



PE77D Series 3.3 V PECL Clock Oscillators

June 2011



- 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.

Part Number:

PE77	45	D	E	V	-125.0M	-XX
Packaging code or blank						
T250 = 250 per Tape and Reel						
T500 = 500 per Tape and Reel						
T1K = 1000 per Tape and Reel						
Frequency in MHz						
Supply Voltage V_{cc}						
V = 3.3V \pm 10%						
Optional Enhanced OTR						
Blank = Temp. range -10 to +70°C						
C = Temp. range -20 to +70°C						
E = Temp. range -40 to +85°C						
Series Model						
Frequency Stability						
45 = \pm 50 ppm						
44 = \pm 25 ppm						
20 = \pm 20 ppm						
Series Model						

Part Marking:

PLE PE77
FF.FFF M
• YMDXX

or

PE7XYWWXX
FF.FFF M
• PLE XXX

Marking Legend:

PLE = Pletronics

FF.FFF M = Frequency in MHz

YYWW or YWW or YMD = Date of Manufacture (year and week, or year-month-day)

All other marking is internal factory codes

Specifications such as frequency stability, supply voltage and operating temperature range, etc. are not identified from the marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Codes for Date Code YMD

Code	0	1	2	3	4	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2010	2011	2012	2013	2014	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	

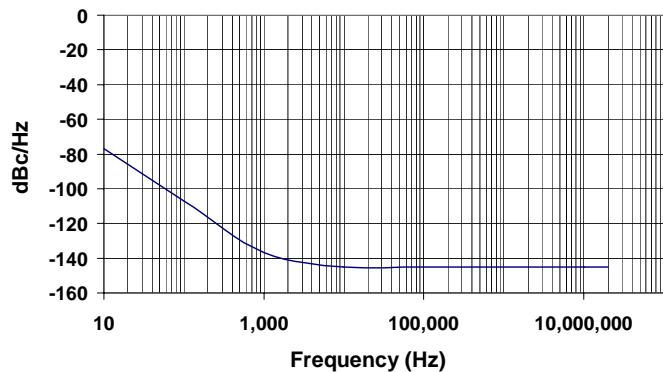
Electrical Specification for 3.30V $\pm 10\%$ over the specified temperature range and the frequency range of 40 to 325 MHz

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)	2.275	2.420	volts	Referenced to Ground, $V_{CC} = 3.3$ V
	0.975	1.120	volts	Referenced to termination voltage, $V_{CC} = 3.3$ V
	-1.025	-0.880	volts	Referenced to V_{CC} , $V_{CC} = 3.3$ V
Output High Level (-40°C)	2.216	2.420	volts	Referenced to Ground, $V_{CC} = 3.3$ V
	0.916	1.120	volts	Referenced to termination voltage, $V_{CC} = 3.3$ V
	-1.084	-0.88	volts	Referenced to V_{CC} , $V_{CC} = 3.3$ V
Output Low Level (0°C to 85°C)	1.490	1.680	volts	Referenced to Ground, $V_{CC} = 3.3$ V
	0.190	0.380	volts	Referenced to termination voltage, $V_{CC} = 3.3$ V
	-1.810	-1.620	volts	Referenced to V_{CC} , $V_{CC} = 3.3$ V
Output Low Level (-40°C)	1.470	1.745	volts	Referenced to Ground, $V_{CC} = 3.3$ V
	0.170	0.445	volts	Referenced to termination voltage, $V_{CC} = 3.3$ V
	-1.830	-1.555	volts	Referenced to V_{CC} , $V_{CC} = 3.3$ 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	2.40	-	volts	Referenced to pad 3
Output leakage $V_{OUT} = V_{CC}$	-10	+10	uA	Pad 1 low, device disabled
	-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

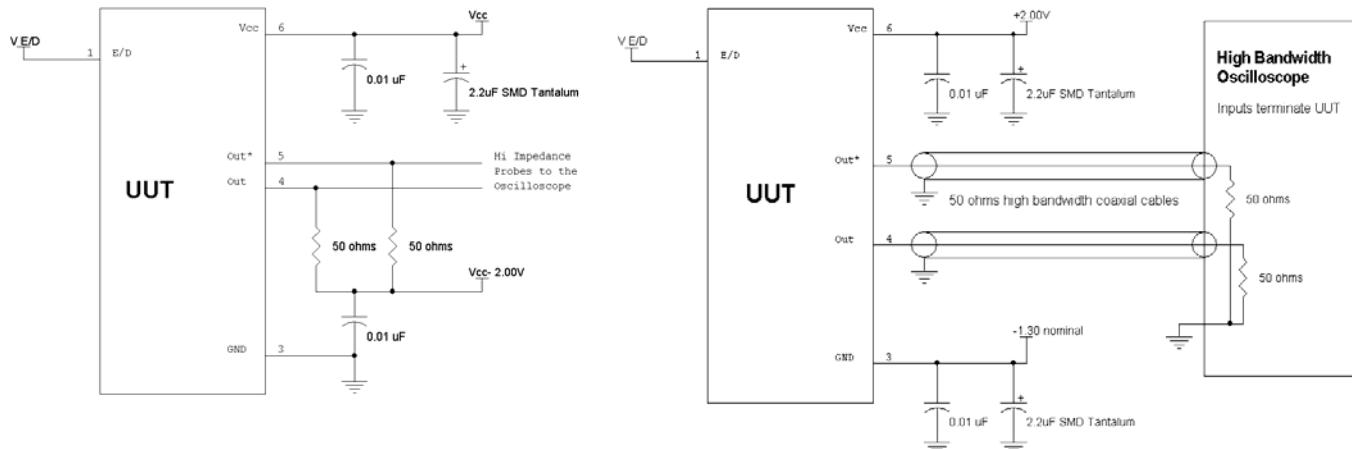
¹ Jitter computed from phase noise data at 125MHz

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

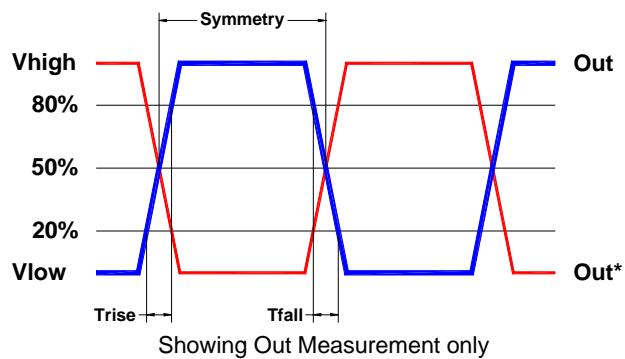
Typical Phase-Noise Response



Load Circuit



Test Waveform



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

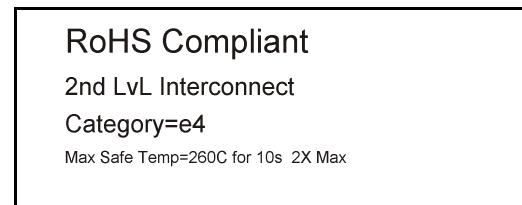
Label is 1" x 2.6" (25.4mm x 66.7mm)

Font is Courier New

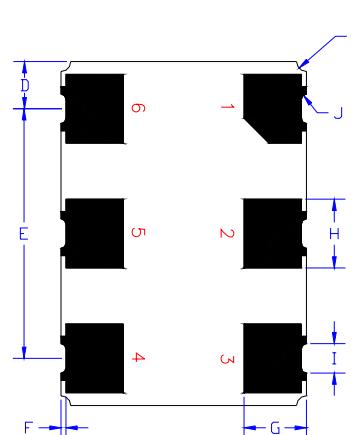
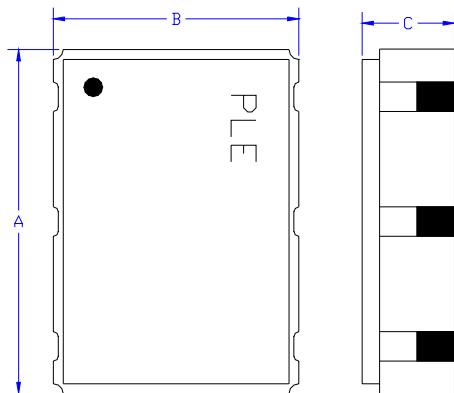
Bar code is 39-Full ASCII

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

Font is Arial



Mechanical:



	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

Not to Scale

¹ Typical dimensions

Contacts (pads) :

 Gold 11.8 to 39.4 μ inches (0.3 to 1.0 μ m) over Nickel 50 to 350 μ inches (1.27 to 8.89 μ m)

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

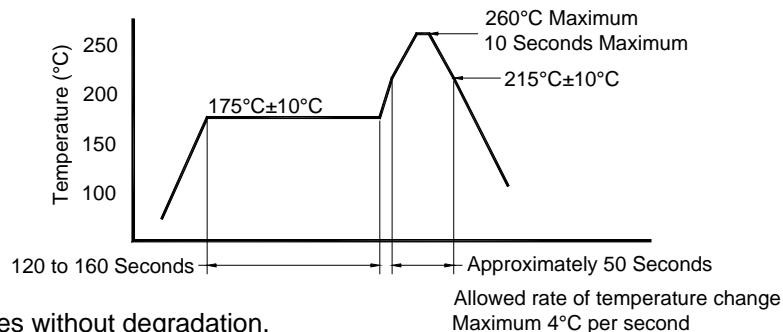


Recommend connecting Pad 1 and Pad 2 together to permit the design to accept Enable/Disable input on either pad

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)



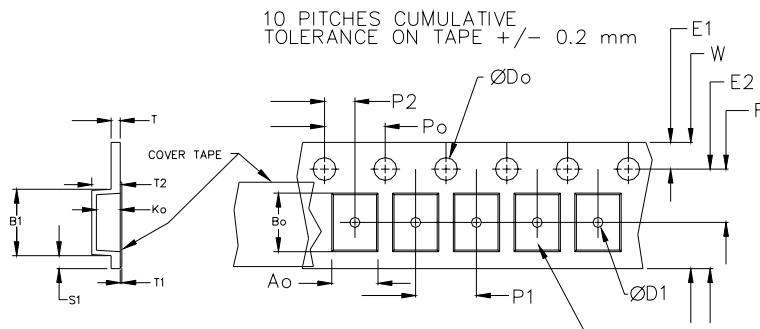
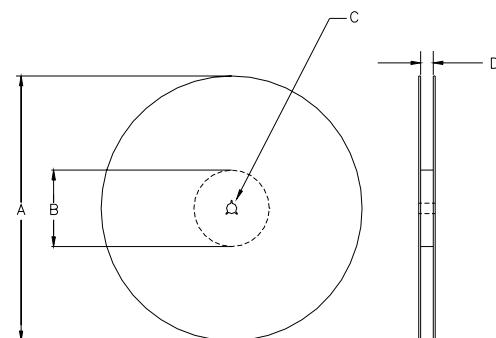
The part may be reflowed 3 times without degradation.

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		1.0						
12mm	1.5	1.5						
16mm	+0.1 -0.0	1.5 ±0.1	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
24mm		1.5			2.0 ±0.1			

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



USER DIRECTION OF UNREELING →

REEL DIMENSIONS			
A	inches	7.0	10.0
B	mm	177.8	254.0
C	mm	63.5	101.6
D	mm	13.0 +0.5 / -0.2	Tape Width
		16.4 +2.0 / -0.0	16.0

Reel dimensions may vary from the above

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