

TCD4012 Series TCVCXO Oscillator

June 2010

Lead Free 

- Pletronics' TCD4 Series is a temperature compensated voltage controlled crystal oscillator with a clipped sinewave output.
- The package is designed for high density surface mount designs.
- Tape and Reel packaging is available.
- **Ideal Device for Femtocell applications**
- 3.2 x 5 mm LCC Ceramic Package
- Optional Voltage Control Function
- Available frequencies

16.384 MHz	19.2 MHz
16.800 MHz	20.00 MHz

**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: 0.2 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020C
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 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 Marking:

ffffyww
PLExYWW

Where: **yww**

= Date code of the crystal
YWW = Date code of the TCXO assembly
x = Internal code

Frequency (MHz)	fff
16.384	1638
16.8	1680
19.2	1920
26.0	2600


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
 (Part number will be: TCD4012-FF.FFM where FF.FF is the frequency in MHz)

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

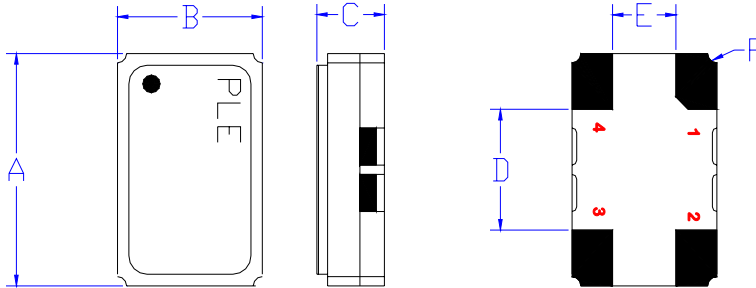
 TCD4027050GH015008-12.75M	
Customer P/N:	 12345678
Qty:	 1000
	D/C  TC512SA

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

Electrical Specification for specified Vcc of 3.30V $\pm 5\%$ over the specified temperature range

Item	Min	Typ	Max	Unit	Condition
Frequency Stability	-0.25	0	0.25	ppm	Vcontrol 1.50 volts 0°C to +70°C
	-0.1	0	0.1		Vcontrol 1.50 volts +20°C to +60 °C (Reference to midpoint min/max frequency)
Holdover	-0.1	0	+0.1		Over any 5 °C range between 0 and 70°C for 24 hrs Max.
Frequency Calibration	-1.0	0	+1.0	ppm	Vcontrol 1.50 volts and Temperature 25°C
Frequency Slope	-50	0	+50	ppb/°C	Minimum 1 frequency reading every 2°C
Frequency Stability vs Supply	-0.2	0	+0.2	ppm	Load: 10K ohm // 10 pF & Vcc $\pm 5\%$
Output Waveform	Clipped Sinewave			DC Coupled	
Output Level	0.8	-	-	V p-p	Load: 10K ohm $\pm 10\%$ // 10 pF $\pm 10\%$
Phase Noise	10 Hz	-	-88	-	dBc/Hz
	100 Hz	-	-115	-	
	1 KHz	-	-136	-	
	10 KHz	-	-148	-	
Supply Current I _{cc}	-	-	2.5	mA	
Aging	-1.0	-	+1.0	ppm	for first year at +25°C total for 10 years at +25°C
	-5.0	-	+5.0		
Frequency Shift after reflow	-1.0	-	+1.0	ppm	measured at 25°C 120 min after reflow
Frequency Pullability	-8.0	-	+8.0	ppm	at Vcontrol 1.50volts ± 1.0 volt
Operating Temperature Range ¹	-30	-	+85	°C	
Supply Voltage	2.7	3.3	3.5		
Storage Temperature Range	-40	-	+85	°C	

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 ¹	0.102	2.60
E ¹	0.055	1.40
F 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

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.

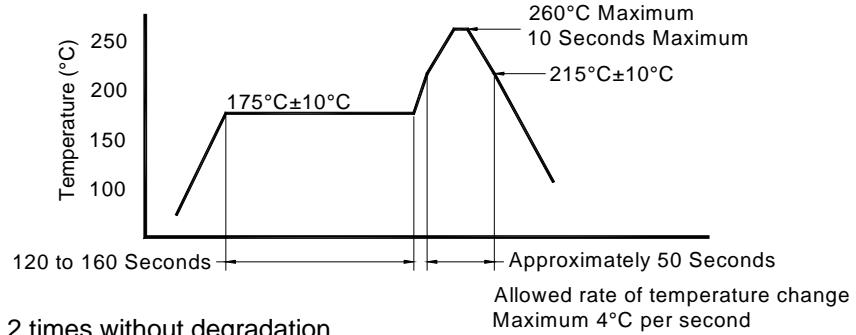


Layout and application information

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)



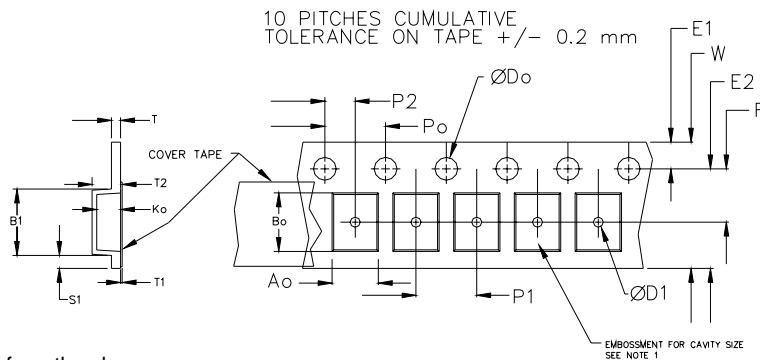
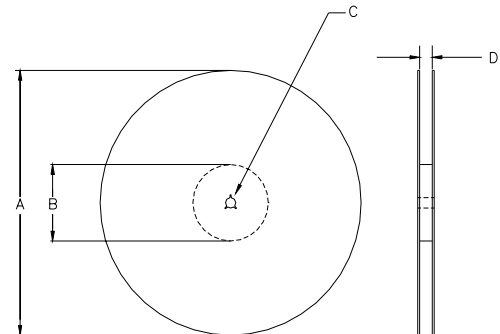
The part may be reflowed 2 times without degradation.

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



from the above

USER DIRECTION OF UNREELING →

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

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