



PE77D Series 2.5 V PECL Clock Oscillators

June 2011

Lead Free



- Pletronics' PE77D Series is a quartz crystal controlled precision square wave generator with a PECL output.
- The package is designed for high density surface mount designs.
- Low cost mass produced oscillator.
- Tape and Reel or cut tape packaging is available.
- 5 x 7 mm LCC Ceramic Package
- Enable/Disable Function on pad 1
- Disable function includes low standby power mode
- 3rd Overtone Crystals used
- Improved circuit to minimize oscillator issues such as multi-mode output signal.
- Low Jitter

**Pletronics Inc. certifies this device is in accordance with the
RoHS 6/6 (2002/95/EC) and WEEE (2002/96/EC) directives.**

Pletronics Inc. guarantees the device does not contain the following:

Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's

Weight of the Device: 0.16 grams

Moisture Sensitivity Level: 1 As defined in J-STD-020D.1

Second Level Interconnect code: e4

Absolute Maximum Ratings:

Parameter	Unit
V _{CC} Supply Voltage	-0.5V to +7.0V
V _i Input Voltage	-0.5V to V _{CC} + 0.5V
V _o Output Voltage	-0.5V to V _{CC} + 0.5V

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.



Electrical Specification for 2.50V $\pm 5\%$ over the specified temperature range and the frequency range of 40 to 325 MHz

Item	Min	Max	Unit	Condition
Frequency Accuracy “45”	-50	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
“44”	-25	+25		
“20”	-20	+20		
Output Waveform	PECL /ECL			
Output High Level (0°C to 85°C)	1.475	1.760	volts	Referenced to Ground, V _{CC} = 2.5 V
	0.975	1.260	volts	Referenced to termination voltage, V _{CC} = 2.5 V
	-1.025	-0.740	volts	Referenced to Vcc, V _{CC} = 2.5 V
Output High Level (-40°C)	1.415	1.620	volts	Referenced to Ground, V _{CC} = 2.5 V
	0.915	1.12	volts	Referenced to termination voltage, V _{CC} = 2.5 V
	-1.085	-0.88	volts	Referenced to Vcc, V _{CC} = 2.5 V
Output Low Level (0°C to 85°C)	0.690	1.095	volts	Referenced to Ground, V _{CC} = 2.5 V
	0.190	0.595	volts	Referenced to termination voltage, V _{CC} = 2.5 V
	-1.810	-1.405	volts	Referenced to Vcc, V _{CC} = 2.5 V
Output Low Level (-40°C)	0.670	1.195	volts	Referenced to Ground, V _{CC} = 2.5 V
	0.170	0.695	volts	Referenced to termination voltage, V _{CC} = 2.5 V
	-1.830	-1.305	volts	Referenced to Vcc, V _{CC} = 2.5 V
Output Symmetry	45	55	%	at 50% point of V _{CC} (See load circuit)
Jitter ¹	-	0.6	pS RMS	12 KHz to 20 MHz from the output frequency
	-	2.8	pS RMS	10 Hz to 1 MHz from the output frequency
Output T _{RISE} and T _{FALL}	-	0.7	nS	V _{th} is 20% and 80% of waveform
V _{CC} Supply Current (I _{CC})	-	90	mA	
Enable/Disable Internal Pull-up	50	-	Kohm	to V _{CC} , measured with Pad 1 = 0.0 volts
V disable	-	0.6	volts	Referenced to pad 3
V enable	1.7	-	volts	Referenced to pad 3
Output leakage V _{OUT} = V _{CC}	-10	+10	uA	Pad 1 low, device disabled
V _{OUT} = 0V	-10	+10	uA	
Enable time	100	500	nS	Time for output to reach a logic state, the output frequency is correct at the specified Start Time.
Disable time	-	200	nS	Time for output to reach a high Z state
Start up time	-	10	mS	Time for output to reach specified frequency
Operating Temperature Range	-10	+70	°C	Standard Temperature Range
	- 20	+70	°C	Extended Temperature Range “C” Option
	- 40	+85	°C	Extended Temperature Range “E” Option
Storage Temperature Range	-55	+125	°C	
Standby Current I _{CC}	-	30	uA	Pad 1 low, device disabled

¹ Jitter computed from phase noise data at 125MHz

Specifications with Pad 1 E/D open circuit unless stated otherwise

The figure consists of two circuit diagrams illustrating the connection of a Universal Under Tester (UUT) to a High Bandwidth Oscilloscope.

Left Diagram: Shows the UUT connected to the oscilloscope. The UUT has pins labeled V/E/D (1), Vcc (6), GND (3), Out* (5), and Out (4). The oscilloscope has inputs labeled Out* (5) and Out (4). The UUT's Vcc is connected to a +2.00V supply. The GND is connected to a -1.30 nominal supply. The Out* and Out pins are connected to the oscilloscope's Out* and Out pins, respectively. The oscilloscope's inputs are terminated with 50 ohm resistors. The UUT's output is terminated with 50 ohm resistors. The UUT's input is terminated with 50 ohm resistors. The UUT's power supply is connected to a +2.00V supply and a -1.30 nominal supply.

Right Diagram: Shows the UUT connected to the oscilloscope using 50 ohm high bandwidth coaxial cables. The UUT has pins labeled V/E/D (1), Vcc (6), GND (3), Out* (5), and Out (4). The oscilloscope has inputs labeled Out* (5) and Out (4). The UUT's Vcc is connected to a +2.00V supply. The GND is connected to a -1.30 nominal supply. The Out* and Out pins are connected to the oscilloscope's Out* and Out pins, respectively. The oscilloscope's inputs are terminated with 50 ohm resistors. The UUT's output is terminated with 50 ohm resistors. The UUT's input is terminated with 50 ohm resistors. The UUT's power supply is connected to a +2.00V supply and a -1.30 nominal supply.

The diagram shows two waveforms, 'Out' (red) and 'Out*' (blue), over time. The vertical axis represents voltage levels: Vhigh, 80%, 50%, 20%, and Vlow. The horizontal axis represents time. The 'Out' waveform is a square wave that transitions from Vlow to Vhigh at the rising edge of 'Out*' and from Vhigh to Vlow at the falling edge of 'Out*'. The 'Out*' waveform is a square wave that transitions from Vlow to Vhigh at the rising edge of 'Out' and from Vhigh to Vlow at the falling edge of 'Out'. The time interval from the rising edge of 'Out' to the rising edge of 'Out*' is labeled 'Trise'. The time interval from the falling edge of 'Out' to the falling edge of 'Out*' is labeled 'Tfall'. The time interval between the rising and falling edges of 'Out' is labeled 'Symmetry'.

Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

ESD Rating

Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

Package Labeling




Label is 1" x 2.6" (25.4mm x 66.7mm)

Font is Courier New

Bar code is 39-Full ASCII

Label is 1" x 2.6" (25.4mm x 66.7mm)

Font is Arial

P/N:		
	PE7745DW-100.0M	
Customer P/N:		
	12345678	
Qty:		D/C 
	1000	75409

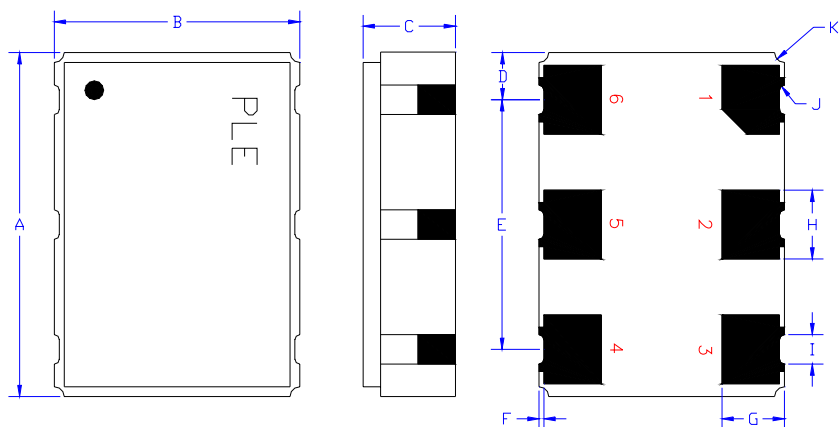
RoHS Compliant

2nd Lvl Interconnect

Category=e4

Max Safe Temp=260C for 10s 2X Max

Mechanical:



Not to Scale

¹ Typical dimensions

	Inches	mm
A	0.276 ±0.006	7.00 ±0.15
B	0.197 ±0.006	5.00 ±0.15
C	0.067 max	1.70 max
D ¹	0.038	0.96
E ¹	0.200	5.08
F ¹	0.004	0.10
G ¹	0.050	1.27
H ¹	0.055	1.40
I ¹	0.024	0.60
J ¹	0.004R	0.10R
K ¹	0.008R	0.20R

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)

Pad	Function	Note
1	Output Enable/Disable	When this pad is not connected the oscillator shall operate. When this pad is <0.30 volts, the output will be inhibited (high impedance state.) Recommend connecting this pad to V _{CC} if the oscillator is to be always on.
2	No connect	There is no internal connection to this pad
3	Ground (GND)	
4	Output	Both outputs must be terminated and biased for proper operation. The ideal termination is 50 ohms connected to 2.0V below the Supply Voltage.
5	Output*	
6	Supply Voltage (V _{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.



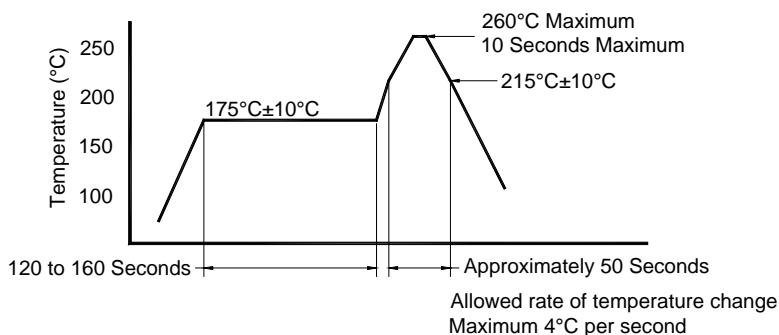
Layout and application information

Recommend connecting Pad 1 and Pad 2 together to permit the design to accept Enable/Disable input on either pad

For Optimum Jitter Performance, Pletronics recommends:

- a ground plane under the device
- no large transient signals (both current and voltage) should be routed under the device
- do not layout near a large magnetic field such as a high frequency switching power supply
- do not place near piezoelectric buzzers or mechanical fans.

Reflow Cycle (typical for lead free processing)



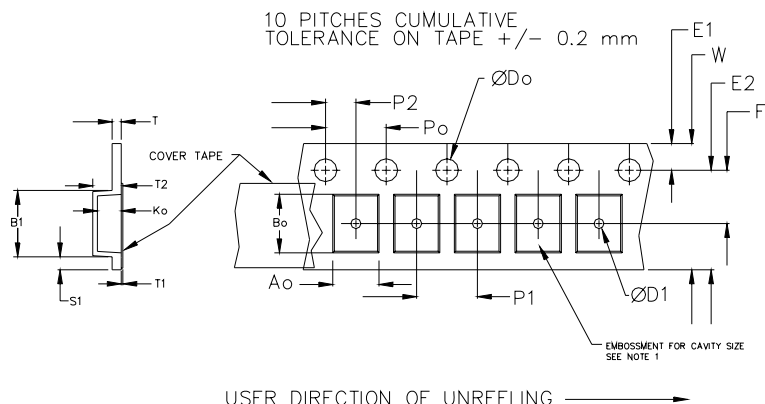
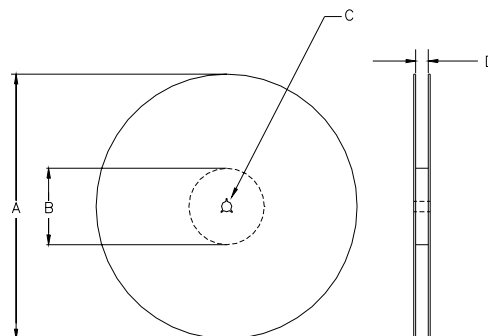
The part may be reflowed 3 times without degradation.

Tape and Reel: available for quantities of 250 to 1000 per reel, cut tape for < 250

Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	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			2.0 ±0.1			
16mm		1.5						
24mm		1.5						

Variable Dimensions Table 2							
Tape Size	B1 Max	E2 Min	F	P1	T2 Max	W Max	Ao, Bo & Ko
16 mm	12.1	14.25	7.5 ± 0.1	8.0 ± 0.1	8.0	16.3	Note 1

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



REEL DIMENSIONS				
A	inches	7.0	10.0	13.0
	mm	177.8	254.0	330.2
B	inches	2.50	4.00	3.75
	mm	63.5	101.6	95.3
C	mm	13.0 +0.5 / -0.2		
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0
		16.0		

Reel dimensions may vary from the above

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