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- Pletronics' LV77F and LV77G Series is a quartz crystal controlled precision square wave generator with a fast rise and fall time LVDS output.
- The package is designed for high density surface mount designs.
- 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
- LV77F use Fundamental Mode Crystals 13MHz to 110MHz
- LV77G use 3<sup>rd</sup> Overtone Crystals 35MHz to 220MHz
- Low Jitter

## 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 <sub>CC</sub> Supply Voltage	-0.5V to +5.0V
Vi Input Voltage	-0.5V to V <sub>CC</sub> + 0.5V
Vo Output Voltage	-0.5V to V <sub>CC</sub> + 0.5V
Junction Temperature (T <sub>j</sub> )	-55°C to +150°C

#### **Thermal Characteristics**

The maximum die or junction temperature is 150°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:

LV7	7 45	G	Е	w	-125.0M	-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
							Supply Voltage V <sub>CC</sub> W = 2.5V ± 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 F = Fundamental mode crystal G = 3 <sup>rd</sup> Overtone mode crystal
							Frequency Stability 45 = ± 50 ppm 44 = ± 25 ppm 20 = ± 20 ppm
							Series Model

#### Marking Legend:

PLE LV7t
ff.fff M
• YMDXX

PLE = Pletronics

t = Mode of operation 'F' or 'G'

ff.fff M = Frequency in MHz

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	4	5	6	7	8	Cod	e A	В	C	D	E	F	G	Н	J	K	L	M
Year	2014	2015	2016	2017	2018	Mon	th JAN	FEB	MAF	RAPR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(	Code		1	2	3	4	5	6	7	8	9	Α	В	С	D	Е	F	G
	Day		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(	Code		Н	J	K	L	М	N	Р	R	Т	U	٧	W	Χ	Υ	Z	
	Day		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	



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### Electrical Specification for 2.50V ±10% over the specified temperature range

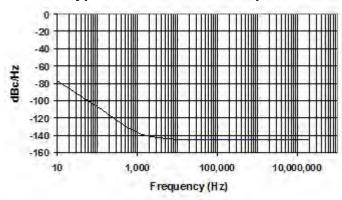
Item	Min	Тур	Max	Unit	Condition	
Frequency Range	13	-	110	MHz	For "F" series devices	
	35	-	220	MHz	For "G" series devices	
Frequency Accuracy "45"	-50	-	+50	ppm	For all supply voltages, lo	
"44"	-25	-	+25		for 1 year, shock, vibratio	n and temperatures
"20"	-20	-	+20			
Supply Voltage Sensitivity	-2	-	2	ppm	For V <sub>cc</sub> change of ±10%	
Output Waveform		L۱	/DS			
Output High Level (V <sub>OH</sub> )	-	1.43	1.60	volts	See load circuit	
Output Low Level (V <sub>oL</sub> )	0.90	1.10	-	volts	See load circuit	
Output Offset Voltage	1.125	-	1.375	volts		
Output Symmetry	45	-	55	%	output crossing point	<= 200 MHz
	40	-	60	%	output crossing point	> 200 MHz
Output Swing	250	350	450	mV	See load circuit	
Jitter	-	-	0.6	pS RMS	12 KHz to 20 MHz from th	ne output frequency
	-	-	2.8	pS RMS	10 Hz to 1 MHz from the	output frequency
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	150	400	pS	Vth is 20% and 80% of w	aveform
V <sub>cc</sub> Supply Current (I <sub>cc</sub> )	-	12 16	20 27	mA	< 80MHz ≥ 80MHz	"F" series devices
		12 16 20 24	20 27 34 40	mA	< 90MHz ≥ 90 MHZ to > 125MHz ≥ 125MHz to > 160MHz ≥ 160MHz	"G" series devices
Disable current	-	-10	-	uA	Pad 1 = 0.0 volts	
V disable	-	-	30	% Vcc	Referenced to pad 3	
V enable	70	-	-	% Vcc	Referenced to pad 3	
Output leakage V <sub>OUT</sub> = V <sub>CC</sub>	-10	-	+10	uA	Pad 1 low, device disable	d
$V_{OUT} = 0V$	-10	-	+10	uA		
Enable time	-	-	2	mS		
Disable time	-	-	200	nS	Time for output to reach a	a high Z state
Start up time	-	-	2	mS	Time for output to reach s	specified frequency
Operating Temperature	-10	-	+70	°C	Standard Temperature Ra	ange
	- 20	-	+70	°C	Extended Temperature R	ange "C" Option
	- 40	-	+85	°C	Extended Temperature R	ange "E" Option
Storage Temperature	-55	-	+125	°C		
Standby Current I <sub>cc</sub>	-	-	10	uA	Pad 1 low, device disable	d

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

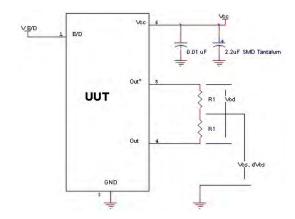


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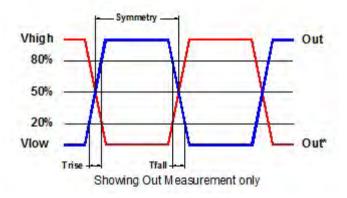
### **Typical Phase-Noise Response**



### **Load Circuit**



### **Test Waveform**





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### 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

RoHS Compliant

2nd LvL Interconnect

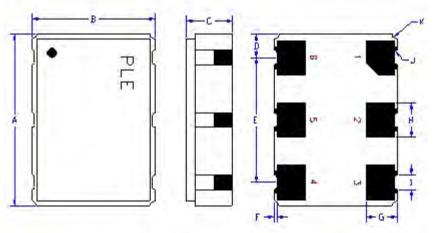
Category=e4

Max Safe Temp=260C for 10s 2X Max



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#### Mechanical:



	Inches	mm
Α	0.276 <u>+</u> 0.006	7.00 <u>+</u> 0.15
В	0.197 <u>+</u> 0.006	5.00 <u>+</u> 0.15
С	0.067 max	1.70 max
D¹	0.038	0.96
E¹	0.200	5.08
F¹	0.004	0.10
G¹	0.050	1.27
H¹	0.055	1.40
I <sup>1</sup>	0.024	0.60
J¹	0.004R	0.10R
K¹	0.008R	0.20R

<sup>1</sup> Typical dimensions

Not to Scale

#### Contacts (pads):

Gold 11.8 to 39.4 μinches (0.3 to 1.0 μm) over Nickel 50 to 350 μinches (1.27 to 8.89 μm)

Pad	Function	Note
1	Output Enable/Disable	When this pad is not connected the oscillator shall operate. When this pad is <30% of $V_{\rm CC}$ , the output will be inhibited (high impedance state.) Recommend connecting this pad to $V_{\rm CC}$ 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
5	Output*	termination.
6	Supply Voltage (V <sub>cc</sub> )	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 input on either pad

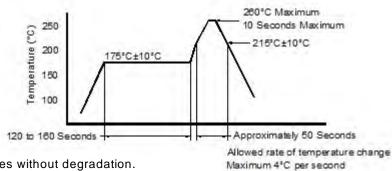
For Optimum Jitter Performance, Pletronics recommends:

- 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.



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### 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

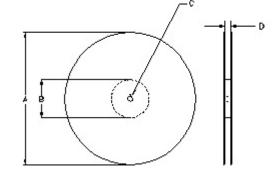
Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm		1.0			2.0			
12mm	1.5	1.5	1.75	4.0	<u>+</u> 0.05			
16mm	+0.1 -0.0	1.5	<u>+</u> 0.1	<u>+</u> 0.1	2.0	0.6	0.6	0.1
24mm		1.5			<u>+</u> 0.1			

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 <u>+</u> 0.1	8.0 <u>+</u> 0.1	8.0	16.3	Note 1

Note 1: Embossed cavity to conform to EIA-481-B

Dimensions in mm

Not to scale



	10 PITCHES CUMULATIVE TOLERANCE ON TAPE +/- 0.2 mm FE1
ective rivers and rive	P2 ØD0 E2

USER	DIRECTION	OF	UNREELING	
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		REE			
Α	inches	7.0	10.0	13.0	
	mm	177.8	254.0	330.2	
В	inches	2.50	4.00	3.75	
	mm	63.5	101.6	95.3	Tape Width
С	mm	13	vviain		
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