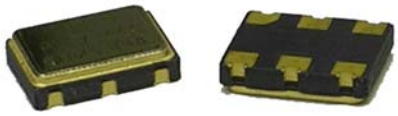
LV88D Dual Frequency LVDS Clock Oscillators

April 2007



- 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 cut tape packaging is available.
- 106.25 MHz or 212.50 MHz may be selected thru Pad 2 (see page 6)
- 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 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: 0.16 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
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo 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.

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Part Number:

LV88	45	D	E	V	-106 / 212M	-XX

-XX — **Packaging code or blank**
T250 = 250 per Tape and Reel
T500 = 500 per Tape and Reel
T1K = 1000 per Tape and Reel

-106 / 212M — **Frequency in MHz**
106.25 or 212.50 MHz are user switchable via Pad 2

V — **Supply Voltage V_{cc}**
V = 3.3V ± 10%

E — **Optional Enhanced OTR**
Blank = Temp. range -10 to +70°C
E = Temp. range -40 to +85°C

D — **Series Model**

45 — **Frequency Stability**
45 = ± 50 ppm
44 = ± 25 ppm
20 = ± 20 ppm

LV88 — **Series Model**

Part Marking:

PLE LV88
106/212M
• ***YMDXX***

or

LV8XYWWXX
106/212 M
• ***PLE XXX***

Marking Legend:
PLE = Pletronics
YYWW or YWW or *YMD* = Date of Manufacture (year and week, or year-month-day)
All other marking is internal factory codes

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

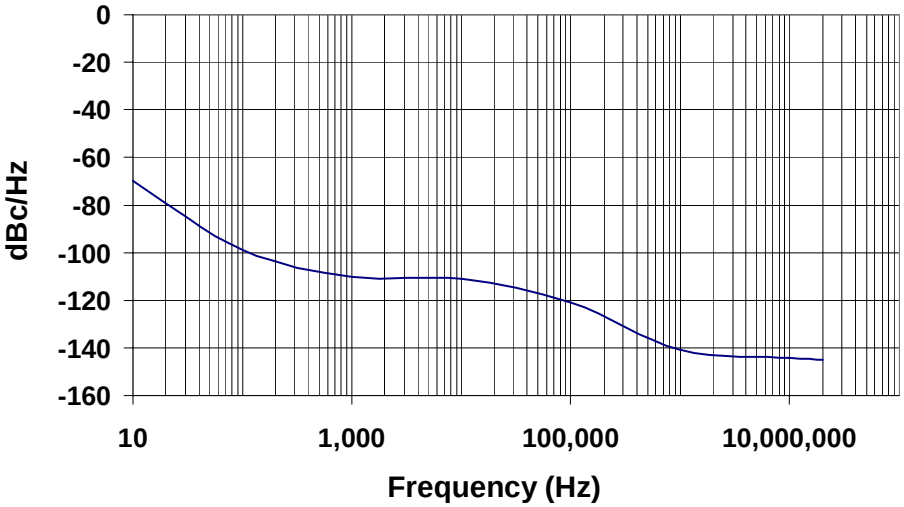
Code	1	2	3	4	5	6	7	8	9	A	B	C
Day	1	2	3	4	5	6	7	8	9	10	11	12
Code	D	E	F	G	H	J	K	L	M	N	P	R
Day	13	14	15	16	17	18	19	20	21	22	23	24
Code	T	U	V	W	X	Y	Z					
Day	25	26	27	28	29	30	31					

Electrical Specification for 3.30V ±10% over the specified temperature range

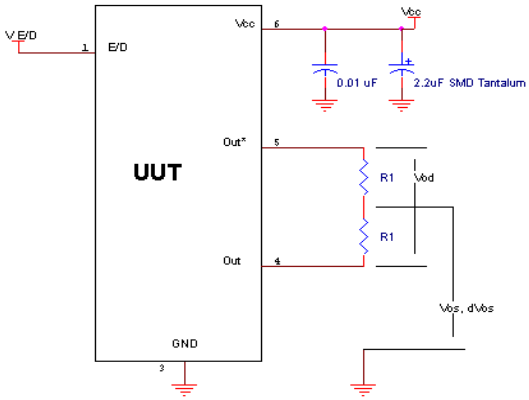
Item	Min	Max	Unit	Condition
Frequency Range	106.25	212.50	MHz	
Frequency Accuracy "**45**"	-50	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
"**44**"	-25	+25		
"**20**"	-20	+20		
Output Waveform	LVDS			
Output High Level	--	1.47	Volts	See load circuit R1 = 50 ohms
Output Low Level	0.93	--	Volts	
Differential Output (V_{OD})	200	400	mVolts	
Output Offset Voltage (V_{OS})	1.125	1.275	Volts	
Differential Output Error (dV_{OS})	--	25	mVolts	
Output Symmetry	48	52	%	Referenced to 50% of amplitude or crossing point
Output T_{RISE} and T_{FALL}	200	600	pS	Vth 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 terminated device
V disable / Frequency Select Low	-	0.8	Volts	Outputs held in a fixed state
V enable / Frequency Select High	2.0	-	Volts	
Input High Current	-10	+10	uA	Pad 1 or Pad 2 at V_{CC}
Input Low Current	-50	+10	uA	Pad 1 or Pad 2 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 Vcc = 3.0V
Operating Temperature Range	-10	+70	°C	Standard Temperature Range
	-40	+85	°C	Extended Temperature Range "**E**" Option
Storage Temperature Range	-55	+125	°C	

Specifications with Pad 1 E/D open circuit unless otherwise stated

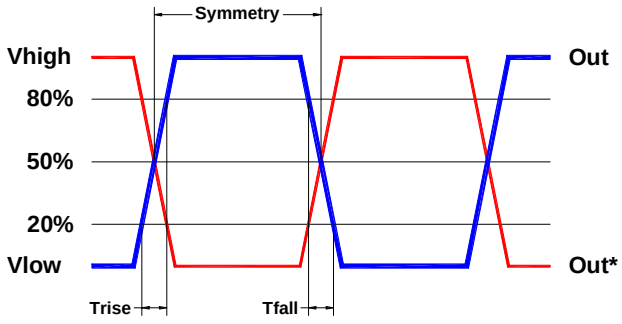
Typical Phase-Noise Response



Load Circuit



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

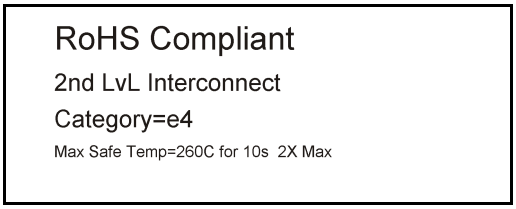
ESD Rating

Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

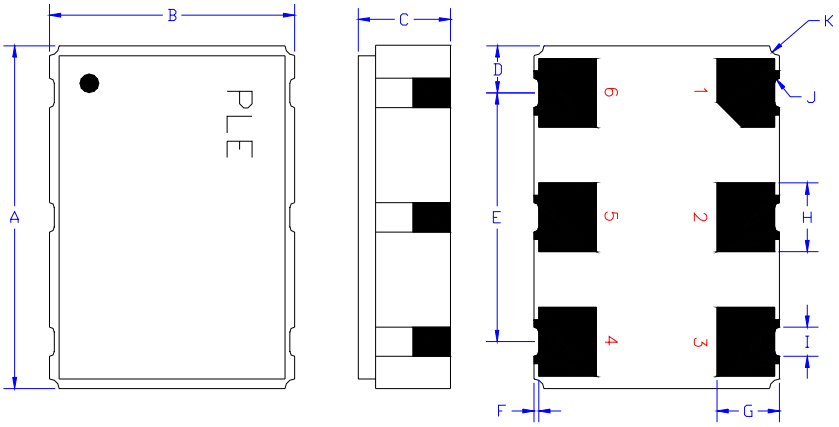
Package Labeling

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

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



Mechanical:



	Inches	mm
A	0.276 ±0.006	7.00 ±0.15
B	0.197 ±0.006	5.00 ±0.15
C	0.067 max	1.70 max
D[1]	0.038	0.96
E[1]	0.200	5.08
F[1]	0.004	0.10
G[1]	0.050	1.27
H[1]	0.055	1.40
I[1]	0.024	0.60
J[1]	0.004R	0.10R
K[1]	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

[1] Typical dimensions

Not to Scale

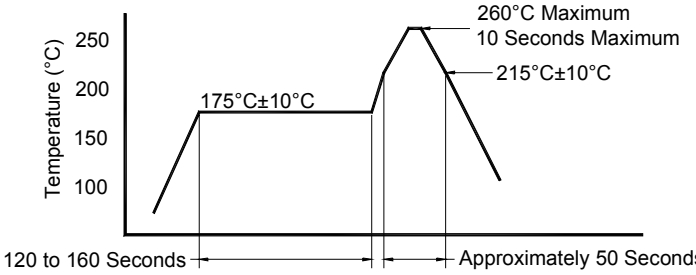
Pad	Function	Note
1	Output Enable/Disable	When this pad is not connected the oscillator shall operate. When this pad is <0.30 volts, the output will be set Output high and Output* low, the outputs are not in a high impedance condition. Recommend connecting this pad to V_{CC} if the oscillator is to be always on.
2	Frequency Select	Logic High: 106.25 MHz, Logic Low: 212.50 MHz
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_{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

Lead Free

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)



Allowed rate of temperature change
Maximum 4°C per second

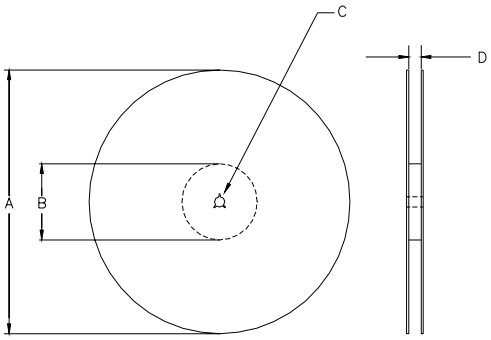
The part may be reflowed 2 times without degradation.

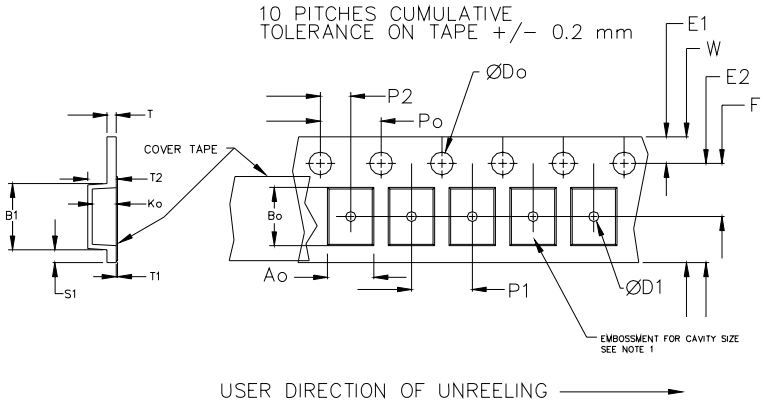
Tape and Reel: available for quantities of 250 to 1000 per reel, cut tape for < 250

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 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5						
16mm		1.5			2.0 ±0.1			
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	
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	
	mm	63.5	101.6	95.3	Tape Width
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

Reel dimensions may vary from the above

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