

LV77D Series 3.3 V LVDS Clock Oscillators

Jan 2006



- Pletronics' LV77D 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.
- 1 to 250 MHz
- 5 x 7 mm LCC Ceramic Package
- Enable/Disable Function on pad 1
- Disable function includes low standby power mode
- 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 +5.0V
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:

LV77 45 D E V -125.0M -XX	Marking
	Internal code or blank
	Frequency in MHz <i>fff.fff</i> M
	Supply Voltage V_{CC} $V = 3.3V \pm 10\%$ V or B
	Enhanced Specification E = Temperature range -40 to 85°C E
	Series Model
	Frequency Stability 45 = + 50 ppm 44 = + 25 ppm 20 = + 20 ppm 5 4 2
	Series Model LV7

Part Marking:

LV7xywwaz
fff.fff M
PLE ss

Where: x = Frequency stability
 ywwaz = 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.

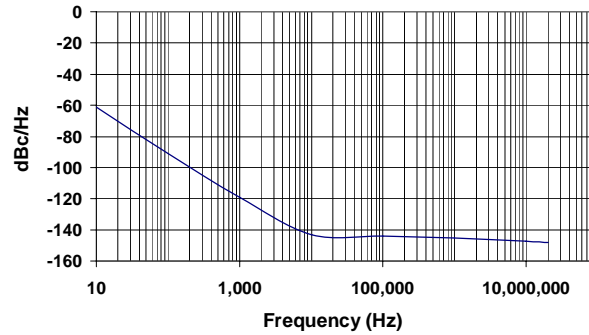
Pletronics may ship parts that are not marked for extended temperature range but were tested for extended temperature range, a Certificate of Conformance will accompany these parts.

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

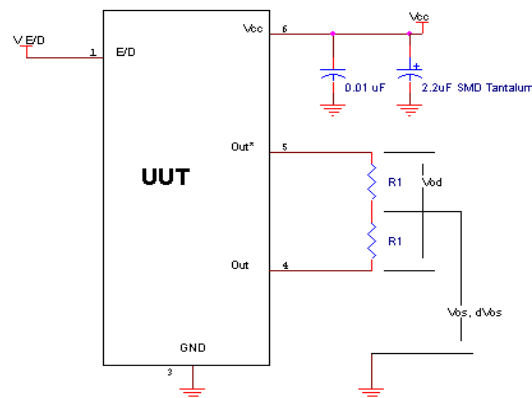
Item	Min	Max	Unit	Condition	
Frequency Range	1	250	MHz		
Frequency Accuracy "45"	-50	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures	
"44"	-25	+25			
"20"	-20	+20			
Output Waveform	LVDS				
Output High Level	--	1.60	Volts	See load circuit R1 = 50 ohms	
Output Low Level	0.90	--	Volts		
Differential Output (V_{OD})	250	450	mVolts		
Output Offset Voltage (V_{OS})	1.125	1.375	Volts		≥ 80 MHz
	1.125	1.500	Volts		< 80 MHz
Differential Output Error (dV_{OS})	--	50	mVolts	-	
Output Symmetry	45	55	%	Referenced to 50% of amplitude or crossing point	
Output T_{RISE} and T_{FALL}	300	700	pS	≥ 80 MHz	
	400	900	pS	< 80 MHz	
Jitter	-	0.15	pS RMS	Measured from 12KHz to 20MHz from Fnominal	
	-	2.8		Measured from 10Hz to 1MHz from Fnominal	
Vcc Supply Current	-	66	mA	≥ 80 MHz	
	-	45	mA	< 80 MHz	
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 $V_{OUT} = V_{CC}$	-10	+10	μ A	Pad 1 low, device disabled	
	$V_{OUT} = 0V$	-10	+10		μ A
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	≥ 80 MHz	
	-	3	mS	< 80 MHz	
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		
Standby Current I_{CC}	-	3	μ A	≥ 80 MHz	
	-	1.5	mA	< 80 MHz	

Specifications with Pad 1 E/D open circuit

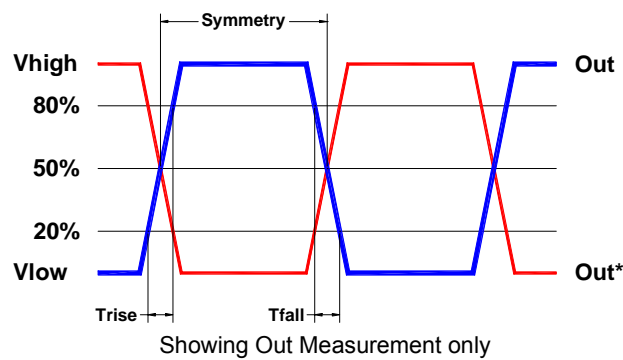
Typical Phase-Noise Response



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

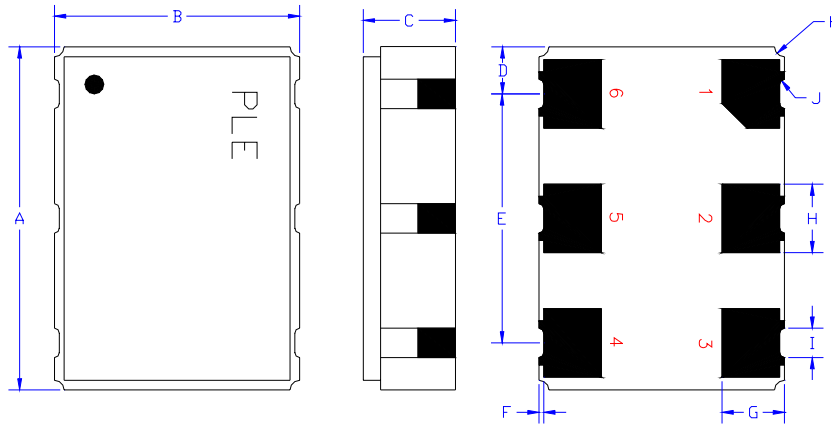
Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

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

P/N:		
	LV7745DV-100.0M	
Customer P/N:		
	12345678	
Qty:		D/C 
	1000	75501

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

Mechanical:



	Inches	mm
A	0.276 \pm 0.006	7.00 \pm 0.15
B	0.197 \pm 0.006	5.00 \pm 0.15
C	0.063 \pm 0.012	1.87 \pm 0.30
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 pinches 0.3 μ m minimum over
Nickel 50 to 350 pinches 1.27 to 8.89 μ m

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 inhibited (high impedance state.) Recommend connecting this pad to V _{CC} if the oscillator is to be always on.
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*	
6	Supply Voltage (V _{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.



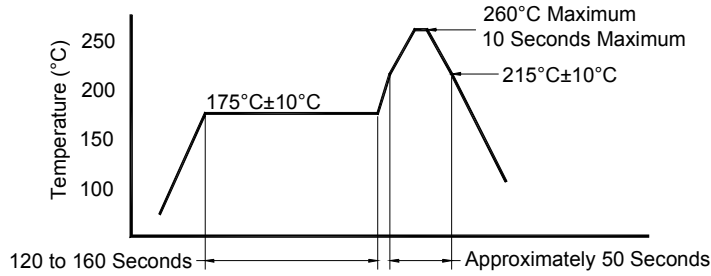
Layout and application information

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.

Reflow Cycle (typical for lead free processing)



The part may be reflowed 2 times without degradation.

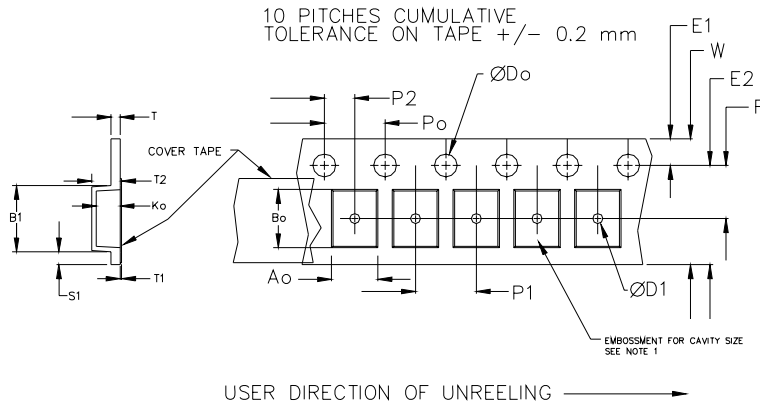
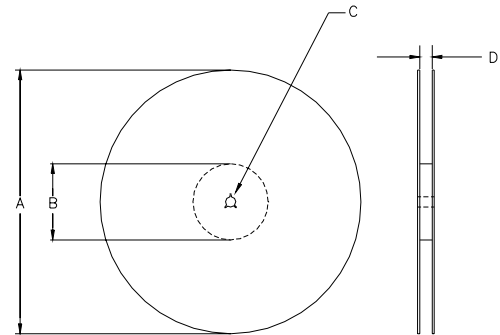
Allowed rate of temperature change
Maximum 4°C per second

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			2.0 ±0.1			
24mm		1.5			2.0 ±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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