



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, SyncE
- Medical
- Storage Area Networking
- COTS
- Telecom
- PON

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range ²	10	-	1500	MHz	
Frequency Stability ² ± 20 = 20* , ± 25 = 44 , ± 50 = 45	±20	-	±50	ppm	Includes supply voltage change, load change, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures. *Aging excluded
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}	2.97	3.3	3.63	V	
Supply Current I _{CC}	-	-	45	mA	
Output Waveform	LVDS			Load = 100Ω Recommended termination is DC-Coupled (Point to Point)	
Differential Output Voltage V _{OD}	175	350		mV	
Differential Offset Voltage		1.25		V	
Output T _{RISE} and T _{FALL}	-	-	1.0	ns	V _{th} is 10% and 90% of output swing
Startup Time	-	-	10	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	At output crossing point
V _{DISABLE} V _{IL}	-	-	0.3*V _{CC}	V	Referenced to Ground
V _{ENABLE} V _{IH}	0.7*V _{CC}	-	-		
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 100 Hz 1 kHz 1 MHz 20 MHz	-	-66 -96 -112 -136 -154	dBc/Hz	Precision Developed Frequencies: 100, 106.25, 120, 156.25, 162.5, 175, 187.5, 200, 212.5, 312.5MHz 25°C ± 2°C / 156.250 MHz
Jitter	-	0.6	-		12 kHz to 20 MHz from the output frequency @ 156.25MHz
Phase Noise	10 Hz 100 Hz 1 kHz 1 MHz 20 MHz	-	-51 -88 -108 -135 -151	dBc/Hz	All Other Frequencies 25°C ± 2°C / 150.0 MHz
Jitter	-	2.4	-		12 kHz to 20 MHz from the output frequency @ 150.0MHz
Aging	-	-	±3.0	ppm	First year at 25°C
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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Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V _{cc}	Frequency in MHz
QL44	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	V = 3.3V ± 10%	10 - 1500MHz

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)

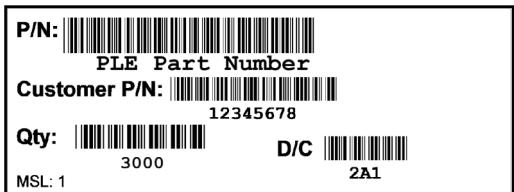
Code	3	4	5	6	7	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2023	2024	2025	2026	2027	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

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

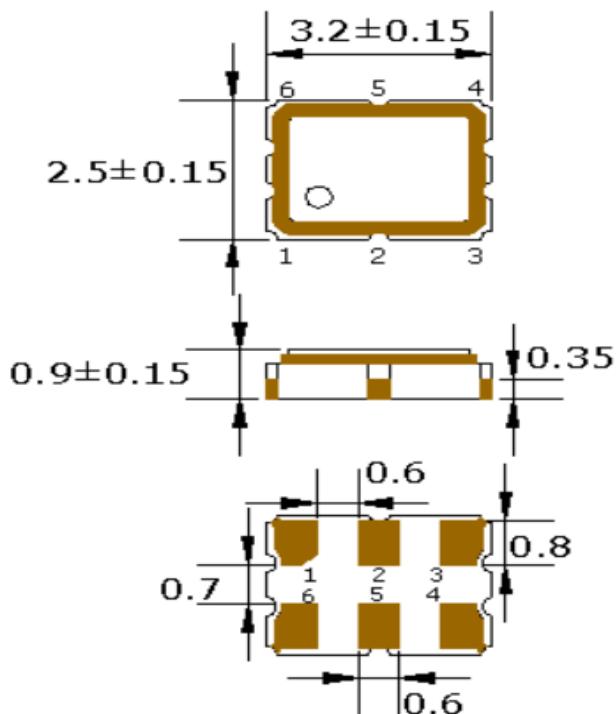
RoHs Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial



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

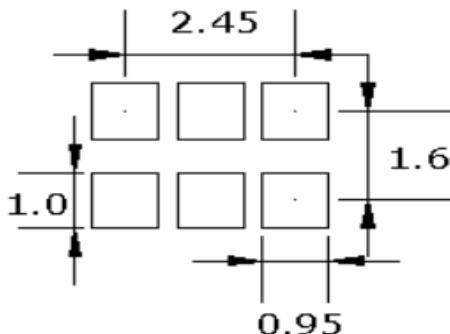
Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.028 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

Mechanical Dimensions



Pin Connections	
PIN #	Function
1	Enable/Disable
2	No connect
3	Ground/Lid
4	Output
5	Output N
6	V _{cc}

ENABLE/DISABLE	
PIN 1	Output
V _{IH} /Open	Active
V _{IL} /Gnd	Disabled/Tristate



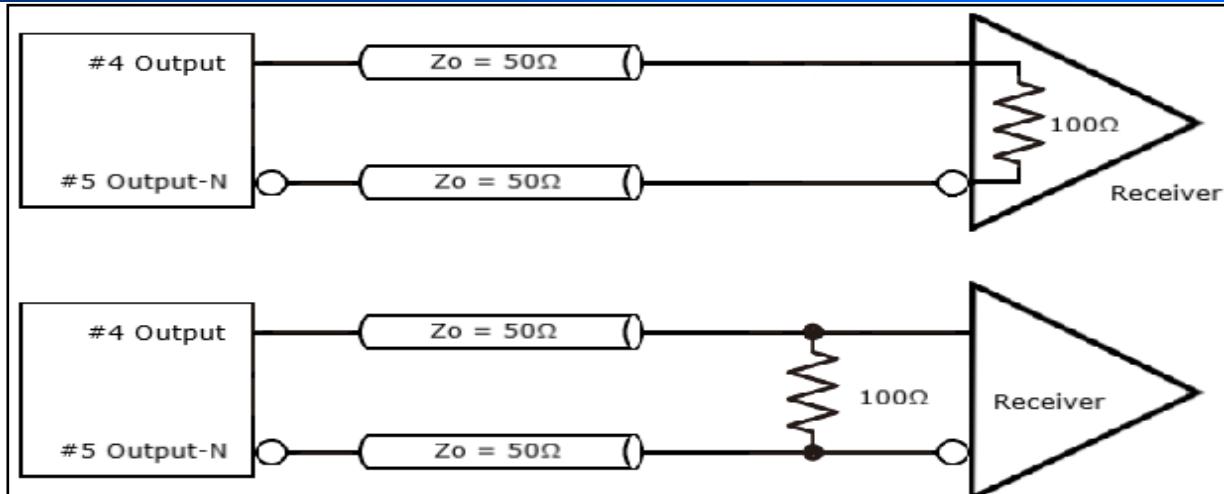
Pad Layout

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

Dimensions in mm

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

Recommended Termination

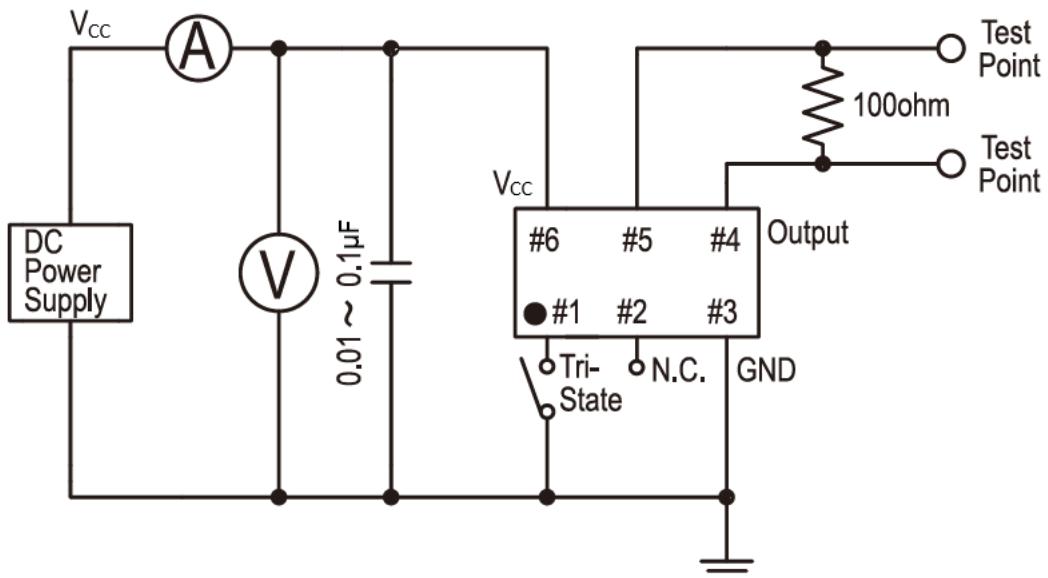


For any other terminations, the oscillator should be sampled and tested in the application. Both outputs shall be terminated and biased for proper operation.

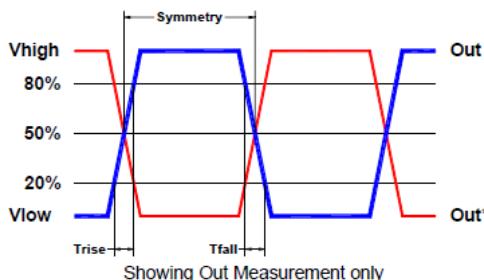
For Optimum Jitter Performance, Pletronics recommends:

- 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



Test Waveform



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 Ratings

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

Thermal Characteristics:

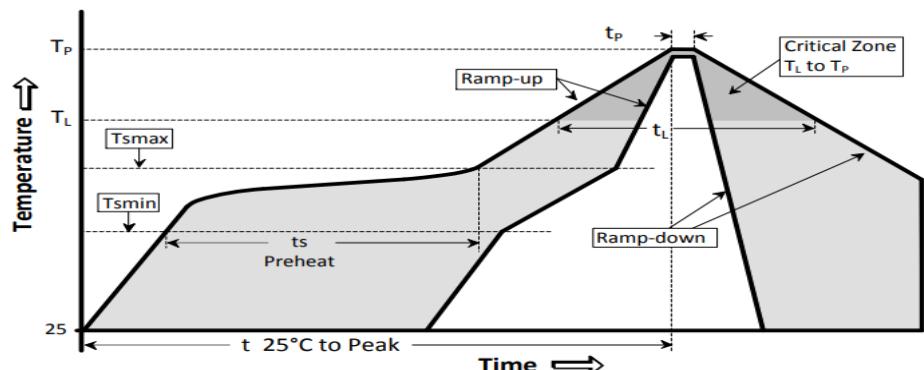
The maximum die or junction temperature is 125°C

Absolute Maximum Ratings

Parameter	Unit
V_{cc} Supply Voltage	-0.5V to +4.2V
V_i Input Voltage	-0.5V to $V_{cc} + 0.5V$
V_o Output Voltage	-0.5V to $V_{cc} + 0.5V$

Reflow Cycle

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

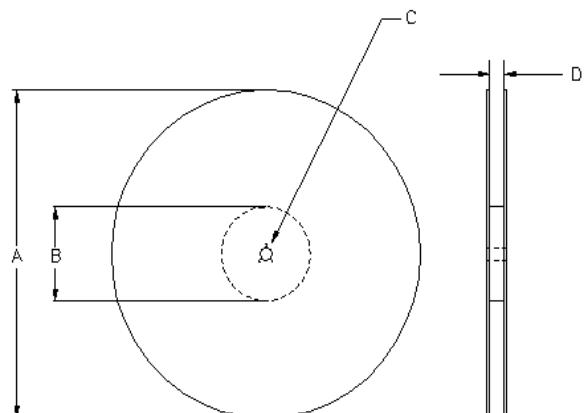
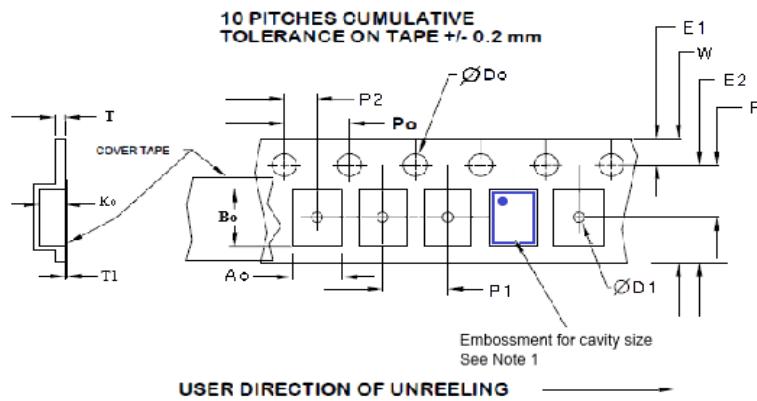


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	$(T_{s_{\max}} \text{ to } T_p)$	$3^{\circ}\text{C} / \text{second max}$	$^{\circ}\text{C} / \text{s}$
Ramp down Rate	T_{cool}	$6^{\circ}\text{C} / \text{second max}$	$^{\circ}\text{C} / \text{s}$
Time 25°C to Peak Temperature	$T_{\text{to-peak}}$	8 minutes max	min
Preheat			
Temperature min	$T_{s_{\min}}$	150	$^{\circ}\text{C}$
Temperature max	$T_{s_{\max}}$	200	$^{\circ}\text{C}$
Time $T_{s_{\min}}$ to $T_{s_{\max}}$	t_s	60 – 180	sec
Soldering above liquidus			
Temperature liquidus	T_L	217	$^{\circ}\text{C}$
Time above liquidus	t_L	60 – 150	sec
Peak temperature			
Peak Temperature	T_p	260	$^{\circ}\text{C}$
Time within 5°C of peak temperature	t_p	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	Ao	Bo	Ko
8mm	6.25 ±0.05	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 typ	E1	Po	P2	T max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.3

Reel Size	A		B		C	D
	Inch-es	mm	Inches	mm	mm	mm
7	7.0	180	2.50	60	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0



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