

# VLB7 Series 3.3 V LVDS VCXO Oscillators

December 2007

- Pletronics' VLB7 Series is a voltage - quartz crystal controlled precision square wave generator with a LVDS output.
- Tape and Reel or cut tape packaging.
- 10.9 MHz to 670 MHz
- 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: 2.18 grams or .82 grams or 1.51 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 +4.6V
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
I <sub>o</sub> 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.



# VPB7 Series 3.3 V LVDS VCXO Oscillators

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## Part Number:

VLB7029036	EG	000	050	- 312.5M	-XX	
						<b>Packaging code or blank</b> <b>T250</b> = 250 per Tape and Reel <b>T500</b> = 500 per Tape and Reel <b>T1K</b> = 1000 per Tape and Reel
						<b>Frequency in MHZ</b>
						<b>Pullability in ppm (Vcontrol) APR</b> <b>050</b> = ± 50 ppm minimum is standard
						<b>Series Model</b>
						<b>Temperature Range</b> <b>EG</b> = -10 to +70°C <b>LK</b> = -40 to +85°C
						<b>Series Model</b>

## Part Marking:

PLE VLB7  
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

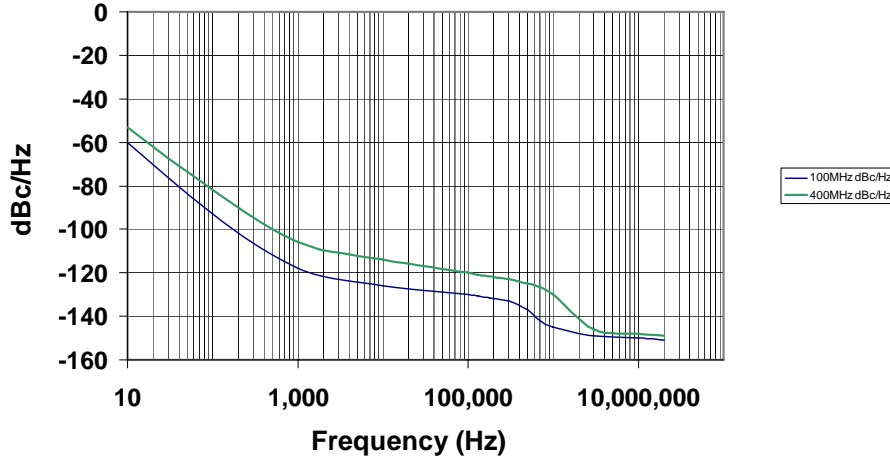
Code	1	2	3	4	5	6	7	8	9	A	B	C
Day	1	2	3	4	5	6	7	8	9	10	11	12
Code	D	E	F	G	H	J	K	L	M	N	P	R
Day	13	14	15	16	17	18	19	20	21	22	23	24
Code	T	U	V	W	X	Y	Z					
Day	25	26	27	28	29	30	31					

**Electrical Specification for 3.30V  $\pm$ 10% over the specified temperature range and the frequency range of 10.9 MHZ to 670 MHZ**

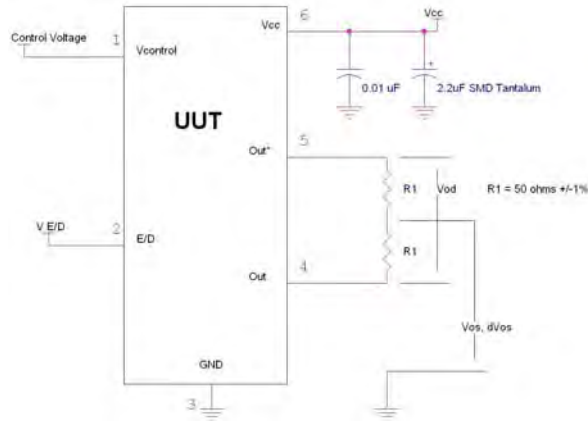
Item	Min	Max	Unit	Condition
Pullability, Absolute Pull Range	-50	+50	ppm	APR includes the effects of supply voltages, load changes, aging for 1 year, shock, vibration and temperature.
Output Waveform	LVDS			
Output High Level	--	1.60	Volts	See load circuit R1 = 50 ohms
Output Low Level	0.90	--	Volts	
Differential Output ( $V_{OD}$ )	250	450	mVolts	
Output Offset Voltage ( $V_{OS}$ )	1.125	1.375	Volts	
Differential Output Error ( $dV_{OS}$ )	--	50	mVolts	
Output Symmetry	47	53	%	Referenced to 50% of amplitude or crossing point
Output $T_{RISE}$ and $T_{FALL}$	150	230	pS	Vth is 20% and 80% of waveform
Jitter	-	0.8	pS RMS	Measured from 12KHz to 20MHz from Fnominal
	-	3.2		Measured from 10Hz to 20MHz from Fnominal
Output Short Circuit Current	-	-20	mA	Vout = 0.0V
Modulation Bandwidth	10	-	KHz	Vcontrol = 1.65V $\pm$ 1.50 V , -3dB
Vcontrol Resistance (Pad 1)	20	-	Kohm	
Voltage vs. Frequency Linearity	-10	+10	%	Vcontrol = 1.65V $\pm$ 1.50 V
Vcc Supply Current	-	90	mA	
Enable/Disable Internal Pull-up	50	-	Kohm	To Vcc (equivalent resistance)
V disable	-	0.8	Volts	Referenced to Ground
V enable	2.0	-	Volts	Referenced to Ground
Output leakage $V_{OUT} = V_{CC}$	-20	+20	$\mu$ A	Pad 1 low, device disabled
	$V_{OUT} = 0V$	-20		
Enable	-	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	Measured from the time Vcc = 3.0V
Operating Temperature Range	-10	+70	$^{\circ}$ C	Standard Temperature Range
	-40	+85	$^{\circ}$ C	Extended Temperature Range "E" Option
Storage Temperature Range	-55	+125	$^{\circ}$ C	

Specifications with Pad 2 E/D open circuit or connected to  $V_{CC}$

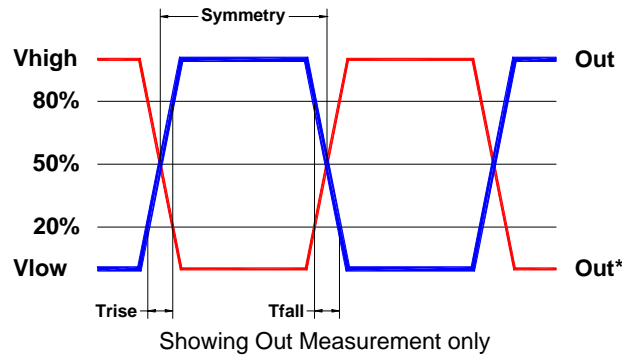
## Typical Phase-Noise Response



## 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

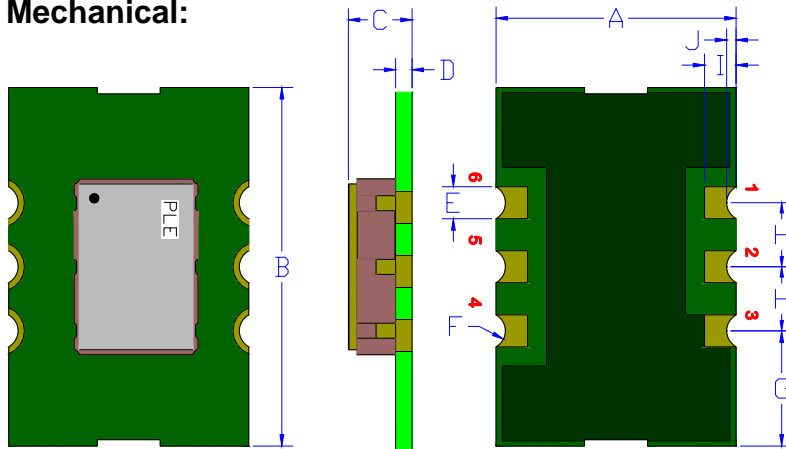
Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Courier New  
Bar code is 39-Full ASCII

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

<b>P/N:</b>  VLB7029036EG000050-312.50M	
<b>Customer P/N:</b>  12345678	
<b>Qty:</b>  500	<b>D/C</b>  7AB1

RoHS Compliant 2nd LvL Interconnect Category=e4 Max Safe Temp=260C for 10s 2X Max
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## 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	0.177 ±0.010	4.50 ±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

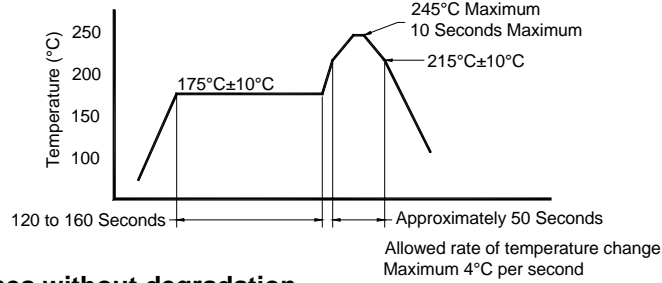
<sup>1</sup> Typical Dimensions

### Label:

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

Pad	Function	Note
1	Vcontrol	Modulates the output frequency
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 <sub>cc</sub> if the oscillator is to be always on.
3	Ground (GND)	
4	Output	The outputs must be terminated, 100 ohms between the outputs is the ideal termination. Capacitor coupled terminations can be used.
5	Output*	
6	Supply Voltage (V <sub>cc</sub> )	Recommend connecting appropriate power supply bypass capacitors as close as possible.

## Reflow Cycle (typical for lead free processing)



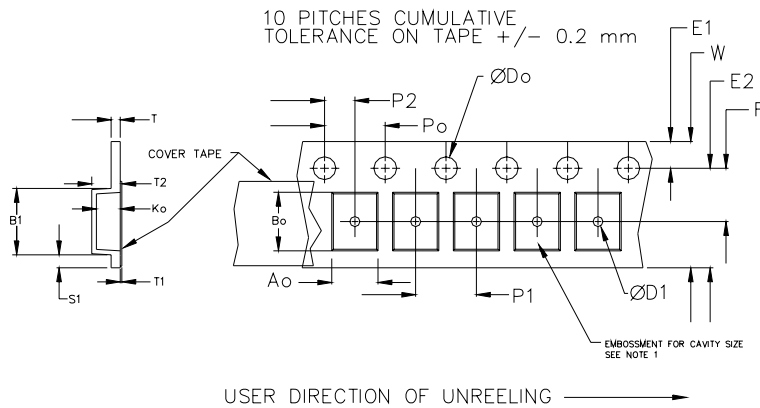
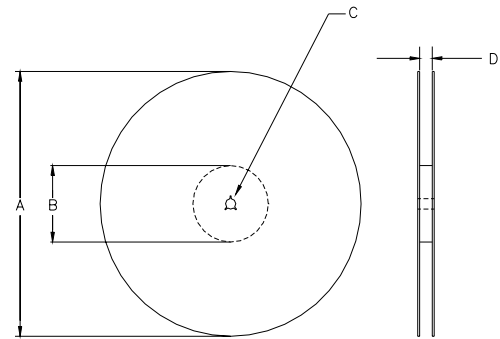
The part may be reflowed 2 times without degradation.

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	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			± 0.1			
24mm		1.5			± 0.1			

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			Tape Width
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	16.0
	mm	--	--	24.4 +2.0 -0.0	24.0
	mm	--	--	32.4 +2.0 -0.0	32.0

Reel dimensions may vary from the above