



# PLETRONICS *PRONTO*™ QP44L SERIES 3.3V PECL Clock Oscillator



QP44L  
3.2 x 2.5 x 0.9 mm  
LCC Ceramic Package

## Features

- Quartz crystal controlled Precision Square Wave Oscillator
- PECL 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, SynchronE  
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> ± 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. *Aging excluded
Operating Temperature Range <sup>2</sup>	-10 -20 -40	-	+70 +70 +85	°C	Standard range Extended range <b>C</b> option 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>	-	-	50	mA	
Output Waveform	PECL				
Output High Level V <sub>OH</sub>	V <sub>CC</sub> -1.03	-	V <sub>CC</sub> -0.6	V	Referenced to Ground
Output Low Level V <sub>OL</sub>	V <sub>CC</sub> -1.85	-	V <sub>CC</sub> -1.6	V	Referenced to Ground
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	-	1.0	ns	V <sub>th</sub> 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 <sub>DISABLE</sub> V <sub>IL</sub>	-	-	0.3*V <sub>CC</sub>	V	Referenced to Ground
V <sub>ENABLE</sub> V <sub>IH</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 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	-	ps rms	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	-	ps rms	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

<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
QP44	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

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

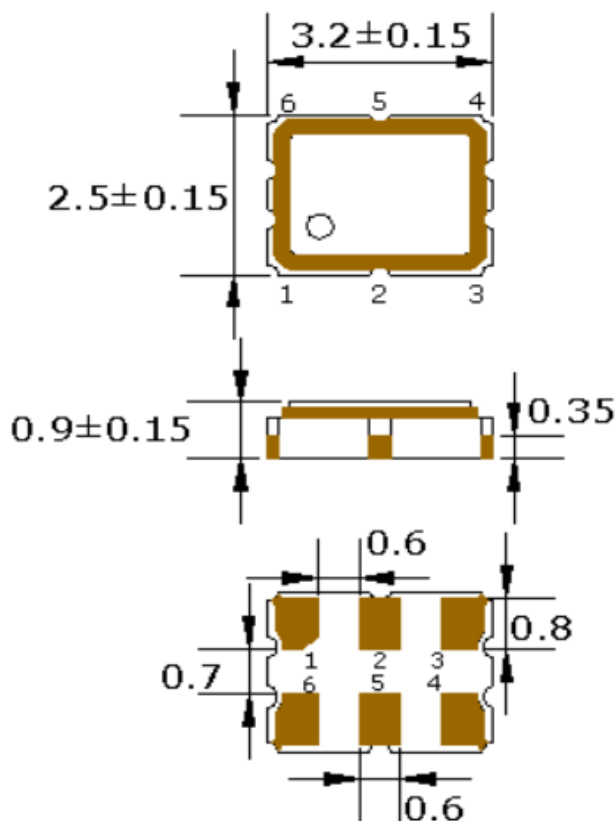
### RoHS Compliant

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: 0.028 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4

## Mechanical Dimensions

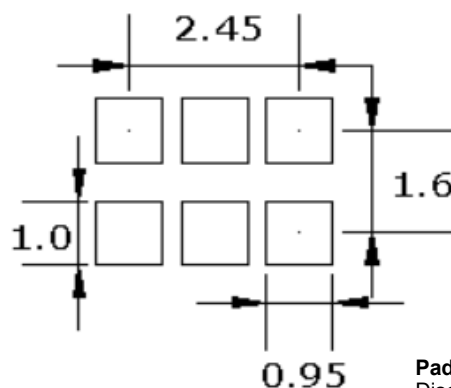


Castellations on pads 2 and 5 may or may not be present

Dimensions in mm

Pin Connections	
PIN#	Function
1	Enable/Disable
2	No connect
3	Ground/Lid
4	Output
5	Output N
6	Vcc

ENABLE/DISABLE	
PIN1	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 μm) over Nickel (1.27 to 8.89 μm)

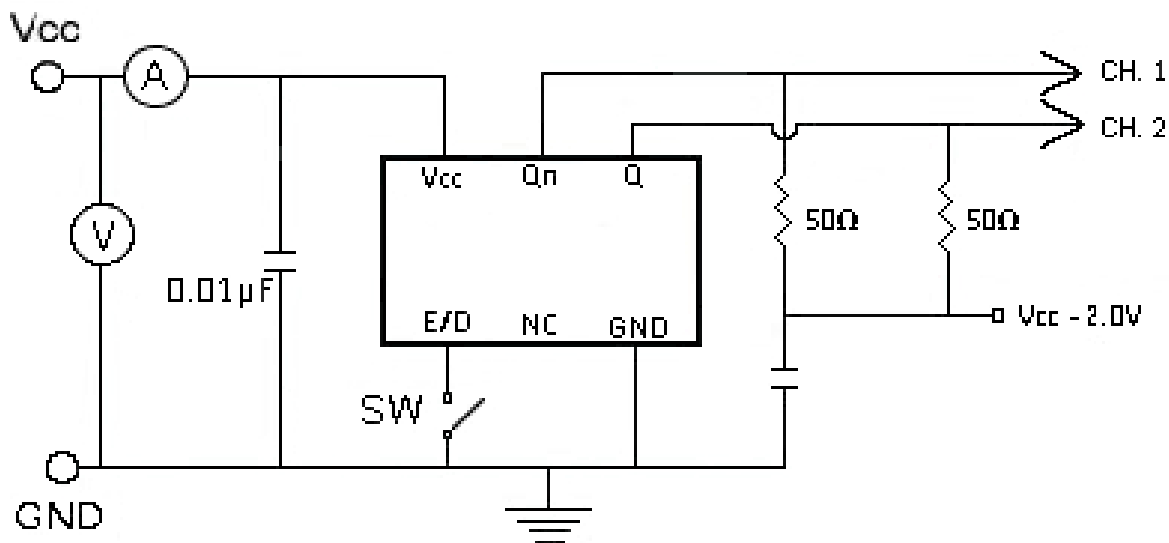
For Optimum Jitter Performance, Pletronics recommends:

- 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

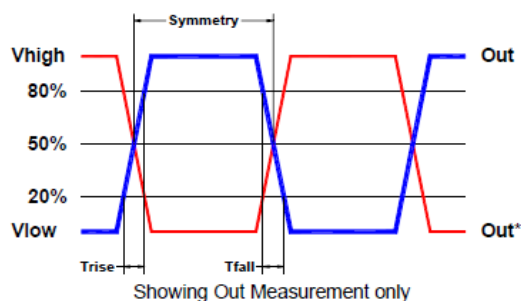


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## Electrical Test /Load Circuit



## 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:

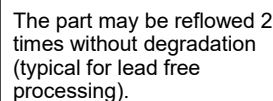
The maximum die or junction temperature is 125°C

## Absolute Maximum Ratings

Parameter	Unit
V <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

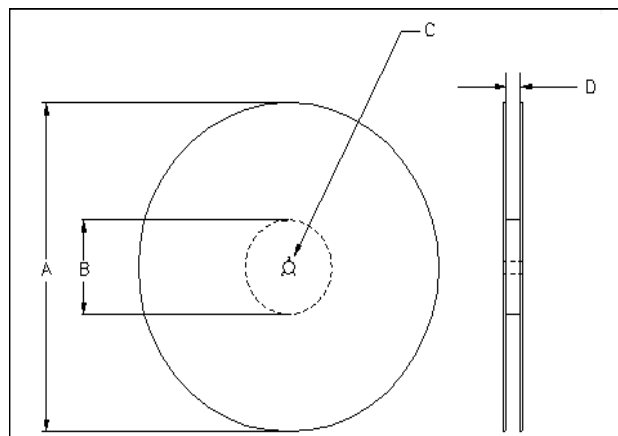


**Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"**



Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	( $T_{s\_max}$ to $T_P$ )	3°C / second max	°C / s
Ramp down Rate	$T_{cool}$	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to-peak}$	8 minutes max	min
<b>Preheat</b>			
Temperature min	$T_{s\_min}$	150	°C
Temperature max	$T_{s\_max}$	200	°C
Time $T_{s\_min}$ to $T_{s\_max}$	$t_s$	60 – 180	sec
<b>Soldering above liquidus</b>			
Temperature liquidus	$T_L$	217	°C
Time above liquidus	$t_L$	60 – 150	sec
<b>Peak temperature</b>			
Peak Temperature	$T_P$	260	°C
Time within 5°C of peak temperature	$t_P$	20 – 40	sec

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



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

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

Type Size	Do	D1 typ	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



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