

## PE3XB Series 2.5 V PECL Clock Oscillators

January 2008



**Do Not Use for New Designs - use PE55 or PE77**

- Pletronics' PE3XB Series is a quartz crystal controlled precision square wave generator with an PECL output.
- Solder pad compatible with many 9x14 Plastic J lead packages.
- FR4 base with a mechanical metal cover.
- Tape and Reel packaging is available.
- 1 to 250 MHz
- 9.9 mm x 13.97 mm 'B' package
- Enable/Disable Function:
  - PE33B** on pad 2
  - PE37B** on pad 1
- 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: 1.34 or .66 grams

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

Second Level Interconnect code: e4

### Absolute Maximum Ratings:

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +6.5V
V <sub>i</sub> Input Voltage	-0.5V to V <sub>CC</sub> + 0.5V
V <sub>o</sub> Output Voltage	-0.5V to V <sub>CC</sub> + 0.5V

### Thermal Characteristics

The maximum die or junction temperature is 155°C

The thermal resistance junction to board is 60 to 100°C/Watt depending on the solder pads, ground plane and construction of the PCB.

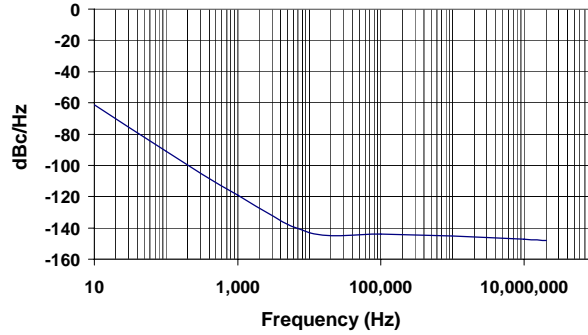


## Electrical Specification for 2.50V $\pm 5\%$ over the specified temperature range

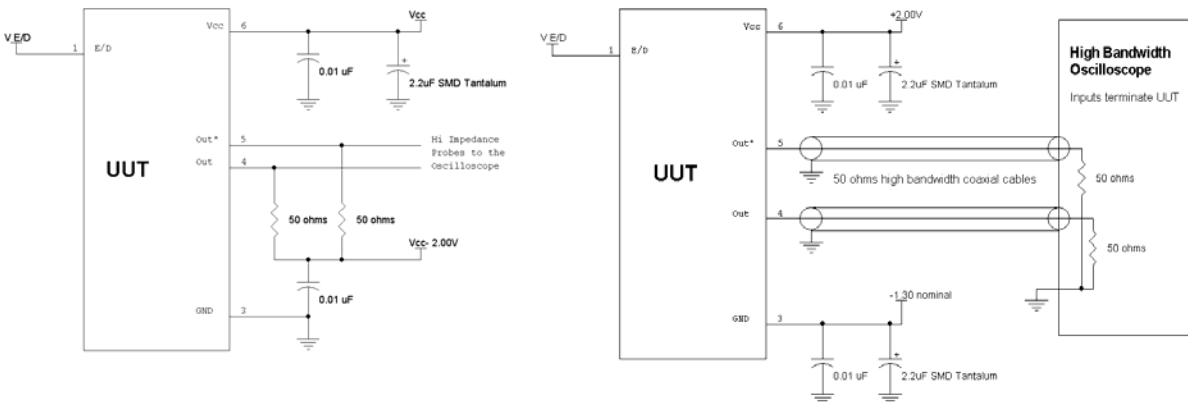
Item	Min	Max	Unit	Condition
Frequency Range	1	250	MHz	
Frequency Accuracy "45"	-50	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
"44"	-25	+25		
"20"	-20	+20		
Output Waveform	PECL /ECL			
Output High Level (0°C to 85°C)	1.475	1.760	volts	Referenced to Ground, $V_{CC} = 2.5\text{ V}$
	0.975	1.260	volts	Referenced to termination voltage, $V_{CC} = 2.5\text{ V}$
	-1.025	-0.740	volts	Referenced to $V_{CC}$ , $V_{CC} = 2.5\text{ V}$
Output High Level (-40°C)	1.415	1.620	volts	Referenced to Ground, $V_{CC} = 2.5\text{ V}$
	0.915	1.12	volts	Referenced to termination voltage, $V_{CC} = 2.5\text{ V}$
	-1.085	-0.88	volts	Referenced to $V_{CC}$ , $V_{CC} = 2.5\text{ V}$
Output Low Level (0°C to 85°C)	0.690	1.095	volts	Referenced to Ground, $V_{CC} = 2.5\text{ V}$
	0.190	0.595	volts	Referenced to termination voltage, $V_{CC} = 2.5\text{ V}$
	-1.810	-1.405	volts	Referenced to $V_{CC}$ , $V_{CC} = 2.5\text{ V}$
Output Low Level (-40°C)	0.670	1.195	volts	Referenced to Ground, $V_{CC} = 2.5\text{ V}$
	0.170	0.695	volts	Referenced to termination voltage, $V_{CC} = 2.5\text{ V}$
	-1.830	-1.305	volts	Referenced to $V_{CC}$ , $V_{CC} = 2.5\text{ V}$
Output Symmetry	45	55	%	at 50% point of $V_{CC}$ (See load circuit)
Jitter	-	0.13	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 $V_{CC}$
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		
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	-	10	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	
Standby Current $I_{CC}$	-	3	uA	Pad 1 low, device disabled

Specifications with E/D pad open circuit

## Typical Phase-Noise Response

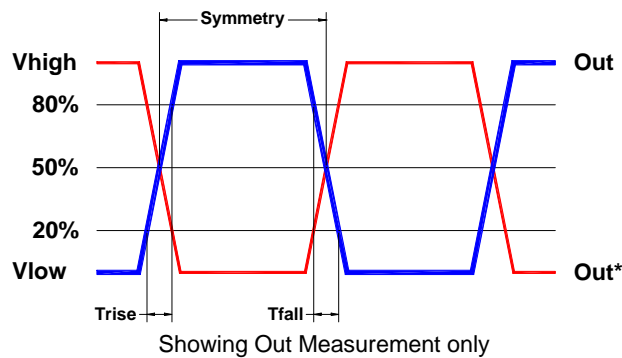


## Load Circuit



E/D shown on pad 1 for PE37B, will be on pad 2 for PE33B

## 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)

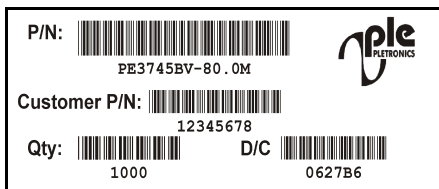
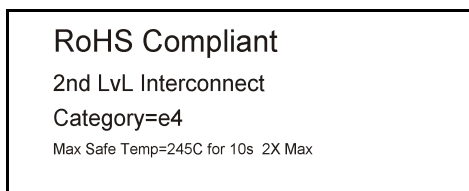
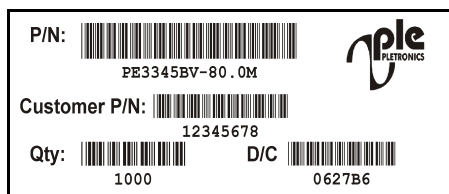
Font is Courier New

Bar code is 39-Full ASCII

The label does show the PE3 full part number

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

Font is Arial



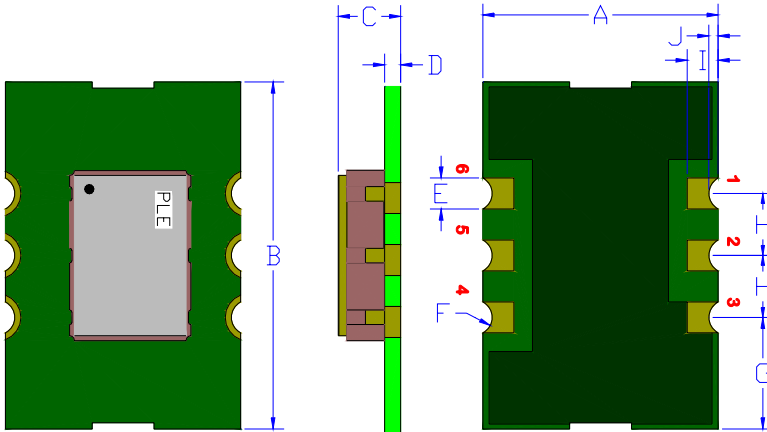
## Layout and application information

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

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.

## 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)

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	0.134 ±0.010	3.40 ±0.25
D <sup>1</sup>	0.062	1.57
E <sup>1</sup>	0.050	1.27
F <sup>1</sup>	0.028 R	0.72 R
G <sup>1</sup>	0.180	4.57
H <sup>1</sup>	0.100	2.54
I <sup>1</sup>	0.050	1.27
J <sup>1</sup>	0.015	0.38

<sup>1</sup> Typical Dimensions

### Label:

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

PE33 Pad	PE37 Pad	Function	Note
2	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 at a steady, non switching state. Recommend connecting this pad to V <sub>CC</sub> if the oscillator is to be always on.
1	2	No connect	There is no internal connection to this pad
3		Ground (GND)	
4		Output	The outputs must be terminated, 100 ohms between the outputs is the ideal termination. When the device is disabled, the Output will be an active logic low and the Output* will be an active logic high. The outputs can not be "wire-ORed" with other oscillators or signal generators
5		Output*	
6		Supply Voltage (V <sub>CC</sub> )	Recommend connecting appropriate power supply bypass capacitors as close as possible.

## Mechanical (obsolete version):

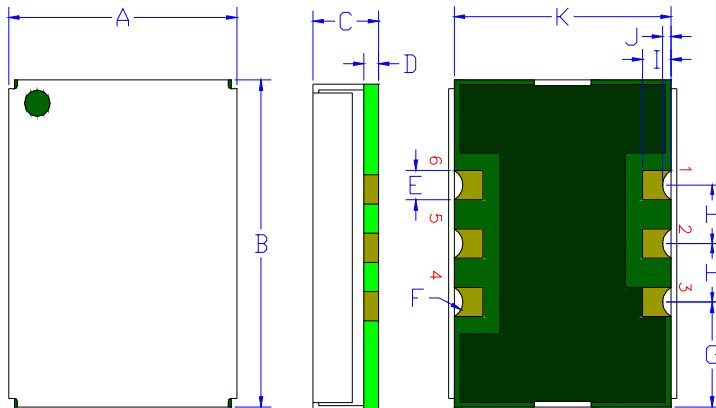
The cover is no longer being supplied over this part. This part is made with a hermetically sealed PE99xxDV series oscillator. This part is now exposed.

The cover has been deleted, the cover was causing problems with the newer high temperature RoHS lead free processes. The cover purpose was only cosmetic.

All parts with 2008 date codes will be made in the new fashion.

There is no change in electrical properties.

Pletronics does recommend that all designs should transition to the PE99xxDV ceramic part.



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:  
White Kapton with Black Letters  
—or—  
Blue Epoxy heat cure ink covering  
top with laser marked lettering

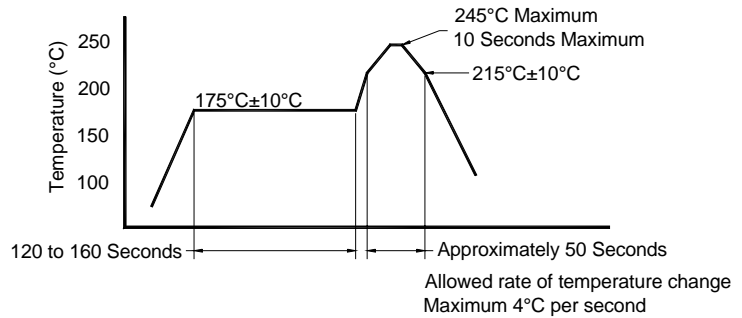
Cover:  
Centered on the base  
304 Stainless Steel  
0.010 inch (0.25µm)  
Electroless Nickel Plated  
1 µinch (25 µm) typical  
Pin 3 Ground plane is typical

**Not to scale**

	Inches	mm
B	0.550 ±0.010	13.97 ±0.25
A	0.390 ±0.010	9.90 ±0.25
C	0.105 ±0.010	2.67 ±0.25
D <sup>1</sup>	0.026 typ.	0.66
E <sup>1</sup>	0.050	1.27
F <sup>1</sup>	0.028 R	0.72 R
G <sup>1</sup>	0.180	4.57
H <sup>1</sup>	0.100	2.54
I <sup>1</sup>	0.050	1.27
J <sup>1</sup>	0.015	0.38
K <sup>1</sup>	0.380	9.65

- The package is not hermetically sealed.
- The sides are intentionally left open to permit cleaning material to freely flow in the package, thus minimizing the accumulation of contaminants during cleaning processes.
- The internal part of the package must be thoroughly dry before operating.

## Reflow Cycle (typical for lead free processing)



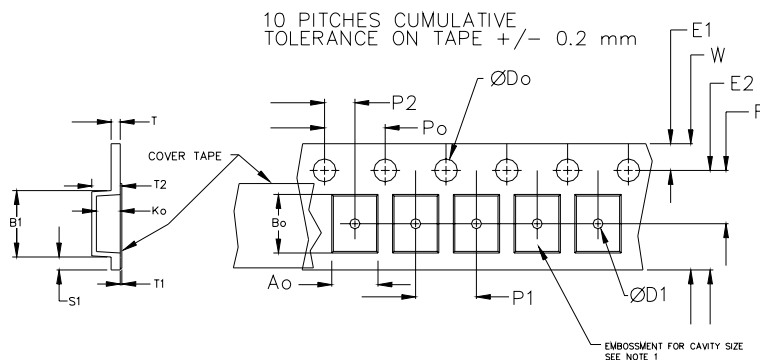
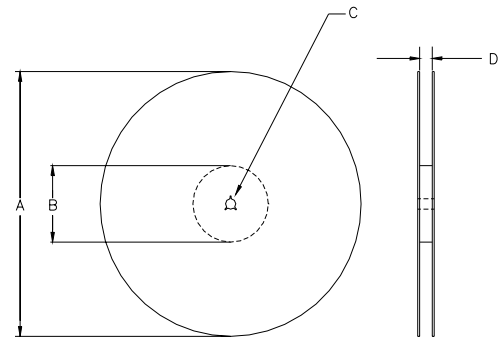
The part may be reflowed 2 times without degradation.

**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	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						

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



USER DIRECTION OF UNREELING →

		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	Tape Width
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			Tape Width
D	mm	---	---	24.4 +2.0 -0.0	

Reel dimensions may vary from the above





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January 2008

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