

CX532
5.0 x 3.2 x 0.8 mm
Ceramic Package

Features

- Miniature low profile 2 pad surface mount crystal.
- Package is ideal for automated surface mount assembly and reflow practices.
- Tape and Reel Packaging.
- AT Cut Crystal
- 8 MHz to 80 MHz

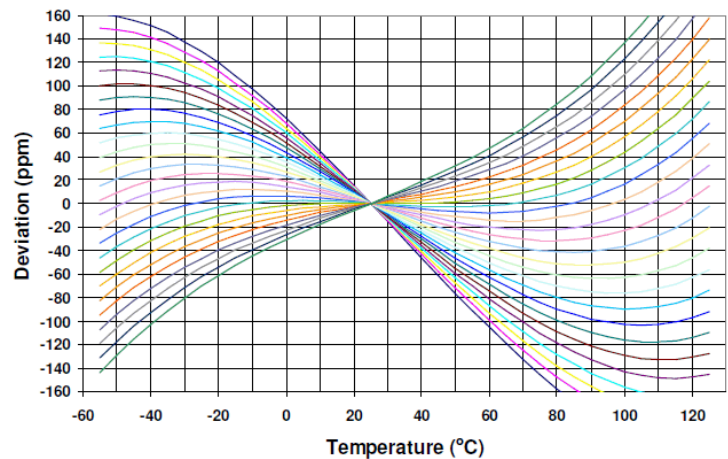
Applications

Bluetooth
WLAN
IoT

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition (Consult factory for other options)
Frequency Range	8.0	-	80	MHz	
Calibration Frequency Tolerance	±10	-	±100	ppm	at +25°C ± 3°C, see part number guide below for available options
Frequency Stability	±10	-	±100	ppm	see part number guide below for available options
Operating Temperature Range	-40	-	+85	°C	see part number guide below for available options
Storage Temperature Range	-55	-	+125	°C	
Equivalent Series Resistance (ESR)	-	-	100 65 60 55 50 45 40 60	Ω	8 MHz ≤ Freq < 11 MHz 11 MHz ≤ Freq < 12 MHz 12 MHz ≤ Freq ≤ 13 MHz 13 MHz < Freq ≤ 16 MHz 16 MHz ≤ Freq < 24 MHz 24 MHz ≤ Freq < 48 MHz 48 MHz ≤ Freq ≤ 53.125 MHz Freq = 80MHz
Drive Level	-	-	100	μW	Use 10μW for testing
Shunt Capacitance (C0)	-	-	5.0	pF	Pad to Pad Capacitance
Aging at 25°C ± 3°C	-	-	±5	ppm	for the first year
	-	-	±2	ppm	after the first year

AT Cut Crystal Frequency versus Temperature Typical Performance:



Part Numbering (Example: CX532Z-A1B3C2-45-25.0D18)

Series Model	Packaging	Operating Temperature Range	Frequency Stability (ppm)	Frequency Tolerance (ppm)	ESR	Frequency (MHz)	Load Capacitance Standards below, others available	Overtone
CX532	Z	A1	B3	C2	45	25	D18	
	Blank=Tape Only Z = Tape/Reel	A0 = -10 ~ +60°C A4 = 0 ~ +70°C A1 = -10 ~ +70°C A5 = -20 ~ +70°C A2 = -40 ~ +85°C	B1 = ±100 B2 = ±50 B3 = ±30 B9 = ±20 B6 = ±15 B4 = ±10	C1 = ±100 C2 = ±50 C3 = ±30 C7 = ±25 C5 = ±20 C8 = ±15 C4 = ±10	See ESR in Table		8pF = D8 10pF = D10 12pF = D12 16pF = D16 18pF = D18 20pF = D20 Series = DS	Blank=Fund 3=3rd OT

Available Frequency Stability versus Temperature in ppm

		B4	B6	B9	BR	B3	B2	B1
		±10	±15	±20	±25	±30	±50	±100
0 to +70°C	A4	•	•	•	•	•	•	•
-10 to +60°C	A0	•	•	•	•	•	•	•
-10 to +70°C	A1	•	•	•	•	•	•	•
-20 to +70°C	A5	•	•	•	•	•	•	•
-40 to +85°C	A2			•	•	•	•	•

• = Available Note: Not every combination of frequency/tolerance/stability/load capacitance may be available

Reliability

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

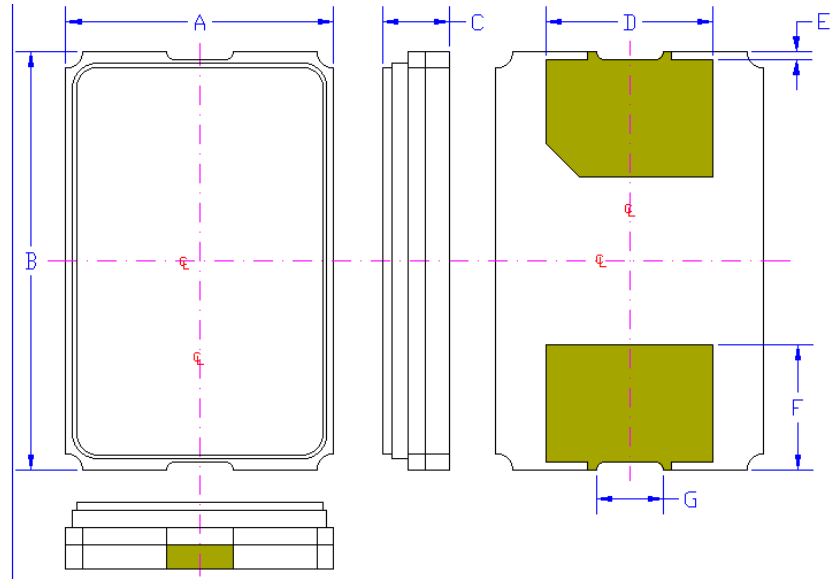
Cardinal Components Inc. certifies this device is in accordance with the RoHS and REACH directives.

Cardinal guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
 Weight of the Device: 0.042 grams
 Moisture Sensitivity Level: 1 As defined in J-STD-020D
 Second Level Interconnect code: e4

Mechanical Dimensions

	Inches	mm
A	0.126 ± 0.006	3.2 ± 0.15
B	0.197 ± 0.006	5.0 ± 0.15
C	0.039 max	1.0 max
D	0.079 ± 0.008	2.0 ± 0.2
E¹	0.004	0.1
F	0.055 ± 0.008	1.5 ± 0.2
G¹	0.031	0.8

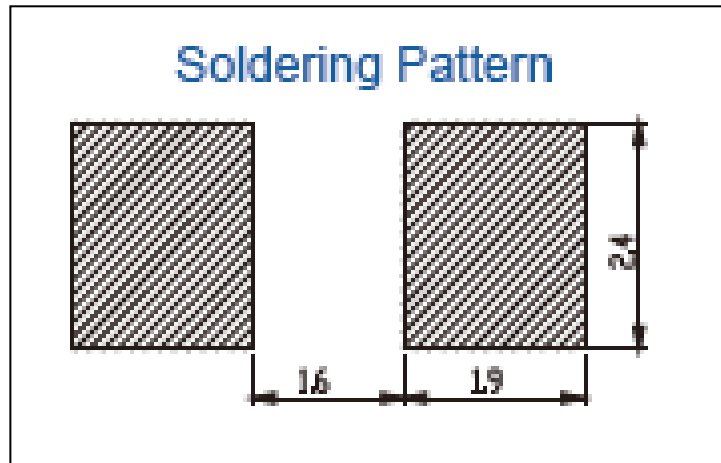
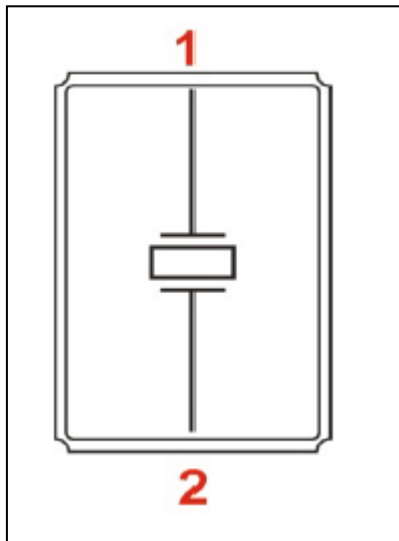
¹ Typical dimensions



Contacts (pads): Gold (0.3 to 1µm) over Nickel (1.27 to 8.89 µm)

The crystal is symmetrical, there is no Pad 1 preference. The part can be rotated 180° when being assembled on the PCB and will still perform correctly.

Layout



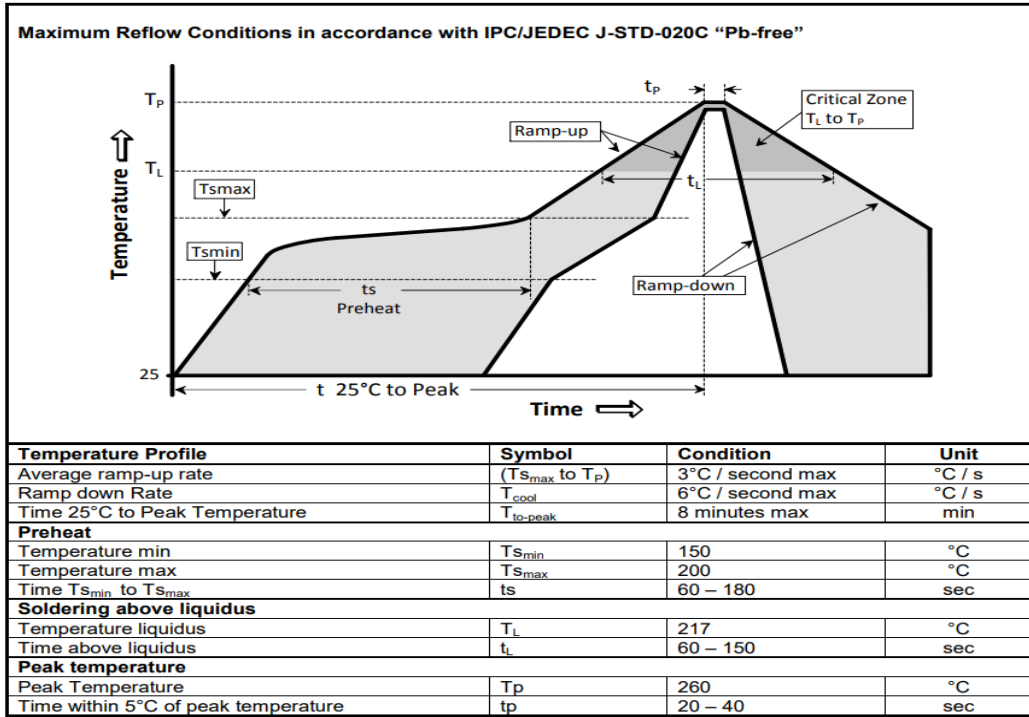
Pad Layout

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

For Optimum Jitter Performance, Cardinal recommends:

- Trace lengths to the crystal should be kept as short as possible.
- The crystal connections are sensitive to noise.
- These very small crystals have high ESR, the oscillator start-up and operation should take this into consideration.
- These small crystals should have their maximum drive level limited to 100 µW.

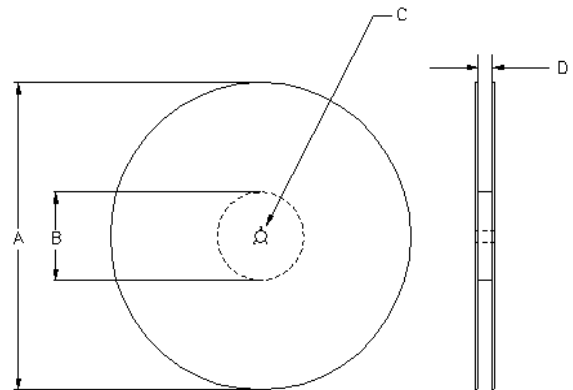
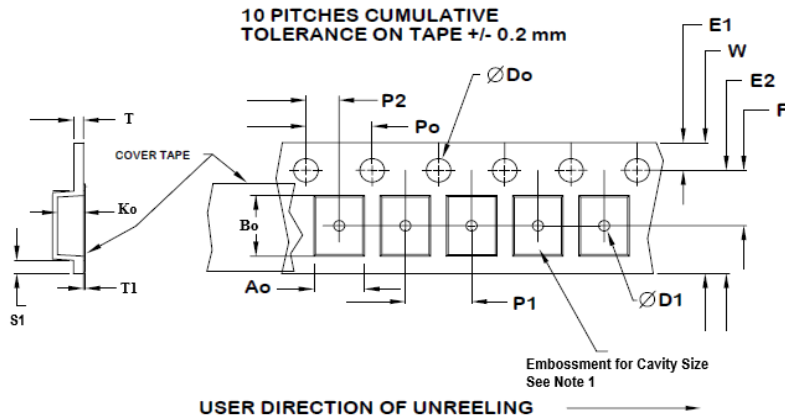
Reflow Cycle



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

Tape and Reel

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



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

Reel Size	A		B		C	D
	Inches	mm	Inches	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		
13	13.0	330.2	3.75	95.3		



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