

VHA6001-Series VCXO CMOS Oscillator

Jan 2015



- 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
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.

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



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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

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

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

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

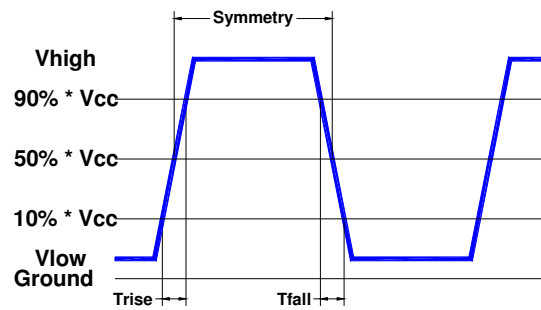
Electrical Specification for 3.30V $\pm 10\%$ over the specified temperature range

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 ± 1.65 V, -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 $V_{OUT} = V_{CC}$ $V_{OUT} = 0V$	-10	-	+10	μ A	Pin 1 low, device disabled
	-10	-	+10	μ A	
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	$^{\circ}$ C	Defined by part number
Storage Temperature Range	-55		+125	$^{\circ}$ C	

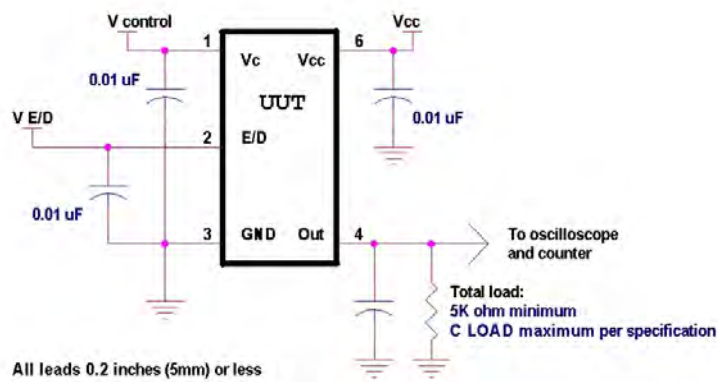
Specifications with Pad 2 E/D open circuit

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

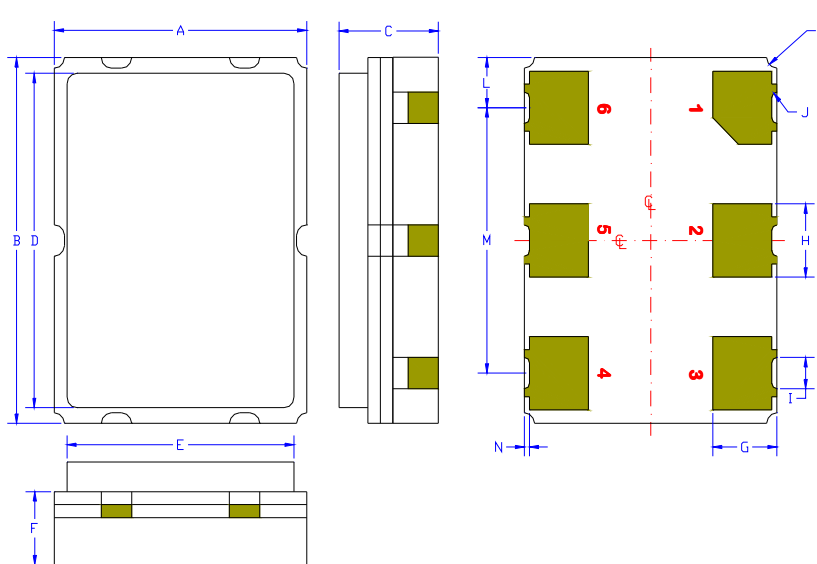
Test Waveform



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

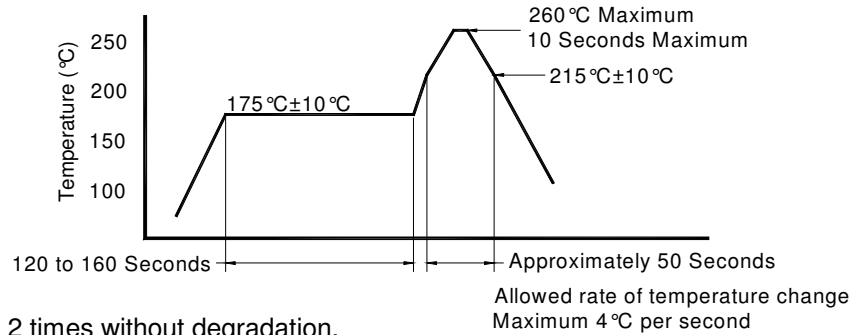
Pad	Function	Note
1	Vcontrol Input	
2	Output Enable/ Disable	When this pad is not connected, the oscillator shall operate When this pad is logic low, the output will be inhibited (high impedance state) Recommend connecting this pad to V _{cc} if the oscillator is to be always on
3	Ground (GND)	
4	Output	
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)



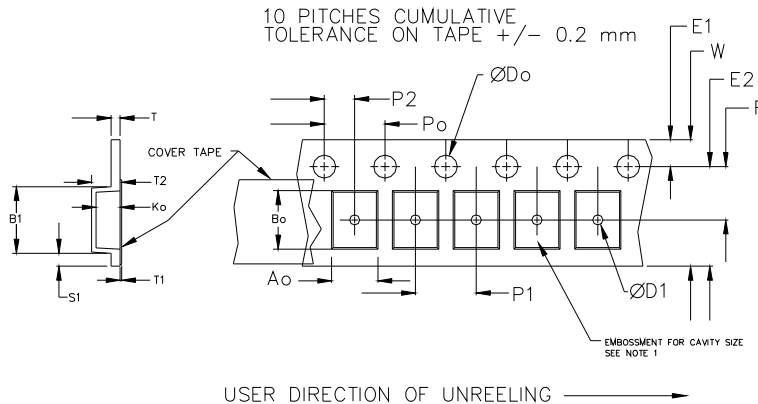
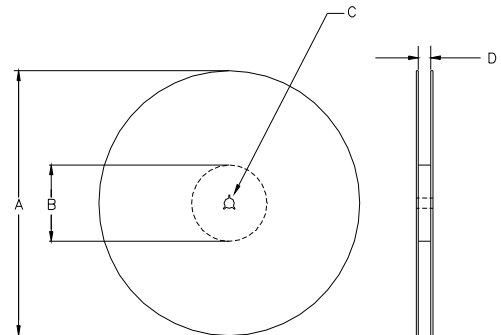
The part may be reflowed 2 times without degradation.

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		1.5			2.0 ± 0.1			
24mm		1.5			2.0 ± 0.1			

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			Tape Width
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	
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