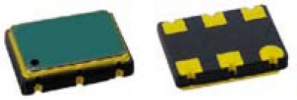
PLETRONICS VHA6 Series
CMOS Clock Oscillator



VHA6
5.0 x 7.0 x 1.7 mm
LCC Ceramic Package

Features

- Pletronics' VHA6 Series is a quartz crystal controlled precision square wave oscillator
- CMOS Output
- Vcontrol on pin 1
- Enable/Disable Function on pin 2
- Low Jitter
- 3.3V nominal Supply Voltage
- 1-108 MHz Frequency Range

Applications

Driving A/Ds, D/As, FPGAs
Digital Video
Ethernet, GbE
Medical
Storage Area Networking
COTS
Broad Band Access
SONET/ SDH/ DWDM
Base Stations/ Picocell
Test & Measurement

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range [2]	1	-	108	MHz	Consult factory for other options
Frequency Stability vs. Temperature [1,2]	-	-	±50	ppm	Not specified if APR is specified
Operating Temperature Range [2]	-40	-	+105	°C	(-40 to +85°C only for 80-126MHz)
Supply Voltage [2] V_{CC}	2.97	3.30	3.63	V	3.3V ± 10%
Supply Current I_{CC} (1-80MHz)	-	3	5	mA	C_{LOAD} = 15 pF
Supply Current I_{CC} (80-126MHz)	-	16	20	mA	C_{LOAD} = 15 pF
Output Waveform	CMOS				
Duty Cycle	45	-	55	%	See Load Circuit
Output V_{HIGH} (for I_{OH} -3mA)	V_{CC} -0.4	-	-	V	
Output V_{LOW} (for I_{OH} +3mA)	-	-	0.4	V	
Output T_{RISE} and T_{FALL}	-	4	6	ns	C_{LOAD} = 15 pF, 10% to 90% of V_{CC}, See Load Circuit
Startup Time	-	1.5	10	ms	Time for output to reach specified frequency
$V_{DISABLE}$	-	-	30	%	Of V_{CC} applied to Pad 2
V_{ENABLE}	70	-			
Startup Time	-	1.5	10	ms	Time for output to reach specified frequency
Enable Time	-	-	250	ns	Time for output to reach a logic state
Disable Time	-	-	250	ns	Time for output to reach a high Z state
Enable/Disable Internal Pull-up	50	-	-	kΩ	To V_{CC}
Vcontrol Resistance Pin 1	20	25	-	kΩ	
Modulation Bandwidth	10	20	-	kHz	Vcontrol = 1.65±1.65V, -3dB
Output Leakage $V_{OUT} = V_{CC}$ V_{OUT} = 0V	-10 -10	-	+10 +10	µA	Pad 2 low, device disabled
Phase Noise 10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	-	-69 -101 -126 -140 -154 -160 -162	-	dBc/Hz	25°C ± 2°C at 100 MHz
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 2 E/D open circuit
[1]For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures.
[2] Specified by part number

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Pullability [1,2] 1MHz-80MHz	110	-	-	ppm	Not specified if APR is specified
80MHz-108MHz	90	-	-		For Vcontrol 1.65V±1.65V
Pullability **APR** [1,2] 1MHz-80MHz	60	-	-	ppm	Absolute pull range, includes the effect of temperature stability
80MHz-108MHz	40	-	-		For Vcontrol 1.65V±1.65V
Linearity	-	-	+10	%	Slope Positive

Notes: Specifications with Pad 2 E/D open circuit
[1]For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures.
[2] Specified by part number

Part Number

Series Model	Lowest Specified Operating Temp	Highest Specified Operating Temp	Stability in ppm (*10)	Pullability in ppm	Frequency in MHz
VHA6029036	**E**	**G**	**500**	**100**	**-80.0M**
Series (Part type, logic, and package)	**A** = +10°C **B** = +5°C **C** = +0°C **D** = -5°C **E** = -10°C **F** = -15°C **G** = -20°C **H** = -25°C **J** = -30°C **K** = -35°C **L** = -40°C **M** = -45°C	**A** = +40°C **B** = +45°C **C** = +50°C **D** = +55°C **E** = +60°C **F** = +65°C **G** = +70°C **H** = +75°C **J** = +80°C **K** = +85°C **L** = +90°C **M** = +95°C **N** = +100°C **P** = +105°C	**000** = APR **250** = 25ppm **500** = 50ppm (typical values shown)	**050** = 50ppm min **100** = 100ppm min (typical values shown)	1.0 - 108.0 MHz

Device Marking

PLE VHA6 *FF.FFF*M • *YMDxx*	VH*YWWXX* *FF.FFF*M · P*XXXXX*

PLE or P = Pletronics
VH or VHA6 = Part Series
FF.FFF = Frequency in MHz
YMD or *YWW* = Date Code (see table below)
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 YMD (Year Month Day)

Code	0	1	2	3	4	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2020	2021	2022	2023	2024	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

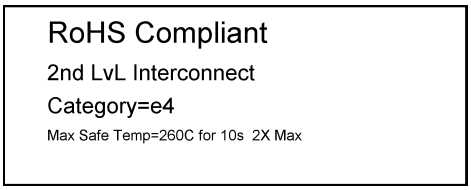
Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Code	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z	
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

Package Labeling

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.

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

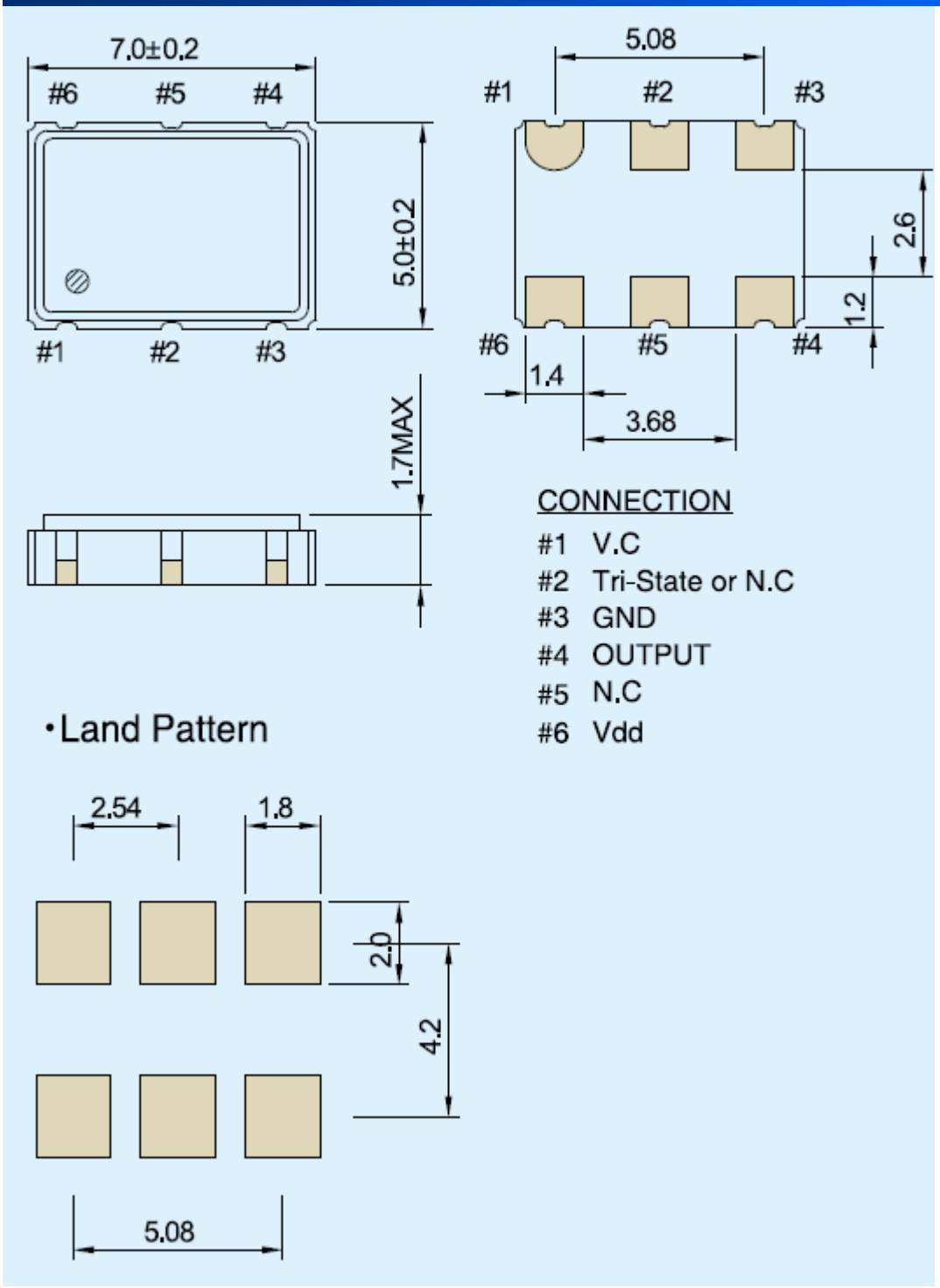
RoHs Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial



Pletronics Inc. certifies this device is in accordance with the RoHS 3 and WEEE 2 directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.17 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

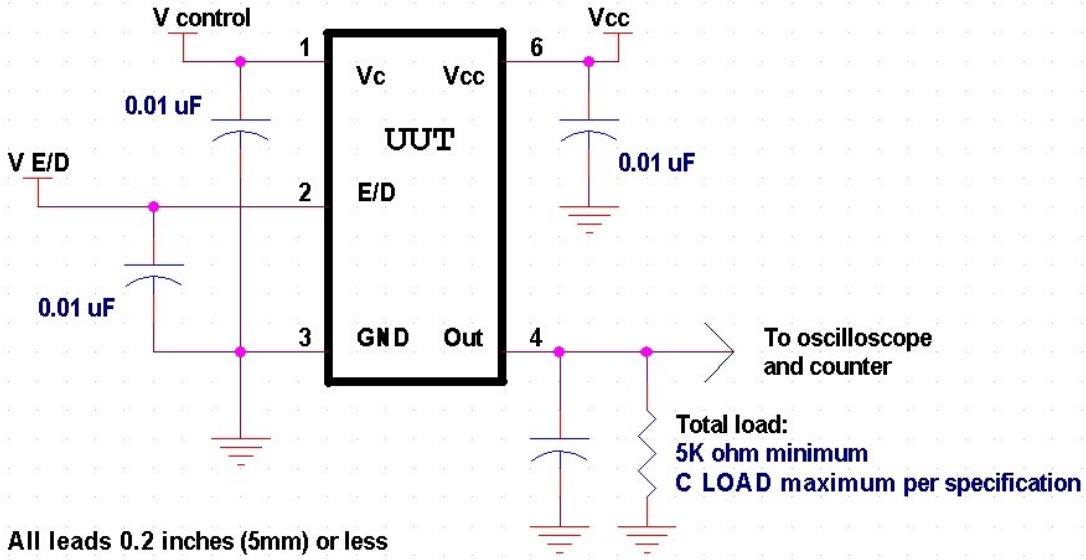
Mechanical Dimensions (mm)

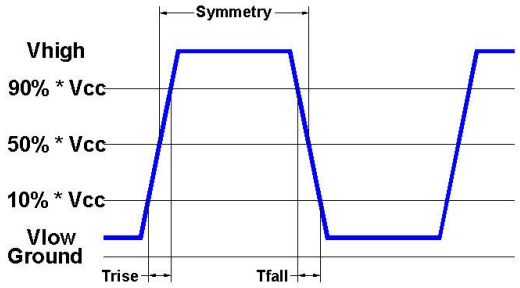


For Optimum Jitter Performance, Pletronics recommends:

- 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 Compliance

Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A

ESD Rating

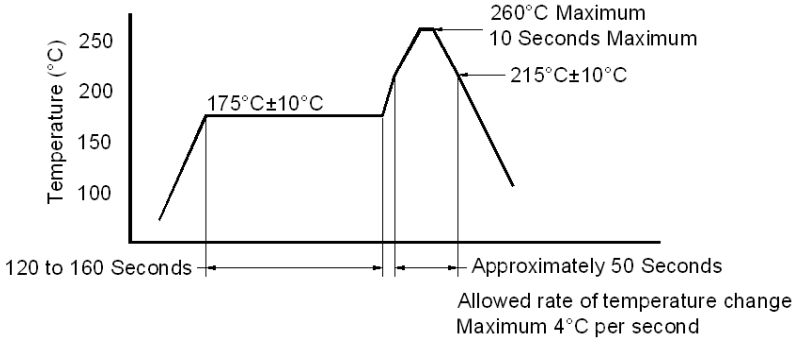
Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	500V	JESD 22-C101
Machine Model	200V	JESD22-A115

Thermal Characteristics:
The maximum die or junction temperature is 155°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.

Absolute Maximum Ratings

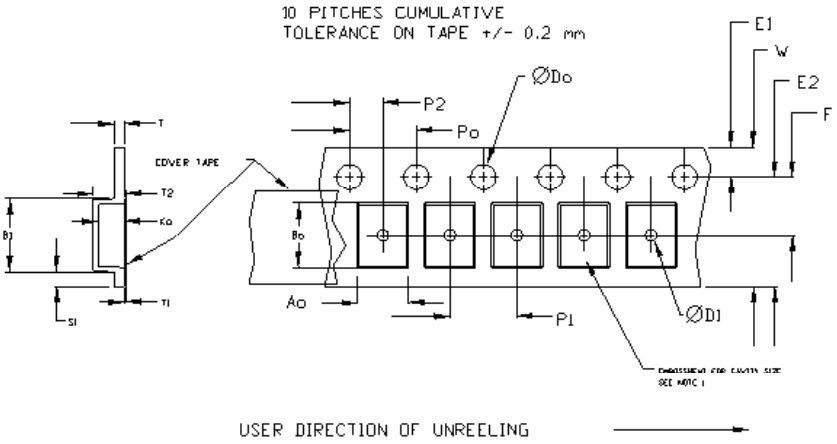
Parameter	Unit
V_{CC} Supply Voltage	-0.3V to +4.0V
Vi Input Voltage	-0.3V to V_{CC} + 0.3V
Vo Output Voltage	-0.3V to V_{CC} + 0.3V

Reflow Cycle



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

Tape and Reel

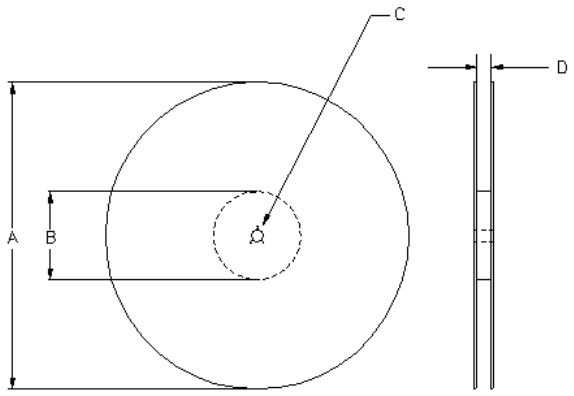


Tape Constant Dimensions Table 1								
Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5						
16mm		1.5			2.0 ±0.1			
24mm		1.5						

Tape Variable Dimensions Table 2							
Tape Size	B1 max	E2 min	F	P1	T2 max	W max	Ao, Bo & Ko
16mm	12.1	14.25	7.5 ±0.1	8.0 ±0.1	8.0	16.3	Note 1

Dimensions in mm Drawing Not to scale

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



Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	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
10	10.0	254.0	4.00	101.6		
13	13.0	330.2	3.75	95.3		

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