

## TBA4 Series TCXO / TCVCXO

November 2010



- Pletronics' TBA4 Series is a temperature compensated crystal oscillator with an optional voltage control function and a clipped sinewave 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 (TCVCXO)

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

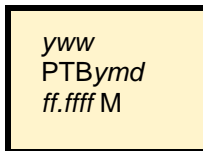
The maximum die or junction temperature is 155°C  
The thermal resistance junction to board is 30 to 50°C/Watt depending on the solder pads, ground plane and construction of the PCB.

### Part Number:

TBA4	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  
 PTB = Pletronics TBA4  
*ymd* = Device Date code (Year Month Day)

#### Codes for Date Code YMD

Code	0	1	2	3	4	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2010	2011	2012	2013	2014	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: 10K ohm // 10 pF & V <sub>CC</sub> ± 5%
Output Waveform	Clipped Sinewave				AC Coupled
Output Amplitude	0.8		-	V P-P	Load: 10K ohm // 10 pF
Phase Noise	-	-62 -91 -116 -137 -145	-	dBc/Hz	
					1 Hz 10 Hz 100 Hz 1 KHz 10 KHz
V Supply Range <sup>1</sup> V <sub>CC</sub>	2.7		5.5	Volts	
Supply Current	-	2.0 2.7 4.4	-	mA	10K ohm // 10 pF @ 3.3 volts
					I <sub>CC</sub> at 13 MHz I <sub>CC</sub> at 26 MHz I <sub>CC</sub> at 52 MHz
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	1.50 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**

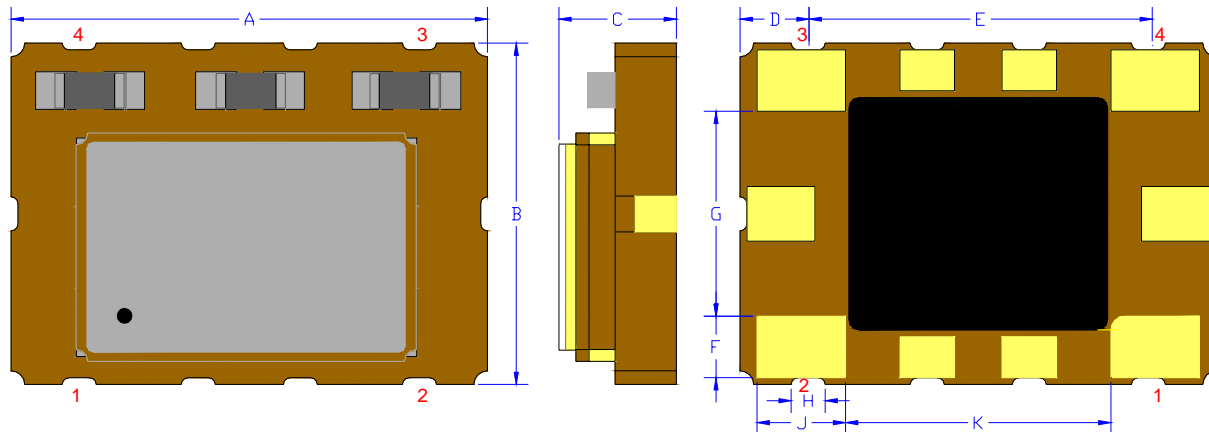
Label is 1" x 2.6" (25.4mm x 66.7mm)  
 Font is Courier New  
 Bar code is 39-Full ASCII

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

<b>P/N:</b>  TBA4029036JH025000-12.80M	
<b>Customer P/N:</b>  12345678	<b>Qty:</b>  1000
<b>D/C:</b>  9HP836	

<b>RoHS Compliant</b> 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 <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

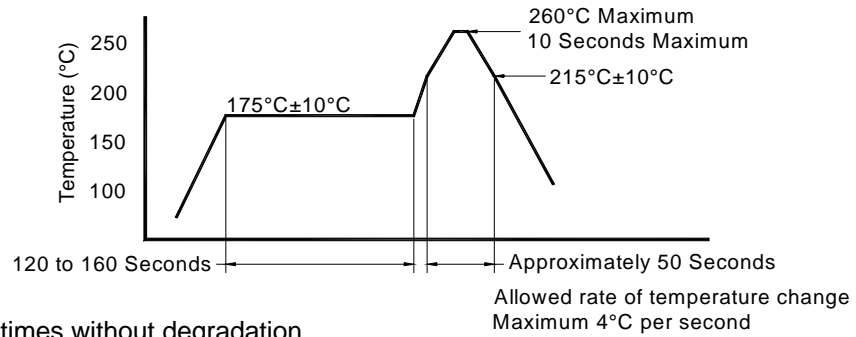
<sup>1</sup> Typical dimensions

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)

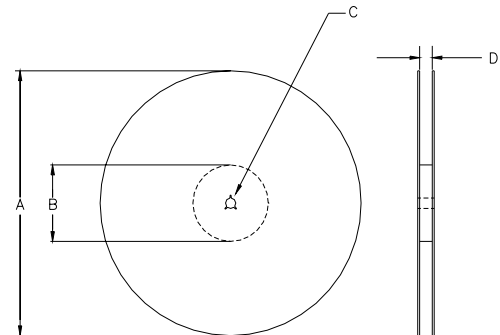


The part may be reflowed 2 times without degradation.

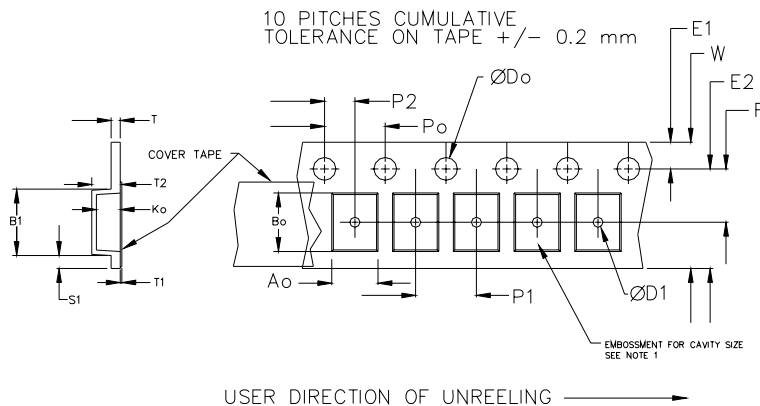
### Tape and Reel: available for quantities of 250 to 1000 per reel, Cut tape for < 250

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

### **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 36<sup>th</sup> Ave. West  
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880  
Fax: 425-776-2760  
E-mail: [ple-sales@pletronics.com](mailto:ple-sales@pletronics.com)  
URL: [www.pletronics.com](http://www.pletronics.com)

Copyright © 2009, 2010 Pletronics Inc.