PLETRONICS
www.pletronics.com 425-776-1880

THA4 Series
TCVCXO Oscillator

February 2009

Lead Free

- Pletronics' THA4 Series is a temperature compensated voltage controlled crystal oscillator with a HCMOS output.
- The package is designed for high density surface mount designs.
- Tape and Reel packaging is available.
- 8 to 52 MHZ
- Stabilities to less than 0.2ppm available
- 5 x 7 mm LCC Ceramic Package
- Optional Voltage Control Function

Pletronics Inc. certifies this device is in accordance with the RoHS (2002/95/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 +6.5V
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 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Part Number:

THA4	031	035	G	H	015	008	-40.0M	-XX	
									Internal code or blank
									Nominal Frequency in MHZ
									Pullability in ppm (Vcontrol) **000** = TCXO only **008** = ± 8 ppm minimum **015** = ± 15 ppm minimum
									Stability in ppm **001** = ± 0.1 ppm **010** = ± 1 ppm **002** = ± 0.2 ppm **015** = ± 1.5 ppm **005** = ± 0.5 ppm **025** = ± 2.5 ppm **007** = ± 0.7 ppm
									Highest Specified Operating Temperature **A** = +40°C **E** = +60°C **J** = +80°C **B** = +45°C **F** = +65°C **K** = +85°C **C** = +50°C **G** = +70°C **D** = +55°C **H** = +75°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 **M** = -45°C
									Highest Supply Voltage* **055** = 5.5 volts **035** = 3.5 volts **036** = 3.6 volts **030** = 3.0 volts
									Lowest Supply Voltage * **045** = 4.5 volts **031** = 3.1 volts **030** = 3.0 volts **027** = 2.7 volts
									Series (Part Type, Logic & Package)

***** Supply Voltage: Select range between 2.7V and 5.5V with ratio of Highest / Lowest ≤ 1.20
For Example: the part number for 3.3V nominal could be TCA4030036.....

ESD Rating

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

Electrical Specification for specified Vcc over the specified temperature range

Item	Min	Max	Unit	Condition
Frequency Range	10	52	MHZ	
Frequency Accuracy [1]	-2.5 -0.1	+2.8 +0.1	ppm	Vcontrol 1.50 volts if used [2]
Frequency Stability versus Supply	-0.2	+0.2	ppm	Load: 15 pF & V_{CC} ± 5%
Output Waveform	CMOS			
Output Level High	90	-	% of V_{CC}	Load: 15 pF
Output Level High	-	10		
Output Rise and Fall Time	-	8	nS	10% to 90% of V_{CC} Load: 15 pF
Output Duty Cycle	40	60	%	50% of V_{CC} Load: 15 pF
Phase Noise 1 Hz 10 Hz 100 Hz 1 KHz 10 KHz >10 KHz	-	-62 -91 -116 -137 -145 -145	dBc/Hz	
V Supply Range [1] V_{CC}	2.7	5.5	Volts	
Supply Current I_{CC} at 13 MHZ I_{CC} at 26 MHZ I_{CC} at 52 MHZ	-	3.2 5.0 9.0	mA	15 pF load
Start-up time	-	10	mS	to be within ±3 ppm of the final frequency
Aging	-1.0 -0.5	+1.0 +0.5	ppm	Per year at 25°C for the first year For any year thereafter
Vcontrol Range	0.5	2.70	Volts	1.35 volts nominal
Vcontrol Input Current	-50	+50	uA	
Frequency Pullability [1]	-15	+15	ppm	
Operating Temperature Range [1]	-45	+85	°C	
Storage Temperature Range	-55	+95	°C	

[1] Specified by part number
[2] For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures

Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition A
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:

TH*ymda*
***fff.fff* M**
P*LHXXX*

Where:
ymd = Date code
fff.fff = frequency in MHZ
P = Pletronics
LH = Lowest Temp, Highest Temp
XXX = Stability

Due to part size limitations, marking cannot identify complete specifications.

Codes for Date Code YMD

Code	6	7	8	9	0	1	2
Year	2006	2007	2008	2009	2010	2011	2012

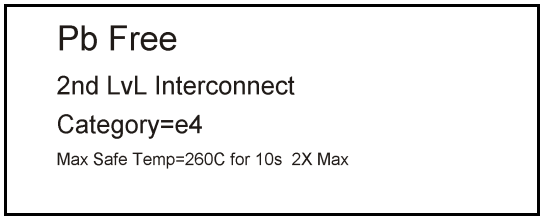
Code	A	B	C	D	E	F	G	H	J	K	L	M
Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Code	1	2	3	4	5	6	7	8	9	A	B	C	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	

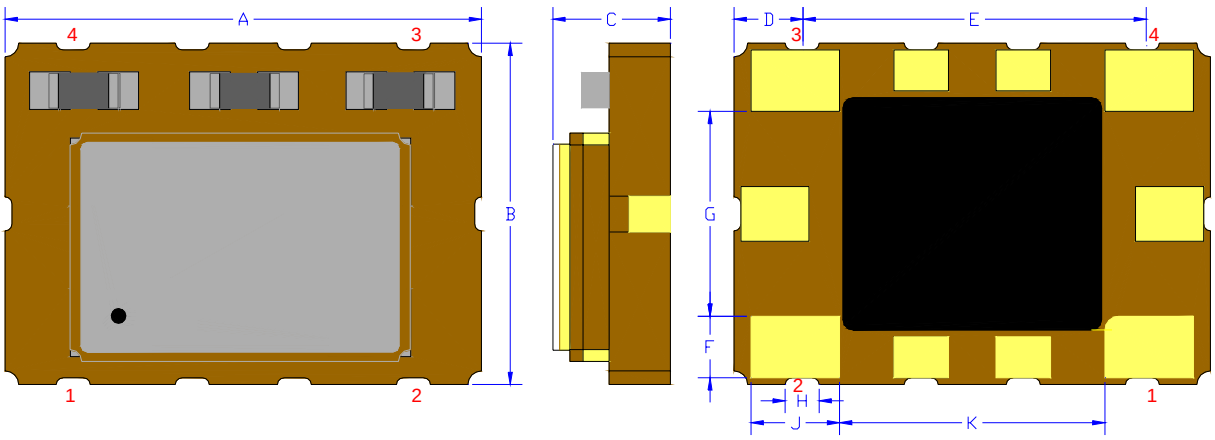
Package Labeling

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



Mechanical:



Not to Scale

Pad	Function	Note
1	Vcontrol Input	If this function is not specified, recommend connecting this pad to ground.
2	Ground (GND)	
3	Output	
4	Supply Voltage (V_{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

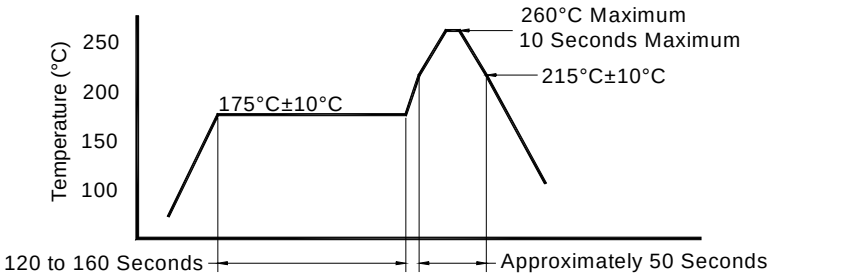
	Inches	mm
A	0.276 ±0.006	7.00 ±0.15
B	0.197 ±0.006	5.00 ±0.15
C	0.074 ±0.006	1.88 ±0.15
D[1]	0.039	1.00
E[1]	0.197	5.00
F[1]	0.025	0.90
G[1]	0.118	3.00
H[1]	0.020	0.50
J[1]	0.051	1.30
K[1]	0.154	3.90

[1] Typic dimensions

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

There are additional pads on the package bottom, these are **not to be connected to any traces** on the PCB, solder masking on the PCB should be used to make sure no contact is made.

Reflow Cycle (typical for lead free processing)



Allowed rate of temperature change
Maximum 4°C per second

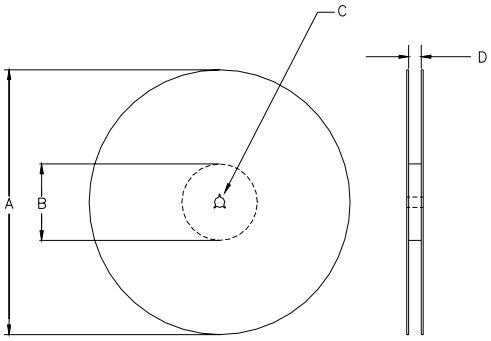
The part may be reflowed 2 times without degradation.

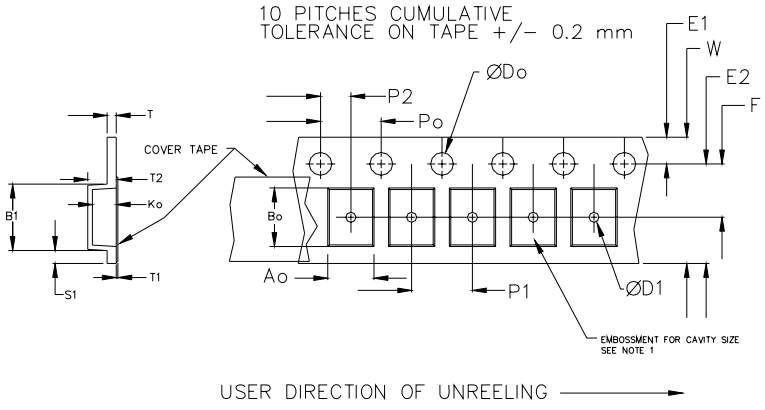
Tape and Reel: available for quantities of 250 to 1000 per reel

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
	mm	---	---	24.4 +2.0 -0.0	24.0
	mm	---	---	32.4 +2.0 -0.0	32.0

Reel dimensions may vary

from the above

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