

## LV88D Single Frequency LVDS Clock Oscillators

April 2005



- Pletronics' LV88D Series is a quartz crystal controlled precision square wave generator with an LVDS output.
- The package is designed for high density surface mount designs.
- Low cost mass produced oscillator.
- Tape and Reel or Tube packaging is available.
- 106.25 MHz or 212.50 MHz
- 5 x 7 mm LCC Ceramic Package
- Enable/Disable Function on pad 1
- $V_{CC}$  of 3.3 volts
- Low Jitter

**Pletronics Inc. certifies this device is in accordance with the  
RoHS (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: 0.2 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 +7.0V
$V_i$ 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 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

## Part Number:

LV88	45	D	E	V	-106.25M	-XX	Marking
Internal code or blank							
Frequency in MHz 106.25 MHz or 212.5 MHz							106.25M 212.50M
Supply Voltage $V_{CC}$ $V = 3.3V \pm 10\%$							V
Enhanced Specification E = Temperature range -40 to 85°C							E
Series Model							
Frequency Stability 45 = $\pm 50$ ppm 44 = $\pm 25$ ppm 20 = $\pm 20$ ppm							5 4 2
Series Model							LV8

## Part Marking:

LV8xywwa  
fff.fff M  
PLE ss

Where: x = Frequency stability  
ywwa = Date code  
fff.fff = frequency in MHz  
ss = Enhanced specification and voltage

Pletronics may ship the following combinations without notice (this is an enhanced specified device)

- 44 (25 ppm) stability parts when 45 (50 ppm) was ordered
- 20 (20 ppm) stability parts when 45 (50 ppm) or 44 (25 ppm) was ordered.
- E temperature range parts when extended was not ordered.

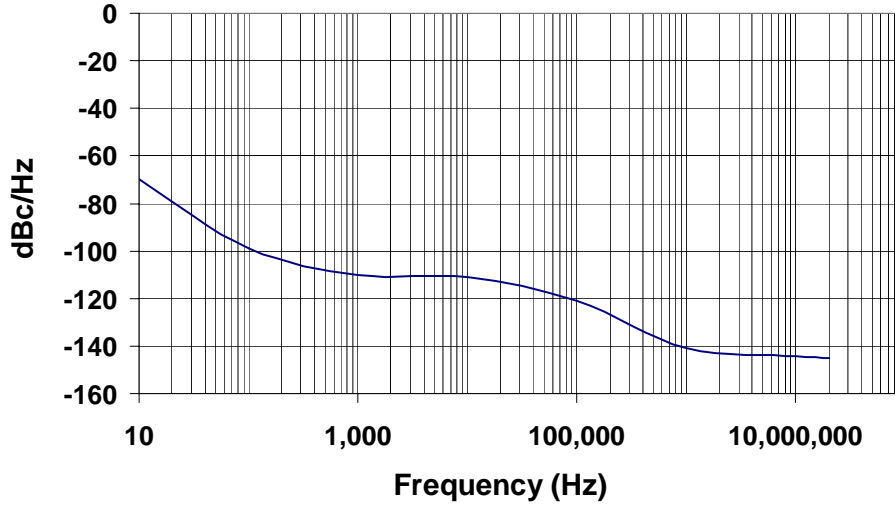
Pletronics may ship parts that are not marked for extended temperature range but were tested for extended temperature range, a Certificate of Conformance will accompany these parts.

## Electrical Specification for 3.30V $\pm 10\%$ over the specified temperature range

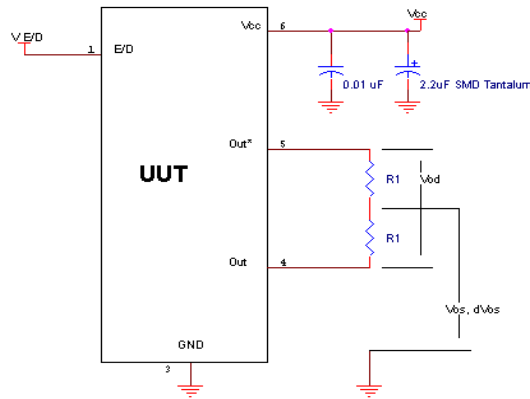
Item	Min	Max	Unit	Condition
Frequency Range	106.25	212.50	MHz	
Frequency Accuracy "45"	-50	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
"44"	-25	+25		
"20"	-20	+20		
Output Waveform	LVDS			
Output High Level	--	1.47	Volts	See load circuit R1 = 50 ohms
Output Low Level	0.93	--	Volts	See load circuit R1 = 50 ohms
Differential Output ( $V_{OD}$ )	200	400	mVolts	See load circuit R1 = 50 ohms
Output Offset Voltage ( $V_{OS}$ )	1.125	1.275	Volts	See load circuit R1 = 50 ohms
Differential Output Error ( $dV_{OS}$ )	--	25	mVolts	See load circuit R1 = 50 ohms
Output Symmetry	48	52	%	Referenced to 50% of amplitude or crossing point
Output $T_{RISE}$ and $T_{FALL}$	200	600	pS	$V_{th}$ is 20% and 80% of waveform
Jitter	-	0.8	pS RMS	Measured 12KHz to 20MHz from Fnominal
	-	1.5		Measured 10Hz to 1MHz from Fnominal
Output Current		12	mA	Outputs shorted together
Vcc Supply Current	-	68	mA	Includes current of properly terminated device
V disable	-	0.8	Volts	Outputs held in a fixed state
V enable	2.0	-	Volts	
Input High Current	-10	+10	$\mu$ A	Pad 1 at $V_{CC}$
Input Low Current	-50	+10	$\mu$ A	Pad 1 at 0 Volts
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 $V_{CC} = 3.0V$
Operating Temperature Range	0	+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 1 E/D open circuit unless otherwise stated

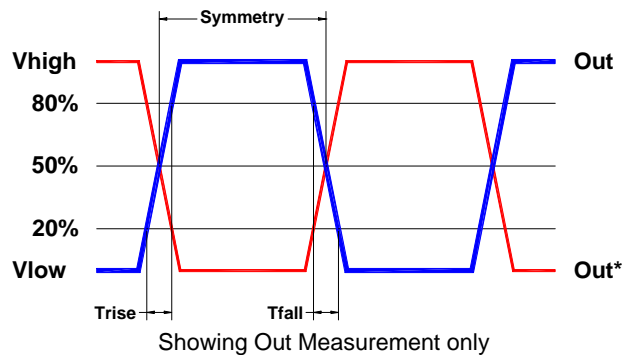
## Typical Phase-Noise Response



## Load Circuit



## Test Waveform



## Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition A
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

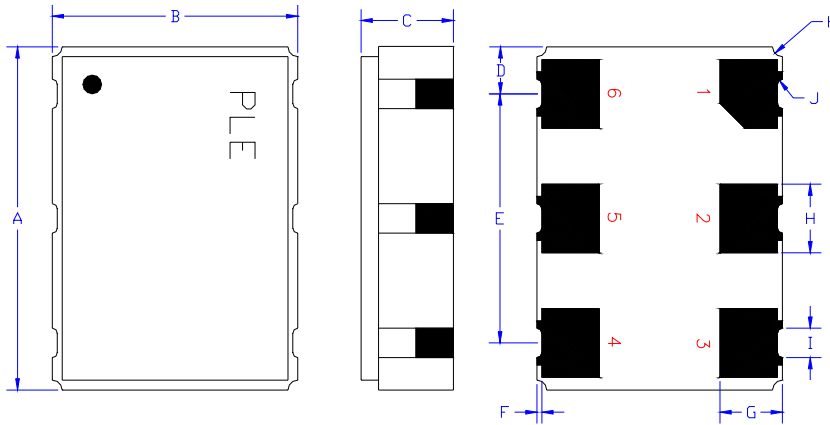
Label is 1" x 2.6" (25.4mm x 66.7mm)  
Font is Courier New  
Bar code is 39-Full ASCII

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

P/N:		
	LV8845DV-106.25M	
Customer P/N:		
	12345678	
Qty:		D/C 
	1000	75501B

Pb Free
2nd LvL Interconnect
Category=e4
Max Safe Temp=260C for 10s

## Mechanical:



	Inches	mm
A	0.276 ±0.006	7.00 ±0.15
B	0.197 ±0.006	5.00 ±0.15
C	0.063 ±0.012	1.87 ±0.30
D <sup>1</sup>	0.038	0.96
E <sup>1</sup>	0.200	5.08
F <sup>1</sup>	0.004	0.10
G <sup>1</sup>	0.050	1.27
H <sup>1</sup>	0.055	1.40
I <sup>1</sup>	0.024	0.60
J <sup>1</sup>	0.004R	0.10R
K <sup>1</sup>	0.008R	0.20R

### Contacts:

Gold 11.8 μinches 0.3 μm minimum over  
Nickel 50 to 350 μinches 1.27 to 8.89 μm

<sup>1</sup> Typical dimensions

Not to Scale

Pad	Function	Note
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 set Output high and Output* low, the outputs are not in a high impedance condition. Recommend connecting this pad to V <sub>CC</sub> if the oscillator is to be always on.
2	No connect	No internal connection
3	Ground (GND)	
4	Output	The outputs must be terminated, 100 ohms between the outputs is the ideal termination.
5	Output*	
6	Supply Voltage (V <sub>CC</sub> )	Recommend connecting appropriate power supply bypass capacitors as close as possible.

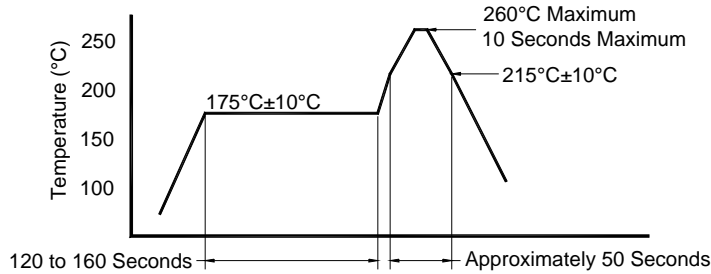


## Layout and application information

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.

## Reflow Cycle (typical for lead free processing)



The part may be reflowed 2 times without degradation.

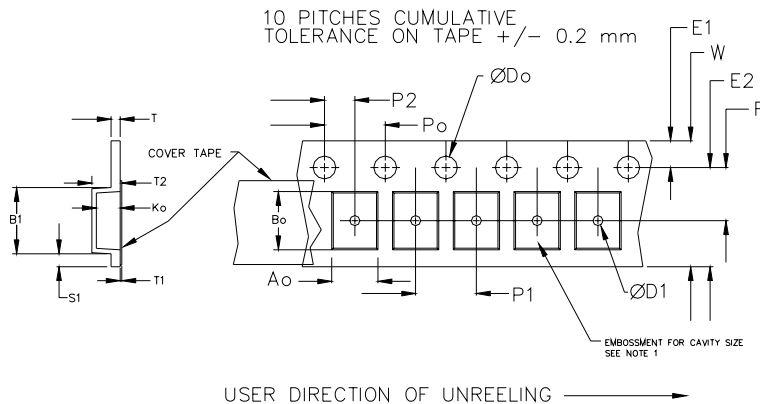
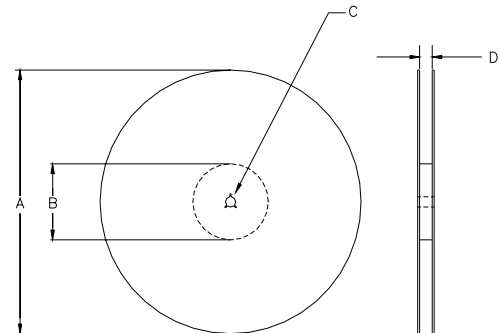
Allowed rate of temperature change  
Maximum 4°C per second

## Tape and Reel: available for quantities of 250 to 1000 per reel

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 ±0.1	4.0 ±0.1	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	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	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	24.0
	mm	---	---	32.4 +2.0 -0.0	32.0

Reel dimensions may vary from the above



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## IMPORTANT NOTICE

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