LV77D Series 3.3 V
LVDS Clock Oscillators

June 2019

- 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 cut tape packaging is available.
- 5 x 7 mm LCC Ceramic Package
- Enable/Disable Function on pad 1
- Disable function includes low standby power mode
- Low Jitter
- 80 MHz ~ 325 MHz

Pletronics Inc. certifies this device is in accordance with the RoHS 6/6 (2011/65/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-020D.1
Second Level Interconnect code: e4

Absolute Maximum Ratings:

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +5.0V
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.

Product information is current as of publication date. The product conforms to specifications per the terms of the Pletronics standard warranty. Production processsing does not necessarily include testing of all parameters.

LV77D Series 3.3 V
LVDS Clock Oscillators
June 2019

Part Number:

LV77	45	D	E	V	-125.0M	-XX

Part Marking:

PLE LV77
***FF.FFF* M**
• *YMDXX*

or

LV7XYWWXX
***FF.FFF* M**
• *PLE XXX*

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

Supply Voltage V_{CC}
V = 3.3V $\pm$ 10%

Optional Enhanced OTR
Blank = Temp. range -10 to +70°C
C = Temp. range -20 to +70°C
E = Temp. range -40 to +85°C

Series Model

Frequency Stability
45 = $\pm$ 50 ppm
44 = $\pm$ 25 ppm
20 = $\pm$ 20 ppm

Series Model

Marking Legend:
PLE = Pletronics
FF.FFF M = Frequency in MHz
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**	**Code**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**
Year	2016	2017	2018	2019	2020	**Month**	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

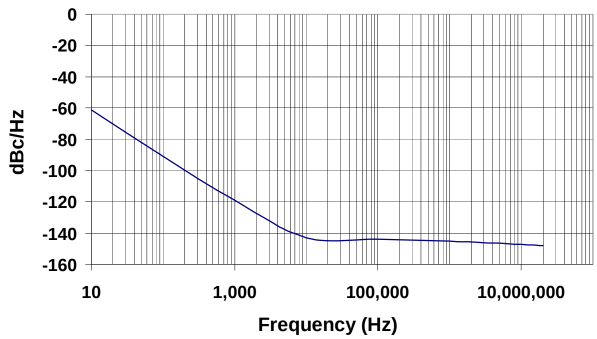
Code	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**R**	**T**	**U**	**V**	**W**	**X**	**Y**	**Z**	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

Electrical Specification for 3.30V ±10% over the specified temperature range and the frequency range of 80 to 325 MHz

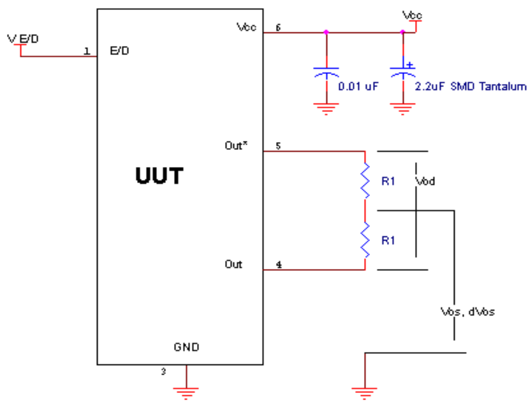
<table>
<tr><th>Item</th><th>Min</th><th>Max</th><th>Unit</th><th colspan="2">Condition</th></tr>
<tr><td>Frequency Accuracy "45"</td><td>-50</td><td>+50</td><td rowspan="3">ppm</td><td rowspan="3" colspan="2">For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures</td></tr>
<tr><td>"44"</td><td>-25</td><td>+25</td></tr>
<tr><td>"20"</td><td>-20</td><td>+20</td></tr>
<tr><td>Output Waveform</td><td colspan="3">LVDS</td><td colspan="2"></td></tr>
<tr><td>Output High Level</td><td>--</td><td>1.60</td><td>Volts</td><td>-</td><td rowspan="6">See load circuit R1 = 50 ohms</td></tr>
<tr><td>Output Low Level</td><td>0.90</td><td>--</td><td>Volts</td><td>-</td></tr>
<tr><td>Differential Output (V_{OD})</td><td>250</td><td>450</td><td>mVolts</td><td>-</td></tr>
<tr><td rowspan="2">Output Offset Voltage (V_{OS})</td><td>1.125</td><td>1.375</td><td>Volts</td><td>≥ 80 MHz</td></tr>
<tr><td>1.125</td><td>1.500</td><td>Volts</td><td>< 80 MHz</td></tr>
<tr><td>Differential Output Error (dV_{OS})</td><td>--</td><td>50</td><td>mVolts</td><td>-</td></tr>
<tr><td>Output Symmetry</td><td>45</td><td>55</td><td>%</td><td colspan="2">Referenced to 50% of amplitude or crossing point</td></tr>
<tr><td rowspan="2">Output T_{RISE} and T_{FALL}</td><td>300</td><td>700</td><td>pS</td><td>≥ 80 MHz</td><td rowspan="2">Vth is 20% and 80% of waveform</td></tr>
<tr><td>400</td><td>900</td><td>pS</td><td>< 80 MHz</td></tr>
<tr><td rowspan="2">Jitter</td><td>-</td><td>0.6</td><td rowspan="2">pS RMS</td><td colspan="2">Measured from 12KHz to 20MHz from Fnominal</td></tr>
<tr><td>-</td><td>2.8</td><td colspan="2">Measured from 10Hz to 1MHz from Fnominal</td></tr>
<tr><td rowspan="2">Vcc Supply Current</td><td>-</td><td>66</td><td>mA</td><td>≥ 80 MHz</td><td rowspan="2">Includes current of properly terminated device</td></tr>
<tr><td>-</td><td>45</td><td>mA</td><td>< 80 MHz</td></tr>
<tr><td>Enable/Disable Internal Pull-up</td><td>50</td><td>-</td><td>Kohm</td><td colspan="2">To Vcc (equivalent resistance)</td></tr>
<tr><td>V disable</td><td>-</td><td>0.8</td><td>Volts</td><td colspan="2">Referenced to Ground</td></tr>
<tr><td>V enable</td><td>2.0</td><td>-</td><td>Volts</td><td colspan="2">Referenced to Ground</td></tr>
<tr><td>Output leakage $V_{OUT} = V_{CC}$</td><td>-10</td><td>+10</td><td>uA</td><td rowspan="2" colspan="2">Pad 1 low, device disabled</td></tr>
<tr><td>$V_{OUT} = 0V$</td><td>-10</td><td>+10</td><td>uA</td></tr>
<tr><td>Enable time</td><td>-</td><td>2</td><td>mS</td><td colspan="2">Time for output to reach a logic state</td></tr>
<tr><td>Disable time</td><td>-</td><td>200</td><td>nS</td><td colspan="2">Time for output to reach a high Z state</td></tr>
<tr><td rowspan="2">Start up time</td><td>-</td><td>5</td><td>mS</td><td>≥ 80 MHz</td><td rowspan="2">Measured from the time Vcc = 3.0V</td></tr>
<tr><td>-</td><td>3</td><td>mS</td><td>< 80 MHz</td></tr>
<tr><td rowspan="3">Operating Temperature Range</td><td>-10</td><td>+70</td><td>°C</td><td colspan="2">Standard Temperature Range</td></tr>
<tr><td>-20</td><td>+70</td><td>°C</td><td colspan="2">Extended Temperature Range "C" Option</td></tr>
<tr><td>-40</td><td>+85</td><td>°C</td><td colspan="2">Extended Temperature Range "E" Option</td></tr>
<tr><td>Storage Temperature Range</td><td>-55</td><td>+125</td><td>°C</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Standby Current I_{CC}</td><td>-</td><td>30</td><td>uA</td><td>≥ 80 MHz</td><td rowspan="2">Pad 1 low, device disabled</td></tr>
<tr><td>-</td><td>1.5</td><td>mA</td><td>< 80 MHz</td></tr>
</table>

Specifications with Pad 1 E/D open circuit

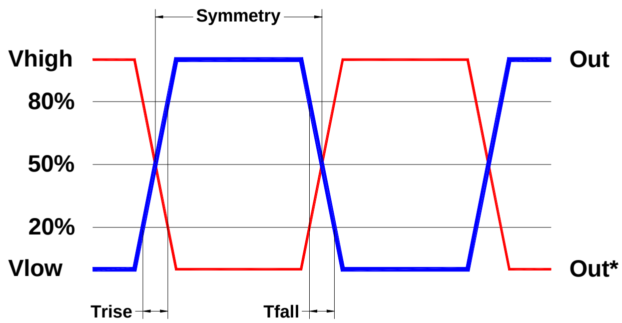
Typical Phase-Noise Response



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

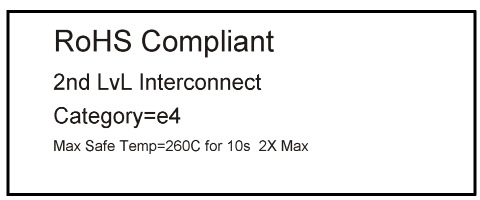
ESD Rating

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

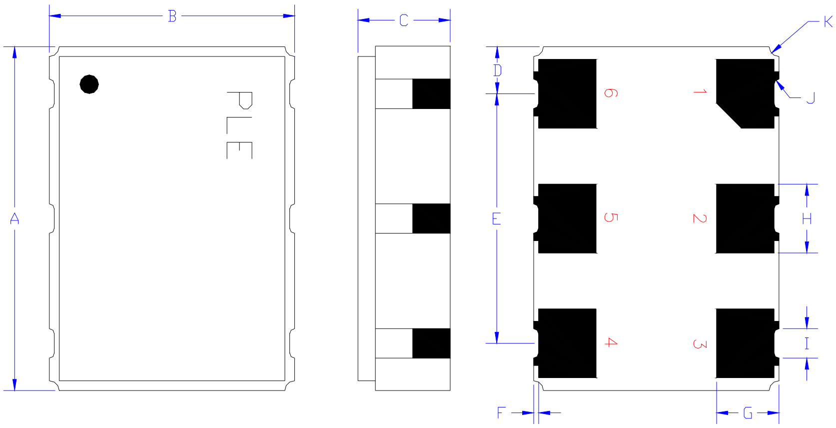
Package Labeling

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 (pads):
Gold 11.8 to 39.4µinches (0.3 to 1.0µm)
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 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.

Lead Free

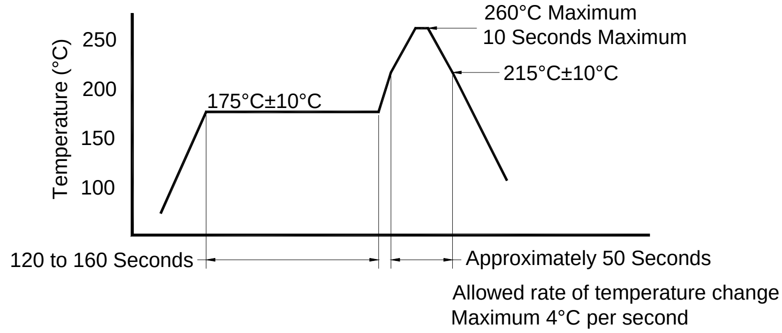
Layout and application information

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 3 times without degradation.

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

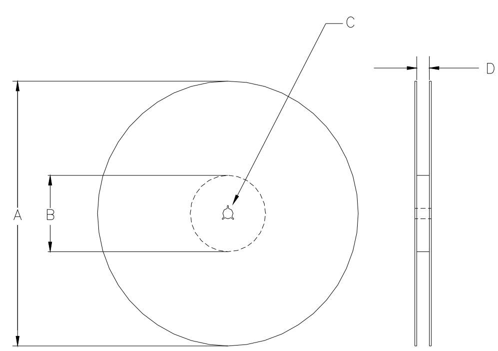
Constant Dimensions Table 1

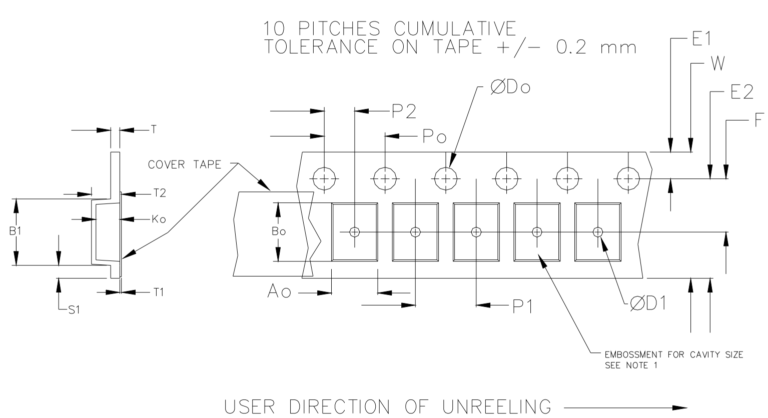
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5						
16mm		1.5			2.0 ±0.1			
24mm		1.5						

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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