



# PLETRONICS PE44F/G Series 2.5V PECL Clock Oscillator



PE44F/G  
3.2 x 2.5 x 0.9 mm  
LCC Ceramic Package

## Features

- Quartz crystal controlled Precision Square Wave Oscillator
- PECL Differential Output
- 'F' series is Fundamental; 'G' series is 3rd OT
- Enable/Disable Function on pad 1
- Low Jitter
- 2.5V nominal Supply Voltage

## 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 <sup>2</sup> (Fo)	13.5 35	- -	110 160	MHz	'G' Series 'F' Series
Frequency Stability <sup>2</sup> ± 20 = <b>20*</b> , ± 25 = <b>44</b> , ± 50 = <b>45</b>	±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 <sup>2</sup>	-10 -20 -40	-	+70 +70 +85	°C	Standard range Extended range <b>C</b> option Extended range <b>E</b> option
Supply Voltage <sup>1,2</sup> V <sub>CC</sub>	2.375	2.5	2.625	V	
Supply Current (I <sub>CC</sub> ) 'F' Series	-	33 34	44 48	mA	< 80 MHz ≥ 80 MHz
Supply Current (I <sub>CC</sub> ) 'G' Series	-	33 34 35	44 48 54	mA	< 90 MHz ≥ 90MHz ~ 125 MHz ≥ 125 MHz ~ 160 MHz
Output Waveform	PECL / ECL				
Output High Level (V <sub>OH</sub> )	V <sub>CC</sub> - 1.025V	V <sub>CC</sub> - 0.95V	V <sub>CC</sub> - 0.88V	V	See test circuit
Output Low Level (V <sub>OL</sub> )	V <sub>CC</sub> - 1.81V	V <sub>CC</sub> - 1.7V	V <sub>CC</sub> - 1.62V	V	See test circuit
Output Voltage Amplitude (V <sub>OPP</sub> )	0.4	-	-	V	Single ended measurement, see test circuit
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	0.2	0.4	ns	V <sub>th</sub> is 20% and 80% levels of V <sub>OPP</sub>
Start Up Time	-	-	2	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	50% level of V <sub>OPP</sub>
V <sub>DISABLE</sub> (V <sub>IL</sub> )	-	-	0.3V <sub>CC</sub>	V	Referenced to ground
V <sub>ENABLE</sub> (V <sub>IH</sub> )	0.7V <sub>CC</sub>	-			
Enable Time	-	-	2	ms	Time for output to reach specified frequency
Disable Time	-	-	200	ns	Time for output to reach a high Z state
Enable/Disable Internal Pull-up	-	39	-	kΩ	To V <sub>CC</sub> , Pin 1 open or ≥0.7V <sub>CC</sub>
Output Leakage	V <sub>OUT</sub> = V <sub>CC</sub> V <sub>OUT</sub> = 0V	- -10	+10 -	μA	Pad 1 low, device disabled
Standby Current	-	-	10	μA	
rms Phase Jitter	-	-	0.6	ps rms	12 kHz to 20 MHz from the output frequency
Phase Noise	1 kHz 10 kHz 100 kHz 1 MHz 20 MHz	-	-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

<sup>1</sup> Place an appropriate power supply bypass capacitor as close as possible to V<sub>CC</sub> for best performance.

<sup>2</sup> Specified by part number



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Part Number						
Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage V <sub>CC</sub>	Frequency in MHz	Optional T&R Packaging code
PE44	45	F or G	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 ± 5%	13.5 - 160 MHz	T250 = 250 per Reel T500 = 500 per Reel T3K = 3000 per Reel (Std)

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

## Device Marking

**PFF.FFP t**  
• **YMDxxx**

P = Pletronics  
FF.FFP = Frequency in MHz, P for PECL  
t = Version F or G  
YMD = Date Code, All other marking is internal code

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	2	3	4	5	6	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2022	2023	2024	2025	2026	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:  3000 D/C  2A1  
MSL: 1

RoHS Compliant  
2nd Lvl Interconnect  
Category=e4  
Max Safe Temp=260C for 10s 2X Max

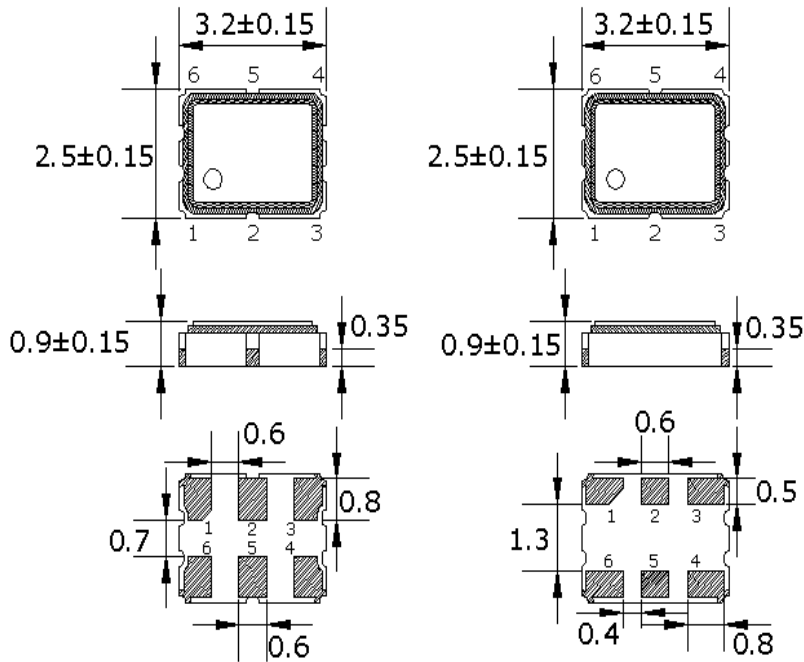
Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.028 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4



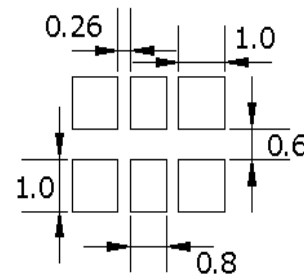
# PLETRONICS PE44F/G Series 2.5V PECL Clock Oscillator

## Mechanical Dimensions / Pinout



Pin Connections	
PIN#	Function
1	Enable/Disable
2	No connect
3	Ground/Lid
4	Output
5	Output N
6	Vcc

ENABLE/DISABLE	
PIN1	Output
V <sub>IH</sub> /Open	Active
V <sub>IL</sub> /Gnd	Disabled/Tristate



Dimensions in mm

### Pad Layout

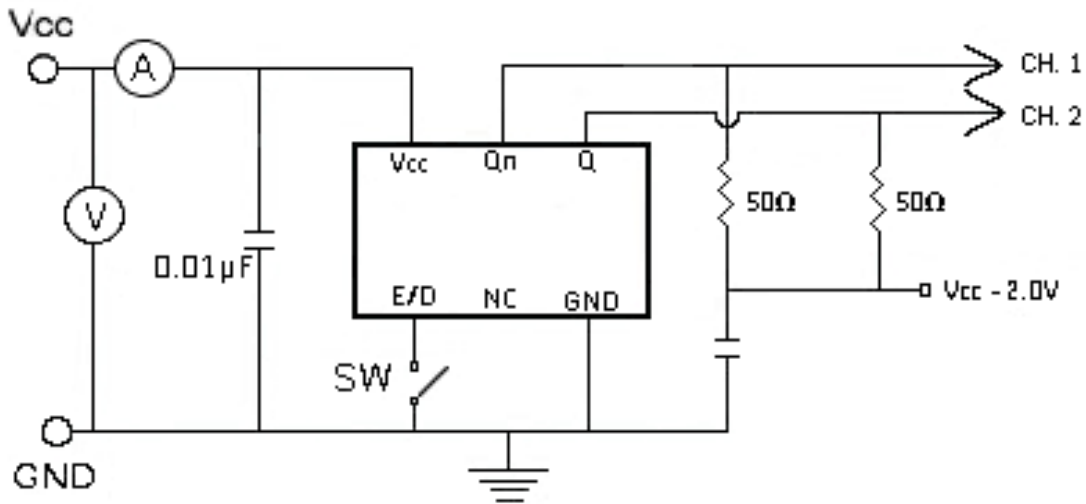
Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

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

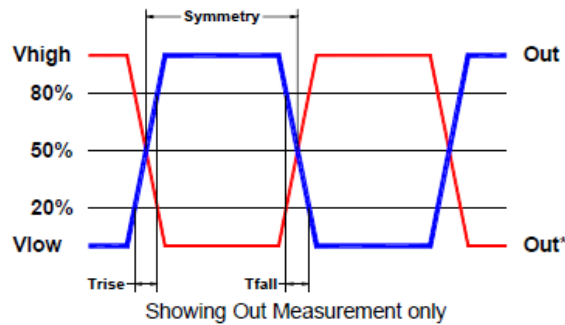
For Optimum Jitter Performance, Pletronics recommends:

- 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

## 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

Absolute Maximum Ratings

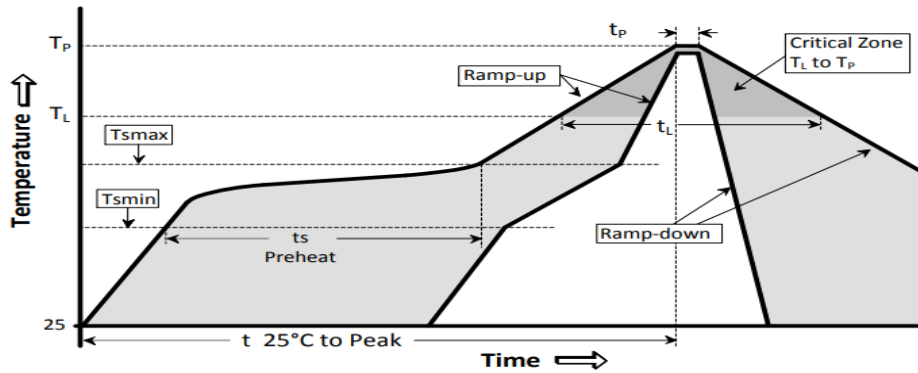
### Thermal Characteristics:

The maximum die or junction temperature is 150°C

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.5V to +5.0V
V <sub>i</sub> Input Voltage	-0.5V to V <sub>CC</sub> + 0.5V
V <sub>o</sub> Output Voltage	-0.5 to V <sub>CC</sub> + 0.5V

## Reflow Cycle

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

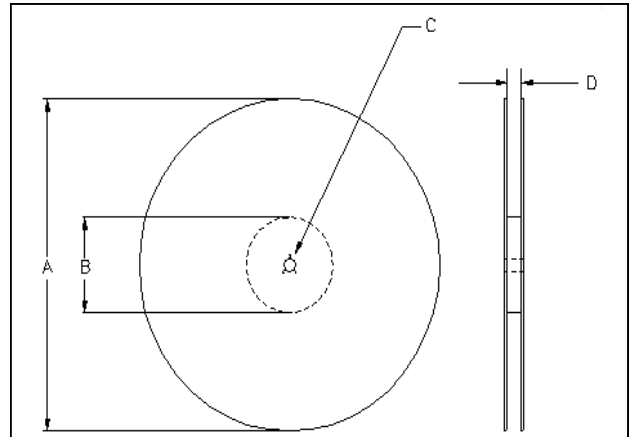
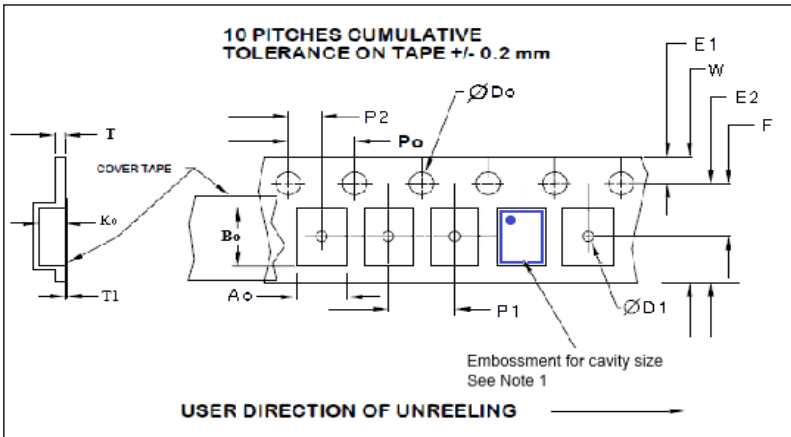


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	( $T_{S_{max}}$ 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	$T_{to-peak}$	8 minutes max	min
<b>Preheat</b>			
Temperature min	$T_{S_{min}}$	150	°C
Temperature max	$T_{S_{max}}$	200	°C
Time $T_{S_{min}}$ to $T_{S_{max}}$	$t_s$	60 – 180	sec
<b>Soldering above liquidus</b>			
Temperature liquidus	$T_L$	217	°C
Time above liquidus	$t_l$	60 – 150	sec
<b>Peak temperature</b>			
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 3000 per reel, cut tape for < 250. 8mm tape, 4mm pitch.



Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
8mm	6.25	3.5 ±0.05	4.0 ±0.1	8.2	2.7±0.1	3.4±0.1	1.4±0.1

Reel Size	A		B		C	D
	Inches	mm	Inches	mm	mm	mm
7	7.0	180	2.50	60	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0

Dimensions in mm Drawing Not to scale  
Note 1: Embossed cavity to conform to EIA- 481-B

Tape Size	Do	D1 typ	E1	Po	P2	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	0.3	0.1



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