PLETRONICS
www.pletronics.com 425-776-1880



P113SD Series 2.5 V
CMOS Clock Oscillators

July 2007

Lead Free

- Pletronics' P113SD Series is a quartz crystal controlled precision square wave generator with a CMOS output.
- The P113SD series will directly interface TTL devices also.
- Greatly reduces RFI and EMI system sensitivity
- Minimizes RFI radiation, eases meeting FCC Class B emissions standards.
- Capable of driving up to 30pF capacitive loads
- Tube packaging is available.
- 70 to 135 MHz
- Full Size Thru-Hole DIP package
- Enable/Disable Function
- Disable function includes low standby power mode
- 3rd Overtone Crystals used
- Improved circuit to minimize oscillator issues such as multi-mode output signal.
- Low Jitter
- Has internal bypass capacitor on the Vcc lead
- 5x7 mm LCC ceramic oscillator inside

Pletronics Inc. certifies this device is in accordance with the RoHS (2002/95/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: 4.0 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020C
Second Level Interconnect code: e1 or e2

Absolute Maximum Ratings:

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +7.0V
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo Output Voltage	-0.5V to V_{CC} + 0.5V

Thermal Characteristics

The maximum die or junction temperature is 155°C
The thermal resistance junction to board is 120°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Product informatin is current as of publication date. The product conforms to specifications per the terms of the Pletronics standard warranty. Production processsing does not necesarily include testing of all parameters.

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Part Number:

P11	45	-3SD	ES	W	-85.0M	-30	-XX		Marking
								Internal code or blank	
								Output Load Capacitance **Blank** = 15pF maximum **30** = 30pF maximum **-** <100 MHz only	none
								Frequency in MHz	***fff.fff*** M
								Supply Voltage V_{cc} **W** = 2.5V ± 10%	W, B, C or D
								Enhanced Specifications (apply in the order shown) **E** = Temperature range -40 to 85°C **S** = Symmetry 45%/55% at 50% of V_{CC}	 E S
								Series Model	
								Frequency Stability **45** = ± 50 ppm **44** = ± 25 ppm **20** = ± 20 ppm	 5 4 2
								Series Model	P3S

Part Marking:

PLE
P3Sxsss
fff.fff **M**
yywwaLF

Where:
x = Frequency stability
sss = Enhanced specification and voltage
fff.fff = Frequency in MHz
yywwa = Date code
LF = Lead Free

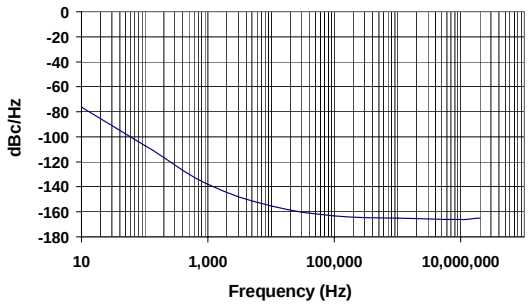
Pletronics may ship the following combinations without notice (this is an enhanced specified device)
44 (25 ppm) stability parts when 45 (50 ppm) was ordered
20 (20 ppm) stability parts when 45 (50 ppm) or 44 (25 ppm) was ordered.
E temperature range parts when extended was not ordered.
S symmetry parts when 40/60% symmetry was ordered.

Pletronics may ship parts that are not marked for extended temperature range but were tested for extended temperature range, a Certificate of Conformance will accompany these parts.

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

Item	Min	Max	Unit	Condition
Frequency Range	70	135	MHz	
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		
Output Waveform	CMOS			
Output High Level	90	-	%	of V_{CC} (See load circuit)
Output Low Level	-	10	%	of V_{CC} (See load circuit)
Output Symmetry	40	60	%	at 50% point of V_{CC} (See load circuit) Standard
	45	55	%	for "**S**" option parts
Jitter	-	0.6	pS RMS	12 KHz to 20 MHz from the output frequency
	-	2.5	pS RMS	10 Hz to 1 MHz from the output frequency
Enable/Disable Internal Pull-up	50	-	Kohm	to V_{CC}
V disable	-	30	%	of V_{CC} applied to pad 1
V enable	70	-	%	of V_{CC} applied to pad 1
Output leakage $V_{OUT} = V_{CC}$	-10	+10	uA	Pad 1 low, device disabled
$V_{OUT} = 0V$	-10	+10	uA	
Standby Current I_{CC}	-	3	uA	Pad 1 low, device disabled
Enable time	-	100	nS	Time for output to reach a logic state
Disable time	-	100	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	0	+70	°C	Standard Temperature Range
	-40	+85	°C	Extended Temperature Range "**E**" Option
Storage Temperature Range	-55	+125	°C	

Typical phase-noise characteristics at 106.25MHz

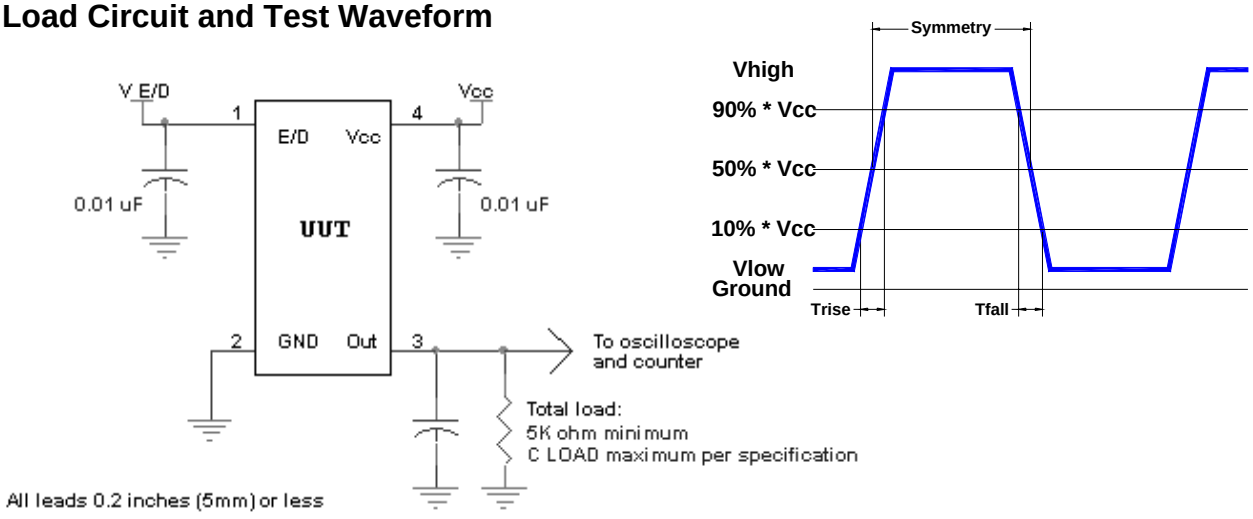


Electrical Specification for 2.50V ±10% over the specified temperature range

Item	Min	Typ	Max	Unit	Condition	
V_{OUT} High (V_{OH})	2.5	2.7	-	V	V_{CC} = 2.97V, I_{OH} = +8 mA	
V_{OUT} Low (V_{OL})	-	0.3	0.4	V	V_{CC} = 2.97V, I_{OL} = -8 mA	
Output T_{RISE} and T_{FALL}	-	1.0	3.0	nS	>110 MHz	C_{LOAD} = 15 pF 10% to 90% of V_{CC} See Load Circuit
	-	1.0	3.0	nS	>80 MHz and <=110 MHz	
	-	2.0	4.0	nS	<=80 MHz	
	-	2.5	4.0	nS	>110 MHz	C_{LOAD} = 30 pF 10% to 90% of V_{CC} See Load Circuit
	-	2.5	4.0	nS	>80 MHz and <=110 MHz	
	-	3.5	6.0	nS	<=80 MHz	
V_{CC} Supply Current (I_{CC})	-	25	60	mA	>110 MHz	C_{LOAD} = 15 pF
	-	20	50	mA	>80 MHz and <=110 MHz	
	-	15	40	mA	<=80 MHz	
	-	38	70	mA	>110 MHz	C_{LOAD} = 30 pF
	-	31	60	mA	>80 MHz and <=110 MHz	
	-	20	45	mA	<=80 MHz	

Specifications with Pad 1 E/D open circuit

Load Circuit and Test Waveform



Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition A
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

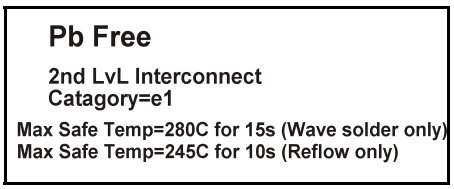
Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

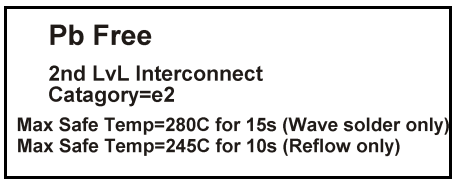
Package Labeling

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



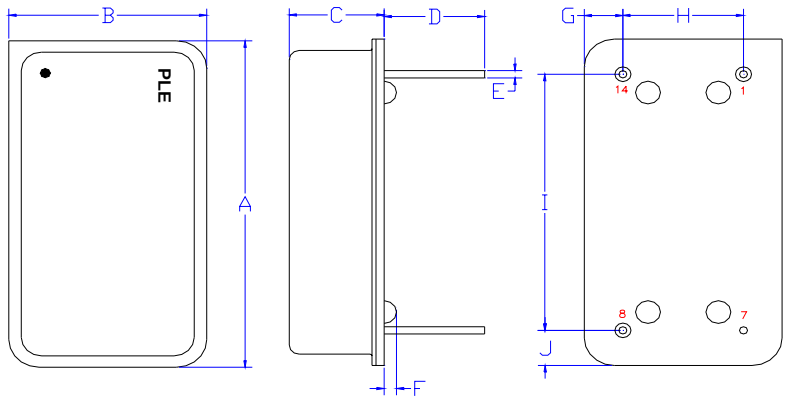


PCB Mounting (typical for lead free processing)

Hand soldering is recommended.

Wave solder at 255°C to 280°C with maximum wave exposure of 15 seconds
Reflow solder maximum exposure of 245°C for 15 seconds
Soldering done in a nitrogen atmosphere enhances the solder joint quality.

Mechanical:



	Inches	mm
A	0.787 ±0.005	20.00 ±0.13
B	0.487 ±0.005	12.37 ±0.13
C	0.225 ±0.011	5.72 ±0.28
D[1]	0.250	6.35
E[1]	0.020	0.51
F[1]	0.031	0.79
G[1]	0.094	2.37
H[1]	0.300	7.62
I[1]	0.600	15.24
J[1]	0.094	2.37

[1] Nominal dimension

Cover:
Kovar
Electroless Nickel Plated
1 µinch (25 µm) typical
Resistance welded to base

Label:
White Kapton with Black Letters
–or--
Blue Epoxy heat cure ink with laser marked lettering

Base:
Kovar
Glass to metal sealed leads

Pin 7 Connected to case

Not to scale

Pad	Function	Note
1	Output Enable/Disable	When this pad is not connected the oscillator shall operate. When this pad is logic low the output will be inhibited (high impedance state.) Recommend connecting this pad to V_{CC} if the oscillator is to be always on.
7	Ground (GND)	
8	Output	
14	Supply Voltage (V_{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

Layout and application information

Lead Free

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.

IMPORTANT NOTICE

Pletronics Incorporated (PLE) reserves the right to make corrections, improvements, modifications and other changes to this product at anytime. PLE reserves the right to discontinue any product or service without notice. Customers are responsible for obtaining the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to PLE's terms and conditions of sale supplied at the time of order acknowledgment.

PLE warrants performance of this product to the specifications applicable at the time of sale in accordance with PLE's standard warranty. Testing and other quality control techniques are used to the extent PLE deems necessary to support this warranty. Except where mandated by specific contractual documents, testing of all parameters of each product is not necessarily performed.

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