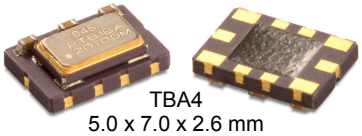
PLETRONICS TBA4 Series
TCXO / TCVCXO



TBA4
5.0 x 7.0 x 2.6 mm
LCC Ceramic Package

Features

- Pletronics' TBA4 Series Temperature Compensated Crystal Oscillator
- Optional Voltage Control Function
- Low Power / Fast Warm Up
- Clipped Sine Wave Output
- 2.8V to 3.3V nominal Supply Voltage
- 8 - 40 MHz Frequency

Applications

SONET / SDH / DWDM
Test & Measurement
Telecom Transmission & Switching Equipment
Base Stations / Picocell
Wireless Communication Equipment

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range [2]	8	-	40.0	MHz	Consult factory for other options
Frequency Stability vs. Temperature [2]	-	±0.5	-	ppm	$(f_{max} - f_{min}) / 2$
Frequency Initial Calibration	-	-	±2.0	ppm	Vcontrol 1.50 volts nominal if used when $V_{CC} \geq 3.0$ volts Referenced to the value 25°C ± 2°C
Operating Temperature Range [2]	-40	-	+85	°C	Widest range available
Supply Voltage [1, 2] V_{CC}	2.8	-	3.3	Volts	± 5%
Supply Current I_{CC}	-	2.0 3.0 4.0	-	mA	13 MHz 26 MHz Load: 10 Kohm || 10 pF, V_{CC} ± 5% 40 MHz
Frequency Stability vs. Supply	-	-	±0.2	ppm	Load: 10 Kohm || 10 pF, V_{CC} ± 5%
Frequency Stability vs. Load	-	-	±0.2	ppm	Load: 10 Kohm || 10 pF, V_{CC} ± 5%
Vcontrol Range	0.5	-	2.5	Volts	1.50 volts nominal for V_{CC}
Frequency Pullability [2]	0	±8.0	±12.0	ppm	Positive Slope
Output Waveform		Clipped Sine Wave			DC Coupled
Output Level	0.8	-	-	V p-p	Load: 10 Kohm || 10 pF ± 10%
Startup Time	-	-	10.0	mS	Within ± 2.0 ppm of final frequency
Long Term Stability (Aging)	-	-	±1.0	ppm	Per year at 25°C ± 2°C
Phase Noise 100 Hz 1 kHz 10 kHz 100 kHz	-	-115 -136 -144 -145	-	dBc/Hz	25°C ± 2°C at 26.0 MHz
Storage Temperature Range	-55	-	+95	°C	

Notes:
[1] Place an appropriate power supply bypass capacitor next to device for correct operation
[2] Specified by part number

Part Number

Series Model	V_{CC} Supply Voltage [1]		Operating Temperature		Stability [1, 2]	Pullability [1]	Frequency
	Lowest	Highest	Lowest	Highest	(ppm)	(ppm)	(MHz)
TBA4	**031**	**035**	**C**	**G**	**015**	**008**	**-19.44M**
	047 = 4.75 for 5.0 volts nominal **031** = 3.1 for 3.3 volts nominal **029** = 2.9 for 3.0 volts nominal **027** = 2.7 for 2.8 volts nominal	**052** = 5.25 for 5.0 volts nominal **035** = 3.5 for 3.3 volts nominal **031** = 3.1 for 3.0 volts nominal **029** = 2.9 for 2.8 volts nominal	**A** = +10°C **B** = +5°C **C** = +0°C **D** = -5°C **E** = -10°C **F** = -15°C **G** = -20°C **H** = -25°C **J** = -30°C **K** = -35°C **L** = -40°C	**A** = +40°C **B** = +45°C **C** = +50°C **D** = +55°C **E** = +60°C **F** = +65°C **G** = +70°C **H** = +75°C **J** = +80°C **K** = +85°C	**005** = ± 0.5 **010** = ± 1.0 **015** = ± 1.5 **020** = ± 2.0 **025** = ± 2.5	**000** = TCXO **005** = ± 5 **008** = ± 8	8 - 40 MHz

[1] Contact Factory for non-standard specifications
[2] Not all stabilities are available with all operating temperature ranges. Contact Factory for exact combinations available.

Device Marking

zzz
PTB*YMD*
• *FFFF* M

FFFF = Frequency in MHz
zzz = Internal factory codes
PTB = Pletronics TBA4
YMD = Date code

Specifications such as part number, frequency stability, supply voltage and operating temperature range, etc. are not identified from marking.

External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Code	2	3	4	5	6	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2012	2013	2014	2015	2016	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	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Package Labeling

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 16mm tape, 8mm pitch.

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

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

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

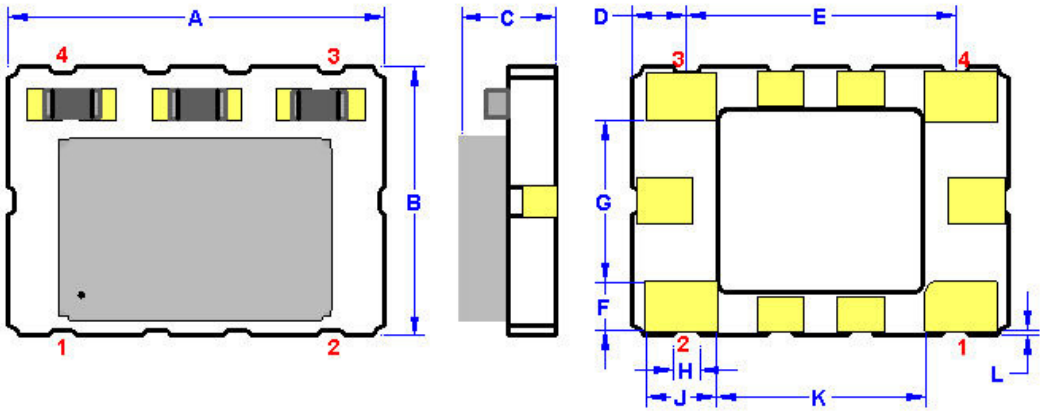
Pletronics Inc. certifies this device is in accordance with the RoHS 2 (2011/65/EU) and WEEE (2002/96/EC) directives.

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-020D
Second Level Interconnect code: e4

Mechanical Dimensions

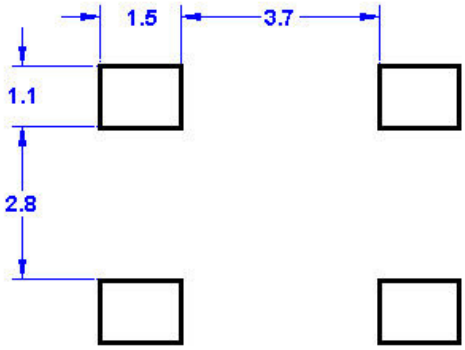
	Inches	mm
A	0.276 ± 0.006	7.00 ± 0.15
B	0.197 ± 0.006	5.00 ± 0.15
C	0.089 max	2.25 max
D[1]	0.039	1.00
E[1]	0.197	5.00
F[1]	0.025	0.90
G[1]	0.118	3.00
H[1]	0.020	0.50
J[1]	0.051	1.30
K[1]	0.154	3.90
L[1]	0.004	0.10

[1] Typical dimensions



Pad Layout mm shown (Top View)

Disclaimer: Recommended layout shown.
Adjust pad layout as needed for individual process requirements.
Solder mask required, as shown.



(Not to Scale)

Contacts (pads): Gold 11.8 to 39.4 µinches (0.3 to 1.0 µm) over Nickel 50 to 350 µinches (1.27 to 8.89 µm)

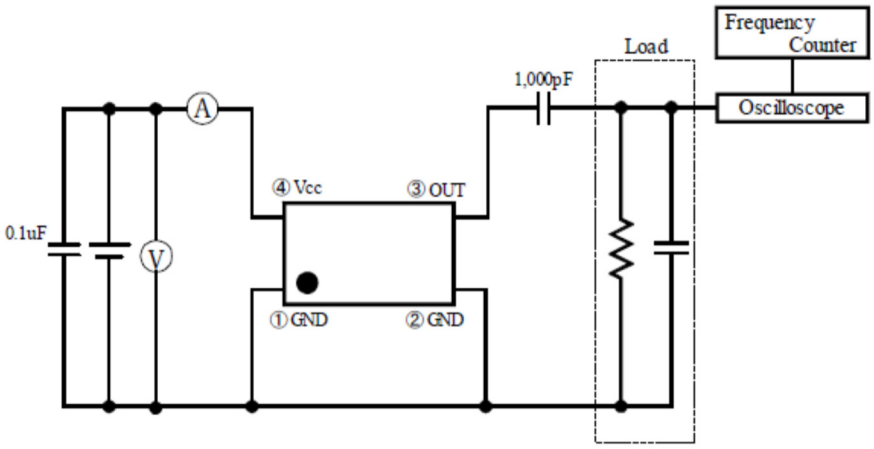
Layout

Pad	Function	Note
1	Vcontrol Input	If this function is not specified, recommend connecting this pad to ground. EFC (Electronic Frequency Control).
2	Ground (GND)	
3	Output	The output is DC coupled. Most commonly used with external coupling capacitor. 0.001 to 0.01µF recommended
4	V_{CC} Supply Voltage	Connect an appropriate 10nF power supply bypass capacitor as close as possible

For Optimum Jitter Performance, Pletronics recommends:

- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans
- Minimize air flow across the device

Electrical Test /Load Circuit



Environmental / ESD Ratings

Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A

ESD Rating

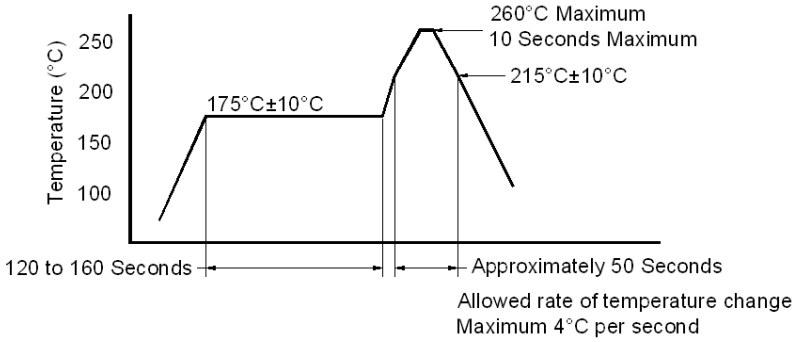
Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	500V	JESD 22-C101
Machine Model	200V	JESD22-A115

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.6V to +6V
Vi Input Voltage	-0.6V to V_{CC} + 0.6V
Io Output Current	-10mA to +10mA

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.

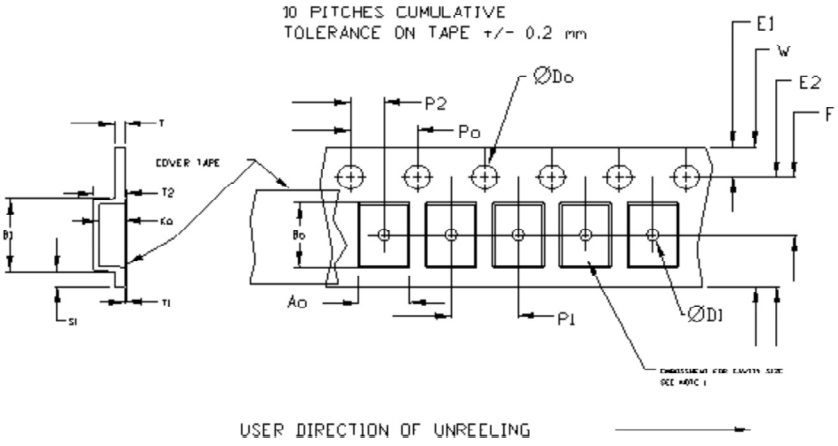
Reflow Cycle



The part may be reflowed 2 times without degradation (typical for lead free processing).

Parts assembled with No Clean (NC) solder paste.

Tape and Reel

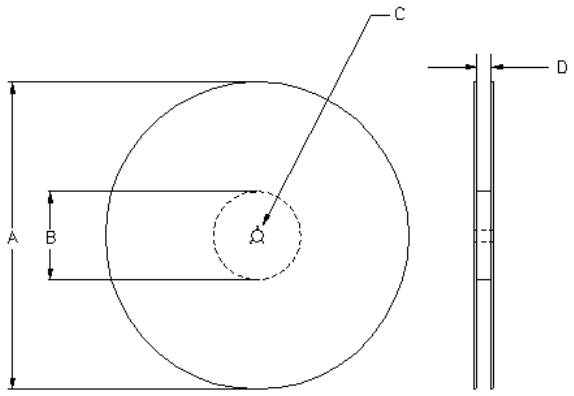


Tape Constant Dimensions Table 1								
Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5						
16mm		1.5			2.0 ±0.1			
24mm		1.5						

Tape Variable Dimensions Table 2							
Tape Size	B1 max	E2 min	F	P1	T2 max	W max	Ao, Bo & Ko
16mm	12.1	14.25	7.5 ±0.1	8.0 ±0.1	8.0	16.3	Note 1

Dimensions in mm Drawing Not to scale

Note 1: Embossed cavity to conform to EIA– 481-B



Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	177.8	2.50	63.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0
10	10.0	254.0	4.00	101.6		
13	13.0	330.2	3.75	95.3		

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