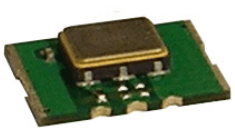
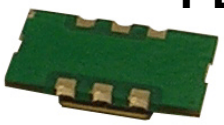
PE91/PE97 Series 3.3 V PECL Clock Oscillators

July 2007





- Pletronics PE91/PE97 Series is a quartz crystal controlled precision square wave generator with an PECL output.
- Solder pad compatible legacy PECL oscillator solutions.
- FR4 base using the PE93 or PE99 5x7 mm ceramic packaged SMD device.
- Tape and Reel packaging is available.
- 10.9 to 1,175 MHZ
- 9.7 mm x 14.0 mm 'B' package
- Enable/Disable Function:
  PE91 on pad 2
  PE97 on pad 1
- Low Jitter

This series, PE91 and PE97, is not recommended for new designs.
Use PE93 or PE99 series for new designs .

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

Absolute Maximum Ratings:

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +6.5V
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo 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 40 to 80°C/Watt depending on the solder pads, ground plane and construction of the PCB.

PE91/PE97 Series 3.3 V
PECL Clock Oscillators

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Part Number:

PE9*x* | 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 ± 10%
Temperature Range **blank** = -10 to +70°C **E** = -40 to +85°C
Series Model
Frequency Stability **45** = ± 50 ppm **44** = ± 25 ppm **20** = ± 20 ppm
Series Model (*x* is 1 or 7)

Part Marking:

PLE PE9x
***FF.FFF* M**
• ***YMDXX***

Marking Legend:

PLE = Pletronics X = 1 or 7
FF.FFF M = Frequency in MHZ
YMD = Date of Manufacture (year-month-day)
All other marking is internal factory codes

Codes for Date Code YMD

Code	7	8	9	0	1	2
Year	2007	2008	2009	2010	2011	2012

Code	A	B	C	D	E	F	G	H	J	K	L	M
Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

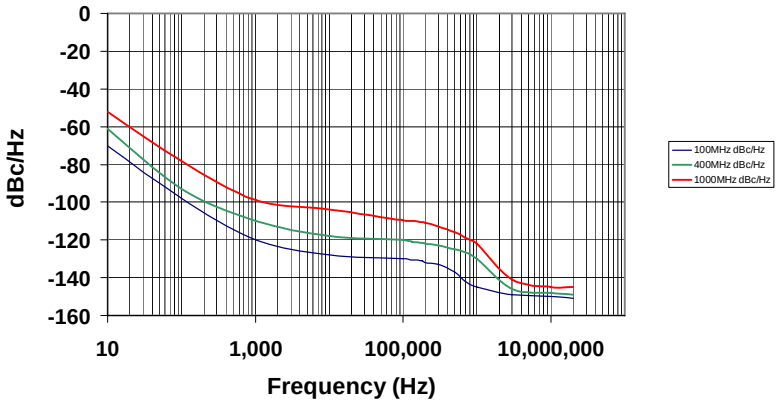
Code	1	2	3	4	5	6	7	8	9	A	B	C
Day	1	2	3	4	5	6	7	8	9	10	11	12
Code	D	E	F	G	H	J	K	L	M	N	P	R
Day	13	14	15	16	17	18	19	20	21	22	23	24
Code	T	U	V	W	X	Y	Z					
Day	25	26	27	28	29	30	31					

Electrical Specification for 3.30V ±10% over the specified temperature range and the frequency range of 10.9 MHZ to 766 MHZ and 876 MHZ to 1,175MHz

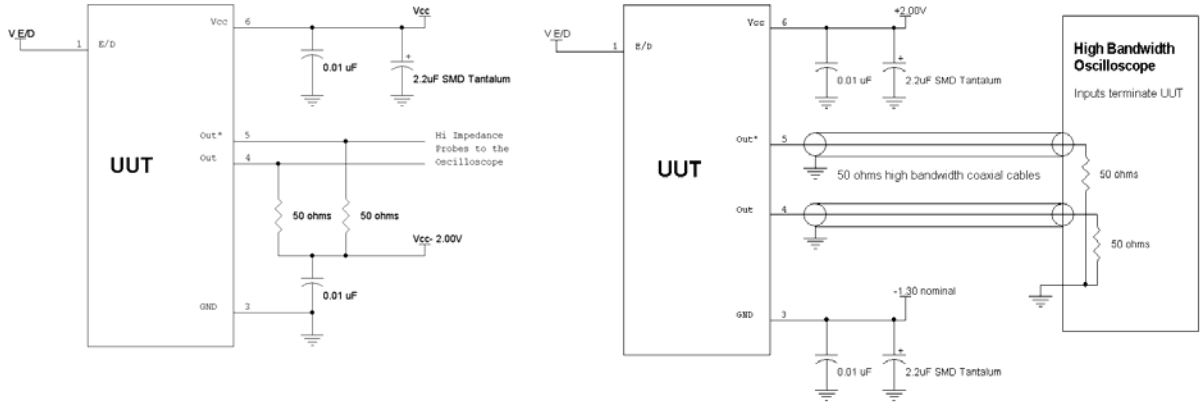
Item	Min	Max	Unit	Condition
Frequency Accuracy "**45**"	-50	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
"**44**"	-25	+25		
"**20**"	-20	+20		
Output Waveform	PECL / ECL			
Output High Level	2.12	2.49	volts	Referenced to Ground, V_{CC} = 3.3 V
	0.82	1.19	volts	Referenced to termination voltage, V_{CC} = 3.3 V
	-1.18	-0.81	volts	Referenced to Vcc, V_{CC} = 3.3 V
Output Low Level	1.83	1.99	volts	Referenced to Ground, V_{CC} = 3.3 V
	0.53	0.69	volts	Referenced to termination voltage, V_{CC} = 3.3 V
	-1.47	-1.31	volts	Referenced to Vcc, V_{CC} = 3.3 V
Output Symmetry	47	53	%	at 50% point of V_{CC} (See load circuit)
Jitter	-	0.6	pS RMS	12 KHz to 20 MHZ from the output frequency
	-	2.8	pS RMS	10 Hz to 20 MHZ from the output frequency
Output T_{RISE} and T_{FALL}	100	300	pS	Vth is 20% and 80% of waveform
V_{CC} Supply Current (I_{CC})	-	90	mA	
Enable/Disable Internal Pull-up	50	-	Kohm	to V_{CC}
V disable	-	0.8	volts	Referenced to pad 3
V enable	2.00	-	volts	Referenced to pad 3
Output leakage $V_{OUT} = V_{CC}$	-50	+50	uA	Pad 1 low, device disabled
V_{OUT} = 0V	-50	+50	uA	
Enable time	-	10	nS	Time for output to reach a logic state
Disable time	-	10	nS	Time for output to reach a high Z state
Start up time	-	5	mS	Time for output to reach specified frequency
Operating Temperature Range	-10	+70	°C	Standard Temperature Range
	- 40	+85	°C	Extended Temperature Range "**E**" Option
Storage Temperature Range	-55	+125	°C	

Specifications with E/D open circuit or connected to V_{CC}

Typical Phase-Noise Response

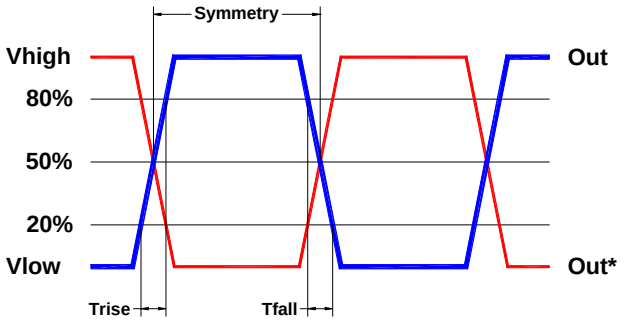


Load Circuit



E/D shown on pad 1 for PE97, will be on pad 2 for PE91

Test Waveform



Showing Out Measurement only

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

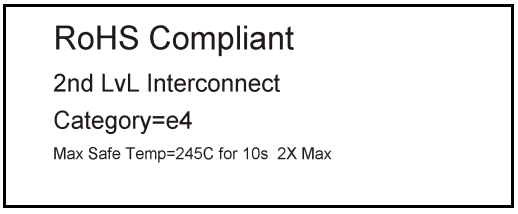
ESD Rating

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
(The part number will show as PE91xx or PE97xx)

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



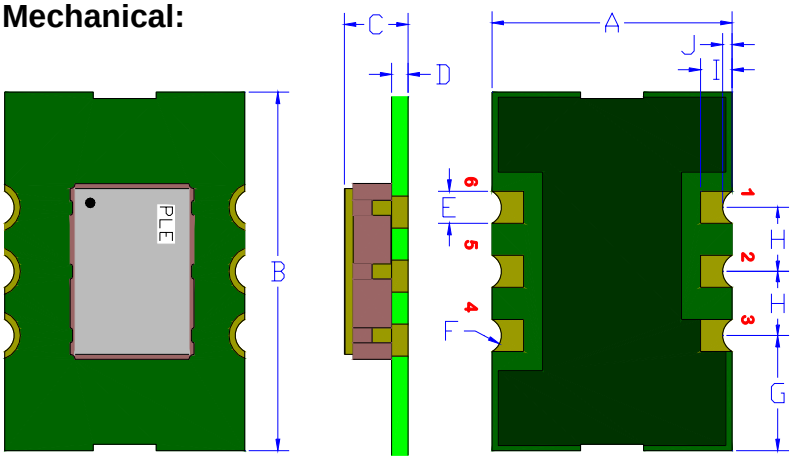
Layout and application information

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.

As much ground plane and thermal paths that can be realized under and to the side of the part is desired.

Mechanical:



FR4 PCB Base:
Solder masked
All via holes tented on bottom
Copper Clad ½ oz. Typical
Gold plated 0.02 µinch (0.5 µm)

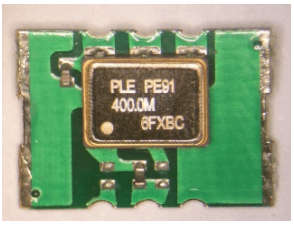
Label:
Laser engraved on the 5x7 mm oscillator that is mounted on the FR4 base

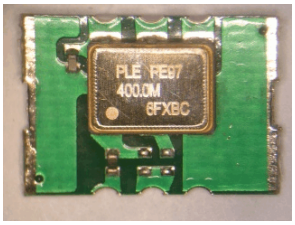
Pin 3 Ground plane is typical

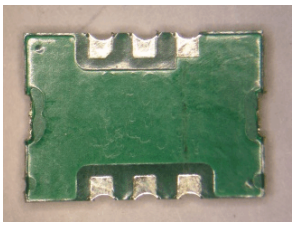
Not to scale

	Inches	mm
A	0.380 ±0.010	9.65 ±0.25
B	0.550 ±0.010	13.97 ±0.25
C	0.098 ±0.010	2.49 ±0.25
D[1]	0.026 typ.	0.66
E[1]	0.050	1.27
F[1]	0.028 R	0.72 R
G[1]	0.180	4.57
H[1]	0.100	2.54
I[1]	0.050	1.27
J[1]	0.015	0.38

[1] Typical Dimensions

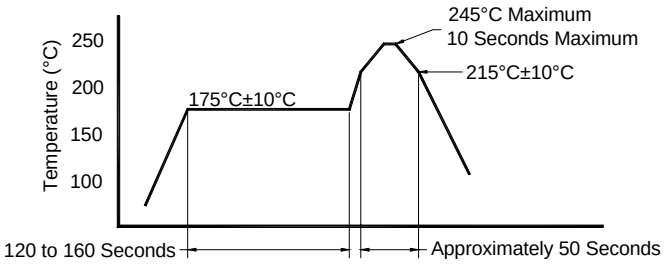






PE91 Pad	PE97 Pad	Function	Note
2	1	Output Enable/Disable	When this pad is not connected the oscillator shall operate. This is not a recommended condition!!!!!! When this pad is <0.80 volts, the output will be inhibited (High impedance state) Recommend connecting this pad to V_{CC} if the oscillator is to be always on.
1	2	No function	Recommend connecting this pad to ground. The is internal connection.
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. The outputs become a High Z when disabled and the voltage level is determined by the termination circuitry.
5		Output*	
6		Supply Voltage (V_{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

Reflow Cycle (typical for lead free processing)



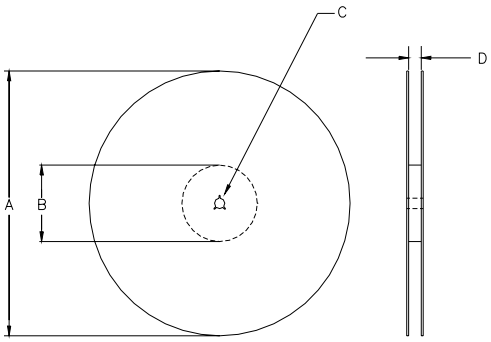
The part may be reflowed 2 times without degradation.

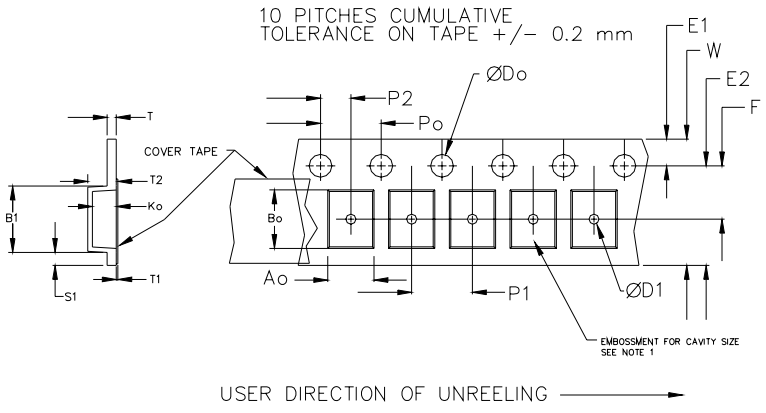
Tape and Reel: available for quantities of 250 to 1000 per reel

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						
16mm		1.5			2.0 ±0.1			
24mm		1.5						

Variable Dimensions Table 2							
Tape Size	B1 Max	E2 Min	F	P1	T2 Max	W Max	Ao, Bo & Ko
24 mm	12.1	14.25	7.5 ±0.1	16.0 ±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	Tape Width
C	mm	13.0 +0.5 / -0.2			
D	mm	---	---	24.4 +2.0 -0.0	24.0

Reel dimensions may vary from the above

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Contacting Pletronics Inc.

Pletronics Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880
Fax: 425-776-2760
E-mail: ple-sales@pletronics.com
URL: www.pletronics.com