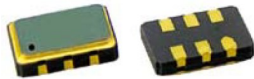




# PLETRONICS VHD6 Series CMOS Clock Oscillator



VHD6  
3.2 x 5.0 x 1.30 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
- 1-112 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 <sup>2</sup>	1	-	112	MHz	Consult factory for other options
Frequency Stability vs. Temperature <sup>1,2</sup>	-	-	±50	ppm	Not specified if APR is specified
Operating Temperature Range <sup>2</sup>	-40	-	+105	°C	(-40 to +85°C only for 80-126MHz)
Supply Voltage <sup>2</sup> V <sub>CC</sub>	2.97	3.30	3.63	V	3.3V ± 10%
Supply Current I <sub>CC</sub> (1-80MHz)	-	3	5	mA	C <sub>LOAD</sub> = 15 pF
Supply Current I <sub>CC</sub> (80-126MHz)	-	16	20	mA	C <sub>LOAD</sub> = 15 pF
Output Waveform	CMOS				
Duty Cycle	45	-	55	%	See Load Circuit
Output V <sub>HIGH</sub> (for I <sub>OH</sub> -3mA)	V <sub>CC</sub> -0.4	-	-	V	
Output V <sub>LOW</sub> (for I <sub>OH</sub> +3mA)	-	-	0.4	V	
Output T <sub>RISE</sub> and T <sub>FALL</sub>	-	4	6	ns	C <sub>LOAD</sub> = 15 pF, 10% to 90% of V <sub>CC</sub> , See Load Circuit
Startup Time	-	1.5	10	ms	Time for output to reach specified frequency
V <sub>DISABLE</sub>	-	-	30	%	Of V <sub>CC</sub> applied to Pad 2
V <sub>ENABLE</sub>	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 <sub>CC</sub>
Vcontrol Resistance Pin 1	20	25	-	kΩ	
Modulation Bandwidth	10	20	-	kHz	Vcontrol = 1.65±1.65V, -3dB
Output Leakage	V <sub>OUT</sub> = V <sub>CC</sub> V <sub>OUT</sub> = 0V	-10 -10	- +10	μA	Pad 2 low, device disabled  25°C ± 2°C at 100 MHz
Phase Noise	10 Hz	-69		dBc/Hz	
	100 Hz	-101			
	1 kHz	-126			
	10 kHz	-140	-		
	100 kHz	-154			
	1 MHz	-160			
	10 MHz	-162			
Storage Temperature Range	-55	-	+125	°C	

Notes: Specifications with Pad 2 E/D open circuit

<sup>1</sup>For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures.

<sup>2</sup>Specified by part number



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## Electrical Characteristics

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

Notes: Specifications with Pad 2 E/D open circuit

<sup>1</sup>For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures.

<sup>2</sup> 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
<b>VHD6029036</b>	<b>E</b>	<b>G</b>	<b>500</b>	<b>100</b>	<b>-80.0M</b>
<b>Series (Part type, logic, and package)</b>	<b>A</b> = +10°C <b>B</b> = +5°C <b>C</b> = +0°C <b>D</b> = -5°C <b>E</b> = -10°C <b>F</b> = -15°C <b>G</b> = -20°C <b>H</b> = -25°C <b>J</b> = -30°C <b>K</b> = -35°C <b>L</b> = -40°C <b>M</b> = -45°C	<b>A</b> = +40°C <b>B</b> = +45°C <b>C</b> = +50°C <b>D</b> = +55°C <b>E</b> = +60°C <b>F</b> = +65°C <b>G</b> = +70°C <b>H</b> = +75°C <b>J</b> = +80°C <b>K</b> = +85°C <b>L</b> = +90°C <b>M</b> = +95°C <b>N</b> = +100°C <b>P</b> = +105°C	<b>000</b> = APR <b>250</b> = 25ppm <b>500</b> = 50ppm  (typical values shown)	<b>050</b> = 50ppm min <b>100</b> = 100ppm min  (typical values shown)	1.0 - 112.0 MHz



# PLETRONICS VHD6 Series CMOS Clock Oscillator

## Device Marking

**PLE VHD6**

**FF.FFFM**

- **YMDxx**

PLE = Pletronics  
 VHD6 = Part Series  
 FF.FFF = Frequency in MHz  
 YMD = 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

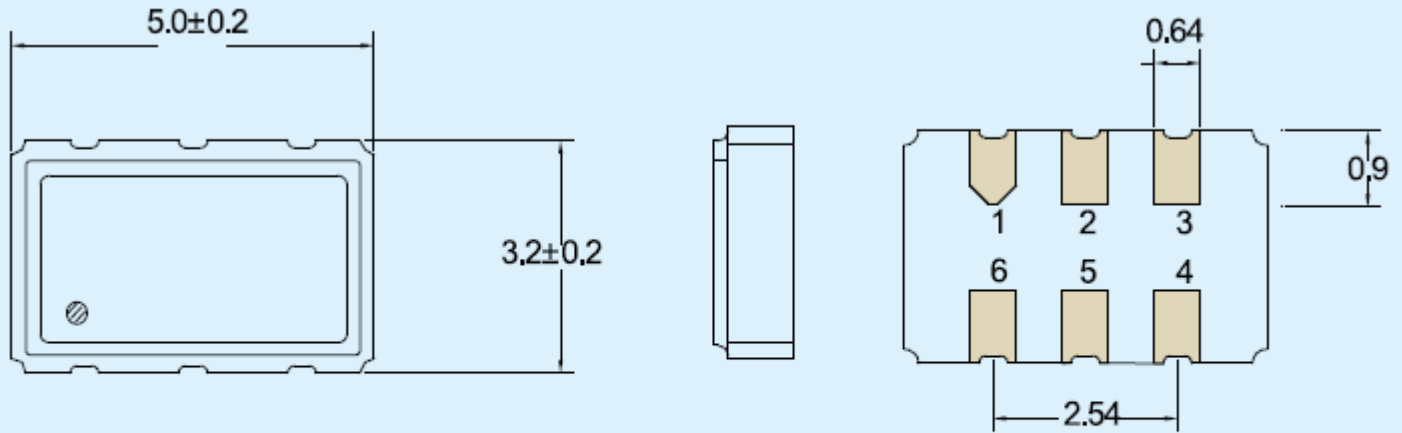
<b>P/N:</b>	
	VHD6029036500100-80.0M
<b>Customer P/N:</b>	
	12345678
<b>Qty:</b>	
	1000
<b>D/C</b>	
	9DW
MSL: 1	

<b>RoHS Compliant</b>
2nd Lvl Interconnect
Category=e4
Max Safe Temp=260C for 10s 2X Max

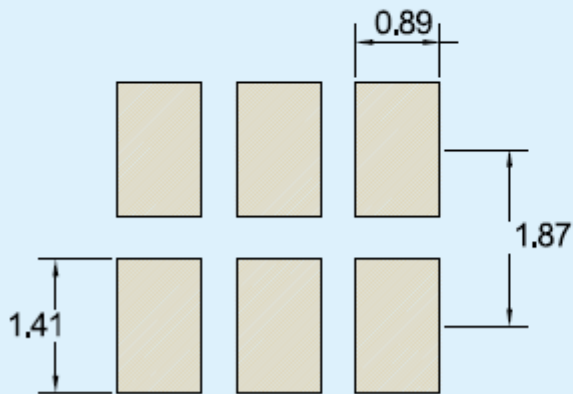
Pletronics Inc. certifies this device is in accordance with the RoHS 3 and WEEE 2 directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
 Weight of the Device: 0.09 grams  
 Moisture Sensitivity Level: 1 As defined in J-STD-020D  
 Second Level Interconnect code: e4

## Mechanical Dimensions (mm)



### • Land Pattern



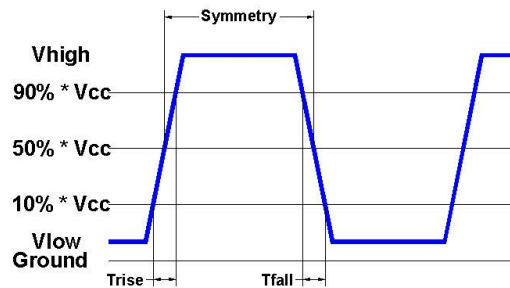
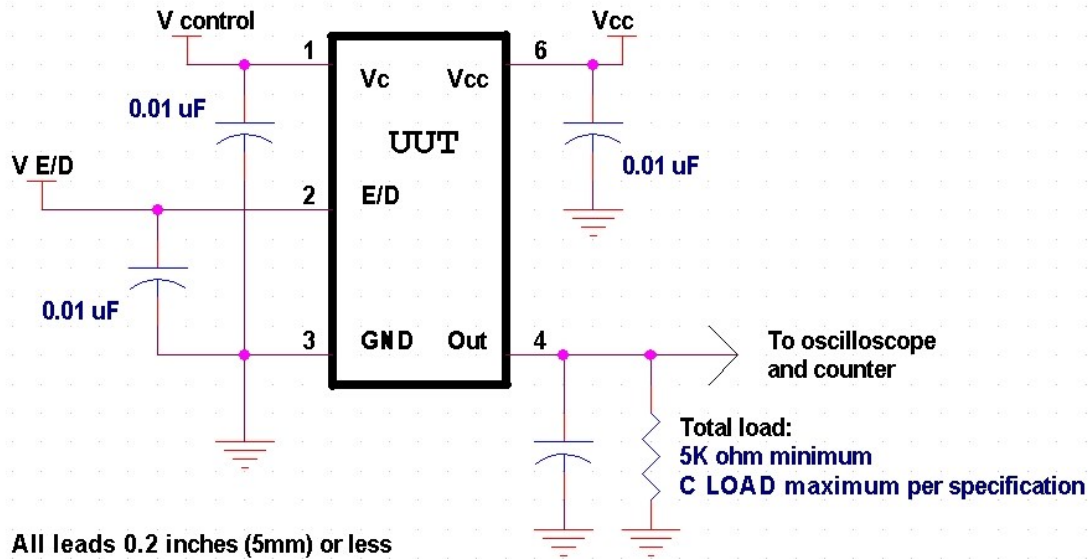
### CONNECTION

- #1 V.C
- #2 Tri-State or N.C
- #3 GND
- #4 OUTPUT
- #5 N.C
- #6 Vdd

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

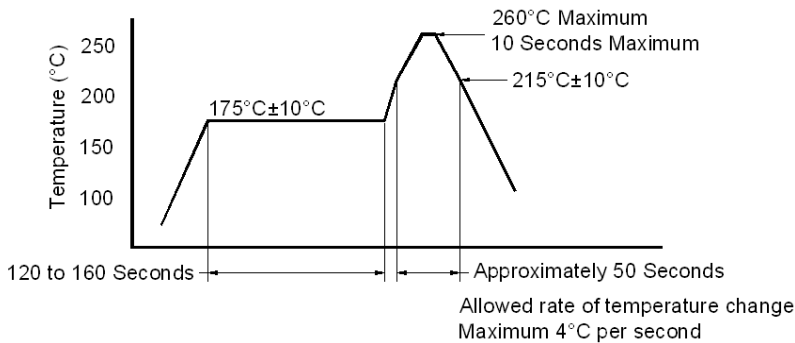
### Thermal Characteristics:

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

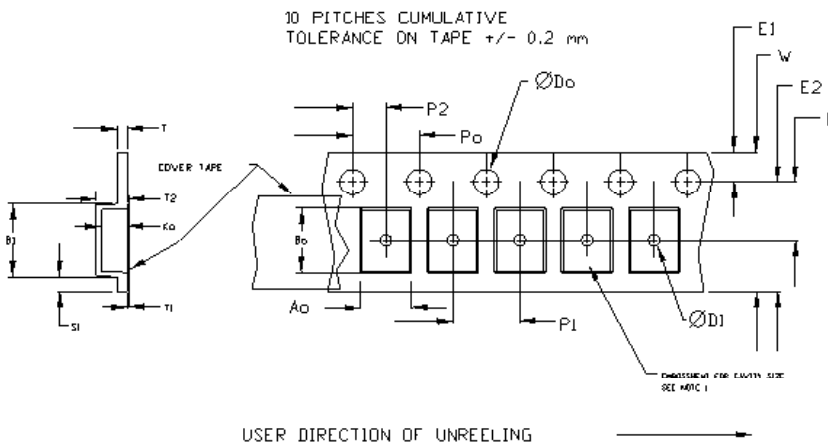
Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.3V to +4.0V
V <sub>i</sub> Input Voltage	-0.3V to V <sub>CC</sub> + 0.3V
V <sub>o</sub> Output Voltage	-0.3V to V <sub>CC</sub> + 0.3V

## Reflow Cycle



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

## Tape and Reel

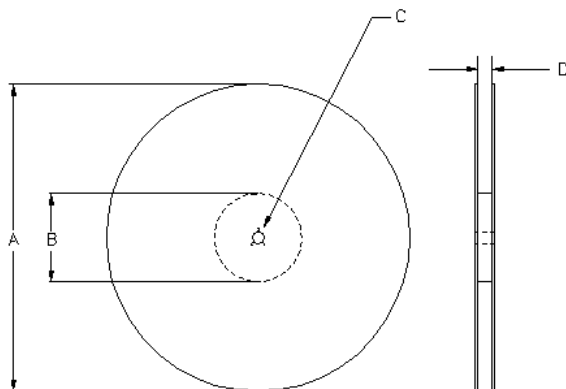


Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
8mm	1.5	1.0	1.75	4.0	2.0	0.6	0.6	0.1
12mm		1.5			±0.05			
16mm	+0.1 -0.0	1.5	±0.1	±0.1	2.0			
24mm		1.5			±0.1			

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 Size	A		B		C	D
	Inches	mm	Inches	mm		
7	7.0	177.8	2.50	63.5	13.0	Tape size +0.4
10	10.0	254.0	4.00	101.6	+0.5 -0.2	+2.0 -0.0
13	13.0	330.2	3.75	95.3		



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