



TCD4 Series TCVCXO Oscillator

Feb 2006

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.
- 10 to 26 MHz
- 3.2 x 5 mm LCC Ceramic Package
- Optional Voltage Control Function

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: 0.2 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.

Part Number:

TCD4 027 050 G H 015 008 -12.75M -XX	Marking
	Internal code or blank
	Nominal Frequency in MHz <i>fff.fff M</i>
	Pullability in ppm (Vcontrol) 000 = TCXO only 008 = ± 8 ppm minimum 015 = ± 15 ppm minimum
	Stability in 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 M = -45°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) TC

* 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:

TCywwa
fff.fff M
PLE

Where: ywwa = Date code
fff.fff = frequency in MHz
PLE = Pletronics

Due to part size limitations, marking cannot identify complete specifications.
A Certificate of Conformance will accompany these parts.

Electrical Specification for specified V_{cc} over the specified temperature range

Item	Min	Max	Unit	Condition
Frequency Range	10	26	MHz	
Frequency Accuracy ¹	-2.5	+2.5	ppm	V _{control} 1.50 volts if used ²
Frequency Stability / Supply	-0.2	+0.2	ppm	Load: 10K ohm // 10 pF & V _{cc} ± 5%
Output Waveform	Clipped Sinewave			
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
V Supply Range ¹ V _{cc}	2.7	5.0	Volts	
Supply Current I _{cc}	-	2.0	mA	
Aging	-1.0	+1.0	ppm	Per year
V _{control} Range	0.5	2.50	Volts	1.50 volts nominal
Frequency Pullability ¹	-15	+15	ppm	
Operating Temperature Range ¹	-45	+85	°C	
Storage Temperature Range	-55	+95	°C	

¹ Specified by part number

² For all supply voltages, load changes, aging for 1 year, shock, vibration and temperatures

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





ESD Rating

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

Package Labeling

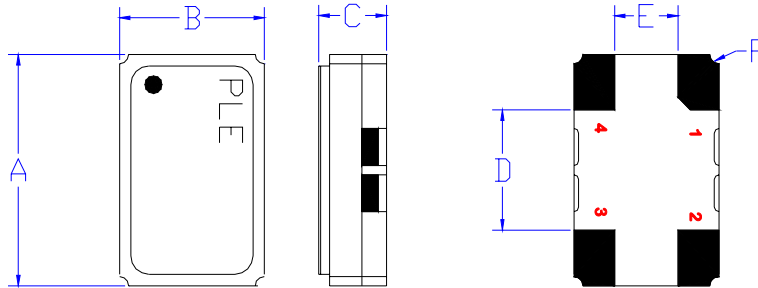
Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

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

 TCD4027050GH015008-12.75M	
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:



	Inches	mm
A	0.197 \pm 0.006	5.00 \pm 0.15
B	0.126 \pm 0.006	3.20 \pm 0.15
C	0.057 \pm 0.002	1.4 \pm 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 μ mches 0.3 μ m minimum over Nickel 50 to 350 μ mches 1.27 to 8.89 μ m

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.

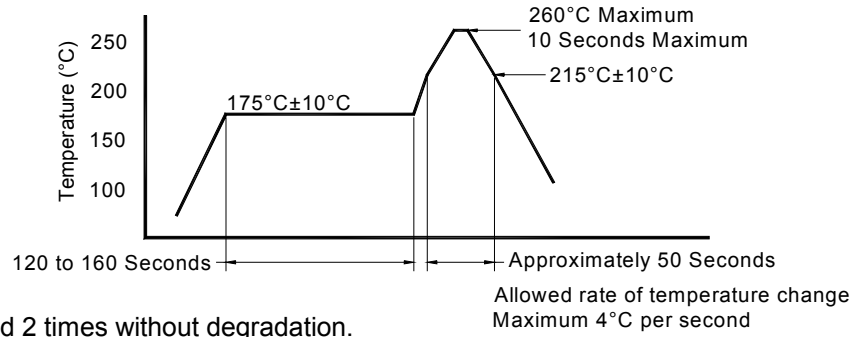


Layout and application information

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)



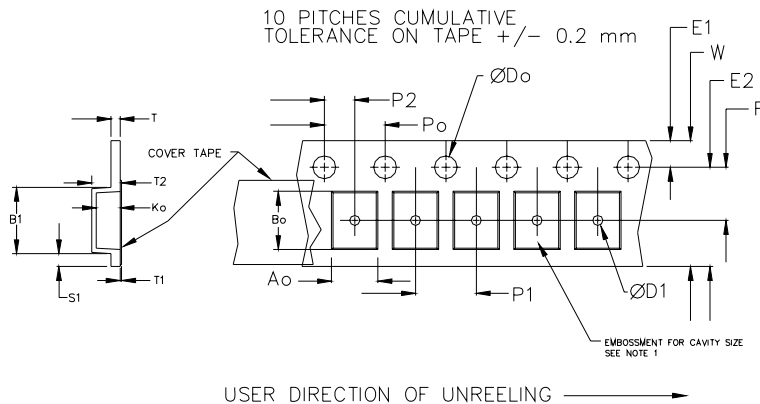
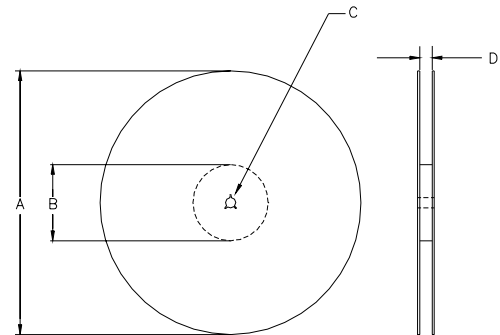
The part may be reflowed 2 times without degradation.

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			1.5			
24mm		1.5			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	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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