



PLETRONICS PE44F/G Series 2.5V PECL Clock Oscillator



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

Features

- Pletronics' PE44F/G Series is a 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 ²	13.5 35	- -	110 160	MHz	'G' Series 'F' Series
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} 'F' Series	-	33 34	44 48	mA	< 80 MHz ≥ 80 MHz
Supply Current I _{CC} '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 _{OH}	1.475	1.55	1.62	V	Referenced to Ground
Output Low Level V _{OL}	0.69	0.8	0.88	V	Referenced to Ground
Output T _{RISE} and T _{FALL}	-	0.2	0.4	ns	V _{th} is 20% and 80% levels of output V _{p-p}
Start Up Time	-	-	2	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	50% level of output V _{p-p}
V _{DISABLE}	-	-	0.3V _{CC}	V	Referenced to ground
V _{ENABLE}	0.7V _{CC}	-			
Enable Time	-	-	2	ms	Time for output to reach a logic high state
Disable Time	-	-	200	ns	Time for output to reach a high Z state
Enable/Disable Internal Pull-up	-	39	-	kΩ	Pin 1 open or High
Output Leakage V _{OUT} = V _{CC} V _{OUT} = 0V	-10 -10	-	+10 +10	μA	Pad 1 low, device disabled
Standby Current	-	-	10	μA	
Jitter	-	-	0.6	ps rms	12 kHz to 20 MHz from the output frequency
	-	-	2.8		10 Hz to 1 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

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
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 $\pm 10\%$	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.FF P t
• YMDxxx

P = Pletronics
FF.FF P = 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:	
Customer P/N:	
Qty:	
D/C	
MSL: 1	

RoHS Compliant

2nd LVL Interconnect
Category=e4
Max Safe Temp=260C for 10s 2X Max

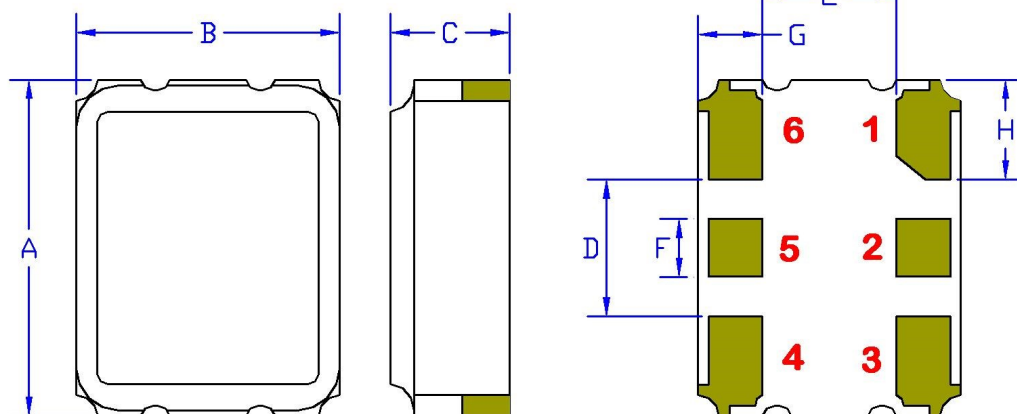
Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

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

Mechanical Dimensions

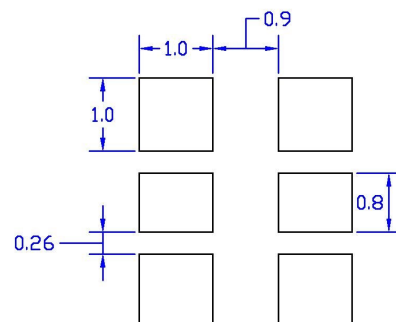
	Inches	mm
A	0.126 ± 0.008	3.20 ± 0.20
B	0.098 ± 0.008	2.50 ± 0.20
C	0.035 ± 0.004	0.9 ± 0.10
D¹	0.063	1.60
E¹	0.051	1.30
F¹	0.024	0.60
G¹	0.024	0.60
H¹	0.031	0.80

¹ Typical dimensions



Pad Layout mm shown

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



(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)

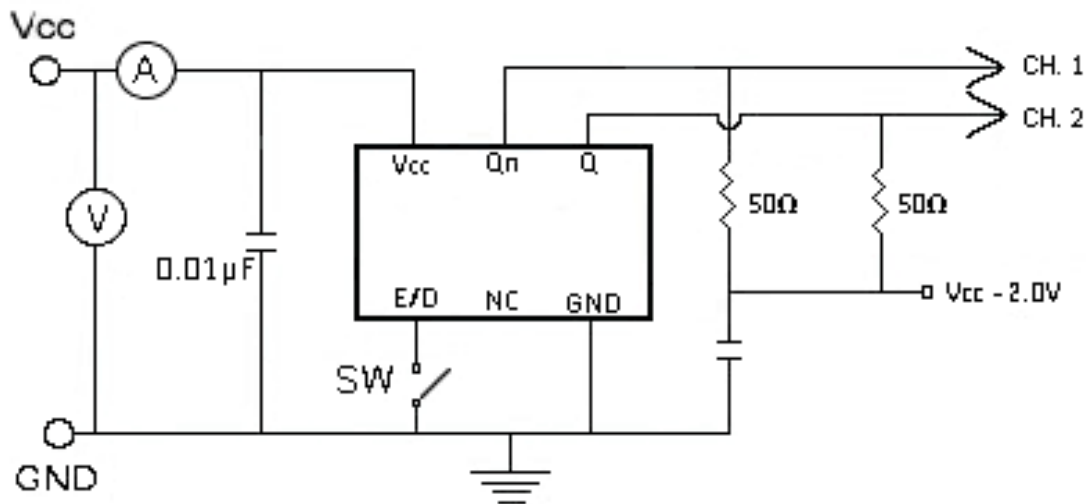
Layout

Pad	Function	Note
1	Output Enable/Disable	The oscillator shall operate when this pad is not connected. The output will be inhibited (high impedance state) when this pad is logic low. 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. Recommend connecting to pad 1 to permit E/D input on either pad for layout.
3	Ground (GND)	
4	Output	Both outputs must be terminated and biased for proper operation. The ideal termination is 50 ohms connected to V _{CC} -2.0V
5	Output*	
6	V _{CC} Supply Voltage	Connect an appropriate power supply bypass capacitor as close as possible to pad 6

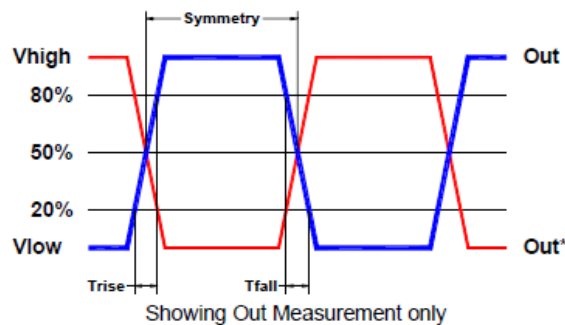
For Optimum Jitter Performance, Pletronics recommends:

- 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	EIAJ ED-4701/300 Ref test method
Machine Model	200V	EIAJ ED-4701/300 Test method 304

Absolute Maximum Ratings

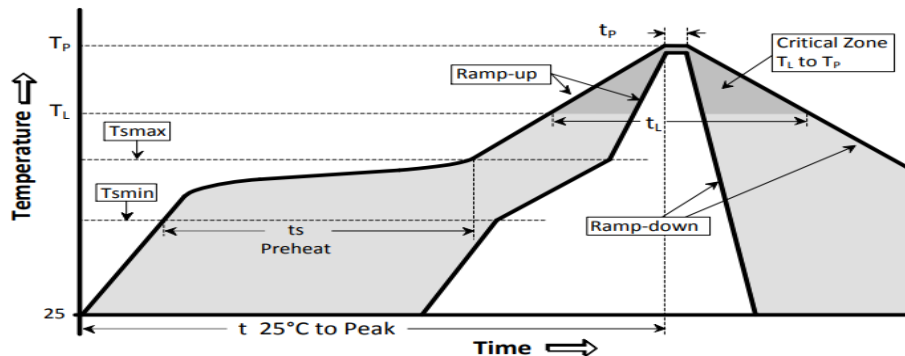
Thermal Characteristics:

The maximum die or junction temperature is 150°C

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	-0.5 to V _{CC} + 0.5V

Reflow Cycle

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

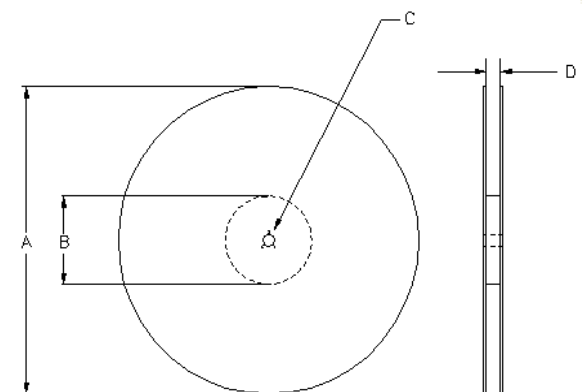
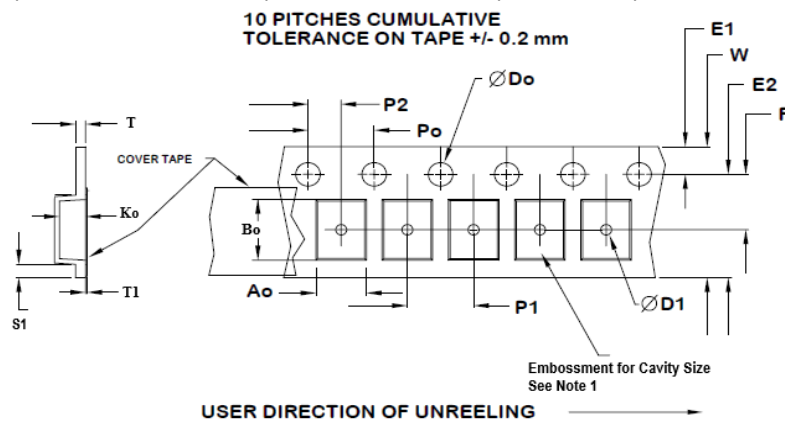


The part may be reflowed 2 times without degradation (typical for lead free processing).

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}	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	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 Variable Dimensions Table 2

Tape Size	E2 typ	F	P1	W max	A ₀	B ₀	K ₀
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

Dimensions in mm Drawing Not to scale

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

Tape Constant Dimensions Table 1

Tape Size	D ₀	D ₁ typ	E ₁	P ₀	P ₂	S ₁ min	T max	T ₁ max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.3	0.1

Reel Dimensions (may vary) Table 3

	A		B		C	D
Reel Size	Inch-es	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



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