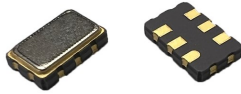




PLETRONICS VHD6 Series CMOS Clock Oscillator



VHD6
5.0 x 3.2 x 1.30 mm
LCC Ceramic Package

Features

- Pletronics' VHD6 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 ²	1	-	112	MHz	Consult factory for other options
Frequency Stability ^{1,2}	-	-	±50	ppm	Not specified if APR is specified
Operating Temperature Range ²	-40	-	+105	°C	(-40 to +85°C only ≥ 80 MHz)
Supply Voltage ² V _{CC}	2.97	3.30	3.63	V	3.3V ± 10%
Supply Current I _{CC} (1-80 MHz)	-	3	5	mA	C _{LOAD} = 15 pF
Supply Current I _{CC} (>80-112 MHz)	-	16	20	mA	C _{LOAD} = 15 pF
Output Waveform	CMOS				
Duty Cycle	45	-	55	%	At 50%V _{CC} level
Output V _{HIGH} (for I _{OH} -3mA)	V _{CC} - 0.4	-	-	V	See Load Circuit
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}
Control Voltage	0	1.65	3.3	V	
Linearity	-	-	±10	%	
Vcontrol Input Impedance	5	-	-	MΩ	Pad 1 to ground
Modulation Bandwidth	15	20	-	kHz	@ -3dB
Output Leakage	V _{OH} = V _{CC} V _{OL} = Gnd	-	+10 -	μA	Pad 2 low
Phase Noise	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	-	-69 -95 -120 -140 -149 -157 -160	-	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 Includes supply voltage change, load changes, aging at 25°C for 1 year, shock, vibration and temperatures.

² Specified by part number



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Part Number					
Series Model	Lowest Specified Operating Temp	Highest Specified Operating Temp	Stability in ppm (*10)	Pullability in ppm	Frequency in MHz
VHD6029036	E	G	500	100	-80.0M
Series (Part type, logic, and package)	C = 0°C E = -10°C G = -20°C J = -30°C L = -40°C	G = +70°C J = +80°C K = +85°C P = +105°C	000 = APR 250 = ±25ppm 500 = ±50ppm (typical values shown)	050 = ±50ppm min 100 = ±100ppm min (typical values shown)	1.0 - 112.0 MHz



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Device Marking

PLE VHD6
FF.FFFM
• **YMDxxx**

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	2	3	4	5	6	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2022	2023	2024	2025	2026	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

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

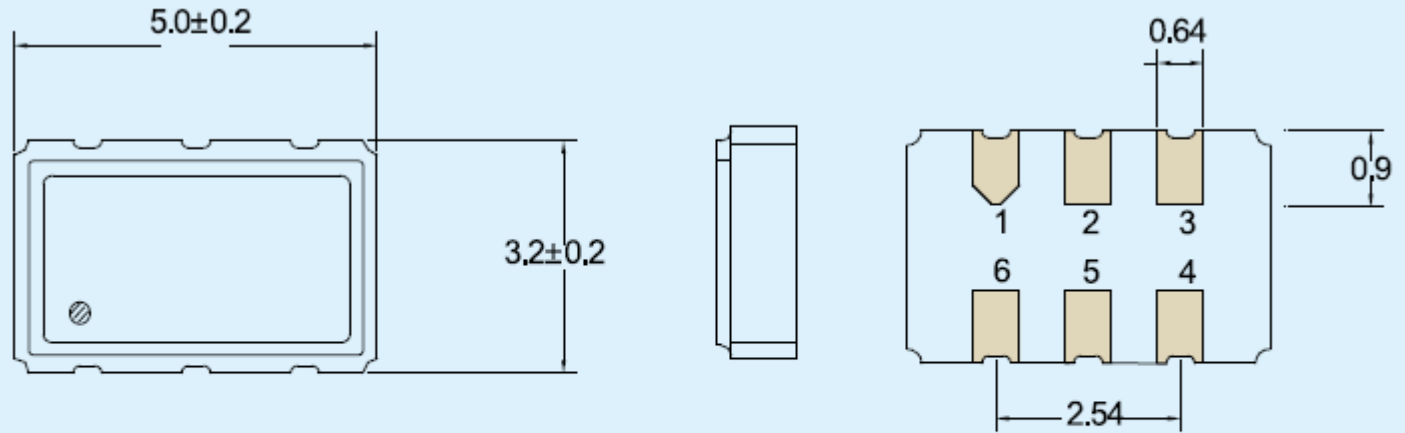
P/N: 
VHD6029036500100-80.0M
Customer P/N: 
12345678
Qty:  1000 **D/C**  9DW
MSL: 1

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

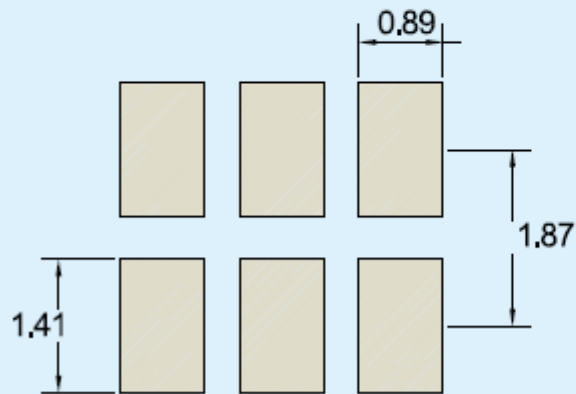
Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.055 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

Enable/Disable	
Pin 2	Output
Open	Active
Logic '1'	Active
Ground or Logic '0'	Tri-state

Pad Layout

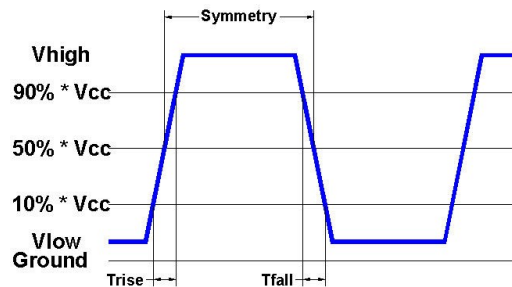
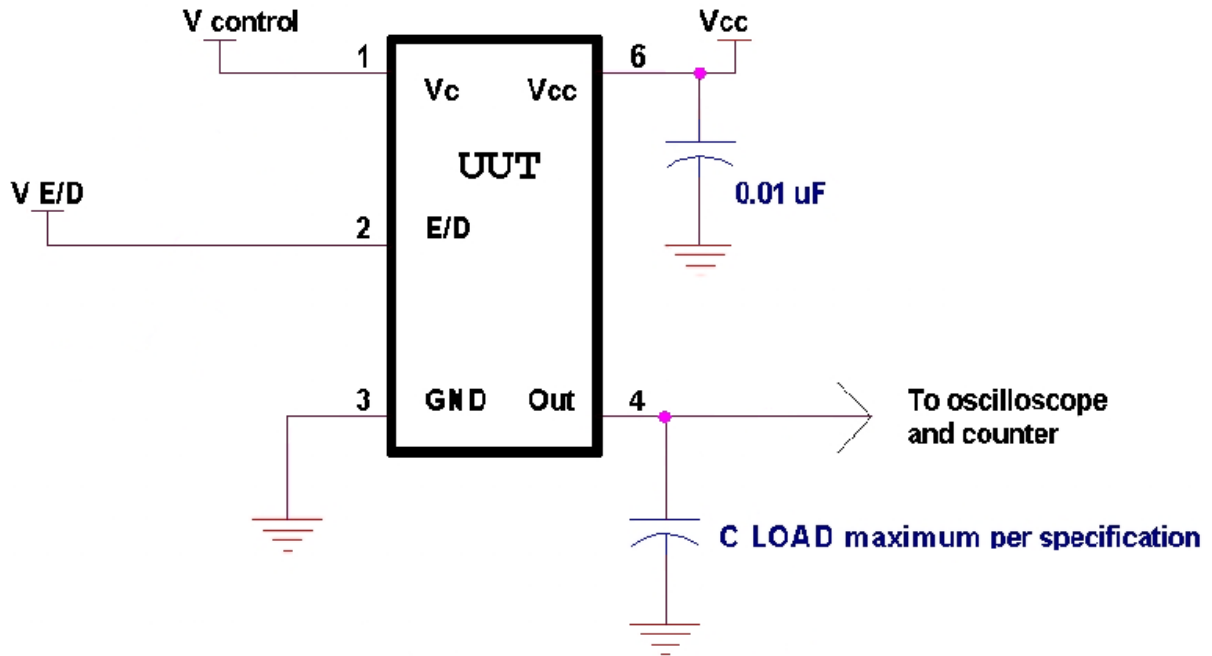
Disclaimer: Recommended layout shown.
Adjust layout as needed for individual process requirements.

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

ESD Rating

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

Absolute Maximum Ratings

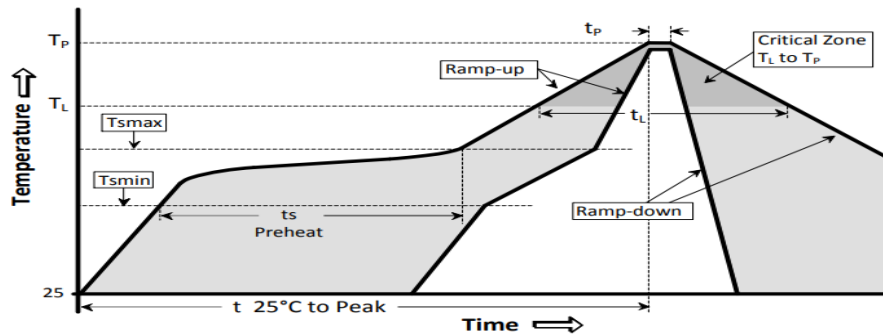
Parameter	Unit
V _{CC} Supply Voltage	-0.5V to +7.0V
V _i Input Voltage	-0.5V to V _{CC} + 0.5V
V _o Output Voltage	-0.5V to V _{CC} + 0.5V

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"

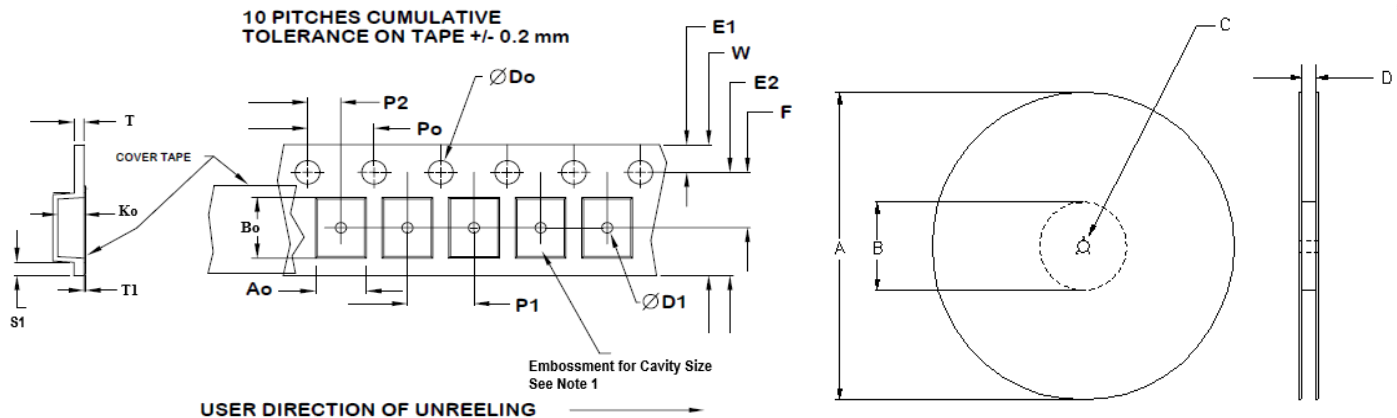


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	($T_{S_{max}}$ 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	$T_{to-peak}$	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 250 to 1000 per reel, cut tape for < 250. 12mm (or 16mm) tape, 8mm pitch.



USER DIRECTION OF UNREELING →

Tape Variable Dimensions Table 2

Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
12mm	10.25	5.5 ±0.05	8.0 ±0.1	12.2	3.6±0.1	5.4±0.1	1.4±0.1
16mm	14.25	7.5 ±0.05	8.0 ±0.1	16.3	3.6±0.1	5.4±0.1	1.4±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 min	E1	Po	P2	S1 min	T max	T1 max
12mm	1.5	1.5	1.75	4.0	2.0	0.6	0.3	0.1
16mm	+0.1 -0.0	1.5	±0.1	±0.1	±0.1			

Reel Dimensions (may vary) Table 3

Reel Size	A		B		C	D
	Inches	mm	Inches	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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