

PE3XB Series 2.5 V PECL Clock Oscillators

January 2008

Lead Free

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 _{CC} Supply Voltage	-0.5V to +6.5V
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 60 to 100°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Part Number:

PE3x 45 B E W -125.0M -XX

Part Marking:

	Packaging code or blank T250 = 250 per Tape and Reel T500 = 500 per Tape and Reel T1K = 1000 per Tape and Reel	PLE PE77 FFFFFM • YMDXX
	Frequency in MHz	
	Supply Voltage V_{CC} W = 2.5V $\pm$ 10%	
	Optional Enhanced OTR Blank = Temp. range -10 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 x is 3 = E/D on pad 2 x is 7 = E/D on pad 1	

Legend:

PLE = Pletronics

FFFFFM = Frequency in MHz

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

All other marking is internal factory codes

The marking is on the cover of the PE77 device

The marking is that of the PE77 device

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	6	7	8	9	0	1	2
Year	2006	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

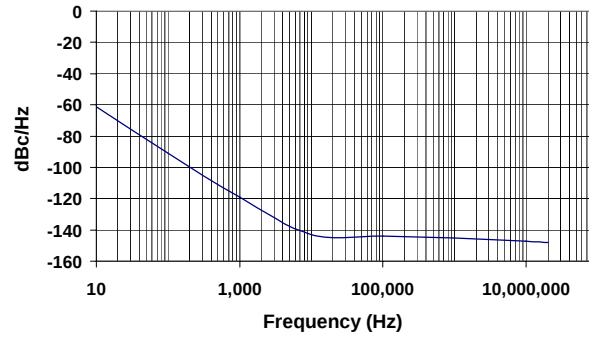
Code	1	2	3	4	5	6	7	8	9	A	B	C
Day	1	2	3	4	5	6	7	8	9	10	11	12
Code	D	E	F	G	H	J	K	L	M	N	P	R
Day	13	14	15	16	17	18	19	20	21	22	23	24
Code	T	U	V	W	X	Y	Z					
Day	25	26	27	28	29	30	31					

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

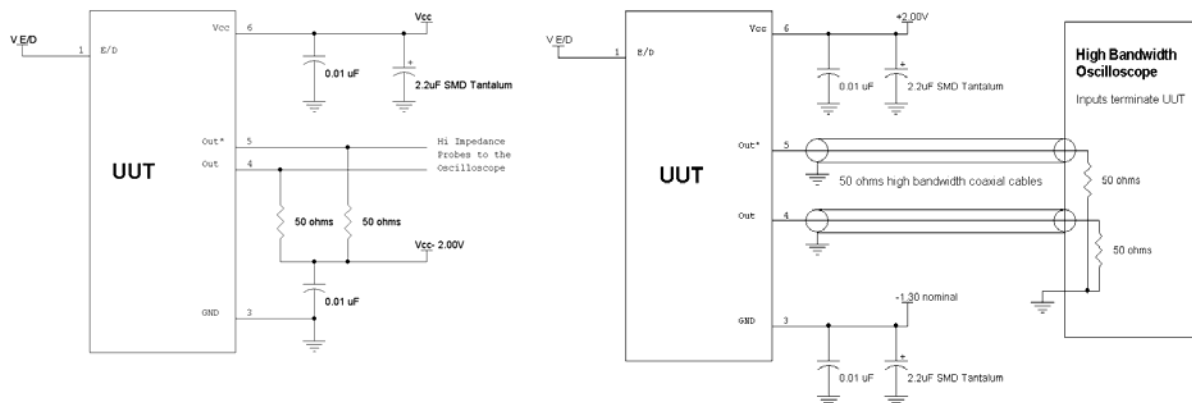
Item	Min	Max	Unit	Condition
Frequency Range	1	250	MHz	
Frequency Accuracy “45”	-50	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
“44”	-25	+25		
“20”	-20	+20		
Output Waveform	PECL /ECL			
Output High Level (0°C to 85°C)	1.475	1.760	volts	Referenced to Ground, V _{CC} = 2.5 V
	0.975	1.260	volts	Referenced to termination voltage, V _{CC} = 2.5 V
	-1.025	-0.740	volts	Referenced to V _{CC} , V _{CC} = 2.5 V
Output High Level (-40°C)	1.415	1.620	volts	Referenced to Ground, V _{CC} = 2.5 V
	0.915	1.12	volts	Referenced to termination voltage, V _{CC} = 2.5 V
	-1.085	-0.88	volts	Referenced to V _{CC} , V _{CC} = 2.5 V
Output Low Level (0°C to 85°C)	0.690	1.095	volts	Referenced to Ground, V _{CC} = 2.5 V
	0.190	0.595	volts	Referenced to termination voltage, V _{CC} = 2.5 V
	-1.810	-1.405	volts	Referenced to V _{CC} , V _{CC} = 2.5 V
Output Low Level (-40°C)	0.670	1.195	volts	Referenced to Ground, V _{CC} = 2.5 V
	0.170	0.695	volts	Referenced to termination voltage, V _{CC} = 2.5 V
	-1.830	-1.305	volts	Referenced to V _{CC} , V _{CC} = 2.5 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	+10	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	-	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

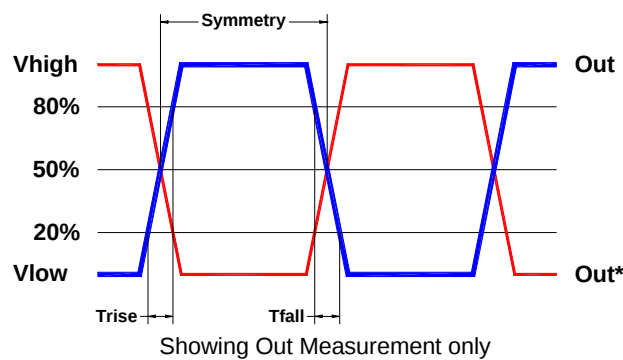


Load Circuit



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

Test Waveform



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)

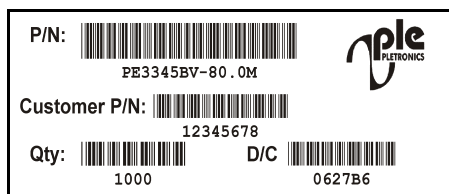
Font is Courier New

Bar code is 39-Full ASCII

The label does show the PE3 full part number

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

Font is Arial

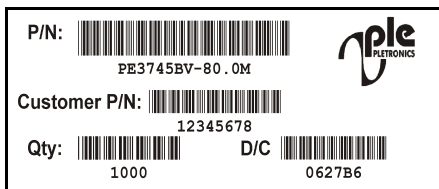


RoHS Compliant

2nd Lvl Interconnect

Category=e4

Max Safe Temp=245C for 10s 2X Max



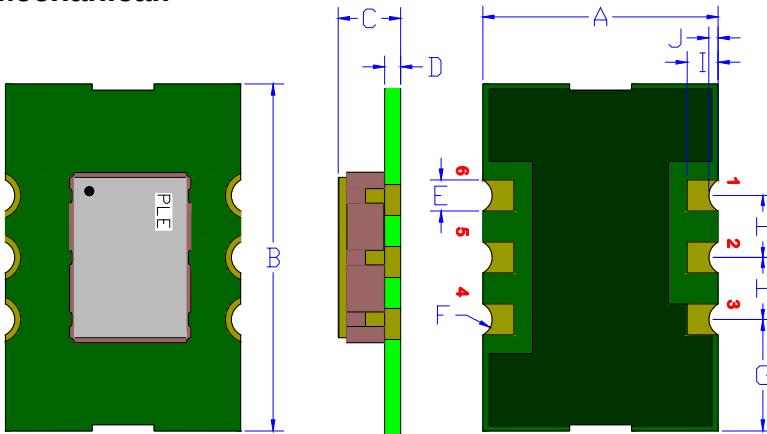
Layout and application information

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 $\pm$ 0.010	9.65 $\pm$ 0.25
B	0.550 $\pm$ 0.010	13.97 $\pm$ 0.25
C	0.134 $\pm$ 0.010	3.40 $\pm$ 0.25
D ¹	0.062	1.57
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

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 _{CC} 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.
5		Output*	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
6		Supply Voltage (V _{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

Mechanical (obsolete version):

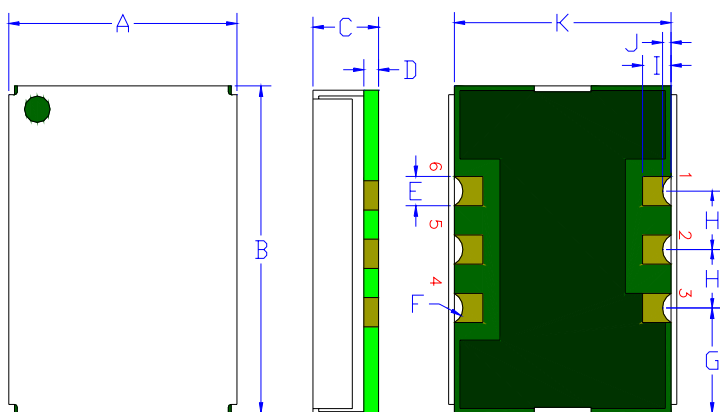
The cover is no longer being supplied over this part. This part is made with a hermetically sealed PE99xxDV series oscillator. This part is now exposed.

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

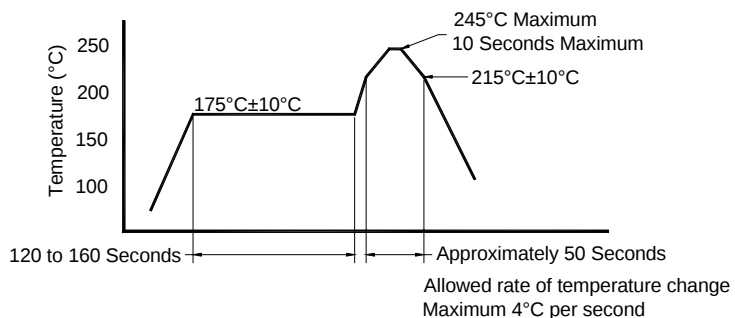
Pin 3 Ground plane is typical

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 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
K ¹	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)



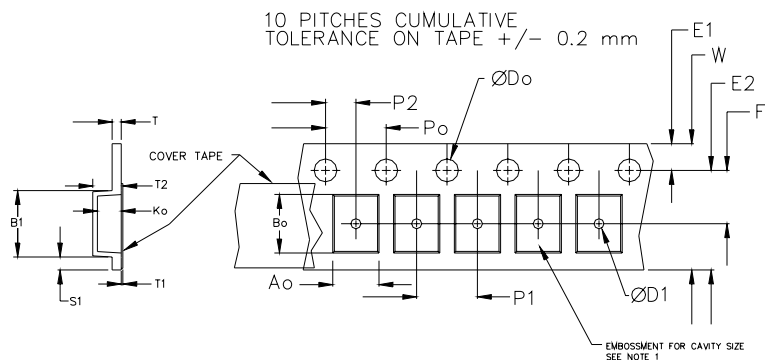
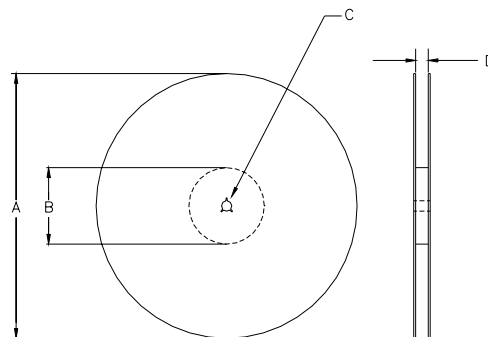
The part may be reflowed 2 times without degradation.

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 +0.1 -0.0	1.0	1.75 <u>+0.1</u>	4.0 <u>+0.1</u>	2.0 <u>+0.05</u>	0.6	0.6	0.1
12mm		1.5			2.0 <u>+0.1</u>			
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
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
	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	---	---	24.4 +2.0 -0.0
		24.0		

Reel dimensions may vary from the above

IMPORTANT NOTICE

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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

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