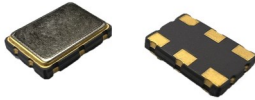




PLETRONICS LV77F/G Series 2.5V LVDS Clock Oscillator



LV77F/G
7.0 x 5.0 x 1.7mm
LCC Ceramic Package

Features

- Pletronics' LV77F/G Series is a Quartz crystal controlled Precision Square Wave Oscillator
- LVDS Output
- Enable/Disable Function on pad 1
- Low Jitter
- 2.5V nominal Supply Voltage
- 13.5 - 220 MHz Frequency Range

Applications

Driving A/Ds, D/As, FPGAs
Fibre Channel
Ethernet, GbE, SynchE
Medical
Storage Area Networking
COTS
Telecom
PON

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range ² Fo	13.5 35	-	110 220	MHz	'F' Series Devices 'G' Series Devices
Frequency Stability ² ± 20 = 20* , ± 25 = 44 , ± 50 = 45	±20	-	±50	ppm	Includes supply voltage change, load change, aging for 1 year at 25°C ± 2°C, shock, vibration and temperatures. *limited frequencies, see page 2
Operating Temperature Range ²	-10 -20 -40	-	+70 +70 +85	°C	Standard range Extended range C option Extended range E option
Supply Voltage ^{1,2} V _{CC}	2.25	2.5	2.75	V	
Supply Current I _{CC}	-	12 16	20 27	mA	<80 MHz 'F' Series ≥80 MHz
		12 16 20 24	20 27 34 40	mA	<90 MHz 'G' Series ≥90 MHz to <125 MHz ≥125 MHz to <160 MHz ≥160 MHz
Output Waveform	LVDS				Load = 100Ω. Recommended termination is DC-Coupled (Point to Point)
Differential Output Voltage V _{OD}	250	350	450	mV	
Output Offset Voltage V _{OS}	1.125	1.25	1.375	V	
Differential Output Error ΔV _{OD}	-	-	50	mV	
Output High Level V _{OH}	-	1.43	1.6	V	
Output Low Level V _{OL}	0.9	1.1	-	V	
Output T _{RISE} and T _{FALL}		0.15	0.4	ns	V _{th} is 20% and 80% output V _{p-p}
Startup Time	-	-	2	ms	Time for output to reach specified frequency
Duty Cycle	≤ 200 MHz	45	55	%	Referenced to 50% of output V _{p-p} or crossing point
	> 200 MHz	40	60		
V _{DISABLE} V _{IL}	-	-	0.3V _{CC}	V	Referenced to Ground
V _{ENABLE} V _{IH}	0.7V _{CC}	-	-		
Enable Time	-	-	2	ms	Time for output to reach a logic state
Disable Time	-	-	200	ns	Time for output to reach a high Z state
Output Leakage	V _{OUT} = V _{CC}	-	+10	μA	Pad 1 low, device disabled
	V _{OUT} = 0V	-10	-		
Standby Current	-	-	10	μA	
Jitter	-	-	0.6	ps	12 kHz to 20 MHz from the output frequency
	-	-	2.8		10 Hz to 1 MHz from the output frequency
Phase Noise	100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 20 MHz	-	-103 -129 -141 -146 -153 -157	-	dBc/Hz 25°C ± 2°C at 106.25 MHz
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 1 E/D open circuit

¹ Place an appropriate power supply bypass capacitor next to device for correct operation

² Specified by part number



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Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V _{CC}	Frequency in MHz	Optional T&R Packaging code
LV77	45	F or	E	W	- 100.0M	-XX
	45 = ± 50 ppm (STD) 44 = ± 25 ppm 20* = ± 20 ppm		Blank = -10 to +70°C (STD) C = -20 to +70°C E = -40 to +85°C	W = 2.5V ± 10%	13.5 - 220 MHz	T250 = 250 per Reel T500 = 500 per Reel T1K = 1000 per Reel (Std)

* Contact PLE sales for limited frequencies. Full frequency range available which excludes aging.

Device Marking

PLE LV7t FF.FFM • YMDxxx	PLE LV7 = Pletronics, LV77 series t = Version, F or G FFF.FFM = Frequency in MHz YMD = Date Code, All other marking is internal codes
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Note: Specifications such as frequency stability, supply voltage and operating temperature range, etc. are not identified from marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Codes for Date Code YMD (Year Month Day)

Code	3	4	5	6	7	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2023	2024	2025	2026	2027	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	

Package Labeling

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

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

P/N:
PLE Part Number
Customer P/N:
12345678
Qty:
1000
D/C
2A1
MSL: 1

RoHS Compliant

2nd LvL Interconnect

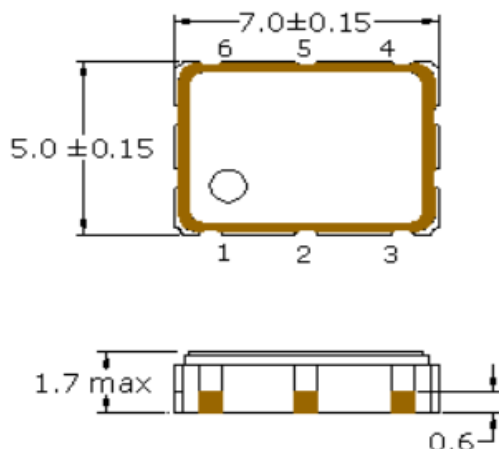
Category=e4

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

Pletronics Inc. certifies this device is in accordance with the RoHS and REACH 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
Second Level Interconnect code: e4

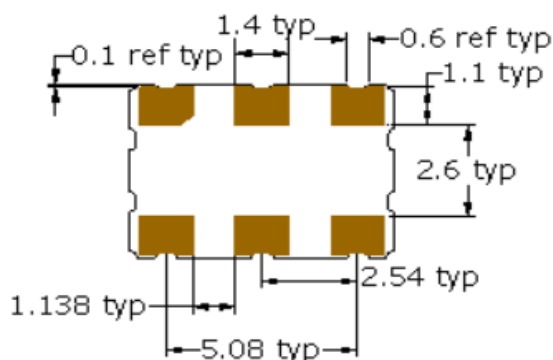
Mechanical Dimensions



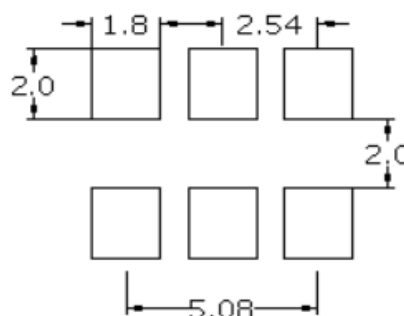
Pad Connections

Pad	Function
1	Enable/Disable
2	No Connect
3	Ground/Lid
4	Output
5	Output-N
6	V _{CC}

ENABLE/DISABLE	
Pad 1	Output
V _{IH} /Open	Active
V _{IL} /Gnd	Disabled/Tristate



Solder pad layout

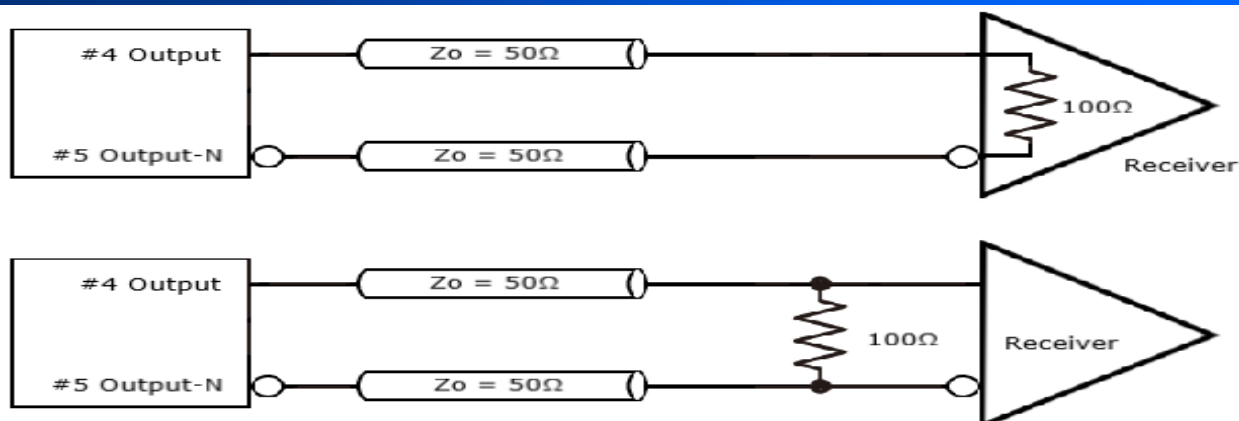


Pad Layout
Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

Dimensions in mm

Contacts (pads): Gold (0.3 to 1.0 μm) over Nickel (1.27 to 8.89 μm)

Recommended Termination

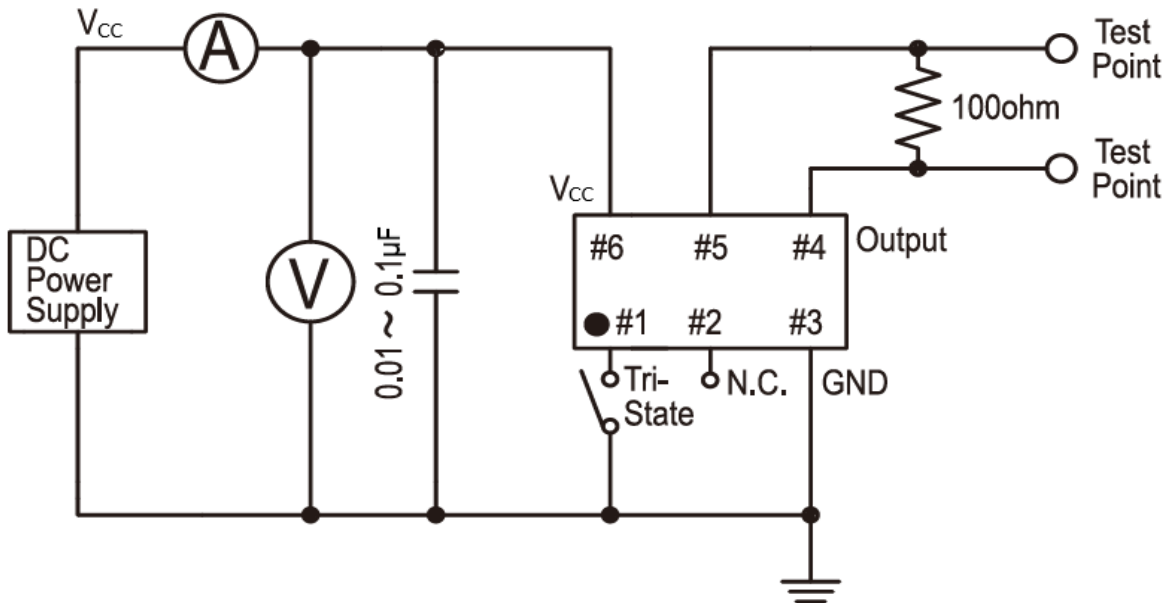


For any other terminations, the oscillator should be sampled and tested in the application.

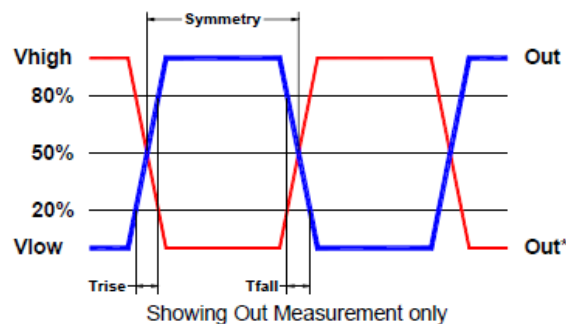
For Optimum Jitter Performance, Pletronics recommends:

- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply

Electrical Test /Load Circuit



Test Waveform



Environmental / ESD Ratings

Reliability: Environmental

ESD Rating

Parameter	Condition
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A
Solderability	IPC J-STD-002
Thermal Cycle	MIL-STD-883 Method 1010, Condition B

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Machine Model	200V	JESD22-A115

Thermal Characteristics:

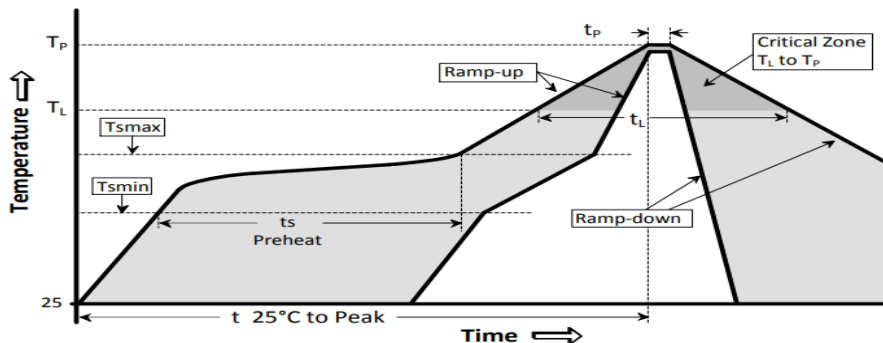
The maximum die or junction temperature is 150°C

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

Reflow Cycle

Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"

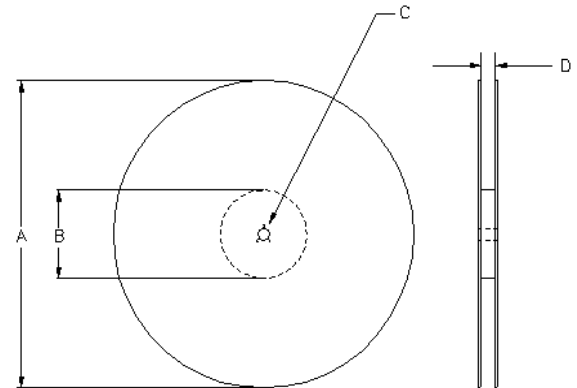
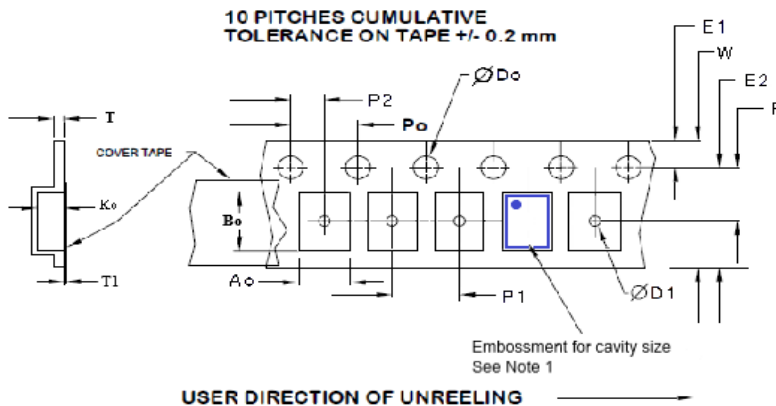


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(T _{smax} to T _P)	3°C / second max	°C / s
Ramp down Rate	T _{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	T _{to-peak}	8 minutes max	min
Preheat			
Temperature min	T _{smin}	150	°C
Temperature max	T _{smax}	200	°C
Time T _{smin} to T _{smax}	t _s	60 – 180	sec
Soldering above liquidus			
Temperature liquidus	T _L	217	°C
Time above liquidus	t _L	60 – 150	sec
Peak temperature			
Peak Temperature	T _P	260	°C
Time within 5°C of peak temperature	t _p	20 – 40	sec

Tape and Reel

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.



Tape Variable Dimensions Table 2							
Tape Size	E2 typ	F	P1	W max	A0	B0	K0
16mm	14.25	7.5 ±0.05	8.0 ±0.1	16.3	5.56±0.1	7.85±0.1	2.0±0.1

Dimensions in mm Drawing Not to scale

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

Tape Constant Dimensions Table 1							
Tape Size	Do	D1 typ	E1	Po	P2	T max	T1 max
16mm	1.5 +0.1 -0.0	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.1	0.3	0.1

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	177.8	2.50	63.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0
10	10.0	254.0	4.00	101.6		
13	13.0	330.2	3.75	95.3		



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