



TCE4 Series TCXO / TCVCXO

May 2012

Lead Free 

- Pletronics' TCE4 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 52 MHz
- 1.7V to 3.7V
- 2.5 x 3.2 mm LCC Ceramic Package
- Optional Voltage Control Function (TCVCXO)

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: 0.10 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 |

Thermal Characteristics

The maximum die or junction temperature is 155°C
The thermal resistance junction to board is 25 to 40°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Part Number:

| | | | | | | | | | |
|--|-----|-----|---|---|-----|-----|---------|-----|--|
| TCE4 | 031 | 035 | G | H | 015 | 008 | -12.75M | -XX | |
| Internal code or blank | | | | | | | | | |
| Nominal Frequency in MHz | | | | | | | | | |
| Pullability in ppm (Vcontrol) (xxx in ppm) 000 = TCXO only 008 = ± 8 ppm minimum Example | | | | | | | | | |
| Stability in ppm (ppm = xxx / 10) Examples are: 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 **L = -40°C C = +0°C G = -20°C D = -5°C H = -25°C | | | | | | | | | |
| Highest Supply Voltage * (xxx / 10) 035 = 3.5 volts for 3.3 volts nominal 031 = 3.1 volts for 3.0 volts nominal 026 = 2.6 volts for 2.5 volts nominal | | | | | | | | | |
| Lowest Supply Voltage * (xxx / 10) 031 = 3.1 volts for 3.3 volts nominal 029 = 2.9 volts for 3.0 volts nominal 024 = 2.4 volts for 2.5 volts nominal | | | | | | | | | |
| Series (Part Type, Logic & Package) | | | | | | | | | |

* Supply Voltage: Select range between 2.7V and 3.3V with Highest / Lowest ≤ 1.10
For Example: the part number for 3.3V nominal would be TCE4032034.....

** Contact factory for extended temperature operation and stabilities. Not all stabilities are available @-40°C

Part Marking:

ffff.xxx
•PLExx.ywww

or

ffff.xxx
•PLE x.ywww

ffff.xxx = frequency in MHz .
PLE = Pletronics
x = Internal code
yww = Year week

Electrical Specification for specified Vsupply with a variation of $\pm 5\%$ over the specified temperature range

| Item | Min | Typ | Max | Unit | Condition | |
|---------------------------------------|------------------|------|--------------|-------|--|--------------------|
| Frequency Range | 10 | - | 52 | MHz | | |
| Frequency Accuracy Range ¹ | -2.5 -0.5 | - | +2.5 +0.5 | ppm | Vcontrol 1.50 volts if used | |
| Frequency setting | -2 | 0 | +2 | ppm | Vcontrol 1.50 volts at 25°C | |
| Frequency Stability vs. Supply | -0.2 | 0 | +0.2 | ppm | Load: 10K ohm // 10 pF & Vcc $\pm 5\%$ | |
| Frequency Stability vs. Load | -0.2 | 0 | +0.2 | ppm | Load: 10K ohm // 10 pF $\pm 5\%$ | |
| Output Waveform | Clipped Sinewave | | | | | |
| Output Level | 0.8 | - | 1.1 | V p-p | Load: 10K ohm $\pm 10\%$ // 10 pF $\pm 10\%$ | |
| Phase Noise | 100 Hz | - | -115 | - | dBc/Hz | |
| | 1 KHz | - | -136 | - | | |
| | 10 KHz | - | -145 | - | | |
| | 100 KHz | - | -145 | - | | |
| V Supply Range | V _{CC} | 1.7 | - | 3.7 | Volts | |
| Supply Current | I _{CC} | - | 2.0 | 3.0 | mA | |
| Aging | | -1.0 | - | +1.0 | ppm | Per year at 25°C |
| Vcontrol Range | | 0.5 | - | 2.50 | Volts | 1.50 volts nominal |
| Frequency Pullability ¹ | | -5 | ± 3 | +5 | ppm | |
| Operating Temperature Range | | -30 | | +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)

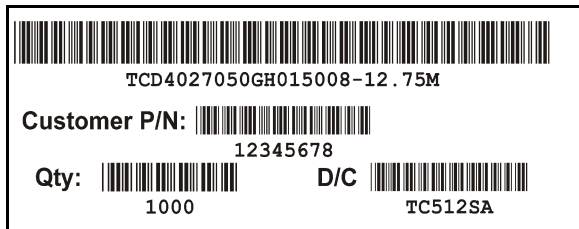
Font is Courier New

Bar code is 39-Full ASCII

(the label will show the TCE4 actual part number)

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

Font is Arial



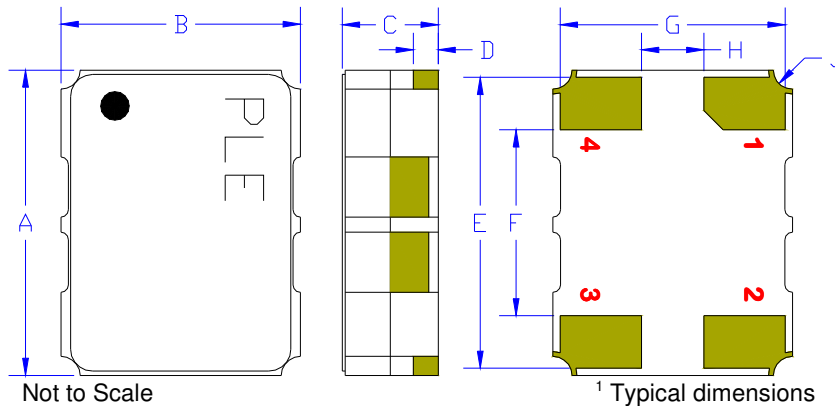
RoHS Compliant

2nd Lvl Interconnect

Category=e4

Max Safe Temp=260C for 10s 2X Max

Mechanical:



| | Inches | mm |
|----------------|--------------|------------|
| A | 0.126 ±0.008 | 3.20 ±0.20 |
| B | 0.098 ±0.008 | 2.50 ±0.20 |
| C | 0.040 max | 1.0 max |
| D ¹ | 0.102 | 0.26 |
| E ¹ | 0.120 | 3.05 |
| F ¹ | 0.077 | 1.95 |
| G ¹ | 0.093 | 2.35 |
| H ¹ | 0.026 | 0.65 |
| J ¹ | 0.008 | 0.20R |

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

| 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. |

Reflow Cycle (typical for lead free processing)



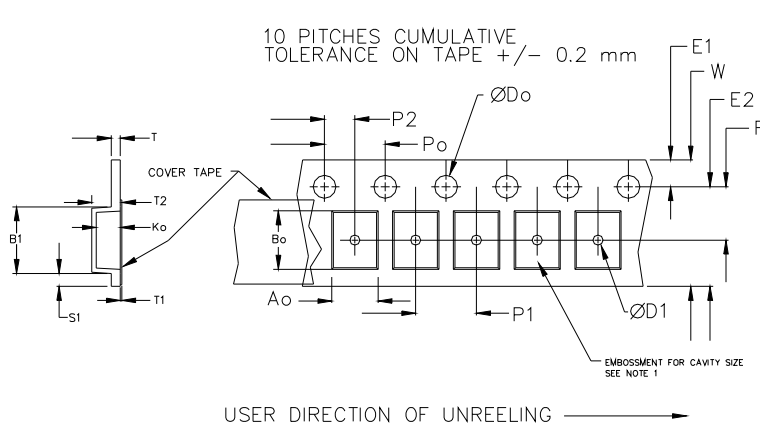
The part may be reflowed 2 times without degradation.

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 | 1.5 | ± 0.1 | ± 0.1 | 2.0 ± 0.1 | | | |
| 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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