

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 _{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.



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Part Number:

| | | | | | | |
|------------|----|-----|-----|----------|-----|---|
| VLB7029036 | EG | 000 | 050 | - 312.5M | -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 |
| | | | | | | Pullability in ppm (Vcontrol) APR 050 = ± 50 ppm minimum is standard |
| | | | | | | Series Model |
| | | | | | | Temperature Range EG = -10 to +70°C LK = -40 to +85°C |
| | | | | | | Series Model |

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 |

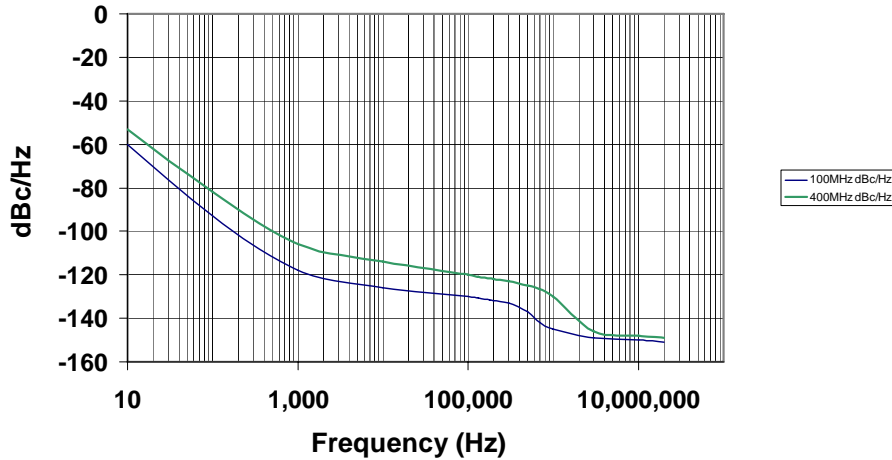
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C |
|------|----|----|----|----|----|----|----|----|----|----|----|----|
| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Code | D | E | F | G | H | J | K | L | M | N | P | R |
| Day | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 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

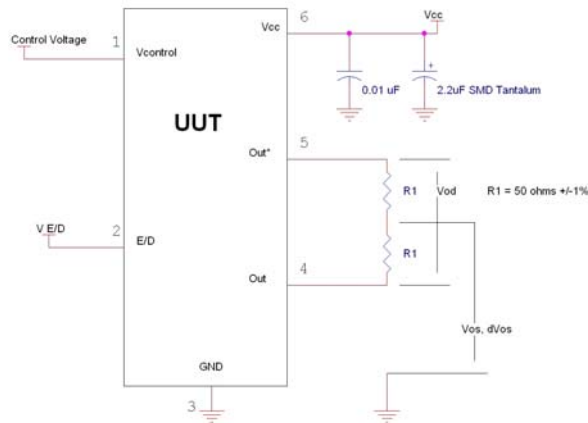
| Item | Min | Max | Unit | Condition |
|---|----------------|-------|--------------|--|
| Pullability, Absolute Pull Range | -50 | +50 | ppm | APR includes the effects of supply voltages, load changes, aging for 1 year, shock, vibration and temperature. |
| Output Waveform | LVDS | | | |
| Output High 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 | μ 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}

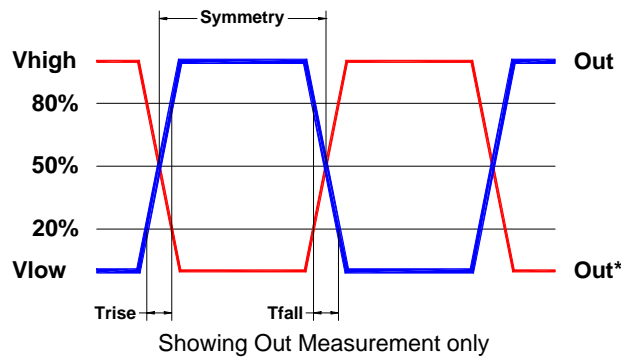
Typical Phase-Noise Response



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

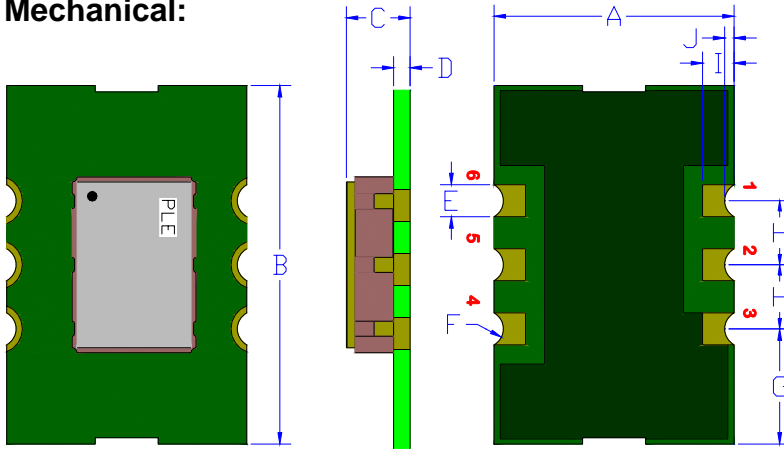
Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

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

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

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

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 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 |

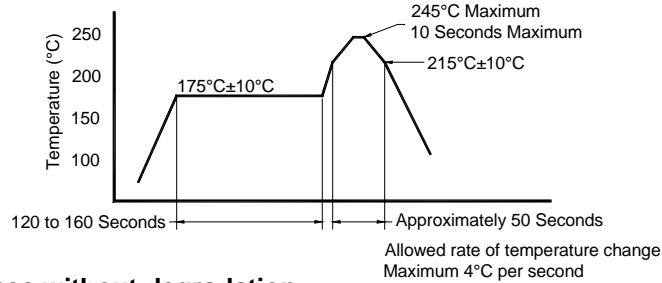
¹ Typical Dimensions

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 _{cc} 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 _{cc}) | Recommend connecting appropriate power supply bypass capacitors as close as possible. |

Reflow Cycle (typical for lead free processing)



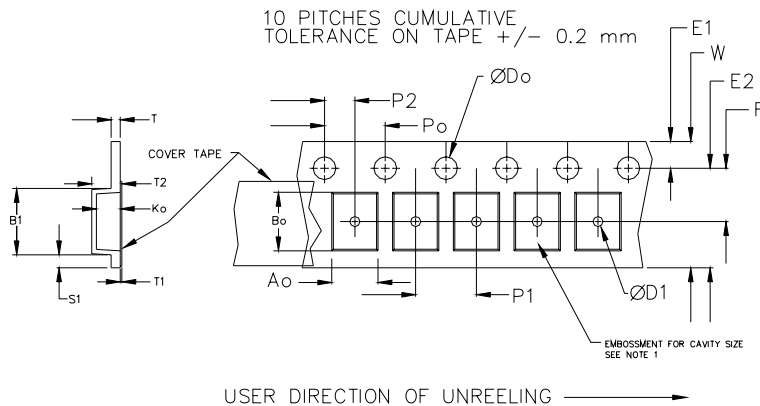
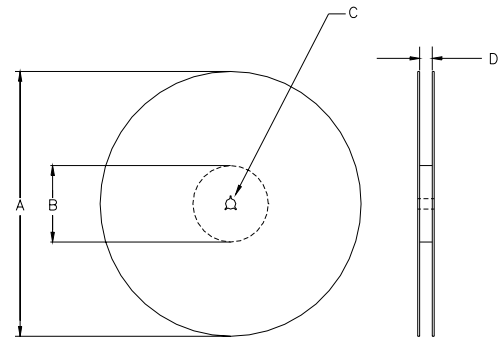
The part may be reflowed 2 times without degradation.

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 | 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



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