



TCF4 Series TCVCXO Oscillator

January 2009

Lead Free

- Pletronics' TCF4 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 40 MHz
- 2.0 x 2.5 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: 0.13 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

www.DataSheet4U.com

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

TCF4 Series TCVCXO Oscillator

January 2009

Part Number:

TCF4	031	035	G	H	015	008	-12.75M	-XX	
Internal code or blank									
Nominal Frequency in MHZ									
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 * 035 = 3.5 volts for 3.3 volts nominal 031 = 3.1 volts for 3.0 volts nominal 026 = 2.6 volts for 2.5 volts nominal									
Lowest Supply Voltage * 031 = 3.1 volts for 3.3 volts nominal 029 = 2.9 volts for 3.0 volts nominal 024 = 2.4 volts for 2.5 volts nominal									
Series (Part Type, Logic & Package)									

www.DataSheet4U.com

* Supply Voltage: Select range between 2.7V and 5.0V with Highest / Lowest ≤ 1.10
 For Example: the part number for 3.3V nominal would be TCE4032034.....

Part Marking:

XXXXXX
Pwwyzz

Where:

XXXXXX = process code for crystal
wwyzz = Date code

Electrical Specification for specified Vcc range of 2.3V through 3.7V with a variation of $\pm 5\%$ over the specified temperature range

Item	Min	Typ	Max	Unit	Condition	
Frequency Range	10	-	40	MHZ		
Frequency Accuracy Range ¹	-2.5 -0.5	-	+2.5 +0.5	ppm	Vcontrol 1.50 volts if used ²	
Frequency setting	-2	0	+2	ppm	Vcontrol 1.50 volts at 25°C	
Frequency Stability vs. Supply	-0.2	0	+0.2	ppm	Load: 10K ohm // 10 pF & Vcc $\pm 5\%$	
Frequency Stability vs. Load	-0.2	0	+0.2	ppm	Load: 10K ohm // 10 pF $\pm 5\%$	
Output Waveform	Clipped Sinewave					
Output Level	0.8	-	1.1	V p-p	Load: 10K ohm $\pm 10\%$ // 10 pF $\pm 10\%$	
Phase Noise	100 Hz 1 KHz 10 KHz 100 KHz	- - - -	-110 -130 -145 -145	- - - -	dBc/Hz	
V Supply Range ¹	V _{CC}	2.3	-	3.7	Volts	
Supply Current	I _{CC}	-	-	2.0	mA	
Aging		-1.0	-	+1.0	ppm	Per year at 25°C
Vcontrol Range		0.5	-	2.50	Volts	1.50 volts nominal
Frequency Pullability ¹		-5	± 3	+5	ppm	
Operating Temperature Range ¹		-30		+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 B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

TCF4 Series TCVCXO Oscillator

January 2009

Package Labeling

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

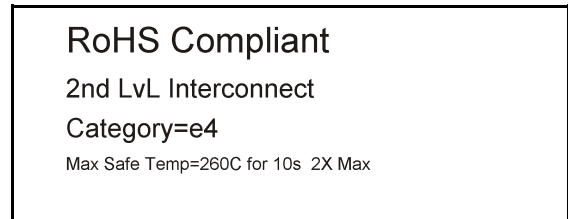
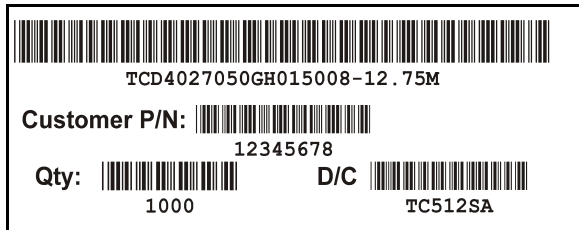
Font is Courier New

Bar code is 39-Full ASCII

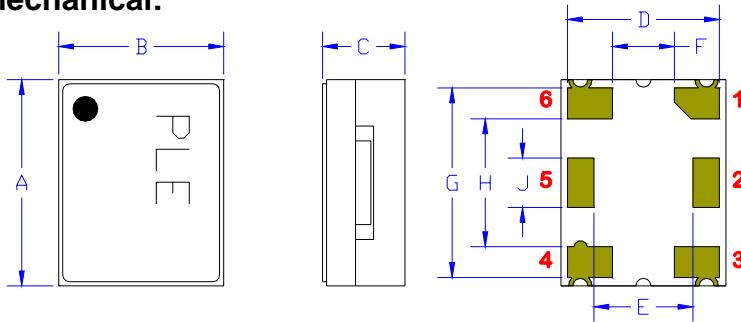
(the label will show the TCF4 actual part number)

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

Font is Arial



Mechanical:



Not to Scale

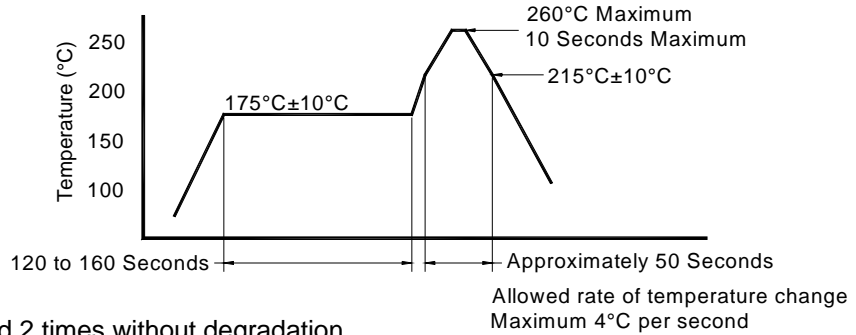
¹ Typical dimensions

	Inches	mm
A	0.098 ±0.008	2.50 ±0.20
B	0.079 ±0.008	2.00 ±0.20
C	0.040 max	1.0 max
D ¹	0.072	1.84
E ¹	0.047	1.20
F ¹	0.030	0.75
G ¹	0.091	2.30
H ¹	0.061	1.55
J ¹	0.028	0.70

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	none	No connection or Ground. Ground is recommended)
3	Ground (GND)	
4	Output	
5	none	No connection or Ground. Ground is recommended)
6	Supply Voltage (V _{CC})	Recommend connecting appropriate power supply bypass capacitors as close as possible.

Reflow Cycle (typical for lead free processing)



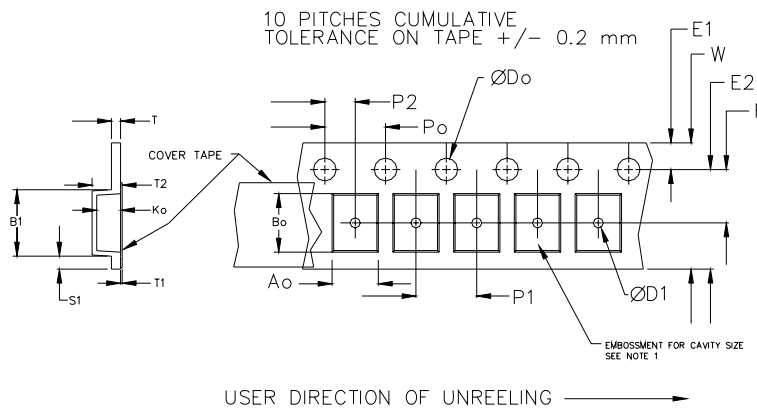
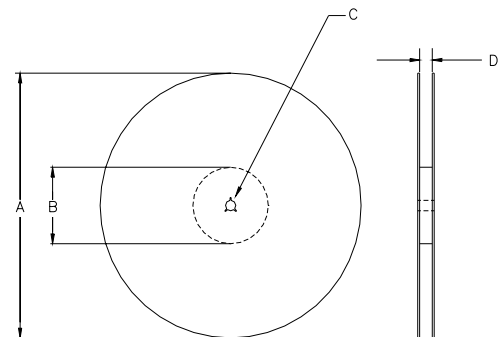
The part may be reflowed 2 times without degradation.

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			± 0.1			
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



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

IMPORTANT NOTICE

Pletronics Incorporated (PLE) reserves the right to make corrections, improvements, modifications and other changes to this product at anytime. PLE reserves the right to discontinue any product or service without notice. Customers are responsible for obtaining the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to PLE's terms and conditions of sale supplied at the time of order acknowledgment.

PLE warrants performance of this product to the specifications applicable at the time of sale in accordance with PLE's limited warranty. Testing and other quality control techniques are used to the extent PLE deems necessary to support this warranty. Except where mandated by specific contractual documents, testing of all parameters of each product is not necessarily performed.

PLE assumes no liability for application assistance or customer product design. Customers are responsible for their products and applications using PLE components. To minimize the risks associated with the customer products and applications, customers should provide adequate design and operating safeguards.

PLE products are not designed, intended, authorized or warranted to be suitable for use in life support applications, devices or systems or other critical applications that may involve potential risks of death, personal injury or severe property or environmental damage. Inclusion of PLE products in such applications is understood to be fully at the risk of the customer. Use of PLE products in such applications requires the written approval of an appropriate PLE officer. Questions concerning potential risk applications should be directed to PLE.

PLE does not warrant or represent that any license, either express or implied, is granted under any PLE patent right, copyright, artwork or other intellectual property right relating to any combination, machine or process which PLE product or services are used. Information published by PLE regarding third-party products or services does not constitute a license from PLE to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from PLE under the patents or other intellectual property of PLE.

www.DataSheet4U.com

Reproduction of information in PLE data sheets or web site is permissible only if the reproduction is without alteration and is accompanied by associated warranties, conditions, limitations and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. PLE is not responsible or liable for such altered documents.

Resale of PLE products or services with statements different from or beyond the parameters stated by PLE for that product or service voids all express and implied warranties for the associated PLE product or service and is an unfair or deceptive business practice. PLE is not responsible for any such statements.

Contacting Pletronics Inc.

Pletronics Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880
Fax: 425-776-2760
E-mail: ple-sales@pletronics.com
URL: www.pletronics.com

Copyright © 2009, Pletronics Inc.