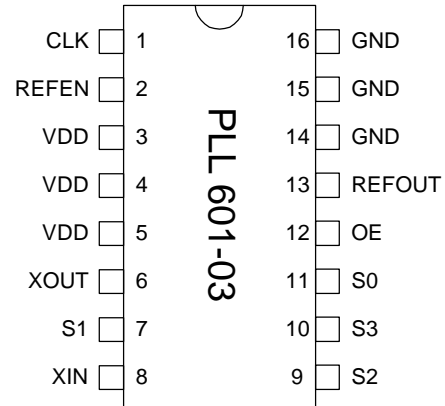


## Low Phase Noise PLL Clock Multiplier

### FEATURES

- Full swing CMOS outputs with 25 mA drive capability at TTL levels.
- Reference 10-30MHz crystal or clock.
- Integrated crystal load capacitor: no external load capacitor required.
- Output clocks up to 198MHz at 3.3V.
- Low phase noise (-126dBc/Hz @ 1kHz).
- Output Enable function.
- Low jitter (RMS): 6.4ps (period), 9.4ps (accum.)
- Advanced low power sub-micron CMOS process.
- 3.3V operation.
- Available in 16-Pin SOIC or TSSOP.

### PIN CONFIGURATION



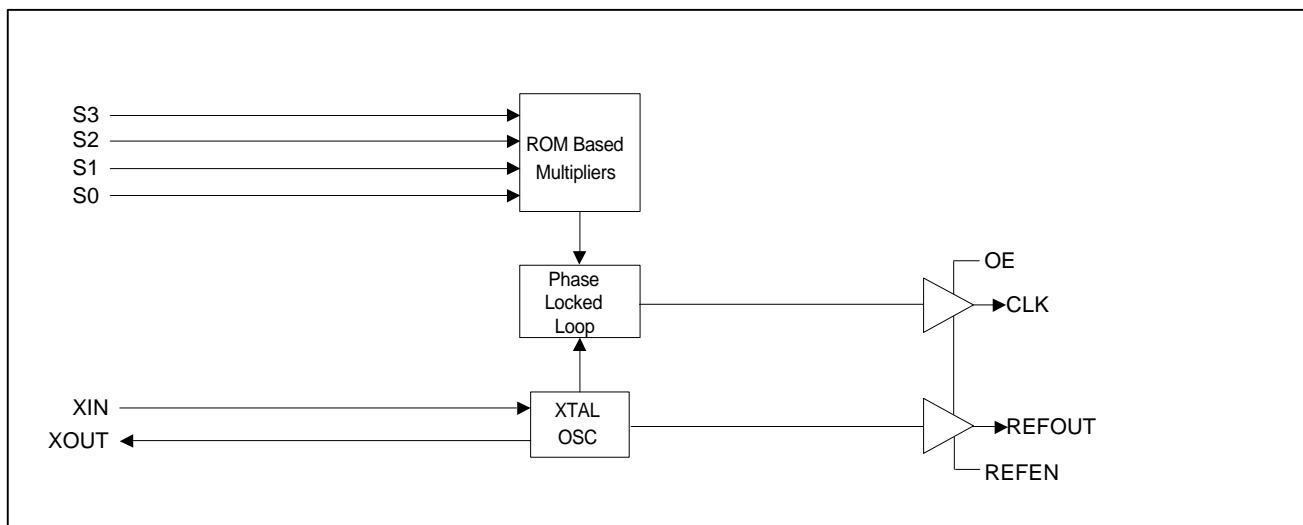
### DESCRIPTIONS

The PLL601-03 is a low cost, high performance and low phase noise clock synthesizer. It implements PhaseLink's proprietary analog and digital Phase Locked Loop techniques to allow the user to select the desired multiplier value. The chip accepts crystal or clock inputs ranging from 10 to 30MHz, depending on selected multiplier, and produces output clocks up to 198MHz at 3.3V.

### MULTIPLIER SELECT TABLE

| S3 | S2 | S1 | S0 | Multiplier             | Xtal range |
|----|----|----|----|------------------------|------------|
| 0  | 0  | 0  | 0  | Reserved               |            |
| 0  | 0  | 0  | 1  | 11x                    | 10-18MHz   |
| 0  | 1  | 0  | 1  | 5x                     | 20-30MHz   |
| 1  | 0  | 0  | 1  | Frequency Pass through |            |
| 1  | 1  | 0  | 1  | 6x                     | 11-22MHz   |

### BLOCK DIAGRAM



**Low Phase Noise PLL Clock Multiplier**
**PIN DESCRIPTIONS**

| Name   | Number   | Type | Description   |
|--------|----------|------|---|
| CLK    | 1        | O    | Clock output from VCO. Equals the input frequency times multiplier.   |
| REFEN  | 2        | I    | Reference clock enable. When Low, it turns off REFOUT.  |
| VDD    | 3,4,5    | P    | 3.3V Power Supply.  |
| XIN    | 8        | I    | Crystal input to be connected to 10-30MHz fundamental parallel mode crystal ( $C_L=15\text{pF}$ ). On chip load capacitors: No external capacitor required. |
| XOUT   | 6        | O    | Crystal Connection.   |
| OE     | 12       | I    | Output Enable. Tri-state CLK and REFOUT when low. Has internal pull-up.   |
| REFOUT | 13       | O    | Buffered crystal oscillator clock output. Controlled by REFEN.  |
| S0     | 11       | I    | Multiplier Select Pin 0. Determines CLK output. Has internal pull-up.   |
| S1     | 7        | I    | Multiplier Select Pin 1. Determines CLK output. Has internal pull-up.   |
| S2     | 9        | I    | Multiplier Select Pin 1. Determines CLK output. Has internal pull-up.   |
| S3     | 10       | I    | Multiplier Select Pin 3. Determines CLK output. Has internal pull-up.   |
| GND    | 14,15,16 | P    | Ground.   |

## Low Phase Noise PLL Clock Multiplier

### ELECTRICAL SPECIFICATIONS

#### 1. Absolute Maximum Ratings

| PARAMETERS                    | SYMBOL          | MIN. | MAX.                 | UNITS |
|-------------------------------|-----------------|------|----------------------|-------|
| Supply Voltage Range          | V <sub>CC</sub> | -0.5 | 7                    | V     |
| Input Voltage Range           | V <sub>I</sub>  | -0.5 | V <sub>CC</sub> +0.5 | V     |
| Output Voltage Range          | V <sub>O</sub>  | -0.5 | V <sub>CC</sub> +0.5 | V     |
| Soldering Temperature         |                 |      | 260                  | °C    |
| Storage Temperature           | T <sub>S</sub>  | -65  | 150                  | °C    |
| Ambient Operating Temperature |                 | 0    | 70                   | °C    |

Exposure of the device under conditions beyond the limits specified by Maximum Ratings for extended periods may cause permanent damage to the device and affect product reliability. These conditions represent a stress rating only, and functional operations of the device at these or any other conditions above the operational limits noted in this specification is not implied.

#### 2. AC Specification

| PARAMETERS                                   | CONDITIONS                                     | MIN. | TYP. | MAX. | UNITS  |
|--|--|------|------|------|--------|
| Input Frequency                              | Depends on selected multiplier                 | 10   |      | 30   | MHz    |
| Output Frequency                             | At 3.3V  |      |      | 160  | MHz    |
| Output Rise Time                             | 0.8V to 2.0V with no load                      |      |      | 1.5  | ns     |
| Output Fall Time                             | 2.0V to 0.8V with no load                      |      |      | 1.5  | ns     |
| Duty Cycle                                   | At VDD/2                                       | 45   | 50   | 55   | %      |
| Period jitter RMS                            | With capacitive decoupling between VDD and GND |      | 6.4  |      | ps     |
| Accumulated jitter RMS                       | With capacitive decoupling between VDD and GND |      | 9.4  |      | ps     |
| Phase Noise, relative to carrier, 155Mhz(x8) | 100Hz offset, 3.3V                             |      | -103 |      | dBc/Hz |
| Phase Noise, relative to carrier, 155Mhz(x8) | 1kHz offset, 3.3V                              |      | -126 |      | dBc/Hz |
| Phase Noise, relative to carrier, 155Mhz(x8) | 10kHz offset, 3.3V                             |      | -133 |      | dBc/Hz |
| Phase Noise, relative to carrier, 155Mhz(x8) | 100kHz offset, 3.3V                            |      | -128 |      | dBc/Hz |

**Low Phase Noise PLL Clock Multiplier**
**3. DC Specification**

| PARAMETERS                        | SYMBOL          | CONDITIONS              | MIN.        | TYP.  | MAX.        | UNITS |
|-----------------------------------|-----------------|-------------------------|-------------|-------|-------------|-------|
| Operating Voltage                 | VDD             |                         | 3.135       |       | 3.465       | V     |
| Input High Voltage                | V <sub>IH</sub> |                         | 2           |       |             | V     |
| Input Low Voltage                 | V <sub>IL</sub> |                         |             |       | 0.8         | V     |
| Input High Voltage                | V <sub>IH</sub> | For XIN pin             | (VDD/2) + 1 | VDD/2 |             | V     |
| Input Low Voltage                 | V <sub>IL</sub> | For XIN pin             |             | VDD/2 | (VDD/2) – 1 | V     |
| Output High Voltage               | V <sub>OH</sub> | I <sub>OH</sub> = -25mA | 2.4         |       |             | V     |
| Output Low Voltage                | V <sub>OL</sub> | I <sub>OL</sub> = 25mA  |             |       | 0.4         | V     |
| Output High Voltage At CMOS Level | V <sub>OH</sub> | I <sub>OH</sub> = -8mA  | VDD-0.4     |       |             | V     |
| Operating Supply Current          | I <sub>DD</sub> | No Load                 |             | 35    |             | mA    |
| Short-circuit Current             | I <sub>S</sub>  |                         |             | ±120  |             | mA    |
| Input Capacitance                 | C <sub>IN</sub> | OE, Select Pins         |             | 5     |             | pF    |

**4. Crystal Specifications**

| PARAMETERS                         | SYMBOL                | CONDITIONS                | MIN. | TYP. | MAX. | UNITS |
|------------------------------------|-----------------------|---------------------------|------|------|------|-------|
| Crystal Resonator Frequency        | F <sub>XIN</sub>      | Parallel Fundamental Mode | 10   |      | 30   | MHz   |
| Crystal Loading Capacitance Rating | C <sub>L (xtal)</sub> |                           |      | 15   |      | pF    |

**Low Phase Noise PLL Clock Multiplier**

**PACKAGE INFORMATION**

16 PIN Narrow SOIC, TSSOP ( mm )

| Symbol | SOIC     |       | TSSOP    |      |
|--------|----------|-------|----------|------|
|        | Min.     | Max.  | Min.     | Max. |
| A      | 1.35     | 1.75  | -        | 1.20 |
| A1     | 0.10     | 0.25  | 0.05     | 0.15 |
| B      | 0.33     | 0.51  | 0.19     | 0.30 |
| C      | 0.19     | 0.25  | 0.09     | 0.20 |
| D      | 9.80     | 10.00 | 4.90     | 5.10 |
| E      | 3.80     | 4.00  | 4.30     | 4.50 |
| H      | 5.80     | 6.20  | 6.40 BSC |      |
| L      | 0.40     | 1.27  | 0.45     | 0.75 |
| e      | 1.27 BSC |       | 0.65 BSC |      |

**ORDERING INFORMATION**

**For part ordering, please contact our Sales Department:**  
 47745 Fremont Blvd., Fremont, CA 94538, USA  
 Tel: (510) 492-0990 Fax: (510) 492-0991

**PART NUMBER**  
 The order number for this device is a combination of the following:  
 Device number, Package type and Operating temperature range

**PLL601-03 X C**

PART NUMBER \_\_\_\_\_

- TEMPERATURE  
 C=COMMERCIAL  
 M=MILITARY  
 I=INDUSTRIAL
- PACKAGE TYPE  
 S=SOIC, O=TSSOP

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