

CTXXPE3  
3.2 x 2.5 x 1.6 mm  
Leadless Ceramic Package

### Features

- Quartz crystal controlled PLL Based TCXO
- LVPECL Output
- Enable/Disable Function on pad 2
- 2.5V and 3.3V Supply Voltages

### Applications

Driving A/Ds, D/As, FPGAs  
Fibre Channel  
Ethernet, GbE, SynchE  
SONET  
Storage Area Networking  
Broadband  
Telecom  
Smart Grid

### Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range	10		1500	MHz	
Frequency Stability	±2.0	-	±2.5	ppm	Specified by part number; $(f_{max} - f_{min}) / 2$
Operating Temperature Range	-40	-	+85	°C	See Part Number guide for options
Storage Temperature Range	-55		+125	°C	
Supply Voltage <sup>1</sup> VDD	2.375 2.97	2.5 3.3	2.625 3.63	V	TVcc ramp = 100µs min
Supply Current IDD	-	54		mA	
Output Waveform	LVPECL				
Output High Voltage (V <sub>OH</sub> )	VDD - 1.03V	-	VDD - 0.6V	V	
Output Low Voltage (V <sub>OL</sub> )	VDD - 1.85V	-	VDD - 1.6V	V	
Output T <sub>RISE</sub> and T <sub>FALL</sub>			0.5	ns	V <sub>th</sub> is 20% and 80% of V <sub>p-p</sub>
Disable Current		16		mA	When output disabled (pin 2 low)
Startup Time	-	-	10	ms	Time for output to reach specified frequency
Duty Cycle	45	-	55	%	At 50% of V <sub>p-p</sub> or crossing point
V <sub>DISABLE</sub> (VIL)	-	-	0.3*V <sub>CC</sub>	V	Referenced to Ground
V <sub>ENABLE</sub> (VIH)	0.7*V <sub>CC</sub>	-	-		
Phase Noise	100Hz 1kHz 10kHz 100kHz 1MHz 5MHz 20MHz	-	-95 -111 -116 -117 -137 -140 -150	dBc/Hz	25°C ± 2°C, 3.3V, 156.25MHz
Phase Jitter	-	1	-	ps rms	12 kHz to 20 MHz from the output frequency; F <sub>o</sub> ≥ 40MHz
Aging	-	-	±1.0	ppm	Per year, +25°C ± 2°C

### Part Number

**Example: CTXXPE3LZLD-100.0**

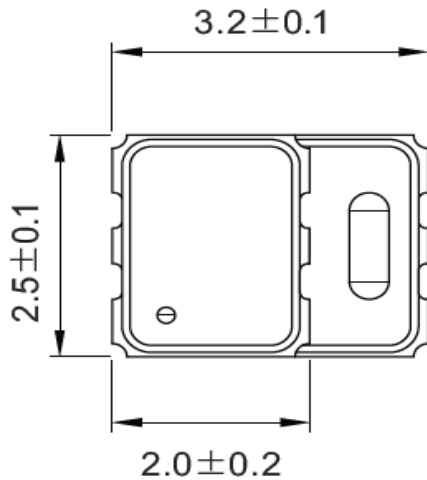
Series Model	Output	Package Size	Supply Voltage	Packaging	Operating Temperature Range	Frequency Stability	Frequency (MHz)
CTXXP	E	3	L	Z	L	D	100.0
	E = LVPECL	3 = 3.2 x 2.5mm	S = 2.5V L = 3.3V	Blank = Tape only Z = Tape/Reel	C = -20 to +70°C H = -30 to +75°C D = -30 to +85°C L = -40 to +85°C	C = ±2.0 ppm D = ±2.5 ppm	

Notes: Specifications with Pad 1 E/D open circuit

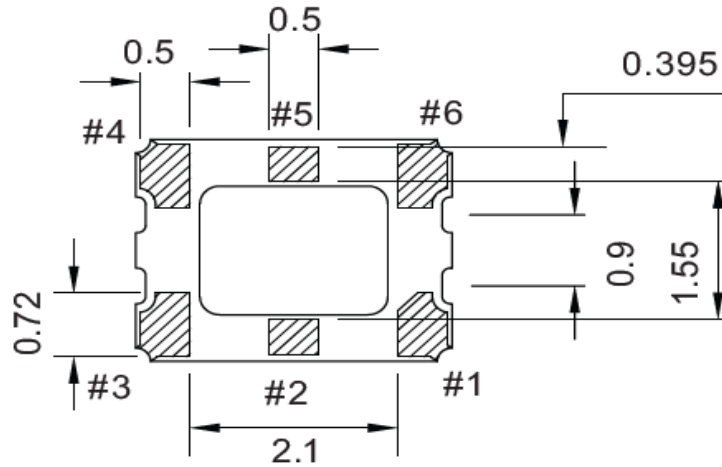
<sup>1</sup> Place an appropriate power supply bypass capacitor next to device for correct operation

### Mechanical Dimensions (mm)

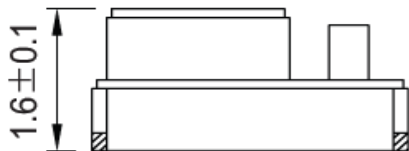
[ TOP VIEW ]



[ BOTTOM VIEW ]



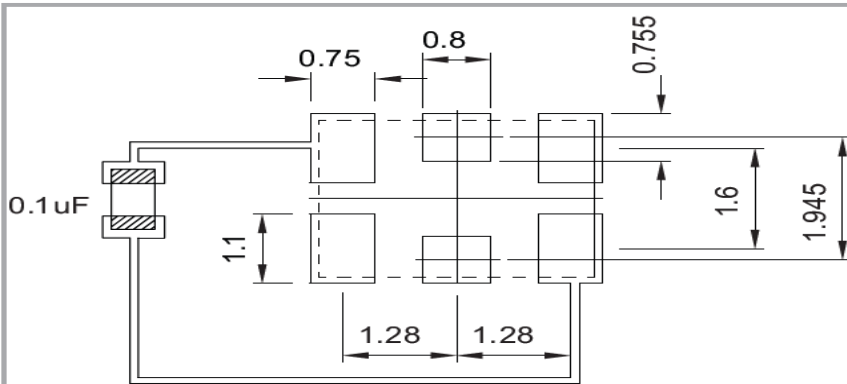
[ SIDE VIEW ]



Type Pad	Differential Function
1	No Connection
2	Tri-State
3	GND
4	Output
5	Comp. Output
6	VDD

Enable/Disable	
Pin 2	Output
Open	Active
Logic '1'	Active
Ground	Tri-state

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.

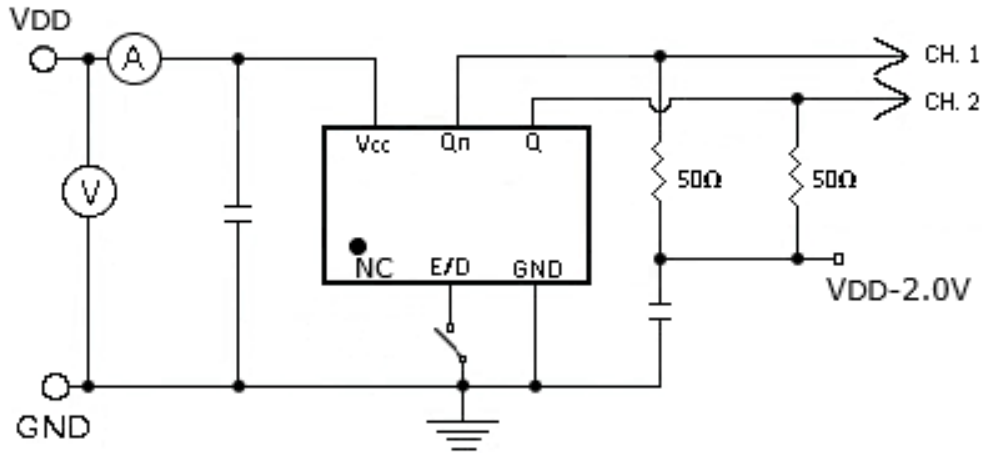
Pad Layout mm shown

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

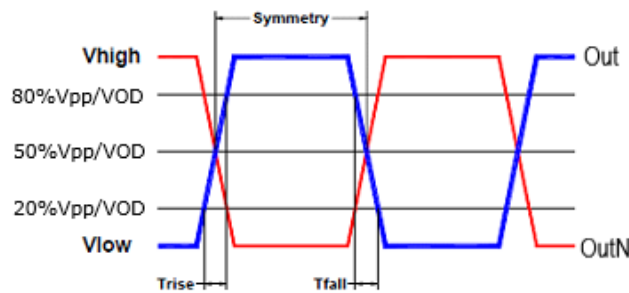
For Optimum Jitter Performance, Cardinal recommends:

- 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



Test Waveform



### Environmental

Reliability: Environmental Test

Parameter	Reference Standard	Test Condition
Vibration	MIL-STD-883 2007 Condition A	10-2000Hz, 1.52mm, 20g, each axis for 4hrs
Thermal Shock	MIL-STD-883 1010 Condition B	-55°C, 125°C, soak time is 10 mins, with total 200 cycles
Mechanical Shock	MIL-STD-883 2002 Condition B	1500g, half-sine, 0.5ms, each axis for 3 times

#### Absolute Maximum Ratings

Parameter	Unit
V <sub>cc</sub> Supply Voltage	-0.5V to +4.2V
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
Max Junction Temperature	125°C

#### ESD Rating

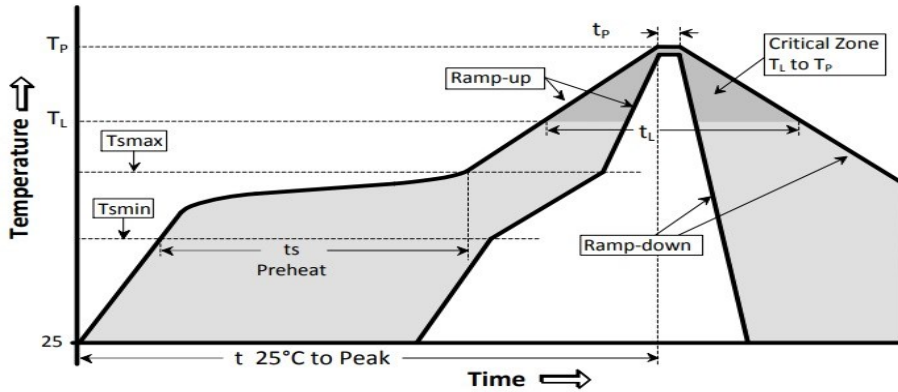
Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Charged Device Model	1000V	JESD22-C101
Machine Model	120V	JESD22-A115

Cardinal Components certifies this device is in accordance with the RoHS and REACH directives.

Cardinal Components guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
 Weight of the Device: 0.029 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"

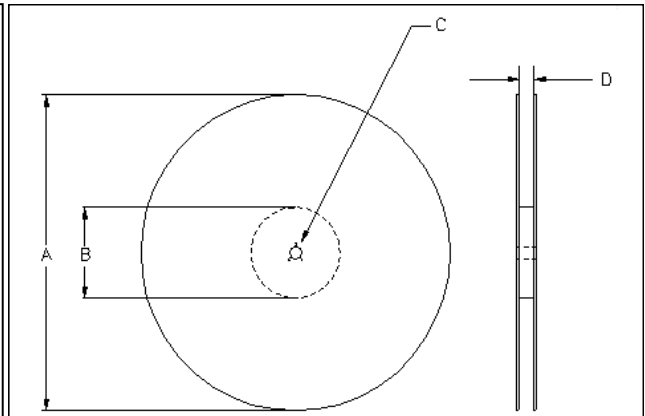
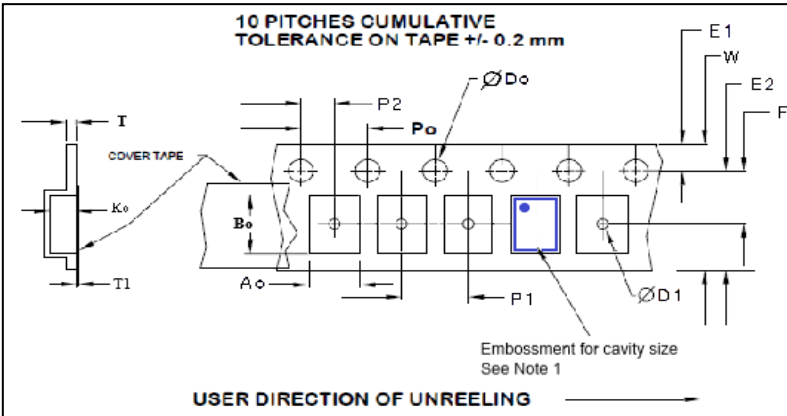


The part may be reflowed 2 times without degradation (typical for lead free processing).

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

## Tape and Reel

Tape and Reel available for quantities of 250 to 3000 per reel, cut tape for < 250. 12mm tape, 4mm pitch.



Tape Variable Dimensions Table 2

Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
12mm	10.25	5.5 ± 0.05	4.0 ± 0.1	12.2	2.9 ± 0.1	3.6 ± 0.1	1.7 ± 0.1

Reel Dimensions (may vary) Table 3

Reel Size	A		B		C	D
	Inches	mm	Inches	mm	mm	mm
7	7.0	180	2.50	60	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0

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 typ	E1	Po	P2	T max	T1 max
12mm	1.5 +0.1 -0.0	1.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.1	0.3	0.1

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