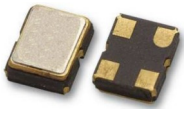
PLETRONICS PRONTO™ QM33L Series
CMOS Programmable Clock Oscillator



QM33L
2.0 x 2.5 x 0.81 mm
LCC Ceramic Package

Features

- Pletronics' QM33L 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] ± 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 -20 -40	- - -	+70 +70 +85	°C	Standard range Extended range **C** option 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
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 22 25 30 35	mA	1MHz ≤ Fo <30MHz 30MHz ≤ Fo < 75MHz 75MHz ≤ Fo < 125MHz 125MHz ≤ Fo < 170MHz 170MHz ≤ Fo ≤ 200MHz	15pF load

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

Parameter	Min	Typ	Max	Unit	Condition Vcc = 1.8V	
Supply Current I_{CC}			20 20 20	mA	1MHz ≤ Fo <30MHz 30MHz ≤ Fo < 75MHz 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
QM33	45	L	E	V	- 125.0M
	45 = ± 50 ppm (STD) 44 = ± 25 ppm 20 = ± 20 ppm		Blank = -10 to +70°C (STD) C = -20 to +70°C E = -40 to +85°C	X = 1.8V ±5% W = 2.5V ±5% V = 3.3V ±5%	1 - 200 MHz (1.8V: 1-125MHz)

Device Marking

PRONTO
- ***YMxxx***

PRONTO = Pletronics Model
YM = Date Code, Year Month (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 YM (Year Month)

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

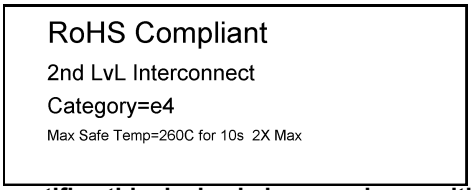
Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.

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





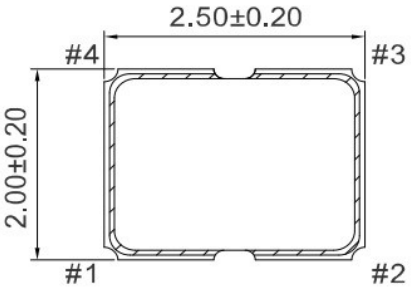
Pletronics Inc. certifies this device is in accordance with the RoHS 3 (2015/863) and WEEE 2 (2012/19/EU) directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.022 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

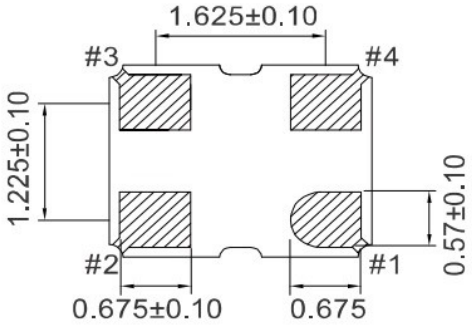
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Mechanical Dimensions (mm)

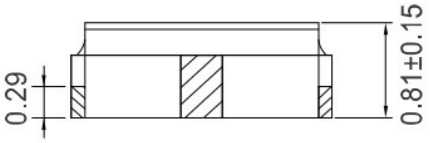
[TOP VIEW]



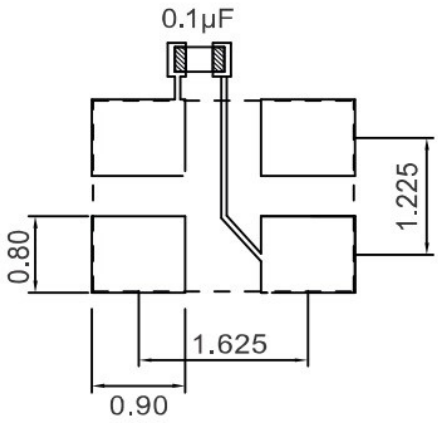
[BOTTOM VIEW]



[SIDE VIEW]



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)

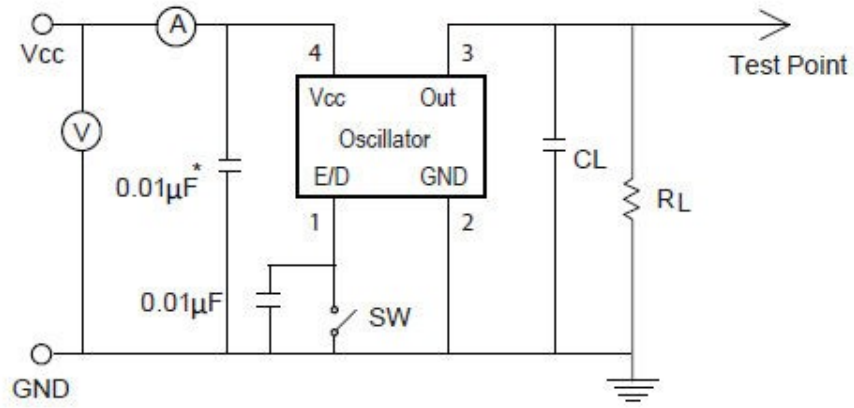
Contacts (pads): Gold 11.8 to 39.4 µinches (0.3 to 1.0 µm) over Nickel 50 to 350 µinches (1.27 to 8.89 µm)

For Optimum Jitter Performance, Pletronics recommends:

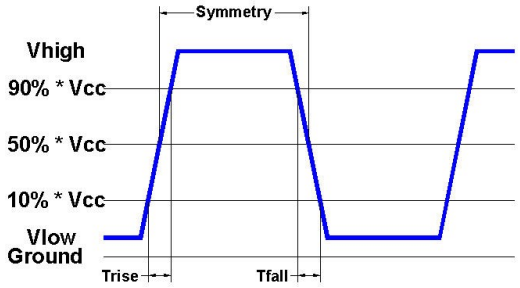
- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans

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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

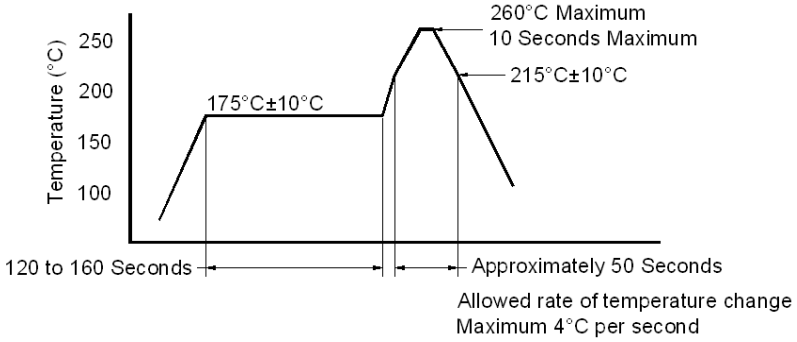
Thermal Characteristics:
The maximum die or junction temperature is 155°C
The thermal resistance junction to board is 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

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

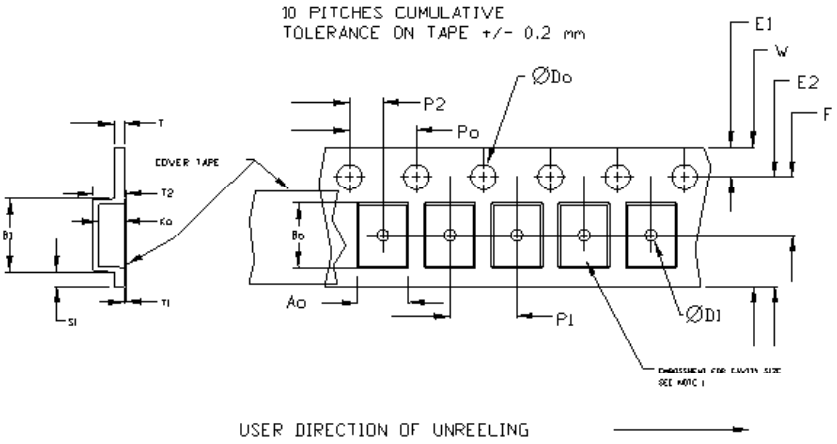
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Reflow Cycle



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

Tape and Reel

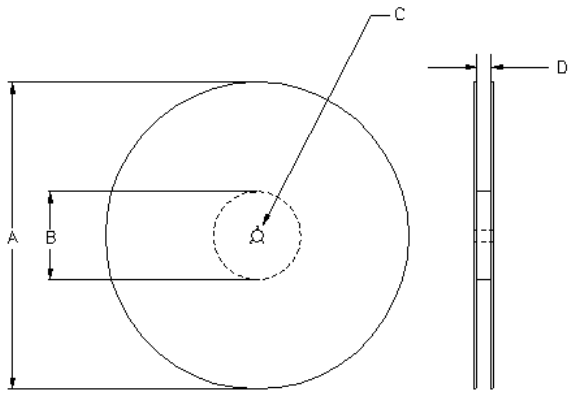


Tape Constant Dimensions Table 1								
Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5						
16mm		1.5			2.0 ±0.1			
24mm		1.5						

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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