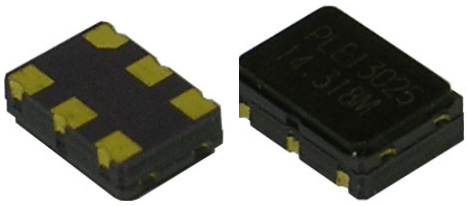
PLETRONICS
Innovations in
Frequency Control



VHA6001-Series
VCXO CMOS Oscillator

Jan 2015

Lead Free

- Pletronics' VHA6 Series is a voltage controlled crystal oscillator with a CMOS output.
- This model uses fundamental mode crystals with no multiplication circuits.
- Tape and Reel packaging is available.
- 5x7 mm Ceramic Non-Magnetic LCC Package
- Design can be used in a high magnetic field
- Voltage Control Function on pad 1
- Enable/ Disable Function on pad 2

Non-Magnetic VCXO Series
Developed Frequencies 38.0 and 40.0 MHz

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: 0.3 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
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo 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.

Reliability: Environmental Compliance

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

Part Marking:

PLE VHA6001
ff.fM
• ***YMDXX***

Legend:
PLE = Pletronics
ff.f = Frequency
YMD = Date of Manufacture (year, month and day)
XX = internal factory codes

Codes for Date Code YMD

Code	7	8	9	0	1	2	3	4	5
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015

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					

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

P/N: VHA6001-38.0M
Customer P/N: 12345678
Qty: 1000
D/C 0JX-MTG
MSL: 1

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

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

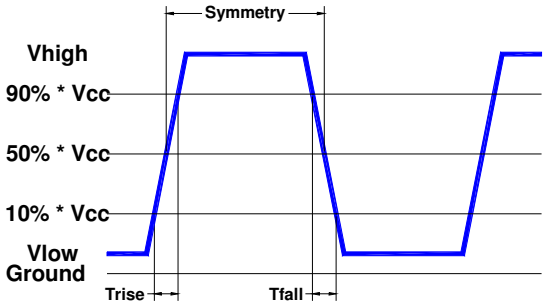
Electrical Specification for 3.30V ±10% over the specified temperature range

Item	Min	Typ	Max	Unit	Condition
Frequency Range		-	40	MHz	Contact Factory for non developed frequencies
Pullability APR	±50	-	-	ppm	
Output Waveform	CMOS				
Output High Level	90	-	-	%	of V_{CC} for I_{OH}= +7 mA
	70	-	-	%	of V_{CC} for I_{OH}= +14 mA
Output Low Level	-	-	10	%	of V_{CC} for I_{OL} = -7 mA
	-	-	30	%	of V_{CC} for I_{OL} = -14 mA
Output T_{RISE} and T_{FALL}	-	4.0	6.0	nS	10% to 90% of V_{CC}, C_{LOAD} = 15 pF
Output Symmetry	45	50	55	%	at 50% point of V_{CC} (See load circuit)
Vcontrol Resistance Pin 1	20	25	-	Kohm	
Modulation Bandwidth	10	20	-	KHz	Vcontrol = 1.65V ±1.65V, -3dB
E/D Internal Pull-up	50	-	-	Kohm	to V_{CC}
V disable	-	-	15	%	of V_{CC} applied to pin 1
V enable	85	-	-	%	of V_{CC} applied to pin 1
Output leakage $V_{OUT} = V_{CC}$	-10	-	+10	uA	Pin 1 low, device disabled
V_{OUT} = 0V	-10	-	+10	uA	
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
Start up time	-	1.5	10	mS	Time for output to reach specified frequency
Supply Current	-	5.0	8.0	mA	C_{LOAD} = 15 pF
Operating Temperature	-45		+85	°C	Defined by part number
Storage Temperature Range	-55		+125	°C	

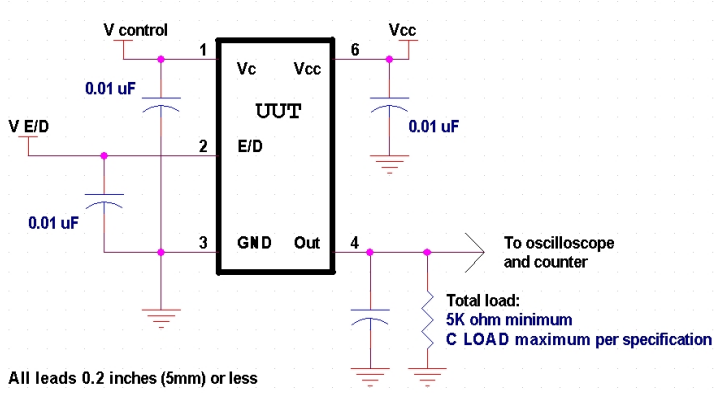
Specifications with Pad 2 E/D open circuit

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

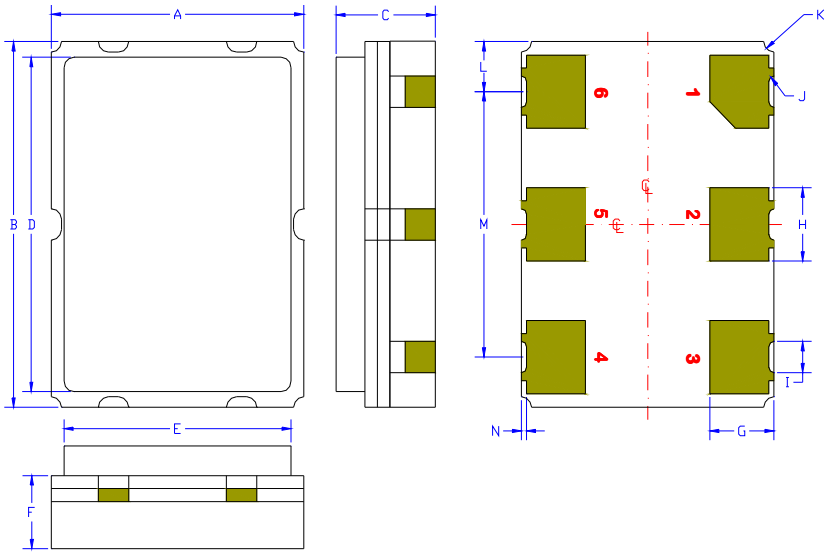
Test Waveform



Load Circuit



Mechanical:



Contacts:
Gold 11.8 µinches 0.3 µm minimum over
Nickel 50 to 350 µinches 1.27 to 8.89 µm

[1] Typical dimensions

Not to Scale

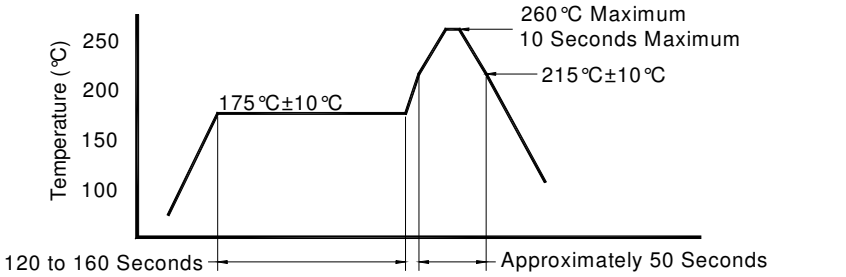
	Inches	mm
A	0.276 ±0.006	7.00 ±0.15
B	0.197 ±0.006	5.00 ±0.15
C	0.087 max	2.20 max
D[1]	0.260	6.60
E[1]	0.181	4.60
F[1]	0.053	1.35
G[1]	0.011	1.27
H[1]	0.055	1.40
I[1]	0.024	0.60
J[1]	0.004R	0.10R
K[1]	0.008R	0.20R
L[1]	0.038	0.96
M[1]	0.200	2.54
N[1]	0.004	0.10

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

Reflow Cycle (typical for lead free processing)



Allowed rate of temperature change
Maximum 4°C per second

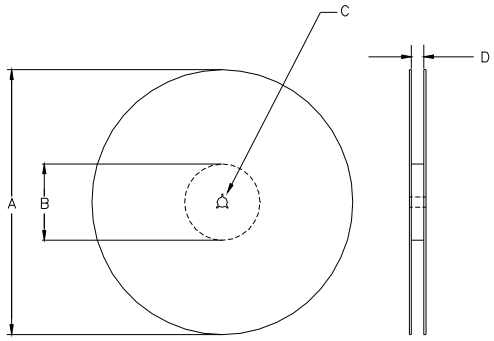
The part may be reflowed 2 times without degradation.

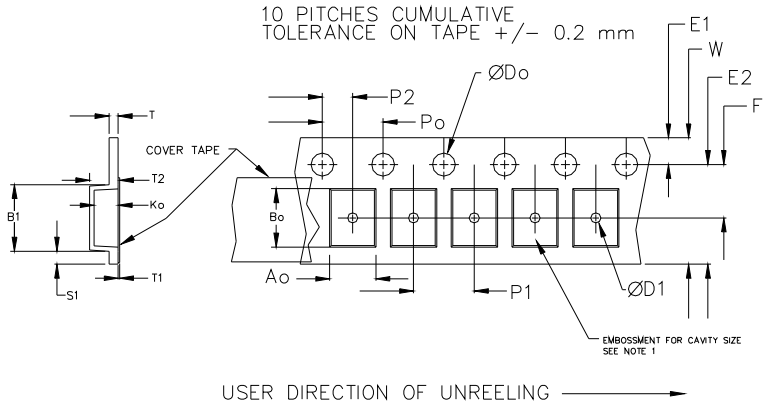
Tape and Reel: available for quantities of 250 to 1000 per reel

Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5 +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						

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	
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	
	mm	63.5	101.6	95.3	Tape Width
C	mm	13.0 +0.5 / -0.2			
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.0

Reel dimensions may vary from the above

IMPORTANT NOTICE

Pletronics Incorporated (PLE) reserves the right to make corrections, improvements, modifications and other changes to this product at anytime. PLE reserves the right to discontinue any product or service without notice. Customers are responsible for obtaining the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to PLE's terms and conditions of sale supplied at the time of order acknowledgment.

PLE warrants performance of this product to the specifications applicable at the time of sale in accordance with PLE's limited warranty. Testing and other quality control techniques are used to the extent PLE deems necessary to support this warranty. Except where mandated by specific contractual documents, testing of all parameters of each product is not necessarily performed.

PLE assumes no liability for application assistance or customer product design. Customers are responsible for their products and applications using PLE components. To minimize the risks associated with the customer products and applications, customers should provide adequate design and operating safeguards.

PLE products are not designed, intended, authorized or warranted to be suitable for use in life support applications, devices or systems or other critical applications that may involve potential risks of death, personal injury or severe property or environmental damage. Inclusion of PLE products in such applications is understood to be fully at the risk of the customer. Use of PLE products in such applications requires the written approval of an appropriate PLE officer. Questions concerning potential risk applications should be directed to PLE.

PLE does not warrant or represent that any license, either express or implied, is granted under any PLE patent right, copyright, artwork or other intellectual property right relating to any combination, machine or process which PLE product or services are used. Information published by PLE regarding third-party products or services does not constitute a license from PLE to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from PLE under the patents or other intellectual property of PLE.

Reproduction of information in PLE data sheets or web site is permissible only if the reproduction is without alteration and is accompanied by associated warranties, conditions, limitations and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. PLE is not responsible or liable for such altered documents.

Resale of PLE products or services with statements different from or beyond the parameters stated by PLE for that product or service voids all express and implied warranties for the associated PLE product or service and is an unfair or deceptive business practice. PLE is not responsible for any such statements.

Contacting Pletronics Inc.

Pletronics Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880
Fax: 425-776-2760
E-mail: ple-sales@pletronics.com
URL: www.pletronics.com