

# TCD4029-26.0M Microcell, Femtocell TCVCXO Oscillator

June 2010

- 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.
- 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 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

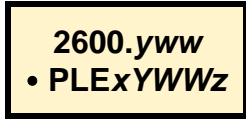
### Thermal Characteristics

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 Marking:**



2600 = 26.00 frequency in MHz  
 yww = Year and Week of the crystal manufacture  
 PLE = Pletronics  
 X = Model number, normally a "B"  
 YWW = Year and Week of assembly of the TCXO  
 Z = internal factory code

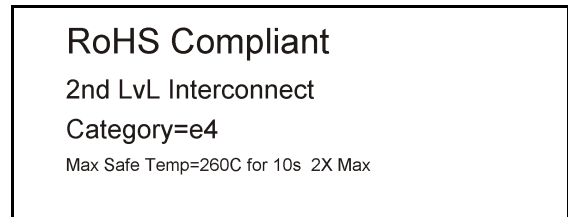
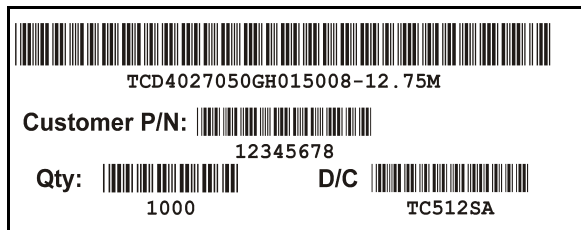
**Reliability: Environmental Compliance**

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  
 The bar code will show TCD4029-26.0M for the Part Number

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

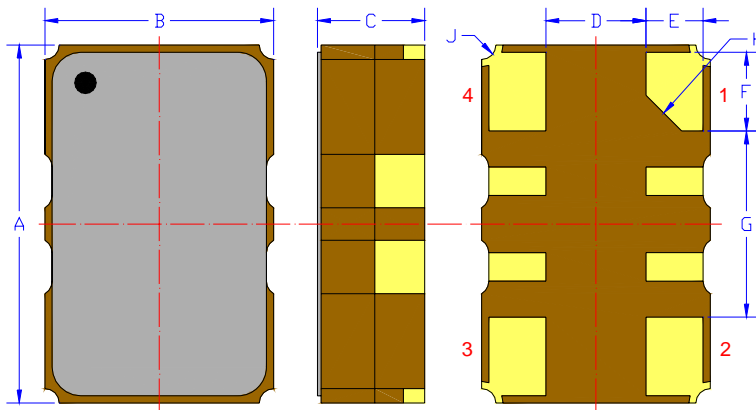


**Electrical Specification for specified Vcc over the specified temperature range**

Item	Min	TYP	Max	Unit	Condition
Frequency Stability over temperature	-100	-	+100	ppb	Over 0°C-80°C at fixed supply voltage + load (reference to midpoint min/max frequency)
Holdover	-100	0	100	ppb	Over 0°C-80°C for 24 hours
Frequency Calibration	-2.0	-	+2.0	ppm	Frequency offset at 25°C, 60 minutes after reflow.
Supply voltage stability	-	-	10	ppb	± 2% variation in supply voltage at 25°C
Load sensitivity	-5	-	5	ppb	2% variation in magnitude from 10K ohm ±10%    10 pF
Aging rate following reflow	-	±10 ±3 ±1	-	ppb/day	1 day after reflow 7 days after reflow 30 days after reflow
Long term stability (Aging)	-1000	-	1000	ppb	Long term stability after 1 year
Long term stability (Aging)	-1000	-	1500	ppb	Long term stability after 5 years
Output Waveform	Clipped Sinewave				DC Coupled
Output Level	0.8	-	-	V p-p	Load: 10K ohm ± 10%    10 pF ±10%, DC Coupled
Phase Noise	10 Hz 100Hz	-	-100 -120	-	dBc/Hz Typical values for a 26.0 MHz oscillator at 25°C
1 KHz	-	-134	-		
10KHz	-	-144	-		
Jitter	-	-	1.7	pS	Frequency offset from carrier 10Hz to 1MHz
V Supply Range <sup>1</sup> V <sub>CC</sub>	2.7	3.3	3.5	Volts	
Supply Current I <sub>CC</sub>	-	-	3.0	mA	
Long term stability	-1500	-	1500	ppb	Long term stability after 5 years
Vcontrol Range	0.5	-	2.50	Volts	1.50 volts nominal
Frequency Pullability	4.5	-	10	±ppm	Slope positive
Linearity	-	0.05	2.0	%	In accordance with MIL-PRF-55310
Operating Temperature Range	0	-	+80	°C	
Storage Temperature Range	-55	-	+95	°C	

Note:<sup>1</sup> For correct operation a 10nF supply de-coupling capacitor should be placed next to the device.

### Mechanical:



	Inches	mm
A	0.197 ±0.008	5.00 ±0.20
B	0.126 ±0.008	3.20 ±0.20
C	0.059 max	1.50 max
D <sup>1</sup>	0.055	1.40
E <sup>1</sup>	0.031	0.80
F <sup>1</sup>	0.043	1.10
G <sup>1</sup>	0.102	2.60
H <sup>1</sup>	0.013C	0.50C
J <sup>1</sup>	0.008	0.20R

Not to Scale

<sup>1</sup> Typical dimensions

#### Contacts:

Gold 11.8 to 39.4 μinches (0.3 to 1.0 μm)  
over  
Nickel 50 to 350 μinches (1.27 to 8.89 μm)

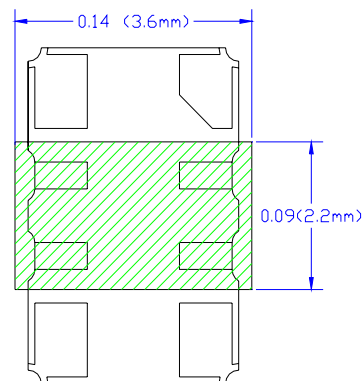
Pad	Function	Note
1	Vcontrol Input	If this function is not specified, recommend connecting this pad to ground.
2	Ground (GND)	
3	Output	The output is DC coupled. Most common used with external coupling capacitor. 0.001 to 0.01uF recommended
4	Supply Voltage (V <sub>CC</sub> )	Connect an appropriate power supply bypass capacitors as close as possible.
-	N. C.	All other pads on the bottom shall not be connected. These are internally connected and were for the TCXO compensation process

### Layout and application information

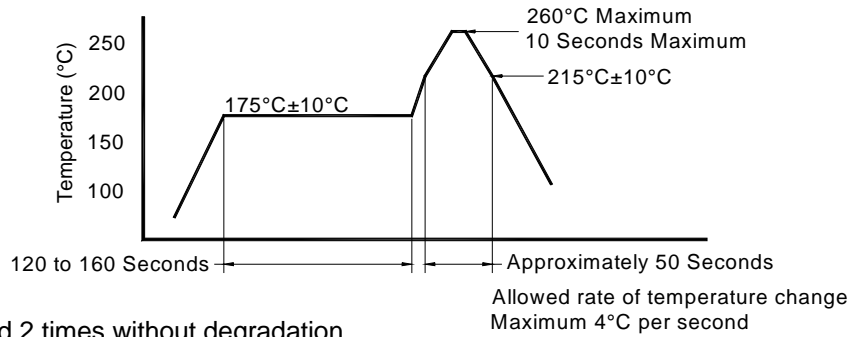
All connection points in the designated region have solder mask cover to avoid any electrical connections

For Optimum Stability and 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.
- minimize air flow across the device



### Reflow Cycle (typical for lead free processing)



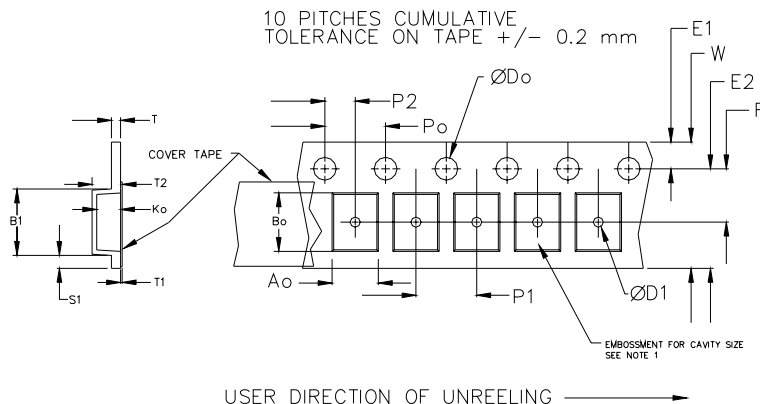
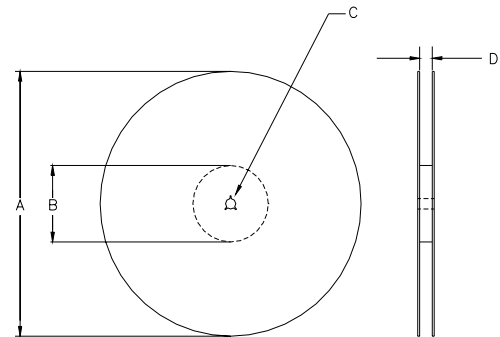
The part may be reflowed 2 times without degradation.

### 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				± 0.1
24mm		1.5			2.0 ± 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



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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