



# PLETRONICS PRONTO™ QL44L SERIES 3.3V LVDS Clock Oscillator



QL44L  
3.2 x 2.5 x 0.9 mm  
LCC Ceramic Package

## Features

- Quartz crystal controlled Precision Square Wave Oscillator
- LVDS Output
- Enable/Disable Function on pad 1
- Low Jitter
- 3.3V nominal Supply Voltage
- 10MHz-1500MHz nominal frequency

## Applications

Driving A/Ds, D/As, FPGAs  
Fibre Channel  
Ethernet, GbE, SynchE  
Medical  
Storage Area Networking  
COTS  
Telecom  
PON

## Electrical Characteristics

| Parameter  | Min   | Typ                                | Max                 | Unit   | Condition  |
|--|---|------------------------------------|---------------------|--------|--|
| Frequency Range <sup>2</sup>   | 10  | -                                  | 1500                | MHz    |  |
| Frequency Stability <sup>2</sup><br>± 20 = <b>20</b> , ± 25 = <b>44</b> , ± 50 = <b>45</b> | ±20   | -                                  | ±50                 | ppm    | Includes supply voltage change, load change, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures                     |
| Operating Temperature Range <sup>2</sup>   | -10<br>-20<br>-40                           | -                                  | +70<br>+70<br>+85   | °C     | Standard range<br>Extended range <b>C</b> option<br>Extended range <b>E</b> option   |
| Supply Voltage <sup>1,2</sup> V <sub>CC</sub>  | 2.97  | 3.3                                | 3.63                | V      |  |
| Supply Current I <sub>CC</sub>   | -   | -                                  | 45                  | mA     |  |
| Output Waveform  | LVDS  |                                    |                     |        |  |
| Differential Output Voltage V <sub>OD</sub>  | 175   | 350                                |                     | mV     |  |
| Differential Offset Voltage  |   | 1.25                               |                     | V      |  |
| Output T <sub>RISE</sub> and T <sub>FALL</sub>   | -   | -                                  | 1.0                 | ns     | V <sub>th</sub> is 10% and 90% of output V <sub>pp</sub>   |
| Startup Time   | -   | -                                  | 10                  | ms     | Time for output to reach specified frequency   |
| Duty Cycle   | 45  | -                                  | 55                  | %      | Referenced to 50% of output V <sub>pp</sub> or crossing point  |
| V <sub>DISABLE</sub>   | -   | -                                  | 0.3*V <sub>CC</sub> | V      | Referenced to Ground   |
| V <sub>ENABLE</sub>  | 0.7*V <sub>CC</sub>                         | -                                  | -                   |        |  |
| Enable Time  | -   | -                                  | 200                 | ns     | < 50MHz  |
|  | -   | -                                  | 100                 | ns     | ≥ 50MHz  |
| Disable Time   | -   | -                                  | 50                  | ns     | Time for output to reach a high Z state  |
| Standby Current  | -   | 18                                 | -                   | mA     | Pad 1 low, device disabled   |
| Phase Noise  | 10 Hz<br>100 Hz<br>1 kHz<br>1 MHz<br>20 MHz | -66<br>-96<br>-112<br>-136<br>-154 | -                   | dBc/Hz | Precision Developed Frequencies: 100, 106.25, 120, 156.25, 162.5, 175, 187.5, 200, 212.5, 312.5MHz<br><br>25°C ± 2°C / 156.250 MHz |
| Jitter   | -   | 0.6                                | -                   |        |  |
| Phase Noise  | 10 Hz<br>100 Hz<br>1 kHz<br>1 MHz<br>20 MHz | -51<br>-88<br>-108<br>-135<br>-151 | -                   | dBc/Hz | All Other Frequencies<br><br>25°C ± 2°C / 150.0 MHz  |
| Jitter   | -   | 2.4                                | -                   |        |  |
| Aging  | -   | -                                  | ±3.0                | ppm    | per year   |
| Storage Temperature Range  | -55   | -                                  | +125                | °C     |  |

Notes: Specifications with Pad 1 E/D open circuit

<sup>1</sup> Place an appropriate power supply bypass capacitor next to device for correct operation

<sup>2</sup> Specified by part number



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## Part Number

| Series Model | Frequency Stability                                   |   | Operating Temperature Range  | Supply Voltage V <sub>CC</sub> | Frequency in MHz |
|--------------|---|---|--|--------------------------------|------------------|
| QL44         | 45  | L | E  | V                              | - 125.0M         |
|              | 45 = ± 50 ppm (STD)<br>44 = ± 25 ppm<br>20 = ± 20 ppm |   | Blank = -10 to +70°C (STD)<br>C = -20 to +70°C<br>E = -40 to +85°C | V = 3.3V ± 10%                 | 10-1500MHz       |

## Device Marking

**PRONTO**  
• **YMDxxx**

PRONTO = Pletronics Model  
YMD = Date Code, Year Month Day (see below)  
xxx = internal factory codes

Note: Specifications such as frequency stability, supply voltage and operating temperature range, etc. are not identified from marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Codes for Date Code YMD (Year Month Day)

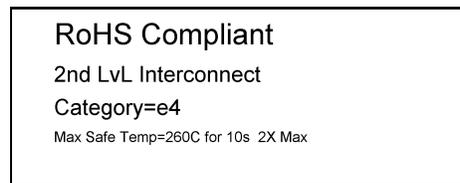
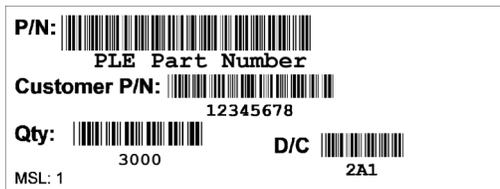
| Code | 2    | 3    | 4    | 5    | 6    | Code  | A   | B   | C   | D   | E   | F   | G   | H   | J   | K   | L   | M   |
|------|------|------|------|------|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Year | 2022 | 2023 | 2024 | 2025 | 2026 | Month | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |

| Code | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | A  | B  | C  | D  | E  | F  | G  |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Day  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Code | H  | J  | K  | L  | M  | N  | P  | R  | T  | U  | V  | W  | X  | Y  | Z  |    |
| Day  | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |    |

## Package Labeling

P/N Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Courier New  
Bar code is 39-Full ASCII

RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Arial



Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

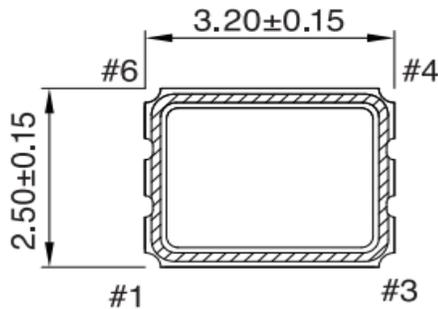
Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.028 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4



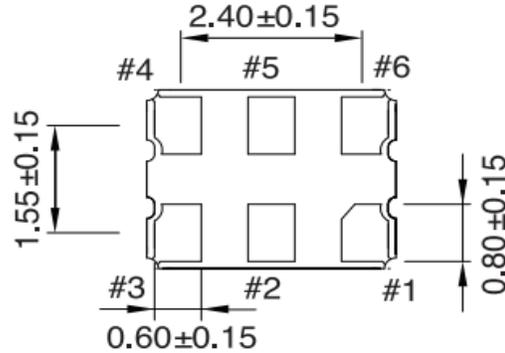
# PLETRONICS *PRONTO*™ QL44L SERIES 3.3V LVDS Clock Oscillator

## Mechanical Dimensions (mm)

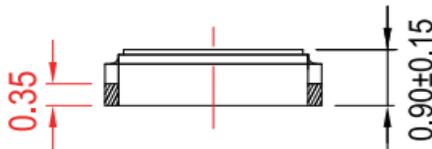
[ TOP VIEW ]



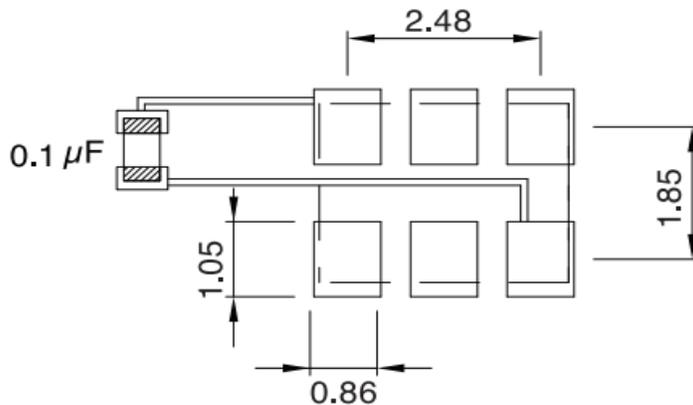
[ BOTTOM VIEW ]



[ SIDE VIEW ]



| Pin# | Function       |
|------|----------------|
| 1    | Tri-State      |
| 2    | NC             |
| 3    | GND            |
| 4    | Output         |
| 5    | Comp. Output   |
| 6    | Supply Voltage |



| Enable/Disable |           |
|----------------|-----------|
| Pin 1          | Output    |
| Open           | Active    |
| Logic '1'      | Active    |
| Ground         | Tri-state |

Pad Layout mm shown

Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

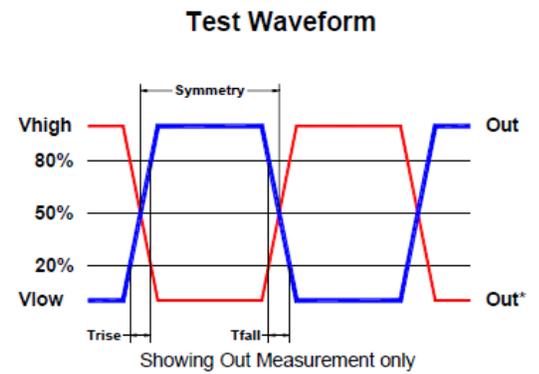
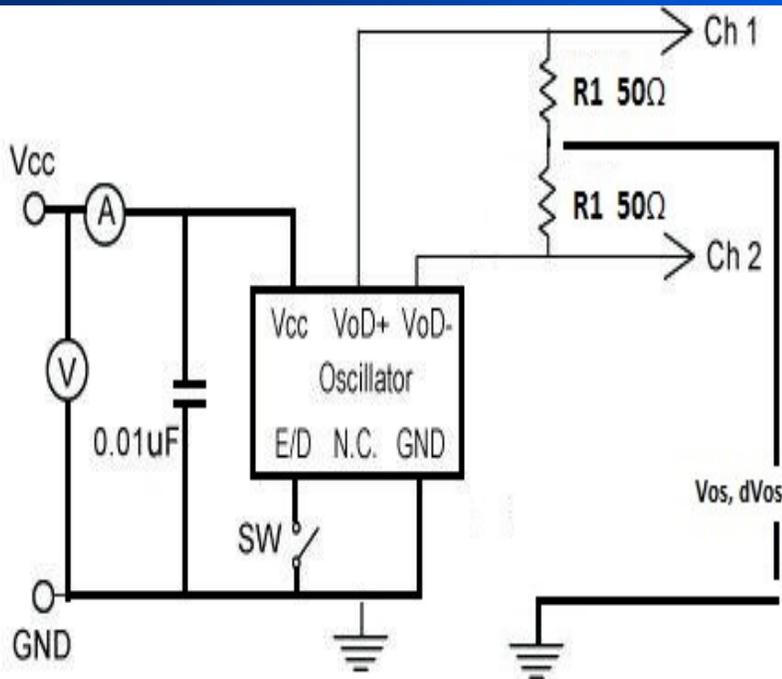
To ensure optimal oscillator performance, place a by-pass capacitor of 0.1 µF as close to the part as possible between Vdd and GND pads.

Contacts (pads): Gold (0.3 to 1.0 µm) over Nickel (1.27 to 8.89 µm)

For Optimum Jitter Performance, Pletronics recommends:

- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans

## Electrical Test /Load Circuit



## Environmental / ESD Ratings

Reliability: Environmental

ESD Ratings

| Parameter        | Condition                             |
|------------------|---------------------------------------|
| Mechanical Shock | MIL-STD-883, Method 2002, Condition B |
| Vibration        | MIL-STD-883, Method 2007, Condition A |
| Solderability    | IPC J-STD-002                         |
| Thermal Cycle    | MIL-STD-883 Method 1010, Condition B  |

| Model                | Min. Voltage | Condition   |
|----------------------|--------------|-------------|
| Human Body Model     | 2000V        | JESD22-A114 |
| Charged Device Model | 1000V        | JESD22-C101 |
| Machine Model        | 120V         | JESD22-A115 |

### Thermal Characteristics:

The maximum die or junction temperature is 125°C

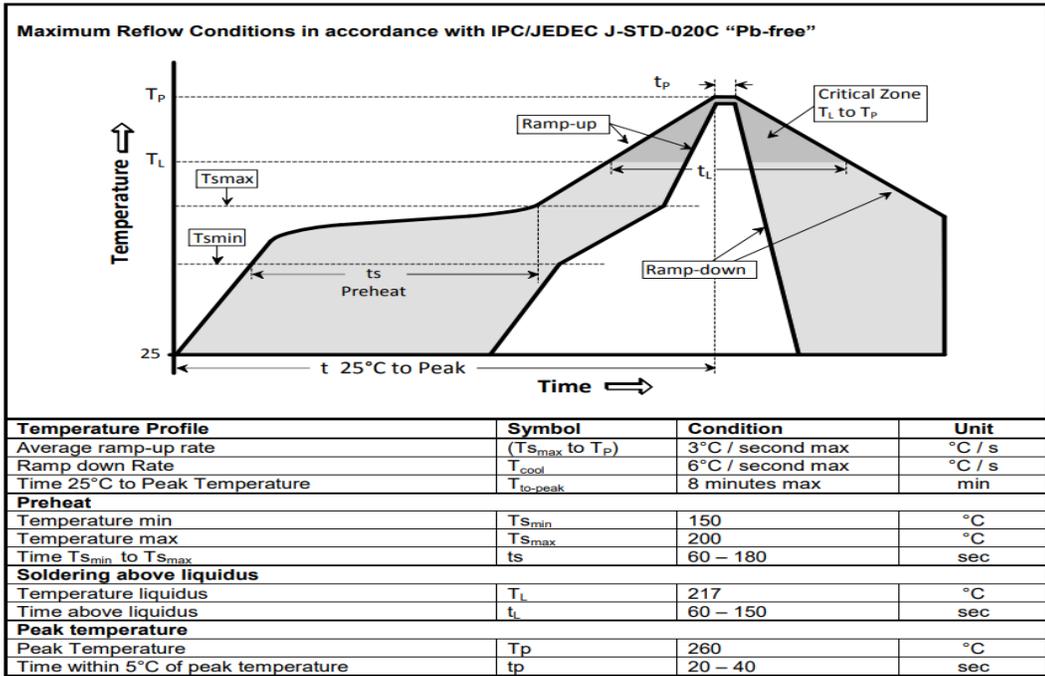
### Absolute Maximum Ratings

| Parameter                      | Unit                            |
|--------------------------------|---------------------------------|
| V <sub>CC</sub> Supply Voltage | -0.5V to +4.2V                  |
| V <sub>i</sub> Input Voltage   | -0.5V to V <sub>CC</sub> + 0.5V |
| V <sub>o</sub> Output Voltage  | -0.5V to V <sub>CC</sub> + 0.5V |



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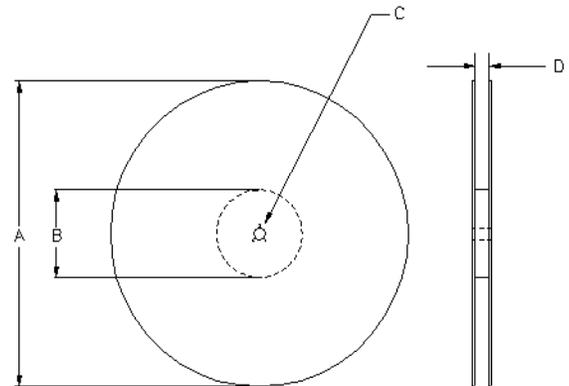
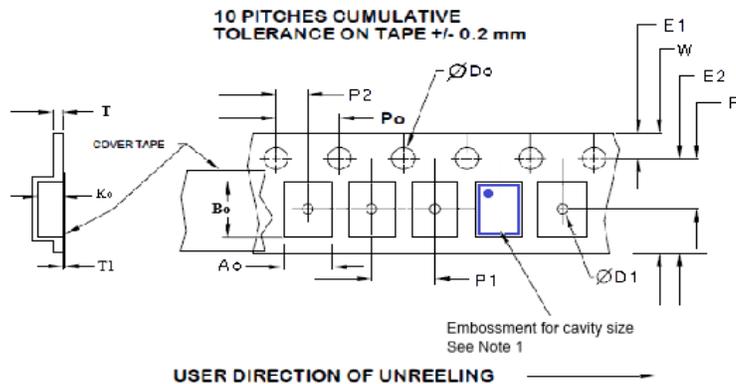
## Reflow Cycle



The part may be reflowed 2 times without degradation (typical for lead free processing).

## Tape and Reel

Tape and Reel available for quantities of 250 to 3000 per reel, cut tape for < 250. 8mm tape, 4mm pitch.



| Tape Size | E2 typ | F         | P1       | W max | Ao      | Bo      | Ko      |
|-----------|--------|-----------|----------|-------|---------|---------|---------|
| 8mm       | 6.25   | 3.5 ±0.05 | 4.0 ±0.1 | 8.2   | 2.7±0.1 | 3.4±0.1 | 1.4±0.1 |

Dimensions in mm Drawing Not to scale  
 Note 1: Embossed cavity to conform to EIA- 481-B

| Tape Size | Do                  | D1 typ | E1        | Po       | P2        | T max | T1 max |
|-----------|---------------------|--------|-----------|----------|-----------|-------|--------|
| 8mm       | 1.5<br>+0.1<br>-0.0 | 1.0    | 1.75 ±0.1 | 4.0 ±0.1 | 2.0 ±0.05 | 0.3   | 0.1    |

| Reel Size | A      |       | B      |       | C                    | D                                 |
|-----------|--------|-------|--------|-------|----------------------|-----------------------------------|
|           | Inches | mm    | Inches | mm    |                      |                                   |
| 7         | 7.0    | 177.8 | 2.50   | 63.5  | 13.0<br>+0.5<br>-0.2 | Tape size<br>+0.4<br>+2.0<br>-0.0 |
| 10        | 10.0   | 254.0 | 4.00   | 101.6 |                      |                                   |
| 13        | 13.0   | 330.2 | 3.75   | 95.3  |                      |                                   |



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