

Six Output Differential Buffer for PCIe Gen 2

9DB106

Description

The **9DB106** zero-delay buffer supports PCIe Gen1 and Gen2 clocking requirements. The **9DB106** is driven by a differential SRC output pair from an IDT CK410/CK505-compliant main clock generator. It attenuates jitter on the input clock and has a selectable PLL bandwidth to maximize performance in systems with or without Spread-Spectrum clocking. An SMBus interface allows control of the PLL bandwidth and bypass options, while 2 clock request (CLKREQ#) pins make the **9DB106** suitable for Express Card applications.

Recommended Applications

6 Output Differential Buffer for PCIe Gen 2

Output Features

- 6 - 0.7V current mode differential output pairs (HCSL)

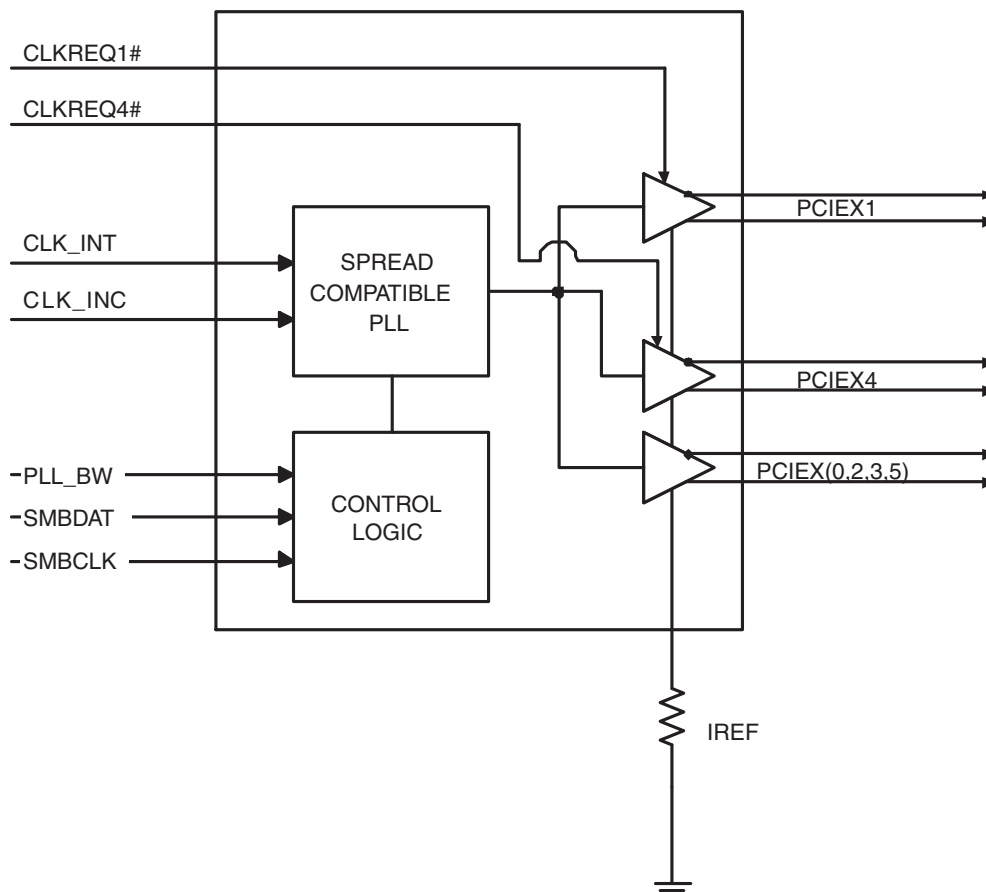
Features/Benefits

- CLKREQ# pin for outputs 1 and 4/ supports Express Card applications
- PLL or bypass mode/PLL can dejitter incoming clock
- Selectable PLL bandwidth/minimizes jitter peaking in downstream PLL's
- Spread Spectrum Compatible/tracks spreading input clock for low EMI
- SMBus Interface/unused outputs can be disabled

Key Specifications

- Cycle-to-cycle jitter < 50ps
- Output-to-output skew < 50 ps

Functional Block Diagram



Pin Configuration

| | | | | |
|-----------|----|---------------|----|-----------|
| PLL_BW | 1 | 9DB106 | 28 | VDDA |
| CLK_INT | 2 | | 27 | GNDA |
| CLK_INC | 3 | | 26 | IREF |
| vCLKREQ1# | 4 | | 25 | vCLKREQ4# |
| PCIEXT0 | 5 | | 24 | PCIEXT5 |
| PCIEXC0 | 6 | | 23 | PCIEXC5 |
| VDD | 7 | | 22 | VDD |
| GND | 8 | | 21 | GND |
| PCIEXT1 | 9 | | 20 | PCIEXT4 |
| PCIEXC1 | 10 | | 19 | PCIEXC4 |
| PCIEXT2 | 11 | | 18 | PCIEXT3 |
| PCIEXC2 | 12 | | 17 | PCIEXC3 |
| VDD | 13 | | 16 | VDD |
| SMBDAT | 14 | | 15 | SMBCLK |

Note: Pins preceded by ' v ' have internal 120K ohm pull down resistors

28-pin SSOP & TSSOP

Power Groups

| Pin Number | | Description |
|---------------|------|-------------------------------|
| VDD | GND | |
| 7, 13, 16, 22 | 8,21 | PCI Express Outputs |
| TBD | TBD | SMBUS |
| N/A | 27 | IREF |
| 28 | 27 | Analog VDD & GND for PLL core |

Pin Description

| PIN # | PIN NAME | PIN TYPE | DESCRIPTION |
|-------|-----------|----------|---|
| 1 | PLL_BW | IN | 3.3V input for selecting PLL Band Width 0 = low, 1= high |
| 2 | CLK_INT | IN | True Input for differential reference clock. |
| 3 | CLK_INC | IN | Complementary Input for differential reference clock. |
| 4 | vCLKREQ1# | IN | Output enable for PCI Express output pair 1. 0 = enabled, 1 =disabled |
| 5 | PCIEXT0 | OUT | True clock of differential PCI_Express pair. |
| 6 | PCIEXC0 | OUT | Complementary clock of differential PCI_Express pair. |
| 7 | VDD | PWR | Power supply, nominal 3.3V |
| 8 | GND | IN | Ground pin. |
| 9 | PCIEXT1 | OUT | True clock of differential PCI_Express pair. |
| 10 | PCIEXC1 | OUT | Complementary clock of differential PCI_Express pair. |
| 11 | PCIEXT2 | OUT | True clock of differential PCI_Express pair. |
| 12 | PCIEXC2 | OUT | Complementary clock of differential PCI_Express pair. |
| 13 | VDD | PWR | Power supply, nominal 3.3V |
| 14 | SMBDAT | I/O | Data pin of SMBUS circuitry, 5V tolerant |
| 15 | SMBCLK | IN | Clock pin of SMBUS circuitry, 5V tolerant |
| 16 | VDD | PWR | Power supply, nominal 3.3V |
| 17 | PCIEXC3 | OUT | Complementary clock of differential PCI_Express pair. |
| 18 | PCIEXT3 | OUT | True clock of differential PCI_Express pair. |
| 19 | PCIEXC4 | OUT | Complementary clock of differential PCI_Express pair. |
| 20 | PCIEXT4 | OUT | True clock of differential PCI_Express pair. |
| 21 | GND | PWR | Ground pin. |
| 22 | VDD | PWR | Power supply, nominal 3.3V |
| 23 | PCIEXC5 | OUT | Complementary clock of differential PCI_Express pair. |
| 24 | PCIEXT5 | OUT | True clock of differential PCI_Express pair. |
| 25 | vCLKREQ4# | IN | Output enable for PCI Express output pair 4. 0 = enabled, 1 =disabled |
| 26 | IREF | OUT | This pin establishes the reference for the differential current-mode output pairs. It requires a fixed precision resistor to ground. 475ohm is the standard value for 100ohm differential impedance. Other impedances require different values. See data sheet. |
| 27 | GNDA | PWR | Ground pin for the PLL core. |
| 28 | VDDA | PWR | 3.3V power for the PLL core. |

Note:

Pins preceded by ' v ' have internal 120K ohm pull down resistors

Electrical Characteristics - Absolute Maximum Ratings

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS | NOTES |
|---------------------------|--------------------|----------------------------|---------|-----|-----------------------|-------|-------|
| 3.3V Core Supply Voltage | VDDA | | | | 4.6 | V | 1,2 |
| 3.3V Logic Supply Voltage | VDD | | | | 4.6 | V | 1,2 |
| Input Low Voltage | V _{IL} | | GND-0.5 | | | V | 1 |
| Input High Voltage | V _{IH} | Except for SMBus interface | | | V _{DD} +0.5V | V | 1 |
| Input High Voltage | V _{IHSMB} | SMBus clock and data pins | | | 5.5V | V | 1 |
| Storage Temperature | T _s | | -65 | | 150 | °C | 1 |
| Junction Temperature | T _j | | | | 125 | °C | 1 |
| Input ESD protection | ESD prot | Human Body Model | 2000 | | | V | 1 |

¹Guaranteed by design and characterization, not 100% tested in production.

²Operation under these conditions is neither implied nor guaranteed.

Electrical Characteristics - Input/Supply/Common Output Parameters

T_A = T_{COM} or T_{IND}; Supply Voltage VDD = 3.3 V +/-5%

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS | Notes |
|--|----------------------|---|-----------------------|-----|-----------------------|--------|-------|
| Ambient Operating Temperature | T _{COM} | Commercial range | 0 | | 70 | °C | 1 |
| | T _{IND} | Industrial range | -40 | | 85 | °C | 1 |
| Input High Voltage | V _{IH} | 3.3 V +/-5% | 2 | | V _{DD} + 0.3 | V | 1,2 |
| Input Low Voltage | V _{IL} | 3.3 V +/-5% | V _{SS} - 0.3 | | 0.8 | V | 1,2 |
| Input High Current | I _{IH} | V _{IN} = V _{DD} | -5 | | 5 | uA | 1,2 |
| Input Low Current | I _{IL1} | V _{IN} = 0 V; Inputs with no pull-up resistors | -5 | | | uA | 1,2 |
| | I _{IL2} | V _{IN} = 0 V; Inputs with pull-up resistors | -200 | | | uA | 1,2 |
| Operating Supply Current | I _{DD3.3OP} | Full Active, C _L = Full load; | | 130 | 150 | mA | 1 |
| | | all differential pairs tri-stated | | 30 | 40 | mA | 1 |
| Input Frequency | F _i | V _{DD} = 3.3 V | 80 | 100 | 105 | MHz | |
| Pin Inductance | L _{pin} | | | | 7 | nH | 1 |
| Input Capacitance | C _{IN} | Logic Inputs | | | 5 | pF | 1 |
| | C _{OUT} | Output pin capacitance | | | 4.5 | pF | 1 |
| Clk Stabilization | T _{STAB} | From VDD reaching 3.1V and input clock stable | | | 1.8 | ms | 1 |
| Input Spread Spectrum Modulation Frequency | | Triangular Modulation | 30 | | 33 | kHz | 1 |
| OE# Latency | t _{LATOE#} | DIF start after OE# assertion DIF stop after OE# deassertion | 1 | | 3 | cycles | 1,3 |
| SMBus Voltage | V _{DD} | | 2.7 | | 5.5 | V | 1 |
| Low-level Output Voltage | V _{OL} | @ I _{PULLUP} | | | 0.4 | V | 1 |
| Current sinking at V _{OL} = 0.4 V | I _{PULLUP} | | 4 | | | mA | 1 |
| SCLK/SDATA Clock/Data Rise Time | T _{RI2C} | (Max V _{IL} - 0.15) to (Min V _{IH} + 0.15) | | | 1000 | ns | 1 |
| SCLK/SDATA Clock/Data Fall Time | T _{FI2C} | (Min V _{IH} + 0.15) to (Max V _{IL} - 0.15) | | | 300 | ns | 1 |

¹Guaranteed by design and characterization, not 100% tested in production.

²Except differential input clock

³Time from deassertion until outputs are >200mV

Electrical Characteristics - Clock Input Parameters

TA = T_{COM} or T_{IND}; Supply Voltage VDD = 3.3 V +/-5%

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS | NOTES |
|------------------------------------|--------------------|---|-----------------------|-----|------|-------|-------|
| Input High Voltage - DIF_IN | V _{IHDIF} | Differential inputs (single-ended measurement) | 600 | 800 | 1150 | mV | 1 |
| Input Low Voltage - DIF_IN | V _{ILDIF} | Differential inputs (single-ended measurement) | V _{SS} - 300 | 0 | 300 | mV | 1 |
| Input Common Mode Voltage - DIF_IN | V _{COM} | Common Mode Input Voltage | 300 | | 1000 | mV | 1 |
| Input Amplitude - DIF_IN | V _{SWING} | Peak to Peak value | 300 | | 1450 | mV | 1 |
| Input Slew Rate - DIF_IN | dv/dt | Measured differentially | 0.4 | | 8 | V/ns | 1,2 |
| Input Leakage Current | I _{IN} | V _{IN} = V _{DD} , V _{IN} = GND | -5 | | 5 | uA | 1 |
| Input Duty Cycle | d _{tin} | Measurement from differential waveform | 45 | | 55 | % | 1 |
| Input Jitter - Cycle to Cycle | J _{DIFIn} | Differential Measurement | 0 | | 125 | ps | 1 |

¹ Guaranteed by design and characterization, not 100% tested in production.

² Slew rate measured through +/-75mV window centered around differential zero

Electrical Characteristics - PLL Parameters

TA = T_{COM} or T_{IND}; Supply Voltage VDD = 3.3 V +/-5%

| Group | Parameter | Description | Min | Typ | Max | Units | Notes |
|--------------------|------------------------|---|-----|-----|-----|--------|-------|
| PLL Jitter Peaking | j _{peak-hibw} | (PLL_BW = 1) | 0 | 1 | 2.5 | dB | 1,4 |
| PLL Jitter Peaking | j _{peak-lobw} | (PLL_BW = 0) | 0 | 1 | 2 | dB | 1,4 |
| PLL Bandwidth | p _{llHIBW} | (PLL_BW = 1) | 2 | 2.5 | 3 | MHz | 1,5 |
| PLL Bandwidth | p _{llLOBW} | (PLL_BW = 0) | 0.4 | 0.5 | 1 | MHz | 1,5 |
| Jitter, Phase | t _{jphasePLL} | PCIe Gen 1 phase jitter (1.5 - 22 MHz) | | 40 | 108 | ps | 1,2,3 |
| | | PCIe Gen 2 jitter (8-16 MHz, 5-16 MHz) Hi-Band >1.5MHz (PLL_BW=1) | | 2.7 | 3.1 | ps rms | 1,2,3 |
| | | PCIe Gen 2 jitter (8-16 MHz, 5-16 MHz) Hi-Band >1.5MHz (PLL_BW=0) | | 2.2 | 3.1 | ps rms | 1,2,3 |
| | | PCIe Gen 2 jitter (8-16 MHz, 5-16 MHz) Lo-Band <1.5MHz | | 1.3 | 3 | ps rms | 1,2,3 |

NOTES:

1. Guaranteed by design and characterization, not 100% tested in production.
2. See <http://www.pcisig.com> for complete specs
3. Device driven by 932S421BGLF or equivalent
4. Measured as maximum pass band gain. At frequencies within the loop BW, highest point of magnification is called PLL jitter peaking.
5. Measured at 3 db down or half power point.

Electrical Characteristics - PCIeX 0.7V Current Mode Differential Outputs

TA = T_{COM} or T_{IND}; V_{DD} = 3.3 V +/-5%; C_L =2pF, R_S=33.2Ω, R_P=49.9Ω, I_{REF} = 475Ω

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS | NOTES |
|---------------------------------|-----------------------------|--|--------|-----|---------|-------|-------|
| Current Source Output Impedance | Z _O ¹ | V _O = V _x | 3000 | | | < | 1 |
| Voltage High | V _{High} | Statistical measurement on single ended signal using oscilloscope math function. | 660 | | 850 | mV | 1,3 |
| Voltage Low | V _{Low} | | -150 | | 150 | | 1,3 |
| Max Voltage | V _{ovs} | Measurement on single ended signal using absolute value. | | | 1150 | mV | 1,3 |
| Min Voltage | V _{uds} | | -300 | | | | 1,3 |
| Crossing Voltage (abs) | V _{cross(abs)} | | 250 | | 550 | mV | 1,3 |
| Crossing Voltage (var) | d-V _{cross} | Variation of crossing over all edges | | | 140 | mV | 1,3 |
| Long Accuracy | ppm | see T _{period} min-max values | | | 0 | ppm | 1,2 |
| Average period | T _{period} | 100.00MHz nominal | 9.9970 | | 10.0030 | ns | 2 |
| | | 100.00MHz spread | 9.9970 | | 10.0533 | ns | 2 |
| Absolute min period | T _{absmin} | 100.00MHz nominal/spread | 9.8720 | | | ns | 1,2 |
| Rise Time | t _r | V _{OL} = 0.175V, V _{OH} = 0.525V | 175 | | 700 | ps | 1 |
| Fall Time | t _f | V _{OH} = 0.525V V _{OL} = 0.175V | 175 | | 700 | ps | 1 |
| Rise Time Variation | d-t _r | | | | 125 | ps | 1 |
| Fall Time Variation | d-t _f | | | | 125 | ps | 1 |
| Input to Output Delay | t _{pd} | PLL Mode. | 0 | | 150 | ps | 1 |
| | t _{pdbyb} | Bypass mode | 3.7 | | 4.2 | ns | 1 |
| Duty Cycle | d _{t3} | Measurement from differential waveform | 45 | | 55 | % | 1 |
| Output-to-Output Skew | t _{sk3} | V _T = 50% | | 40 | 50 | ps | 1 |
| Jitter, Cycle to cycle | t _{jcy-cyc} | PLL mode, Measurement from differential waveform | | 35 | 50 | ps | 1 |
| | | BYPASS mode as additive jitter | | 35 | 50 | ps | 1 |

¹Guaranteed by design and characterization, not 100% tested in production.

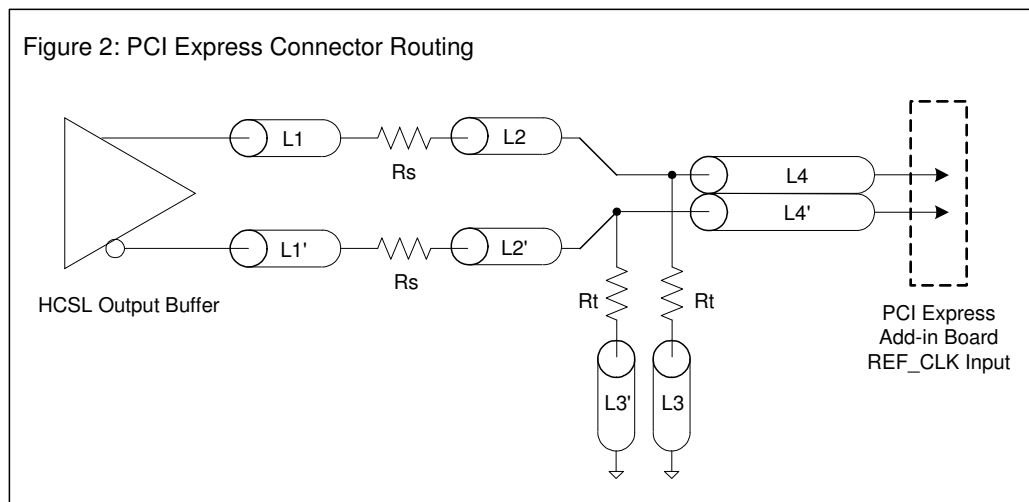
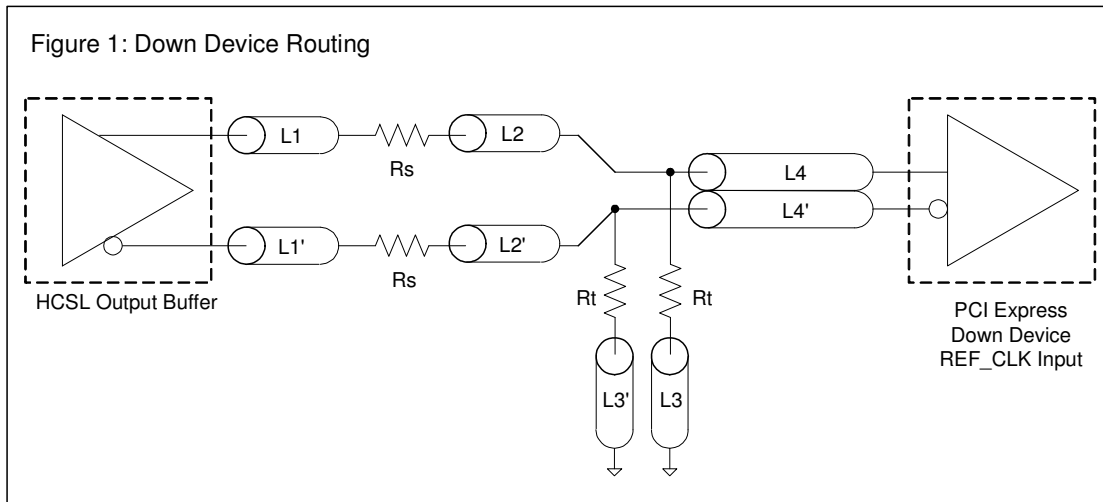
²The 9DB106 does not add a ppm error to the input clock.

³I_{REF} = V_{DD}/(3xR_R). For R_R = 475Ω (1%), I_{REF} = 2.32mA. I_{OH} = 6 x I_{REF} and V_{OH} = 0.7V @ Z_O=50Ω.

| SRC Reference Clock | | | |
|---|--------------------|------|--------|
| Common Recommendations for Differential Routing | Dimension or Value | Unit | Figure |
| L1 length, route as non-coupled 50ohm trace | 0.5 max | inch | 1 |
| L2 length, route as non-coupled 50ohm trace | 0.2 max | inch | 1 |
| L3 length, route as non-coupled 50ohm trace | 0.2 max | inch | 1 |
| R_s | 33 | ohm | 1 |
| R_t | 49.9 | ohm | 1 |

| Down Device Differential Routing | | | |
|--|---------------------|------|---|
| L4 length, route as coupled microstrip 100ohm differential trace | 2 min to 16 max | inch | 1 |
| L4 length, route as coupled stripline 100ohm differential trace | 1.8 min to 14.4 max | inch | 1 |

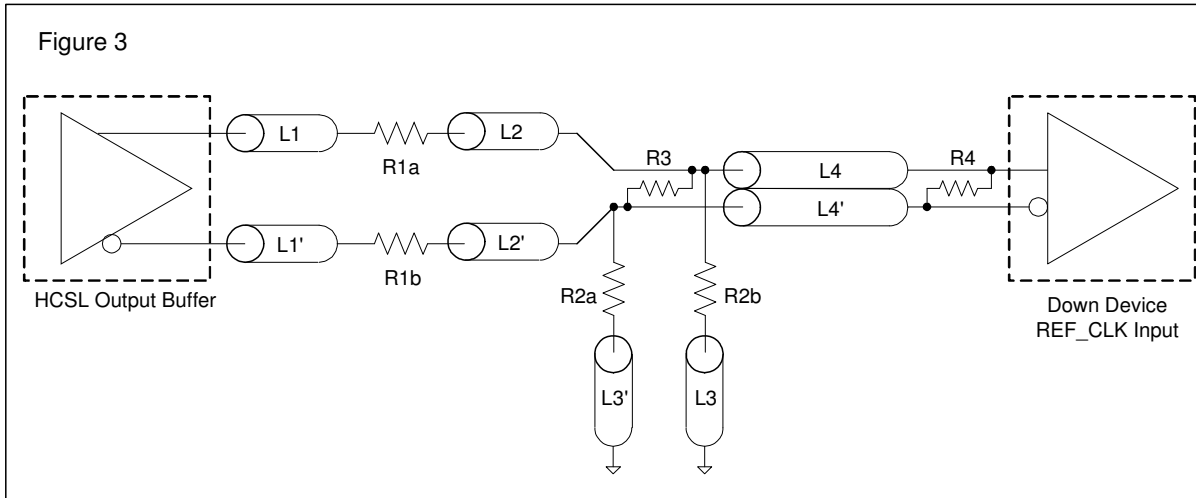
| Differential Routing to PCI Express Connector | | | |
|--|-----------------------|------|---|
| L4 length, route as coupled microstrip 100ohm differential trace | 0.25 to 14 max | inch | 2 |
| L4 length, route as coupled stripline 100ohm differential trace | 0.225 min to 12.6 max | inch | 2 |



Alternative Termination for LVDS and other Common Differential Signals (figure 3)

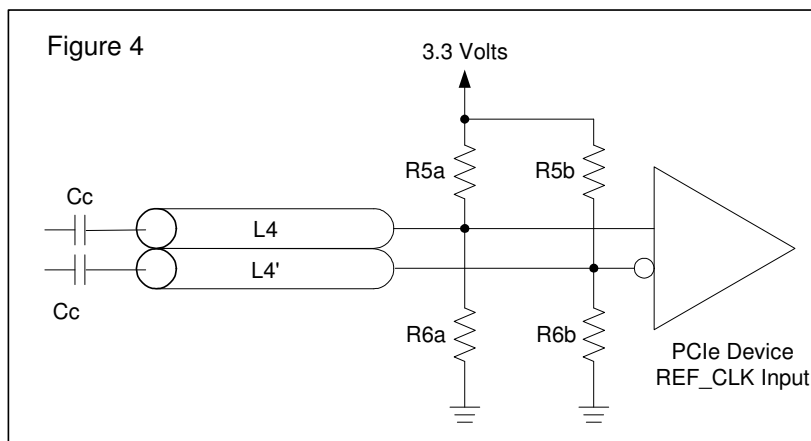
| Vdiff | Vp-p | Vcm | R1 | R2 | R3 | R4 | Note |
|-------|-------|------|----|------|------|-----|--------------------------------|
| 0.45v | 0.22v | 1.08 | 33 | 150 | 100 | 100 | |
| 0.58 | 0.28 | 0.6 | 33 | 78.7 | 137 | 100 | |
| 0.80 | 0.40 | 0.6 | 33 | 78.7 | none | 100 | ICS874003i-02 input compatible |
| 0.60 | 0.3 | 1.2 | 33 | 174 | 140 | 100 | Standard LVDS |

R1a = R1b = R1
R2a = R2b = R2



Cable Connected AC Coupled Application (figure 4)

| Component | Value | Note |
|-----------|-------------|------|
| R5a, R5b | 8.2K 5% | |
| R6a, R6b | 1K 5% | |
| Cc | 0.1 μ F | |
| Vcm | 0.350 volts | |



General SMBus serial interface information for the 9DB106

How to Write:

- Controller (host) sends a start bit.
- Controller (host) sends the write address $D4_{(h)}$
- IDT clock will **acknowledge**
- Controller (host) sends the beginning byte location = N
- IDT clock will **acknowledge**
- Controller (host) sends the data byte count = X
- IDT clock will **acknowledge**
- Controller (host) starts sending **Byte N through Byte N + X - 1**
- IDT clock will **acknowledge** each byte **one at a time**
- Controller (host) sends a Stop bit

How to Read:

- Controller (host) will send start bit.
- Controller (host) sends the write address $D4_{(h)}$
- IDT clock will **acknowledge**
- Controller (host) sends the beginning byte location = N
- IDT clock will **acknowledge**
- Controller (host) will send a separate start bit.
- Controller (host) sends the read address $D5_{(h)}$
- IDT clock will **acknowledge**
- IDT clock will send the data byte count = X
- IDT clock sends **Byte N + X - 1**
- IDT clock sends **Byte 0 through byte X (if $X_{(h)}$ was written to byte 8).**
- Controller (host) will need to acknowledge each byte
- Controller (host) will send a not acknowledge bit
- Controller (host) will send a stop bit

| Index Block Write Operation | | |
|-----------------------------|-----------|----------------------|
| Controller (Host) | | IDT (Slave/Receiver) |
| T | starT bit | |
| Slave Address $D4_{(h)}$ | | |
| WR | WRite | |
| | | ACK |
| Beginning Byte = N | | |
| | | ACK |
| Data Byte Count = X | | |
| | | ACK |
| Beginning Byte N | X Byte | |
| ◇ | | ACK |
| ◇ | | ◇ |
| ◇ | | ◇ |
| ◇ | | ◇ |
| Byte N + X - 1 | | |
| | | ACK |
| P | stoP bit | |

| Index Block Read Operation | | | |
|----------------------------|-----------------|----------------------|------------------|
| Controller (Host) | | IDT (Slave/Receiver) | |
| T | starT bit | | |
| Slave Address $D4_{(h)}$ | | | |
| WR | WRite | | |
| | | ACK | |
| Beginning Byte = N | | | |
| | | ACK | |
| RT | Repeat starT | | |
| Slave Address $D5_{(h)}$ | | | |
| RD | ReaD | | |
| | | ACK | |
| | | Data Byte Count = X | |
| ACK | | | |
| ACK | | X Byte | |
| | | | Beginning Byte N |
| ◇ | | | |
| ◇ | | | |
| ◇ | | | |
| | | Byte N + X - 1 | |
| N | Not acknowledge | | |
| P | stoP bit | | |

SMBusTable: Device Control Register, READ/WRITE ADDRESS (D4/D5)

| Byte 0 | Pin # | Name | Control Function | Type | 0 | 1 | PWD |
|--------|-------|----------------|-------------------------------------|------|-----------------------------------|-------------------------------|-----|
| Bit 7 | - | SW_EN | Enables SMBus Control of bits (1:0) | RW | PLL controlled by SMBus registers | PLL controlled by device pins | 1 |
| Bit 6 | - | RESERVED | | RW | - | - | X |
| Bit 5 | - | RESERVED | | RW | - | - | X |
| Bit 4 | - | RESERVED | | RW | - | - | X |
| Bit 3 | - | RESERVED | | RW | - | - | X |
| Bit 2 | - | RESERVED | | RW | - | - | X |
| Bit 1 | - | PLL BW #adjust | Selects PLL Bandwidth | RW | Low BW | High BW | 1 |
| Bit 0 | - | PLL Enable | Bypasses PLL for board test | RW | PLL bypassed (fan out mode) | PLL enabled (ZDB mode) | 1 |

SMBusTable: Output Enable Register

| Byte 1 | Pin # | Name | Control Function | Type | 0 | 1 | PWD |
|--------|-------|----------|------------------|------|---------|--------|-----|
| Bit 7 | - | RESERVED | | RW | - | - | X |
| Bit 6 | - | RESERVED | | RW | - | - | X |
| Bit 5 | 24,23 | PCIEX5 | Output Control | RW | Disable | Enable | 1 |
| Bit 4 | - | RESERVED | | RW | - | - | X |
| Bit 3 | 18,17 | PCIEX3 | Output Control | RW | Disable | Enable | 1 |
| Bit 2 | 11,12 | PCIEX2 | Output Control | RW | Disable | Enable | 1 |
| Bit 1 | - | RESERVED | | RW | - | - | X |
| Bit 0 | 5,6 | PCIEX0 | Output Control | RW | Disable | Enable | 1 |

SMBusTable: Function Select Register

| Byte 2 | Pin # | Name | Control Function | Type | 0 | 1 | PWD |
|--------|-------|----------|------------------|------|---|---|-----|
| Bit 7 | - | RESERVED | | RW | - | - | X |
| Bit 6 | - | RESERVED | | RW | - | - | X |
| Bit 5 | - | RESERVED | | RW | - | - | X |
| Bit 4 | - | RESERVED | | RW | - | - | X |
| Bit 3 | - | RESERVED | | RW | - | - | X |
| Bit 2 | - | RESERVED | | RW | - | - | X |
| Bit 1 | - | RESERVED | | RW | - | - | X |
| Bit 0 | - | RESERVED | | RW | - | - | X |

SMBusTable: Vendor & Revision ID Register

| Byte 3 | Pin # | Name | Control Function | Type | 0 | 1 | PWD |
|--------|-------|------|------------------|------|---|---|-----|
| Bit 7 | - | RID3 | REVISION ID | R | - | - | 0 |
| Bit 6 | - | RID2 | | R | - | - | 0 |
| Bit 5 | - | RID1 | | R | - | - | 0 |
| Bit 4 | - | RID0 | | R | - | - | 1 |
| Bit 3 | - | VID3 | VENDOR ID | R | - | - | 0 |
| Bit 2 | - | VID2 | | R | - | - | 0 |
| Bit 1 | - | VID1 | | R | - | - | 0 |
| Bit 0 | - | VID0 | | R | - | - | 1 |

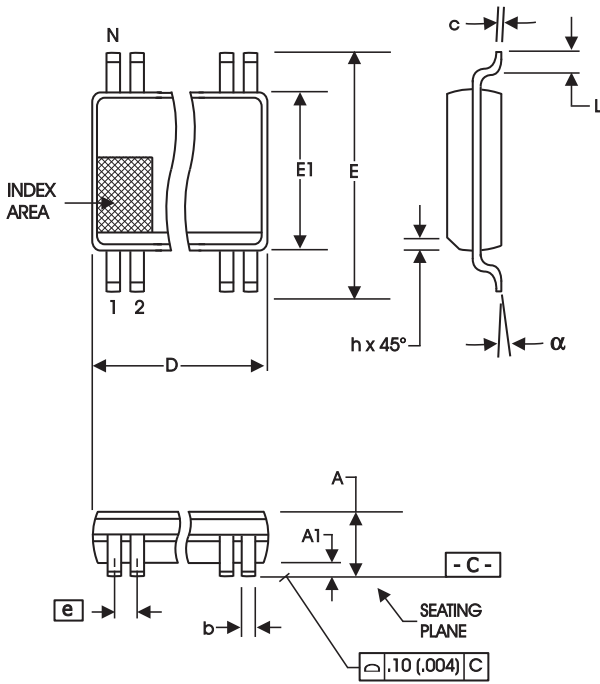
SMBusTable: DEVICE ID

| Byte 4 | Pin # | Name | Control Function | Type | 0 | 1 | PWD |
|--------|-------|-----------------------|------------------|------|---|---|-----|
| Bit 7 | - | Device ID = 06 Hex | | R | - | - | 0 |
| Bit 6 | - | | | R | - | - | 0 |
| Bit 5 | - | | | R | - | - | 0 |
| Bit 4 | - | | | R | - | - | 0 |
| Bit 3 | - | | | R | - | - | 0 |
| Bit 2 | - | | | R | - | - | 1 |
| Bit 1 | - | | | R | - | - | 1 |
| Bit 0 | - | | | R | - | - | 0 |

SMBusTable: Byte Count Register

| Byte 5 | Pin # | Name | Control Function | Type | 0 | 1 | PWD |
|--------|-------|------|--|------|---|---|-----|
| Bit 7 | - | BC7 | Writing to this register will configure how many bytes will be read back, default is 06 = 6 bytes. | RW | - | - | 0 |
| Bit 6 | - | BC6 | | RW | - | - | 0 |
| Bit 5 | - | BC5 | | RW | - | - | 0 |
| Bit 4 | - | BC4 | | RW | - | - | 0 |
| Bit 3 | - | BC3 | | RW | - | - | 0 |
| Bit 2 | - | BC2 | | RW | - | - | 1 |
| Bit 1 | - | BC1 | | RW | - | - | 1 |
| Bit 0 | - | BC0 | | RW | - | - | 0 |

9DB106
Six Output Differential Buffer for PCIe Gen 2



209 mil SSOP

| SYMBOL | In Millimeters COMMON DIMENSIONS | | In Inches COMMON DIMENSIONS | |
|--------|-------------------------------------|------|--------------------------------|------|
| | MIN | MAX | MIN | MAX |
| A | -- | 2.00 | -- | .079 |
| A1 | 0.05 | -- | .002 | -- |
| A2 | 1.65 | 1.85 | .065 | .073 |
| b | 0.22 | 0.38 | .009 | .015 |
| c | 0.09 | 0.25 | .0035 | .010 |
| D | SEE VARIATIONS | | SEE VARIATIONS | |
| E | 7.40 | 8.20 | .291 | .323 |
| E1 | 5.00 | 5.60 | .197 | .220 |
| e | 0.65 BASIC | | 0.0256 BASIC | |
| L | 0.55 | 0.95 | .022 | .037 |
| N | SEE VARIATIONS | | SEE VARIATIONS | |
| a | 0° | 8° | 0° | 8° |

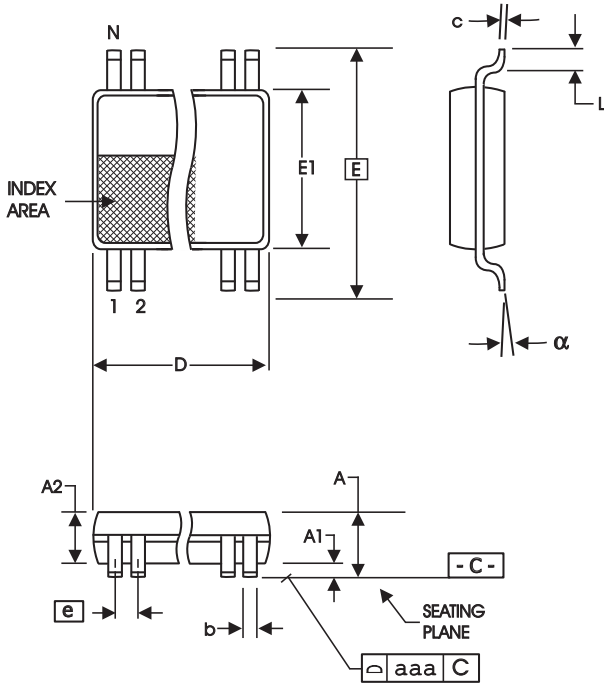
VARIATIONS

| N | D mm. | | D (inch) | |
|----|-------|-------|----------|------|
| | MIN | MAX | MIN | MAX |
| 28 | 9.90 | 10.50 | .390 | .413 |

Reference Doc.: JEDEC Publication 95, MO-150

10-0033

9DB106
Six Output Differential Buffer for PCIe Gen 2



4.40 mm. Body, 0.65 mm. Pitch TSSOP

(173 mil) (25.6 mil)

| SYMBOL | In Millimeters COMMON DIMENSIONS | | In Inches COMMON DIMENSIONS | |
|--------|-------------------------------------|------|--------------------------------|------|
| | MIN | MAX | MIN | MAX |
| A | -- | 1.20 | -- | .047 |
| A1 | 0.05 | 0.15 | .002 | .006 |
| A2 | 0.80 | 1.05 | .032 | .041 |
| b | 0.19 | 0.30 | .007 | .012 |
| c | 0.09 | 0.20 | .0035 | .008 |
| D | SEE VARIATIONS | | SEE VARIATIONS | |
| E | 6.40 BASIC | | 0.252 BASIC | |
| E1 | 4.30 | 4.50 | .169 | .177 |
| e | 0.65 BASIC | | 0.0256 BASIC | |
| L | 0.45 | 0.75 | .018 | .030 |
| N | SEE VARIATIONS | | SEE VARIATIONS | |
| a | 0° | 8° | 0° | 8° |
| aaa | -- | 0.10 | -- | .004 |

VARIATIONS

| N | D mm. | | D (inch) | |
|----|-------|------|----------|------|
| | MIN | MAX | MIN | MAX |
| 28 | 9.60 | 9.80 | .378 | .386 |

Reference Doc.: JEDEC Publication 95, MO-153

10-0035

Ordering Information

| Part / Order Number | Shipping Packaging | Package | Temperature |
|---------------------|--------------------|--------------|--------------|
| 9DB106BFLF | Tubes | 28-pin SSOP | 0 to +70°C |
| 9DB106BFLFT | Tape and Reel | 28-pin SSOP | 0 to +70°C |
| 9DB106BGLF | Tubes | 28-pin TSSOP | 0 to +70°C |
| 9DB106BGLFT | Tape and Reel | 28-pin TSSOP | 0 to +70°C |
| 9DB106BFILF | Tubes | 28-pin SSOP | -40 to +85°C |
| 9DB106BFILFT | Tape and Reel | 28-pin SSOP | -40 to +85°C |
| 9DB106BGILF | Tubes | 28-pin TSSOP | -40 to +85°C |
| 9DB106BGILFT | Tape and Reel | 28-pin TSSOP | -40 to +85°C |

"LF" after the package code are the Pb-Free configuration and are RoHS compliant.

"B" is the device revision designator (will not correlate to the datasheet revision).

Revision History

| Rev. | Originator | Issue Date | Description | Page # |
|------|------------|------------|--|-----------|
| B | RDW | 9/12/2005 | 1. Changed Output to Output skew from 30ps to 45ps. 2. Changed PLL mode jitter from 40ps to 35ps. 3. Changed Bypass mode additive jitter from 25ps to 35ps. 4. Updated LF Ordering Information. | 5, 8-9 |
| C | RDW | 8/17/2006 | Corrected Typo of SMBus Read/Write Address. | 7 |
| D | RDW | 3/12/2007 | Added SMBus Read/Write Table. | 6 |
| E | RDW | 8/6/2007 | 1. Added Phase Noise Parameters, Updated input to output delay values. 2. PLL BW moved to PLL parameters table. 3. Added terminations tables. | 6-8 |
| F | | 12/14/2007 | Updated SMBus serial Interface Information. | 9 |
| G | RDW | 4/1/2010 | Updated ordering info for Rev B | 13 |
| H | RDW | 9/15/2010 | 1. Updated DS to include I-temp specs and ordering information 2. Updated electrical tables to reflect common set of numbers for I-temp and C-temp 3. Converted all references of ICS to IDT 4. Corrected placement of AC coupling caps in Figure 4 | |
| J | RDW | 1/27/2011 | Updated Termination Figure 4. | 8 |
| K | RDW | 4/20/2011 | 1. Changed pull down indicator from "*" to "v" to correct pin description of CLKREQ# pins. | |
| L | AT | 5/24/2012 | Added OE# Latency spec to Common Input/Output Parameters table | 4 |

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