PLETRONICS
www.pletronics.com 425-776-1880

TCD4012 Series
TCVCXO Oscillator

March 2009

Preliminary

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	26.0 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
Vi Input Voltage	-0.5V to V_{CC} + 0.5V
Vo 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:

***ffff*yww**
PLE*x*YWW

Where: ***yww*** = Date code of the crystal
YWW = Date code of the TCXO assembly
x = Internal code

Frequency (MHz)	*ffff*
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

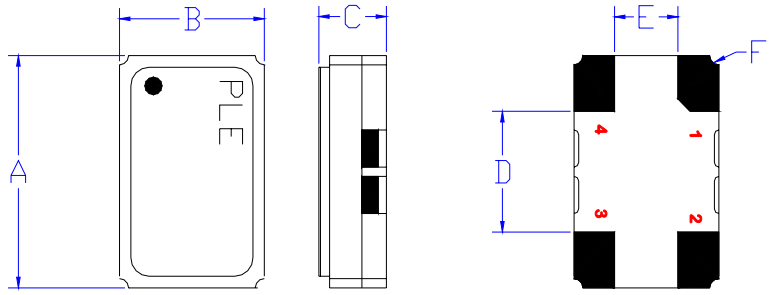
TCD4027050GH015008-12.75M
Customer P/N: 12345678
Qty: 1000 D/C TC512SA

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

Electrical Specification for specified Vcc of 3.30V ±5% over the specified temperature range

Item	Min	Typ	Max	Unit	Condition
Frequency Stability	-0.25 -0.1	0 0	0.25 0.1	ppm	Vcontrol 1.50 volts 0°C to +70°C 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 ± 5%
Output Waveform	Clipped Sinewave				DC Coupled
Output Level	0.8		1.2	V p-p	Load: 10K ohm ± 10% // 10 pF ± 10%
Phase Noise 10 Hz 100 Hz 1 KHz 10 KHz	- - - -	-88 -115 -136 -148	- - - -	dBc/Hz	
Supply Current I_{CC}	-	-	2.5	mA	
Aging	-1.0 -5.0	- -	+1.0 +5.0	ppm	for first year at +25°C total for 10 years at +25°C
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 ±1.0volt
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.

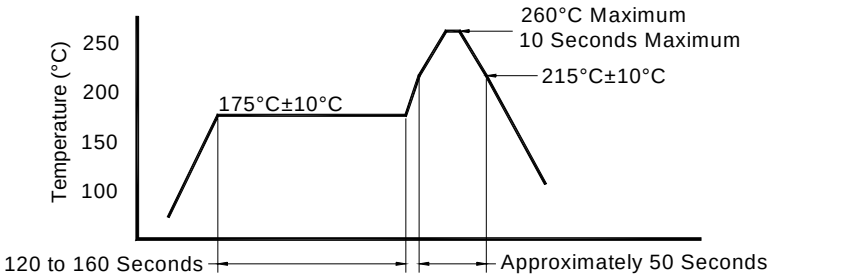
Lead Free

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

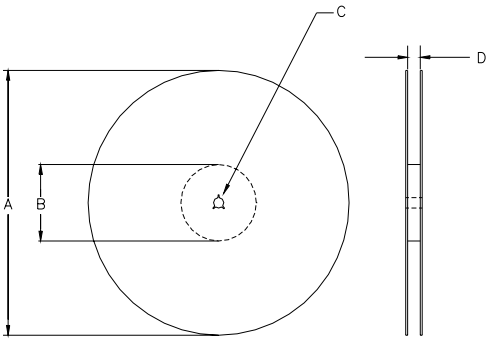
Constant Dimensions Table 1

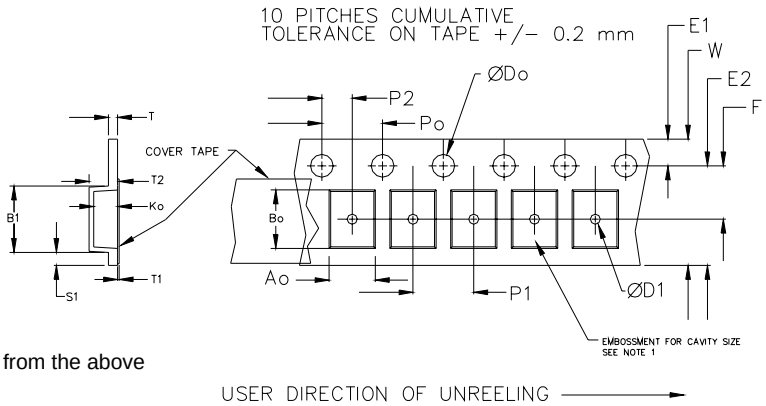
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.6	0.1
12mm		1.5						
16mm		1.5			2.0 ±0.1			
24mm		1.5						

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	
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	
	mm	63.5	101.6	95.3	Tape Width
C	mm	13.0 +0.5 / -0.2			
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.0

Reel dimensions may vary

from the above

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