PE77F / PE77G Series 2.5 V
PECL Clock Oscillators

February 2016

- Pletronics' PE77F and PE77G Series is a quartz crystal controlled precision square wave generator with a fast rise and fall time PECL 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
- PE77F use Fundamental Mode Crystals 13MHz to 110MHz
- PE77G use 3rd 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_{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
Junction Temperature (T_j)	-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:

PE77	45	G	E	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_{cc}
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 = 3rd Overtone mode crystal

Frequency Stability
45 = ± 50 ppm
44 = ± 25 ppm
20 = ± 20 ppm

Series Model

Marking Legend:

PLE PE7*t*
***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	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2014	2015	2016	2017	2018	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

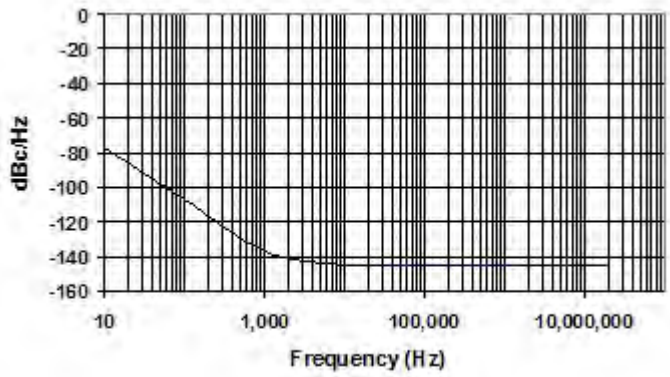
Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**R**	**T**	**U**	**V**	**W**	**X**	**Y**	**Z**	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

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

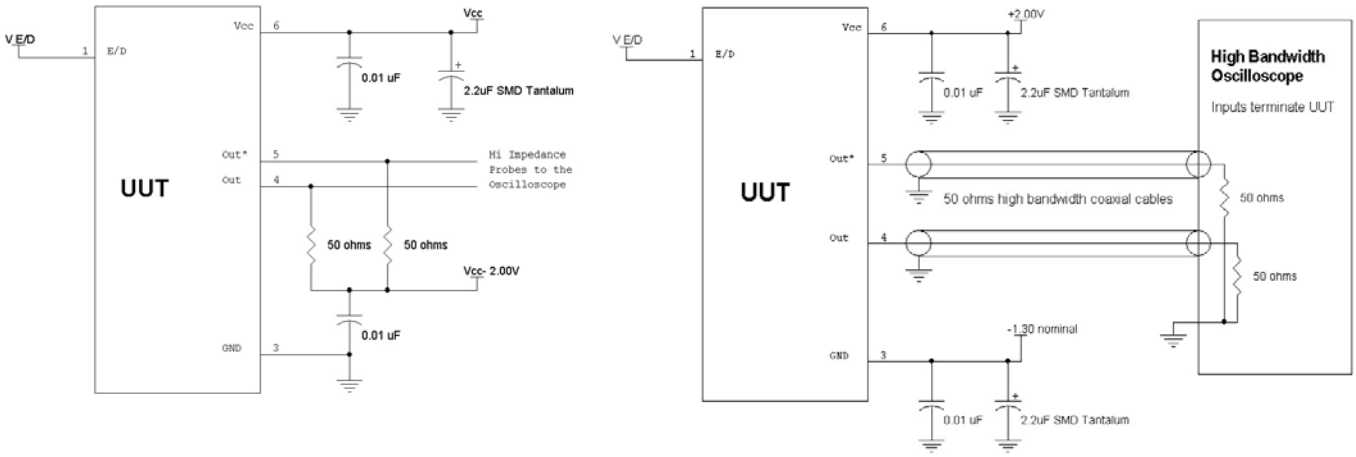
Item	Min	Typ	Max	Unit	Condition	
Frequency Range	13	-	110	MHz	For "F" series devices	
	35	-	220	MHz	For "G" series devices	
Frequency Accuracy "45"	-50	-	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures	
"44"	-25	-	+25			
"20"	-20	-	+20			
Supply Voltage Sensitivity	-2	-	2	ppm	For V_{CC} change of ±10%	
Output Waveform	PECL /ECL					
Output High Level (V_{OH})	1.475	1.550	1.620	volts	Referenced to Ground, V_{CC} = 2.5 V	
	0.975	1.050	1.120	volts	Referenced to termination voltage, V_{CC} - 2.0V	
	-1.025	-0.950	-0.880	volts	Referenced to Vcc, V_{CC} = 2.5 V	
Output Low Level (V_{OL})	0.690	0.800	0.880	volts	Referenced to Ground, V_{CC} = 2.5 V	
	0.190	0.300	0.380	volts	Referenced to termination voltage, V_{CC} - 2.0 V	
	-1.810	-1.700	-1.620	volts	Referenced to Vcc, V_{CC} = 2.5 V	
Output Symmetry	45	-	55	%	output crossing point	<= 200 MHz
	40	-	60	%	output crossing point	> 200 MHz
Output Swing	595	750	930	mV	See load circuit	
Jitter	-	-	0.6	pS RMS	12 KHz to 20 MHz from the output frequency	
	-	-	2.8	pS RMS	10 Hz to 1 MHz from the output frequency	
Output T_{RISE} and T_{FALL}	-	200	400	pS	Vth is 20% and 80% of waveform	
V_{CC} Supply Current (I_{CC})	-	33 34	44 48	mA	< 80MHz ≥ 80MHz	"F" series devices
	- - - -	33 34 35 37	44 48 50 54	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 $V_{OUT} = V_{CC}$	-10	-	+10	uA	Pad 1 low, device disabled	
V_{OUT} = 0V	-10	-	+10	uA		
Enable time	-	-	2	mS		
Disable time	-	-	200	nS	Time for output to reach a high Z state	
Start up time	-	-	2	mS	Time for output to reach specified frequency	
Operating Temperature	-10	-	+70	°C	Standard Temperature Range	
	- 20	-	+70	°C	Extended Temperature Range "C" Option	
	- 40	-	+85	°C	Extended Temperature Range "E" Option	
Storage Temperature	-55	-	+125	°C		
Standby Current I_{CC}	-	-	10	uA	Pad 1 low, device disabled	

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

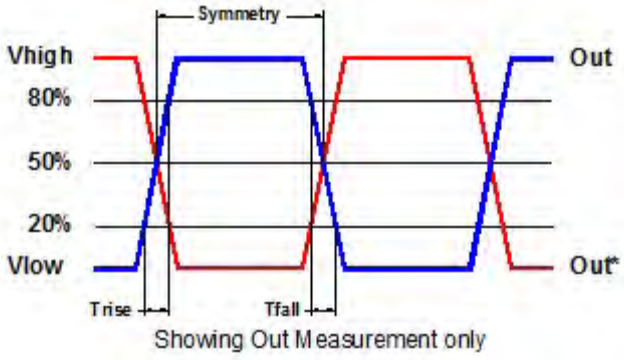
Typical Phase-Noise Response



Load Circuit



Test Waveform



Reliability: Environmental Compliance

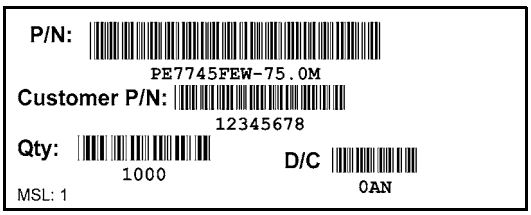
Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

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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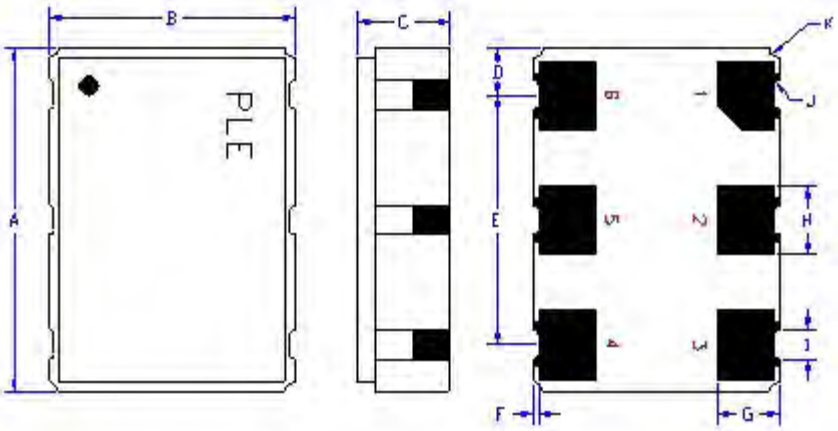
Mechanical:



Not to Scale

[1] Typical dimensions

	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 39.4 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_{CC}, 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	Both outputs must be terminated and biased for proper operation. The ideal termination is 50 ohms connected to 2.0V below the Supply Voltage.
5	Output*	
6	Supply Voltage (V_{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

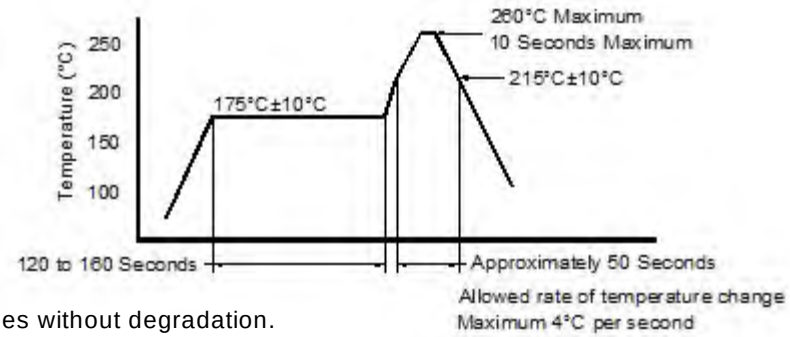
Lead Free

Layout and application information

Recommend connecting Pad 1 and Pad 2 together to permit the design to accept Enable/Disable 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.

Reflow Cycle (typical for lead free processing)



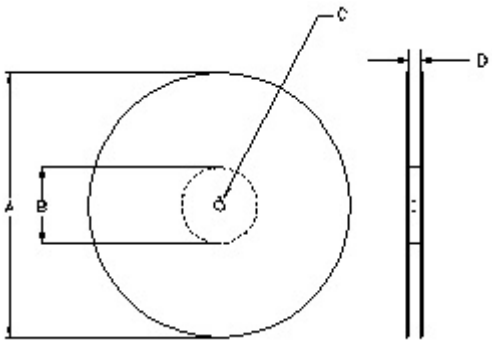
The part may be reflowed 3 times without degradation.

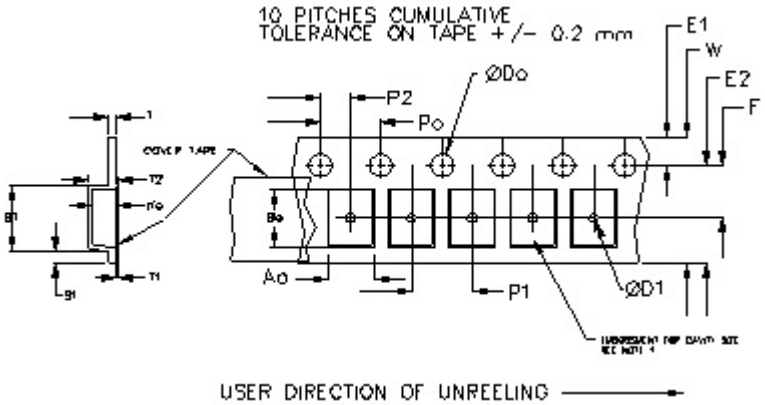
Tape and Reel: available for quantities of 250 to 1000 per reel, cut tape for < 250

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