



## THA4 Series TCVCXO Oscillator

August 2009



- 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 0.2 ppm available
- 5 x 7 mm LCC Ceramic Package
- Optional Voltage Control Function

Commonly available frequencies (MHz):

8.192	10.000	12.000	12.800	13.000	16.384
19.200	19.440	20.000	24.000	25.000	26.000

**Pletronics Inc. certifies this device is in accordance with the RoHS 6/6 (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 <sub>CC</sub> Supply Voltage	-0.5V to +6.5V
V <sub>i</sub> Input Voltage	-0.5V to V <sub>CC</sub> + 0.5V
V <sub>o</sub> Output Voltage	-0.5V to V <sub>CC</sub> + 0.5V

### Thermal Characteristics

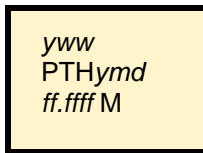
The maximum die or junction temperature is 155°C  
The thermal resistance junction to board is 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

### 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 002 = ± 0.2 ppm 010 = ± 1 ppm 015 = ± 1.5 ppm 025 = ± 2.5 ppm 003 = ± 0.3 ppm 005 = ± 0.5 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									
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 THA4030036.....

### Part Marking:



Where: *yww* = Component Date code (Year Week Week)  
*ff.ffff* = frequency in MHz  
PTH = Pletronics THA4  
*ymd* = Device Date code (Year Month Day)

#### Codes for Date Code YMD

Code	9	0	1	2	3	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2009	2010	2011	2012	2013	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	

**Electrical Specification for specified V<sub>cc</sub> over the specified temperature range**

Item	Min	Typ	Max	Unit	Condition
Frequency Range	10		52	MHz	See standard frequencies below
Frequency Accuracy <sup>1</sup>	-2.5 -0.5		+2.5 +0.5	ppm	V <sub>control</sub> 1.50 volts if used
Frequency Stability versus Supply	-0.2		+0.2	ppm	Load: 15 pF & V <sub>cc</sub> ± 5%
Output Waveform	CMOS				
Output Level High	90		-	% of V <sub>cc</sub>	Load: 15 pF
Output Level Low	-		10		
Output Rise and Fall Time	-		8	nS	10% to 90% of V <sub>cc</sub> Load: 15 pF
Output Duty Cycle	40		60	%	50% of V <sub>cc</sub> Load: 15 pF
Phase Noise					
1 Hz	-	-62	-	dBc/Hz	
10 Hz		-91			
100 Hz		-116			
1 KHz		-137			
10 KHz		-145			
V Supply Range <sup>1</sup> V <sub>cc</sub>	2.7		5.5	Volts	
Supply Current					
I <sub>cc</sub> at 13 MHz	-	3.2	-	mA	15 pF load @ 3.3 volts
I <sub>cc</sub> at 26 MHz		5.0			
I <sub>cc</sub> at 52 MHz		9.0			
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
V <sub>control</sub> Range	0.5		2.50	Volts	1.5 volts nominal
V <sub>control</sub> Input Current	-50		+50	uA	
Frequency Pullability <sup>1</sup>	-15		+15	ppm	Frequency dependent
Operating Temperature Range <sup>1</sup>	-40		+85	°C	
Storage Temperature Range	-55		+95	°C	

<sup>1</sup> Specified by part number

**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

**ESD Rating**

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

**Package Labeling**

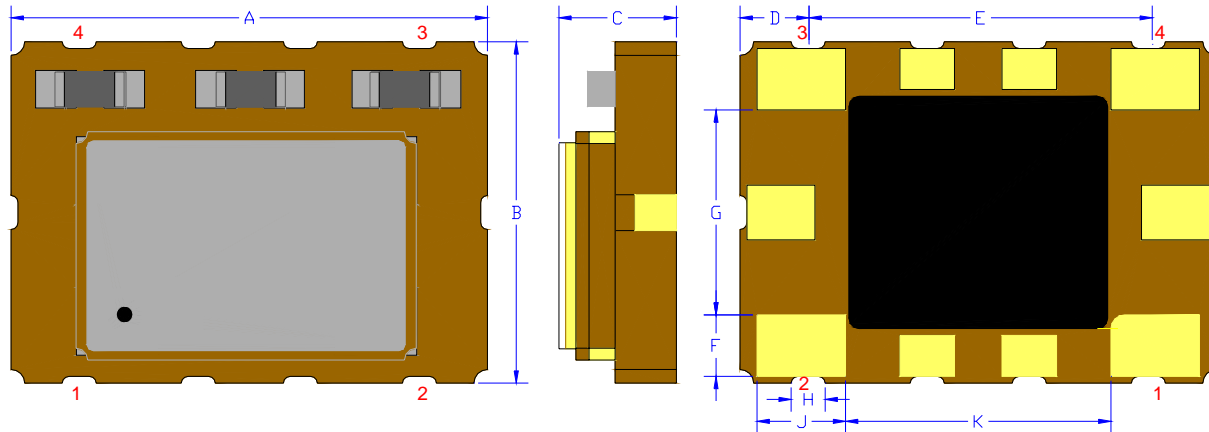
Label is 1" x 2.6" (25.4mm x 66.7mm)  
 Font is Courier New  
 Bar code is 39-Full ASCII

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

<b>P/N:</b>  THA4029036JH025000-12.80M <b>Customer P/N:</b>  12345678 <b>Qty:</b>  1000 <b>D/C</b>  9HP836
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<b>RoHS Compliant</b> 2nd LvL Interconnect Category=e4 Max Safe Temp=260C for 10s 2X Max
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### 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 <sub>CC</sub> )	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 <sup>1</sup>	0.039	1.00
E <sup>1</sup>	0.197	5.00
F <sup>1</sup>	0.025	0.90
G <sup>1</sup>	0.118	3.00
H <sup>1</sup>	0.020	0.50
J <sup>1</sup>	0.051	1.30
K <sup>1</sup>	0.154	3.90

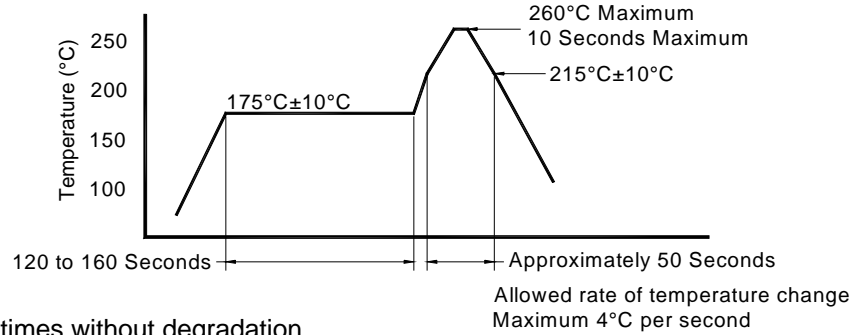
<sup>1</sup> Typical dimensions

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)

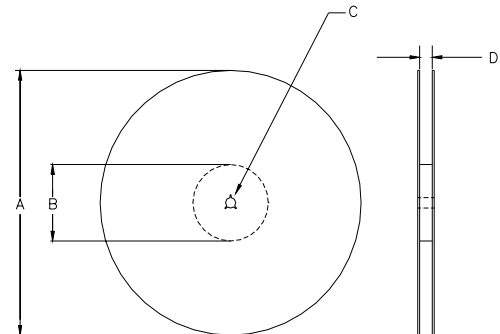


The part may be reflowed 2 times without degradation.

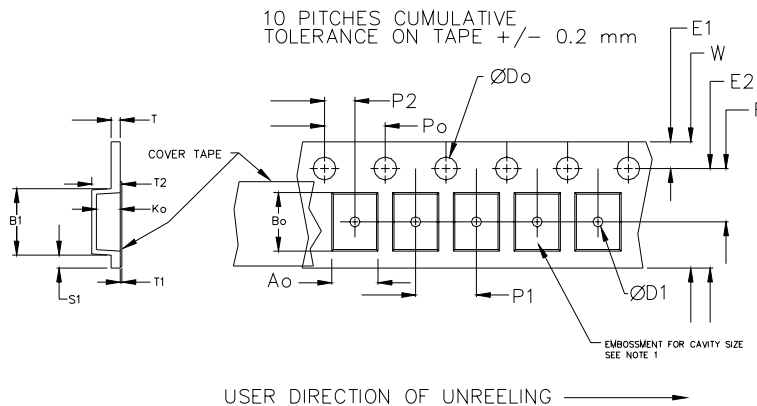
### Tape and Reel: available for quantities of 250 to 1000 per reel, cut tape for < 250

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	4.0	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5			2.0 ±0.1			
16mm		1.5						
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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