

PE93D Series 3.3 V PECL Clock Oscillators

February 2008

Lead Free 

- Pletronics' PE93D 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.
- 5 x 7 mm LCC Ceramic Package
- Enable/Disable Function on pad 2
- Output frequency is synthesized.
- Low Jitter
- RoHS 6/6 Compliant

**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-020C

Second Level Interconnect code: e4

Absolute Maximum Ratings:

Parameter	Unit
V _{CC} Supply Voltage	-0.5V to +4.6V
V _i Input Voltage	-0.5V to V _{CC} + 0.5V
V _o Output Voltage	-0.5V to V _{CC} + 0.5V
I _o Output Current	-50mA

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:

PE93	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%
							Temperature Range blank = -10 to +70°C E = -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 PE93
FF.FFF M
• YMDXX

Marking Legend:

PLE = Pletronics
 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

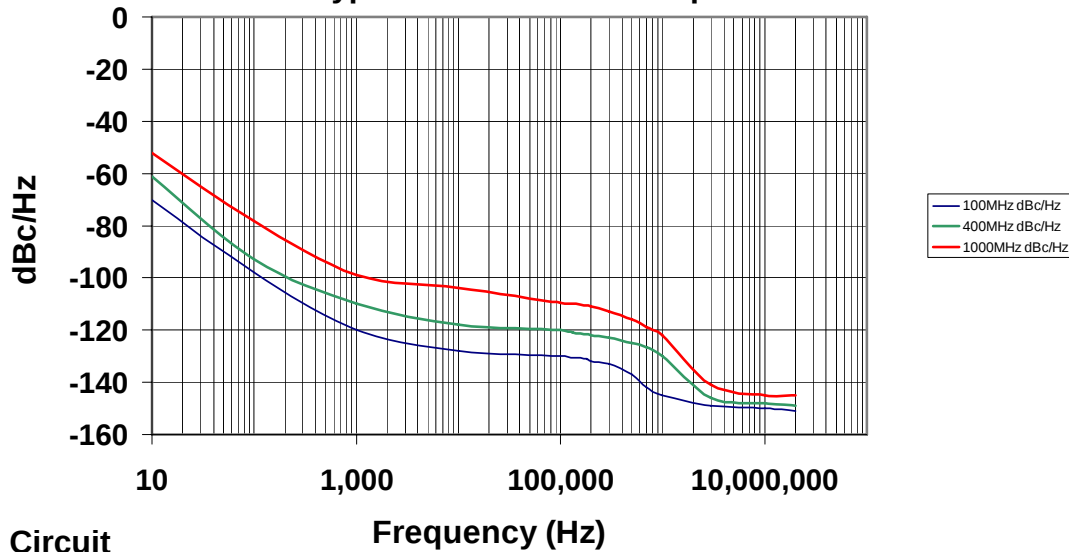
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Day	1	2	3	4	5	6	7	8	9	10	11	12
Code	D	E	F	G	H	J	K	L	M	N	P	R
Day	13	14	15	16	17	18	19	20	21	22	23	24
Code	T	U	V	W	X	Y	Z					
Day	25	26	27	28	29	30	31					

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

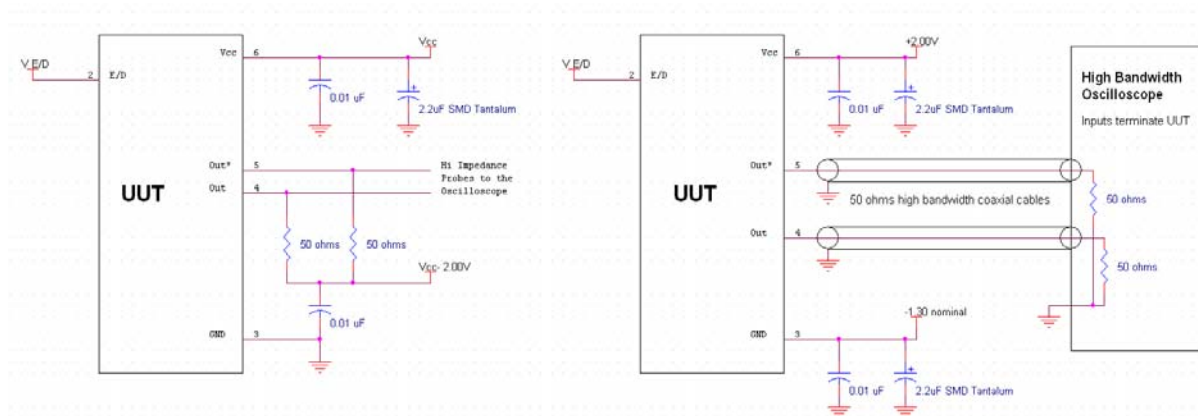
Item	Min	Max	Unit	Condition
Frequency Accuracy “45”	-50	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
“44”	-25	+25		
“20”	-20	+20		
Output Waveform	PECL / ECL			
Output High Level	2.12	2.49	volts	Referenced to Ground, V _{CC} = 3.3 V
	0.82	1.19	volts	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 Peak to Peak Level	0.405	1.076	volts	
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 Pad 1 E/D open circuit or connected to V_{CC}

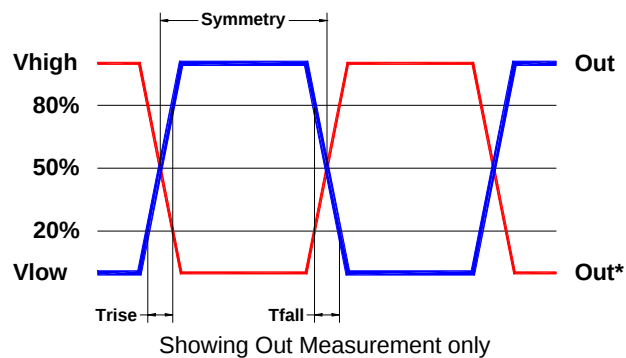
Typical Phase-Noise Response



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	2000	MIL-STD-883 Method 3115
Charged Device Model	1500	JESD 22-C101

Package Labeling

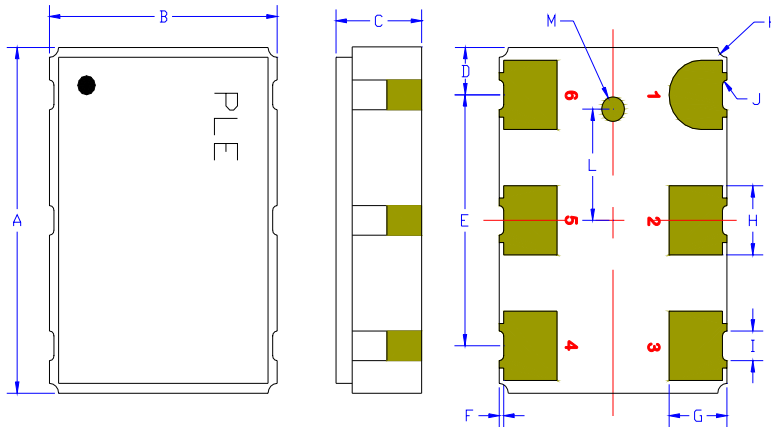
Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

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

P/N: 		
PE9344DV-312.50M		
Customer P/N: 		
12345678		
Qty: 	D/C	
1000		7AA-BT

RoHS Compliant 2nd LVL Interconnect Category=e4 Max Safe Temp=260C for 10s 2X Max

Mechanical:



Contacts:

Gold 11.8 μ inches 0.3 μ m minimum over
Nickel 50 to 350 μ inches 1.27 to 8.89 μ m

¹ Typical dimensions

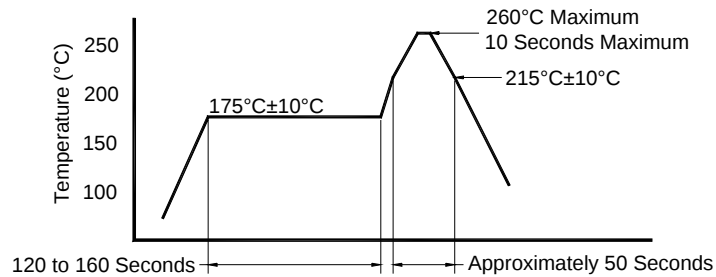
Not to Scale

Center metalized pad on the base is
not connected.

	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	1.70 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
L ¹	0.089	2.25
M ¹	0.010r	0.25r

Pad	Function	Note
1	No connect	The pad can be connected to Vcc, Ground or left open. This pad is internally connected. Connect to Vcc or Ground for best thermal resistance.
2	Output Enable/Disable	When this pad is not connected the oscillator shall operate. 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.
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)



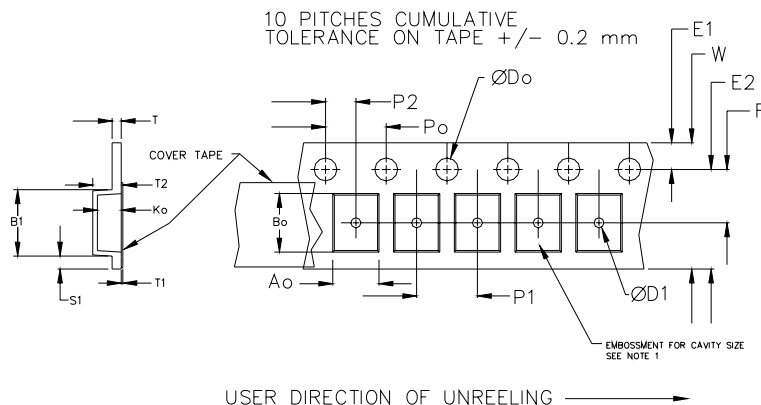
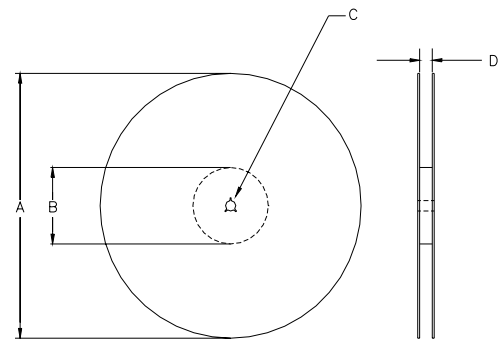
The part may be reflowed 2 times without degradation.

Tape and Reel: available for quantities of 250 to 1000 per reel, 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	4.0	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
	mm	---	---	24.4 +2.0 -0.0
	mm	---	---	32.4 +2.0 -0.0

Reel dimensions may vary from the above

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