

TCA4 Series TCXO / TCVCXO

November 2010

Lead Free 

- Pletronics' TCA4 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.
- 10 to 40 MHz
- 5 x 7 mm LCC Ceramic Package
- Optional Voltage Control Function (TCVCXO)

**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: 0.17 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D.1
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 |

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 |

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:

| | | | | | | | | | |
|-------------|------------|------------|----------|----------|------------|------------|----------------|------------|---|
| TCA4 | 027 | 050 | G | H | 015 | 008 | -12.75M | -XX | |
| | | | | | | | | | Internal code or blank |
| | | | | | | | | | Nominal Frequency in MHz |
| | | | | | | | | | Pullability in ppm (Vcontrol) 000 = TCXO only 008 = ± 8 ppm minimum 012 = ± 12 ppm minimum |
| | | | | | | | | | Stability in ppm 005 = ± 0.5 ppm 010 = ± 1 ppm 015 = ± 1.5 ppm 025 = ± 2.5 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* 050 = 5.0 volts 036 = 3.6 volts |
| | | | | | | | | | Lowest Supply Voltage * 029 = 2.9 volts 027 = 2.7 volts |
| | | | | | | | | | Series (Part Type, Logic & Package) |

* Supply Voltage: Select range between 2.7V and 5.0V with Highest / Lowest ≤ 1.20
 For Example: the part number for 3.3V nominal would be TCA4030036.....

Part Marking:

Tcywwa
fff.fff M
PLHXXX

Where: **ywwa** = 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.
 A Certificate of Conformance will accompany these parts.

Electrical Specification for specified Vcc over the specified temperature range

| Item | Min | Max | Unit | Condition |
|---|------------------|------|--------|------------------------------------|
| Frequency Range | 10 | 40 | MHz | |
| Frequency Accuracy ¹ | -2.5 | +2.5 | ppm | Vcontrol 1.50 volts if used |
| Frequency Stability / Supply | -0.2 | +0.2 | ppm | Load: 10K ohm // 10 pF & Vcc ± 5% |
| Output Waveform | Clipped Sinewave | | | |
| Output Level | 0.8 | - | V p-p | Load: 10K ohm ± 10% // 10 pF ± 10% |
| Phase Noise | - | -135 | dBc/Hz | Typical at 1 kHz |
| V Supply Range ¹ V _{CC} | 2.7 | 5.0 | Volts | |
| Supply Current I _{CC} | - | 4.0 | mA | |
| Aging | -1.0 | +1.0 | ppm | Per year @ 25°C |
| Vcontrol Range | 0.5 | 2.50 | Volts | 1.50 volts nominal |
| Frequency Pullability ¹ | -12 | +12 | ppm | |
| Operating Temperature Range ¹ | -40 | +85 | °C | |
| Storage Temperature Range | -55 | +95 | °C | |

¹ Specified by part number

ESD Rating

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

Package Labeling

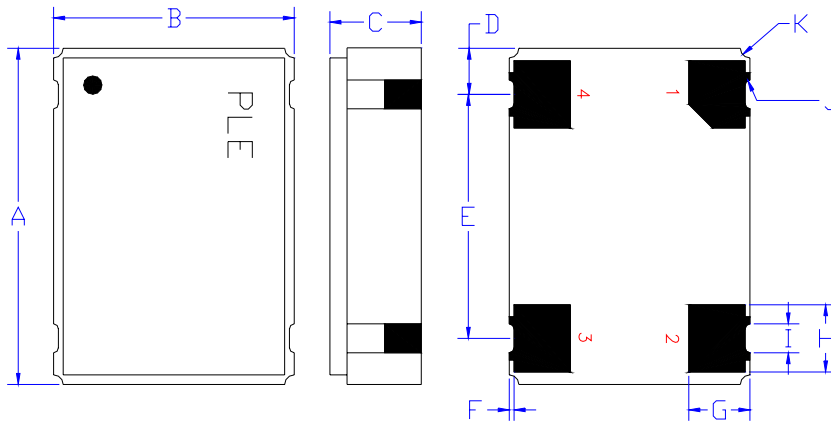
Label is 1" x 2.6" (25.4mm x 66.7mm)
 Font is Courier New
 Bar code is 39-Full ASCII

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

| | |
|--|---|
|  TCA4027050GH015008-12.75M | |
| Customer P/N: |  12345678 |
| Qty: |  1000 D/C  TC512SA |

| |
|--|
| Pb Free 2nd Lvl Interconnect Category=e4 Max Safe Temp=260C for 10s 2X Max |
|--|

Mechanical: Pad dimensions are typical. Actual dimensions may vary.



| | 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 | 0.038 | 0.96 |
| E ¹ | 0.200 | 5.08 |
| F ¹ | 0.004 | 0.10 |
| G ¹ | 0.039 | 1.00 |
| H ¹ | 0.047 | 1.20 |
| I ¹ | 0.024 | 0.60 |
| J ¹ | 0.004 | 0.10R |
| K ¹ | 0.008 | 0.020R |

Not to Scale

¹ Typical dimensions

Contacts :

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

IMPORTANT: The additional package connections are not to be connected and shall remain open circuits.
These are pads for programming the performance of the VCTCXO.
The location of these pads will vary.

| 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. |

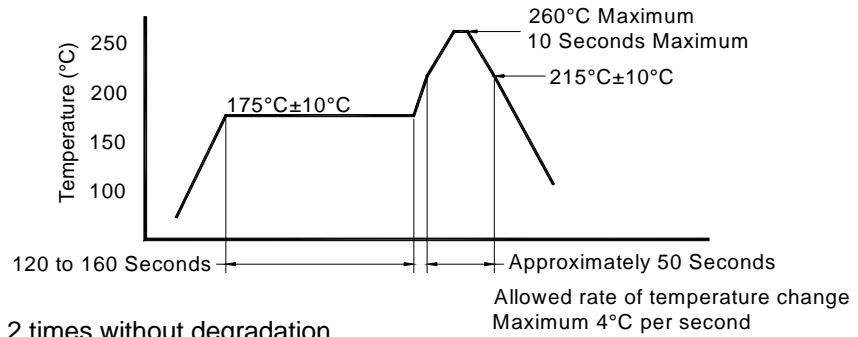
Layout and application information



For Optimum Jitter Performance, Pletronics recommends:

- a ground plane under the device
- no large transient signals (both current and voltage) should be routed under the device
- do not layout near a large magnetic field such as a high frequency switching power supply
- do not place near piezoelectric buzzers or mechanical fans.

Reflow Cycle (typical for lead free processing)



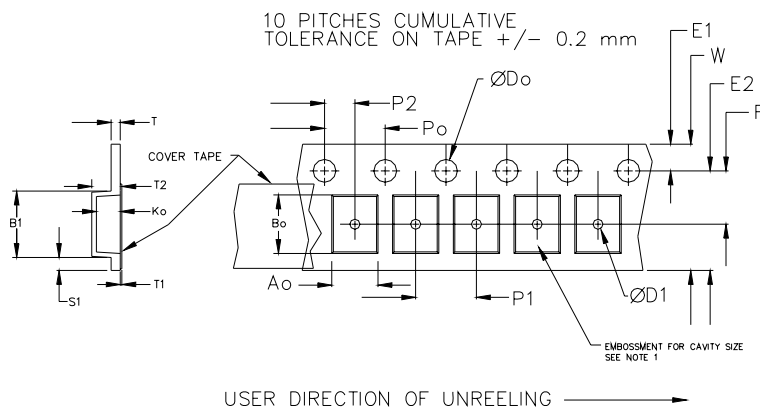
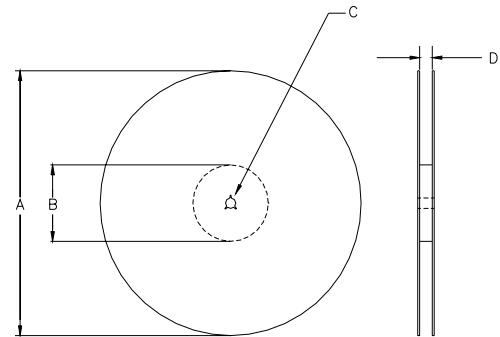
The part may be reflowed 2 times without degradation.

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

| 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 | 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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