

TCE4 Series TCVCXO Oscillator

December 2008



- Pletronics' TCE4 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
- 2.5 x 3.2 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: 0.2 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 25 to 40°C/Watt depending on the solder pads, ground plane and construction of the PCB.

Part Number:

TCE4	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)

* 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		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

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)

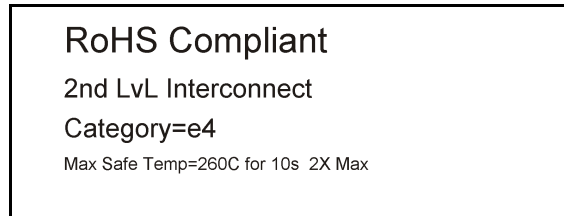
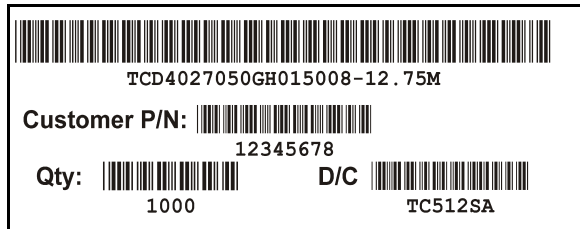
Font is Courier New

Bar code is 39-Full ASCII

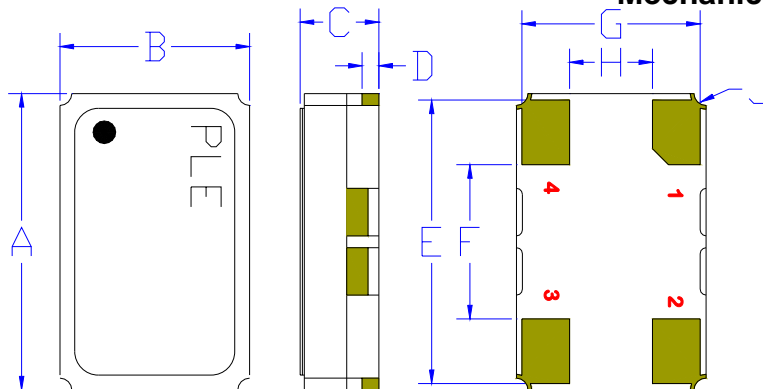
(the label will show the TCE4 actual part number)

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

Font is Arial



Mechanical:



	Inches	mm
A	0.126 ±0.008	3.20 ±0.20
B	0.098 ±0.008	2.50 ±0.20
C	0.040 max	1.0 max
D ¹	0.102	0.26
E ¹	0.120	3.05
F ¹	0.077	1.95
G ¹	0.093	2.35
H ¹	0.026	0.65
J ¹	0.008	0.020R

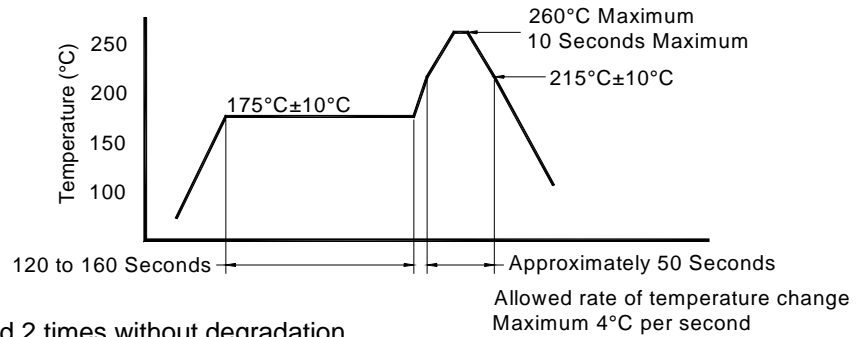
Not to Scale

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.

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

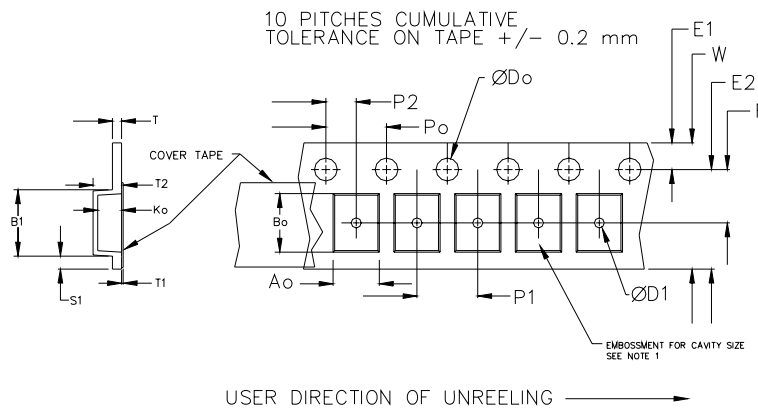
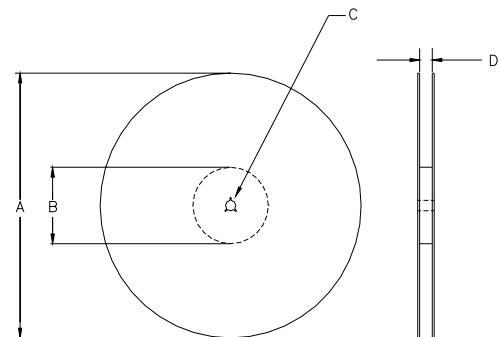
Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5	1.0	1.75	4.0	2.0 ± 0.05	0.6	0.6	0.1
12mm		1.5			2.0 ± 0.1			
16mm		+0.1 -0.0			± 0.1			
24mm		1.5			± 0.1			

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



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	
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			
D	mm	16.4	16.4	16.4	
		+2.0 -0.0	+2.0 -0.0	+2.0 -0.0	

Reel dimensions may vary from the above

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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

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