

PE77J002-156.25M PECL Clock Oscillators

September 2014



- Pletronics' PE77J002-156.25M is a quartz crystal controlled precision square wave generator with a PECL output.
- Improved phase noise performance.
- 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.
- Lowest Jitter Product

* BEST OPTION FOR LOW JITTER REQUIREMENTS

Pletronics Inc. certifies this device is in accordance with the RoHS 6/6 (2011/65/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	-0.3V to +4.0V
V _i Input Voltage	-0.3V to V _{CC} + 0.3V
V _o Output Voltage	-0.3V to V _{CC} + 0.3V

Thermal Characteristics

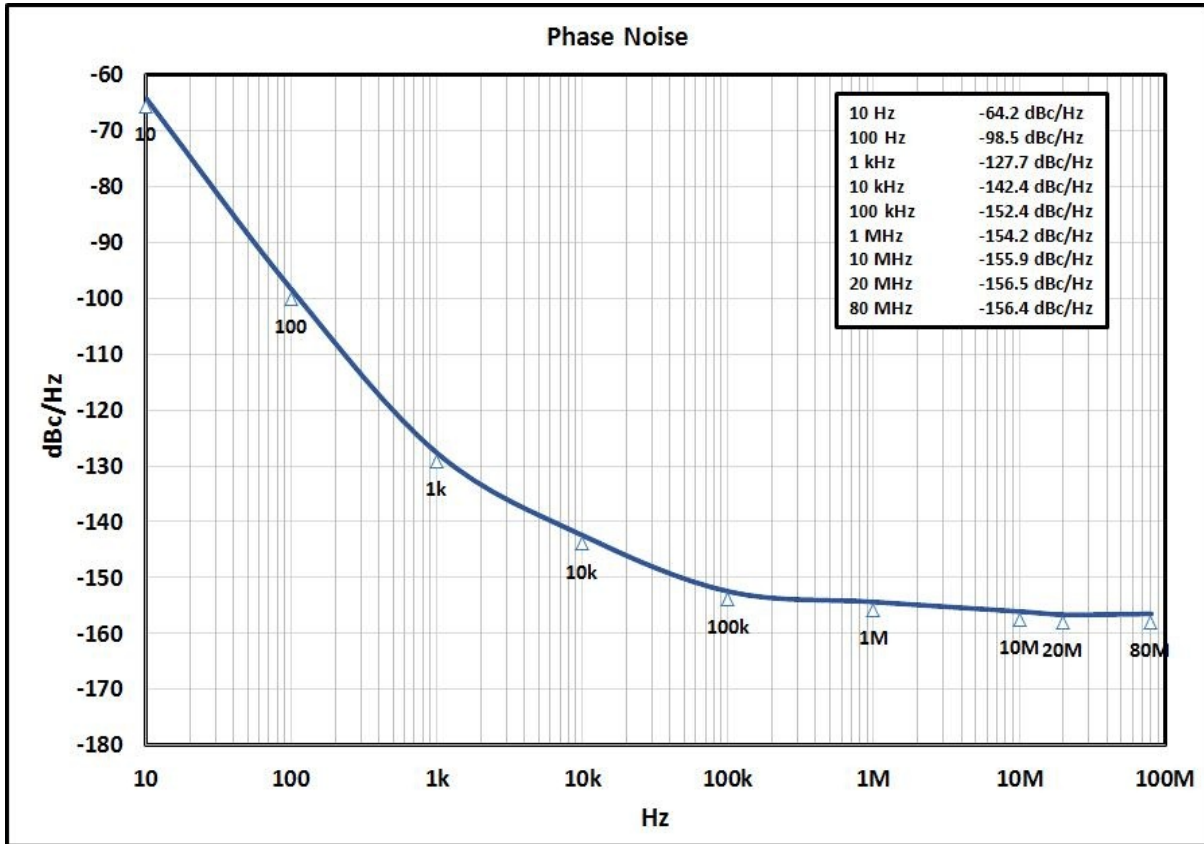
The maximum die or junction temperature is 125°C
The thermal resistance junction to board is 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Electrical Specification for 3.30V $\pm 5\%$ over the specified temperature range and the frequency of 156.25 MHz

Item	Min	Typ	Max	Unit	Condition	
Frequency Accuracy	-25	-	+25	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures	
Output Waveform	PECL /ECL					
Output High Level	2.275	2.35	2.420	V	$V_{CC} = 3.3\text{ V}$	
Output Low Level	1.490	1.60	1.680	V	$V_{CC} = 3.3\text{ V}$	
Output Symmetry	45	-	55	%	at 50% point of V_{CC} (See load circuit)	
Jitter ¹	-	0.1	-	pS RMS	12 KHz to 20 MHz from the output frequency	
	-	1.25	-	pS RMS	10 Hz to 1 MHz from the output frequency	
Output T_{RISE} and T_{FALL}	-	-	0.5	nS	V_{th} is 20% and 80% of waveform	
V_{CC} Supply Current (I_{CC})	-	-	60	mA		
Enable/Disable Internal Pull-up	50	-	-	Kohm	to V_{CC} , measured with Pad 1 = 0.0 volts	
V disable	-	-	0.7	V	Referenced to pad 3, $0.3 V_{CC}$	
V enable	1.7	-	-	V	Referenced to pad 3, $0.7 V_{CC}$	
Output leakage	$V_{OUT} = V_{CC}$	-10	-	+10	μA	Pad 1 low, device disabled
	$V_{OUT} = 0\text{V}$	-10	-	+10	μA	
Enable time	-	-	2	mS	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	-40	-	+85	$^{\circ}\text{C}$	Extended Temperature Range	
Storage Temperature Range	-55	-	+125	$^{\circ}\text{C}$		
Standby Current I_{CC}	-	-	30	μA	Pad 1 low, device disabled	

¹ Jitter computed from phase noise data at 156.25MHz
 Specifications with Pad 1 E/D open circuit unless stated otherwise

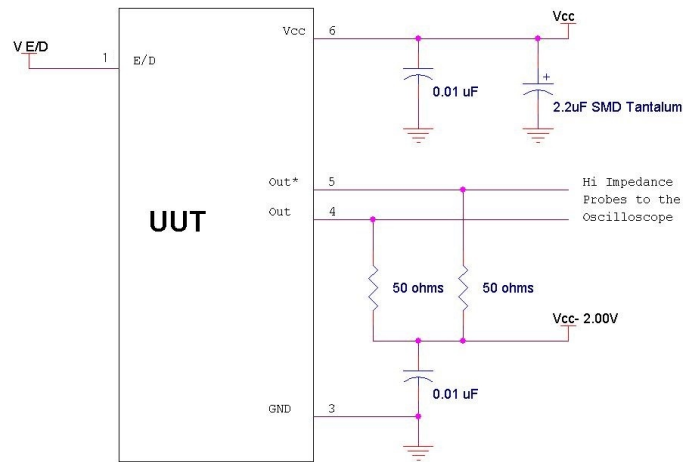
Typical Phase Noise



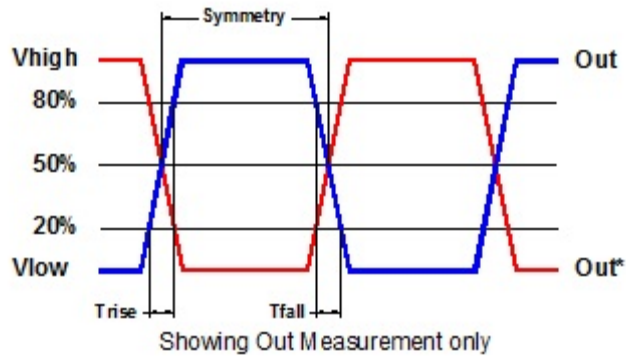
*Chart Data typical of 156.25 MHz at 25°C

Temperature	Integrated Bandwidth	Typical Jitter in Femtoseconds
-40°C	10K to 1 MHz	25
-20°C	10K to 1 MHz	26
25°C	10K to 1 MHz	31
75°C	10K to 1 MHz	33
85°C	10K to 1 MHz	36

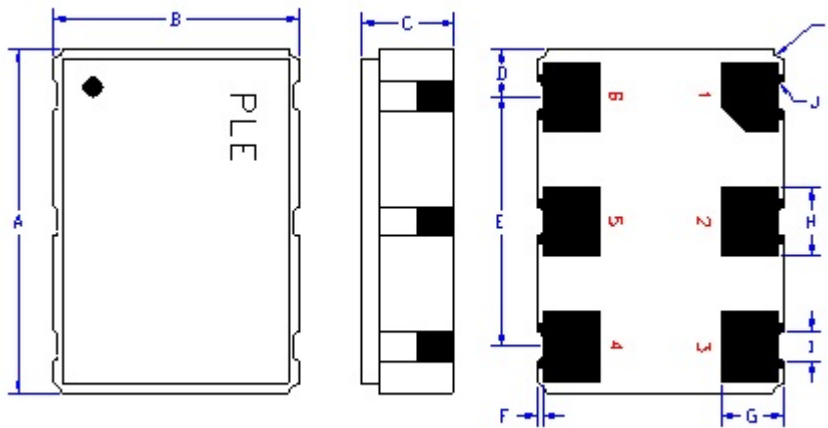
Load Circuit



Test Waveform



Mechanical:



	Inches	mm
A	0.276 \pm 0.006	7.00 \pm 0.15
B	0.197 \pm 0.006	5.00 \pm 0.15
C	0.067 max	1.80 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 mches (0.3 to 1.0 μ m) over Nickel 50 to 350 μ mches (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.



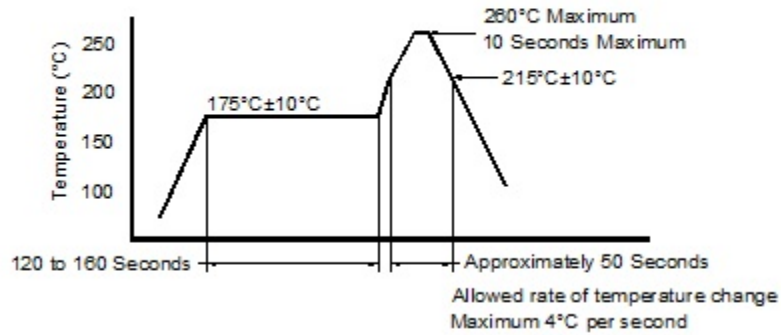
Layout and application information

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)



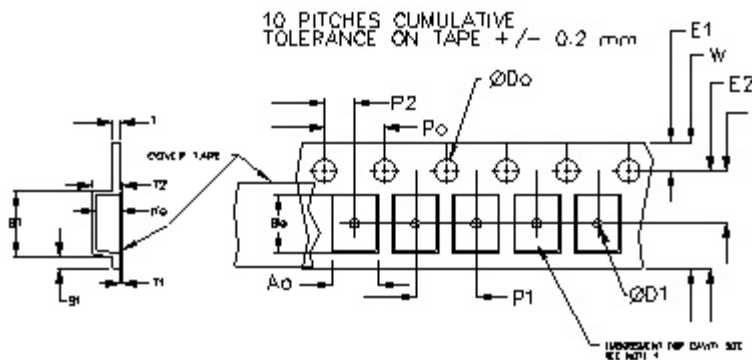
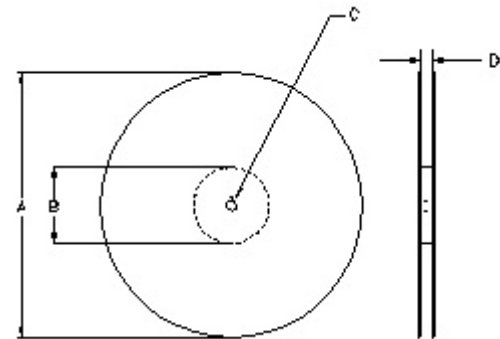
The part may be reflowed 3 times without degradation.

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	1.5	1.0	1.75	4.0	2.0 +0.05	0.6	0.6	0.1
12mm		1.5			2.0 ±0.1			
16mm		+0.1 -0.0			1.5			
24mm		1.5			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	Tape Width
	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	16.4	16.4	
		+2.0 -0.0	+2.0 -0.0	+2.0 -0.0	

Reel dimensions may vary from the above

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