



## TCD4 Series TCXO / TCVCXO

November 2010

**Lead Free** 

- Pletronics' TCD4 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 26 MHz
- 3.2 x 5 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 <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.

### ESD Rating

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

**Part Number:**

TCD4	027	050	G	H	015	008	-12.75M	-XX	
Internal code or blank									
Nominal Frequency in MHz									
Pullability in ppm (Vcontrol)(in ppm) 000 = TCXO only 008 = ± 8 ppm minimum (typical xamples shown)									
Stability in ppm (ppm * 10) 010 = ± 1 ppm 015 = ± 1.5 ppm 025 = ± 2.5 ppm (typical examples shown)									
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 C = +0°C G = -20°C D = -5°C H = -25°C									
Highest Supply Voltage <sup>1</sup> (voltage * 10) 055 = 5.5 volts 036 = 3.6 volts (typical examples shown)									
Lowest Supply Voltage <sup>1</sup> (voltage * 10) 029 = 2.9 volts 027 = 2.7 volts (typical examples shown)									
Series (Part Type, Logic & Package)									

<sup>1</sup> 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 TCD4030036.....

**Part Marking:**

**ffff.yww**  
• PLExx.xxxx

or

**ffff.yww**  
• PLExx.xxxx

ffff.yww = frequency in MHz . Year week  
PLE = Pletronics  
xx.xxxx = internal code

**Electrical Specification for specified Vcc over the specified temperature range**

Item	Min	Max	Unit	Condition
Frequency Range	10	26	MHz	
Frequency Accuracy <sup>1</sup>	-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			DC Coupled
Output Level	0.8	1.1	V p-p	Load: 10K ohm ± 10% // 10 pF ± 10%
Phase Noise	-	-135	dBc/Hz	Typical at 1 kHz @19.2 MHz
V Supply Range <sup>1</sup> V <sub>cc</sub>	2.7	5.0	Volts	
Supply Current I <sub>cc</sub>	-	3.0	mA	
Aging	-1.0	+1.0	ppm	Per year
Vcontrol Range	0.5	2.50	Volts	1.50 volts nominal
Frequency Pullability <sup>1</sup>	-15	+15	ppm	
Operating Temperature Range <sup>1</sup>	-30	+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

**Package Labeling**

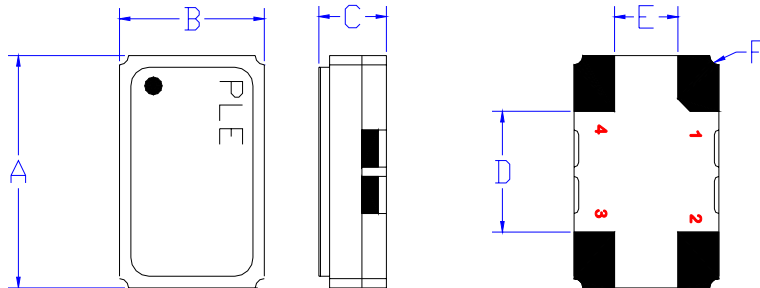
Label is 1" x 2.6" (25.4mm x 66.7mm)  
 Font is Courier New  
 Bar code is 39-Full ASCII

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

 TCD4027050GH015008-12.75M	
Customer P/N:	 12345678
Qty:	 1000
D/C	 TC512SA

<p><b>RoHS Compliant</b></p> <p>2nd LvL Interconnect</p> <p>Category=e4</p> <p>Max Safe Temp=260C for 10s 2X Max</p>
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### Mechanical:



	Inches	mm
A	0.197 ±0.006	5.00 ±0.15
B	0.126 ±0.006	3.20 ±0.15
C	0.057 ±0.002	1.4 ±0.15
D <sup>1</sup>	0.102	2.60
E <sup>1</sup>	0.055	1.40
F <sup>1</sup>	0.008	0.020R

Not to Scale

<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

Pad	Function	Note
1	Vcontrol Input	If this function is not specified, recommend connecting this pad to ground.
2	Ground (GND)	
3	Output	The output is DC coupled. Most common used with external coupling capacitor. 0.001 to 0.01uF recommended
4	Supply Voltage (V <sub>CC</sub> )	Recommend connecting appropriate power supply bypass capacitors as close as possible.



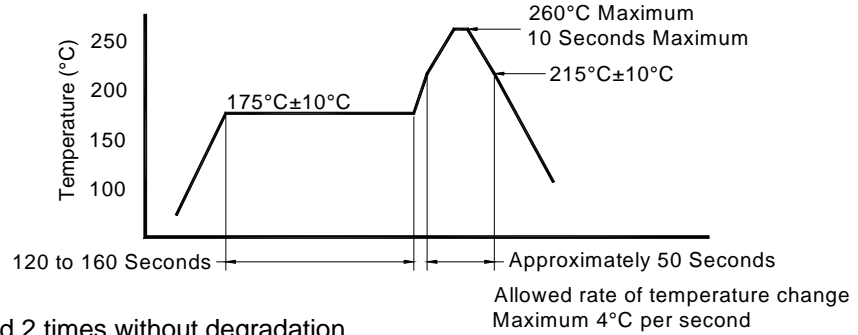
### Layout and application information

The area under the device should have no exposed contacts except the 4 pad areas. Placing solder mask under the device and covering all feed throughs is highly recommended.

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)



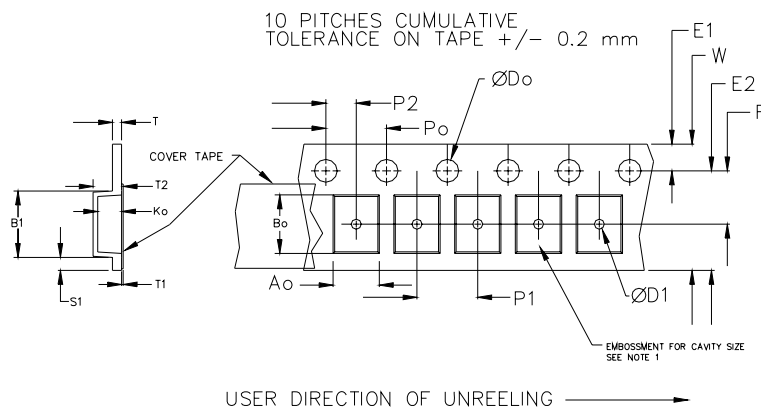
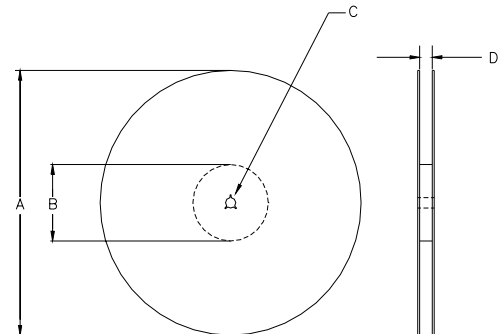
The part may be reflowed 2 times without degradation.

### Tape and Reel: available for quantities of 250 to 1000 per reel, 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 +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			2.0 ±0.1			
16mm		1.5						
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	16.4	16.4	16.0
		+2.0	+2.0	+2.0	
		-0.0	-0.0	-0.0	

Reel dimensions may vary from the above

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