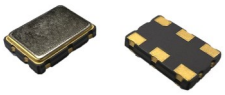
PLETRONICS VL77Q SERIES
LVDS VCXO OSCILLATOR



VL77Q
7.0 x 5.0 x 1.7 mm
LCC Ceramic Package

Features

- Quartz crystal voltage controlled Precision Square Wave Oscillator
- LVDS Output
- Voltage Control function
- Enable/Disable Function on pad 2
- 3.3V nominal Supply Voltage
- 10MHz-1500MHz nominal frequency

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]	10	-	1500	MHz	
Frequency pullability **APR** [2]	-	±50	-	ppm	Absolute pull range, includes effect of temperature stability
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}	2.97	3.3	3.63	V	
Supply Current I_{CC}	-	-	50	mA	
Output Waveform	LVDS				
Differential Output Voltage V_{OD}	175	350	-	mV	
Output Offset Voltage V_{OS}	-	1.25	-	V	
Output T_{RISE} and T_{FALL}	-	-	1.0	ns	Vth is 10% and 90% of waveform
Startup Time	-	-	10	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	Referenced to 50% of amplitude or crossing point
$V_{DISABLE}$	-	-	0.3*Vcc	Volts	Referenced to Ground
V_{ENABLE}	0.7*Vcc	-	-		
Enable Time	-	-	200	ns	< 50MHz
	-	-	100	ns	≥ 50MHz
Disable Time	-	-	50	ns	Time for output to reach a high Z state
Modulation Bandwidth	10	-	-	kHz	Vcontrol = 1.65V ±1.65 V
Voltage vs. Frequency Linearity	-	10	-	%	Vcontrol = 1.65V ±1.65 V
Standby Current	-	18	-	mA	Pad 2 low, device disabled
Aging at 25°C	-	-	±3.0	ppm	First year
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 2 E/D open circuit
[1] Place an appropriate power supply bypass capacitor next to device for correct operation
[2] Defined by part number

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Typical Phase Noise/Jitter

Phase Noise	10 Hz 100 Hz 1 kHz 1 MHz 20 MHz	-66 -96 -112 -136 -154	dBc/Hz	**Precision Developed Frequencies: 100, 106.25, 120, 150, 156.25, 162.5, 175, 187.5, 200, 212.5, 250.0, 312.5, 625.0MHz** 25°C ± 2°C at 2.5V / 156.250 MHz
Jitter		0.6	ps rms	12 kHz to 20 MHz from the output frequency @ 156.25Mhz
Phase Noise	10 Hz 100 Hz 1 kHz 1 MHz 20 MHz	-51 -88 -108 -135 -151	dBc/Hz	**All Other Frequencies** 25°C ± 2°C at 2.5V / 133 MHz
Jitter		2.4	ps rms	12 kHz to 20 MHz from the output frequency @133MHz

Part Number

Series Model	Frequency Stability	Pullability	Series Model	Operating Temperature Range	Supply Voltage V_{CC}	Frequency in MHz
VL77	**0**	**5**	**Q**	**E**	**V**	**- 100.0M**
	0 = APR (STD)	**5** = ± 50 ppm (STD)		**Blank** = -10 to +70°C (STD) **C** = -20 to +70°C **E** = -40 to +85°C	**V** = 3.3V ±10%	10 - 1500 MHz

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Device Marking

PLE VL7Q
***FFF.FF* M**
- ***YMDxxx***

PLE = Pletronics
VL7Q = Model Number
FFF.FF = Frequency in MHz
YMD = Date Code (see table below)
x = All other marking is internal codes

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.

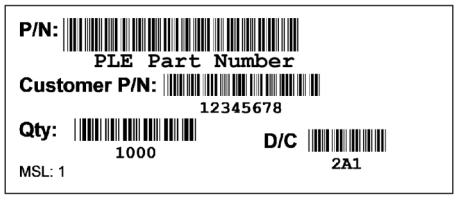
Codes for Date Code YMD (Year Month Day)

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

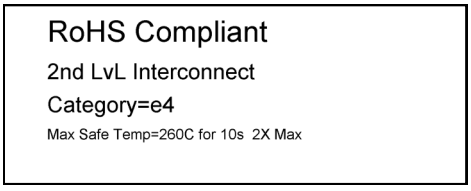
Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

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



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

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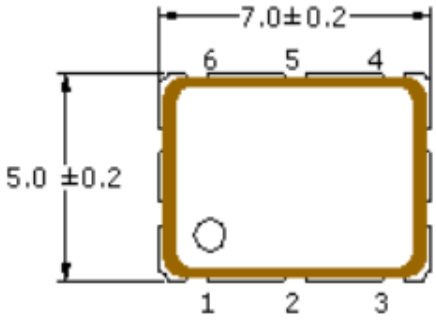
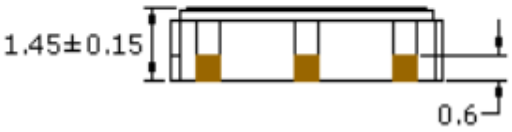
Mechanical Dimensions

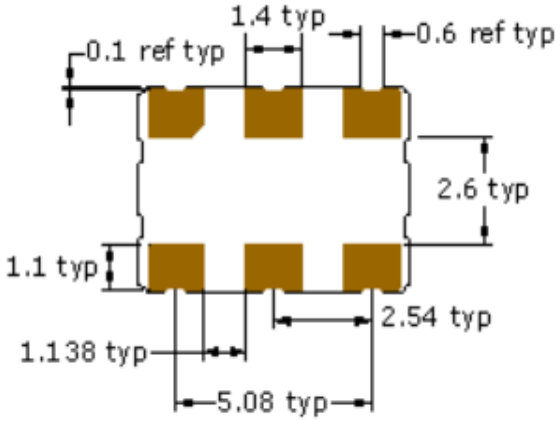


Pad Connections

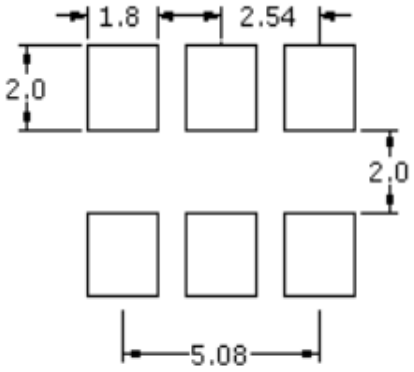
Pad	Function
1	Voltage Control
2	Enable / Disable
3	Ground
4	Output
5	Output N
6	Vcc

ENABLE/DISABLE	
Pad 1	Output
VIH / Open	Active
VIL / Gnd	Disabled/Tristate





Dimensions in mm



Solder pad layout

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

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

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
- Do not place near piezoelectric buzzers or mechanical fans

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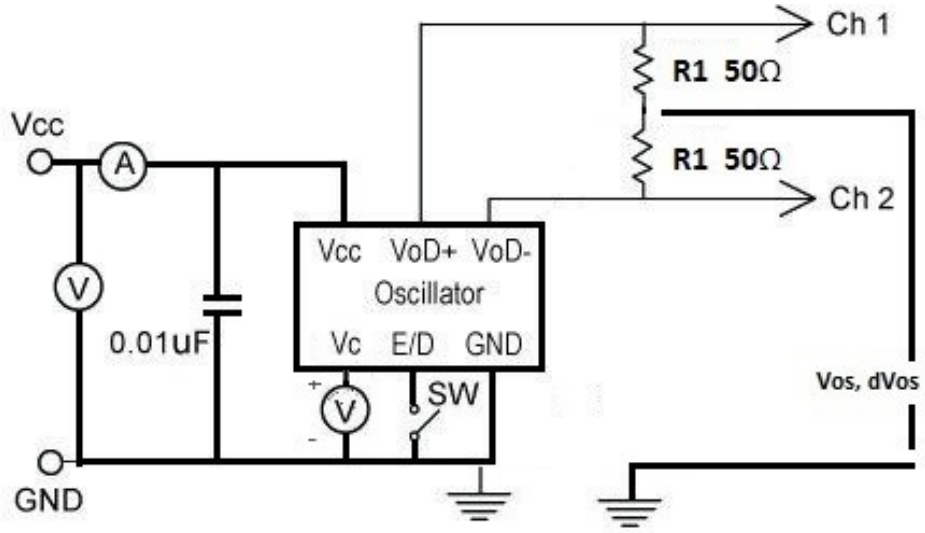
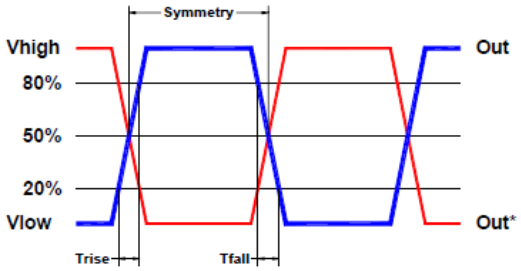
Electrical Test /Load Circuit



Test Waveform



Showing Out Measurement only

Environmental / ESD Ratings

Reliability: Environmental

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

ESD Rating

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	1000V	JESD22-C101
Machine Model	120V	JESD22-A115

Thermal Characteristics:
The maximum die or junction temperature is 125°C

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +4.2V
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo Output Voltage	-0.5V to V_{CC} + 0.5V

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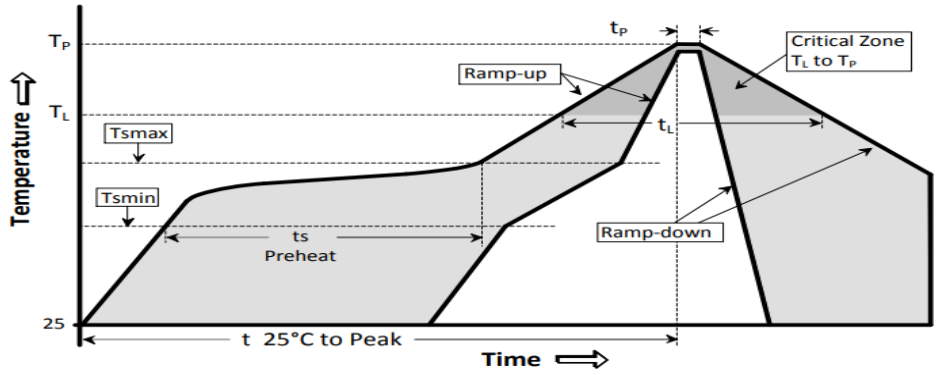
Reflow Cycle

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

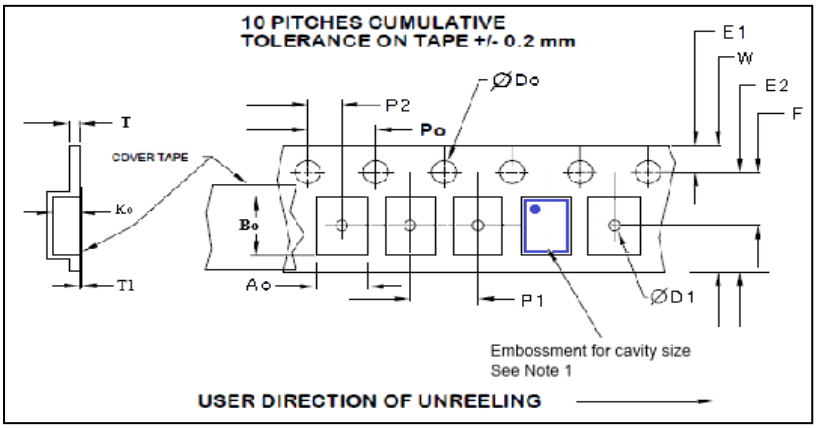


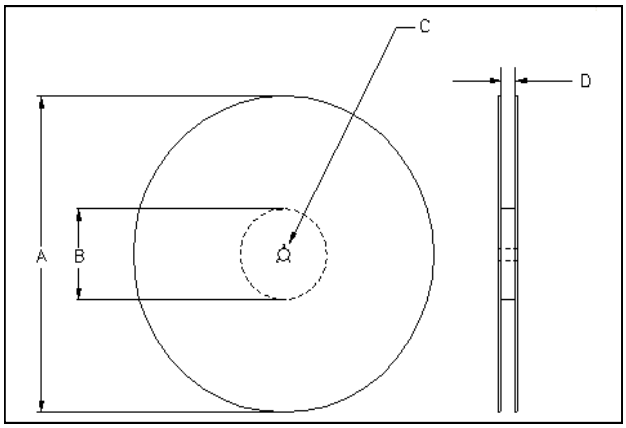
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time Ts_{min} to Ts_{max}	ts	60 – 180	sec
Soldering above liquidus			
Temperature liquidus	T_L	217	°C
Time above liquidus	t_L	60 – 150	sec
Peak temperature			
Peak Temperature	Tp	260	°C
Time within 5°C of peak temperature	tp	20 – 40	sec

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

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	Ao	Bo	Ko
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

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	180	2.50	60	13.0 +0.5 -0.2	Tape size +0.4
13	13.0	330	3.75	100		+2.0 -0.0

Tape Constant Dimensions Table 1							
Tape Size	Do	D1	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

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