PLETRONICS HC33G 2.5V HCSL Clock Oscillator

HC33GW
2.5 x 2.0 x 0.9 mm
LCC Ceramic Package

Features

- Quartz crystal controlled Precision Square Wave Oscillator
- HCSL Output
- Enable/Disable Function on pad 1
- Low Jitter
- 2.5V Supply Voltage
- 13.5 ~ 160 MHz Frequency Range

Applications

PCIe
Driving A/Ds, D/As, FPGAs
Fibre Channel
Ethernet, GbE, SynchE
Medical
Storage Area Networking
COTS
Telecom

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range [2] (Fo)	13.5	-	160	MHz	
Frequency Stability vs. Temperature [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 pg 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
Supply Voltage [1, 2] (V_{CC})	2.25	2.5	2.75	V	
Supply Current (I_{CC})	-	22	40	mA	
Output Waveform	HCSL				RL = 50Ω to ground
Output High Level (V_{OH})	0.55	-	0.9	V	
Output Low Level (V_{OL})	-0.15	-	0.15	V	
Output Swing (V_{OPP})	0.55	-	-	V	Rs = 0Ω
Output T_{RISE} and T_{FALL}	-	0.2	0.5	ns	Vth is 20% and 80% of V_{OPP}, Rs = 0Ω
Startup Time	-	-	10	ms	
Duty Cycle (at output crossing point)	45	-	55	%	
$V_{DISABLE}$ (VIL)	-	-	30	%Vcc	Referenced to ground
V_{ENABLE} (VIH)	70	-			
Enable Input Pull-up Resistance	-	39	-	kΩ	To V_{CC}, Pin 1 open or ≥0.7Vcc
Enable Time	-	-	10	ms	
Disable Time	-	-	200	ns	Time for output to reach a high Z state
Standby Current	-	-	10	µA	Pad 1 low, device disabled
Jitter	-	-	0.2	ps	Fo ≥ 40MHz; 12 kHz to 20 MHz offset
Phase Noise 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz 20 MHz	-	-121 -143 -153 -159 -161 -161 -161	-	dBc/Hz	25°C ± 2°C at 100.0 MHz
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 1 E/D open circuit
[1] Place an appropriate power supply bypass capacitor as close as possible to Vcc for best operation
[2] Specified by part number

Part Number

Series Model	Frequency Stability		Operating Temperature Range	Supply Voltage	Frequency	Optional T&R Packaging code
HC33	**45**	**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 **G** = -40 to +105°C **H** = -40 to +125°C	**W** = 2.5V ± 5%	13.5 - 160 MHz	**T1K** = 1000 per Reel **Blank** = 3000pcs (standard reel qty)

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

Device Marking

***FF.FF*H**
- ***YMxxx***

FF.FF = Frequency in MHz (Max 5 characters includes decimal) Examples: 156.25M is 156.2; 50MHz is 50.0
H = HCSL Output
YM = Date Code, All other markings are internal codes

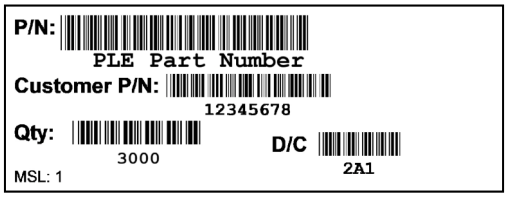
Note: Specifications such as frequency stability, supply voltage and operating temperature range, etc. are not identified from marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Codes for Date Code YM (Year Month)

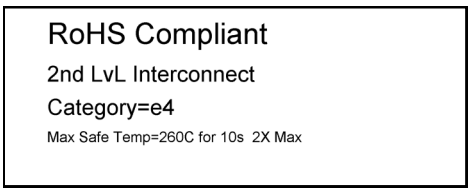
Code	3	4	5	6	7	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2023	2024	2025	2026	2027	**Month**	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

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



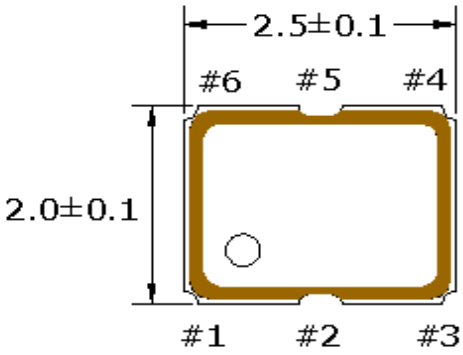
RoHs Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial



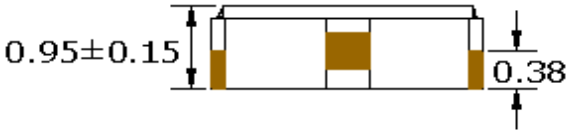
Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

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

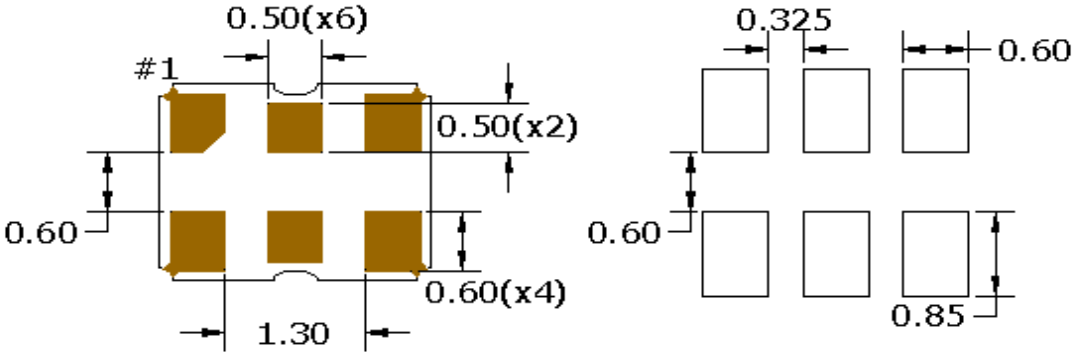
Mechanical Dimensions / Solder Pad Layout



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



ENABLE/DISABLE	
PIN1	Output
VIH/Open	Active
VIL/Gnd	Disabled/Tristate



Dimensions in mm

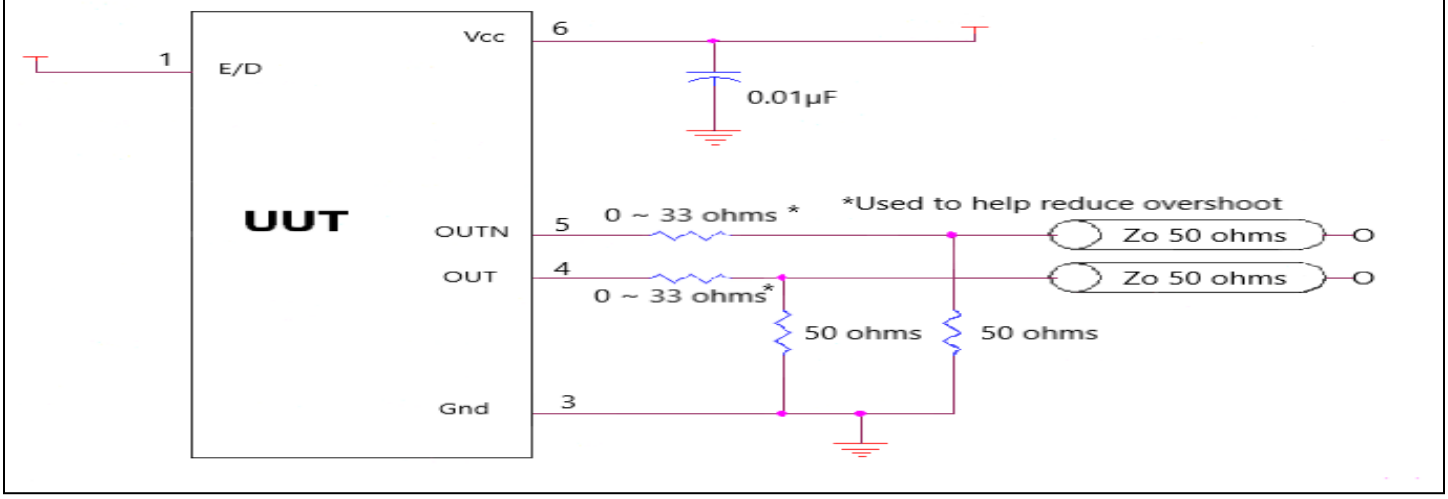
Pad Layout
Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

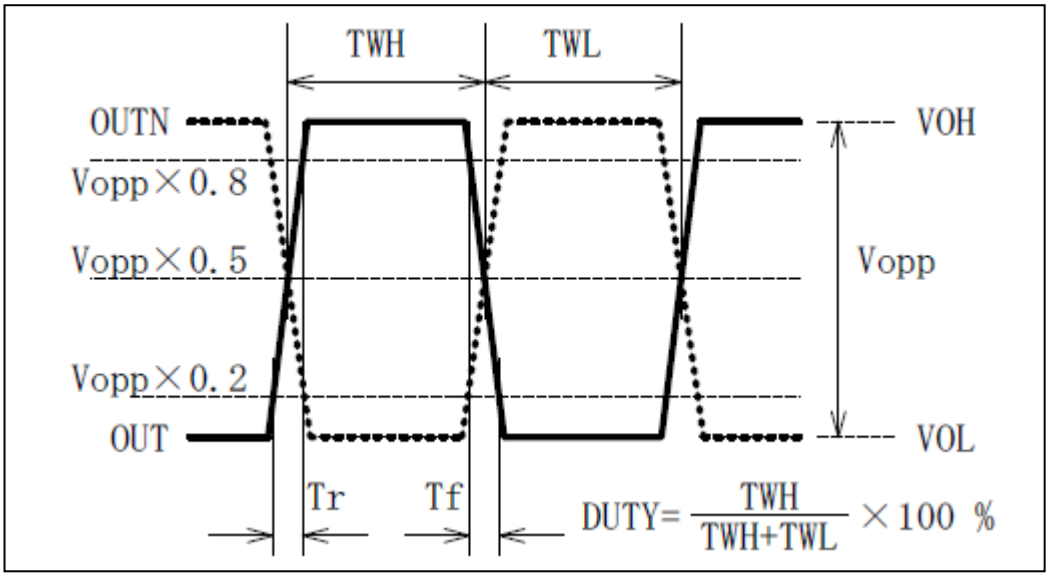
Contacts (pads): Gold (0.3 to 1.0 µm) over Nickel (1.27 to 8.89 µm)

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





Environmental / ESD Ratings

Reliability: Environmental

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

Thermal Characteristics:
The maximum die or junction temperature is 150°C

ESD Rating

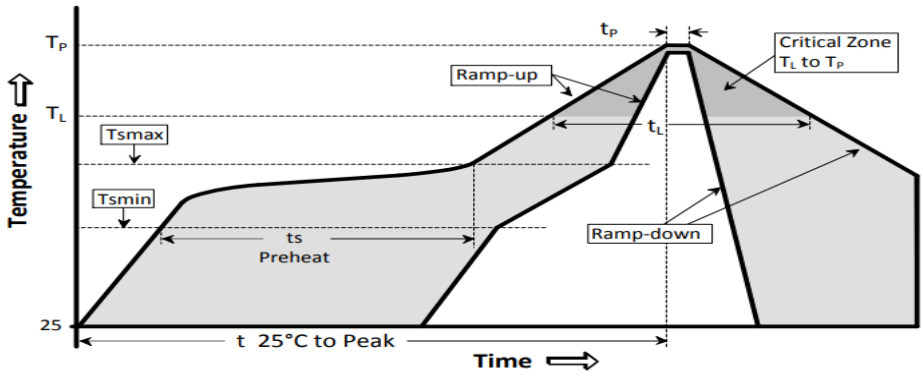
Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Machine Model	200V	JESD22-A115

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.5V to +5V
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo Output Voltage	-0.5V to V_{CC} + 0.5V

Reflow Cycle

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

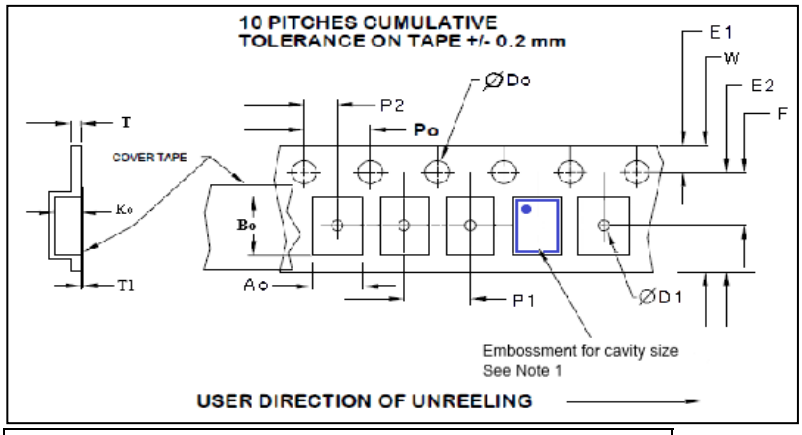


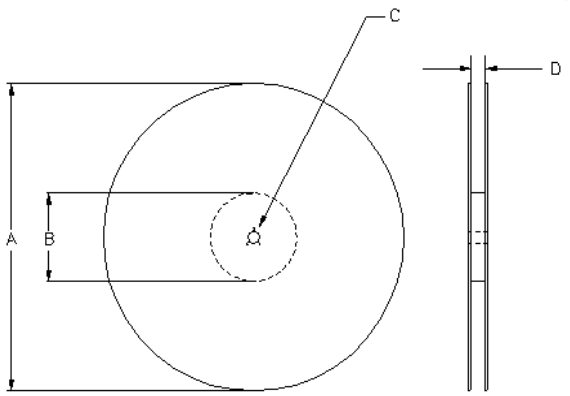
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time Ts_{min} to Ts_{max}	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	Tp	260	°C
Time within 5°C of peak temperature	tp	20 – 40	sec

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

Tape and Reel

Tape and Reel available for quantities of 1000 to 3000 per reel, cut tape for < 1000. 8mm tape, 4mm pitch.





Tape Variable Dimensions Table 2							
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

Dimensions in mm Drawing Not to scale

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

Tape Constant Dimensions Table 1							
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

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inch-es	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

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