



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 _{CC} Supply Voltage	-0.5V to +6.5V
V _i Input Voltage	-0.5V to V _{CC} + 0.5V
V _o Output Voltage	-0.5V to V _{CC} + 0.5V

Thermal Characteristics

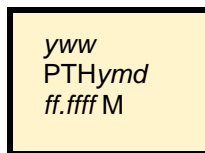
The maximum die or junction temperature is 155°C
The thermal resistance junction to board is 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

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									
003 = ± 0.3 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									
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
ywd = 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_{cc} over the specified temperature range

Item	Min	Typ	Max	Unit	Condition
Frequency Range	10		52	MHz	See standard frequencies below
Frequency Accuracy ¹	-2.5 -0.5		+2.5 +0.5	ppm	V _{control} 1.50 volts if used
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 Low	-		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	-	-62	-	dBc/Hz	
10 Hz		-91			
100 Hz		-116			
1 KHz		-137			
10 KHz		-145			
V Supply Range ¹ V _{cc}	2.7		5.5	Volts	
Supply Current					
I _{cc} at 13 MHz	-	3.2	-	mA	15 pF load @ 3.3 volts
I _{cc} at 26 MHz		5.0			
I _{cc} 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 _{control} Range	0.5		2.50	Volts	1.5 volts nominal
V _{control} Input Current	-50		+50	uA	
Frequency Pullability ¹	-15		+15	ppm	Frequency dependent
Operating Temperature Range ¹	-40		+85	°C	
Storage Temperature Range	-55		+95	°C	

¹ 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

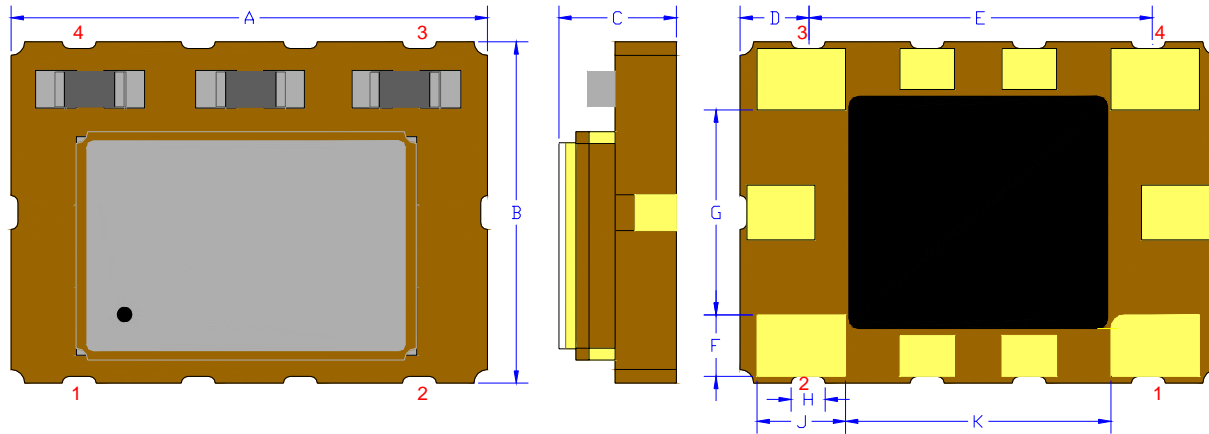
Label is 1" x 2.6" (25.4mm x 66.7mm)
 Font is Courier New
 Bar code is 39-Full ASCII

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

P/N:  THA4029036JH025000-12.80M Customer P/N:  12345678 Qty:  1000 D/C  9HP836
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RoHS Compliant 2nd LvL Interconnect Category=e4 Max Safe Temp=260C for 10s 2X Max

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

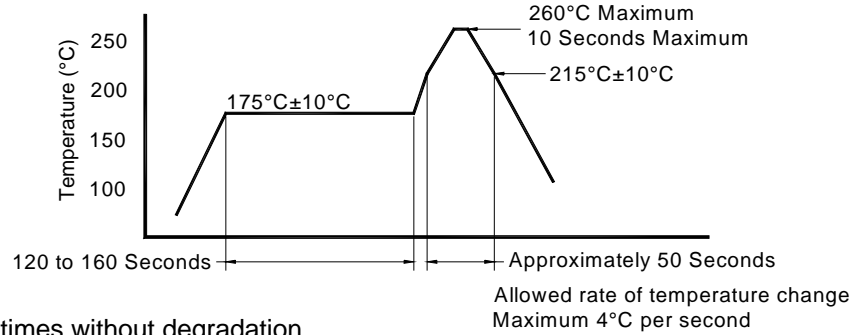
¹ Typical dimensions

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)

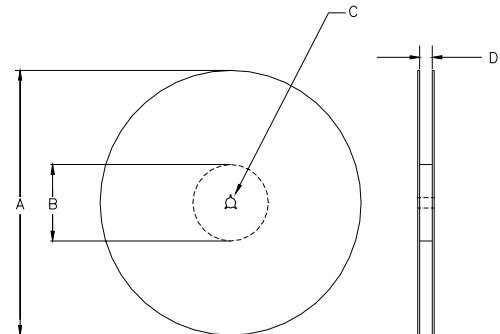


The part may be reflowed 2 times without degradation.

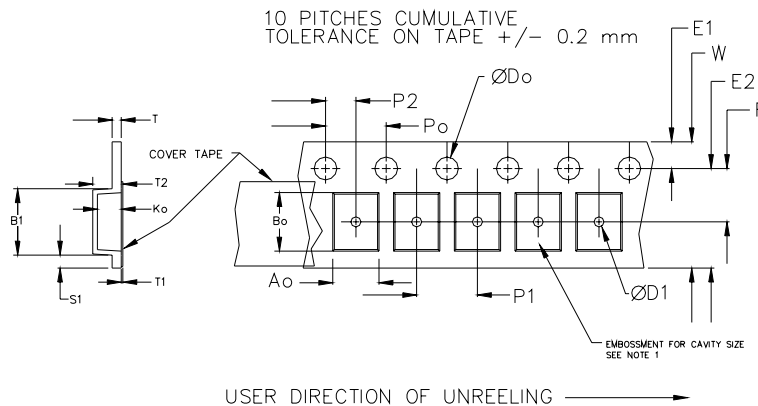
Tape and Reel: available for quantities of 250 to 1000 per reel, cut tape for < 250

Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5	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			± 0.1			
24mm		1.5			± 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					
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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