



PE44J Series 2.5 V PECL Clock Oscillators

April 2017

Lead Free 

- Pletronics' PE44J Series is a quartz crystal controlled precision square wave generator with a PECL output.
- Improved phase noise performance.
- Low cost mass produced oscillator.
- Tape and Reel or cut tape packaging is available.
- 3.2 x 2.5 mm LCC Ceramic Package
- Enable/Disable Function on pad 1
- Disable function includes low standby power mode
- Fundamental and 3rd Overtone Crystals used
- Improved circuit to minimize oscillator issues such as multi-mode output signal.
- Lowest Jitter Product

* BEST OPTION FOR LOW JITTER REQUIREMENTS

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: 0.09 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	-0.3V to +4.0V
V _i Input Voltage	-0.3V to V _{CC} + 0.3V
V _o Output Voltage	-0.3V to V _{CC} + 0.3V

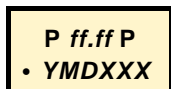
Thermal Characteristics

The maximum die or junction temperature is 125°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.

Part Number:

PE44	45	J	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		Available Frequencies:	
						Frequency in MHz		100.0MHz 106.25MHz 125.0MHz 133.0MHz 156.25MHz	
						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		Contact factory for other options	
						Series Model			
						Frequency Stability 45 = ± 50 ppm 44 = ± 25 ppm			
						Series Model			

Part Marking:



- PLE = Pletronics
- ff.fff M = Frequency in MHz
- P = PECL
- 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	

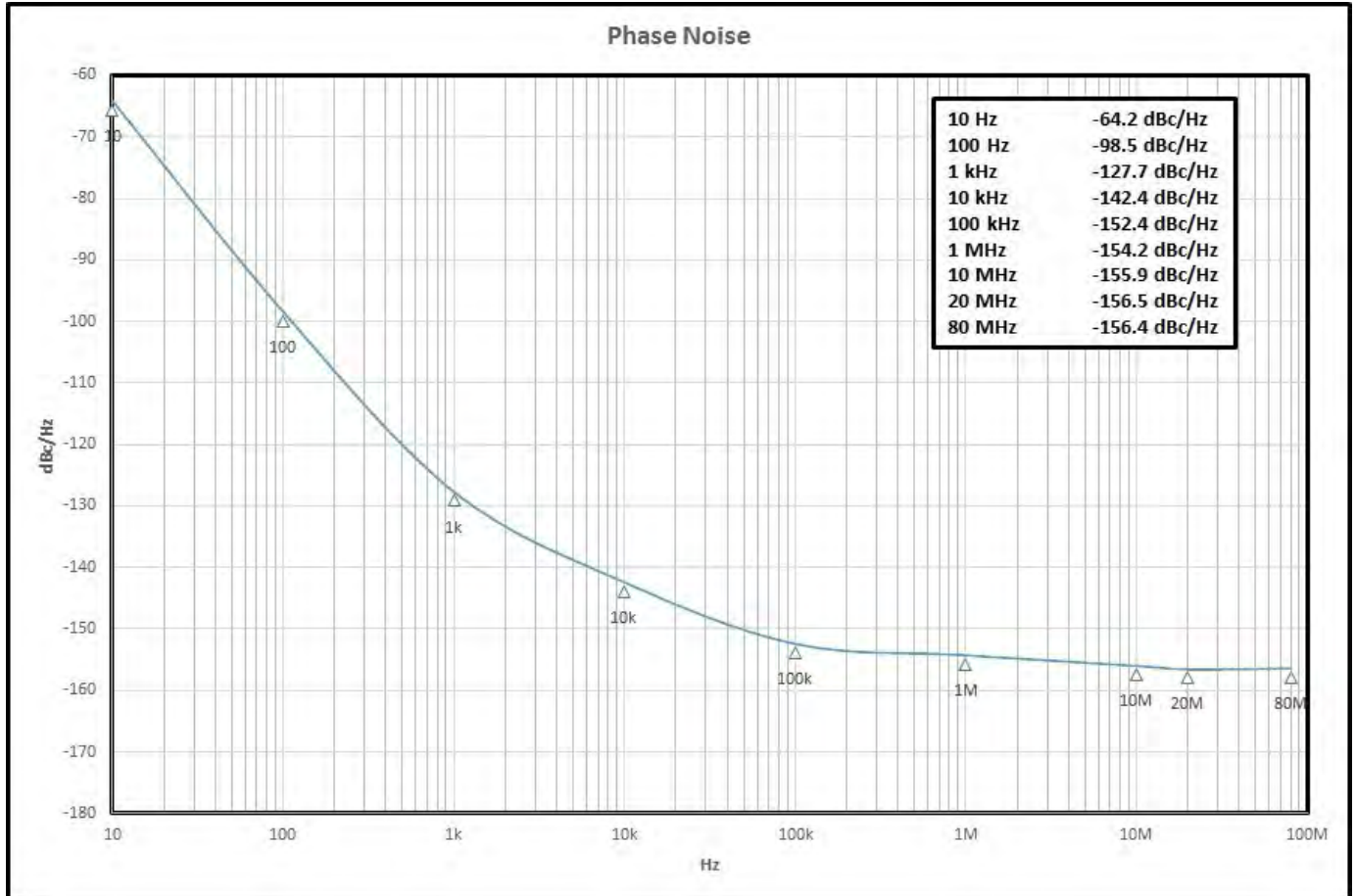
Electrical Specification for 2.50V $\pm 5\%$ over the specified temperature range and the frequency range of 25 to 175 MHz

Item	Min	Typ	Max	Unit	Condition
Frequency Accuracy "45"	-50	-	+50	ppm	For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures
"44"	-25	-	+25		
Output Waveform	PECL /ECL				
Output High Level	1.475	1.55	1.620	V	$V_{CC} = 2.5 V$
Output Low Level	0.690	0.80	0.880	V	$V_{CC} = 2.5 V$
Output Symmetry	45	-	55	%	at 50% point of V_{CC} (See load circuit)
Jitter ¹	-	0.1	-	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}	-	-	0.5	nS	Vth is 20% and 80% of waveform
V_{CC} Supply Current (I_{CC})	-	-	60	mA	
Enable/Disable Internal Pull-up	50	-	-	Kohm	to V_{CC} , measured with Pad 1 = 0.0 volts
V disable	-	-	0.7	V	Referenced to pad 3, 0.3 V_{CC}
V enable	1.7	-	-	V	Referenced to pad 3, 0.7 V_{CC}
Output leakage $V_{OUT} = V_{CC}$	-10	-	+10	uA	Pad 1 low, device disabled
$V_{OUT} = 0V$	-10	-	+10	uA	
Enable time	-	-	2	mS	Time for output to reach a logic state, the output frequency is correct at the specified Start Time.
Disable time	-	-	200	nS	Time for output to reach a high Z state
Start up time	-	-	10	mS	Time for output to reach specified frequency
Operating Temperature Range	-10	-	+70	°C	Standard Temperature Range
	-20	-	+70	°C	Extended Temperature Range "C" Option
	-40	-	+85	°C	Extended Temperature Range "E" Option
Storage Temperature Range	-55	-	+125	°C	
Standby Current I_{CC}	-	-	30	uA	Pad 1 low, device disabled

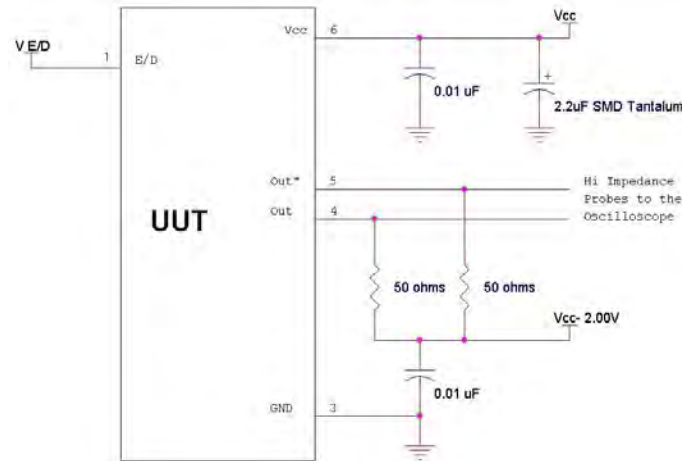
¹ Jitter computed from phase noise data at 156.25MHz

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

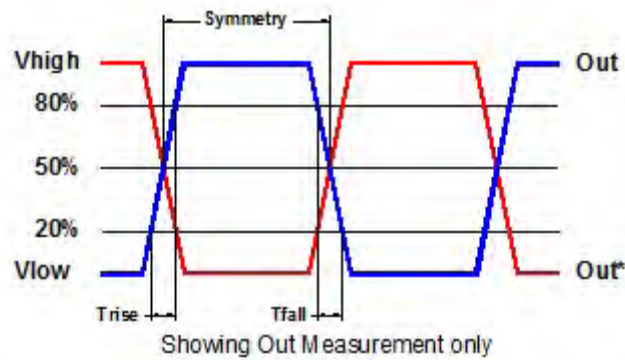
Typical Phase Noise



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

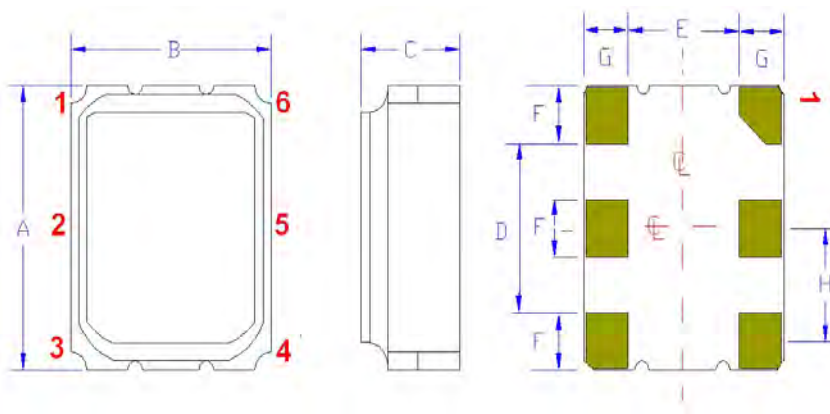
Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

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

P/N: 	
PE4445JEW-100.0M	
Customer P/N: 	
12345678	
Qty: 	D/C: 
1000	5MX-MK29
MSL: 1	

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

Mechanical:



	Inches	mm
A	0.125 ±0.004	3.20 ±0.10
B	0.098 ±0.004	2.50 ±0.10
C	0.040 max	1.00 max
D ¹	0.063	1.60
E ¹	0.051	1.30
F ¹	0.031	0.80
G ¹	0.024	0.60
H ¹	0.047	1.20

Contacts:

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)

¹ Typical dimensions

Not to Scale

Pad	Function	Note
1	Output Enable/Disable	When this pad is not connected the oscillator shall operate. When this pad is < 'V disable', 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	The outputs must be terminated, 100 ohms between the outputs is the ideal termination.
5	Output*	
6	Supply Voltage (V _{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.



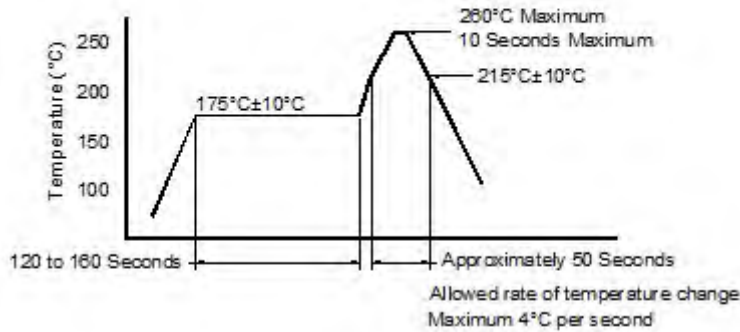
Layout and application information

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

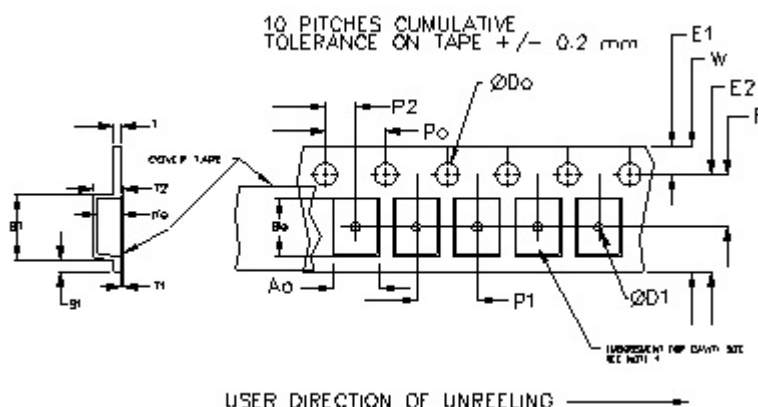
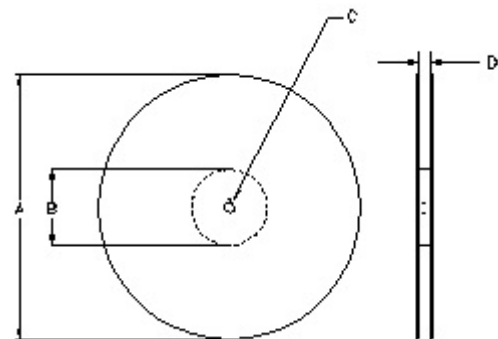
3 times without degradation.

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	1.0	1.75	4.0	2.0 ± 0.05	0.6	0.6	0.1
12mm		1.5			2.0 ± 0.1			
16mm		+0.1 -0.0			± 0.1			
24mm		1.5			± 0.1			

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			Tape Width
A	inches	7.0	10.0	13.0	
	mm	177.8	254.0	330.2	B
B	inches	2.50	4.00	3.75	
	mm	63.5	101.6	95.3	C
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