



# PLETRONICS *PRONTO*™ QM44L Series

## CMOS Configurable Clock Oscillator



QM44L  
3.2 x 2.5 x 0.95 mm  
LCC Ceramic Package

### Features

- A configurable quartz crystal controlled precision square wave oscillator
- CMOS Output (will interface with TTL devices)
- Enable/Disable Function (low standby power option)
- Low Jitter
- 1.8V, 2.5V, or 3.3V nominal Supply Voltage
- 1-160 MHz Frequency Range (1-125MHz at 1.8V)
- Fundamental crystal

### 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 <sup>2</sup>                   | 1                        | -                | 160                       | MHz  | (1.8V frequency range 1-125MHz)   |
| Frequency Stability <sup>2</sup>               | ±20*                     | -                | ±50                       | ppm  | For all supply voltages, load changes, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures. *Aging excluded |
| Operating Temperature Range <sup>2</sup>       | -10<br>-20<br>-40<br>-40 | -<br>-<br>-<br>- | +70<br>+70<br>+85<br>+105 | °C   | Standard range<br>Extended range <b>C</b> option<br>Extended range <b>E</b> option<br>Extended range <b>G</b> option      |
| Supply Voltage <sup>1,2</sup> V <sub>CC</sub>  | 1.8                      | -                | 3.3                       | V    | ± 5%, See Part Number options on page 3   |
| Supply Current I <sub>CC</sub>                 | -                        | -                | -                         | mA   | See Page 2  |
| Output Waveform                                | CMOS                     |                  |                           |      | Load = 15 pF  |
| Duty Cycle                                     | 45                       | -                | 55                        | %    | See Load Circuit and waveform page  |
| Output V <sub>HIGH</sub>                       | 0.9V <sub>CC</sub>       | -                | -                         | V    |   |
| Output V <sub>LOW</sub>                        | -                        | -                | 0.1V <sub>CC</sub>        | V    |   |
| Output T <sub>RISE</sub> and T <sub>FALL</sub> | -                        | -                | 2                         | ns   |   |
| Startup Time                                   | -                        | -                | 8                         | ms   | After V <sub>CC</sub> ≥ 1.62V, Time for output to reach specified frequency   |
| V <sub>DISABLE</sub> V <sub>IL</sub>           | -                        | -                | 0.3V <sub>CC</sub>        | V    |   |
| V <sub>ENABLE</sub> V <sub>IH</sub>            | 0.7V <sub>CC</sub>       | -                |                           |      |   |
| Output Enable Time                             | -                        | -                | 100                       | ns   | Time for valid output (E/D version)   |
| Output Disable Time                            | -                        | -                | 100                       | ns   | Time for output to reach a high Z state   |
| Disable Current                                | -<br>-                   | -<br>0.4         | -<br>-                    | mA   | Enable/Disable: Pad 1 low, output disabled; See page 2<br>Standby option: Pad 1 low, output disabled, oscillator shutdown |
| 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

<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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### Electrical Characteristics - Input Current

| Parameter                      | Min | Typ | Max            | Unit | Condition Vcc = 3.3V   |           |
|--------------------------------|-----|-----|----------------|------|--|-----------|
| Supply Current I <sub>cc</sub> |     |     | 27<br>30<br>35 | mA   | 1MHz ≤ Fo < 75MHz<br>75MHz ≤ Fo < 125MHz<br>125MHz ≤ Fo < 160MHz | 15pF load |

| Parameter                      | Min | Typ | Max            | Unit | Condition Vcc = 2.5V   |           |
|--------------------------------|-----|-----|----------------|------|--|-----------|
| Supply Current I <sub>cc</sub> |     |     | 27<br>30<br>35 | mA   | 1MHz ≤ Fo < 75MHz<br>75MHz ≤ Fo < 125MHz<br>125MHz ≤ Fo ≤ 160MHz | 15pF load |

| Parameter                      | Min | Typ | Max | Unit | Condition Vcc = 1.8V |           |
|--------------------------------|-----|-----|-----|------|----------------------|-----------|
| Supply Current I <sub>cc</sub> |     |     | 25  | mA   | 1MHz ≤ Fo ≤ 125MHz   | 15pF load |



# PLETRONICS *PRONTO*™ QM44L Series

## CMOS Configurable Clock Oscillator

### Part Number\*\*

| Series Model | Frequency Stability                                   |   | Operating Temperature Range   | Supply Voltage V <sub>CC</sub>                  | 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<br>G = -40 to +105°C | X = 1.8V ± 5%<br>W = 2.5V ± 5%<br>V = 3.3V ± 5% | 1 - 160 MHz<br>(1.8V: 1-125MHz) |

\*\* A custom part number is assigned for parts using the standby option

### Device Marking

|          |
|----------|
| PFF.FF   |
| • YMDxxx |

P = Pletronics  
FF.FF = Frequency, max 5 digits includes decimal. Integer freq, i.e., 50MHz, to significant decimal (50.0)  
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 | 3    | 4    | 5    | 6    | 7    | Code  | A   | B   | C   | D   | E   | F   | G   | H   | J   | K   | L   | M   |
|------|------|------|------|------|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Year | 2023 | 2024 | 2025 | 2026 | 2027 | 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

P/N:   
PLE Part Number  
Customer P/N:   
12345678  
Qty:  3000 D/C   
MSL: 1 2A1

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 and REACH directives.

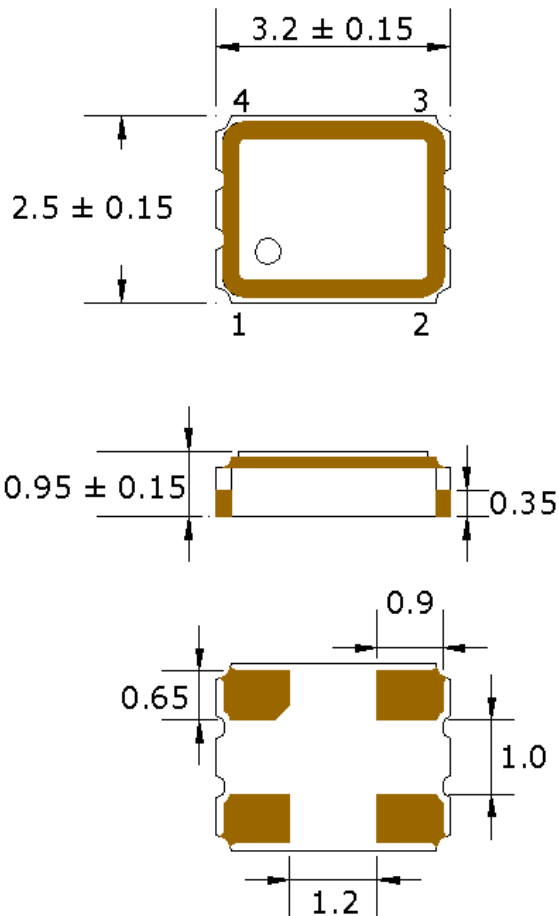
Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.026 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4



# PLETRONICS *PRONTO*™ QM44L Series

## CMOS Configurable Clock Oscillator

### Mechanical Dimensions

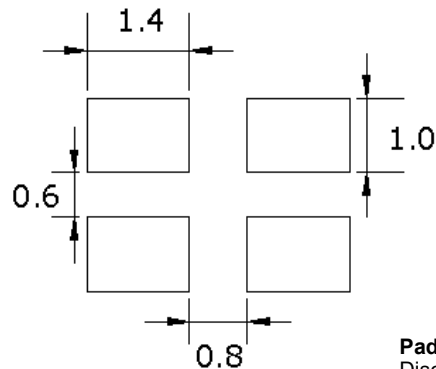


Dimensions in mm

### Pad Connections

| Pad | Function       |
|-----|----------------|
| 1   | Enable/Disable |
| 2   | Ground         |
| 3   | Output         |
| 4   | Vcc            |

| ENABLE/DISABLE        |                   |
|-----------------------|-------------------|
| Pad 1                 | Output            |
| V <sub>IH</sub> /Open | Active            |
| V <sub>IL</sub> /Gnd  | Disabled/Tristate |



### Pad Layout

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

Contacts (pads): Gold (0.3 to 1.0  $\mu\text{m}$ ) over Nickel (1.27 to 8.89  $\mu\text{m}$ )

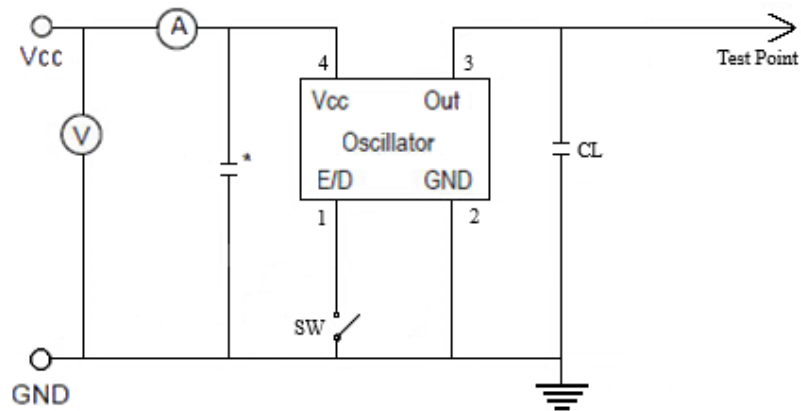
For Optimum Jitter Performance, Pletronics recommends:

- 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



# PLETRONICS *PRONTO*™ QM44L Series CMOS Configurable Clock Oscillator

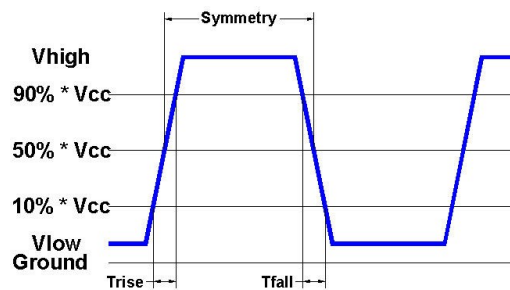
## Electrical Test / Load Circuit



Notes:

CL: 15pF Includes the input capacitance of oscilloscope

\* 0.01~0.1μF external by-pass filter is recommended



## Environmental / ESD Ratings

Reliability: Environmental

| 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  |

ESD Rating

| Model            | Min. Voltage | Condition          |
|------------------|--------------|--------------------|
| Human Body Model | 2000V        | MIL-STD-883 3015.7 |
| Machine Model    | 200V         | EIAJ ED-4701/304   |

Absolute Maximum Ratings

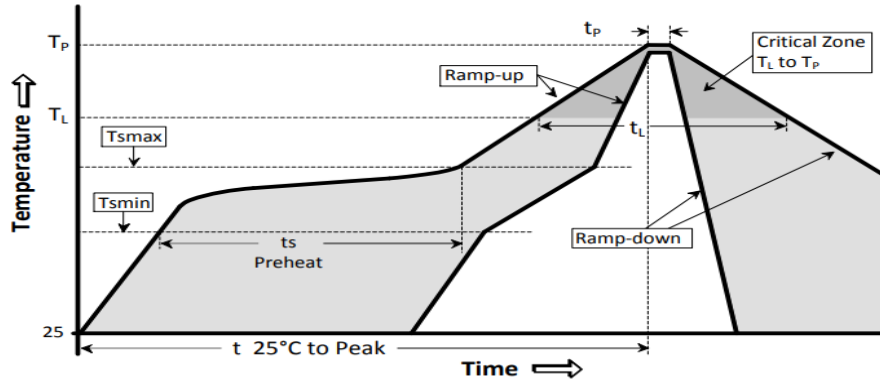
| Parameter                      | Unit                            |
|--------------------------------|---------------------------------|
| V <sub>CC</sub> Supply Voltage | -0.5V to +7.0V                  |
| V <sub>i</sub> Input Voltage   | -0.5V to V <sub>CC</sub> + 0.5V |
| V <sub>o</sub> Output Voltage  | -0.5V to V <sub>CC</sub> + 0.5V |

### Thermal Characteristics:

The maximum die or junction temperature is 125°C

### Reflow Cycle

Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"

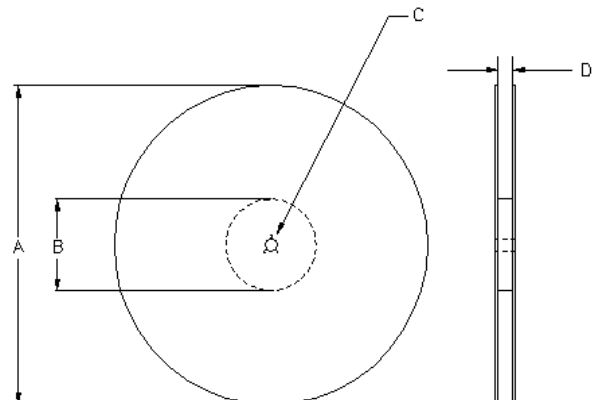
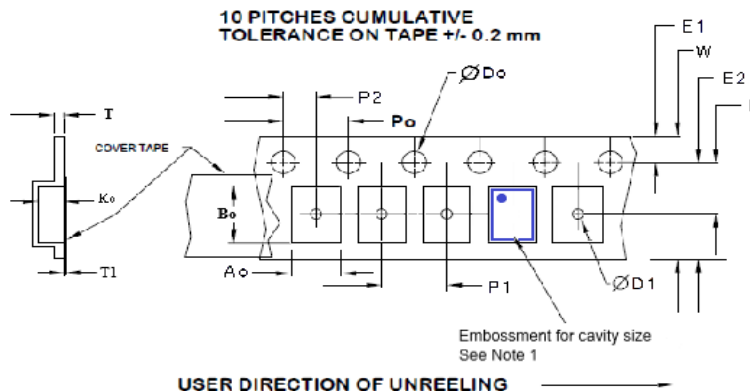


The part may be reflowed 2 times without degradation (typical for lead free processing).

| Temperature Profile                         | Symbol                                 | Condition        | Unit   |
|---|--|------------------|--------|
| Average ramp-up rate                        | (T <sub>smax</sub> to T <sub>P</sub> ) | 3°C / second max | °C / s |
| Ramp down Rate                              | T <sub>cool</sub>                      | 6°C / second max | °C / s |
| Time 25°C to Peak Temperature               | T <sub>to-peak</sub>                   | 8 minutes max    | min    |
| <b>Preheat</b>                              |  |                  |        |
| Temperature min                             | T <sub>smin</sub>                      | 150              | °C     |
| Temperature max                             | T <sub>smax</sub>                      | 200              | °C     |
| Time T <sub>smin</sub> to T <sub>smax</sub> | t <sub>s</sub>                         | 60 – 180         | sec    |
| <b>Soldering above liquidus</b>             |  |                  |        |
| Temperature liquidus                        | T <sub>L</sub>                         | 217              | °C     |
| Time above liquidus                         | t <sub>L</sub>                         | 60 – 150         | sec    |
| <b>Peak temperature</b>                     |  |                  |        |
| Peak Temperature                            | T <sub>P</sub>                         | 260              | °C     |
| Time within 5°C of peak temperature         | t <sub>P</sub>                         | 20 – 40          | sec    |

### Tape and Reel

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



Tape Variable Dimensions Table 2

| Tape Size | E2 typ | F         | P1       | W max | A <sub>o</sub> | B <sub>o</sub> | K <sub>o</sub> |
|-----------|--------|-----------|----------|-------|----------------|----------------|----------------|
| 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 Constant Dimensions Table 1

| Tape Size | Do            | D1 min | E1        | Po       | P2        | 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 | 0.3   | 0.1    |

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 |



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