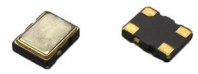
CARDINAL COMPONENTS

CTX5 Series
TCXO / VCTCXO



CTX5
5.0 x 3.2 x 1.1 mm
LCC Ceramic Package

Features

- Temperature compensated
- Optional Voltage Control Function
- Clipped Sine Wave Output
- 1.8V to 3.3V nominal Supply Voltage
- 10 - 40 MHz Frequency

Applications

GPS
WiMAX, Wi-Fi, Wi-LAN
Handsets
Broadband Access
Point to point radios
Seismic Exploration
Wireless Communications
Base Stations
Test Equipment

Electrical Characteristics

Parameter	**Min**	**Typ**	**Max**	**Unit**	**Condition** (Consult factory for other options)
Frequency Range	10	-	40	MHz	Specified by part number
Frequency Stability vs. Temperature	±0.5	-	±2.5	ppm	Specified by part number (f_{max} - f_{min}) / 2
Frequency Initial Calibration @ 25°C±2°C	-	-	±2.0	ppm	If Vcontrol used: Vcontrol 1.50 volts at 25°C ± 2°C when $V_{CC} \geq$ 2.5 volts Vcontrol 0.9 volts at 25°C ± 2°C when V_{CC} = 1.8 volts
Operable Temperature Range	-40	-	+85	°C	Specified by part number, Consult factory for wider range
Supply Voltage [1] V_{CC}	1.8	-	3.3	V	± 5%, Specified by part number
Supply Current I_{CC}	-	2.0	3.0	mA	Load: 10 Kohm || 10 pF, V_{CC} ± 5%
Frequency Stability vs. Supply	-	-	±0.2	ppm	Load: 10 Kohm || 10 pF, V_{CC} ± 5%
Frequency Stability vs. Load	-	-	±0.2	ppm	Load: [10 Kohm || 10 pF] ± 10%
Vcontrol Range	0.50 0.30	1.50 0.90	2.50 1.50	V	1.50 volts nominal for V_{CC} nominal $\geq$ 2.5 volts 0.9 volts nominal for V_{CC} nominal = 1.8 volts
Frequency Pullability [2]	0	±8.0	-	ppm	Specified by part number, Positive Slope
Output Waveform		Clipped Sine Wave			DC Coupled
Output Level	0.8	-	-	V p-p	Load: [10 Kohm || 10 pF] ± 10%
Startup Time	-	-	10.0	mS	Within ± 2.0 ppm of final frequency
Long Term Stability (Aging)	-	-	±1.0	ppm	First year at 25°C ± 2°C
Phase Noise 100 Hz 1 kHz 10 kHz	-	-115 -135 -148	-	dBc/Hz	25°C ± 2°C at 19.2 MHz
Storage Temperature Range	-55	-	+85	°C	

Notes:
[1] Place an appropriate power supply bypass capacitor next to device for correct operation

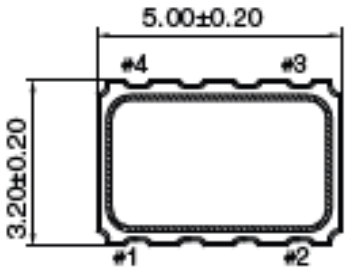
Part Number (Example: CTX5SLZ-A7B4M-20.0)

Series Model	Output	Voltage	Packaging		Operating Temperature	Stability	Pullability		Frequency
CTX5	**S**	**L**	**Z**	**-**	**A7**	**B4**	**M**	**-**	**20.0**
	S = Clipped Sine	**L = 3.3V** S = 2.5V K = 1.8V	**Z = Tape/reel** Blank = Bulk		A3 = -30 ~ +75°C A5 = -20 ~ +70°C A6 = -30 ~ +85°C **A7 = -40 ~ +85°C**	B3 = ±2.5ppm **B4 = ±2.0ppm** B5 = ±1.5ppm B6 = ±1.0ppm B7 = ±0.5ppm	Blank = TCXO **M = ± 5ppm min** N = ± 8ppm min		10 - 40 MHz

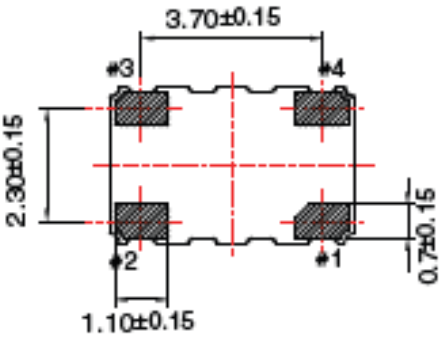
Contact Factory for non-standard specifications. Not all combinations may be possible.

Mechanical Dimensions (mm)

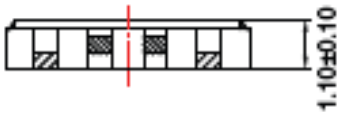
[TOP VIEW]



[BOTTOM VIEW]

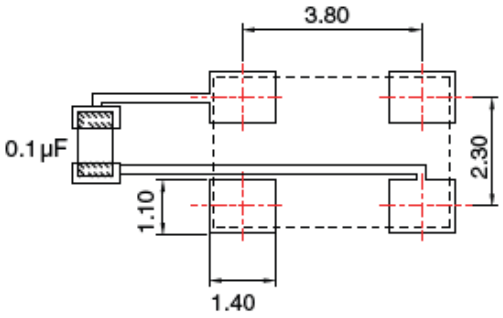


[SIDE VIEW]



Pin#	Function
1	Vcon: VC-TCXO GND /NC:TCXO
2	GND
3	Output
4	VDD

Contacts (pads): Gold (0.3 to 1.0 µm) over Nickel (1.27 to 8.89 µm)



To ensure optimal oscillator performance,
place a by-pass capacitor of 0.1µF
as close to the part as possible between Vdd and GND pads.

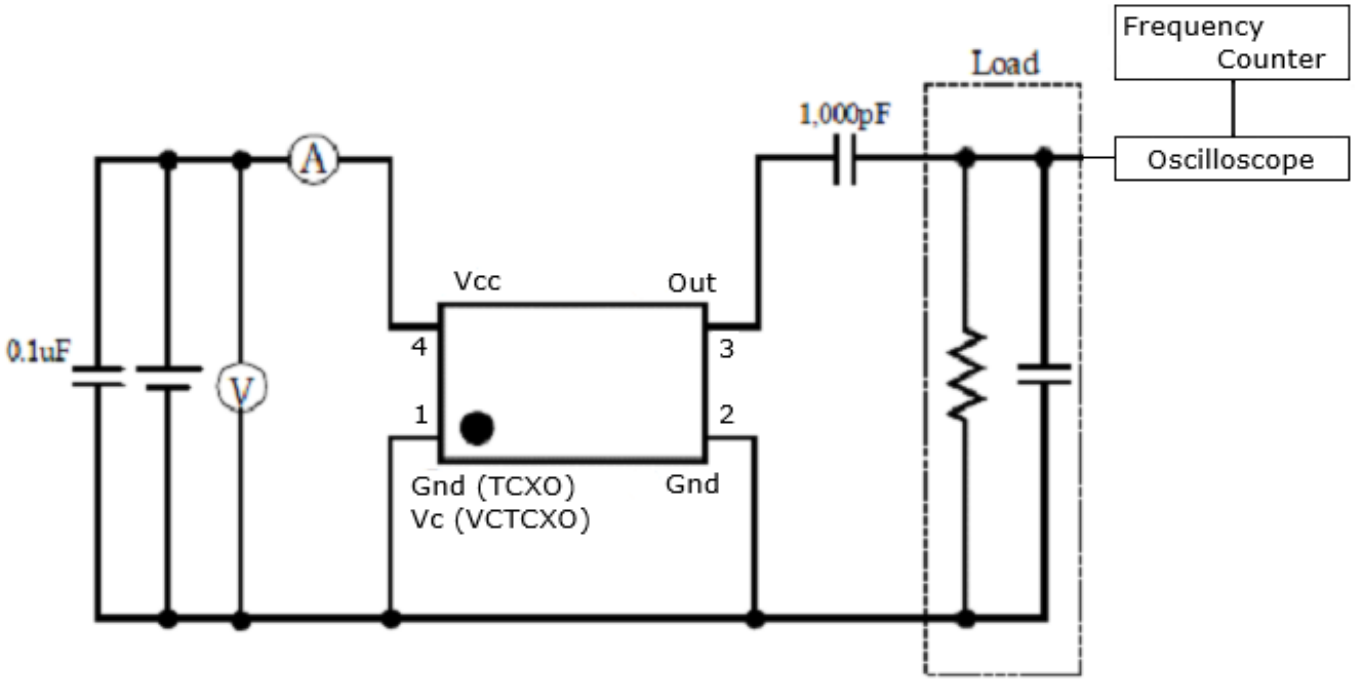
Pad Layout

Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

For Optimum Jitter Performance, Cardinal recommends:

- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans

Electrical Test / Load Circuit



Environmental / ESD Ratings

Reliability: Environmental

Parameter	Condition
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A
Solderability	IPC J-STD-002
Thermal Cycle	MIL-STD-883 Method 1010, Condition B

ESD Rating

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Machine Model	200V	JESD22-A115

Thermal Characteristics:
The maximum die or junction temperature is 125°C

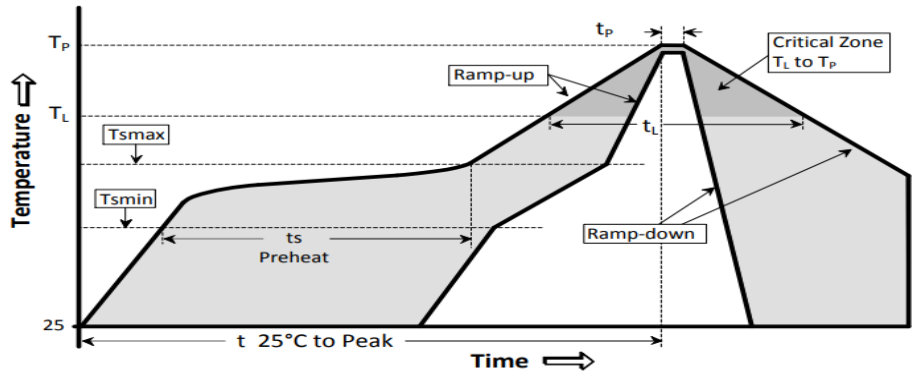
Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.6V to +4.6V
Vi Input Voltage	-0.6V to V_{CC} + 0.6V
Io Output Current	-10mA to +10mA

Cardinal Components Inc. certifies this device is in accordance with the RoHS and REACH directives.
Cardinal guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.059 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

Reflow Cycle

Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"

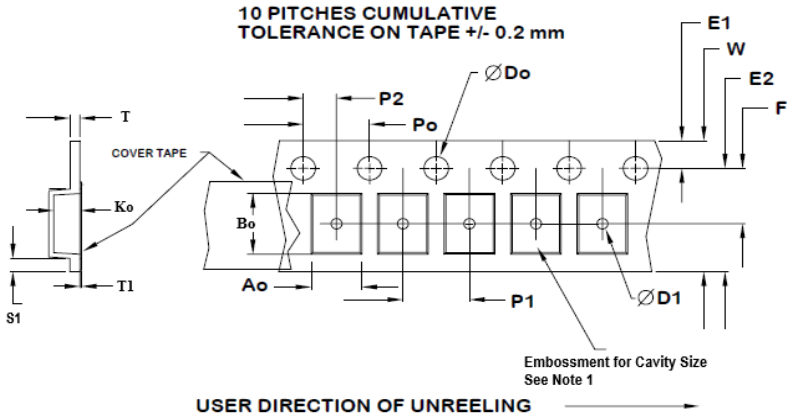


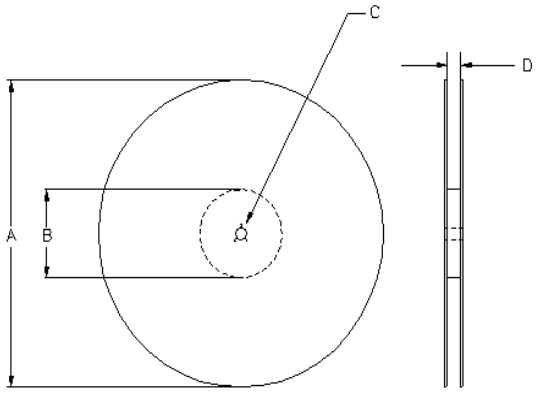
The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time Ts_{min} to Ts_{max}	ts	60 – 180	sec
Soldering above liquidus			
Temperature liquidus	T_L	217	°C
Time above liquidus	t_L	60 – 150	sec
Peak temperature			
Peak Temperature	Tp	260	°C
Time within 5°C of peak temperature	tp	20 – 40	sec

Tape and Reel

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 12mm tape, 8mm pitch.





Tape Variable Dimensions Table 2							
Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
12mm	10.25	5.5 ±0.05	8.0 ±0.1	12.2	3.6±0.1	5.4±0.1	1.4±0.1

Dimensions in mm Drawing Not to scale

Note 1: Embossed cavity to conform to EIA– 481-B

Tape Constant Dimensions Table 1								
Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
12mm	1.5 +0.1 -0.0	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.3	0.1

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	177.8	2.50	63.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0
10	10.0	254.0	4.00	101.6		

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