFF               | ON                |                          |
| CY91F524BSDPMC1 |           | ON                | ON                |                          |
| CY91F524BHDPMC1 |           | OFF               | ON                |                          |
| CY91F523BSDPMC1 |           | ON                | ON                |                          |
| CY91F523BHDPMC1 |           | OFF               | ON                |                          |
| CY91F522BSDPMC1 |           | ON                | ON                |                          |
| CY91F522BHDPMC1 |           | OFF               | ON                |                          |

\*: For details of the package, see [Package Dimensions](#).

**16. Ordering Information CY91F52xxxE**

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package*                                         |
|-----------------|-----------|-------------------|-------------------|--------------------------------------------------|
| CY91F526LWEPMC  | Yes       | ON                | ON                | LQP • 176 pin,<br>Plastic                        |
| CY91F526LJEPMC  |           | OFF               | ON                |                                                  |
| CY91F525LWEPMC  |           | ON                | ON                |                                                  |
| CY91F525LJEPMC  |           | OFF               | ON                |                                                  |
| CY91F524LWEPMC  |           | ON                | ON                |                                                  |
| CY91F524LJEPMC  |           | OFF               | ON                |                                                  |
| CY91F523LWEPMC  |           | ON                | ON                |                                                  |
| CY91F523LJEPMC  |           | OFF               | ON                |                                                  |
| CY91F522LWEPMC  |           | ON                | ON                |                                                  |
| CY91F522LJEPMC  |           | OFF               | ON                |                                                  |
| CY91F526LSEPMC  | None      | ON                | ON                |                                                  |
| CY91F526LHEPMC  |           | OFF               | ON                |                                                  |
| CY91F526LKEPMC  |           | OFF               | OFF               |                                                  |
| CY91F525LSEPMC  |           | ON                | ON                |                                                  |
| CY91F525LHEPMC  |           | OFF               | ON                |                                                  |
| CY91F524LSEPMC  |           | ON                | ON                |                                                  |
| CY91F524LHEPMC  |           | OFF               | ON                |                                                  |
| CY91F523LSEPMC  |           | ON                | ON                |                                                  |
| CY91F523LHEPMC  |           | OFF               | ON                |                                                  |
| CY91F522LSEPMC  |           | ON                | ON                |                                                  |
| CY91F522LHEPMC  |           | OFF               | ON                |                                                  |
| CY91F526KWEPMC  | Yes       | ON                | ON                | LQS • 144 pin,<br>(Lead pitch 0.5 mm)<br>Plastic |
| CY91F526KJEPMC  |           | OFF               | ON                |                                                  |
| CY91F525KWEPMC  |           | ON                | ON                |                                                  |
| CY91F525KJEPMC  |           | OFF               | ON                |                                                  |
| CY91F524KWEPMC  |           | ON                | ON                |                                                  |
| CY91F524KJEPMC  |           | OFF               | ON                |                                                  |
| CY91F523KWEPMC  |           | ON                | ON                |                                                  |
| CY91F523KJEPMC  |           | OFF               | ON                |                                                  |
| CY91F522KWEPMC  |           | ON                | ON                |                                                  |
| CY91F522KJEPMC  |           | OFF               | ON                |                                                  |
| CY91F526KSEPMC  | None      | ON                | ON                |                                                  |
| CY91F526KHSEPMC |           | OFF               | ON                |                                                  |
| CY91F525KSEPMC  |           | ON                | ON                |                                                  |
| CY91F525KHSEPMC |           | OFF               | ON                |                                                  |
| CY91F524KSEPMC  |           | ON                | ON                |                                                  |
| CY91F524KHSEPMC |           | OFF               | ON                |                                                  |
| CY91F523KSEPMC  |           | ON                | ON                |                                                  |
| CY91F523KHSEPMC |           | OFF               | ON                |                                                  |
| CY91F522KSEPMC  |           | ON                | ON                |                                                  |
| CY91F522KHSEPMC |           | OFF               | ON                |                                                  |

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package*                                         |
|-----------------|-----------|-------------------|-------------------|--------------------------------------------------|
| CY91F526KWEPMC1 | Yes       | ON                | ON                | LQN • 144 pin,<br>(LeaE pitch 0.4 mm)<br>Plastic |
| CY91F526KJEPMC1 |           | OFF               | ON                |                                                  |
| CY91F525KWEPMC1 |           | ON                | ON                |                                                  |
| CY91F525KJEPMC1 |           | OFF               | ON                |                                                  |
| CY91F524KWEPMC1 |           | ON                | ON                |                                                  |
| CY91F524KJEPMC1 |           | OFF               | ON                |                                                  |
| CY91F523KWEPMC1 |           | ON                | ON                |                                                  |
| CY91F523KJEPMC1 |           | OFF               | ON                |                                                  |
| CY91F522KWEPMC1 |           | ON                | ON                |                                                  |
| CY91F522KJEPMC1 |           | OFF               | ON                |                                                  |
| CY91F526KSEPMC1 | None      | ON                | ON                |                                                  |
| CY91F526KHEPMC1 |           | OFF               | ON                |                                                  |
| CY91F525KSEPMC1 |           | ON                | ON                |                                                  |
| CY91F525KHEPMC1 |           | OFF               | ON                |                                                  |
| CY91F524KSEPMC1 |           | ON                | ON                |                                                  |
| CY91F524KHEPMC1 |           | OFF               | ON                |                                                  |
| CY91F523KSEPMC1 |           | ON                | ON                |                                                  |
| CY91F523KHEPMC1 |           | OFF               | ON                |                                                  |
| CY91F522KSEPMC1 |           | ON                | ON                |                                                  |
| CY91F522KHEPMC1 |           | OFF               | ON                |                                                  |
| CY91F526JWEPMC  | Yes       | ON                | ON                | LQM • 120 pin,<br>Plastic                        |
| CY91F526JJEPMC  |           | OFF               | ON                |                                                  |
| CY91F525JWEPMC  |           | ON                | ON                |                                                  |
| CY91F525JJEPMC  |           | OFF               | ON                |                                                  |
| CY91F524JWEPMC  |           | ON                | ON                |                                                  |
| CY91F524JJEPMC  |           | OFF               | ON                |                                                  |
| CY91F523JWEPMC  |           | ON                | ON                |                                                  |
| CY91F523JJEPMC  |           | OFF               | ON                |                                                  |
| CY91F522JWEPMC  |           | ON                | ON                |                                                  |
| CY91F522JJEPMC  |           | OFF               | ON                |                                                  |
| CY91F526JSEPMC  | None      | ON                | ON                |                                                  |
| CY91F526JHEPMC  |           | OFF               | ON                |                                                  |
| CY91F525JSEPMC  |           | ON                | ON                |                                                  |
| CY91F525JHEPMC  |           | OFF               | ON                |                                                  |
| CY91F524JSEPMC  |           | ON                | ON                |                                                  |
| CY91F524JHEPMC  |           | OFF               | ON                |                                                  |
| CY91F523JSEPMC  |           | ON                | ON                |                                                  |
| CY91F523JHEPMC  |           | OFF               | ON                |                                                  |
| CY91F522JSEPMC  |           | ON                | ON                |                                                  |
| CY91F522JHEPMC  |           | OFF               | ON                |                                                  |

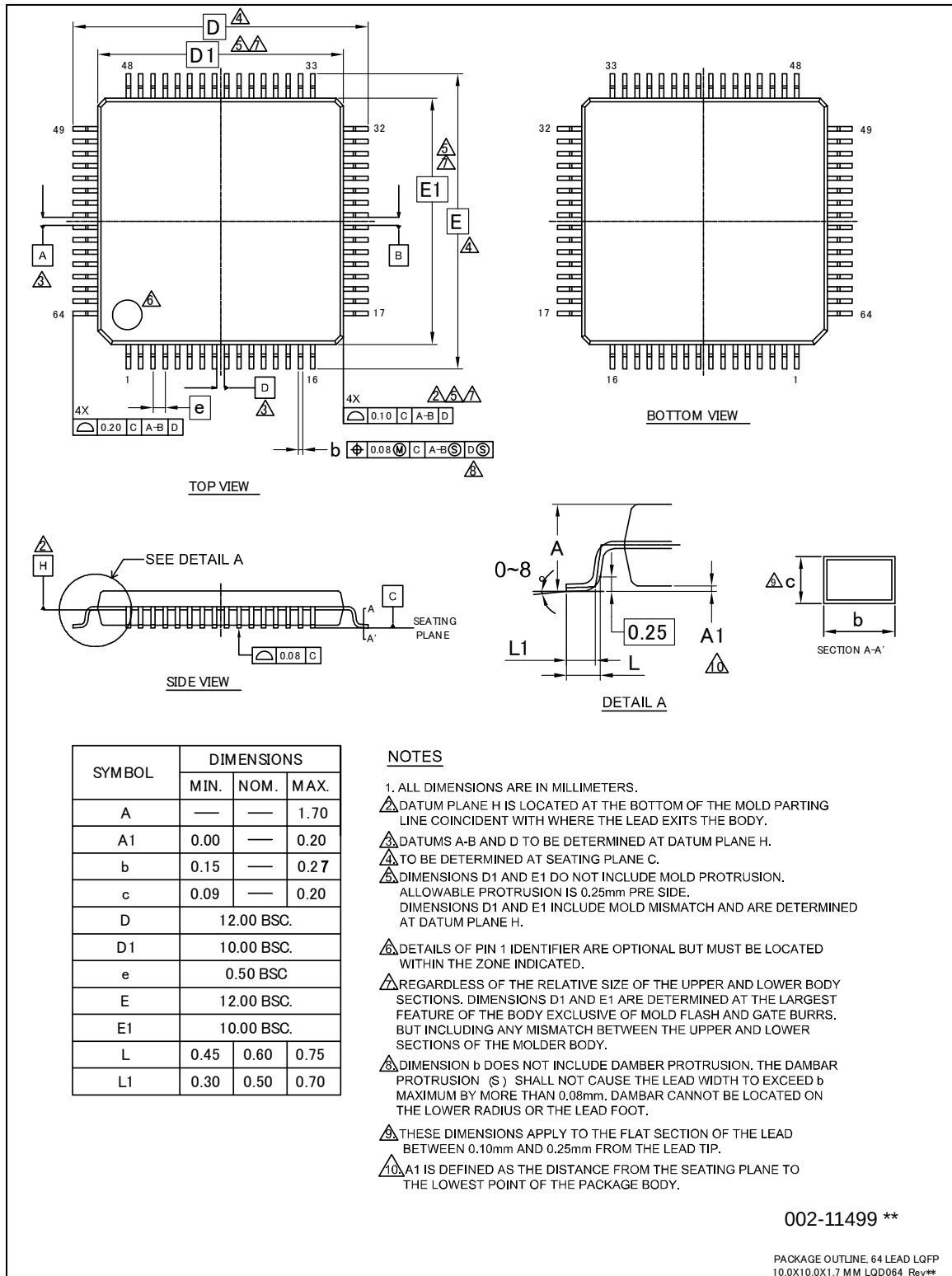
| Part Number    | Sub Clock | CSV Initial Value | LVD Initial Value | Package*                  |
|----------------|-----------|-------------------|-------------------|---------------------------|
| CY91F526FWEPMC | Yes       | ON                | ON                | LQI • 100 pin,<br>Plastic |
| CY91F526FJEPMC |           | OFF               | ON                |                           |
| CY91F525FWEPMC |           | ON                | ON                |                           |
| CY91F525FJEPMC |           | OFF               | ON                |                           |
| CY91F524FWEPMC |           | ON                | ON                |                           |
| CY91F524FJEPMC |           | OFF               | ON                |                           |
| CY91F523FWEPMC |           | ON                | ON                |                           |
| CY91F523FJEPMC |           | OFF               | ON                |                           |
| CY91F522FWEPMC |           | ON                | ON                |                           |
| CY91F522FJEPMC |           | OFF               | ON                |                           |
| CY91F526FSEPMC | None      | ON                | ON                |                           |
| CY91F526FHEPMC |           | OFF               | ON                |                           |
| CY91F525FSEPMC |           | ON                | ON                |                           |
| CY91F525FHEPMC |           | OFF               | ON                |                           |
| CY91F524FSEPMC |           | ON                | ON                |                           |
| CY91F524FHEPMC |           | OFF               | ON                |                           |
| CY91F523FSEPMC |           | ON                | ON                |                           |
| CY91F523FHEPMC |           | OFF               | ON                |                           |
| CY91F522FSEPMC |           | ON                | ON                |                           |
| CY91F522FHEPMC |           | OFF               | ON                |                           |
| CY91F526DWEPMC | Yes       | ON                | ON                | LQH • 80 pin,<br>Plastic  |
| CY91F526DJEPMC |           | OFF               | ON                |                           |
| CY91F525DWEPMC |           | ON                | ON                |                           |
| CY91F525DJEPMC |           | OFF               | ON                |                           |
| CY91F524DWEPMC |           | ON                | ON                |                           |
| CY91F524DJEPMC |           | OFF               | ON                |                           |
| CY91F523DWEPMC |           | ON                | ON                |                           |
| CY91F523DJEPMC |           | OFF               | ON                |                           |
| CY91F522DWEPMC |           | ON                | ON                |                           |
| CY91F522DJEPMC |           | OFF               | ON                |                           |
| CY91F526DSEPMC | None      | ON                | ON                |                           |
| CY91F526DHEPMC |           | OFF               | ON                |                           |
| CY91F525DSEPMC |           | ON                | ON                |                           |
| CY91F525DHEPMC |           | OFF               | ON                |                           |
| CY91F524DSEPMC |           | ON                | ON                |                           |
| CY91F524DHEPMC |           | OFF               | ON                |                           |
| CY91F523DSEPMC |           | ON                | ON                |                           |
| CY91F523DHEPMC |           | OFF               | ON                |                           |
| CY91F522DSEPMC |           | ON                | ON                |                           |
| CY91F522DHEPMC |           | OFF               | ON                |                           |

| Part Number     | Sub Clock | CSV Initial Value | LVD Initial Value | Package*                 |
|-----------------|-----------|-------------------|-------------------|--------------------------|
| CY91F526BWEPMC1 | Yes       | ON                | ON                | LQD • 64 pin,<br>Plastic |
| CY91F526BJEPMC1 |           | OFF               | ON                |                          |
| CY91F525BWEPMC1 |           | ON                | ON                |                          |
| CY91F525BJEPMC1 |           | OFF               | ON                |                          |
| CY91F524BWEPMC1 |           | ON                | ON                |                          |
| CY91F524BJEPMC1 |           | OFF               | ON                |                          |
| CY91F523BWEPMC1 |           | ON                | ON                |                          |
| CY91F523BJEPMC1 |           | OFF               | ON                |                          |
| CY91F522BWEPMC1 |           | ON                | ON                |                          |
| CY91F522BJEPMC1 |           | OFF               | ON                |                          |
| CY91F526BSEPMC1 | None      | ON                | ON                |                          |
| CY91F526BHEPMC1 |           | OFF               | ON                |                          |
| CY91F525BSEPMC1 |           | ON                | ON                |                          |
| CY91F525BHEPMC1 |           | OFF               | ON                |                          |
| CY91F524BSEPMC1 |           | ON                | ON                |                          |
| CY91F524BHEPMC1 |           | OFF               | ON                |                          |
| CY91F523BSEPMC1 |           | ON                | ON                |                          |
| CY91F523BHEPMC1 |           | OFF               | ON                |                          |
| CY91F522BSEPMC1 |           | ON                | ON                |                          |
| CY91F522BHEPMC1 |           | OFF               | ON                |                          |

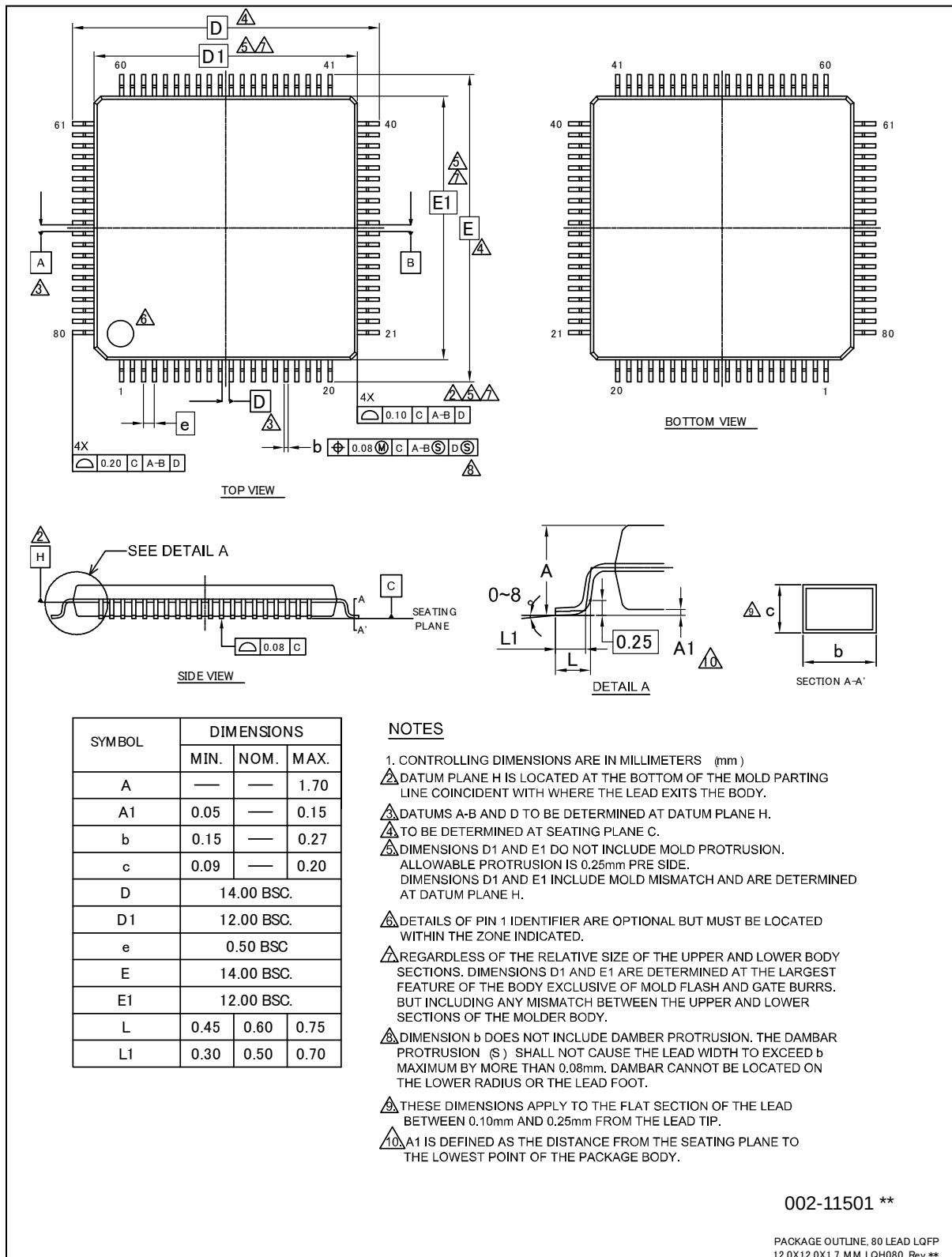
\*: For details of the package, see [Package Dimensions](#).

## 17. Package Dimensions

| Package Type | Package Code |
|--------------|--------------|
| LQFP 64pin   | LQD064       |



| Package Type | Package Code |
|--------------|--------------|
| LQFP 80pin   | LQH080       |



| Package Type | Package Code |
|--------------|--------------|
| LQFP 100pin  | LQI100       |



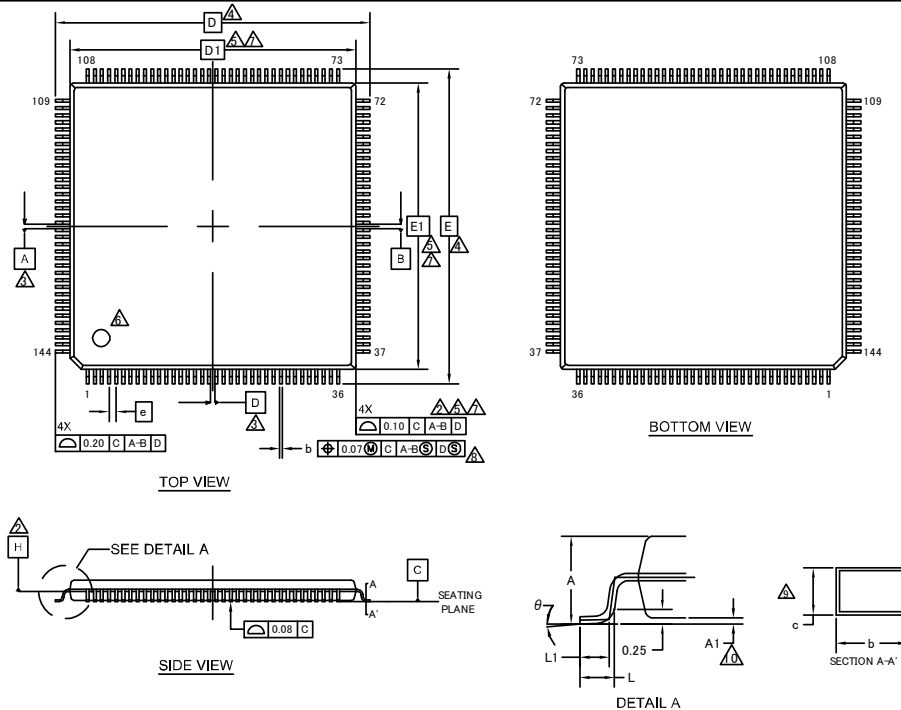
| Package Type | Package Code |
|--------------|--------------|
| LQFP 120pin  | LQM120       |



| Package Type | Package Code |
|--------------|--------------|
| LQFP 144pin  | LQS144       |



| Package Type | Package Code |
|--------------|--------------|
| LQFP 144pin  | LQN144       |



| SYMBOL   | DIMENSIONS |      |       |
|----------|------------|------|-------|
|          | MIN.       | NOM. | MAX.  |
| A        | —          | —    | 1.70  |
| A1       | 0.05       | —    | 0.15  |
| b        | 0.145      | 0.18 | 0.215 |
| c        | 0.115      | —    | 0.195 |
| D        | 18.00 BSC  |      |       |
| D1       | 16.00 BSC  |      |       |
| e        | 0.40 BSC   |      |       |
| E        | 18.00 BSC  |      |       |
| E1       | 16.00 BSC  |      |       |
| L        | 0.45       | 0.60 | 0.75  |
| L1       | 0.30       | 0.50 | 0.70  |
| $\theta$ | 0°         | —    | 8°    |

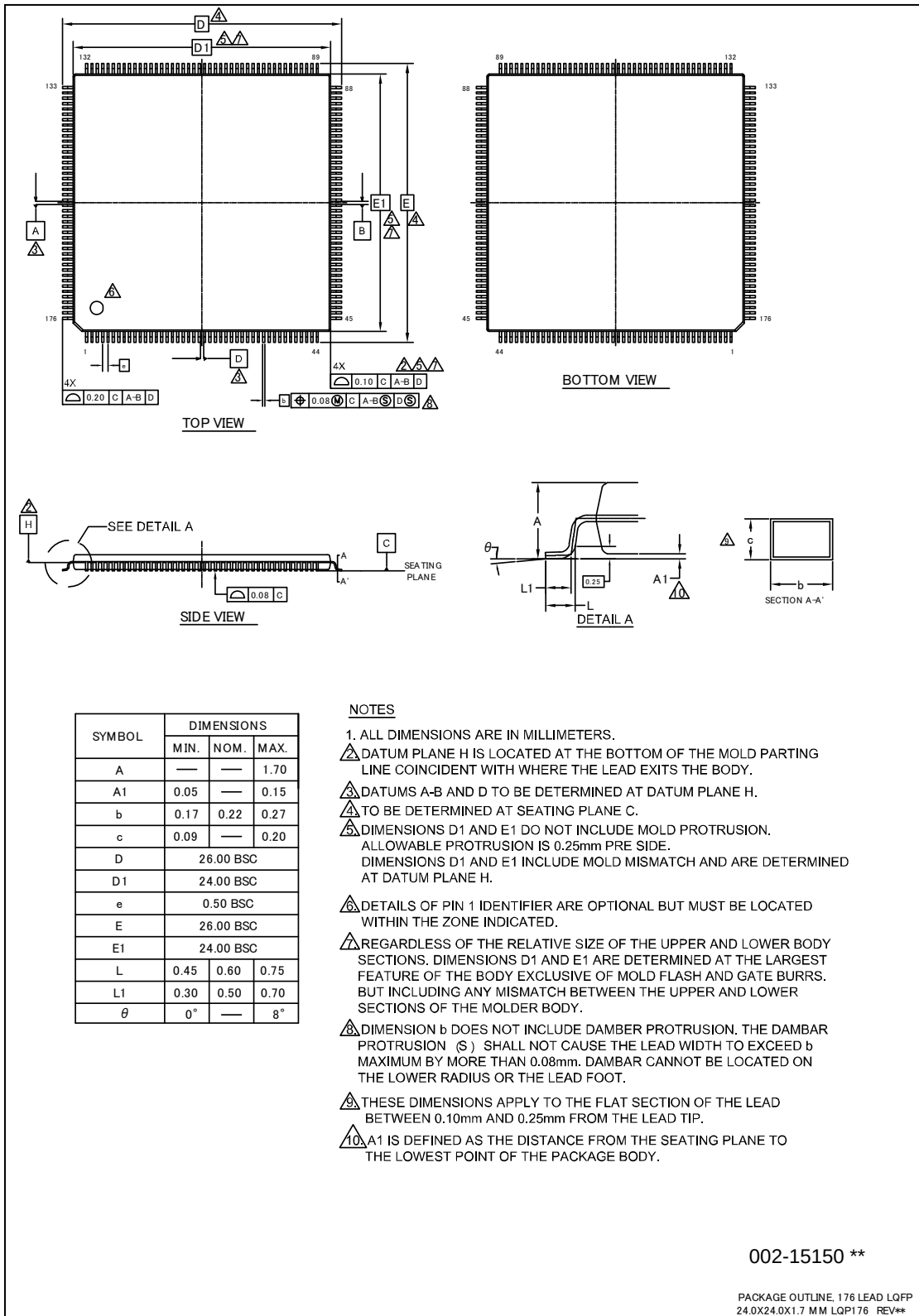
### NOTES

- CONTROLLING DIMENSIONS ARE IN MILLIMETERS (mm)
- DATUM PLANE H IS LOCATED AT THE BOTTOM OF THE MOLD PARTING LINE COINCIDENT WITH WHERE THE LEAD EXITS THE BODY.
- DATUMS A-B AND D TO BE DETERMINED AT DATUM PLANE H.
- TO BE DETERMINED AT SEATING PLANE C.
- DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25mm PRE SIDE. DIMENSIONS D1 AND E1 INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE H.
- DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
- REGARDLESS OF THE RELATIVE SIZE OF THE UPPER AND LOWER BODY SECTIONS. DIMENSIONS D1 AND E1 ARE DETERMINED AT THE LARGEST FEATURE OF THE BODY EXCLUSIVE OF MOLD FLASH AND GATE BURRS. BUT INCLUDING ANY MISMATCH BETWEEN THE UPPER AND LOWER SECTIONS OF THE MOLDER BODY.
- DIMENSION b DOES NOT INCLUDE DAMBER PROTRUSION. THE DAMBER PROTRUSION (S) SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED b MAXIMUM BY MORE THAN 0.08mm. DAMBER CANNOT BE LOCATED ON THE LOWER RADIUS OR THE LEAD FOOT.
- THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10mm AND 0.25mm FROM THE LEAD TIP.
- A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.

002-14045 \*\*

PACKAGE OUTLINE, 144 LEAD LQFP  
 16.0X16.0X1.7 MM LQN144 REV\*\*

| Package Type | Package Code |
|--------------|--------------|
| LQFP 176pin  | LQP176       |



## 18. Errata

This section describes the errata for the CY91520 Series. Details include errata trigger conditions, scope of impact, available workarounds, and silicon revision applicability. Contact your local Cypress Sales Representative if you have questions.

### Part Numbers Affected

| Part Number         |
|---------------------|
| CY91F522B/D/F/J/K/L |
| CY91F523B/D/F/J/K/L |
| CY91F524B/D/F/J/K/L |
| CY91F525B/D/F/J/K/L |
| CY91F526B/D/F/J/K/L |

### CY91F522/3/4/5/6 Qualification Status

Product Status: Production

### Errata Summary

The following table defines the errata applicability to available CY91520 Series devices.

| Items                                                                 | Part Number                                                       | Silicon Revision | Fix Status                                       |
|-----------------------------------------------------------------------|-------------------------------------------------------------------|------------------|--------------------------------------------------|
| [1]. Power-on Conditions is not enough in the Datasheet Specification | CY91F522B/D/F/J/K/L<br>CY91F523B/D/F/J/K/L<br>CY91F524B/D/F/J/K/L | B, C             | Will be fixed in production silicon version D, E |
| [2]. Limitation for Watch mode (power off)                            | CY91F525B/D/F/J/K/L<br>CY91F526B/D/F/J/K/L                        | B, C, D, E       | -                                                |

#### 1. Power-on Conditions is not enough in the Datasheet Specification

##### ■ Problem Definition

If the Power-On-Reset and Internal Low Voltage Detection are not generated, some port functions will not be available.

##### ■ Parameters Affected

$t_{OFF}$  for Power off time on Power-on Conditions

VCC Power ramp rate on Power-on Conditions

##### ■ Trigger Condition

When the power supply voltage to the MCU has been turned off but has not reached 0 V when the power supply voltage is turned on again, MCU does not generate an internal power-on-reset signal (Power-On reset or Internal LVD reset). Then, some port functions will not be available.

If below condition (1) or (2) or (3) is satisfied, Power-On Reset (Initialization-Reset signal) is generated and no problem occurs.

- (1) The VCC voltage is less than 200 mV for 50 ms or longer ( $t_{OFF}$ )
- (2) VCC Power ramp rate less than 4 mV/ $\mu$ s (dV/dt) until a voltage level for a safe Power-On detection is reached
- (3) C-pin voltage is below 60 mV when VCC is turned on again

### ■ Scope of Impact

For the affected parts, when the Power-On Reset and Internal Low Voltage Detection are not generated, the MCU may set invalid package and sub clock option information. Therefore, the MCU may operate with an invalid pin configuration.

### ■ Workaround

For the affected parts, it is necessary to satisfy at least one of the Power-On Reset requirements for any Power-On event as given below:

- (1) The VCC voltage is less than 200 mV for 50 ms or longer ( $t_{OFF}$ )
- (2) VCC Power ramp rate is less than 4 mV/ $\mu$ s (dV/dt) until a voltage level for a safe Power-On detection is reached
- (3) C-pin voltage is below 60 mV when VCC is turned on again

If the customer system does not satisfy the condition above-mentioned, Cypress will release new version D, so Cypress recommends the version D for CY91F52x. The new version prevents the limitation when an external reset signal is asserted at pin RSTX anytime the supply voltage (VCC) is turned on.

### ■ Fix Status

Will be fixed in production silicon version D, E

## 2. Limitation for Watch mode (power off)

### ■ Problem Definition

If the below all trigger conditions (1) to (3) are satisfied, the below registers will be initialized after MCU recovers from watch mode (power off).

### ■ Trigger Conditions

- (1) Using the watch mode (power off)
- (2) Interrupt levels that are used as sources for recovering from the watch mode (power off) are '16' to '30', or using NMIX pin as source for recovering from the watch mode (power off)
- (3) The sources for recovering from the watch mode (power off) are generated between PCLK 1 cycle and PMUCLK 3 cycles (\*), after CPU state changes to the watch mode (power off)  
(\*): In case of PCLK = 0.5 MHz and PMUCLK = 32 kHz, it is approx. 2  $\mu$ s to 100  $\mu$ s

### ■ Scope of Impact

If the all trigger conditions (1) to (3) are satisfied, the below registers will be initialized after MCU recovers from watch mode (power off).

WTCRH, WTCRM, WTCRL  
CSELR.SCEN  
CMONR.SCRDY  
CCRTSELR.CST  
CCRTSELR.CSC

**■ Workaround**

It is necessary to satisfy the below both conditions of (1) and (2).

- (1) Interrupt levels that are used as sources for recovering from the watch mode (power off) are '31', before CPU state changes to the watch mode (power off)
- (2) Don't use NMIX pin as source for recovering from the watch mode (power off)

**■ Fix Status**

Will not be planned

## 19. Major Changes

Spanion Publication Number: MB91F526L\_DS705-00011

| Page         | Section                                                            | Change Results                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Revision 1.0 |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                  |
| -            | -                                                                  | Initial release                                                                                                                                                                                                                                                                                                                                                                                  |
| Revision 2.0 |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3            | ■FEATURES                                                          | Corrected the following description.<br>5V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 Automotive input<br>↓<br>5V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 CMOS hysteresis input                                                                                                                                                                                               |
| 33 to 36     | ■I/O CIRCUIT TYPE                                                  | Corrected the following description to "Type F, G, I, J, K, M".<br>Schmitt input → CMOS hysteresis input<br>Corrected the following description to "Type D, E".<br>I <sup>2</sup> C Schmitt input → I <sup>2</sup> C hysteresis input                                                                                                                                                            |
| 44 to 49     | ■BLOCK DIAGRAM                                                     | Corrected the following description.<br>●MB91F522B, MB91F523B, MB91F524B, MB91F525B, MB91F526B<br>●MB91F522D, MB91F523D, MB91F524D, MB91F525D, MB91F526D<br>●MB91F522F, MB91F523F, MB91F524F, MB91F525F, MB91F526F<br>●MB91F522J, MB91F523J, MB91F524J, MB91F525J, MB91F526J<br>●MB91F522K, MB91F523K, MB91F524K, MB91F525K, MB91F526K<br>●MB91F522L, MB91F523L, MB91F524L, MB91F525L, MB91F526L |
| 138          | ■ELECTRICAL CHARACTERISTICS<br>2. Recommended operating conditions | Added the following description.<br>*1 : When it is used outside recommended operation guarantee range (range of the operation guarantee), contact your sales representative. Moreover, minimum value with an effective external low-voltage detection reset becomes a voltage until generating low-voltage detection reset                                                                      |
| 139,140      | ■ELECTRICAL CHARACTERISTICS<br>3.DC characteristics                | Corrected the value of "ICCT5 When using sub clock 32kHz TA=+25°C". Max 1420μA → Max 2000μA                                                                                                                                                                                                                                                                                                      |
| 139          | ■ELECTRICAL CHARACTERISTICS<br>3.DC characteristics                | Corrected the value of "Power supply voltage range".<br>(TA:-40°C to +105°C, Vcc=AVcc=2.7V to 5.5V, VSS=AVSS=0.0V)<br>↓<br>(TA:-40°C to +105°C, Vcc=AVcc=5.0V±10%/3.3V±0.3V, VSS=AVSS=0.0V)                                                                                                                                                                                                      |
| 140,141      | ■ELECTRICAL CHARACTERISTICS<br>3.DC characteristics                | Corrected the value of "Power supply voltage range".<br>(TA:-40°C to +125°C, Vcc=AVcc=2.7V to 5.5V, VSS=AVSS=0.0V)<br>↓<br>(TA:-40°C to +125°C, Vcc=AVcc=5.0V±10%/3.3V±0.3V, VSS=AVSS=0.0V)                                                                                                                                                                                                      |
| 141          | ■ELECTRICAL CHARACTERISTICS<br>3.DC characteristics                | Corrected the value of " Pull-up resistance R <sub>UP1</sub> ".<br>Vcc=3.3V±0.3V Min 49 Max 140 →Min 45 Max 140                                                                                                                                                                                                                                                                                  |
| 141          | ■ELECTRICAL CHARACTERISTICS<br>3.DC characteristics                | Corrected the following description.<br>Pull-up resistance R <sub>UP2</sub><br>Port pin other than P035,041,093,122 → P073,074,076,077                                                                                                                                                                                                                                                           |
| 141          | ■ELECTRICAL CHARACTERISTICS<br>3.DC characteristics                | Corrected the value of " Pull-up resistance R <sub>UP2</sub> ".<br>VCC=5.0V±10% Min 25 Max 100 →Min 25 Max 60<br>VCC=3.3V±0.3V Min 49 Max 140 →Min 33 Max 90                                                                                                                                                                                                                                     |
| 141          | ■ELECTRICAL CHARACTERISTICS<br>3.DC characteristics                | Added the value of " Pull-up resistance R <sub>UP3</sub> ".<br>Pin name : Port pin other than P035,041,073,074,076,077,093,122<br>VCC=5.0V±10% Min 25 Max 100<br>VCC=3.3V±0.3V Min 45 Max 140                                                                                                                                                                                                    |

| Page                | Section                                                                                                                                          | Change Results                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 150,152,<br>154,156 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-1),(4-1-2),(4-1-3),(4-1-4) | (4-1-1),(4-1-4)SCK <sub>J</sub> ⇒SOT delay time $t_{SLOVI}$<br>(4-1-2),(4-1-3)SCK <sub>I</sub> ⇒SOT delay time $t_{SHOVI}$<br>Corrected the following description.<br>Pin name: SCK0 to SCK11<br>SOT0 to SOT11<br>Value: Min -30 Max 30<br>↓<br>Pin name: SCK0 to SCK2,SCK5 to SCK11<br>SOT0 to SOT2,SOT5 to SOT11<br>Value: Min -30 Max 30<br>Pin name: SCK3,SCK4<br>SOT3,SOT4<br>Value: Min -300 Max 300 |
| 150,152,<br>154,156 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-1),(4-1-2),(4-1-3),(4-1-4) | (4-1-1),(4-1-4)Valid SIN⇒SCK <sub>I</sub> setup time $t_{IVSHI}$<br>(4-1-2),(4-1-3)Valid SIN⇒SCK <sub>J</sub> setup time $t_{IVSLI}$<br>Corrected the following description.<br>Pin name: SCK0 to SCK11 SIN0 to SIN11<br>Value: Min 34 Max -<br>↓<br>Pin name: SCK0 to SCK2,SCK5 to SCK11 SIN0 to SIN2,SIN5 to SIN11<br>Value: Min 34 Max -<br>Pin name: SCK3,SCK4,SIN3,SIN4<br>Value: Min 300 Max -       |
| 150,152,<br>154,156 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-1),(4-1-2),(4-1-3),(4-1-4) | (4-1-1),(4-1-4)SCK <sub>J</sub> ⇒SOT delay time $t_{SLOVE}$<br>(4-1-2),(4-1-3)SCK <sub>I</sub> ⇒SOT delay time $t_{SHOVE}$<br>Corrected the following description.<br>Pin name: SCK0 to SCK11<br>SOT0 to SOT11<br>Value: Min - Max 33<br>↓<br>Pin name: SCK0 to SCK2,SCK5 to SCK11<br>SOT0 to SOT2,SOT5 to SOT11<br>Value: Min - Max 33<br>Pin name: SCK3,SCK4 SOT3,SOT4<br>Value: Min - Max 300           |
| 150,152,<br>154,156 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-1),(4-1-2),(4-1-3),(4-1-4) | (4-1-1),(4-1-2),(4-1-3),(4-1-4)SCK fall time $t_F$<br>Corrected the following description.<br>Pin name: SCK0 to SCK2,SCK5 to SCK11<br>Value: Min - Max 5<br>Pin name: SCK3,SCK4<br>Value: Min - Max 250<br>↓<br>Pin name: SCK0 to SCK11<br>Value: Min - Max 5                                                                                                                                              |

| Page                | Section                                                                                                                                          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 158,161,<br>164,167 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-5),(4-1-6),(4-1-7),(4-1-8) | (4-1-5)SCS $\downarrow$ $\Rightarrow$ SCK $\downarrow$ setup time $t_{CSSI}$<br>(4-1-6)SCS $\downarrow$ $\Rightarrow$ SCK $\uparrow$ setup time $t_{CSSI}$<br>(4-1-7)SCS $\uparrow$ $\Rightarrow$ SCK $\downarrow$ setup time $t_{CSSI}$<br>(4-1-8)SCS $\uparrow$ $\Rightarrow$ SCK $\uparrow$ setup time $t_{CSSI}$<br>Corrected the following description.<br>Pin name: SCK1 to SCK11<br>SCS1 to SCS3,SCS40 to SCS43,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11<br>Value: Min $t_{CSSU}+0$ Max $t_{CSSU}+50$<br>$\downarrow$<br>Pin name: SCK1,SCK2,SCK5 to SCK11<br>SCS1,SCS2,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11<br>Value: Min $t_{CSSU}-50$ Max $t_{CSSU}+0$<br>Pin name: SCK3,SCK4 SCS3,SCS40 to SCS43<br>Value: Min $t_{CSSU}-50$ Max $t_{CSSU}+300$ |
| 158,161,<br>164,167 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-5),(4-1-6),(4-1-7),(4-1-8) | (4-1-5)SCK $\uparrow$ $\Rightarrow$ SCS $\uparrow$ hold time $t_{CSHI}$<br>(4-1-6)SCK $\downarrow$ $\Rightarrow$ SCS $\uparrow$ hold time $t_{CSHI}$<br>(4-1-7)SCK $\uparrow$ $\Rightarrow$ SCS $\downarrow$ hold time $t_{CSHI}$<br>(4-1-8)SCK $\downarrow$ $\Rightarrow$ SCS $\downarrow$ hold time $t_{CSHI}$<br>Corrected the following description.<br>Pin name: SCK1 to SCK11<br>SCS1 to SCS3,SCS40 to SCS43,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11<br>Value: Min $t_{CSHD}-50$ Max $t_{CSHD}+0$<br>$\downarrow$<br>Pin name: SCK1,SCK2,SCK5 to SCK11<br>SCS1,SCS2,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11<br>Value: Min $t_{CSHD}-10$ Max $t_{CSHD}+50$<br>Pin name: SCK3,SCK4 SCS3,SCS40 to SCS43<br>Value: Min $t_{CSHD}-300$ Max $t_{CSHD}+50$    |
| 158,161,<br>164,167 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-5),(4-1-6),(4-1-7),(4-1-8) | (4-1-5),(4-1-6)SCS $\downarrow$ $\Rightarrow$ SOT delay time $t_{DSE}$<br>(4-1-7),(4-1-8)SCS $\uparrow$ $\Rightarrow$ SOT delay time $t_{DSE}$<br>Corrected the following description.<br>Pin name: SCS1 to SCS3,SCS40 to SCS43,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11<br>SOT1 to SOT11<br>Value: Min - Max 40<br>$\downarrow$<br>Pin name: SCS1,SCS2,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11<br>SOT1,SOT2,SOT5 to SOT11<br>Value: Min - Max 40<br>Pin name: SCS3,SCS40 to SCS43<br>SOT3,SOT4<br>Value: Min - Max 300                                                                                                                                                                                                                                       |

| Page                | Section                                                                                                                                          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 159,162,<br>165,168 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-5),(4-1-6),(4-1-7),(4-1-8) | (4-1-5)SCK↓⇒SCS↓ clock switch time $t_{SCC}$<br>(4-1-6)SCK↑⇒SCS↓ clock switch time $t_{SCC}$<br>(4-1-7)SCK↓⇒SCS↑ clock switch time $t_{SCC}$<br>(4-1-8)SCK↑⇒SCS↑ clock switch time $t_{SCC}$<br>Corrected the following description.<br>Pin name: SCK1 to SCK11<br>SCS1 to SCS3,SCS40 to SCS43,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11<br>Value: Min $3t_{C_{PP}}+0$ Max $3t_{C_{PP}}+50$<br>↓<br>Pin name: SCK1,SCK2,SCK5 to SCK11<br>SCS1,SCS2,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11<br>Value: Min $3t_{C_{PP}}-10$ Max $3t_{C_{PP}}+50$<br>Pin name: SCK3,SCK4 SCS3,SCS40 to SCS43<br>Value: Min $3t_{C_{PP}}-300$ Max $3t_{C_{PP}}+50$ |
| 159,162,<br>165,168 | <b>■ELECTRICAL CHARACTERISTICS</b><br>4. AC characteristics<br>(4) Multi-function Serial<br>(4-1) CSIO timing<br>(4-1-5),(4-1-6),(4-1-7),(4-1-8) | Added the following description.<br>Regardless of the deselect time setting, once after the serial chip select pin becomes inactive, it will take at least five peripheral bus clock cycles to be active again                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 184                 | <b>■ELECTRICAL CHARACTERISTICS</b><br>5.A/D Converter<br>(1) 12-bit A/D Converter<br>Electrical Characteristics                                  | Added the value of "Total error".<br>Total error value Min – Typ – Max $\pm 12$ LSB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 184                 | <b>■ELECTRICAL CHARACTERISTICS</b><br>5.A/D Converter<br>(1) 12-bit A/D Converter<br>Electrical Characteristics                                  | Corrected the value of "Zero transition voltage".<br>Min $AV_{RL}+0.5LSB-20mV$ Max $AV_{RL}+0.5LSB+20mV$<br>↓<br>Min $AV_{RL}-11.5LSB$ Max $AV_{RL}+12.5LSB$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 184                 | <b>■ELECTRICAL CHARACTERISTICS</b><br>5.A/D Converter<br>(1) 12-bit A/D Converter<br>Electrical Characteristics                                  | Corrected the value of "Full-scale transition voltage".<br>Min $AV_{RH}-1.5LSB-20mV$ Max $AV_{RH}-1.5LSB+20mV$<br>↓<br>Min $AV_{RH}-13.5LSB$ Max $AV_{RH}+10.5LSB$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 184                 | <b>■ELECTRICAL CHARACTERISTICS</b><br>5.A/D Converter<br>(1) 12-bit A/D Converter<br>Electrical Characteristics                                  | Added the following description.<br>Parameter : Power supply current $I_A AV_{CC}^*3$<br>*3: The power supply current described only current value on A/D converter. The total $AV_{CC}$ current value must be calculated the power supply current for A/D converter and D/A converter.                                                                                                                                                                                                                                                                                                                                                                                            |
| 188                 | <b>■ELECTRICAL CHARACTERISTICS</b><br>7.D/A Converter                                                                                            | Added the following description.<br>Parameter : Power supply current *1<br>*1: The power supply current described only current value on D/A converter.The total $AV_{CC}$ current value must be calculated the power supply current for D/A converter and A/D converter.                                                                                                                                                                                                                                                                                                                                                                                                           |
| 187                 | <b>■ELECTRICAL CHARACTERISTICS</b><br>6.Flash memory                                                                                             | Parameter: Erase cycle*2/Data retain time<br>Deleted the following description.<br>Remarks :<br>"Temperature at writing/erasing $T_j < +105^{\circ}C$ "                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Page       | Section                                        | Change Results                                                                                                                                                                                                                              |
|------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 188        | ■ELECTRICAL CHARACTERISTICS<br>7.D/A Converter | Corrected the following description.<br>Parameter : Power supply current<br>Symbol IA Pin name AV <sub>CC</sub><br>Symbol IAH Pin name AV <sub>CC</sub><br>↓<br>Symbol IA Pin name AV <sub>CC</sub><br>Symbol IAH Pin name AV <sub>CC</sub> |
| 190        | ■EXAMPLE CHARACTERISTICS                       | Corrected the following description.<br>Watch mode                                                                                                                                                                                          |
| 192        | ■ORDERING INFORMATION                          | Corrected the following description.<br>■ORDERING INFORMATION<br>↓<br>■ORDERING INFORMATION MB91F52xxxB* <sup>1</sup><br>Package<br>↓<br>Package* <sup>2</sup>                                                                              |
| 198        | ■ORDERING INFORMATION                          | Added the following description.<br>* <sup>1</sup> : It is only supported for customers who have already adopted it now. We do not recommend adopting new products.                                                                         |
| 198        | ■ORDERING INFORMATION                          | Corrected the following description.<br>For details of the package, see "■ PACKAGE DIMENSIONS ".<br>↓<br>* <sup>2</sup> : For details of the package, see "■ PACKAGE DIMENSIONS ".                                                          |
| 199 to 205 | ■ORDERING INFORMATION                          | Added the following description.<br>■ORDERING INFORMATION MB91F52xxxC                                                                                                                                                                       |
| -          | -                                              | Company name and layout design change                                                                                                                                                                                                       |

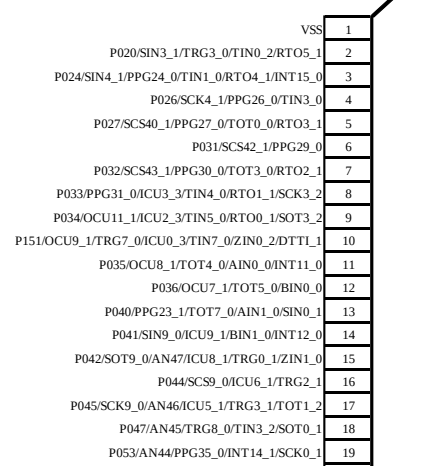
| Page                               | Section         | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 |      |                                 |        |
|------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------|---------------------------------|--------|
| Cypress Document Number: 002-04662 |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |                                 |        |
| Rev *B                             |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |                                 |        |
| 1                                  | ■Features       | <p>Corrected the following description.</p> <ul style="list-style-type: none"><li>· Clock generation (equipped with SSCG function)<ul style="list-style-type: none"><li>· Main oscillation (4MHz to 16MHz)</li><li>· Sub oscillation (32kHz to 100kHz) or none sub oscillation</li><li>· PLL multiplication rate : 1 to 20 times</li></ul></li></ul> <p>↓</p> <ul style="list-style-type: none"><li>· Clock generation (equipped with SSCG function)<ul style="list-style-type: none"><li>· Main oscillation (4MHz to 16MHz)</li><li>· Sub oscillation (32kHz) or no sub oscillation</li><li>· PLL multiplication rate : 1 to 20 times</li><li>· Equipped with a 100kHz CR oscillator</li></ul></li></ul>                           |                                 |      |                                 |        |
| 2                                  | ■Features       | <p>Corrected the following description.</p> <ul style="list-style-type: none"><li>· Base timer : Max. 2 channels<ul style="list-style-type: none"><li>· 16-bit timer</li><li>· Any of four PWM/PPG/PWC/reload timer functions can be selected and used</li><li>· A 32-bit timer can be used in 2 channels of cascade mode</li></ul></li></ul> <p>↓</p> <ul style="list-style-type: none"><li>· Base timer : Max. 2 channels<ul style="list-style-type: none"><li>· 16-bit timer</li><li>· Any of four PWM/PPG/PWC/reload timer functions can be selected and used</li><li>· As for the PWC function and the reload timer function, a pair of 16-bit timers can be used as one 32-bit timer in the cascaded mode</li></ul></li></ul> |                                 |      |                                 |        |
| 6                                  | ■Product Lineup | <p>Corrected the following description for Product lineup comparison(64 pin).</p> <table><tr><td>Multi-Function Serial Interface</td><td>8ch</td></tr></table> <p>↓</p> <table><tr><td>Multi-Function Serial Interface</td><td>8ch*1</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Multi-Function Serial Interface | 8ch  | Multi-Function Serial Interface | 8ch*1  |
| Multi-Function Serial Interface    | 8ch             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |                                 |        |
| Multi-Function Serial Interface    | 8ch*1           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |                                 |        |
| 6                                  | ■Product Lineup | <p>Added the following sentences under Product lineup comparison(64 pin)</p> <p>*1: Only channel 5, channel 6 and channel 11 support the I<sup>2</sup>C (standard mode).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |      |                                 |        |
| 7                                  | ■Product Lineup | <p>Corrected the following description for Product lineup comparison(80 pin).</p> <table><tr><td>Multi-Function Serial Interface</td><td>9ch</td></tr></table> <p>↓</p> <table><tr><td>Multi-Function Serial Interface</td><td>9ch*1</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Multi-Function Serial Interface | 9ch  | Multi-Function Serial Interface | 9ch*1  |
| Multi-Function Serial Interface    | 9ch             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |                                 |        |
| Multi-Function Serial Interface    | 9ch*1           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |                                 |        |
| 7                                  | ■Product Lineup | <p>Added the following sentences under Product lineup comparison(80 pin)</p> <p>*1: Only channel 5, channel 6 and channel 11 support the I<sup>2</sup>C (standard mode).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |      |                                 |        |
| 8                                  | ■Product Lineup | <p>Corrected the following description for Product lineup comparison(100 pin).</p> <table><tr><td>Multi-Function Serial Interface</td><td>12ch</td></tr></table> <p>↓</p> <table><tr><td>Multi-Function Serial Interface</td><td>12ch*1</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Multi-Function Serial Interface | 12ch | Multi-Function Serial Interface | 12ch*1 |
| Multi-Function Serial Interface    | 12ch            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |                                 |        |
| Multi-Function Serial Interface    | 12ch*1          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |                                 |        |
| 8                                  | ■Product Lineup | <p>Added the following sentences under Product lineup comparison(100 pin)</p> <p>*1: Only channel 5, channel 6, channel 7, channel 8 and channel 11 support the I<sup>2</sup>C (standard mode).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |      |                                 |        |

| Page                            | Section         | Change Results                                                                                                                                                                                                                                                                                                              |                                 |      |                                 |        |
|---------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------|---------------------------------|--------|
| 9                               | ■Product Lineup | <div>Corrected the following description for Product lineup comparison(120 pin).</div> <table><tr><td>Multi-Function Serial Interface</td><td>12ch</td></tr></table> <div>↓</div> <table><tr><td>Multi-Function Serial Interface</td><td>12ch*1</td></tr></table>                                                           | Multi-Function Serial Interface | 12ch | Multi-Function Serial Interface | 12ch*1 |
| Multi-Function Serial Interface | 12ch            |                                                                                                                                                                                                                                                                                                                             |                                 |      |                                 |        |
| Multi-Function Serial Interface | 12ch*1          |                                                                                                                                                                                                                                                                                                                             |                                 |      |                                 |        |
| 9                               | ■Product Lineup | <div>Added the following sentences under Product lineup comparison(120 pin)</div> <div>*1: Only channel 3 and channel 4 support the I<sup>2</sup>C (high-speed mode/standard mode).</div> <div>Only channel 5, channel 6, channel 7, channel 8 and channel 11 support the I<sup>2</sup>C (standard mode).</div>             |                                 |      |                                 |        |
| 10                              | ■Product Lineup | <div>Corrected the following description for Product lineup comparison(144 pin).</div> <table><tr><td>Multi-Function Serial Interface</td><td>12ch</td></tr></table> <div>↓</div> <table><tr><td>Multi-Function Serial Interface</td><td>12ch*1</td></tr></table>                                                           | Multi-Function Serial Interface | 12ch | Multi-Function Serial Interface | 12ch*1 |
| Multi-Function Serial Interface | 12ch            |                                                                                                                                                                                                                                                                                                                             |                                 |      |                                 |        |
| Multi-Function Serial Interface | 12ch*1          |                                                                                                                                                                                                                                                                                                                             |                                 |      |                                 |        |
| 10                              | ■Product Lineup | <div>Added the following sentences under Product lineup comparison(144 pin)</div> <div>*1: Only channel 3 and channel 4 support the I<sup>2</sup>C (high-speed mode/standard mode).</div> <div>Only channel 5, channel 6, channel 7, channel 8, channel 10 and channel 11 support the I<sup>2</sup>C (standard mode).</div> |                                 |      |                                 |        |
| 11                              | ■Product Lineup | <div>Corrected the following description for Product lineup comparison(176 pin).</div> <table><tr><td>Multi-Function Serial Interface</td><td>12ch</td></tr></table> <div>↓</div> <table><tr><td>Multi-Function Serial Interface</td><td>12ch*1</td></tr></table>                                                           | Multi-Function Serial Interface | 12ch | Multi-Function Serial Interface | 12ch*1 |
| Multi-Function Serial Interface | 12ch            |                                                                                                                                                                                                                                                                                                                             |                                 |      |                                 |        |
| Multi-Function Serial Interface | 12ch*1          |                                                                                                                                                                                                                                                                                                                             |                                 |      |                                 |        |
| 11                              | ■Product Lineup | <div>Added the following sentences under Product lineup comparison(176 pin)</div> <div>*1: Only channel 3 and channel 4 support the I<sup>2</sup>C (high-speed mode/standard mode).</div> <div>Only channel 5, channel 6, channel 7, channel 8, channel 10 and channel 11 support the I<sup>2</sup>C (standard mode).</div> |                                 |      |                                 |        |

| Page | Section                    | Change Results                                                                                                                                                                                                                                                      |
|------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13   | ■ Pin Assignment MB91F52xB | <p>Signals indicated by the shading below deleted in Figure.</p> <p>- Left side</p>  <p>↓</p>  |

| Page | Section                    | Change Results                                                                                                                                                                                      |
|------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13   | ■ Pin Assignment MB91F52xB | <p>- Right side</p>  <p>↓</p>  |

| Page | Section                    | Change Results                                                                                                                                                                               |
|------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13   | ■ Pin Assignment MB91F52xB | <p>- Top</p>  <p>↓</p>  |
| 13   | ■ Pin Assignment MB91F52xB | <p>The following note added on the bottom left of Figure.</p> <p>* In a single clock product, pin 56 and pin 57 are the general-purpose ports.</p>                                           |

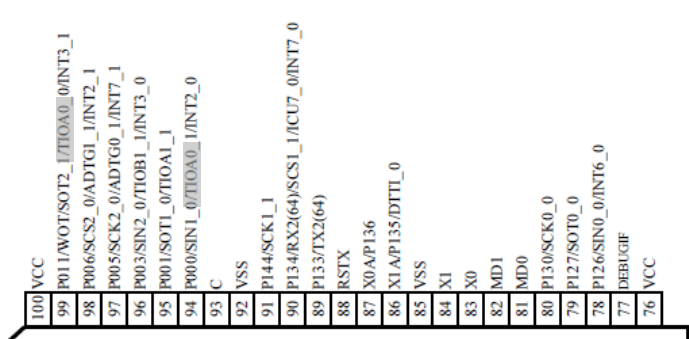
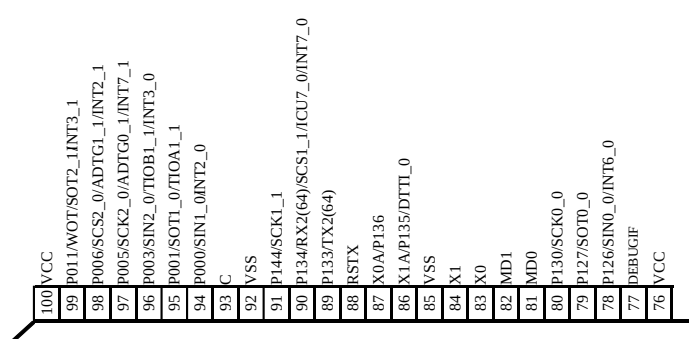
| Page | Section                    | Change Results                                                                                                                                                                                                                                                      |
|------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14   | ■ Pin Assignment MB91F52xD | <p>Signals indicated by the shading below deleted in Figure.</p> <p>- Left side</p>  <p>↓</p>  |

| Page | Section                    | Change Results                                                                                      |
|------|----------------------------|-----------------------------------------------------------------------------------------------------|
| 14   | ■ Pin Assignment MB91F52xD | <p>- Bottom</p>  |

| Page | Section                    | Change Results                                                                                                                                                                                      |
|------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14   | ■ Pin Assignment MB91F52xD | <p>- Right side</p>  <p>↓</p>  |

| Page | Section                    | Change Results                                                                                                                                                                               |
|------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14   | ■ Pin Assignment MB91F52xD | <p>- Top</p>  <p>↓</p>  |
| 14   | ■ Pin Assignment MB91F52xD | <p>The following note added on the bottom left of Figure.</p> <p>* In a single clock product, pin 71 and pin 72 are the general-purpose ports.</p>                                           |

| Page | Section                                                | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
|------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|----|-------------------------|----|------------------|----|------------------------|----|-----------------------------|----|--------------------------------------|----|--------------|----|------------------------------|----|--------------------------------|----|--------------------------------|----|-------------|----|--------------------------|----|----------------------------------------|----|-------------------------------------|----|------------------------------------------|----|-----------------------------------------|----|--------------------------------------------------------|----|-------------------------------------------------------|----|-------------------------------------------|----|-------------|----|-------|----|------------------------------------------------------|----|-------|----|----------------------------------|----|-----|----|-----|----|-------------------------|----|------------------|----|------------------------|----|-----------------------------|----|--------------------------------------|----|--------------|----|------------------|----|--------------------------------|----|--------------------------------|----|-------------|----|--------------------------|----|----------------------------------------|----|-------------------------------------|----|------------------------------------------|----|-----------------------------------------|----|--------------------------------------------------------|----|-------------------------------------------------------|----|-------------------------------------------|----|-------------|----|-------|----|------------------------------------------------------|----|-------|----|----------------------------------|----|-----|
| 15   | ■ Pin Assignment MB91F52xF                             | <div>Signals indicated by the shading below deleted in Figure.</div> <div>(Error)<br/>- Bottom</div> <div><table><tr><td>50</td><td>VCC</td></tr><tr><td>49</td><td>P087/DA00/P0G7_0/INT8_0</td></tr><tr><td>48</td><td>P086/DA01/P0G6_0</td></tr><tr><td>47</td><td>P082/SIN5_0/ANI/P0G2_0</td></tr><tr><td>46</td><td>P081/SOT5_0/SDA5/AN0/P0G1_0</td></tr><tr><td>45</td><td>PI53/SCS5_0/SCI5/AN32/FRCK1_1/INT4_1</td></tr><tr><td>44</td><td>PI52/SCS53_0</td></tr><tr><td>43</td><td>P073/SOT4_0/SDA4/AN33/ICU3_2</td></tr><tr><td>42</td><td>P072/SIN4_0/AN34/ICU2_2/INT5_0</td></tr><tr><td>41</td><td>P071/SCK4_2/AN35/ICU1_2/MONCLK</td></tr><tr><td>40</td><td>P070/ICU0_2</td></tr><tr><td>39</td><td>P067/AN36/FRCK5_0/AIN0_1</td></tr><tr><td>38</td><td>P066/SOT4_2/SCS3_0/AN37/FRCK4_0/BIN0_1</td></tr><tr><td>37</td><td>P065/SCS43_0/FRCK3_0/ZIN0_1/P0G44_1</td></tr><tr><td>36</td><td>P064/SCS42_0/AN38/FRCK2_0/AIN1_1/P0G43_1</td></tr><tr><td>35</td><td>P063/SCS41_0/AN39/P0G5_1/FRCK1_0/BIN1_1</td></tr><tr><td>34</td><td>P062/SCS10_1/SCS40_0/AN40/P0G4_1/FRCK0_0/TOT7_1/ZIN1_1</td></tr><tr><td>33</td><td>P061/SOT10_1/AN41/ICU6_0/P0G3_1/ICU3_1/TOT6_1/INT13_1</td></tr><tr><td>32</td><td>P060/SCS10_0/P0G2_1/ICU2_1/TOT5_1/INT13_0</td></tr><tr><td>31</td><td>AVSSI/AVRL1</td></tr><tr><td>30</td><td>AVRHI</td></tr><tr><td>29</td><td>P057/SCK10_1/AN42/ICU8_0/TRG0_2/P0G1_1/ICU1_1/TIN6_1</td></tr><tr><td>28</td><td>AVCCI</td></tr><tr><td>27</td><td>P055/SIN10_0/AN43/P0G37_0/TIN4_1</td></tr><tr><td>26</td><td>VSS</td></tr></table><table><tr><td>50</td><td>VCC</td></tr><tr><td>49</td><td>P087/DA00/P0G7_0/INT8_0</td></tr><tr><td>48</td><td>P086/DA01/P0G6_0</td></tr><tr><td>47</td><td>P082/SIN5_0/ANI/P0G2_0</td></tr><tr><td>46</td><td>P081/SOT5_0/SDA5/AN0/P0G1_0</td></tr><tr><td>45</td><td>PI53/SCS5_0/SCI5/AN32/FRCK1_1/INT4_1</td></tr><tr><td>44</td><td>PI52/SCS53_0</td></tr><tr><td>43</td><td>P073/AN33/ICU3_2</td></tr><tr><td>42</td><td>P072/SIN4_0/AN34/ICU2_2/INT5_0</td></tr><tr><td>41</td><td>P071/SCK4_2/AN35/ICU1_2/MONCLK</td></tr><tr><td>40</td><td>P070/ICU0_2</td></tr><tr><td>39</td><td>P067/AN36/FRCK5_0/AIN0_1</td></tr><tr><td>38</td><td>P066/SOT4_2/SCS3_0/AN37/FRCK4_0/BIN0_1</td></tr><tr><td>37</td><td>P065/SCS43_0/FRCK3_0/ZIN0_1/P0G44_1</td></tr><tr><td>36</td><td>P064/SCS42_0/AN38/FRCK2_0/AIN1_1/P0G43_1</td></tr><tr><td>35</td><td>P063/SCS41_0/AN39/P0G5_1/FRCK1_0/BIN1_1</td></tr><tr><td>34</td><td>P062/SCS10_1/SCS40_0/AN40/P0G4_1/FRCK0_0/TOT7_1/ZIN1_1</td></tr><tr><td>33</td><td>P061/SOT10_1/AN41/ICU6_0/P0G3_1/ICU3_1/TOT6_1/INT13_1</td></tr><tr><td>32</td><td>P060/SCS10_0/P0G2_1/ICU2_1/TOT5_1/INT13_0</td></tr><tr><td>31</td><td>AVSSI/AVRL1</td></tr><tr><td>30</td><td>AVRHI</td></tr><tr><td>29</td><td>P057/SCK10_1/AN42/ICU8_0/TRG0_2/P0G1_1/ICU1_1/TIN6_1</td></tr><tr><td>28</td><td>AVCCI</td></tr><tr><td>27</td><td>P055/SIN10_0/AN43/P0G37_0/TIN4_1</td></tr><tr><td>26</td><td>VSS</td></tr></table></div> | 50 | VCC | 49 | P087/DA00/P0G7_0/INT8_0 | 48 | P086/DA01/P0G6_0 | 47 | P082/SIN5_0/ANI/P0G2_0 | 46 | P081/SOT5_0/SDA5/AN0/P0G1_0 | 45 | PI53/SCS5_0/SCI5/AN32/FRCK1_1/INT4_1 | 44 | PI52/SCS53_0 | 43 | P073/SOT4_0/SDA4/AN33/ICU3_2 | 42 | P072/SIN4_0/AN34/ICU2_2/INT5_0 | 41 | P071/SCK4_2/AN35/ICU1_2/MONCLK | 40 | P070/ICU0_2 | 39 | P067/AN36/FRCK5_0/AIN0_1 | 38 | P066/SOT4_2/SCS3_0/AN37/FRCK4_0/BIN0_1 | 37 | P065/SCS43_0/FRCK3_0/ZIN0_1/P0G44_1 | 36 | P064/SCS42_0/AN38/FRCK2_0/AIN1_1/P0G43_1 | 35 | P063/SCS41_0/AN39/P0G5_1/FRCK1_0/BIN1_1 | 34 | P062/SCS10_1/SCS40_0/AN40/P0G4_1/FRCK0_0/TOT7_1/ZIN1_1 | 33 | P061/SOT10_1/AN41/ICU6_0/P0G3_1/ICU3_1/TOT6_1/INT13_1 | 32 | P060/SCS10_0/P0G2_1/ICU2_1/TOT5_1/INT13_0 | 31 | AVSSI/AVRL1 | 30 | AVRHI | 29 | P057/SCK10_1/AN42/ICU8_0/TRG0_2/P0G1_1/ICU1_1/TIN6_1 | 28 | AVCCI | 27 | P055/SIN10_0/AN43/P0G37_0/TIN4_1 | 26 | VSS | 50 | VCC | 49 | P087/DA00/P0G7_0/INT8_0 | 48 | P086/DA01/P0G6_0 | 47 | P082/SIN5_0/ANI/P0G2_0 | 46 | P081/SOT5_0/SDA5/AN0/P0G1_0 | 45 | PI53/SCS5_0/SCI5/AN32/FRCK1_1/INT4_1 | 44 | PI52/SCS53_0 | 43 | P073/AN33/ICU3_2 | 42 | P072/SIN4_0/AN34/ICU2_2/INT5_0 | 41 | P071/SCK4_2/AN35/ICU1_2/MONCLK | 40 | P070/ICU0_2 | 39 | P067/AN36/FRCK5_0/AIN0_1 | 38 | P066/SOT4_2/SCS3_0/AN37/FRCK4_0/BIN0_1 | 37 | P065/SCS43_0/FRCK3_0/ZIN0_1/P0G44_1 | 36 | P064/SCS42_0/AN38/FRCK2_0/AIN1_1/P0G43_1 | 35 | P063/SCS41_0/AN39/P0G5_1/FRCK1_0/BIN1_1 | 34 | P062/SCS10_1/SCS40_0/AN40/P0G4_1/FRCK0_0/TOT7_1/ZIN1_1 | 33 | P061/SOT10_1/AN41/ICU6_0/P0G3_1/ICU3_1/TOT6_1/INT13_1 | 32 | P060/SCS10_0/P0G2_1/ICU2_1/TOT5_1/INT13_0 | 31 | AVSSI/AVRL1 | 30 | AVRHI | 29 | P057/SCK10_1/AN42/ICU8_0/TRG0_2/P0G1_1/ICU1_1/TIN6_1 | 28 | AVCCI | 27 | P055/SIN10_0/AN43/P0G37_0/TIN4_1 | 26 | VSS |
| 50   | VCC                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 49   | P087/DA00/P0G7_0/INT8_0                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 48   | P086/DA01/P0G6_0                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 47   | P082/SIN5_0/ANI/P0G2_0                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 46   | P081/SOT5_0/SDA5/AN0/P0G1_0                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 45   | PI53/SCS5_0/SCI5/AN32/FRCK1_1/INT4_1                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 44   | PI52/SCS53_0                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 43   | P073/SOT4_0/SDA4/AN33/ICU3_2                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 42   | P072/SIN4_0/AN34/ICU2_2/INT5_0                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 41   | P071/SCK4_2/AN35/ICU1_2/MONCLK                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 40   | P070/ICU0_2                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 39   | P067/AN36/FRCK5_0/AIN0_1                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 38   | P066/SOT4_2/SCS3_0/AN37/FRCK4_0/BIN0_1                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 37   | P065/SCS43_0/FRCK3_0/ZIN0_1/P0G44_1                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 36   | P064/SCS42_0/AN38/FRCK2_0/AIN1_1/P0G43_1               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 35   | P063/SCS41_0/AN39/P0G5_1/FRCK1_0/BIN1_1                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 34   | P062/SCS10_1/SCS40_0/AN40/P0G4_1/FRCK0_0/TOT7_1/ZIN1_1 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 33   | P061/SOT10_1/AN41/ICU6_0/P0G3_1/ICU3_1/TOT6_1/INT13_1  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 32   | P060/SCS10_0/P0G2_1/ICU2_1/TOT5_1/INT13_0              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 31   | AVSSI/AVRL1                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 30   | AVRHI                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 29   | P057/SCK10_1/AN42/ICU8_0/TRG0_2/P0G1_1/ICU1_1/TIN6_1   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 28   | AVCCI                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 27   | P055/SIN10_0/AN43/P0G37_0/TIN4_1                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 26   | VSS                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 50   | VCC                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 49   | P087/DA00/P0G7_0/INT8_0                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 48   | P086/DA01/P0G6_0                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 47   | P082/SIN5_0/ANI/P0G2_0                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 46   | P081/SOT5_0/SDA5/AN0/P0G1_0                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 45   | PI53/SCS5_0/SCI5/AN32/FRCK1_1/INT4_1                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 44   | PI52/SCS53_0                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 43   | P073/AN33/ICU3_2                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 42   | P072/SIN4_0/AN34/ICU2_2/INT5_0                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 41   | P071/SCK4_2/AN35/ICU1_2/MONCLK                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 40   | P070/ICU0_2                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 39   | P067/AN36/FRCK5_0/AIN0_1                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 38   | P066/SOT4_2/SCS3_0/AN37/FRCK4_0/BIN0_1                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 37   | P065/SCS43_0/FRCK3_0/ZIN0_1/P0G44_1                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 36   | P064/SCS42_0/AN38/FRCK2_0/AIN1_1/P0G43_1               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 35   | P063/SCS41_0/AN39/P0G5_1/FRCK1_0/BIN1_1                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 34   | P062/SCS10_1/SCS40_0/AN40/P0G4_1/FRCK0_0/TOT7_1/ZIN1_1 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 33   | P061/SOT10_1/AN41/ICU6_0/P0G3_1/ICU3_1/TOT6_1/INT13_1  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 32   | P060/SCS10_0/P0G2_1/ICU2_1/TOT5_1/INT13_0              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 31   | AVSSI/AVRL1                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 30   | AVRHI                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 29   | P057/SCK10_1/AN42/ICU8_0/TRG0_2/P0G1_1/ICU1_1/TIN6_1   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 28   | AVCCI                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 27   | P055/SIN10_0/AN43/P0G37_0/TIN4_1                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |
| 26   | VSS                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                              |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |    |     |    |                         |    |                  |    |                        |    |                             |    |                                      |    |              |    |                  |    |                                |    |                                |    |             |    |                          |    |                                        |    |                                     |    |                                          |    |                                         |    |                                                        |    |                                                       |    |                                           |    |             |    |       |    |                                                      |    |       |    |                                  |    |     |

| Page                                  | Section                   | Change Results                                                                                                                                                                                                                                                                                |                                       |                        |                                       |                        |
|---------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------|---------------------------------------|------------------------|
| 15                                    | ■Pin Assignment MB91F52xF | <div>- Top</div> <div></div> <div></div>                                                                                 |                                       |                        |                                       |                        |
| 15                                    | ■Pin Assignment MB91F52xF | The following note added on the bottom left of Figure.<br>* In a single clock product, pin 86 and pin 87 are the general-purpose ports.                                                                                                                                                       |                                       |                        |                                       |                        |
| 16                                    | ■Pin Assignment MB91F52xJ | The following note added on the bottom left of Figure.<br>* In a single clock product, pin 102 and pin 103 are the general-purpose ports.                                                                                                                                                     |                                       |                        |                                       |                        |
| 17                                    | ■Pin Assignment MB91F52xK | The following note added on the bottom left of Figure.<br>* In a single clock product, pin 121 and pin 122 are the general-purpose ports.                                                                                                                                                     |                                       |                        |                                       |                        |
| 18                                    | ■Pin Assignment MB91F52xL | The following note added on the bottom left of Figure.<br>* In a single clock product, pin 149 and pin 150 are the general-purpose ports.                                                                                                                                                     |                                       |                        |                                       |                        |
| 19 to 35                              | ■PIN Description          | <div>A List of "Pin Description" modified.</div> <div><table><tr><td>I/O<br/>Circuit<br/>types<sup>*1</sup></td><td>Function<sup>*2</sup></td></tr></table><div>↓</div><div><table><tr><td>I/O<br/>Circuit<br/>types<sup>*8</sup></td><td>Function<sup>*9</sup></td></tr></table></div></div> | I/O<br>Circuit<br>types <sup>*1</sup> | Function <sup>*2</sup> | I/O<br>Circuit<br>types <sup>*8</sup> | Function <sup>*9</sup> |
| I/O<br>Circuit<br>types <sup>*1</sup> | Function <sup>*2</sup>    |                                                                                                                                                                                                                                                                                               |                                       |                        |                                       |                        |
| I/O<br>Circuit<br>types <sup>*8</sup> | Function <sup>*9</sup>    |                                                                                                                                                                                                                                                                                               |                                       |                        |                                       |                        |

| Page | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----|-----|-----|----------|----------|----|----|-----|-----|-----|-----|---|---|---|---|---|---|------|--|--|--|--|--|--|-----|--|--|--|--|--|--|--------|---|---|---|---|---|---|------|--|--|--|--|--|--|-----|--|--|--|--|--|--|--------|---|---|---|---|---|---|------|--|--|--|--|--|--|---------|---|---|---|---|---|---|------|--|--|--|--|--|--|-----|--|--|--|--|--|--|--------|---|---|---|---|---|---|------|--|--|--|--|--|--|---------|---|---|---|---|---|---|------|-----|--------|--------|--------|--------|---|---|---|---|---|---|------|------|--------|--------|--------|---|---|---|---|---|---|------|------|--------|--------|--------|---|---|---|---|---|----|------|-----|--------|---------|--------|---|---|---|---|---|----|------|------|--------|---------|--------|--------|---------|
| 19   | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>2</td><td>2</td><td>P015</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D29</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG0_0</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>3</td><td>3</td><td>P016</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D30</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG1_0</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>4</td><td>P170</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG36_1</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>4</td><td>5</td><td>P017</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D31</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG2_0</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>6</td><td>P171</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG37_1</td></tr><tr><td rowspan="6">2</td><td rowspan="6">2</td><td rowspan="6">2</td><td rowspan="6">2</td><td rowspan="6">5</td><td rowspan="6">7</td><td>P020</td></tr><tr><td>ASX</td></tr><tr><td>SIN3_1</td></tr><tr><td>TRG3_0</td></tr><tr><td>TIN0_2</td></tr><tr><td>RTO5_1</td></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">3</td><td rowspan="5">6</td><td rowspan="5">8</td><td>P021</td></tr><tr><td>CS0X</td></tr><tr><td>SOT3_1</td></tr><tr><td>TRG6_1</td></tr><tr><td>TRG4_0</td></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">4</td><td rowspan="5">7</td><td rowspan="5">9</td><td>P022</td></tr><tr><td>CS1X</td></tr><tr><td>SCK3_1</td></tr><tr><td>TRG7_1</td></tr><tr><td>TRG5_0</td></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">5</td><td rowspan="5">8</td><td rowspan="5">10</td><td>P023</td></tr><tr><td>RDX</td></tr><tr><td>SCS3_1</td></tr><tr><td>PPG32_0</td></tr><tr><td>TIN0_0</td></tr><tr><td rowspan="7">3</td><td rowspan="7">3</td><td rowspan="7">3</td><td rowspan="7">6</td><td rowspan="7">9</td><td rowspan="7">11</td><td>P024</td></tr><tr><td>WR0X</td></tr><tr><td>SIN4_1</td></tr><tr><td>PPG24_0</td></tr><tr><td>TIN1_0</td></tr><tr><td>RTO4_1</td></tr><tr><td>INT15_0</td></tr></table> | Pin no. |     |     |     |     |          | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | - | - | - | - | 2 | 2 | P015 |  |  |  |  |  |  | D29 |  |  |  |  |  |  | TRG0_0 | - | - | - | - | 3 | 3 | P016 |  |  |  |  |  |  | D30 |  |  |  |  |  |  | TRG1_0 | - | - | - | - | - | 4 | P170 |  |  |  |  |  |  | PPG36_1 | - | - | - | - | 4 | 5 | P017 |  |  |  |  |  |  | D31 |  |  |  |  |  |  | TRG2_0 | - | - | - | - | - | 6 | P171 |  |  |  |  |  |  | PPG37_1 | 2 | 2 | 2 | 2 | 5 | 7 | P020 | ASX | SIN3_1 | TRG3_0 | TIN0_2 | RTO5_1 | - | - | - | 3 | 6 | 8 | P021 | CS0X | SOT3_1 | TRG6_1 | TRG4_0 | - | - | - | 4 | 7 | 9 | P022 | CS1X | SCK3_1 | TRG7_1 | TRG5_0 | - | - | - | 5 | 8 | 10 | P023 | RDX | SCS3_1 | PPG32_0 | TIN0_0 | 3 | 3 | 3 | 6 | 9 | 11 | P024 | WR0X | SIN4_1 | PPG24_0 | TIN1_0 | RTO4_1 | INT15_0 |
|      |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | Pin Name |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 80      | 100 | 120 | 144 | 176 |          |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -       | -   | -   | 2   | 2   | P015     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | D29      |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TRG0_0   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -       | -   | -   | 3   | 3   | P016     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | D30      |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TRG1_0   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -       | -   | -   | -   | 4   | P170     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | PPG36_1  |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -       | -   | -   | 4   | 5   | P017     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | D31      |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TRG2_0   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -       | -   | -   | -   | 6   | P171     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | PPG37_1  |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2       | 2   | 2   | 5   | 7   | P020     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
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|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | SIN3_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TRG3_0   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TIN0_2   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | RTO5_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -       | -   | 3   | 6   | 8   | P021     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | CS0X     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | SOT3_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TRG6_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TRG4_0   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -       | -   | 4   | 7   | 9   | P022     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | CS1X     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | SCK3_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TRG7_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TRG5_0   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -       | -   | 5   | 8   | 10  | P023     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
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|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | SCS3_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | PPG32_0  |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TIN0_0   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3       | 3   | 6   | 9   | 11  | P024     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | WR0X     |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | SIN4_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | PPG24_0  |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | TIN1_0   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | RTO4_1   |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | INT15_0  |          |    |    |     |     |     |     |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |   |      |  |  |  |  |  |  |         |   |   |   |   |   |   |      |     |        |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |   |      |      |        |        |        |   |   |   |   |   |    |      |     |        |         |        |   |   |   |   |   |    |      |      |        |         |        |        |         |

| Page            | Section          | Change Results           |                 |                 |                 |         |     |                                |  |  |  |
|-----------------|------------------|--------------------------|-----------------|-----------------|-----------------|---------|-----|--------------------------------|--|--|--|
| 19              | ■PIN Description | (Continued)<br>(Correct) |                 |                 |                 |         |     |                                |  |  |  |
|                 |                  | Pin no.                  |                 |                 |                 |         |     | Pin Name                       |  |  |  |
|                 |                  | 64                       | 80              | 100             | 120             | 144     | 176 |                                |  |  |  |
|                 |                  | -                        | -               | -               | -               | 2       | 2   | P015                           |  |  |  |
|                 |                  | -                        | -               | -               | -               | 2       | 2   | D29                            |  |  |  |
|                 |                  | -                        | -               | -               | -               | 2       | 2   | TRG0_0                         |  |  |  |
|                 |                  | -                        | -               | -               | -               | 3       | 3   | P016                           |  |  |  |
|                 |                  | -                        | -               | -               | -               | 3       | 3   | D30                            |  |  |  |
|                 |                  | -                        | -               | -               | -               | 3       | 3   | TRG1_0                         |  |  |  |
|                 |                  | -                        | -               | -               | -               | -       | 4   | P170                           |  |  |  |
|                 |                  | -                        | -               | -               | -               | -       | 4   | PPG36_1                        |  |  |  |
|                 |                  | -                        | -               | -               | -               | 4       | 5   | P017                           |  |  |  |
|                 |                  | -                        | -               | -               | -               | 4       | 5   | D31                            |  |  |  |
|                 |                  | -                        | -               | -               | -               | 4       | 5   | TRG2_0                         |  |  |  |
|                 |                  | -                        | -               | -               | -               | -       | 6   | P171                           |  |  |  |
|                 |                  | -                        | -               | -               | -               | -       | 6   | PPG37_1                        |  |  |  |
|                 |                  | 2 <sup>*1</sup>          | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 5       | 7   | P020                           |  |  |  |
|                 |                  | 2 <sup>*1</sup>          | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 5       | 7   | ASX <sup>*2, *3, *4, *5</sup>  |  |  |  |
|                 |                  | 2 <sup>*1</sup>          | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 5       | 7   | SIN3_1                         |  |  |  |
|                 |                  | 2 <sup>*1</sup>          | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 5       | 7   | TRG3_0                         |  |  |  |
|                 |                  | 2 <sup>*1</sup>          | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 5       | 7   | TIN0_2                         |  |  |  |
|                 |                  | 2 <sup>*1</sup>          | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 2 <sup>*1</sup> | 5       | 7   | RTO5_1                         |  |  |  |
|                 |                  | -                        | -               | -               | 3 <sup>*1</sup> | 6       | 8   | P021                           |  |  |  |
|                 |                  | -                        | -               | -               | 3 <sup>*1</sup> | 6       | 8   | CS0X <sup>*5</sup>             |  |  |  |
|                 |                  | -                        | -               | -               | 3 <sup>*1</sup> | 6       | 8   | SOT3_1                         |  |  |  |
|                 |                  | -                        | -               | -               | 3 <sup>*1</sup> | 6       | 8   | TRG6_1                         |  |  |  |
|                 |                  | -                        | -               | -               | 3 <sup>*1</sup> | 6       | 8   | TRG4_0                         |  |  |  |
|                 |                  | -                        | -               | -               | 4 <sup>*1</sup> | 7       | 9   | P022                           |  |  |  |
|                 |                  | -                        | -               | -               | 4 <sup>*1</sup> | 7       | 9   | CS1X <sup>*5</sup>             |  |  |  |
|                 |                  | -                        | -               | -               | 4 <sup>*1</sup> | 7       | 9   | SCK3_1                         |  |  |  |
|                 |                  | -                        | -               | -               | 4 <sup>*1</sup> | 7       | 9   | TRG7_1                         |  |  |  |
|                 |                  | -                        | -               | -               | 4 <sup>*1</sup> | 7       | 9   | TRG5_0                         |  |  |  |
|                 |                  | -                        | -               | -               | 5 <sup>*1</sup> | 8       | 10  | P023                           |  |  |  |
|                 |                  | -                        | -               | -               | 5 <sup>*1</sup> | 8       | 10  | RDX <sup>*5</sup>              |  |  |  |
|                 |                  | -                        | -               | -               | 5 <sup>*1</sup> | 8       | 10  | SCS3_1                         |  |  |  |
|                 |                  | -                        | -               | -               | 5 <sup>*1</sup> | 8       | 10  | PPG32_0                        |  |  |  |
|                 |                  | -                        | -               | -               | 5 <sup>*1</sup> | 8       | 10  | TIN0_0                         |  |  |  |
|                 |                  | 3 <sup>*1</sup>          | 3 <sup>*1</sup> | 3 <sup>*1</sup> | 6 <sup>*1</sup> | 9       | 11  | P024                           |  |  |  |
|                 |                  | 3 <sup>*1</sup>          | 3 <sup>*1</sup> | 3 <sup>*1</sup> | 6 <sup>*1</sup> | 9       | 11  | WROX <sup>*2, *3, *4, *5</sup> |  |  |  |
|                 |                  | 3 <sup>*1</sup>          | 3 <sup>*1</sup> | 3 <sup>*1</sup> | 6 <sup>*1</sup> | 9       | 11  | SIN4_1                         |  |  |  |
| 3 <sup>*1</sup> | 3 <sup>*1</sup>  | 3 <sup>*1</sup>          | 6 <sup>*1</sup> | 9               | 11              | PPG24_0 |     |                                |  |  |  |
| 3 <sup>*1</sup> | 3 <sup>*1</sup>  | 3 <sup>*1</sup>          | 6 <sup>*1</sup> | 9               | 11              | TIN1_0  |     |                                |  |  |  |
| 3 <sup>*1</sup> | 3 <sup>*1</sup>  | 3 <sup>*1</sup>          | 6 <sup>*1</sup> | 9               | 11              | RTO4_1  |     |                                |  |  |  |
| 3 <sup>*1</sup> | 3 <sup>*1</sup>  | 3 <sup>*1</sup>          | 6 <sup>*1</sup> | 9               | 11              | INT15_0 |     |                                |  |  |  |

| Page | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |
|------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----|-----|-----|----------|----------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|------|------|--------|---------|--------|---|---|---|---|---|----|------|---------|---|---|---|---|----|----|------|-----|--------|---------|--------|---|---|---|---|----|----|------|-----|---------|---------|--------|---|---|---|---|---|----|--------|------|---|---|---|----|----|----|---------|------|-----|---------|---------|---|---|---|----|----|----|--------|------|-----|---------|---------|---|---|---|----|----|----|--------|------|-----|---------|---------|---|---|----|----|----|----|--------|--------|------|-----|---------|--------|--------|--------|--------|
| 20   | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |
|      |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |
|      |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">4</td><td rowspan="5">7</td><td rowspan="5">10</td><td rowspan="5">12</td><td>P025</td></tr><tr><td>WR1X</td></tr><tr><td>SOT4_1</td></tr><tr><td>PPG25_0</td></tr><tr><td>TIN2_0</td></tr><tr><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">13</td><td>P172</td></tr><tr><td>PPG38_1</td></tr><tr><td rowspan="5">-</td><td rowspan="5">4</td><td rowspan="5">5</td><td rowspan="5">8</td><td rowspan="5">11</td><td rowspan="5">14</td><td>P026</td></tr><tr><td>A00</td></tr><tr><td>SCK4_1</td></tr><tr><td>PPG26_0</td></tr><tr><td>TIN3_0</td></tr><tr><td rowspan="5">4</td><td rowspan="5">5</td><td rowspan="5">6</td><td rowspan="5">9</td><td rowspan="5">12</td><td rowspan="5">15</td><td>P027</td></tr><tr><td>A01</td></tr><tr><td>SCS40_1</td></tr><tr><td>PPG27_0</td></tr><tr><td>TOT0_0</td></tr><tr><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">16</td><td>RTO3_1</td></tr><tr><td>P173</td></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">7</td><td rowspan="5">10</td><td rowspan="5">13</td><td rowspan="5">17</td><td>PPG39_1</td></tr><tr><td>P030</td></tr><tr><td>A02</td></tr><tr><td>SCS41_1</td></tr><tr><td>PPG28_0</td></tr><tr><td rowspan="5">-</td><td rowspan="5">6</td><td rowspan="5">8</td><td rowspan="5">11</td><td rowspan="5">14</td><td rowspan="5">18</td><td>TOT1_0</td></tr><tr><td>P031</td></tr><tr><td>A03</td></tr><tr><td>SCS42_1</td></tr><tr><td>PPG29_0</td></tr><tr><td rowspan="5">5</td><td rowspan="5">7</td><td rowspan="5">9</td><td rowspan="5">12</td><td rowspan="5">15</td><td rowspan="5">19</td><td>TOT2_0</td></tr><tr><td>P032</td></tr><tr><td>A04</td></tr><tr><td>SCS43_1</td></tr><tr><td>PPG30_0</td></tr><tr><td rowspan="7">6</td><td rowspan="7">8</td><td rowspan="7">10</td><td rowspan="7">13</td><td rowspan="7">16</td><td rowspan="7">20</td><td>TOT3_0</td></tr><tr><td>RTO2_1</td></tr><tr><td>P033</td></tr><tr><td>A05</td></tr><tr><td>PPG31_0</td></tr><tr><td>ICU3_3</td></tr><tr><td>TIN4_0</td></tr><tr><td>RTO1_1</td></tr><tr><td>SCK3_2</td></tr></table> | Pin no. |     |     |     |     |          | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | - | - | 4 | 7 | 10 | 12 | P025 | WR1X | SOT4_1 | PPG25_0 | TIN2_0 | - | - | - | - | - | 13 | P172 | PPG38_1 | - | 4 | 5 | 8 | 11 | 14 | P026 | A00 | SCK4_1 | PPG26_0 | TIN3_0 | 4 | 5 | 6 | 9 | 12 | 15 | P027 | A01 | SCS40_1 | PPG27_0 | TOT0_0 | - | - | - | - | - | 16 | RTO3_1 | P173 | - | - | 7 | 10 | 13 | 17 | PPG39_1 | P030 | A02 | SCS41_1 | PPG28_0 | - | 6 | 8 | 11 | 14 | 18 | TOT1_0 | P031 | A03 | SCS42_1 | PPG29_0 | 5 | 7 | 9 | 12 | 15 | 19 | TOT2_0 | P032 | A04 | SCS43_1 | PPG30_0 | 6 | 8 | 10 | 13 | 16 | 20 | TOT3_0 | RTO2_1 | P033 | A05 | PPG31_0 | ICU3_3 | TIN4_0 | RTO1_1 | SCK3_2 |
|      |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |     |     |     |     | Pin Name |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |
|      |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 80      | 100 | 120 | 144 | 176 |          |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |
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|      |                  | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 7       | 9   | 12  | 15  | 19  | TOT2_0   |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |
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|      |                  | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 8       | 10  | 13  | 16  | 20  | TOT3_0   |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |
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|      |                  | RTO1_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |
|      |                  | SCK3_2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |    |    |      |      |        |         |        |   |   |   |   |   |    |      |         |   |   |   |   |    |    |      |     |        |         |        |   |   |   |   |    |    |      |     |         |         |        |   |   |   |   |   |    |        |      |   |   |   |    |    |    |         |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |   |    |    |    |        |      |     |         |         |   |   |    |    |    |    |        |        |      |     |         |        |        |        |        |

| Page | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                  |                  |     |     |                               |          |    |    |     |     |     |     |   |   |                 |                 |    |    |      |                        |        |         |        |   |   |   |   |   |    |      |         |   |                 |                 |                 |    |    |      |                           |        |         |        |                 |                 |                 |                 |    |    |      |                               |         |         |        |   |   |   |   |   |    |        |      |         |   |   |                 |                  |    |    |      |                       |         |         |        |   |                 |                 |                  |    |    |      |                           |         |         |                      |                 |                 |                 |                  |    |    |      |                               |         |         |        |                 |                 |                  |                  |    |    |        |      |                               |         |        |        |  |  |  |  |  |  |        |        |
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| 20   | ■PIN Description | (Continued)<br>(Correct)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                  |                  |     |     |                               |          |    |    |     |     |     |     |   |   |                 |                 |    |    |      |                        |        |         |        |   |   |   |   |   |    |      |         |   |                 |                 |                 |    |    |      |                           |        |         |        |                 |                 |                 |                 |    |    |      |                               |         |         |        |   |   |   |   |   |    |        |      |         |   |   |                 |                  |    |    |      |                       |         |         |        |   |                 |                 |                  |    |    |      |                           |         |         |                      |                 |                 |                 |                  |    |    |      |                               |         |         |        |                 |                 |                  |                  |    |    |        |      |                               |         |        |        |  |  |  |  |  |  |        |        |
|      |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">4<sup>*1</sup></td><td rowspan="5">7<sup>*1</sup></td><td rowspan="5">10</td><td rowspan="5">12</td><td>P025</td></tr><tr><td>WR1X<sup>*4, *5</sup></td></tr><tr><td>SOT4_1</td></tr><tr><td>PPG25_0</td></tr><tr><td>TIN2_0</td></tr><tr><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">13</td><td>P172</td></tr><tr><td>PPG38_1</td></tr><tr><td rowspan="5">-</td><td rowspan="5">4<sup>*1</sup></td><td rowspan="5">5<sup>*1</sup></td><td rowspan="5">8<sup>*1</sup></td><td rowspan="5">11</td><td rowspan="5">14</td><td>P026</td></tr><tr><td>A00<sup>*3, *4, *5</sup></td></tr><tr><td>SCK4_1</td></tr><tr><td>PPG26_0</td></tr><tr><td>TIN3_0</td></tr><tr><td rowspan="5">4<sup>*1</sup></td><td rowspan="5">5<sup>*1</sup></td><td rowspan="5">6<sup>*1</sup></td><td rowspan="5">9<sup>*1</sup></td><td rowspan="5">12</td><td rowspan="5">15</td><td>P027</td></tr><tr><td>A01<sup>*2, *3, *4, *5</sup></td></tr><tr><td>SCS40_1</td></tr><tr><td>PPG27_0</td></tr><tr><td>TOT0_0</td></tr><tr><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">16</td><td>RTO3_1</td></tr><tr><td>P173</td></tr><tr><td>PPG39_1</td></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">7<sup>*1</sup></td><td rowspan="5">10<sup>*1</sup></td><td rowspan="5">13</td><td rowspan="5">17</td><td>P030</td></tr><tr><td>A02<sup>*4, *5</sup></td></tr><tr><td>SCS41_1</td></tr><tr><td>PPG28_0</td></tr><tr><td>TOT1_0</td></tr><tr><td rowspan="5">-</td><td rowspan="5">6<sup>*1</sup></td><td rowspan="5">8<sup>*1</sup></td><td rowspan="5">11<sup>*1</sup></td><td rowspan="5">14</td><td rowspan="5">18</td><td>P031</td></tr><tr><td>A03<sup>*3, *4, *5</sup></td></tr><tr><td>SCS42_1</td></tr><tr><td>PPG29_0</td></tr><tr><td>TOT2_0<sup>*3</sup></td></tr><tr><td rowspan="5">5<sup>*1</sup></td><td rowspan="5">7<sup>*1</sup></td><td rowspan="5">9<sup>*1</sup></td><td rowspan="5">12<sup>*1</sup></td><td rowspan="5">15</td><td rowspan="5">19</td><td>P032</td></tr><tr><td>A04<sup>*2, *3, *4, *5</sup></td></tr><tr><td>SCS43_1</td></tr><tr><td>PPG30_0</td></tr><tr><td>TOT3_0</td></tr><tr><td rowspan="6">6<sup>*1</sup></td><td rowspan="6">8<sup>*1</sup></td><td rowspan="6">10<sup>*1</sup></td><td rowspan="6">13<sup>*1</sup></td><td rowspan="6">16</td><td rowspan="6">20</td><td>RTO2_1</td></tr><tr><td>P033</td></tr><tr><td>A05<sup>*2, *3, *4, *5</sup></td></tr><tr><td>PPG31_0</td></tr><tr><td>ICU3_3</td></tr><tr><td>TIN4_0</td></tr><tr><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td>RTO1_1</td></tr><tr><td>SCK3_2</td></tr></table> | Pin no.         |                  |                  |     |     |                               | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | - | - | 4 <sup>*1</sup> | 7 <sup>*1</sup> | 10 | 12 | P025 | WR1X <sup>*4, *5</sup> | SOT4_1 | PPG25_0 | TIN2_0 | - | - | - | - | - | 13 | P172 | PPG38_1 | - | 4 <sup>*1</sup> | 5 <sup>*1</sup> | 8 <sup>*1</sup> | 11 | 14 | P026 | A00 <sup>*3, *4, *5</sup> | SCK4_1 | PPG26_0 | TIN3_0 | 4 <sup>*1</sup> | 5 <sup>*1</sup> | 6 <sup>*1</sup> | 9 <sup>*1</sup> | 12 | 15 | P027 | A01 <sup>*2, *3, *4, *5</sup> | SCS40_1 | PPG27_0 | TOT0_0 | - | - | - | - | - | 16 | RTO3_1 | P173 | PPG39_1 | - | - | 7 <sup>*1</sup> | 10 <sup>*1</sup> | 13 | 17 | P030 | A02 <sup>*4, *5</sup> | SCS41_1 | PPG28_0 | TOT1_0 | - | 6 <sup>*1</sup> | 8 <sup>*1</sup> | 11 <sup>*1</sup> | 14 | 18 | P031 | A03 <sup>*3, *4, *5</sup> | SCS42_1 | PPG29_0 | TOT2_0 <sup>*3</sup> | 5 <sup>*1</sup> | 7 <sup>*1</sup> | 9 <sup>*1</sup> | 12 <sup>*1</sup> | 15 | 19 | P032 | A04 <sup>*2, *3, *4, *5</sup> | SCS43_1 | PPG30_0 | TOT3_0 | 6 <sup>*1</sup> | 8 <sup>*1</sup> | 10 <sup>*1</sup> | 13 <sup>*1</sup> | 16 | 20 | RTO2_1 | P033 | A05 <sup>*2, *3, *4, *5</sup> | PPG31_0 | ICU3_3 | TIN4_0 |  |  |  |  |  |  | RTO1_1 | SCK3_2 |
|      |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                  |                  |     |     | Pin Name                      |          |    |    |     |     |     |     |   |   |                 |                 |    |    |      |                        |        |         |        |   |   |   |   |   |    |      |         |   |                 |                 |                 |    |    |      |                           |        |         |        |                 |                 |                 |                 |    |    |      |                               |         |         |        |   |   |   |   |   |    |        |      |         |   |   |                 |                  |    |    |      |                       |         |         |        |   |                 |                 |                  |    |    |      |                           |         |         |                      |                 |                 |                 |                  |    |    |      |                               |         |         |        |                 |                 |                  |                  |    |    |        |      |                               |         |        |        |  |  |  |  |  |  |        |        |
|      |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 80              | 100              | 120              | 144 | 176 |                               |          |    |    |     |     |     |     |   |   |                 |                 |    |    |      |                        |        |         |        |   |   |   |   |   |    |      |         |   |                 |                 |                 |    |    |      |                           |        |         |        |                 |                 |                 |                 |    |    |      |                               |         |         |        |   |   |   |   |   |    |        |      |         |   |   |                 |                  |    |    |      |                       |         |         |        |   |                 |                 |                  |    |    |      |                           |         |         |                      |                 |                 |                 |                  |    |    |      |                               |         |         |        |                 |                 |                  |                  |    |    |        |      |                               |         |        |        |  |  |  |  |  |  |        |        |
|      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -               | 4 <sup>*1</sup>  | 7 <sup>*1</sup>  | 10  | 12  | P025                          |          |    |    |     |     |     |     |   |   |                 |                 |    |    |      |                        |        |         |        |   |   |   |   |   |    |      |         |   |                 |                 |                 |    |    |      |                           |        |         |        |                 |                 |                 |                 |    |    |      |                               |         |         |        |   |   |   |   |   |    |        |      |         |   |   |                 |                  |    |    |      |                       |         |         |        |   |                 |                 |                  |    |    |      |                           |         |         |                      |                 |                 |                 |                  |    |    |      |                               |         |         |        |                 |                 |                  |                  |    |    |        |      |                               |         |        |        |  |  |  |  |  |  |        |        |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                  |                  |     |     | WR1X <sup>*4, *5</sup>        |          |    |    |     |     |     |     |   |   |                 |                 |    |    |      |                        |        |         |        |   |   |   |   |   |    |      |         |   |                 |                 |                 |    |    |      |                           |        |         |        |                 |                 |                 |                 |    |    |      |                               |         |         |        |   |   |   |   |   |    |        |      |         |   |   |                 |                  |    |    |      |                       |         |         |        |   |                 |                 |                  |    |    |      |                           |         |         |                      |                 |                 |                 |                  |    |    |      |                               |         |         |        |                 |                 |                  |                  |    |    |        |      |                               |         |        |        |  |  |  |  |  |  |        |        |
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|      |                  | 5 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 7 <sup>*1</sup> | 9 <sup>*1</sup>  | 12 <sup>*1</sup> | 15  | 19  | P032                          |          |    |    |     |     |     |     |   |   |                 |                 |    |    |      |                        |        |         |        |   |   |   |   |   |    |      |         |   |                 |                 |                 |    |    |      |                           |        |         |        |                 |                 |                 |                 |    |    |      |                               |         |         |        |   |   |   |   |   |    |        |      |         |   |   |                 |                  |    |    |      |                       |         |         |        |   |                 |                 |                  |    |    |      |                           |         |         |                      |                 |                 |                 |                  |    |    |      |                               |         |         |        |                 |                 |                  |                  |    |    |        |      |                               |         |        |        |  |  |  |  |  |  |        |        |
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|      |                  | 6 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 8 <sup>*1</sup> | 10 <sup>*1</sup> | 13 <sup>*1</sup> | 16  | 20  | RTO2_1                        |          |    |    |     |     |     |     |   |   |                 |                 |    |    |      |                        |        |         |        |   |   |   |   |   |    |      |         |   |                 |                 |                 |    |    |      |                           |        |         |        |                 |                 |                 |                 |    |    |      |                               |         |         |        |   |   |   |   |   |    |        |      |         |   |   |                 |                  |    |    |      |                       |         |         |        |   |                 |                 |                  |    |    |      |                           |         |         |                      |                 |                 |                 |                  |    |    |      |                               |         |         |        |                 |                 |                  |                  |    |    |        |      |                               |         |        |        |  |  |  |  |  |  |        |        |
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| Page   | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |     |     |        |     |                 |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
|--------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----|--------|-----|-----------------|----------|----|----|-----|-----|-----|-----|---|---|----|----|----|----|------|-----|---------|--------|--------|--------|--------|--|--|--|--|--|--|--|---|----|----|----|----|----|------|-----------------|--------|--------|--------|--------|--------|--------|---|----|----|----|----|----|------|-----|--------|--------|--------|--------|---------|----|----|----|----|----|----|------|-----|--------|--------|--------|---|---|----|----|----|----|--------|------|-----|--------|---|---|---|---|---|----|--------|--------|---|---|---|---|---|----|------|--------|
| 21, 22 | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |     |     |        |     |                 |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
|        |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |        |     |                 |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
|        |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td rowspan="7">7</td><td rowspan="7">9</td><td rowspan="7">11</td><td rowspan="7">14</td><td rowspan="7">17</td><td rowspan="7">21</td><td>P034</td></tr><tr><td>A06</td></tr><tr><td>OCU11_1</td></tr><tr><td>ICU2_3</td></tr><tr><td>TIN5_0</td></tr><tr><td>RTO0_1</td></tr><tr><td>SOT3_2</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="8">8</td><td rowspan="8">10</td><td rowspan="8">13</td><td rowspan="8">16</td><td rowspan="8">19</td><td rowspan="8">23</td><td>P151</td></tr><tr><td>SCK8_0/<br/>SCL8</td></tr><tr><td>OCU9_1</td></tr><tr><td>TRG7_0</td></tr><tr><td>ICU0_3</td></tr><tr><td>TIN7_0</td></tr><tr><td>ZIN0_2</td></tr><tr><td>DTTI_1</td></tr><tr><td rowspan="6">9</td><td rowspan="6">11</td><td rowspan="6">14</td><td rowspan="6">17</td><td rowspan="6">20</td><td rowspan="6">24</td><td>P035</td></tr><tr><td>A07</td></tr><tr><td>SIN8_0</td></tr><tr><td>OCU8_1</td></tr><tr><td>TOT4_0</td></tr><tr><td>AIN0_0</td></tr><tr><td>INT11_0</td></tr><tr><td rowspan="5">10</td><td rowspan="5">12</td><td rowspan="5">15</td><td rowspan="5">18</td><td rowspan="5">21</td><td rowspan="5">25</td><td>P036</td></tr><tr><td>A08</td></tr><tr><td>SCS8_0</td></tr><tr><td>OCU7_1</td></tr><tr><td>TOT5_0</td></tr><tr><td rowspan="4">-</td><td rowspan="4">-</td><td rowspan="4">16</td><td rowspan="4">19</td><td rowspan="4">22</td><td rowspan="4">26</td><td>BIN0_0</td></tr><tr><td>P037</td></tr><tr><td>A09</td></tr><tr><td>OCU6_1</td></tr><tr><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">27</td><td>TOT6_0</td></tr><tr><td>ZIN0_0</td></tr><tr><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">27</td><td>P174</td></tr><tr><td>TRG8_1</td></tr></table> | Pin no. |     |     |        |     |                 | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | 7 | 9 | 11 | 14 | 17 | 21 | P034 | A06 | OCU11_1 | ICU2_3 | TIN5_0 | RTO0_1 | SOT3_2 |  |  |  |  |  |  |  | 8 | 10 | 13 | 16 | 19 | 23 | P151 | SCK8_0/<br>SCL8 | OCU9_1 | TRG7_0 | ICU0_3 | TIN7_0 | ZIN0_2 | DTTI_1 | 9 | 11 | 14 | 17 | 20 | 24 | P035 | A07 | SIN8_0 | OCU8_1 | TOT4_0 | AIN0_0 | INT11_0 | 10 | 12 | 15 | 18 | 21 | 25 | P036 | A08 | SCS8_0 | OCU7_1 | TOT5_0 | - | - | 16 | 19 | 22 | 26 | BIN0_0 | P037 | A09 | OCU6_1 | - | - | - | - | - | 27 | TOT6_0 | ZIN0_0 | - | - | - | - | - | 27 | P174 | TRG8_1 |
|        |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |        |     | Pin Name        |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
|        |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 80      | 100 | 120 | 144    | 176 |                 |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
|        |                  | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 9       | 11  | 14  | 17     | 21  | P034            |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |     |     |        |     | TIN5_0          |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |     |     |        |     | SOT3_2          |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
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|        |                  | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 10      | 13  | 16  | 19     | 23  | P151            |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |     |     |        |     | TRG7_0          |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
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|        |                  | INT11_0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |        |     |                 |          |    |    |     |     |     |     |   |   |    |    |    |    |      |     |         |        |        |        |        |  |  |  |  |  |  |  |   |    |    |    |    |    |      |                 |        |        |        |        |        |        |   |    |    |    |    |    |      |     |        |        |        |        |         |    |    |    |    |    |    |      |     |        |        |        |   |   |    |    |    |    |        |      |     |        |   |   |   |   |   |    |        |        |   |   |   |   |   |    |      |        |
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| Page   | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
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| 21, 22 | ■PIN Description | (Continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | (Correct)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td rowspan="7">7<sup>*1</sup></td><td rowspan="7">9<sup>*1</sup></td><td rowspan="7">11<sup>*1</sup></td><td rowspan="7">14<sup>*1</sup></td><td rowspan="7">17</td><td rowspan="7">21</td><td>P034</td></tr><tr><td>A06<sup>*2, *3, *4, *5</sup></td></tr><tr><td>OCU11_1</td></tr><tr><td>ICU2_3</td></tr><tr><td>TIN5_0</td></tr><tr><td>RTO0_1</td></tr><tr><td>SOT3_2</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="7">8<sup>*1</sup></td><td rowspan="7">10<sup>*1</sup></td><td rowspan="7">13</td><td rowspan="7">16</td><td rowspan="7">19</td><td rowspan="7">23</td><td>P151</td></tr><tr><td>SCK8_0/<br/>SCL8<sup>*2, *3</sup></td></tr><tr><td>OCU9_1</td></tr><tr><td>TRG7_0</td></tr><tr><td>ICU0_3</td></tr><tr><td>TIN7_0</td></tr><tr><td>ZIN0_2</td></tr><tr><td>DTTI_1</td></tr><tr><td rowspan="6">9<sup>*1</sup></td><td rowspan="6">11<sup>*1</sup></td><td rowspan="6">14<sup>*1</sup></td><td rowspan="6">17<sup>*1</sup></td><td rowspan="6">20</td><td rowspan="6">24</td><td>P035</td></tr><tr><td>A07<sup>*2, *3, *4, *5</sup></td></tr><tr><td>SIN8_0<sup>*2, *3</sup></td></tr><tr><td>OCU8_1</td></tr><tr><td>TOT4_0</td></tr><tr><td>AIN0_0</td></tr><tr><td>INT11_0</td></tr><tr><td rowspan="5">10<sup>*1</sup></td><td rowspan="5">12<sup>*1</sup></td><td rowspan="5">15<sup>*1</sup></td><td rowspan="5">18<sup>*1</sup></td><td rowspan="5">21</td><td rowspan="5">25</td><td>P036</td></tr><tr><td>A08<sup>*2, *3, *4, *5</sup></td></tr><tr><td>SCS8_0<sup>*2, *3</sup></td></tr><tr><td>OCU7_1</td></tr><tr><td>TOT5_0</td></tr><tr><td>BIN0_0</td></tr><tr><td rowspan="4">-</td><td rowspan="4">-</td><td rowspan="4">16<sup>*1</sup></td><td rowspan="4">19<sup>*1</sup></td><td rowspan="4">22</td><td rowspan="4">26</td><td>P037</td></tr><tr><td>A09<sup>*4, *5</sup></td></tr><tr><td>OCU6_1</td></tr><tr><td>TOT6_0</td></tr><tr><td>ZIN0_0</td></tr><tr><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">27</td><td>P174</td></tr><tr><td>TRG8_1</td></tr></table> | Pin no.          |                  |                  |     |     |                                   | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | 7 <sup>*1</sup> | 9 <sup>*1</sup> | 11 <sup>*1</sup> | 14 <sup>*1</sup> | 17 | 21 | P034 | A06 <sup>*2, *3, *4, *5</sup> | OCU11_1 | ICU2_3 | TIN5_0 | RTO0_1 | SOT3_2 |  |  |  |  |  |  |  | 8 <sup>*1</sup> | 10 <sup>*1</sup> | 13 | 16 | 19 | 23 | P151 | SCK8_0/<br>SCL8 <sup>*2, *3</sup> | OCU9_1 | TRG7_0 | ICU0_3 | TIN7_0 | ZIN0_2 | DTTI_1 | 9 <sup>*1</sup> | 11 <sup>*1</sup> | 14 <sup>*1</sup> | 17 <sup>*1</sup> | 20 | 24 | P035 | A07 <sup>*2, *3, *4, *5</sup> | SIN8_0 <sup>*2, *3</sup> | OCU8_1 | TOT4_0 | AIN0_0 | INT11_0 | 10 <sup>*1</sup> | 12 <sup>*1</sup> | 15 <sup>*1</sup> | 18 <sup>*1</sup> | 21 | 25 | P036 | A08 <sup>*2, *3, *4, *5</sup> | SCS8_0 <sup>*2, *3</sup> | OCU7_1 | TOT5_0 | BIN0_0 | - | - | 16 <sup>*1</sup> | 19 <sup>*1</sup> | 22 | 26 | P037 | A09 <sup>*4, *5</sup> | OCU6_1 | TOT6_0 | ZIN0_0 | - | - | - | - | - | 27 | P174 | TRG8_1 |
|        |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |                  |                  |     |     | Pin Name                          |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 80               | 100              | 120              | 144 | 176 |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | 7 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 9 <sup>*1</sup>  | 11 <sup>*1</sup> | 14 <sup>*1</sup> | 17  | 21  | P034                              |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | OCU11_1                           |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | ICU2_3                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | TIN5_0                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | RTO0_1                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | SOT3_2                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | 8 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10 <sup>*1</sup> | 13               | 16               | 19  | 23  | P151                              |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | SCK8_0/<br>SCL8 <sup>*2, *3</sup> |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | OCU9_1                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | TRG7_0                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | ICU0_3                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | TIN7_0                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | ZIN0_2                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | DTTI_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | 9 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 11 <sup>*1</sup> | 14 <sup>*1</sup> | 17 <sup>*1</sup> | 20  | 24  | P035                              |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | A07 <sup>*2, *3, *4, *5</sup>     |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | SIN8_0 <sup>*2, *3</sup>          |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | OCU8_1                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | TOT4_0                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | AIN0_0                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | INT11_0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | 10 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12 <sup>*1</sup> | 15 <sup>*1</sup> | 18 <sup>*1</sup> | 21  | 25  | P036                              |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | A08 <sup>*2, *3, *4, *5</sup>     |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | SCS8_0 <sup>*2, *3</sup>          |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | OCU7_1                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | TOT5_0                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | BIN0_0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                | 16 <sup>*1</sup> | 19 <sup>*1</sup> | 22  | 26  | P037                              |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | A09 <sup>*4, *5</sup>             |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | OCU6_1                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     | TOT6_0                            |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | ZIN0_0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                | -                | -                | -   | 27  | P174                              |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |
| TRG8_1 |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                  |                  |     |     |                                   |          |    |    |     |     |     |     |                 |                 |                  |                  |    |    |      |                               |         |        |        |        |        |  |  |  |  |  |  |  |                 |                  |    |    |    |    |      |                                   |        |        |        |        |        |        |                 |                  |                  |                  |    |    |      |                               |                          |        |        |        |         |                  |                  |                  |                  |    |    |      |                               |                          |        |        |        |   |   |                  |                  |    |    |      |                       |        |        |        |   |   |   |   |   |    |      |        |

| Page   | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
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| 22, 23 | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     |          |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>28</td><td>P175</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG9_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>P040</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>A10</td></tr><tr><td>11</td><td>13</td><td>17</td><td>20</td><td>23</td><td>29</td><td>PPG23_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TOT7_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AIN1_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SIN0_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>P041</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>A11</td></tr><tr><td>12</td><td>14</td><td>18</td><td>21</td><td>24</td><td>30</td><td>SIN9_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ICU9_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>BIN1_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT12_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>P042</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>A12</td></tr><tr><td>13</td><td>15</td><td>19</td><td>22</td><td>25</td><td>31</td><td>SOT9_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN47</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ICU8_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG0_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ZIN1_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>P043</td></tr><tr><td>-</td><td>-</td><td>20</td><td>23</td><td>26</td><td>32</td><td>A13</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ICU7_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG1_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>P044</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>A14</td></tr><tr><td>-</td><td>16</td><td>21</td><td>24</td><td>27</td><td>33</td><td>SCS9_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ICU6_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG2_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>P045</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>A15</td></tr><tr><td>14</td><td>17</td><td>22</td><td>25</td><td>28</td><td>34</td><td>SCK9_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN46</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ICU5_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG3_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TOT1_2</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>P046</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>A16</td></tr><tr><td>-</td><td>-</td><td>-</td><td>26</td><td>29</td><td>35</td><td>ICU4_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG4_1</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>36</td><td>P176</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TRG10_0</td></tr></table> | Pin no. |     |     |     |     |          | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | - | - | - | - | - | 28 | P175 |  |  |  |  |  |  | TRG9_1 |  |  |  |  |  |  | P040 |  |  |  |  |  |  | A10 | 11 | 13 | 17 | 20 | 23 | 29 | PPG23_1 |  |  |  |  |  |  | TOT7_0 |  |  |  |  |  |  | AIN1_0 |  |  |  |  |  |  | SIN0_1 |  |  |  |  |  |  | P041 |  |  |  |  |  |  | A11 | 12 | 14 | 18 | 21 | 24 | 30 | SIN9_0 |  |  |  |  |  |  | ICU9_1 |  |  |  |  |  |  | BIN1_0 |  |  |  |  |  |  | INT12_0 |  |  |  |  |  |  | P042 |  |  |  |  |  |  | A12 | 13 | 15 | 19 | 22 | 25 | 31 | SOT9_0 |  |  |  |  |  |  | AN47 |  |  |  |  |  |  | ICU8_1 |  |  |  |  |  |  | TRG0_1 |  |  |  |  |  |  | ZIN1_0 |  |  |  |  |  |  | P043 | - | - | 20 | 23 | 26 | 32 | A13 |  |  |  |  |  |  | ICU7_1 |  |  |  |  |  |  | TRG1_1 |  |  |  |  |  |  | P044 |  |  |  |  |  |  | A14 | - | 16 | 21 | 24 | 27 | 33 | SCS9_0 |  |  |  |  |  |  | ICU6_1 |  |  |  |  |  |  | TRG2_1 |  |  |  |  |  |  | P045 |  |  |  |  |  |  | A15 | 14 | 17 | 22 | 25 | 28 | 34 | SCK9_0 |  |  |  |  |  |  | AN46 |  |  |  |  |  |  | ICU5_1 |  |  |  |  |  |  | TRG3_1 |  |  |  |  |  |  | TOT1_2 |  |  |  |  |  |  | P046 |  |  |  |  |  |  | A16 | - | - | - | 26 | 29 | 35 | ICU4_1 |  |  |  |  |  |  | TRG4_1 | - | - | - | - | - | 36 | P176 |  |  |  |  |  |  | TRG10_0 |
|        |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | Pin Name |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 80      | 100 | 120 | 144 | 176 |          |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | -   | -   | 28  | P175     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TRG9_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | P040     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | A10      |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 13      | 17  | 20  | 23  | 29  | PPG23_1  |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TOT7_0   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | AIN1_0   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | P041     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | A11      |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 14      | 18  | 21  | 24  | 30  | SIN9_0   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | ICU9_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | BIN1_0   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | INT12_0  |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | P042     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
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|        |                  | 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 15      | 19  | 22  | 25  | 31  | SOT9_0   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | AN47     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | ICU8_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TRG0_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | ZIN1_0   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | P043     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | 20  | 23  | 26  | 32  | A13      |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TRG1_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | P044     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | A14      |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 16      | 21  | 24  | 27  | 33  | SCS9_0   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | ICU6_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TRG2_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | P045     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
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|        |                  | 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 17      | 22  | 25  | 28  | 34  | SCK9_0   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | AN46     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | ICU5_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TRG3_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TOT1_2   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | P046     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | A16      |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | 26  | 29  | 35  | ICU4_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TRG4_1   |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | -   | -   | 36  | P176     |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TRG10_0  |          |    |    |     |     |     |     |   |   |   |   |   |    |      |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |         |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |   |   |    |    |    |    |     |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |    |    |    |    |    |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |    |    |    |    |    |    |        |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |        |  |  |  |  |  |  |      |  |  |  |  |  |  |     |   |   |   |    |    |    |        |  |  |  |  |  |  |        |   |   |   |   |   |    |      |  |  |  |  |  |  |         |

| Page   | Section          | Change Results           |                  |                  |                  |                   |     |                               |  |  |  |
|--------|------------------|--------------------------|------------------|------------------|------------------|-------------------|-----|-------------------------------|--|--|--|
| 22, 23 | ■PIN Description | (Continued)<br>(Correct) |                  |                  |                  |                   |     |                               |  |  |  |
|        |                  | Pin no.                  |                  |                  |                  |                   |     | Pin Name                      |  |  |  |
|        |                  | 64                       | 80               | 100              | 120              | 144               | 176 |                               |  |  |  |
|        |                  | -                        | -                | -                | -                | -                 | 28  | P175                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | TRG9_1                        |  |  |  |
|        |                  | 11 <sup>*1</sup>         | 13 <sup>*1</sup> | 17 <sup>*1</sup> | 20 <sup>*1</sup> | 23                | 29  | P040                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | A10 <sup>*2, *3, *4, *5</sup> |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | PPG23_1                       |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | TOT7_0                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | AIN1_0                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | SIN0_1                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     |                               |  |  |  |
|        |                  | 12 <sup>*1</sup>         | 14 <sup>*1</sup> | 18 <sup>*1</sup> | 21 <sup>*1</sup> | 24                | 30  | P041                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | A11 <sup>*2, *3, *4, *5</sup> |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | SIN9_0                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | ICU9_1                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | BIN1_0                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | INT12_0                       |  |  |  |
|        |                  | 13 <sup>*1</sup>         | 15 <sup>*1</sup> | 19 <sup>*1</sup> | 22 <sup>*1</sup> | 25                | 31  | P042                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | A12 <sup>*2, *3, *4, *5</sup> |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | SOT9_0                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | AN47                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | ICU8_1                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | TRG0_1                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | ZIN1_0                        |  |  |  |
|        |                  | -                        | -                | 20 <sup>*1</sup> | 23 <sup>*1</sup> | 26                | 32  | P043                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | A13 <sup>*4, *5</sup>         |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | ICU7_1                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | TRG1_1                        |  |  |  |
|        |                  | -                        | 16 <sup>*1</sup> | 21 <sup>*1</sup> | 24 <sup>*1</sup> | 27                | 33  | P044                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | A14 <sup>*3, *4, *5</sup>     |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | SCS9_0                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | ICU6_1                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | TRG2_1                        |  |  |  |
|        |                  | 14 <sup>*1</sup>         | 17 <sup>*1</sup> | 22 <sup>*1</sup> | 25 <sup>*1</sup> | 28                | 34  | P045                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | A15 <sup>*2, *3, *4, *5</sup> |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | SCK9_0                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | AN46                          |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | ICU5_1                        |  |  |  |
|        |                  |                          |                  |                  |                  |                   |     | TRG3_1                        |  |  |  |
| TOT1_2 |                  |                          |                  |                  |                  |                   |     |                               |  |  |  |
| -      | -                | -                        | 26 <sup>*1</sup> | 29               | 35               | P046              |     |                               |  |  |  |
|        |                  |                          |                  |                  |                  | A16 <sup>*5</sup> |     |                               |  |  |  |
|        |                  |                          |                  |                  |                  | ICU4_1            |     |                               |  |  |  |
|        |                  |                          |                  |                  |                  | TRG4_1            |     |                               |  |  |  |
| -      | -                | -                        | -                | -                | 36               | P176              |     |                               |  |  |  |
|        |                  |                          |                  |                  |                  | TRG10_0           |     |                               |  |  |  |

| Page   | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |     |     |          |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |
|--------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----|-----|-----|----------|----------|----|----|-----|-----|-----|-----|----|----|----|----|----|----|------|-----|------|--------|--------|--------|---|---|---|---|---|----|------|---------|---|---|---|----|----|----|------|-----|--------|---------|---|---|---|---|----|----|------|-----|--------|---|---|---|---|----|----|------|-----|---------|---------|----|----|----|----|----|----|------|-----|------|---------|---------|--------|---|---|---|---|----|----|------|--------|---------|----|----|----|----|----|----|------|------|---------|------|---------|--------|--|--|--|--|--|--|--|---|---|---|----|----|----|------|------|--------|--------|--------|--------|--------|
| 23, 24 | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |     |     |     |     |          |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |
|        |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |     |     |     |     |          |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |
|        |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td rowspan="6">15</td><td rowspan="6">18</td><td rowspan="6">23</td><td rowspan="6">27</td><td rowspan="6">30</td><td rowspan="6">37</td><td>P047</td></tr><tr><td>A17</td></tr><tr><td>AN45</td></tr><tr><td>TRG8_0</td></tr><tr><td>TIN3_2</td></tr><tr><td>SOT0_1</td></tr><tr><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">38</td><td>P177</td></tr><tr><td>TRG11_0</td></tr><tr><td rowspan="4">-</td><td rowspan="4">-</td><td rowspan="4">-</td><td rowspan="4">28</td><td rowspan="4">31</td><td rowspan="4">39</td><td>P050</td></tr><tr><td>A18</td></tr><tr><td>TRG5_1</td></tr><tr><td>PPG33_0</td></tr><tr><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">32</td><td rowspan="3">40</td><td>P051</td></tr><tr><td>A19</td></tr><tr><td>TRG9_0</td></tr><tr><td rowspan="4">-</td><td rowspan="4">-</td><td rowspan="4">-</td><td rowspan="4">-</td><td rowspan="4">33</td><td rowspan="4">41</td><td>P052</td></tr><tr><td>A20</td></tr><tr><td>PPG34_0</td></tr><tr><td>INT14_0</td></tr><tr><td rowspan="6">16</td><td rowspan="6">19</td><td rowspan="6">24</td><td rowspan="6">29</td><td rowspan="6">34</td><td rowspan="6">42</td><td>P053</td></tr><tr><td>A21</td></tr><tr><td>AN44</td></tr><tr><td>PPG35_0</td></tr><tr><td>INT14_1</td></tr><tr><td>SCK0_1</td></tr><tr><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">-</td><td rowspan="3">35</td><td rowspan="3">43</td><td>P054</td></tr><tr><td>SYSCLK</td></tr><tr><td>PPG36_0</td></tr><tr><td rowspan="6">17</td><td rowspan="6">22</td><td rowspan="6">27</td><td rowspan="6">32</td><td rowspan="6">38</td><td rowspan="6">46</td><td>P055</td></tr><tr><td>CS2X</td></tr><tr><td>SIN10_0</td></tr><tr><td>AN43</td></tr><tr><td>PPG37_0</td></tr><tr><td>TIN4_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="7">-</td><td rowspan="7">-</td><td rowspan="7">-</td><td rowspan="7">33</td><td rowspan="7">39</td><td rowspan="7">49</td><td>P056</td></tr><tr><td>CS3X</td></tr><tr><td>ICU9_0</td></tr><tr><td>PPG0_1</td></tr><tr><td>ICU0_1</td></tr><tr><td>TIN5_1</td></tr><tr><td>DTTI_2</td></tr></table> | Pin no. |     |     |     |     |          | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | 15 | 18 | 23 | 27 | 30 | 37 | P047 | A17 | AN45 | TRG8_0 | TIN3_2 | SOT0_1 | - | - | - | - | - | 38 | P177 | TRG11_0 | - | - | - | 28 | 31 | 39 | P050 | A18 | TRG5_1 | PPG33_0 | - | - | - | - | 32 | 40 | P051 | A19 | TRG9_0 | - | - | - | - | 33 | 41 | P052 | A20 | PPG34_0 | INT14_0 | 16 | 19 | 24 | 29 | 34 | 42 | P053 | A21 | AN44 | PPG35_0 | INT14_1 | SCK0_1 | - | - | - | - | 35 | 43 | P054 | SYSCLK | PPG36_0 | 17 | 22 | 27 | 32 | 38 | 46 | P055 | CS2X | SIN10_0 | AN43 | PPG37_0 | TIN4_1 |  |  |  |  |  |  |  | - | - | - | 33 | 39 | 49 | P056 | CS3X | ICU9_0 | PPG0_1 | ICU0_1 | TIN5_1 | DTTI_2 |
|        |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |     |     |     |     | Pin Name |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |
|        |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80      | 100 | 120 | 144 | 176 |          |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |     |     |     | PPG0_1   |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |     |     |     | ICU0_1   |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |     |     |     | TIN5_1   |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |     |     |     | DTTI_2   |          |    |    |     |     |     |     |    |    |    |    |    |    |      |     |      |        |        |        |   |   |   |   |   |    |      |         |   |   |   |    |    |    |      |     |        |         |   |   |   |   |    |    |      |     |        |   |   |   |   |    |    |      |     |         |         |    |    |    |    |    |    |      |     |      |         |         |        |   |   |   |   |    |    |      |        |         |    |    |    |    |    |    |      |      |         |      |         |        |  |  |  |  |  |  |  |   |   |   |    |    |    |      |      |        |        |        |        |        |

| Page               | Section          | Change Results                                                                                                                                                   |                  |                  |                  |        |     |                                |          |    |    |     |     |     |     |
|--------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|------------------|--------|-----|--------------------------------|----------|----|----|-----|-----|-----|-----|
| 23, 24             | ■PIN Description | (Continued)<br>(Correct)                                                                                                                                         |                  |                  |                  |        |     |                                |          |    |    |     |     |     |     |
|                    |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr></table> | Pin no.          |                  |                  |        |     |                                | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 |
|                    |                  | Pin no.                                                                                                                                                          |                  |                  |                  |        |     | Pin Name                       |          |    |    |     |     |     |     |
|                    |                  | 64                                                                                                                                                               | 80               | 100              | 120              | 144    | 176 |                                |          |    |    |     |     |     |     |
|                    |                  | 15 <sup>*1</sup>                                                                                                                                                 | 18 <sup>*1</sup> | 23 <sup>*1</sup> | 27 <sup>*1</sup> | 30     | 37  | P047                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | A17 <sup>*2, *3, *4, *5</sup>  |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | AN45                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | TRG8_0                         |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | TIN3_2                         |          |    |    |     |     |     |     |
|                    |                  | -                                                                                                                                                                | -                | -                | -                | -      | 38  | SOT0_1                         |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | P177                           |          |    |    |     |     |     |     |
|                    |                  | -                                                                                                                                                                | -                | -                | 28 <sup>*1</sup> | 31     | 39  | TRG11_0                        |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | P050                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | A18 <sup>*5</sup>              |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | TRG5_1                         |          |    |    |     |     |     |     |
|                    |                  | -                                                                                                                                                                | -                | -                | -                | 32     | 40  | PPG33_0                        |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | P051                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | A19                            |          |    |    |     |     |     |     |
|                    |                  | -                                                                                                                                                                | -                | -                | -                | 33     | 41  | TRG9_0                         |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | P052                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | A20                            |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | PPG34_0                        |          |    |    |     |     |     |     |
|                    |                  | 16 <sup>*1</sup>                                                                                                                                                 | 19 <sup>*1</sup> | 24 <sup>*1</sup> | 29 <sup>*1</sup> | 34     | 42  | INT14_0                        |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | P053                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | A21 <sup>*2, *3, *4, *5</sup>  |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | AN44                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | PPG35_0                        |          |    |    |     |     |     |     |
|                    |                  | -                                                                                                                                                                | -                | -                | -                | 35     | 43  | INT14_1                        |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | SCK0_1                         |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | P054                           |          |    |    |     |     |     |     |
|                    |                  | 17 <sup>*1</sup>                                                                                                                                                 | 22 <sup>*1</sup> | 27 <sup>*1</sup> | 32 <sup>*1</sup> | 38     | 46  | SYSCLK                         |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | PPG36_0                        |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | P055                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | CS2X <sup>*2, *3, *4, *5</sup> |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | SIN10_0                        |          |    |    |     |     |     |     |
|                    |                  | -                                                                                                                                                                | -                | -                | 33 <sup>*1</sup> | 39     | 49  | AN43                           |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     | PPG37_0                        |          |    |    |     |     |     |     |
| TIN4_1             |                  |                                                                                                                                                                  |                  |                  |                  |        |     |                                |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  |        |     |                                |          |    |    |     |     |     |     |
| P056               |                  |                                                                                                                                                                  |                  |                  |                  |        |     |                                |          |    |    |     |     |     |     |
| CS3X <sup>*5</sup> |                  |                                                                                                                                                                  |                  |                  |                  |        |     |                                |          |    |    |     |     |     |     |
| ICU9_0             |                  |                                                                                                                                                                  |                  |                  |                  |        |     |                                |          |    |    |     |     |     |     |
| PPG0_1             |                  |                                                                                                                                                                  |                  |                  |                  |        |     |                                |          |    |    |     |     |     |     |
| -                  | -                | -                                                                                                                                                                | -                | -                | -                | ICU0_1 |     |                                |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  | TIN5_1 |     |                                |          |    |    |     |     |     |     |
|                    |                  |                                                                                                                                                                  |                  |                  |                  | DTTI_2 |     |                                |          |    |    |     |     |     |     |

| Page                                                 | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
|------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--|--------------------------|------------------------------------------|------------------------------------------------------|-------------------------|-------------------------|--------------------------------------|------------------------|--|--------------------------|---------------------------------------|------------------------------------------------------|-------------------------|-------------------------|--------------------------------------|
| 24                                                   | ■PIN Description | <p>A List of "Pin Description" modified.</p> <p>(Error)</p> <table><tr><td>Function<sup>*2</sup></td></tr><tr><td> </td></tr><tr><td>General-purpose I/O port</td></tr><tr><td>External Bus chip select 2 output pin(0)</td></tr><tr><td>Multi-function serial ch.10 serial data input pin(0)</td></tr><tr><td>ADC analog 43 input pin</td></tr><tr><td>PPG ch.37 output pin(0)</td></tr><tr><td>Reload timer ch.4 event input pin(1)</td></tr></table> <p>(Correct)</p> <table><tr><td>Function<sup>*9</sup></td></tr><tr><td> </td></tr><tr><td>General-purpose I/O port</td></tr><tr><td>External Bus chip select 2 output pin</td></tr><tr><td>Multi-function serial ch.10 serial data input pin(0)</td></tr><tr><td>ADC analog 43 input pin</td></tr><tr><td>PPG ch.37 output pin(0)</td></tr><tr><td>Reload timer ch.4 event input pin(1)</td></tr></table> | Function <sup>*2</sup> |  | General-purpose I/O port | External Bus chip select 2 output pin(0) | Multi-function serial ch.10 serial data input pin(0) | ADC analog 43 input pin | PPG ch.37 output pin(0) | Reload timer ch.4 event input pin(1) | Function <sup>*9</sup> |  | General-purpose I/O port | External Bus chip select 2 output pin | Multi-function serial ch.10 serial data input pin(0) | ADC analog 43 input pin | PPG ch.37 output pin(0) | Reload timer ch.4 event input pin(1) |
| Function <sup>*2</sup>                               |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
|                                                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| General-purpose I/O port                             |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| External Bus chip select 2 output pin(0)             |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| Multi-function serial ch.10 serial data input pin(0) |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| ADC analog 43 input pin                              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| PPG ch.37 output pin(0)                              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| Reload timer ch.4 event input pin(1)                 |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| Function <sup>*9</sup>                               |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
|                                                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| General-purpose I/O port                             |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| External Bus chip select 2 output pin                |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| Multi-function serial ch.10 serial data input pin(0) |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| ADC analog 43 input pin                              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| PPG ch.37 output pin(0)                              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |
| Reload timer ch.4 event input pin(1)                 |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |  |                          |                                          |                                                      |                         |                         |                                      |                        |  |                          |                                       |                                                      |                         |                         |                                      |

| Page                                         | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
|----------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------|------------------------------------------|---------------------------------|------------------------|---------------------------------|--------------------------------------|----------------------------------------------|------------|--------------------------|---------------------------------------|---------------------------------|------------------------|---------------------------------|--------------------------------------|----------------------------------------------|
| 24                                           | ■PIN Description | <p>A List of "Pin Description" modified.</p> <p>(Error)</p> <table><tr><td>Function*2</td></tr><tr><td>General-purpose I/O port</td></tr><tr><td>External Bus chip select 3 output pin(0)</td></tr><tr><td>Input capture ch.9 input pin(0)</td></tr><tr><td>PPG ch.0 output pin(1)</td></tr><tr><td>Input capture ch.0 input pin(1)</td></tr><tr><td>Reload timer ch.5 event input pin(1)</td></tr><tr><td>Waveform generator ch.0 to ch.5 input pin(2)</td></tr></table> <p>(Correct)</p> <table><tr><td>Function*9</td></tr><tr><td>General-purpose I/O port</td></tr><tr><td>External Bus chip select 3 output pin</td></tr><tr><td>Input capture ch.9 input pin(0)</td></tr><tr><td>PPG ch.0 output pin(1)</td></tr><tr><td>Input capture ch.0 input pin(1)</td></tr><tr><td>Reload timer ch.5 event input pin(1)</td></tr><tr><td>Waveform generator ch.0 to ch.5 input pin(2)</td></tr></table> | Function*2 | General-purpose I/O port | External Bus chip select 3 output pin(0) | Input capture ch.9 input pin(0) | PPG ch.0 output pin(1) | Input capture ch.0 input pin(1) | Reload timer ch.5 event input pin(1) | Waveform generator ch.0 to ch.5 input pin(2) | Function*9 | General-purpose I/O port | External Bus chip select 3 output pin | Input capture ch.9 input pin(0) | PPG ch.0 output pin(1) | Input capture ch.0 input pin(1) | Reload timer ch.5 event input pin(1) | Waveform generator ch.0 to ch.5 input pin(2) |
| Function*2                                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| General-purpose I/O port                     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| External Bus chip select 3 output pin(0)     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Input capture ch.9 input pin(0)              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| PPG ch.0 output pin(1)                       |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Input capture ch.0 input pin(1)              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Reload timer ch.5 event input pin(1)         |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Waveform generator ch.0 to ch.5 input pin(2) |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Function*9                                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| General-purpose I/O port                     |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| External Bus chip select 3 output pin        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Input capture ch.9 input pin(0)              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| PPG ch.0 output pin(1)                       |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Input capture ch.0 input pin(1)              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Reload timer ch.5 event input pin(1)         |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |
| Waveform generator ch.0 to ch.5 input pin(2) |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                          |                                          |                                 |                        |                                 |                                      |                                              |            |                          |                                       |                                 |                        |                                 |                                      |                                              |

| Page                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----|-----|-----------------------------------|----------|-----------------|----------|-----|-----|-----|-----|------------------|------------------|------------------|------------------|----|----|------|-------------------------------|---------|------|---------|--------|--------|-----------------------------------|--------|-----------------|--------|--|--|--|------|--|------|--|--|--|--|--------|--|--------|
| 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td rowspan="8">19</td><td rowspan="8">24</td><td rowspan="8">29</td><td rowspan="8">35</td><td rowspan="8">41</td><td rowspan="8">51</td><td>P057</td></tr><tr><td>RDY</td></tr><tr><td>SCK10_1</td></tr><tr><td>AN42</td></tr><tr><td>ICU8_0</td></tr><tr><td>TRG0_2</td></tr><tr><td>PPG1_1</td></tr><tr><td>ICU1_1</td></tr><tr><td>TIN6_1</td></tr></table> | Pin no.          |     |     |                                   |          |                 | Pin Name | 64  | 80  | 100 | 120 | 144              | 176              | 19               | 24               | 29 | 35 | 41   | 51                            | P057    | RDY  | SCK10_1 | AN42   | ICU8_0 | TRG0_2                            | PPG1_1 | ICU1_1          | TIN6_1 |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |     |     |                                   |          | Pin Name        |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80               | 100 | 120 | 144                               | 176      |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 24               | 29  | 35  | 41                                | 51       | P057            |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          | RDY             |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          | SCK10_1         |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          | AN42            |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          | ICU8_0          |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| TRG0_2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| PPG1_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| ICU1_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| TIN6_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| (Correct)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td rowspan="8">19<sup>*1</sup></td><td rowspan="8">24<sup>*1</sup></td><td rowspan="8">29<sup>*1</sup></td><td rowspan="8">35<sup>*1</sup></td><td rowspan="8">41</td><td rowspan="8">51</td><td>P057</td></tr><tr><td>RDY<sup>*2, *3, *4, *5</sup></td></tr><tr><td>SCK10_1</td></tr><tr><td>AN42</td></tr><tr><td>ICU8_0</td></tr><tr><td>TRG0_2</td></tr><tr><td>PPG1_1</td></tr><tr><td>ICU1_1</td></tr><tr><td>TIN6_1</td></tr></table> | Pin no.          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   | Pin Name | 64              | 80       | 100 | 120 | 144 | 176 | 19 <sup>*1</sup> | 24 <sup>*1</sup> | 29 <sup>*1</sup> | 35 <sup>*1</sup> | 41 | 51 | P057 | RDY <sup>*2, *3, *4, *5</sup> | SCK10_1 | AN42 | ICU8_0  | TRG0_2 | PPG1_1 | ICU1_1                            | TIN6_1 |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | Pin Name                          |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 80               | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 120              | 144 | 176 |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| 19 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24 <sup>*1</sup> | 29 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 35 <sup>*1</sup> | 41  | 51  | P057                              |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | RDY <sup>*2, *3, *4, *5</sup>     |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | SCK10_1                           |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | AN42                              |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | ICU8_0                            |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | TRG0_2                            |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | PPG1_1                            |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | ICU1_1                            |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| TIN6_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td>-</td><td>35</td><td>43</td><td>49</td><td>57</td><td>71</td><td>P073</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SOT4_0/<br/>SDA4</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN33</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ICU3_2</td></tr></table>                    | Pin no.          |     |     |                                   |          |                 | Pin Name | 64  | 80  | 100 | 120 | 144              | 176              | -                | 35               | 43 | 49 | 57   | 71                            | P073    |      |         |        |        |                                   |        | SOT4_0/<br>SDA4 |        |  |  |  |      |  | AN33 |  |  |  |  |        |  | ICU3_2 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |     |     |                                   |          | Pin Name        |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80               | 100 | 120 | 144                               | 176      |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 35               | 43  | 49  | 57                                | 71       | P073            |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          | SOT4_0/<br>SDA4 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   |          | ICU3_2          |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | (Correct)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |     |     |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td>-</td><td>35<sup>*3</sup></td><td>43<sup>*4</sup></td><td>49</td><td>57</td><td>71</td><td>P073</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SOT4_0/<br/>SDA4<sup>*3, *4</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN33</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ICU3_2</td></tr></table>                                                      | Pin no.          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     |                                   | Pin Name | 64              | 80       | 100 | 120 | 144 | 176 | -                | 35 <sup>*3</sup> | 43 <sup>*4</sup> | 49               | 57 | 71 | P073 |                               |         |      |         |        |        | SOT4_0/<br>SDA4 <sup>*3, *4</sup> |        |                 |        |  |  |  | AN33 |  |      |  |  |  |  | ICU3_2 |  |        |
| Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | Pin Name                          |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 80               | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 120              | 144 | 176 |                                   |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 35 <sup>*3</sup> | 43 <sup>*4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 49               | 57  | 71  | P073                              |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | SOT4_0/<br>SDA4 <sup>*3, *4</sup> |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | AN33                              |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |     |     | ICU3_2                            |          |                 |          |     |     |     |     |                  |                  |                  |                  |    |    |      |                               |         |      |         |        |        |                                   |        |                 |        |  |  |  |      |  |      |  |  |  |  |        |  |        |

| Page | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |     |     |     |     |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----|-----|-----|-----|----------|----------|----|----|-----|-----|-----|-----|--|--|--|--|--|--|--|------------------|------------------|----|----|----|----|------|-------|---------|-----|--------|---------|--------|-------------------------|
| 29   | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |     |     |     |     |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |     |     |     |     |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="7">34</td><td rowspan="7">42</td><td rowspan="7">52</td><td rowspan="7">62</td><td rowspan="7">77</td><td rowspan="7">96</td><td>P093</td></tr><tr><td>TX0_1</td></tr><tr><td>SIN11_0</td></tr><tr><td>AN7</td></tr><tr><td>ICU4_2</td></tr><tr><td>PPG16_1</td></tr><tr><td>ICU3_0</td></tr><tr><td>TOT2_1</td></tr></table>                                           | Pin no.          |     |     |     |     |          | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 |  |  |  |  |  |  |  | 34               | 42               | 52 | 62 | 77 | 96 | P093 | TX0_1 | SIN11_0 | AN7 | ICU4_2 | PPG16_1 | ICU3_0 | TOT2_1                  |
|      |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |     |     |     |     | Pin Name |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 80               | 100 | 120 | 144 | 176 |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | 34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 42               | 52  | 62  | 77  | 96  | P093     |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | TX0_1    |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | SIN11_0  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | AN7      |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | ICU4_2   |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | PPG16_1  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | ICU3_0   |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | TOT2_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |     |     |     |     |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | (Correct)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |     |     |     |     |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="7">34<sup>*1</sup></td><td rowspan="7">42<sup>*1</sup></td><td rowspan="7">52</td><td rowspan="7">62</td><td rowspan="7">77</td><td rowspan="7">96</td><td>P093</td></tr><tr><td>TX0_1</td></tr><tr><td>SIN11_0</td></tr><tr><td>AN7</td></tr><tr><td>ICU4_2</td></tr><tr><td>PPG16_1</td></tr><tr><td>ICU3_0</td></tr><tr><td>TOT2_1<sup>*2,*3</sup></td></tr></table> | Pin no.          |     |     |     |     |          | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 |  |  |  |  |  |  |  | 34 <sup>*1</sup> | 42 <sup>*1</sup> | 52 | 62 | 77 | 96 | P093 | TX0_1 | SIN11_0 | AN7 | ICU4_2 | PPG16_1 | ICU3_0 | TOT2_1 <sup>*2,*3</sup> |
|      |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |     |     |     |     | Pin Name |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 80               | 100 | 120 | 144 | 176 |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | 34 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 42 <sup>*1</sup> | 52  | 62  | 77  | 96  | P093     |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | TX0_1    |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | SIN11_0  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | AN7      |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | ICU4_2   |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | PPG16_1  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |     |     |     |     | ICU3_0   |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |
|      |                  | TOT2_1 <sup>*2,*3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |     |     |     |     |          |          |    |    |     |     |     |     |  |  |  |  |  |  |  |                  |                  |    |    |    |    |      |       |         |     |        |         |        |                         |

| Page             | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |     |     |                               |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----|-------------------------------|-----|-------------------|----------|----|----|-----|-----|-----|-----|---|------------------|----|----|----|-----|------|--|--|--|--|--|--|-------------------------------|--|--|--|--|--|--|------|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|------------------|------------------|----|----|----|-----|------|--|--|--|--|--|--|--------------------------|--|--|--|--|--|--|------|--|--|--|--|--|--|---------|--|--|--|--|--|--|---------|------------------|------------------|----|----|----|-----|------|--|--|--|--|--|--|---------------------------|--|--|--|--|--|--|------|--|--|--|--|--|--|---------|------------------|------------------|----|----|----|-----|------|--|--|--|--|--|--|---------------------------|--|--|--|--|--|--|------|--|--|--|--|--|--|---------|------------------|------------------|----|----|----|-----|------|--|--|--|--|--|--|---------------------------|--|--|--|--|--|--|------|--|--|--|--|--|--|---------|
| 30               | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |     |     |                               |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |     |     |                               |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td>-</td><td>48</td><td>59</td><td>69</td><td>85</td><td>104</td><td>P100</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCK7_0/<br/>SCL7_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN12</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG8_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>40</td><td>49</td><td>61</td><td>71</td><td>87</td><td>106</td><td>P102</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SIN7_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN14</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG10_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT10_0</td></tr><tr><td>41</td><td>50</td><td>62</td><td>72</td><td>88</td><td>107</td><td>P103</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCS73_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN15</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG11_0</td></tr><tr><td>42</td><td>51</td><td>63</td><td>73</td><td>89</td><td>108</td><td>P104</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCS72_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN16</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG12_0</td></tr><tr><td>43</td><td>52</td><td>64</td><td>74</td><td>90</td><td>109</td><td>P105</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCS71_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN17</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG13_0</td></tr></table>                                                                                                                                                                                                     | Pin no. |     |     |                               |     |                   | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | - | 48               | 59 | 69 | 85 | 104 | P100 |  |  |  |  |  |  | SCK7_0/<br>SCL7_0             |  |  |  |  |  |  | AN12 |  |  |  |  |  |  | PPG8_0 |  |  |  |  |  |  |  | 40               | 49               | 61 | 71 | 87 | 106 | P102 |  |  |  |  |  |  | SIN7_0                   |  |  |  |  |  |  | AN14 |  |  |  |  |  |  | PPG10_0 |  |  |  |  |  |  | INT10_0 | 41               | 50               | 62 | 72 | 88 | 107 | P103 |  |  |  |  |  |  | SCS73_0                   |  |  |  |  |  |  | AN15 |  |  |  |  |  |  | PPG11_0 | 42               | 51               | 63 | 73 | 89 | 108 | P104 |  |  |  |  |  |  | SCS72_0                   |  |  |  |  |  |  | AN16 |  |  |  |  |  |  | PPG12_0 | 43               | 52               | 64 | 74 | 90 | 109 | P105 |  |  |  |  |  |  | SCS71_0                   |  |  |  |  |  |  | AN17 |  |  |  |  |  |  | PPG13_0 |
|                  |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |     |     |                               |     | Pin Name          |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 80      | 100 | 120 | 144                           | 176 |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 48      | 59  | 69  | 85                            | 104 | P100              |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |                               |     | SCK7_0/<br>SCL7_0 |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |                               |     | AN12              |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |                               |     | PPG8_0            |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |                               |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 40               | 49               | 61                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 71      | 87  | 106 | P102                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SIN7_0                        |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN14                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG10_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | INT10_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 41               | 50               | 62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 72      | 88  | 107 | P103                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SCS73_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN15                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG11_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 42               | 51               | 63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 73      | 89  | 108 | P104                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SCS72_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN16                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG12_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 43               | 52               | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 74      | 90  | 109 | P105                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SCS71_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN17                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG13_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  | (Correct)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |     |     |                               |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td>-</td><td>48<sup>*1</sup></td><td>59</td><td>69</td><td>85</td><td>104</td><td>P100</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCK7_0/<br/>SCL7<sup>*3</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN12</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG8_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>40<sup>*1</sup></td><td>49<sup>*1</sup></td><td>61</td><td>71</td><td>87</td><td>106</td><td>P102</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SIN7_0<sup>*2, *3</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN14</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG10_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT10_0</td></tr><tr><td>41<sup>*1</sup></td><td>50<sup>*1</sup></td><td>62</td><td>72</td><td>88</td><td>107</td><td>P103</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCS73_0<sup>*2, *3</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN15</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG11_0</td></tr><tr><td>42<sup>*1</sup></td><td>51<sup>*1</sup></td><td>63</td><td>73</td><td>89</td><td>108</td><td>P104</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCS72_0<sup>*2, *3</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN16</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG12_0</td></tr><tr><td>43<sup>*1</sup></td><td>52<sup>*1</sup></td><td>64</td><td>74</td><td>90</td><td>109</td><td>P105</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCS71_0<sup>*2, *3</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>AN17</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG13_0</td></tr></table> | Pin no. |     |     |                               |     |                   | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | - | 48 <sup>*1</sup> | 59 | 69 | 85 | 104 | P100 |  |  |  |  |  |  | SCK7_0/<br>SCL7 <sup>*3</sup> |  |  |  |  |  |  | AN12 |  |  |  |  |  |  | PPG8_0 |  |  |  |  |  |  |  | 40 <sup>*1</sup> | 49 <sup>*1</sup> | 61 | 71 | 87 | 106 | P102 |  |  |  |  |  |  | SIN7_0 <sup>*2, *3</sup> |  |  |  |  |  |  | AN14 |  |  |  |  |  |  | PPG10_0 |  |  |  |  |  |  | INT10_0 | 41 <sup>*1</sup> | 50 <sup>*1</sup> | 62 | 72 | 88 | 107 | P103 |  |  |  |  |  |  | SCS73_0 <sup>*2, *3</sup> |  |  |  |  |  |  | AN15 |  |  |  |  |  |  | PPG11_0 | 42 <sup>*1</sup> | 51 <sup>*1</sup> | 63 | 73 | 89 | 108 | P104 |  |  |  |  |  |  | SCS72_0 <sup>*2, *3</sup> |  |  |  |  |  |  | AN16 |  |  |  |  |  |  | PPG12_0 | 43 <sup>*1</sup> | 52 <sup>*1</sup> | 64 | 74 | 90 | 109 | P105 |  |  |  |  |  |  | SCS71_0 <sup>*2, *3</sup> |  |  |  |  |  |  | AN17 |  |  |  |  |  |  | PPG13_0 |
| Pin no.          |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | Pin Name                      |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 64               | 80               | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 120     | 144 | 176 |                               |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| -                | 48 <sup>*1</sup> | 59                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 69      | 85  | 104 | P100                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SCK7_0/<br>SCL7 <sup>*3</sup> |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN12                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG8_0                        |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     |                               |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 40 <sup>*1</sup> | 49 <sup>*1</sup> | 61                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 71      | 87  | 106 | P102                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SIN7_0 <sup>*2, *3</sup>      |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN14                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG10_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | INT10_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 41 <sup>*1</sup> | 50 <sup>*1</sup> | 62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 72      | 88  | 107 | P103                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SCS73_0 <sup>*2, *3</sup>     |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN15                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG11_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 42 <sup>*1</sup> | 51 <sup>*1</sup> | 63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 73      | 89  | 108 | P104                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SCS72_0 <sup>*2, *3</sup>     |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN16                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG12_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
| 43 <sup>*1</sup> | 52 <sup>*1</sup> | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 74      | 90  | 109 | P105                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | SCS71_0 <sup>*2, *3</sup>     |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | AN17                          |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |
|                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |     |     | PPG13_0                       |     |                   |          |    |    |     |     |     |     |   |                  |    |    |    |     |      |  |  |  |  |  |  |                               |  |  |  |  |  |  |      |  |  |  |  |  |  |        |  |  |  |  |  |  |  |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                          |  |  |  |  |  |  |      |  |  |  |  |  |  |         |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |                  |                  |    |    |    |     |      |  |  |  |  |  |  |                           |  |  |  |  |  |  |      |  |  |  |  |  |  |         |

| Page                 | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |     |     |     |     |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|----------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|-----|-----|---------------------------|--|--|--|--|--|----------|----|----|-----|-----|-----|-----|--|--|--|--|--|--|--|---|---|----|-----|-----|-----|------|-----------------------|--------|-----------------------|--------|---|----|----|-----|-----|-----|------|---------------------------|----------------------|---------|
| 33                   | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |     |     |     |     |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |     |     |     |     |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">94</td><td rowspan="5">111</td><td rowspan="5">131</td><td rowspan="5">159</td><td>P000</td></tr><tr><td>D16</td></tr><tr><td>SIN1_0</td></tr><tr><td>TIOA0_1</td></tr><tr><td>INT2_0</td></tr><tr><td rowspan="4">-</td><td rowspan="4">75</td><td rowspan="4">95</td><td rowspan="4">112</td><td rowspan="4">132</td><td rowspan="4">160</td><td>P001</td></tr><tr><td>D17</td></tr><tr><td>SOT1_0</td></tr><tr><td>TIOA1_1</td></tr></table>                                                                 |    |     |     |     |     | Pin no.                   |  |  |  |  |  | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 |  |  |  |  |  |  |  | - | - | 94 | 111 | 131 | 159 | P000 | D16                   | SIN1_0 | TIOA0_1               | INT2_0 | - | 75 | 95 | 112 | 132 | 160 | P001 | D17                       | SOT1_0               | TIOA1_1 |
|                      |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |     |     |     |     | Pin Name                  |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 80 | 100 | 120 | 144 | 176 |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -  | 94  | 111 | 131 | 159 | P000                      |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | D16                       |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | SIN1_0                    |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | TIOA0_1                   |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | INT2_0                    |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 75 | 95  | 112 | 132 | 160 | P001                      |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | D17                       |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | SOT1_0                    |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | TIOA1_1                   |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | (Correct)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |     |     |     |     |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="5">-</td><td rowspan="5">-</td><td rowspan="5">94</td><td rowspan="5">111</td><td rowspan="5">131</td><td rowspan="5">159</td><td>P000</td></tr><tr><td>D16<sup>*4, *5</sup></td></tr><tr><td>SIN1_0</td></tr><tr><td>TIOA0_1<sup>*4</sup></td></tr><tr><td>INT2_0</td></tr><tr><td rowspan="4">-</td><td rowspan="4">75</td><td rowspan="4">95</td><td rowspan="4">112</td><td rowspan="4">132</td><td rowspan="4">160</td><td>P001</td></tr><tr><td>D17<sup>*3, *4, *5</sup></td></tr><tr><td>SOT1_0<sup>*3</sup></td></tr><tr><td>TIOA1_1</td></tr></table> |    |     |     |     |     | Pin no.                   |  |  |  |  |  | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 |  |  |  |  |  |  |  | - | - | 94 | 111 | 131 | 159 | P000 | D16 <sup>*4, *5</sup> | SIN1_0 | TIOA0_1 <sup>*4</sup> | INT2_0 | - | 75 | 95 | 112 | 132 | 160 | P001 | D17 <sup>*3, *4, *5</sup> | SOT1_0 <sup>*3</sup> | TIOA1_1 |
|                      |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |     |     |     |     | Pin Name                  |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 80 | 100 | 120 | 144 | 176 |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -  | 94  | 111 | 131 | 159 | P000                      |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | D16 <sup>*4, *5</sup>     |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | SIN1_0                    |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | TIOA0_1 <sup>*4</sup>     |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | INT2_0                    |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 75 | 95  | 112 | 132 | 160 | P001                      |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     | D17 <sup>*3, *4, *5</sup> |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
| SOT1_0 <sup>*3</sup> |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |
| TIOA1_1              |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |     |     |     |     |                           |  |  |  |  |  |          |    |    |     |     |     |     |  |  |  |  |  |  |  |   |   |    |     |     |     |      |                       |        |                       |        |   |    |    |     |     |     |      |                           |                      |         |

| Page   | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |     |     |     |     |           |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
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| 34, 35 | ■PIN Description | A List of "Pin Description" modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |     |     |     |     |           |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | (Error)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     |           |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr><tr><td>-</td><td>-</td><td>-</td><td>113</td><td>133</td><td>161</td><td>P002</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D18</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCK1_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TIOB0_1</td></tr><tr><td>-</td><td>76</td><td>96</td><td>114</td><td>134</td><td>162</td><td>P003</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D19</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SIN2_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TIOB1_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT3_0</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>135</td><td>163</td><td>P004</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D20</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SOT2_0</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>164</td><td>P164</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG32_1</td></tr><tr><td>61</td><td>77</td><td>97</td><td>115</td><td>136</td><td>165</td><td>P005</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D21</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCK2_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ADTG0_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT7_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>(RX2(64))</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>166</td><td>P165</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG33_1</td></tr><tr><td>62</td><td>78</td><td>98</td><td>116</td><td>137</td><td>167</td><td>P006</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D22</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCS2_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ADTG1_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT2_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>(TX2(64))</td></tr><tr><td>-</td><td>-</td><td>-</td><td>117</td><td>138</td><td>168</td><td>P007</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D23</td></tr><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>169</td><td>P166</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG34_1</td></tr><tr><td>-</td><td>-</td><td>-</td><td>118</td><td>139</td><td>170</td><td>P010</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D24</td></tr><tr><td>63</td><td>79</td><td>99</td><td>119</td><td>140</td><td>171</td><td>P011</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>WOT</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D25</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SOT2_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TIOA0_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT3_1</td></tr></table> | Pin no. |     |     |     |     |           | Pin Name | 64 | 80 | 100 | 120 | 144 | 176 | - | - | - | 113 | 133 | 161 | P002 |  |  |  |  |  |  | D18 |  |  |  |  |  |  | SCK1_0 |  |  |  |  |  |  | TIOB0_1 | - | 76 | 96 | 114 | 134 | 162 | P003 |  |  |  |  |  |  | D19 |  |  |  |  |  |  | SIN2_0 |  |  |  |  |  |  | TIOB1_1 |  |  |  |  |  |  | INT3_0 | - | - | - | - | 135 | 163 | P004 |  |  |  |  |  |  | D20 |  |  |  |  |  |  | SOT2_0 | - | - | - | - | - | 164 | P164 |  |  |  |  |  |  | PPG32_1 | 61 | 77 | 97 | 115 | 136 | 165 | P005 |  |  |  |  |  |  | D21 |  |  |  |  |  |  | SCK2_0 |  |  |  |  |  |  | ADTG0_1 |  |  |  |  |  |  | INT7_1 |  |  |  |  |  |  | (RX2(64)) | - | - | - | - | - | 166 | P165 |  |  |  |  |  |  | PPG33_1 | 62 | 78 | 98 | 116 | 137 | 167 | P006 |  |  |  |  |  |  | D22 |  |  |  |  |  |  | SCS2_0 |  |  |  |  |  |  | ADTG1_1 |  |  |  |  |  |  | INT2_1 |  |  |  |  |  |  | (TX2(64)) | - | - | - | 117 | 138 | 168 | P007 |  |  |  |  |  |  | D23 | - | - | - | - | - | 169 | P166 |  |  |  |  |  |  | PPG34_1 | - | - | - | 118 | 139 | 170 | P010 |  |  |  |  |  |  | D24 | 63 | 79 | 99 | 119 | 140 | 171 | P011 |  |  |  |  |  |  | WOT |  |  |  |  |  |  | D25 |  |  |  |  |  |  | SOT2_1 |  |  |  |  |  |  | TIOA0_0 |  |  |  |  |  |  | INT3_1 |
|        |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |     |     |     |     | Pin Name  |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 80      | 100 | 120 | 144 | 176 |           |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | 113 | 133 | 161 | P002      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | D18       |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | SCK1_0    |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TIOB0_1   |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 76      | 96  | 114 | 134 | 162 | P003      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | D19       |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | SIN2_0    |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | TIOB1_1   |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
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|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | -   | 135 | 163 | P004      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | D20       |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | SOT2_0    |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | -   | -   | 164 | P164      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | PPG32_1   |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | 61                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 77      | 97  | 115 | 136 | 165 | P005      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | D21       |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | SCK2_0    |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | INT7_1    |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | (RX2(64)) |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | -   | -   | 166 | P165      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | PPG33_1   |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | 62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 78      | 98  | 116 | 137 | 167 | P006      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | D22       |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | SCS2_0    |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | ADTG1_1   |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | (TX2(64)) |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | 117 | 138 | 168 | P007      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | D23       |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | -   | -   | 169 | P166      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | PPG34_1   |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -       | -   | 118 | 139 | 170 | P010      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | D24       |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
|        |                  | 63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 79      | 99  | 119 | 140 | 171 | P011      |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
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|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |     |     |     |     | D25       |          |    |    |     |     |     |     |   |   |   |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |   |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |   |   |   |   |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |   |   |     |      |  |  |  |  |  |  |         |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |  |  |  |  |  |  |           |   |   |   |     |     |     |      |  |  |  |  |  |  |     |   |   |   |   |   |     |      |  |  |  |  |  |  |         |   |   |   |     |     |     |      |  |  |  |  |  |  |     |    |    |    |     |     |     |      |  |  |  |  |  |  |     |  |  |  |  |  |  |     |  |  |  |  |  |  |        |  |  |  |  |  |  |         |  |  |  |  |  |  |        |
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| Page                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Section          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                   |                   |                               |                   |                                   |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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| 34, 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ■PIN Description | (Continued)<br>(Correct)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                   |                   |                               |                   |                                   |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><th colspan="6">Pin no.</th><th rowspan="2">Pin Name</th></tr><tr><th>64</th><th>80</th><th>100</th><th>120</th><th>144</th><th>176</th></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Pin no.           |                   |                   |                               |                   |                                   | Pin Name | 64 | 80 | 100 | 120 | 144               | 176 |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |                   |                   |                               |                   | Pin Name                          |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80                | 100               | 120               | 144                           | 176               |                                   |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><td>-</td><td>-</td><td>-</td><td>113<sup>*1</sup></td><td>133</td><td>161</td><td>P002</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D18<sup>*5</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCK1_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TIOB0_1</td></tr></table>                                                                                                                                                                                                                                                                                    | -                 | -                 | -                 | 113 <sup>*1</sup>             | 133               | 161                               | P002     |    |    |     |     |                   |     | D18 <sup>*5</sup>             |  |  |  |  |                               |  | SCK1_0               |  |  |  |  |                      |  | TIOB0_1 |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                 | -                 | 113 <sup>*1</sup> | 133                           | 161               | P002                              |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |                   |                   |                               |                   | TIOB0_1                           |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><td>-</td><td>76<sup>*1</sup></td><td>96<sup>*1</sup></td><td>114<sup>*1</sup></td><td>134</td><td>162</td><td>P003</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D19<sup>*3, *4, *5</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SIN2_0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TIOB1_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT3_0</td></tr></table>                                                                                                                                                                  | -                 | 76 <sup>*1</sup>  | 96 <sup>*1</sup>  | 114 <sup>*1</sup>             | 134               | 162                               | P003     |    |    |     |     |                   |     | D19 <sup>*3, *4, *5</sup>     |  |  |  |  |                               |  | SIN2_0               |  |  |  |  |                      |  | TIOB1_1 |  |  |  |  |                               |  | INT3_0 |  |  |  |  |        |  |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 76 <sup>*1</sup>  | 96 <sup>*1</sup>  | 114 <sup>*1</sup> | 134                           | 162               | P003                              |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |                   |                   |                               |                   | SIN2_0                            |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>135</td><td>163</td><td>P004</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D20</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SOT2_0</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                               | -                 | -                 | -                 | -                             | 135               | 163                               | P004     |    |    |     |     |                   |     | D20                           |  |  |  |  |                               |  | SOT2_0               |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                 | -                 | -                 | 135                           | 163               | P004                              |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>164</td><td>P164</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG32_1</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -                 | -                 | -                 | -                             | -                 | 164                               | P164     |    |    |     |     |                   |     | PPG32_1                       |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><td>61<sup>*1</sup></td><td>77<sup>*1</sup></td><td>97<sup>*1</sup></td><td>115<sup>*1</sup></td><td>136<sup>*1</sup></td><td>165<sup>*1</sup></td><td>P005</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D21<sup>*2, *3, *4, *5</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCK2_0<sup>*2</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ADTG0_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT7_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>RX2(64)<sup>*4, *5, *6, *7</sup></td></tr></table> | 61 <sup>*1</sup>  | 77 <sup>*1</sup>  | 97 <sup>*1</sup>  | 115 <sup>*1</sup>             | 136 <sup>*1</sup> | 165 <sup>*1</sup>                 | P005     |    |    |     |     |                   |     | D21 <sup>*2, *3, *4, *5</sup> |  |  |  |  |                               |  | SCK2_0 <sup>*2</sup> |  |  |  |  |                      |  | ADTG0_1 |  |  |  |  |                               |  | INT7_1 |  |  |  |  |        |  | RX2(64) <sup>*4, *5, *6, *7</sup> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | 61 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 77 <sup>*1</sup>  | 97 <sup>*1</sup>  | 115 <sup>*1</sup> | 136 <sup>*1</sup>             | 165 <sup>*1</sup> | P005                              |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>166</td><td>P165</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG33_1</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -                 | -                 | -                 | -                             | -                 | 166                               | P165     |    |    |     |     |                   |     | PPG33_1                       |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><td>62<sup>*1</sup></td><td>78<sup>*1</sup></td><td>98<sup>*1</sup></td><td>116<sup>*1</sup></td><td>137<sup>*1</sup></td><td>167<sup>*1</sup></td><td>P006</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D22<sup>*2, *3, *4, *5</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SCS2_0<sup>*2</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>ADTG1_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT2_1</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TX2(64)<sup>*4, *5, *6, *7</sup></td></tr></table> | 62 <sup>*1</sup>  | 78 <sup>*1</sup>  | 98 <sup>*1</sup>  | 116 <sup>*1</sup>             | 137 <sup>*1</sup> | 167 <sup>*1</sup>                 | P006     |    |    |     |     |                   |     | D22 <sup>*2, *3, *4, *5</sup> |  |  |  |  |                               |  | SCS2_0 <sup>*2</sup> |  |  |  |  |                      |  | ADTG1_1 |  |  |  |  |                               |  | INT2_1 |  |  |  |  |        |  | TX2(64) <sup>*4, *5, *6, *7</sup> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | 62 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 78 <sup>*1</sup>  | 98 <sup>*1</sup>  | 116 <sup>*1</sup> | 137 <sup>*1</sup>             | 167 <sup>*1</sup> | P006                              |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | <table><tr><td>-</td><td>-</td><td>-</td><td>117<sup>*1</sup></td><td>138</td><td>168</td><td>P007</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D23<sup>*5</sup></td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -                 | -                 | -                 | 117 <sup>*1</sup>             | 138               | 168                               | P007     |    |    |     |     |                   |     | D23 <sup>*5</sup>             |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 117 <sup>*1</sup> | 138               | 168               | P007                          |                   |                                   |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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| <table><tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>169</td><td>P166</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>PPG34_1</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                         | -                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                 | -                 | -                 | 169                           | P166              |                                   |          |    |    |     |     | PPG34_1           |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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| <table><tr><td>-</td><td>-</td><td>-</td><td>118<sup>*1</sup></td><td>139</td><td>170</td><td>P010</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D24<sup>*5</sup></td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                               | -                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                 | 118 <sup>*1</sup> | 139               | 170                           | P010              |                                   |          |    |    |     |     | D24 <sup>*5</sup> |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 118 <sup>*1</sup> | 139               | 170               | P010                          |                   |                                   |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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| <table><tr><td>63<sup>*1</sup></td><td>79<sup>*1</sup></td><td>99<sup>*1</sup></td><td>119<sup>*1</sup></td><td>140</td><td>171</td><td>P011</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>WOT</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>D25<sup>*2, *3, *4, *5</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>SOT2_1<sup>*2</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>TIOA0_0<sup>*2, *3, *4</sup></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>INT3_1</td></tr></table> | 63 <sup>*1</sup> | 79 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 99 <sup>*1</sup>  | 119 <sup>*1</sup> | 140               | 171                           | P011              |                                   |          |    |    |     |     | WOT               |     |                               |  |  |  |  | D25 <sup>*2, *3, *4, *5</sup> |  |                      |  |  |  |  | SOT2_1 <sup>*2</sup> |  |         |  |  |  |  | TIOA0_0 <sup>*2, *3, *4</sup> |  |        |  |  |  |  | INT3_1 |  |                                   |
| 63 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 79 <sup>*1</sup> | 99 <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 119 <sup>*1</sup> | 140               | 171               | P011                          |                   |                                   |          |    |    |     |     |                   |     |                               |  |  |  |  |                               |  |                      |  |  |  |  |                      |  |         |  |  |  |  |                               |  |        |  |  |  |  |        |  |                                   |
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| Page | Section          | Change Results                                                |
|------|------------------|---------------------------------------------------------------|
| 34   | ■PIN Description | A List of "Pin Description" modified.                         |
|      |                  | (Error)                                                       |
|      |                  | Function <sup>*2</sup>                                        |
|      |                  |                                                               |
|      |                  | General-purpose I/O port                                      |
|      |                  | External bus data bit21 I/O (0)                               |
|      |                  | Multi-function serial ch.2 clock I/O (0)                      |
|      |                  | A/D converter external trigger input 0 (1)                    |
|      |                  | INT7 External interrupt input (1)                             |
|      |                  | (CAN reception data 2 input<br>MB91F52xB ,MB91F52xD only)     |
|      |                  |                                                               |
|      |                  | General-purpose I/O port                                      |
|      |                  | External bus data bit22 I/O (0)                               |
|      |                  | Serial chip select 2 I/O (0)                                  |
|      |                  | A/D converter external trigger input 1 (1)                    |
|      |                  | INT2 External interrupt input (1)                             |
|      |                  | (CAN transmission data 2 output<br>MB91F52xB ,MB91F52xD only) |
|      |                  |                                                               |
|      |                  | (Correct)                                                     |
|      |                  | Function <sup>*9</sup>                                        |
|      |                  |                                                               |
|      |                  | General-purpose I/O port                                      |
|      |                  | External bus data bit21 I/O (0)                               |
|      |                  | Multi-function serial ch.2 clock I/O (0)                      |
|      |                  | A/D converter external trigger input 0 (1)                    |
|      |                  | INT7 External interrupt input (1)                             |
|      |                  | CAN reception data 2 input                                    |
|      |                  |                                                               |
|      |                  | General-purpose I/O port                                      |
|      |                  | External bus data bit22 I/O (0)                               |
|      |                  | Serial chip select 2 I/O (0)                                  |
|      |                  | A/D converter external trigger input 1 (1)                    |
|      |                  | INT2 External interrupt input (1)                             |
|      |                  | CAN transmission data 2 output                                |

| Page | Section           | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 36   | ■PIN Description  | <p>The following sentences modified under the Table of Pin description.</p> <p>(Error)</p> <p>*1: For the I/O circuit types, see "■I/O CIRCUIT TYPE".</p> <p>*2: For switching, see "I/O Port" in HARDWARE MANUAL.</p> <p>(Correct)</p> <p>*1: There is a restriction of pin functions. See "Pin Name" of this table.</p> <p>*2: not supported in 64pin</p> <p>*3: not supported in 80pin</p> <p>*4: not supported in 100pin</p> <p>*5: not supported in 120pin</p> <p>*6: not supported in 144pin</p> <p>*7: not supported in 176pin</p> <p>*8: For the I/O circuit types, see "■I/O CIRCUIT TYPE".</p> <p>*9: For switching, see "I/O Port" in HARDWARE MANUAL.</p> |
| 39   | ■I/O Circuit Type | <p>Remarks for Type I in "I/O Circuit Types" modified as follows:</p> <p>(Error)</p> <ul style="list-style-type: none"> <li>- 3V pad power supply (5V tolerant),<br/>General-purpose I/O port</li> <li>- Output 4mA</li> <li>- CMOS hysteresis input</li> </ul> <p>(Correct)</p> <ul style="list-style-type: none"> <li>- General-purpose I/O port (5V tolerant)</li> <li>- Output 4mA</li> <li>- CMOS hysteresis input</li> </ul>                                                                                                                                                                                                                                    |
| 40   | ■I/O Circuit Type | <p>Remarks for Type J in "I/O Circuit Types" modified as follows:</p> <p>(Error)</p> <ul style="list-style-type: none"> <li>- 3V pad power supply (5V tolerant),<br/>Analog input, General-purpose I/O port</li> <li>- Output 4mA</li> <li>- CMOS hysteresis input</li> </ul> <p>(Correct)</p> <ul style="list-style-type: none"> <li>- Analog input, General-purpose I/O port (5V tolerant)</li> <li>- Output 4mA</li> <li>- CMOS hysteresis input</li> </ul>                                                                                                                                                                                                        |

| Page                 | Section                 | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
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| 40                   | ■I/O Circuit Type       | Remarks for Type L in "I/O Circuit Types" modified as follows:<br><br>(Error)<br>- Open-drain I/O<br>- Output 25mA (NOD)<br>- TTL input<br><br>(Correct)<br>- Open-drain I/O<br>- Output 25mA (Nch open-drain)<br>- TTL input                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| 40                   | ■I/O Circuit Type       | Remarks for Type M in "I/O Circuit Types" modified as follows:<br><br>(Error)<br>- CMOS hysteresis input<br>- Pull-up resistor 50kΩ (5V cont)<br><br>(Correct)<br>- CMOS hysteresis input<br>- Pull-up resistor 50kΩ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| 121                  | ■Interrupt Vector Table | The following sentence deleted from Interrupt vector 64pins.<br>*5: It does not support the DMA transfer by the interrupt because of the RAM ECC bit error.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| 124                  | ■Interrupt Vector Table | The interrupt factor in Interrupt vector 80pin modified as follows:<br><br>(Error)<br><table><tr><td>Base timer<br/>1 IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR<br/>45</td><td rowspan="4">308<sub>H</sub></td><td rowspan="4">000F<br/>FF08<br/><sub>H</sub></td><td rowspan="4">45*5</td></tr><tr><td>Base timer<br/>1 IRQ1</td></tr><tr><td>-</td></tr><tr><td>-</td></tr></table><br><br>(Correct)<br><table><tr><td>Base timer<br/>1 IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR<br/>45</td><td rowspan="4">308<sub>H</sub></td><td rowspan="4">000F<br/>FF08<br/><sub>H</sub></td><td rowspan="4">45</td></tr><tr><td>Base timer<br/>1 IRQ1</td></tr><tr><td>-</td></tr><tr><td>-</td></tr></table> | Base timer<br>1 IRQ0 | 61               | 3D                           | ICR<br>45 | 308 <sub>H</sub> | 000F<br>FF08<br><sub>H</sub> | 45*5 | Base timer<br>1 IRQ1 | -                            | -    | Base timer<br>1 IRQ0 | 61 | 3D | ICR<br>45 | 308 <sub>H</sub> | 000F<br>FF08<br><sub>H</sub> | 45 | Base timer<br>1 IRQ1 | - | - |
| Base timer<br>1 IRQ0 | 61                      | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ICR<br>45            |                  |                              |           |                  |                              |      | 308 <sub>H</sub>     | 000F<br>FF08<br><sub>H</sub> | 45*5 |                      |    |    |           |                  |                              |    |                      |   |   |
| Base timer<br>1 IRQ1 |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| -                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| -                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| Base timer<br>1 IRQ0 | 61                      | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ICR<br>45            | 308 <sub>H</sub> | 000F<br>FF08<br><sub>H</sub> | 45        |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| Base timer<br>1 IRQ1 |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| -                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| -                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |
| 125                  | ■Interrupt Vector Table | The following sentence deleted from Interrupt vector 80pins.<br><br>(Error)<br>*5: It does not support the DMA transfer by the interrupt because of the RAM ECC bit error.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                  |                              |           |                  |                              |      |                      |                              |      |                      |    |    |           |                  |                              |    |                      |   |   |

| Page                 | Section                 | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
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| 129                  | ■Interrupt Vector Table | <p>The interrupt factor in Interrupt vector 100pin modified as follows:</p> <p>(Error)</p> <table><tr><td>Base timer 0<br/>IRQ0</td><td rowspan="2">60</td><td rowspan="2">3<br/>C</td><td rowspan="2">ICR<br/>44</td><td rowspan="2">30C<sub>H</sub></td><td rowspan="2">000F<br/>FF0C<sub>H</sub></td><td rowspan="2">44</td></tr><tr><td>Base timer 0<br/>IRQ1</td></tr></table> <p>(Correct)</p> <table><tr><td></td><td rowspan="2">60</td><td rowspan="2">3<br/>C</td><td rowspan="2">ICR<br/>44</td><td rowspan="2">30C<sub>H</sub></td><td rowspan="2">000F<br/>FF0C<sub>H</sub></td><td rowspan="2">44</td></tr><tr><td></td></tr></table>                                                                                                                    | Base timer 0<br>IRQ0 | 60               | 3<br>C                    | ICR<br>44 | 30C <sub>H</sub> | 000F<br>FF0C <sub>H</sub> | 44       | Base timer 0<br>IRQ1 |                           | 60       | 3<br>C               | ICR<br>44 | 30C <sub>H</sub> | 000F<br>FF0C <sub>H</sub> | 44               |                           |    |                      |   |   |
| Base timer 0<br>IRQ0 | 60                      | 3<br>C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ICR<br>44            |                  |                           |           |                  |                           |          | 30C <sub>H</sub>     | 000F<br>FF0C <sub>H</sub> |          |                      |           |                  |                           |                  | 44                        |    |                      |   |   |
| Base timer 0<br>IRQ1 |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
|                      | 60                      | 3<br>C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ICR<br>44            | 30C <sub>H</sub> | 000F<br>FF0C <sub>H</sub> | 44        |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
|                      |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
| 129                  | ■Interrupt Vector Table | <p>The interrupt factor in Interrupt vector 100pin modified as follows:</p> <p>(Error)</p> <table><tr><td>Base timer 1<br/>IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR<br/>45</td><td rowspan="4">308<sub>H</sub></td><td rowspan="4">000F<br/>FF08<sub>H</sub></td><td rowspan="4">45<br/>*5</td></tr><tr><td>Base timer 1<br/>IRQ1</td></tr><tr><td>—</td></tr><tr><td>—</td></tr></table> <p>(Correct)</p> <table><tr><td>Base timer 1<br/>IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR<br/>45</td><td rowspan="4">308<sub>H</sub></td><td rowspan="4">000F<br/>FF08<sub>H</sub></td><td rowspan="4">45</td></tr><tr><td>Base timer 1<br/>IRQ1</td></tr><tr><td>—</td></tr><tr><td>—</td></tr></table> | Base timer 1<br>IRQ0 | 61               | 3D                        | ICR<br>45 | 308 <sub>H</sub> | 000F<br>FF08 <sub>H</sub> | 45<br>*5 | Base timer 1<br>IRQ1 | —                         | —        | Base timer 1<br>IRQ0 | 61        | 3D               | ICR<br>45                 | 308 <sub>H</sub> | 000F<br>FF08 <sub>H</sub> | 45 | Base timer 1<br>IRQ1 | — | — |
| Base timer 1<br>IRQ0 | 61                      | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ICR<br>45            |                  |                           |           |                  |                           |          | 308 <sub>H</sub>     | 000F<br>FF08 <sub>H</sub> | 45<br>*5 |                      |           |                  |                           |                  |                           |    |                      |   |   |
| Base timer 1<br>IRQ1 |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
| —                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
| —                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
| Base timer 1<br>IRQ0 | 61                      | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ICR<br>45            | 308 <sub>H</sub> | 000F<br>FF08 <sub>H</sub> | 45        |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
| Base timer 1<br>IRQ1 |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
| —                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
| —                    |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |
| 129                  | ■Interrupt Vector Table | <p>The following sentence deleted from Interrupt vector 100pins.</p> <p>(Error)</p> <p>*5: It does not support the DMA transfer by the interrupt because of the RAM ECC bit error.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                  |                           |           |                  |                           |          |                      |                           |          |                      |           |                  |                           |                  |                           |    |                      |   |   |

| Page                                                    | Section                 | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |                  |                        |                  |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
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| 131                                                     | ■Interrupt Vector Table | <p>"42" is deleted as shown below from the interrupt factor in Interrupt vector 120pin.</p> <p>(Error)</p> <table><tr><td>PPG2/3/12/13/22 /23/32/33/42/43</td><td rowspan="2">41</td><td rowspan="2">29</td><td rowspan="2">ICR 25</td><td rowspan="2">358<sub>H</sub></td><td rowspan="2">000F FF58<sub>H</sub></td><td rowspan="2">25<sup>*3</sup></td></tr><tr><td>16-bit free-run timer 2 (0 detection) / (compare clear)</td></tr></table> <p>(Correct)</p> <table><tr><td>PPG2/3/12/13/22 /23/32/33/43</td><td rowspan="2">41</td><td rowspan="2">29</td><td rowspan="2">ICR 25</td><td rowspan="2">358<sub>H</sub></td><td rowspan="2">000F FF58<sub>H</sub></td><td rowspan="2">25<sup>*3</sup></td></tr><tr><td>16-bit free-run timer 2 (0 detection) / (compare clear)</td></tr></table> | PPG2/3/12/13/22 /23/32/33/42/43 | 41               | 29                     | ICR 25           | 358 <sub>H</sub> | 000F FF58 <sub>H</sub> | 25 <sup>*3</sup> | 16-bit free-run timer 2 (0 detection) / (compare clear) | PPG2/3/12/13/22 /23/32/33/43 | 41               | 29                | ICR 25 | 358 <sub>H</sub> | 000F FF58 <sub>H</sub> | 25 <sup>*3</sup> | 16-bit free-run timer 2 (0 detection) / (compare clear) |    |                   |   |   |
| PPG2/3/12/13/22 /23/32/33/42/43                         | 41                      | 29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ICR 25                          |                  |                        |                  |                  |                        |                  | 358 <sub>H</sub>                                        | 000F FF58 <sub>H</sub>       |                  |                   |        |                  |                        |                  | 25 <sup>*3</sup>                                        |    |                   |   |   |
| 16-bit free-run timer 2 (0 detection) / (compare clear) |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                  |                        |                  |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
| PPG2/3/12/13/22 /23/32/33/43                            | 41                      | 29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ICR 25                          | 358 <sub>H</sub> | 000F FF58 <sub>H</sub> | 25 <sup>*3</sup> |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
| 16-bit free-run timer 2 (0 detection) / (compare clear) |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                  |                        |                  |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
| 133                                                     | ■Interrupt Vector Table | <p>The interrupt factor in Interrupt vector 120pin modified as follows:</p> <p>(Error)</p> <table><tr><td>Base timer 1 IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR 45</td><td rowspan="4">308<sub>H</sub></td><td rowspan="4">000F FF08<sub>H</sub></td><td rowspan="4">45<sup>*5</sup></td></tr><tr><td>Base timer 1 IRQ1</td></tr><tr><td>—</td></tr><tr><td>—</td></tr></table> <p>(Correct)</p> <table><tr><td>Base timer 1 IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR 45</td><td rowspan="4">308<sub>H</sub></td><td rowspan="4">000F FF08<sub>H</sub></td><td rowspan="4">45</td></tr><tr><td>Base timer 1 IRQ1</td></tr><tr><td>—</td></tr><tr><td>—</td></tr></table>                                                       | Base timer 1 IRQ0               | 61               | 3D                     | ICR 45           | 308 <sub>H</sub> | 000F FF08 <sub>H</sub> | 45 <sup>*5</sup> | Base timer 1 IRQ1                                       | —                            | —                | Base timer 1 IRQ0 | 61     | 3D               | ICR 45                 | 308 <sub>H</sub> | 000F FF08 <sub>H</sub>                                  | 45 | Base timer 1 IRQ1 | — | — |
| Base timer 1 IRQ0                                       | 61                      | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ICR 45                          |                  |                        |                  |                  |                        |                  | 308 <sub>H</sub>                                        | 000F FF08 <sub>H</sub>       | 45 <sup>*5</sup> |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
| Base timer 1 IRQ1                                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                  |                        |                  |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
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| Base timer 1 IRQ0                                       | 61                      | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ICR 45                          | 308 <sub>H</sub> | 000F FF08 <sub>H</sub> | 45               |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
| Base timer 1 IRQ1                                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                  |                        |                  |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
| —                                                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                  |                        |                  |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
| —                                                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                  |                        |                  |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |
| 133                                                     | ■Interrupt Vector Table | <p>The following sentence deleted from Interrupt vector 120pins.</p> <p>(Error)</p> <p>*5: It does not support the DMA transfer by the interrupt because of the RAM ECC bit error.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 |                  |                        |                  |                  |                        |                  |                                                         |                              |                  |                   |        |                  |                        |                  |                                                         |    |                   |   |   |

| Page                                                    | Section                 | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                |          |                   |          |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
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| 135                                                     | ■Interrupt Vector Table | <p>"42" is deleted as shown below from the interrupt factor in Interrupt vector 144pin.</p> <p>(Error)</p> <table><tr><td>PPG2/3/12/13/22/23/32/33/42/43</td><td rowspan="2">41</td><td rowspan="2">29</td><td rowspan="2">ICR 25</td><td rowspan="2">358<br/>H</td><td rowspan="2">000F<br/>FF58<br/>H</td><td rowspan="2">25*<br/>3</td></tr><tr><td>16-bit free-run timer 2 (0 detection) / (compare clear)</td></tr></table> <p>(Correct)</p> <table><tr><td>PPG2/3/12/13/22/23/32/33/43</td><td rowspan="2">41</td><td rowspan="2">29</td><td rowspan="2">ICR 25</td><td rowspan="2">358<br/>H</td><td rowspan="2">000F<br/>FF58<br/>H</td><td rowspan="2">25*<br/>3</td></tr><tr><td>16-bit free-run timer 2 (0 detection) / (compare clear)</td></tr></table> | PPG2/3/12/13/22/23/32/33/42/43 | 41       | 29                | ICR 25   | 358<br>H | 000F<br>FF58<br>H | 25*<br>3 | 16-bit free-run timer 2 (0 detection) / (compare clear) | PPG2/3/12/13/22/23/32/33/43 | 41       | 29                | ICR 25 | 358<br>H | 000F<br>FF58<br>H | 25*<br>3 | 16-bit free-run timer 2 (0 detection) / (compare clear) |    |                   |   |   |
| PPG2/3/12/13/22/23/32/33/42/43                          | 41                      | 29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ICR 25                         |          |                   |          |          |                   |          | 358<br>H                                                | 000F<br>FF58<br>H           |          |                   |        |          |                   |          | 25*<br>3                                                |    |                   |   |   |
| 16-bit free-run timer 2 (0 detection) / (compare clear) |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |          |                   |          |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
| PPG2/3/12/13/22/23/32/33/43                             | 41                      | 29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ICR 25                         | 358<br>H | 000F<br>FF58<br>H | 25*<br>3 |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
| 16-bit free-run timer 2 (0 detection) / (compare clear) |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |          |                   |          |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
| 137                                                     | ■Interrupt Vector Table | <p>The interrupt factor in Interrupt vector 144pin modified as follows:</p> <p>(Error)</p> <table><tr><td>Base timer 1 IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR 45</td><td rowspan="4">308<br/>H</td><td rowspan="4">000F<br/>FF08<br/>H</td><td rowspan="4">45<br/>*5</td></tr><tr><td>Base timer 1 IRQ1</td></tr><tr><td>-</td></tr><tr><td>-</td></tr></table> <p>(Correct)</p> <table><tr><td>Base timer 1 IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR 45</td><td rowspan="4">308<br/>H</td><td rowspan="4">000F<br/>FF08<br/>H</td><td rowspan="4">45</td></tr><tr><td>Base timer 1 IRQ1</td></tr><tr><td>-</td></tr><tr><td>-</td></tr></table>                                               | Base timer 1 IRQ0              | 61       | 3D                | ICR 45   | 308<br>H | 000F<br>FF08<br>H | 45<br>*5 | Base timer 1 IRQ1                                       | -                           | -        | Base timer 1 IRQ0 | 61     | 3D       | ICR 45            | 308<br>H | 000F<br>FF08<br>H                                       | 45 | Base timer 1 IRQ1 | - | - |
| Base timer 1 IRQ0                                       | 61                      | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ICR 45                         |          |                   |          |          |                   |          | 308<br>H                                                | 000F<br>FF08<br>H           | 45<br>*5 |                   |        |          |                   |          |                                                         |    |                   |   |   |
| Base timer 1 IRQ1                                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |          |                   |          |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
| -                                                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |          |                   |          |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
| -                                                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |          |                   |          |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
| Base timer 1 IRQ0                                       | 61                      | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ICR 45                         | 308<br>H | 000F<br>FF08<br>H | 45       |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
| Base timer 1 IRQ1                                       |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |          |                   |          |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |
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| 137                                                     | ■Interrupt Vector Table | <p>The following sentence deleted from Interrupt vector 144pins.</p> <p>(Error)</p> <p>*5: It does not support the DMA transfer by the interrupt because of the RAM ECC bit error.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |          |                   |          |          |                   |          |                                                         |                             |          |                   |        |          |                   |          |                                                         |    |                   |   |   |

| Page                                   | Section                                                    | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |            |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
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| 141                                    | ■Interrupt Vector Table                                    | <p>The interrupt factor in Interrupt vector 176pin modified as follows:</p> <p>(Error)</p> <table><tr><td>Base timer 1<br/>IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR<br/>45</td><td rowspan="4">308<br/>H</td><td rowspan="4">000F<br/>FF08<br/>H</td><td rowspan="4">45<br/>*5</td></tr><tr><td>Base timer 1<br/>IRQ1</td></tr><tr><td>-</td></tr><tr><td>-</td></tr></table> <p>(Correct)</p> <table><tr><td>Base timer 1<br/>IRQ0</td><td rowspan="4">61</td><td rowspan="4">3D</td><td rowspan="4">ICR<br/>45</td><td rowspan="4">308<br/>H</td><td rowspan="4">000F<br/>FF08<br/>H</td><td rowspan="4">45</td></tr><tr><td>Base timer 1<br/>IRQ1</td></tr><tr><td>-</td></tr><tr><td>-</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Base timer 1<br>IRQ0 | 61         | 3D                | ICR<br>45 | 308<br>H | 000F<br>FF08<br>H | 45<br>*5 | Base timer 1<br>IRQ1 | -                                      | -        | Base timer 1<br>IRQ0 | 61 | 3D | ICR<br>45 | 308<br>H | 000F<br>FF08<br>H | 45 | Base timer 1<br>IRQ1 | - | -                                      |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| Base timer 1<br>IRQ0                   | 61                                                         | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ICR<br>45            |            |                   |           |          |                   |          | 308<br>H             | 000F<br>FF08<br>H                      | 45<br>*5 |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| Base timer 1<br>IRQ1                   |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |            |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
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| Base timer 1<br>IRQ0                   | 61                                                         | 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ICR<br>45            | 308<br>H   | 000F<br>FF08<br>H | 45        |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| Base timer 1<br>IRQ1                   |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |            |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
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| 141                                    | ■Interrupt Vector Table                                    | <p>The following sentence deleted from Interrupt vector 176pins.</p> <p>(Error)</p> <p>*5: It does not support the DMA transfer by the interrupt because of the RAM ECC bit error.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |            |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| 142                                    | ■Electrical Characteristics<br>1. Absolute Maximum Ratings | <p>The remarks of "L" level average output current" and "H" level average output current" modified as follows.</p> <p>(Error)</p> <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Sym<br/>bol</th><th colspan="2">Rating</th><th rowspan="2">Unit</th><th rowspan="2">Remarks</th></tr><tr><th>Min</th><th>Max</th></tr><tr><td rowspan="2">"L" level average<br/>output current *4</td><td>IOLAV1</td><td>-</td><td>4</td><td>mA</td><td></td></tr><tr><td>IOLAV2</td><td>-</td><td>12</td><td>mA</td><td></td></tr><tr><td rowspan="2">"H" level average<br/>output current *4</td><td>IOHAV1</td><td>-</td><td>-4</td><td>mA</td><td></td></tr><tr><td>IOHAV2</td><td>-</td><td>-12</td><td>mA</td><td></td></tr></table> <p>(Correct)</p> <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Sym<br/>bol</th><th colspan="2">Rating</th><th rowspan="2">Unit</th><th rowspan="2">Remarks</th></tr><tr><th>Min</th><th>Max</th></tr><tr><td rowspan="2">"L" level average<br/>output current *4</td><td>IOLAV1</td><td>-</td><td>4</td><td>mA</td><td>*9</td></tr><tr><td>IOLAV2</td><td>-</td><td>12</td><td>mA</td><td>*10</td></tr><tr><td rowspan="2">"H" level average<br/>output current *4</td><td>IOHAV1</td><td>-</td><td>-4</td><td>mA</td><td>*9</td></tr><tr><td>IOHAV2</td><td>-</td><td>-12</td><td>mA</td><td>*10</td></tr></table> | Parameter            | Sym<br>bol | Rating            |           | Unit     | Remarks           | Min      | Max                  | "L" level average<br>output current *4 | IOLAV1   | -                    | 4  | mA |           | IOLAV2   | -                 | 12 | mA                   |   | "H" level average<br>output current *4 | IOHAV1 | - | -4 | mA |  | IOHAV2 | - | -12 | mA |  | Parameter | Sym<br>bol | Rating |  | Unit | Remarks | Min | Max | "L" level average<br>output current *4 | IOLAV1 | - | 4 | mA | *9 | IOLAV2 | - | 12 | mA | *10 | "H" level average<br>output current *4 | IOHAV1 | - | -4 | mA | *9 | IOHAV2 | - | -12 | mA | *10 |
| Parameter                              | Sym<br>bol                                                 | Rating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |            | Unit              | Remarks   |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
|                                        |                                                            | Min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Max                  |            |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| "L" level average<br>output current *4 | IOLAV1                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4                    | mA         |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
|                                        | IOLAV2                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12                   | mA         |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| "H" level average<br>output current *4 | IOHAV1                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -4                   | mA         |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
|                                        | IOHAV2                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -12                  | mA         |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| Parameter                              | Sym<br>bol                                                 | Rating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      | Unit       | Remarks           |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
|                                        |                                                            | Min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Max                  |            |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| "L" level average<br>output current *4 | IOLAV1                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4                    | mA         | *9                |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
|                                        | IOLAV2                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12                   | mA         | *10               |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| "H" level average<br>output current *4 | IOHAV1                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -4                   | mA         | *9                |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
|                                        | IOHAV2                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -12                  | mA         | *10               |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |
| 143                                    | ■Electrical Characteristics<br>1. Absolute Maximum Ratings | <p>The following note added.</p> <p>(Correct)</p> <p>*9: Corresponding pins: General-purpose ports other than those of P103, P104, P105 and P106.</p> <p>*10: Corresponding pins: General-purpose ports of P103, P104, P105 and P106.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |            |                   |           |          |                   |          |                      |                                        |          |                      |    |    |           |          |                   |    |                      |   |                                        |        |   |    |    |  |        |   |     |    |  |           |            |        |  |      |         |     |     |                                        |        |   |   |    |    |        |   |    |    |     |                                        |        |   |    |    |    |        |   |     |    |     |

| Page                      | Section                                                                      | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 155                       | ■Electrical Characteristics<br>AC Characteristics<br>(2) Reset Input         | Added the At power-on*2 condition to the remarks in Reset input time.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 156                       | ■Electrical Characteristics<br>AC Characteristics<br>(3) Power-on Conditions | Deleted the Slope detection undetected specification.<br>Added the Power ramp rate and C pin voltage at Power-on.<br>*1, *2: Changed the sentence.<br>Added *3, *4, Note, Figure at the Power off time, Power ramp rate, C pin voltage at Power-on.                                                                                                                                                                                                                                                                   |
| 6 to 11,<br>203 to<br>216 | ■Product lineup<br>■Ordering information                                     | Package description modified to JEDEC description.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 47                        | ■During Power-on                                                             | The following sentence modified as fdeleted from Interrupt<br>(Error)<br>To prevent a malfunction of the voltage step-down circuit built in the device, set the voltage rising time to have 50μs or longer (between 0.2V and 2.7V) during power-on.<br><br>(Correct)<br>To prevent a malfunction of the voltage step-down circuit built in the device, the voltage rising must be monotonic increasing during power-on.<br>Power-on prohibits that the voltage goes up and down and voltage rising stops temporarily. |
| 49, 50                    | ■Block Diagram                                                               | The following Block diagram modified as follows:<br>●MB91F522B, MB91F523B, MB91F524B, MB91F525B, MB91F526B<br>●MB91F522D, MB91F523D, MB91F524D, MB91F525D, MB91F526D<br>(Error)<br>CAN (2ch).<br><br>(Correct)<br>CAN (3ch)                                                                                                                                                                                                                                                                                           |
| 217 to<br>220             | ■Ordering Information                                                        | Added the following description.<br>■ORDERING INFORMATION MB91F52xxxD                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 221 to<br>227             | ■Package Dimensions                                                          | Package Dimensions modified to JEDEC description.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Page             | Section                          | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                |              |                   |
|------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|-------------------|
| Rev *C           |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                |              |                   |
| 2                | Features<br>Peripheral Functions | <p>The following sentence modified in I2C as following:</p> <p>(Error)<br/>&lt; I2C &gt;<br/>2 channels ch.3 , ch.4 Standard mode/high-speed mode supported.</p> <p>Standard mode (Max. 100kbps) / high-speed mode (Max. 400kbps) supported</p> <p>(Correct)<br/>&lt; I2C &gt;<br/>2 channels ch.3 , ch.4 Standard mode/fast mode supported.</p> <p>Standard mode (Max. 100kbps) / fast mode (Max. 400kbps) supported</p>                                                                                                                                                                                        |              |                |              |                   |
| 5,6,7,8,9<br>,10 | 1. Product Lineup                | <p>The following *2 added as follows:</p> <p>(Error)</p> <table><tr><td>Power supply</td><td>2.7 V to 5.5 V</td></tr></table> <p>(Correct)</p> <table><tr><td>Power supply</td><td>2.7 V to 5.5 V *2</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                           | Power supply | 2.7 V to 5.5 V | Power supply | 2.7 V to 5.5 V *2 |
| Power supply     | 2.7 V to 5.5 V                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                |              |                   |
| Power supply     | 2.7 V to 5.5 V *2                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                |              |                   |
| 5,6,7,8,9<br>,10 | 1. Product Lineup                | <p>The following sentence added as follows:</p> <p>(Correct)<br/>*2: Detection voltage of the external low voltage detection reset (initial) is 2.8V±8% (2.576V to 3.024V).<br/>This detection voltage (2.576V) is below the minimum operation guarantee voltage (2.7V).<br/>Between this detection voltage and the minimum operation guarantee voltage, MCU functions are not guaranteed except for the low voltage detector.<br/>Note that although the detection level is below the minimum operation guarantee voltage, the LVD reset factor flag is set as the voltage drops below the detection level.</p> |              |                |              |                   |
| 8, 9, 10,        | 1. Product Lineup                | <p>The following sentence modified in the bottom of Product lineup comparison table as following:</p> <p>(Error)<br/>*1: Only channel 3 and channel 4 support the I2C (high-speed mode/standard mode).</p> <p>(Correct)<br/>*1: Only channel 3 and channel 4 support the I2C (fast mode/standard mode).</p>                                                                                                                                                                                                                                                                                                      |              |                |              |                   |
| 11               | 1. Product Lineup                | Added silicon version E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |                |              |                   |

| Page              | Section                                                                  | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
|-------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--|------|---------|-----|-----|--|--|--|--|-------------|--|------|---------|-----|-----|--|--|--|--|
| 46                | ■During Power-on                                                         | <p>The following sentence modified as following:</p> <p>(Error)<br/>To prevent a malfunction of the voltage step-down circuit built in the device, the voltage rising must be monotonic increasing during power-on.<br/>Power-on prohibits that the voltage goes up and down and voltage rising stops temporarily.</p> <p>(Correct)<br/>To prevent a malfunction of the voltage step-down circuit built in the device, the voltage rising must be monotonic during power-on.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
| 142,143           | 11. Electrical Characteristics<br>Recommended operating conditions       | <p>The following sentence modified as following:</p> <p>(Error)<br/>*1: When it is used outside recommended operation guarantee range (range of the operation guarantee), contact your sales representative. Moreover, minimum value with an effective external low-voltage detection reset becomes a voltage until generating low-voltage detection reset.</p> <p>(Correct)<br/>*1: When it is used outside recommended operation guarantee range (range of the operation guarantee), contact your sales representative.<br/>Detection voltage of the external low voltage detection reset (initial) is 2.8V±8% (2.576V to 3.024V).<br/>This detection voltage (2.576V) is below the minimum operation guarantee voltage (2.7V).<br/>Between this detection voltage and the minimum operation guarantee voltage, MCU functions are not guaranteed except for the low voltage detector. Note that although the detection level is below the minimum operation guarantee voltage, the LVD reset factor flag is set as the voltage drops below the detection level.</p> |                   |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
| 156, 157          | 11. Electrical Characteristics<br>AC Characteristics                     | Added (3-2) Power-on Conditions for MB91F52xxxE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
| 184               | 11. Electrical Characteristics<br>AC Characteristics<br>(4-4) I2C timing | <p>The following sentence modified as following:</p> <p>(Error)</p> <table><tr><th colspan="2">High-speed mode*3</th><th rowspan="2">Unit</th><th rowspan="2">Remarks</th></tr><tr><th>Min</th><th>Max</th></tr><tr><td></td><td></td><td></td><td></td></tr></table> <p>Notes: Only ch.3 and ch.4 are standard mode/high-speed mode correspondence.</p> <p>*3: A high-speed mode I2C bus device can be used</p> <p>(Correct)</p> <table><tr><th colspan="2">Fast mode*3</th><th rowspan="2">Unit</th><th rowspan="2">Remarks</th></tr><tr><th>Min</th><th>Max</th></tr><tr><td></td><td></td><td></td><td></td></tr></table> <p>Notes: Only ch.3 and ch.4 are standard mode/fast mode correspondence.</p> <p>*3: A fast mode I2C bus device can be used</p>                                                                                                                                                                                                                                                                                                          | High-speed mode*3 |  | Unit | Remarks | Min | Max |  |  |  |  | Fast mode*3 |  | Unit | Remarks | Min | Max |  |  |  |  |
| High-speed mode*3 |                                                                          | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Remarks           |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
| Min               | Max                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
|                   |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
| Fast mode*3       |                                                                          | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Remarks           |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
| Min               | Max                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |
|                   |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |  |      |         |     |     |  |  |  |  |             |  |      |         |     |     |  |  |  |  |

| Page       | Section                                                                                              | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
|------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------------------------------|--|------|---------|-----|-----|-----|-----|---|-----|---|--|-----|-----|-----|---|----------------------------------------------------------------------|-------|--|--|------|---------|-----|-----|-----|-----|---|-----|---|--|-----|-----------------|-----|---|----------------------------------------------------------------|
| 187        | 11. Electrical Characteristics<br>(8) Low voltage detection<br>(External low-voltage detection)      | <p>The following sentence modified in the Detection voltage as following:</p> <p>(Error)</p> <table><tr><th colspan="3">Value</th><th rowspan="2">Unit</th><th rowspan="2">Remarks</th></tr><tr><th>Min</th><th>Typ</th><th>Max</th></tr><tr><td>2.7</td><td>-</td><td>5.5</td><td>V</td><td></td></tr><tr><td>-8%</td><td>2.8</td><td>+8%</td><td>V</td><td>When power-supply voltage falls and detection level is set initially</td></tr></table> <p>(Correct)</p> <table><tr><th colspan="3">Value</th><th rowspan="2">Unit</th><th rowspan="2">Remarks</th></tr><tr><th>Min</th><th>Typ</th><th>Max</th></tr><tr><td>2.7</td><td>-</td><td>5.5</td><td>V</td><td></td></tr><tr><td>-8%</td><td>LVD5F_SEL [3:0]</td><td>+8%</td><td>V</td><td>LVD5F_SEL[3:0] are programmable. Refer to the hardware manual.</td></tr></table> | Value |                                                                      |  | Unit | Remarks | Min | Typ | Max | 2.7 | - | 5.5 | V |  | -8% | 2.8 | +8% | V | When power-supply voltage falls and detection level is set initially | Value |  |  | Unit | Remarks | Min | Typ | Max | 2.7 | - | 5.5 | V |  | -8% | LVD5F_SEL [3:0] | +8% | V | LVD5F_SEL[3:0] are programmable. Refer to the hardware manual. |
| Value      |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Unit  | Remarks                                                              |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| Min        | Typ                                                                                                  | Max                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| 2.7        | -                                                                                                    | 5.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | V     |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| -8%        | 2.8                                                                                                  | +8%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | V     | When power-supply voltage falls and detection level is set initially |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| Value      |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Unit  | Remarks                                                              |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| Min        | Typ                                                                                                  | Max                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| 2.7        | -                                                                                                    | 5.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | V     |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| -8%        | LVD5F_SEL [3:0]                                                                                      | +8%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | V     | LVD5F_SEL[3:0] are programmable. Refer to the hardware manual.       |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| 188        | 11. Electrical Characteristics<br>(9) Low voltage detection<br>(RAM retention low-voltage detection) | <p>The following sentence modified as following:</p> <p>(Error)</p> <p>(9) Low voltage detection (Internal low-voltage detection)</p> <p>(Correct)</p> <p>(9) Low voltage detection (RAM retention low-voltage detection)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| 220 to 223 | 16. Ordering Information                                                                             | Added the following description.<br>■ORDERING INFORMATION MB91F52xxxE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| Rev *D     |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |
| 1          | Features                                                                                             | <p>The following sentence should be modified as follows:</p> <p>(Error)</p> <p>Conversion time : 1μs</p> <p>(Correct)</p> <p>Conversion time : 1.4μs</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                                      |  |      |         |     |     |     |     |   |     |   |  |     |     |     |   |                                                                      |       |  |  |      |         |     |     |     |     |   |     |   |  |     |                 |     |   |                                                                |

| Page         | Section                                                            | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5,6,7,8,9,10 | 1. Product Lineup                                                  | <p>The following sentence should be modified as follows:</p> <p>(Error)</p> <p>*2: Detection voltage of the external low voltage detection reset (initial) is 2.8V±8% (2.576V to 3.024V). This detection voltage (2.576V) is below the minimum operation guarantee voltage (2.7V). Between this detection voltage and the minimum operation guarantee voltage, MCU functions are not guaranteed except for the low voltage detector. Note that although the detection level is below the minimum operation guarantee voltage, the LVD reset factor flag is set as the voltage drops below the detection level.</p> <p>(Correct)</p> <p>*2: The initial detection voltage of the external low voltage detection is 2.8V±8% (2.576V to 3.024V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.</p>                                                                                                                                                                                                                                                                                   |
| 142,143      | 11. Electrical Characteristics<br>Recommended operating conditions | <p>The following sentence should be modified as follows:</p> <p>(Error)</p> <p>*1: When it is used outside recommended operation guarantee range (range of the operation guarantee), contact your sales representative.<br/>Detection voltage of the external low voltage detection reset (initial) is 2.8V±8% (2.576V to 3.024V). This detection voltage (2.576V) is below the minimum operation guarantee voltage (2.7V). Between this detection voltage and the minimum operation guarantee voltage, MCU functions are not guaranteed except for the low voltage detector. Note that although the detection level is below the minimum operation guarantee voltage, the LVD reset factor flag is set as the voltage drops below the detection level.</p> <p>(Correct)</p> <p>*1: When it is used outside recommended operation guarantee range (range of the operation guarantee), contact your sales representative.<br/>The initial detection voltage of the external low voltage detection is 2.8V±8% (2.576V to 3.024V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.</p> |
| 146          | 11. Electrical Characteristics<br>DC Characteristics               | <p>Pin name of RUP3 should be modified as follows:</p> <p>(Error)</p> <p>Port pin other than P035,041,093,122</p> <p>(Correct)</p> <p>Port pin other than P035,041,073,074,076,077,093,122</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Page           | Section                                                                                         | Change Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
|----------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------|-------------------|-------------------|----------|----------------|------|----|----|----------------------|----------------|-----|----|----------------|-----|-----|
| 187            | 11. Electrical Characteristics<br>(8) Low voltage detection<br>(External low-voltage detection) | <p>Note of Detection voltage should be added as follows:</p> <p>(Correct)<br/>Detection voltage *3</p> <p>*3: The initial detection voltage of the external low voltage detection is 2.8V±8% (2.576V to 3.024V). This LVD setting cannot be used to reliably generate a reset before voltage dips below minimum guaranteed MCU operation voltage, as this detection level is below the minimum guaranteed MCU operation voltage (2.7V). Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.</p> |                   |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
| 188            | 11. Electrical Characteristics<br>(9) Low voltage detection<br>(Internal low-voltage detection) | <p>The following sentence modified as following:</p> <p>(Error)<br/>(9) Low voltage detection (RAM retention low-voltage detection)</p> <p>(Correct)<br/>(9) Low voltage detection (Internal low-voltage detection)</p>                                                                                                                                                                                                                                                                                                                                      |                   |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
|                |                                                                                                 | <p>The following symbol should be modified as follows:</p> <p>(Error)<br/>*</p> <p>(Correct)<br/>*1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
|                |                                                                                                 | <p>Note of Detection voltage should be added as follows:</p> <p>(Correct)<br/>Detection voltage *2</p> <p>*2: The detection voltage of the internal low voltage detection is 0.9V±0.1V. This LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed MCU operation voltage, as this detection level is below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.</p>                                         |                   |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
| 233 to 235     | 18. Errata                                                                                      | Limitation for Watch mode (power off) should be added in Errata.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
| Rev *F         |                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
| 222            | 16. Ordering Information<br>MB91F52xxxE                                                         | <p>The shading part added as below.</p> <table><tr><th>Part number</th><th>Sub clock</th><th>CSV Initial value</th><th>LVD Initial value</th><th>Package*</th></tr><tr><td>MB91F526LSEPMC</td><td rowspan="3">None</td><td>ON</td><td>ON</td><td rowspan="3">LQP・176 pin, Plastic</td></tr><tr><td>MB91F526LHEPMC</td><td>OFF</td><td>ON</td></tr><tr><td>MB91F526LKEPMC</td><td>OFF</td><td>OFF</td></tr></table>                                                                                                                                           | Part number       | Sub clock            | CSV Initial value | LVD Initial value | Package* | MB91F526LSEPMC | None | ON | ON | LQP・176 pin, Plastic | MB91F526LHEPMC | OFF | ON | MB91F526LKEPMC | OFF | OFF |
| Part number    | Sub clock                                                                                       | CSV Initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LVD Initial value | Package*             |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
| MB91F526LSEPMC | None                                                                                            | ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ON                | LQP・176 pin, Plastic |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
| MB91F526LHEPMC |                                                                                                 | OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ON                |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |
| MB91F526LKEPMC |                                                                                                 | OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OFF               |                      |                   |                   |          |                |      |    |    |                      |                |     |    |                |     |     |

| Page                           | Section                                                          | Change Results                                                                                                                                                                                                                            |    |    |    |                                |                         |                                      |
|--------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|--------------------------------|-------------------------|--------------------------------------|
| Rev *G                         |                                                                  |                                                                                                                                                                                                                                           |    |    |    |                                |                         |                                      |
| -                              | Marketing Part Numbers changed from an MB prefix to a CY prefix. |                                                                                                                                                                                                                                           |    |    |    |                                |                         |                                      |
| Rev *H                         |                                                                  |                                                                                                                                                                                                                                           |    |    |    |                                |                         |                                      |
| 13                             | 2. Pin Assignment                                                | <p>The shading part added for LQH080 as below.</p> <table><tr><td>34</td><td>35</td><td>36</td></tr><tr><td>P072/SIN4_0/AN34/ICU2_2/INT5_0</td><td>P073/SOT4_0/AN33/ICU3_2</td><td>P153/SCK5_0/SCL5/AN32/FRCK1_1/INT4_1</td></tr></table> | 34 | 35 | 36 | P072/SIN4_0/AN34/ICU2_2/INT5_0 | P073/SOT4_0/AN33/ICU3_2 | P153/SCK5_0/SCL5/AN32/FRCK1_1/INT4_1 |
| 34                             | 35                                                               | 36                                                                                                                                                                                                                                        |    |    |    |                                |                         |                                      |
| P072/SIN4_0/AN34/ICU2_2/INT5_0 | P073/SOT4_0/AN33/ICU3_2                                          | P153/SCK5_0/SCL5/AN32/FRCK1_1/INT4_1                                                                                                                                                                                                      |    |    |    |                                |                         |                                      |
| 14                             | 2. Pin Assignment                                                | <p>The shading part added for LQI100 as below.</p> <table><tr><td>42</td><td>43</td><td>44</td></tr><tr><td>P072/SIN4_0/AN34/ICU2_2/INT5_0</td><td>P073/SOT4_0/AN33/ICU3_2</td><td>P152/SCSS53_0</td></tr></table>                        | 42 | 43 | 44 | P072/SIN4_0/AN34/ICU2_2/INT5_0 | P073/SOT4_0/AN33/ICU3_2 | P152/SCSS53_0                        |
| 42                             | 43                                                               | 44                                                                                                                                                                                                                                        |    |    |    |                                |                         |                                      |
| P072/SIN4_0/AN34/ICU2_2/INT5_0 | P073/SOT4_0/AN33/ICU3_2                                          | P152/SCSS53_0                                                                                                                                                                                                                             |    |    |    |                                |                         |                                      |
| 217                            | 16. Ordering Information<br>CY91F52xxxE                          | <p>The shading part modified as below.</p> <p>Error)<br/>LQE • 64 pin, Plastic</p> <p>Correct)<br/>LQD • 64 pin, Plastic</p>                                                                                                              |    |    |    |                                |                         |                                      |

## Document History

Document Title: CY91520 Series 32-bit FR81S Microcontroller

Document Number: 002-04662

| Revision | ECN | Orig. of Change | Submission Date | Description of Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------|-----|-----------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | —   | —               | —               | Initial release                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| **       | —   | —               | 2/20/2014       | <p>Features:</p> <p>Corrected the following description.</p> <p>5V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 Automotive input</p> <p style="text-align: center;">↓</p> <p>5V tolerant input: 4 channels ch.6, ch.8, ch.9, ch.11 CMOS hysteresis input</p> <p>I/O CIRCUIT TYPE:</p> <p>Corrected the following description to "Type F, G, I, J, K, M".</p> <p>Schmitt input → CMOS hysteresis input</p> <p>Corrected the following description to "Type D, E".</p> <p>I<sup>2</sup>C Schmitt input → I<sup>2</sup>C hysteresis input</p> <p>Block Diagram</p> <p>Corrected the following description.</p> <ul style="list-style-type: none"> <li>• MB91F522B, MB91F523B, MB91F524B, MB91F525B, MB91F526B</li> <li>• MB91F522D, MB91F523D, MB91F524D, MB91F525D, MB91F526D</li> <li>• MB91F522F, MB91F523F, MB91F524F, MB91F525F, MB91F526F</li> <li>• MB91F522J, MB91F523J, MB91F524J, MB91F525J, MB91F526J</li> <li>• MB91F522K, MB91F523K, MB91F524K, MB91F525K, MB91F526K</li> <li>• MB91F522L, MB91F523L, MB91F524L, MB91F525L, MB91F526L</li> </ul> <p>Electrical Characteristics</p> <p>2. Recommended operating conditions:</p> <p>*1 :When it is used outside recommended operation guarantee range (range of the operation guarantee),contact your sales representative. Moreover, minimum value with an effective external low-voltage detection reset becomes a voltage until generating low-voltage detection reset</p> <p>Electrical Characteristics</p> <p>3.DC characteristics</p> <p>Corrected the value of "ICCT5 When using sub clock 32kHz TA=+25°C". Max 1420μA → Max 2000μA</p> <p>Corrected the value of "Power supply voltage range".</p> <p>(TA:-40°C to +105°C,Vcc=AVcc=2.7V to 5.5V,VSS=AVSS=0.0V)</p> <p style="text-align: center;">↓</p> <p>(TA:-40°C to +105°C,Vcc=AVcc=5.0V±10%/3.3V±0.3V,VSS=AVSS=0.0V)</p> <p>Corrected the value of "Power supply voltage range".</p> <p>(TA:-40°C to +125°C,Vcc=AVcc=2.7V to 5.5V,VSS=AVSS=0.0V)</p> <p style="text-align: center;">↓</p> <p>(TA:-40°C to +125°C,Vcc=AVcc=5.0V±10%/3.3V±0.3V,VSS=AVSS=0.0V)</p> <p>Corrected the value of " Pull-up resistance R<sub>UP1</sub>".</p> <p>Vcc=3.3V±0.3V Min 49 Max 140 →Min 45 Max 140</p> <p>Corrected the following description.</p> <p>Pull-up resistance R<sub>UP2</sub></p> <p>Port pin other than P035,041,093,122 → P073,074,076,077</p> <p>Corrected the value of " Pull-up resistance R<sub>UP2</sub>".</p> |

| Revision | ECN | Orig. of Change | Submission Date | Description of Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|          |     |                 |                 | <p>VCC=5.0V±10% Min 25 Max 100 →Min 25 Max 60<br/> VCC=3.3V±0.3V Min 49 Max 140 →Min 33 Max 90</p> <p>Added the value of " Pull-up resistance <math>R_{UP3}</math>".<br/> Pin name : Port pin other than P035,041,073,074,076,077,093,122<br/> VCC=5.0V±10% Min 25 Max 100<br/> VCC=3.3V±0.3V Min 45 Max 140</p> <p>Electrical Characteristics<br/> 4. AC characteristics<br/> (4) Multi-function Serial<br/> (4-1) CSIO timing<br/> (4-1-1),(4-1-2),(4-1-3),(4-1-4)<br/> (4-1-1),(4-1-4)SCK↓⇒SOT delay time <math>t_{SLOVI}</math><br/> (4-1-2),(4-1-3)SCK↑⇒SOT delay time <math>t_{SHOVI}</math></p> <p>Corrected the following description.<br/> Pin name: SCK0 to SCK11<br/> SOT0 to SOT11<br/> Value: Min -30 Max 30<br/> ↓<br/> Pin name: SCK0 to SCK2,SCK5 to SCK11<br/> SOT0 to SOT2,SOT5 to SOT11<br/> Value: Min -30 Max 30<br/> Pin name: SCK3,SCK4<br/> SOT3,SOT4<br/> Value: Min -300 Max 300</p> <p>(4-1-1),(4-1-4)Valid SIN⇒SCK↑ setup time <math>t_{VSHI}</math><br/> (4-1-2),(4-1-3)Valid SIN⇒SCK↓ setup time <math>t_{VSLI}</math></p> <p>Corrected the following description.<br/> Pin name: SCK0 to SCK11 SIN0 to SIN11<br/> Value: Min 34 Max -<br/> ↓<br/> Pin name: SCK0 to SCK2,SCK5 to SCK11 SIN0 to SIN2,SIN5 to SIN11<br/> Value: Min 34 Max -<br/> Pin name: SCK3,SCK4,SIN3,SIN4<br/> Value: Min 300 Max -</p> <p>(4-1-1),(4-1-4)SCK↓⇒SOT delay time <math>t_{SLOVE}</math><br/> (4-1-2),(4-1-3)SCK↑⇒SOT delay time <math>t_{SHOVE}</math></p> <p>Corrected the following description.<br/> Pin name: SCK0 to SCK11<br/> SOT0 to SOT11<br/> Value: Min - Max 33<br/> ↓<br/> Pin name: SCK0 to SCK2,SCK5 to SCK11<br/> SOT0 to SOT2,SOT5 to SOT11<br/> Value: Min - Max 33<br/> Pin name: SCK3,SCK4 SOT3,SOT4<br/> Value: Min - Max 300</p> <p>(4-1-1),(4-1-2),(4-1-3),(4-1-4)SCK fall time <math>t_f</math><br/> Corrected the following description.<br/> Pin name: SCK0 to SCK2,SCK5 to SCK11<br/> Value: Min - Max 5<br/> Pin name: SCK3,SCK4<br/> Value: Min - Max 250<br/> ↓<br/> Pin name: SCK0 to SCK11</p> |

| Revision | ECN | Orig. of Change | Submission Date | Description of Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------|-----|-----------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |     |                 |                 | <p>Value: Min - Max 5</p> <p>(4-1-5)SCS<math>\downarrow</math><math>\Rightarrow</math>SCK<math>\downarrow</math> setup time <math>t_{CSSI}</math></p> <p>(4-1-6)SCS<math>\downarrow</math><math>\Rightarrow</math>SCK<math>\uparrow</math> setup time <math>t_{CSSI}</math></p> <p>(4-1-7)SCS<math>\uparrow</math><math>\Rightarrow</math>SCK<math>\downarrow</math> setup time <math>t_{CSSI}</math></p> <p>(4-1-8)SCS<math>\uparrow</math><math>\Rightarrow</math>SCK<math>\uparrow</math> setup time <math>t_{CSSI}</math></p> <p>Corrected the following description.</p> <p>Pin name: SCK1 to SCK11</p> <p>SCS1 to SCS3,SCS40 to SCS43,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11</p> <p>Value: Min <math>t_{CSSU}+0</math> Max <math>t_{CSSU}+50</math></p> <p><math>\downarrow</math></p> <p>Pin name: SCK1,SCK2,SCK5 to SCK11</p> <p>SCS1,SCS2,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11</p> <p>Value: Min <math>t_{CSSU}-50</math> Max <math>t_{CSSU}+0</math></p> <p>Pin name: SCK3,SCK4 SCS3,SCS40 to SCS43</p> <p>Value: Min <math>t_{CSSU}-50</math> Max <math>t_{CSSU}+300</math></p> <p>(4-1-5)SCK<math>\uparrow</math><math>\Rightarrow</math>SCS<math>\uparrow</math>hold time <math>t_{CSHI}</math></p> <p>(4-1-6)SCK<math>\downarrow</math><math>\Rightarrow</math>SCS<math>\uparrow</math>hold time <math>t_{CSHI}</math></p> <p>(4-1-7)SCK<math>\uparrow</math><math>\Rightarrow</math>SCS<math>\downarrow</math>hold time <math>t_{CSHI}</math></p> <p>(4-1-8)SCK<math>\downarrow</math><math>\Rightarrow</math>SCS<math>\downarrow</math>hold time <math>t_{CSHI}</math></p> <p>Corrected the following description.</p> <p>Pin name: SCK1 to SCK11</p> <p>SCS1 to SCS3,SCS40 to SCS43,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11</p> <p>Value: Min <math>t_{CSHD}-50</math> Max <math>t_{CSHD}+0</math></p> <p><math>\downarrow</math></p> <p>Pin name: SCK1,SCK2,SCK5 to SCK11</p> <p>SCS1,SCS2,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11</p> <p>Value: Min <math>t_{CSHD}-10</math> Max <math>t_{CSHD}+50</math></p> <p>Pin name: SCK3,SCK4 SCS3,SCS40 to SCS43</p> <p>Value: Min <math>t_{CSHD}-300</math> Max <math>t_{CSHD}+50</math></p> <p>(4-1-5),(4-1-6)SCS<math>\downarrow</math><math>\Rightarrow</math>SOT delay time <math>t_{DSE}</math></p> <p>(4-1-7),(4-1-8)SCS<math>\uparrow</math><math>\Rightarrow</math>SOT delay time <math>t_{DSE}</math></p> <p>Corrected the following description.</p> <p>Pin name: SCS1 to SCS3,SCS40 to SCS43,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11</p> <p>SOT1 to SOT11</p> <p>Value: Min - Max 40</p> <p><math>\downarrow</math></p> <p>Pin name: SCS1,SCS2,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11</p> <p>SOT1,SOT2,SOT5 to SOT11</p> <p>Value: Min - Max 40</p> <p>Pin name: SCS3,SCS40 to SCS43</p> <p>SOT3,SOT4</p> <p>Value: Min - Max 300</p> <p>(4-1-5)SCK<math>\downarrow</math><math>\Rightarrow</math>SCS<math>\downarrow</math> clock switch time <math>t_{SCC}</math></p> <p>(4-1-6)SCK<math>\uparrow</math><math>\Rightarrow</math>SCS<math>\downarrow</math> clock switch time <math>t_{SCC}</math></p> <p>(4-1-7)SCK<math>\downarrow</math><math>\Rightarrow</math>SCS<math>\uparrow</math> clock switch time <math>t_{SCC}</math></p> <p>(4-1-8)SCK<math>\uparrow</math><math>\Rightarrow</math>SCS<math>\uparrow</math> clock switch time <math>t_{SCC}</math></p> <p>Corrected the following description.</p> <p>Pin name: SCK1 to SCK11</p> <p>SCS1 to SCS3,SCS40 to SCS43,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11</p> |

| Revision | ECN | Orig. of Change | Submission Date | Description of Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------|-----|-----------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |     |                 |                 | <p>Value: Min <math>3t_{\text{CPP}}+0</math> Max <math>3t_{\text{CPP}}+50</math></p> <p>↓</p> <p>Pin name: SCK1,SCK2,SCK5 to SCK11</p> <p>SCS1,SCS2,SCS50 to SCS53,SCS60 to SCS63,SCS70 to SCS73,SCS8 to SCS11</p> <p>Value: Min <math>3t_{\text{CPP}}-10</math> Max <math>3t_{\text{CPP}}+50</math></p> <p>Pin name: SCK3,SCK4 SCS3,SCS40 to SCS43</p> <p>Value: Min <math>3t_{\text{CPP}}-300</math> Max <math>3t_{\text{CPP}}+50</math></p> <p>Added the following description.</p> <p>Regardless of the deselect time setting, once after the serial chip select pin becomes inactive, it will take at least five peripheral bus clock cycles to be active again</p> <p>Electrical Characteristics</p> <p>5.A/D Converter</p> <p>(1) 12-bit A/D Converter Electrical Characteristics:</p> <p>Added the value of "Total error".</p> <p>Total error value Min – Typ – Max <math>\pm 12</math> LSB</p> <p>Corrected the value of "Zero transition voltage".</p> <p>Min AVRL+0.5LSB-20mV Max AVRL+0.5LSB+20mV</p> <p>↓</p> <p>Min AVRL-11.5LSB Max AVRL+12.5LSB</p> <p>Corrected the value of "Full-scale transition voltage".</p> <p>Min AVRH-1.5LSB-20mV Max AVRH-1.5LSB+20mV</p> <p>↓</p> <p>Min AVRH-13.5LSB Max AVRH+10.5LSB</p> <p>Added the following description.</p> <p>Parameter : Power supply current <math>I_A</math> AVCC*3</p> <p>*3: The power supply current described only current value on A/D converter. The total AVcc current value must be calculated the power supply current for A/D converter and D/A converter.</p> <p>Electrical Characteristics</p> <p>7.D/A Converter:</p> <p>Added the following description.</p> <p>Parameter : Power supply current *1</p> <p>*1: The power supply current described only current value on D/A converter.The total Avcc current value must be calculated the power supply current for D/A converter and A/D converter.</p> <p>Electrical Characteristics</p> <p>6.Flash memory:</p> <p>Parameter: Erase cycle*2/Data retain time</p> <p>Deleted the following description.</p> <p>Remarks :</p> <p>"Temperature at writing/erasing <math>T_j &lt; +105^\circ\text{C}</math>"</p> <p>Electrical Characteristics</p> <p>7.D/A Converter:</p> <p>Corrected the following description.</p> <p>Parameter : Power supply current</p> <p>Symbol <math>I_A</math> Pin name AV<sub>CC</sub></p> <p>Symbol <math>I_{AH}</math> Pin name AV<sub>CC</sub></p> <p>↓</p> <p>Symbol <math>I_A</math> Pin name AVCC</p> |

| Revision | ECN     | Orig. of Change | Submission Date | Description of Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------|---------|-----------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |         |                 |                 | <p>Symbol IAH Pin name AVCC</p> <p>Example Characteristics</p> <p>Corrected the following description.</p> <p>Watch mode</p> <p>Ordering Information</p> <p>Corrected the following description.</p> <ul style="list-style-type: none"> <li>ORDERING INFORMATION</li> </ul> <p>↓</p> <ul style="list-style-type: none"> <li>ORDERING INFORMATION MB91F52xxxB<sup>*1</sup></li> </ul> <p>Package</p> <p>↓</p> <p>Package<sup>*2</sup></p> <p>Added the following description.</p> <p><sup>*1</sup>: It is only supported for customers who have already adopted it now. We do not recommend adopting new products.</p> <p>Corrected the following description.</p> <p>For details of the package, see "■ PACKAGE DIMENSIONS".</p> <p>↓</p> <p><sup>*2</sup>: For details of the package, see "■ PACKAGE DIMENSIONS".</p> <p>Added the following description.</p> <ul style="list-style-type: none"> <li>ORDERING INFORMATION MB91F52xxxC</li> </ul> <p>Company name and layout design change</p> |
| *A       | 4999456 | JHMU            | 11/13/2015      | <p>Updated to Cypress template.</p> <p>Added the following note to the remarks of "'L' level average output current" and "'H' level average output current" in "Absolute Maximum Ratings" of "ELECTRICAL CHARACTERISTICS".</p> <p><sup>*9</sup>: Corresponding pins: General-purpose ports other than those of P103, P104, P105 and P106.</p> <p><sup>*10</sup>: Corresponding pins: General-purpose ports of P103, P104, P105 and P106.</p> <p>Added Errata section.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| *B       | 5112138 | KUME            | 01/28/2016      | <p>Fixed some clerical errors.</p> <p>For details, please see the chapter 18. Major Changes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| *C       | 5196285 | KUME            | 04/28/2016      | <p>For details, please see the chapter 19. Major Changes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| *D       | 5318862 | KUME            | 06/23/2016      | <p>For details, please see the chapter 19. Major Changes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| *E       | 5711679 | AESATMP7        | 04/25/2017      | <p>Updated Cypress Logo and Copyright.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| *F       | 5984090 | KUME            | 12/05/2017      | <p>For details, please see the chapter 19. Major Changes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| *G       | 5990912 | KUME            | 12/12/2017      | <p>Marketing Part Numbers changed from an MB prefix to a CY prefix.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| *H       | 6216567 | KUME            | 06/25/2018      | <p>Fixed LQD064 package for Ordering Information CY91F52xxxE.</p> <p>For details, please see the chapter 19. Major Changes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Sales, Solutions, and Legal Information

### Worldwide Sales and Design Support

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|                               |                                                                    |
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