

VHD6 Series VCXO CMOS Oscillator

November 2018



- Pletronics' VHD6 Series is a voltage controlled crystal oscillator with a CMOS output.
- This model uses fundamental mode crystals with no multiplication circuits.
- Tape and Reel or tube packaging is available.
- 1 to 80 MHz
- 3.2 x 5 mm Ceramic LCC Package
- Voltage Control Function on pad 1
- Enable/ Disable Function on pad 2
- 2.5 or 3.3V Supply Voltage

**Pletronics Inc. certifies this device is in accordance with the
RoHS 6/6 (2011/65/EC) and WEEE (2002/96/EC) 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-020C
Second Level Interconnect code: e4

Absolute Maximum Ratings:

Parameter	Unit
V _{CC} Supply Voltage	-0.5V to +5.5V
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 155°C
The thermal resistance junction to board is 60 to 100°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Part Number:

VHD6	031	035	E	G	500	100	-16.384M	-XX	
									Internal code or blank
									Nominal Frequency in MHZ
									Pullability in ppm (Vcontrol) 050 = ± 50 ppm minimum 100 = ± 100 ppm minimum
									Stability in ppm * (xxx / 10) 000 = APR 500 = ± 50 ppm 250 = ± 25 ppm
									Highest Specified Operating Temperature A = +40°C F = +65°C B = +45°C G = +70°C C = +50°C H = +75°C D = +55°C J = +80°C E = +60°C K = +85°C
									Lowest Specified Operating Temperature A = +10°C E = -10°C J = -30°C B = +5°C F = -15°C K = -35°C C = +0°C G = -20°C L = -40°C D = -5°C H = -25°C
									Highest Supply Voltage * (xxx / 10) 035 = 3.5 volts for 3.3 volts nominal 026 = 2.6 volts for 2.5 volts nominal
									Lowest Supply Voltage * (xxx / 10) 031 = 3.1 volts for 3.3 volts nominal 024 = 2.4 volts for 2.5 volts nominal
									Series (Part Type, Logic & Package)

Part Marking:

PLE VHD6
FF.FFFM
• **YMDXX**

Legend:

P or PLE = Pletronics
FF.FFFM = Frequency in MHZ
YMD = Date of Manufacture
xx = Internal factory codes

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

Codes for Date Code YMD

Code	4	5	6	7	8	9	0
Year	2014	2015	2016	2017	2018	2019	2020

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

Electrical Specification for 2.50V or 3.30V $\pm 5\%$ over the specified temperature range

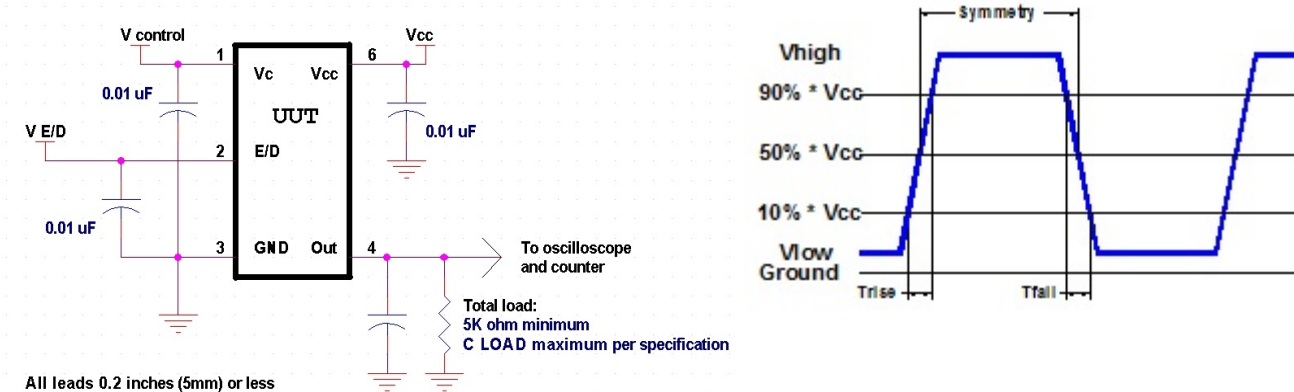
Item	Min	Typ	Max	Unit	Condition
Frequency Range	10	-	108	MHZ	
Frequency Accuracy ¹	± 20	-	± 100	ppm	Not specified if APR is specified
Pullability ¹	± 50	-	± 100	ppm	Over Vcontrol range.* Not specified if APR is specified Defined by the part number
Pullability (APR) ¹	± 50	-	-	ppm	Absolute Pull Range, includes the effect of temperature stability Defined by the part number
Output Waveform	CMOS				
Output High Level	90	-	-	%	of V_{CC}
Output Low Level	-	-	10	%	of V_{CC}
Output T_{RISE} and T_{FALL}	-	-	10.0	ns	1.000 to 20.000MHz 10% to 90% of V_{CC} , $C_{LOAD} = 15$ pF
	-	-	8.0		
	-	-	5.0		
Output Symmetry	45	50	55	%	at 50% point of V_{CC} (See load circuit)
RMS Jitter	-	-	1.0	ps	12 kHz to 20MHz
V disable	-	-	30	%	of V_{CC} applied to pin 1
V enable	70	-	-	%	of V_{CC} applied to pin 1
Linearity	-	-	10	%	
Start up time	-	-	10	ms	Time for output to reach specified frequency
Supply Current	-	-	10.0	mA	$C_{LOAD} = 15$ pF
	-	-	15.0		
	-	-	25.0		
Operating Temperature	-40	-	+85	°C	Defined by part number
Storage Temperature Range	-55	-	+125	°C	

Specifications with Pad 2 E/D open circuit

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

*Consult factory for Vcontrol range options

Load Circuit and Test Waveform



Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A



ESD Rating

Model	Minimum Voltage	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

Package Labeling

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

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

P/N:	
	VHD6024026LK000100-25.0M
Customer P/N:	
	12345678
Qty:	
	1000
D/C	
	6D1-SF
MSL: 1	

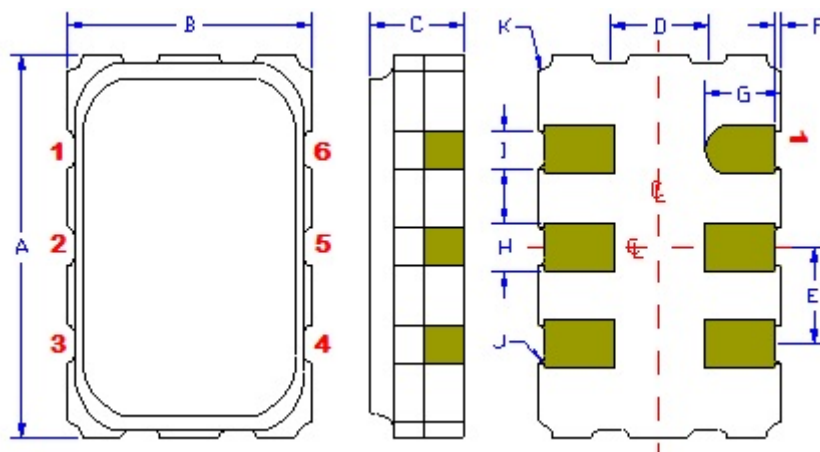
RoHS Compliant

2nd LvL Interconnect

Category=e4

Max Safe Temp=260C for 10s 2X Max

Mechanical:



	Inches	mm
A	0.197 \pm 0.006	5.00 \pm 0.15
B	0.125 \pm 0.006	3.20 \pm 0.15
C	0.053 max	1.35 max
D ¹	0.050	1.27
E ¹	0.050	1.27
F ¹	0.004	0.10
G ¹	0.039	1.00
H ¹	0.025	0.63
I ¹	0.020	0.50
J ¹	0.004R	0.10R
K ¹	0.008R	0.20R

Contacts:
 Gold 11.8 pinches 0.3 μ m minimum over
 Nickel 50 to 350 pinches 1.27 to 8.89 μ m

¹ Typical dimensions
 Not to Scale

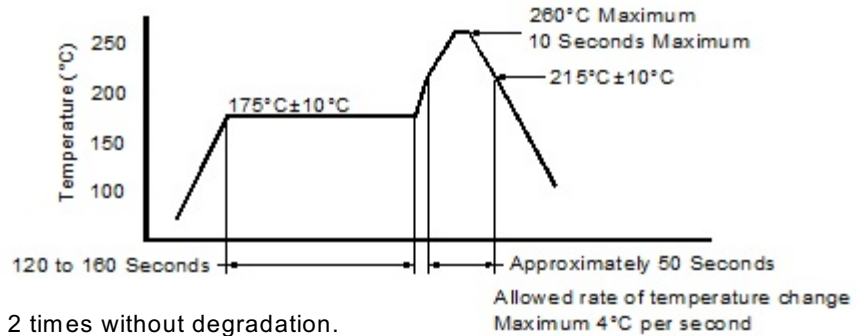
Pad	Function	Note
1	Vcontrol Input	
2	Output Enable/ Disable	When this pad is not connected, the oscillator shall operate When this pad is logic low, the output will be inhibited (high impedance state) Recommend connecting this pad to V _{cc} if the oscillator is to be always on
3	Ground (GND)	
4	Output	
5	N.C.	No Internal connection, pad may be connected to ground or V _{cc}
6	Supply Voltage (V _{cc})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

Layout and application information

For Optimum Jitter Performance, Pletronics recommends:

- a ground plane under the device
- no large transient signals (both current and voltage) should be routed under the device do not layout near a large magnetic field such as a high frequency switching power supply
- do not place near piezoelectric buzzers or mechanical fans.

Reflow Cycle (typical for lead free processing)



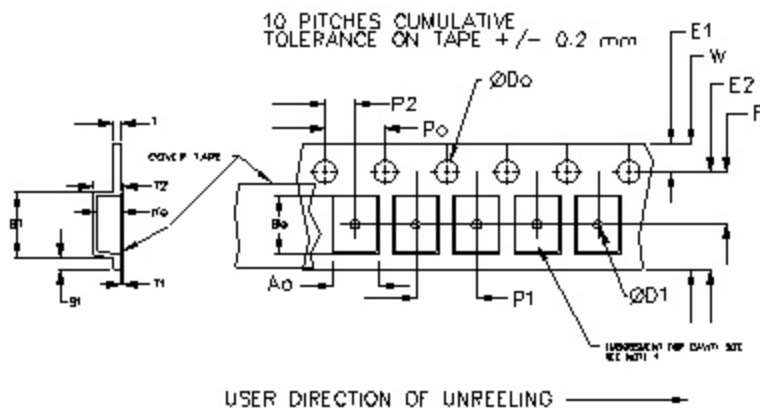
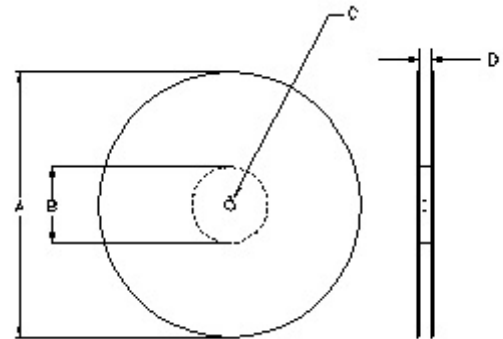
The part may be reflowed 2 times without degradation.

Tape and Reel: available for quantities of 250 to 1000 per reel

Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5	1.0	1.75	4.0	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5			2.0 ±0.1			
16mm	+0.1 -0.0	1.5	±0.1	±0.1	2.0 ±0.1			
24mm		1.5						

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

Note 1: Embossed cavity to conform to EIA-481-B Dimensions in mm Not to scale



		REEL DIMENSIONS			
A	inches	7.0	10.0	13.0	Tape Width
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	Tape Width
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			Tape Width
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0	

Reel dimensions may vary from the above

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