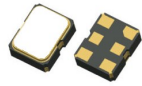




PLETRONICS HC33J Series 2.5V HCSL Clock Oscillator



HC33JW
2.5 x 2.0 x 0.9 mm
LCC Ceramic Package

Features

- Quartz crystal controlled Precision Square Wave Oscillator
- HCSL Differential Output
- Enable/Disable Function on pad 1
- Low Jitter
- 2.5V nominal Supply Voltage
- 100 - 175 MHz Frequency Range

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	100	-	175	MHz	Not all frequencies available, check with PLE sales
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 -40 -40	-	+70 +70 +85 +105 +125	°C	Standard range Extended range C option Extended range E option Extended range G option Extended range H option
Storage Temperature Range	-55	-	+125	°C	
Supply Voltage ^{1,2} (V _{CC})	2.25	2.5	2.75	V	
Supply Current (I _{CC})	-	-	50	mA	
Output Waveform	HCSL				Load 50Ω to ground
Output Voltage Level (V _O)	0.45	-	-	V _{p-p}	
Output High Level (V _{OH})	0.6	-	0.9	V	
Output Low Level (V _{OL})	-0.15	-	0.15	V	
Output T _{RISE} and T _{FALL}	-	-	0.5	ns	0.175 ~ 0.525V
Start Up Time	-	-	5	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	At 50% of output pk-pk
V _{DISABLE} (V _{IL})	-	-	0.3V _{CC}	V	Referenced to ground
V _{ENABLE} (V _{IH})	0.7V _{CC}	-			
Enable Time	-	-	5	ms	
Disable Time	-	-	200	ns	
Enable/Disable Internal Pull-up	30	70	150	KΩ	To V _{CC} , Pin 1 open or ≥0.7V _{CC}
Output Leakage	V _{OUT} = V _{CC} V _{OUT} = 0V	- -10	+10 -	μA	Pad 1 low, device disabled
Standby Current	-	-	30	μA	
rms Phase Jitter	-	0.05	0.1	ps	12 kHz to 20 MHz offset
Phase Noise	1 kHz 10 kHz 100 kHz 1 MHz 20 MHz	-	-130 -155 -160 -165 -165	- - - - -	dBc/Hz 25°C ± 2°C at 155.52 MHz

Notes: Specifications with Pad 1 E/D open circuit

¹ Place an appropriate power supply bypass capacitor as close as possible to V_{CC} for best 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 code (Std 3K no designator)
HC33	45	J	E	W	- 100.0M	-XX
	45 = ± 50 ppm 44 = ± 25 ppm 20* = ± 20 ppm		Blank = -10 to +70°C C = -20 to +70°C E* = -40 to +85°C G = -40 to +105°C H = -40 to +125°C	W = 2.5V ± 10%	100-175 MHz	T1K = 1000 per Reel

*Contact PLE sales for limited frequencies. Full frequency range available which excludes aging.
Options G and H apply to ±50ppm stability

Device Marking

FF.FF H
• YMxxx

FF.FF = Frequency in MHz (max 5 digits includes decimal); Examples: 156.25M is 156.2; 50MHz is 50.0
H = HCSL
YM = 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 YM (Year Month)

Code	3	4	5	6	7	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2023	2024	2025	2026	2027	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

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

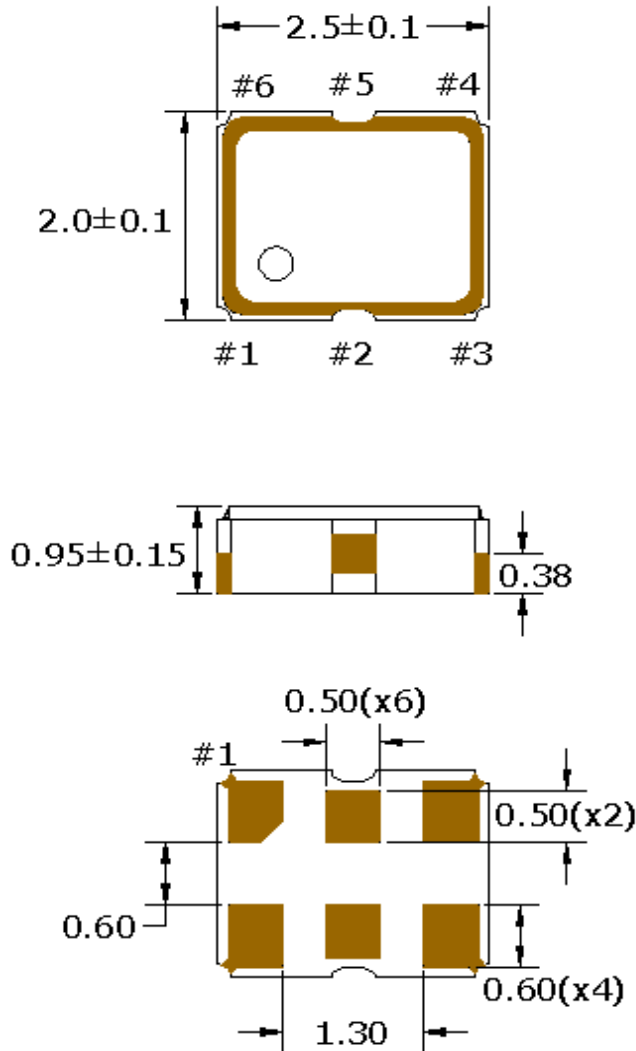
P/N:
PLE Part Number
Customer P/N:
12345678
Qty:
3000
D/C
2A1
MSL: 1

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: 0.015 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

Mechanical Dimensions / Solder Pad Layout



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 _{IH} /Open	Active
V _{IL} /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)

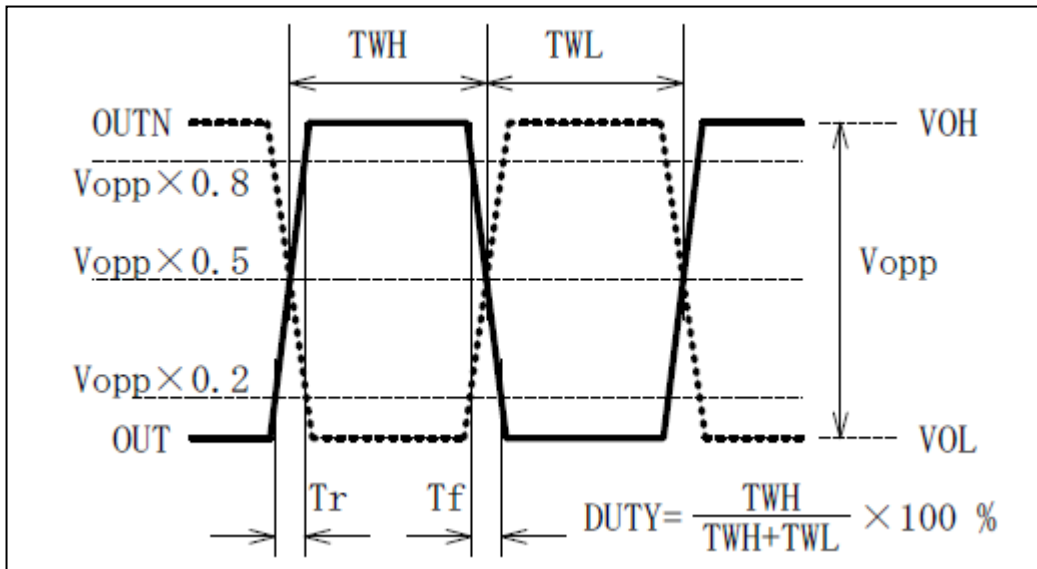
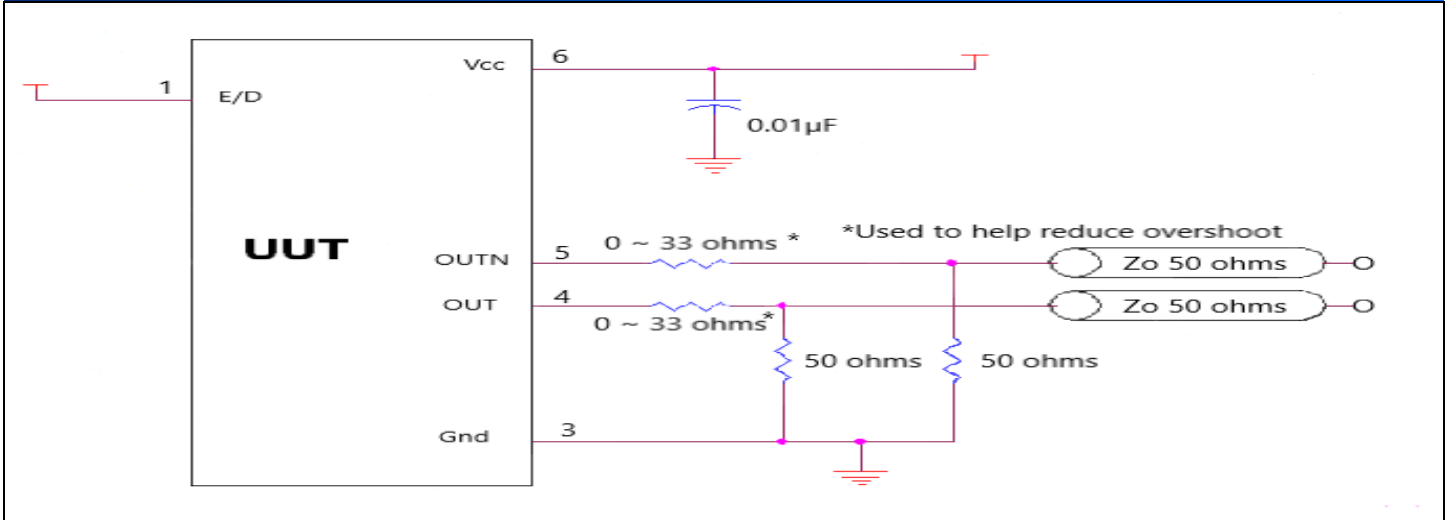
For Optimum Jitter Performance, Pletronics recommends:

- 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



PLETRONICS HC33J Series 2.5V HCSL Clock Oscillator

Electrical Test / Load Circuit



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

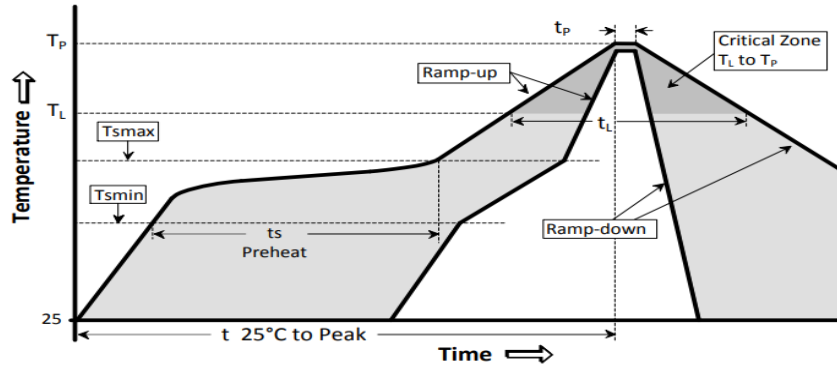
Parameter	Unit
V _{CC} Supply Voltage	-0.3V to +4.5V
V _i Input Voltage	-0.3V to V _{CC} + 0.3V
V _o Output Voltage	-0.3V to V _{CC} + 0.3V

Thermal Characteristics:

The maximum die or junction temperature is 150°C

Reflow Cycle

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

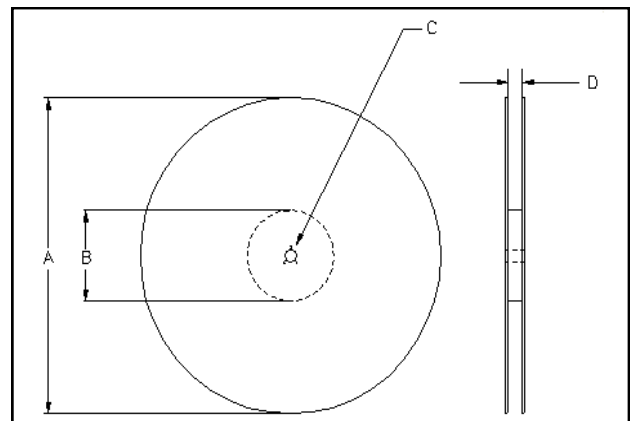
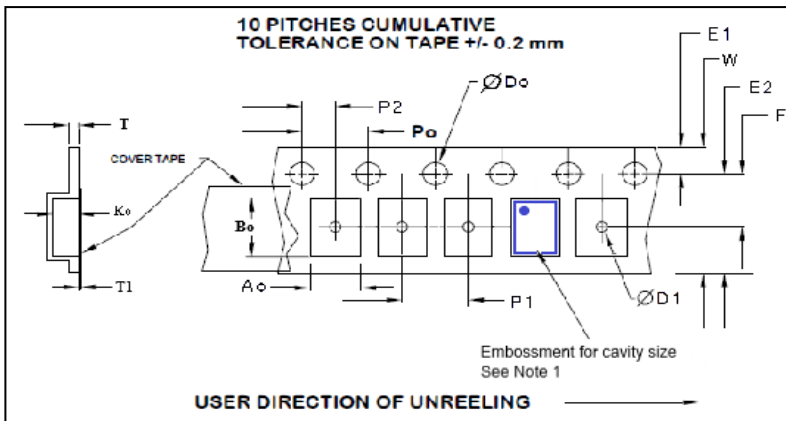


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	$(T_{S_{max}} \text{ to } T_P)$	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{\text{to-peak}}$	8 minutes max	min
Preheat			
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
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 1000 to 3000 per reel, cut tape for < 1000. 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	2.25 ± 0.1	2.75 ± 0.1	1.15 ± 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	8.4 +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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