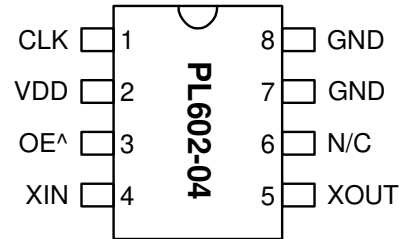


Low Phase Noise CMOS XO (96MHz to 200MHz)

FEATURES

- Low phase noise XO output for the 96MHz to 200MHz range (-125 dBc at 10kHz offset).
- 12 to 25MHz crystal input.
- Integrated crystal load capacitor: no external load capacitor required.
- Selectable High Drive (30mA) or Standard Drive (10mA) output.
- 3.3V operation.
- Available in 8-Pin TSSOP or SOIC.

PIN CONFIGURATION



Note: ^ denotes internal pull up

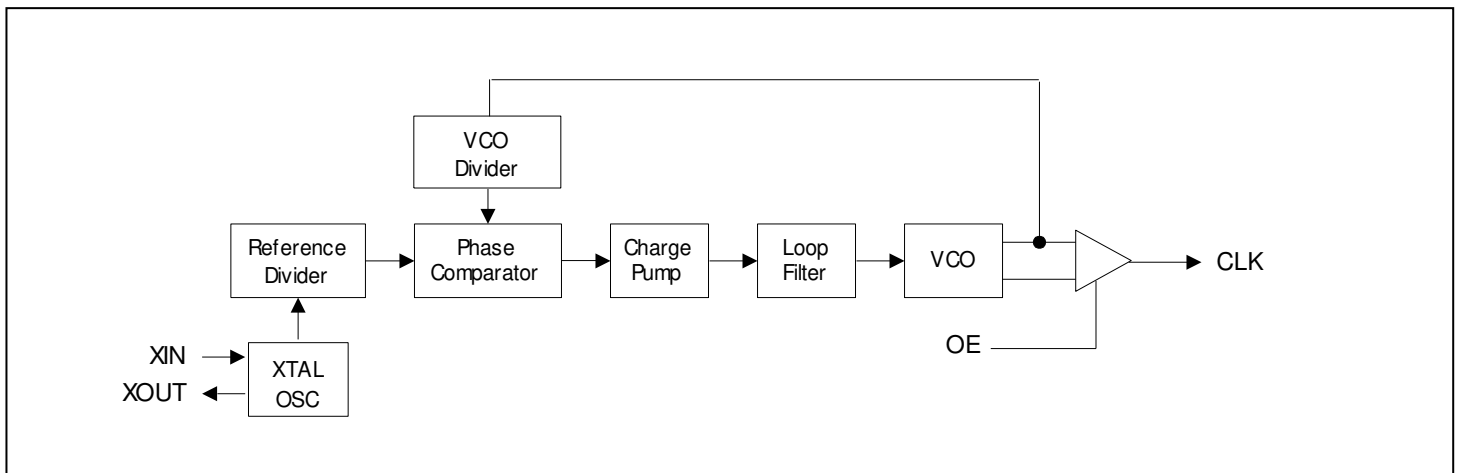
DESCRIPTION

The PL602-04 is a low cost, high performance and low phase noise XO, providing less than -125dBc at 10kHz offset in the 96MHz to 200MHz operating range. The very low jitter makes this chip ideal for applications requiring clean reference frequency sources. Input crystal can range from 12 to 25MHz (fundamental resonant mode).

OUTPUT RANGE

| MULTIPLIER | FREQUENCY RANGE | OUTPUT BUFFER |
|------------|-----------------|---------------|
| X8 | 96 - 200MHz | CMOS |

BLOCK DIAGRAM



Low Phase Noise CMOS XO (96MHz to 200MHz)
PIN DESCRIPTIONS

| Name | Number | Type | Description |
|------|--------|------|---|
| CLK | 1 | O | Output clock. |
| VDD | 2 | P | power supply. |
| OE | 3 | I | Output enable input. Disables (tri-state) output when low. Internal pull-up enables output by default if pin is not connected to low. |
| XIN | 4 | I | Crystal input. See Crystal Specification on page 3. |
| XOUT | 5 | I | Crystal output. See Crystal Specification on page 3. |
| N/C | 6 | - | Not connected. |
| GND | 7, 8 | P | Ground. |

ELECTRICAL SPECIFICATIONS
1. Absolute Maximum Ratings

| PARAMETERS | SYMBOL | MIN. | MAX. | UNITS |
|-----------------------------------|----------|------|--------------|-------|
| Supply Voltage | V_{DD} | | 4.6 | V |
| Input Voltage, dc | V_I | -0.5 | $V_{DD}+0.5$ | V |
| Output Voltage, dc | V_O | -0.5 | $V_{DD}+0.5$ | V |
| Storage Temperature | T_S | -65 | 150 | °C |
| Ambient Operating Temperature* | T_A | -40 | 85 | °C |
| Lead Temperature (soldering, 10s) | | | 260 | °C |
| ESD Protection, Human Body Model | | | 2 | kV |

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.

* Note: Operating Temperature is guaranteed by design for all parts (COMMERCIAL and INDUSTRIAL), but tested for COMMERCIAL grade only.

2. DC Specifications

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|--|----------|--|------|------|------|-------|
| Supply Current, Dynamic, with Loaded Outputs | I_{DD} | $F_{XIN} = 12 - 25\text{MHz}$ Output load of 10pF | | | 35 | mA |
| Operating Voltage | V_{DD} | | 2.97 | | 3.63 | V |
| Output drive current (High Drive) | I_{OH} | $V_{OH} = V_{DD}-0.4\text{V}$, $V_{DD}=3.3\text{V}$ | 30 | | | mA |
| | I_{OL} | $V_{OL} = 0.4\text{V}$, $V_{DD} = 3.3\text{V}$ | 30 | | | mA |
| Output drive current (Standard Drive) | I_{OH} | $V_{OH} = V_{DD}-0.4\text{V}$, $V_{DD}=3.3\text{V}$ | 10 | | | mA |
| | I_{OL} | $V_{OL} = 0.4\text{V}$, $V_{DD} = 3.3\text{V}$ | 10 | | | mA |

Low Phase Noise CMOS XO (96MHz to 200MHz)
3. AC Specifications

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|--|--------|--------------------------------|------|------|------|-------|
| Input Crystal Frequency | | | 12 | | 25 | MHz |
| Output Clock Rise/Fall Time (Standard Drive) | | 0.3V ~ 3.0V with 15 pF load | | 2.4 | | ns |
| Output Clock Rise/Fall Time (High Drive) | | | | 1.2 | | |
| Output Clock Duty Cycle | | Measured @ 50% V _{DD} | 45 | 50 | 55 | % |

4. Jitter and Phase Noise Specification

| PARAMETERS | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|--|---|------|------|------|--------|
| RMS Period Jitter (1 sigma – 1000 samples) | at 80MHz, with capacitive decoupling between VDD and GND. | | 20 | | ps |
| Phase Noise relative to carrier | 155.52MHz @100Hz offset | | -100 | | dBc/Hz |
| Phase Noise relative to carrier | 155.52MHz @1kHz offset | | -115 | | dBc/Hz |
| Phase Noise relative to carrier | 155.52MHz @10kHz offset | | -125 | | dBc/Hz |
| Phase Noise relative to carrier | 155.52MHz @100kHz offset | | -116 | | dBc/Hz |
| Phase Noise relative to carrier | 155.52MHz @1MHz offset | | -114 | | dBc/Hz |
| Phase Noise relative to carrier | 155.52MHz @10MHz offset | | -132 | | dBc/Hz |

5. Crystal Specifications

| PARAMETERS | SYMBOL | MIN. | TYP. | MAX. | UNITS |
|------------------------------------|-----------------------|------|------|------|-------|
| Crystal Resonator Frequency | F _{XIN} | 12 | | 25 | MHz |
| Crystal Loading Capacitance Rating | C _{L (xtal)} | | 20 | | pF |
| Driving power | | | 1 | | mW |
| ESR | R _s | | | 30 | Ω |

PACKAGE INFORMATION

8 PIN (dimensions in mm)

| Symbol | Narrow SOIC | | TSSOP | |
|--------|-------------|------|----------|------|
| | Min. | Max | Min. | Max |
| A | 1.34 | 1.74 | - | 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 | 4.80 | 4.95 | 2.90 | 3.10 |
| E | 3.80 | 4.00 | 4.30 | 4.50 |
| H | 5.80 | 6.20 | 6.20 | 6.60 |
| L | 0.38 | 1.27 | 0.45 | 0.75 |
| e | 1.27 BSC | | 0.65 BSC | |

Low Phase Noise CMOS XO (96MHz to 200MHz)

ORDERING INFORMATION

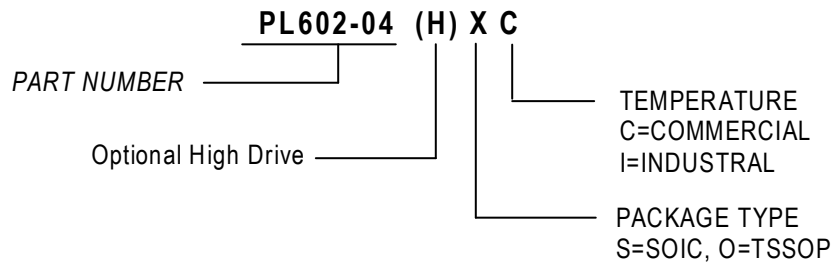
For part ordering, please contact our Sales Department:

2180 Fortune Drive, San Jose, CA 95131, USA

Tel: (408) 944-0800 Fax: (408) 474-1000

PART NUMBER

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



| Part/Order Number (Commercial) | Marking* | Package Option |
|-----------------------------------|----------------|---------------------------|
| PL602-04OC | P602-04 OC | 8-Pin SOP Tube |
| PL602-04OC-R | LLLLL | 8-Pin SOP (Tape and Reel) |
| PL602-04HOC | P602-04 HOC | 8-Pin SOP Tube |
| PL602-04HOC-R | LLLLL | 8-Pin SOP (Tape and Reel) |
| PL602-04SC | P602-04 SC | 8-Pin SOP Tube |
| PL602-04SC-R | LLLLL | 8-Pin SOP (Tape and Reel) |
| PL602-04HSC | P602-04 HSC | 8-Pin SOP Tube |
| PL602-04HSC-R | LLLLL | 8-Pin SOP (Tape and Reel) |

*Note: LLLLL designates lot number

Micrel Inc., reserves the right to make changes in its products or specifications, or both at any time without notice. The information furnished by Micrel is believed to be accurate and reliable. However, Micrel makes no guarantee or warranty concerning the accuracy of said information and shall not be responsible for any loss or damage of whatever nature resulting from the use of, or reliance upon this product.

LIFE SUPPORT POLICY: Micrel's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President of Micrel Inc.