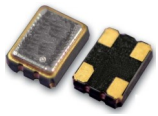
# PLETRONICS PRONTO™ QM44L Series
## CMOS Programmable Clock Oscillator



QM44L
2.5 x 3.2 x 0.95 mm
LCC Ceramic Package

### Features

- Pletronics' QM44L Series is a programmable quartz crystal controlled precision square wave oscillator
- CMOS Output (will interface with TTL devices)
- Enable/Disable Function includes low standby power
- Low Jitter
- 1.8V, 2.5V, or 3.3V nominal Supply Voltage
- 1-200 MHz Frequency Range (1-125MHz at 1.8V)
- Fundamental crystals

### Applications

Driving A/Ds, D/As, FPGAs
Digital Video
Ethernet, GbE
Medical
Storage Area Networking
COTS
Broad Band Access
SONET/ SDH/ DWDM
Test & Measurement

### Electrical Characteristics

| Parameter | Min | Typ | Max | Unit | Condition |
|---|---|---|---|---|---|
| Frequency Range [2] | 1 | - | 200 | MHz | Consult factory for other options (1.8V frequency range 1-125MHz) |
| Frequency Stability vs. Temperature [2]<br>± 20 = **20**, ± 25 = **44**, ± 50 = **45** | ±20 | - | ±50 | ppm | For all supply voltages, load changes, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures |
| Operating Temperature Range [2] | -10<br>-20<br>-40 | -<br>-<br>- | +70<br>+70<br>+85 | °C | Standard range<br>Extended range **C** option<br>Extended range **E** option |
| Supply Voltage [1, 2] $V_{CC}$ | 1.8 | - | 3.3 | Volts | ± 5%, See Part Number options on page 3 |
| Supply Current $I_{CC}$ | - | - | - | mA | See Page 2 |
| Output Waveform | CMOS | | | | |
| Duty Cycle | 45 | - | 55 | % | See Load Circuit |
| Output $V_{HIGH}$ | 90 | - | - | %$V_{CC}$ | |
| Output $V_{LOW}$ | - | - | 10 | %$V_{CC}$ | |
| Output $T_{RISE}$ and $T_{FALL}$ | - | - | 2 | ns | |
| Startup Time | - | - | 5 | ms | Time for output to reach specified frequency |
| $V_{DISABLE}$ | - | - | 30 | % | Of $V_{CC}$ applied to Pad 1 |
| $V_{ENABLE}$ | 70 | - | | | |
| Enable Time | - | - | 100 | ns | Time for output to reach a logic state |
| Disable Time | - | - | 100 | ns | Time for output to reach a high Z state |
| Aging | - | - | ±3 | ppm | First year |
| Disable Current | - | - | - | mA | Pad 1 low, device disabled; See Page 2 |
| Jitter | - | 1.0 | - | ps | 12 kHz to 20 MHz @ 110 MHz |
| Storage Temperature Range | -55 | - | +125 | °C | |

Notes: Specifications with Pad 1 E/D open circuit
[1] Place an appropriate power supply bypass capacitor next to device for correct operation
[2] Specified by part number


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| Parameter | Min | Typ | Max | Unit | Condition Vcc = 3.3V | |
|---|---|---|---|---|---|---|
| Supply Current $I_{CC}$ | | | 22<br>22<br>25<br>30<br>35 | mA | 1MHz ≤ Fo <30MHz<br>30MHz ≤ Fo < 75MHz<br>75MHz ≤ Fo < 125MHz<br>125MHz ≤ Fo < 170MHz<br>170MHz ≤ Fo ≤ 200MHz | 15pF load |

| Parameter | Min | Typ | Max | Unit | Condition Vcc = 2.5V | |
|---|---|---|---|---|---|---|
| Supply Current $I_{CC}$ | | | 22<br>22<br>25<br>30<br>30 | mA | 1MHz ≤ Fo <30MHz<br>30MHz ≤ Fo < 75MHz<br>75MHz ≤ Fo < 125MHz<br>125MHz ≤ Fo < 170MHz<br>170MHz ≤ Fo ≤ 200MHz | 15pF load |

| Parameter | Min | Typ | Max | Unit | Condition Vcc = 1.8V | |
|---|---|---|---|---|---|---|
| Supply Current $I_{CC}$ | | | 20<br>20<br>20 | mA | 1MHz ≤ Fo <30MHz<br>30MHz ≤ Fo < 75MHz<br>75MHz ≤ Fo ≤ 125MHz | 15pF load |


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## Part Number

| Series Model | Frequency Stability | | Operating Temperature Range | Supply Voltage $V_{CC}$ | Frequency in MHz |
|---|---|---|---|---|---|
| QM44 | 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 | X = 1.8V ±5%<br>W = 2.5V ±5%<br>V = 3.3V ±5% | 1 - 200 MHz<br>(1.8V: 1-125MHz) |

## 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 | 9 | 0 | 1 | 2 | 3 | Code | A | B | C | D | E | F | G | H | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2019 | 2020 | 2021 | 2022 | 2023 | 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 | |

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.

## 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



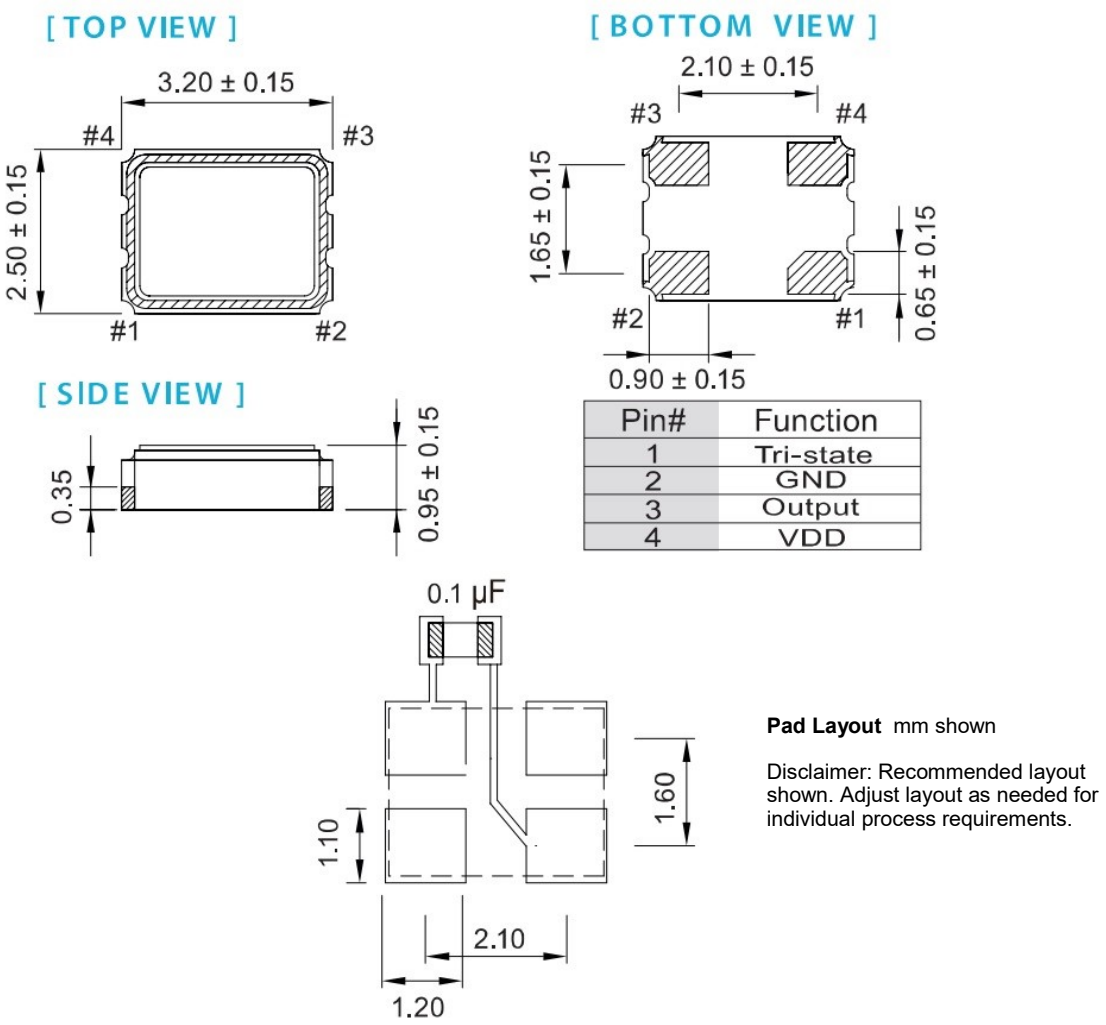

RoHS Compliant
2nd LvL Interconnect
Category=e4
Max Safe Temp=260C for 10s 2X Max

**Pletronics Inc. certifies this device is in accordance with the RoHS 3 (2015/863) and WEEE 2 (2012/19/EU) directives.**

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.041 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4


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## Mechanical Dimensions (mm)




| Pin# | Function |
|---|---|
| 1 | Tri-state |
| 2 | GND |
| 3 | Output |
| 4 | VDD |




**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 0.1µF as close to the part as possible between Vdd and GND pads.

**(Not to Scale)**

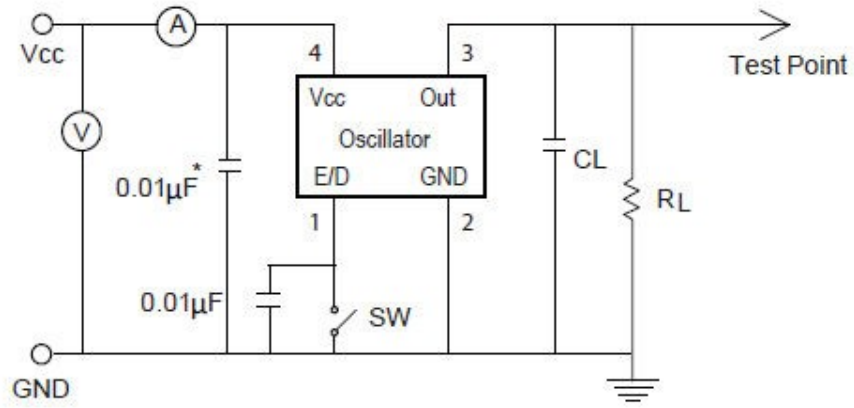
**Contacts (pads):** Gold 11.8 to 39.4 µinches (0.3 to 1.0 µm) over Nickel 50 to 350 µinches (1.27 to 8.89 µm)

For Optimum Jitter Performance, Pletronics recommends:

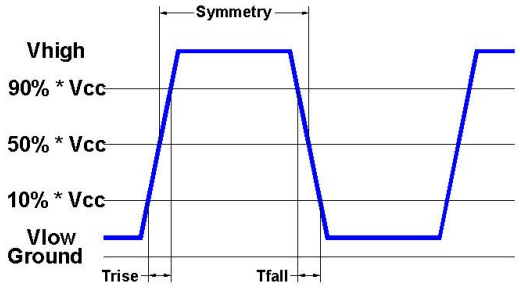
- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans


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## Electrical Test / Load Circuit




Notes:
RL: 5 Kohm minimum
CL: Includes the input capacitance of oscilloscope
* 0.01µF external by-pass filter is recommended




## Environmental / ESD Ratings

Reliability: Environmental Compliance

| Parameter | Condition |
|---|---|
| Mechanical Shock | JESD22-B104 |
| Vibration | JESD22-B103 |
| Solderability | IPC J-STD-002 |
| Thermal Shock | MIL-STD-883 Method 1011, Condition A |

ESD Rating

| Model | Min. Voltage | Condition |
|---|---|---|
| Human Body Model | 2000V | JESD22-A114 |
| Charged Device Model | 500V | JESD 22-C101 |
| Machine Model | 200V | JESD22-A115 |

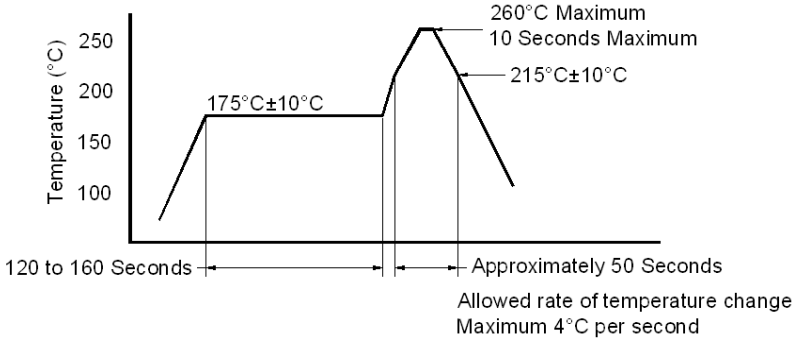
**Thermal Characteristics:**
The maximum die or junction temperature is 155°C
The thermal resistance junction to board is 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Absolute Maximum Ratings

| Parameter | Unit |
|---|---|
| $V_{CC}$ Supply Voltage | -0.5V to +7.0V |
| Vi Input Voltage | -0.5V to $V_{CC}$ + 0.5V |
| Vo Output Voltage | -0.5V to $V_{CC}$ + 0.5V |

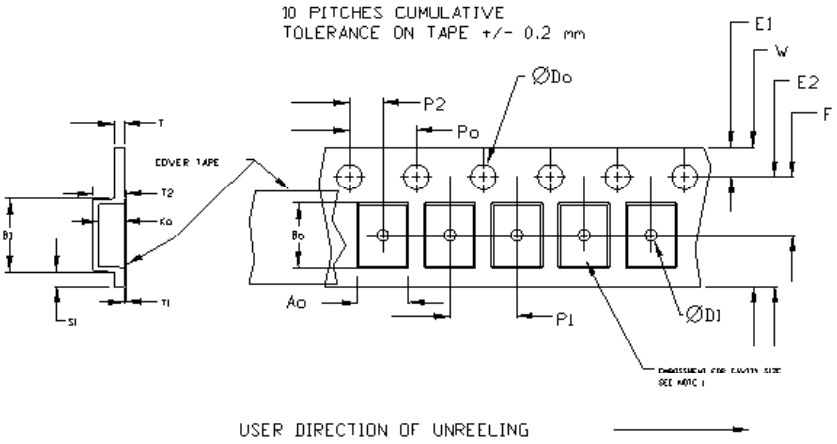

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## Reflow Cycle




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

## Tape and Reel

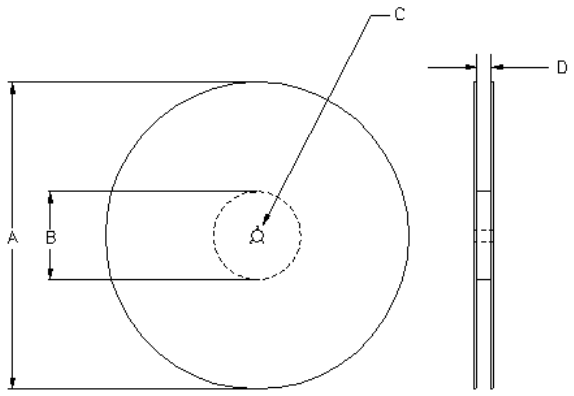



| Tape Constant Dimensions Table 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tape Size | Do | D1 min | E1 | Po | P2 | S1 min | T max | T1 max |
| 8mm | 1.5 +0.1 -0.0 | 1.0 | 1.75 ±0.1 | 4.0 ±0.1 | 2.0 ±0.05 | 0.6 | 0.6 | 0.1 |
| 12mm | | 1.5 | | | | | | |
| 16mm | | 1.5 | | | 2.0 ±0.1 | | | |
| 24mm | | 1.5 | | | | | | |

| Tape Variable Dimensions Table 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Tape Size | B1 max | E2 min | F | P1 | T2 max | W max | Ao, Bo & Ko |
| 8mm | 4.55 | 6.25 | 3.5 ±0.05 | 4.0 ±0.1 | 1.55 | 8.3 | Note 1 |

Dimensions in mm  Drawing Not to scale

Note 1: Embossed cavity to conform to EIA– 481-B




| Reel Dimensions (may vary) Table 3 | | | | | | |
|---|---|---|---|---|---|---|
| | A | | B | | C | D |
| Reel Size | Inches | mm | Inches | mm | mm | mm |
| 7 | 7.0 | 177.8 | 2.50 | 63.5 | 13.0 +0.5 -0.2 | Tape size +0.4 +2.0 -0.0 |
| 10 | 10.0 | 254.0 | 4.00 | 101.6 | | |
| 13 | 13.0 | 330.2 | 3.75 | 95.3 | | |


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