

CX252
2.5 x 2.0 x 0.55 mm
Ceramic Package

Features

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

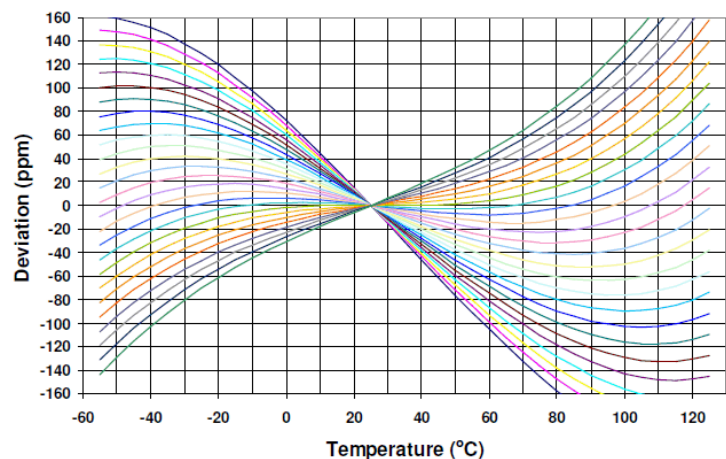
Applications

Bluetooth
WLAN
IoT
Wearables

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition (Consult factory for other options)
Frequency Range	12	-	80	MHz	
Calibration Frequency Tolerance	±10	-	±50	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	-	+125	°C	see part number guide below for available options
Storage Temperature Range	-55	-	+125	°C	
Equivalent Series Resistance (ESR)	-	-	180 80 70 50	Ω	12 MHz ≤ Freq < 16 MHz 16 MHz ≤ Freq < 21 MHz 21 MHz ≤ Freq < 31 MHz 31 MHz ≤ Freq ≤ 80 MHz
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: CX252Z-A1B2C3-70-25.0D8)

Series Model	Packaging		Operating Temperature (°C)	Frequency Stability (ppm)	Frequency Calibration Tolerance (ppm)		ESR (Ω)		Frequency (MHz)	Load Capacitance
CX252	Z	-	A1	B2	C3	-	70	-	25.0	D8
	Z = Tape/Reel Blank = Tape Only		A4 = 0 to +70 A1 = -10 to +70 A5 = -20 to +70 AU = -20 to +75 AQ = -30 to +85 A2 = -40 to +85	B2 = ±50 B3 = ±30 BR = ±25 B9 = ±20 B6 = ±15 B4 = ±10	C2 = ±50 C3 = ±30 C7 = ±25 C5 = ±20 C8 = ±15 C4 = ±10		See ESR Table			D6 = 6 pF D8 = 8 pF D10 = 10 pF D12 = 12 pF D16 = 16 pF DS = Series Standard loads, others available, check with sales with your requirement

Frequency Stability versus Temperature in ppm

		B4	B6	B9	BR	B3	B2
		±10	±15	±20	±25	±30	±50
0 to +70°C	A4	•	•	•	•	•	•
-10 to +70°C	A1	•	•	•	•	•	•
-20 to +70°C	A5	•	•	•	•	•	•
-20 to +75°C	AU	•	•	•	•	•	•
-30 to +85°C	AQ		△	•	•	•	•
-40 to +85°C	A2		△	•	•	•	•

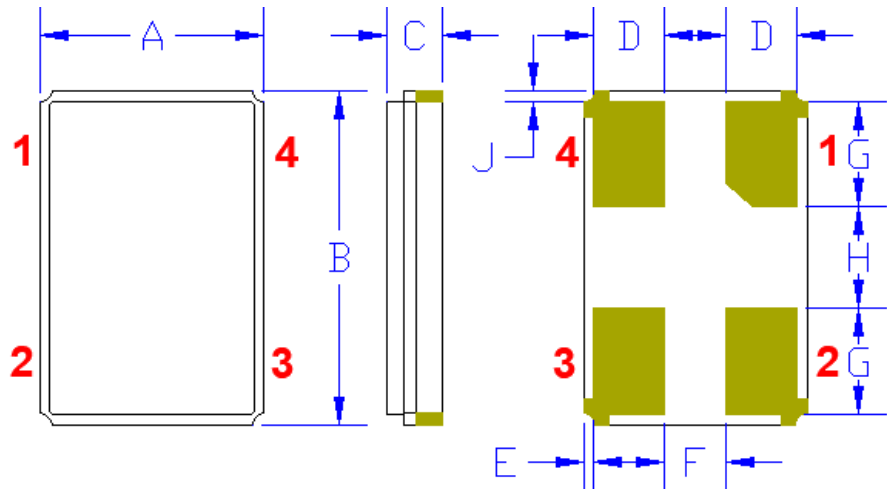
• = Available

△ = Check with Cardinal

Mechanical Dimensions

	Inches	mm
A	0.078 ± 0.004	2.0 ± 0.1
B	0.098 ± 0.004	2.5 ± 0.1
C	0.021 ± 0.004	0.55 ± 0.1
D ¹	0.022	0.55
E ¹	0.004	0.1
F ¹	0.028	0.7
G ¹	0.028	0.7
H ¹	0.035	0.9
J ¹	0.004	0.1

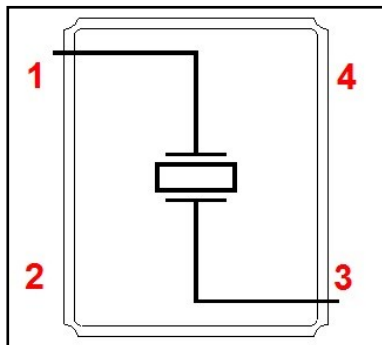
¹ Typical dimensions



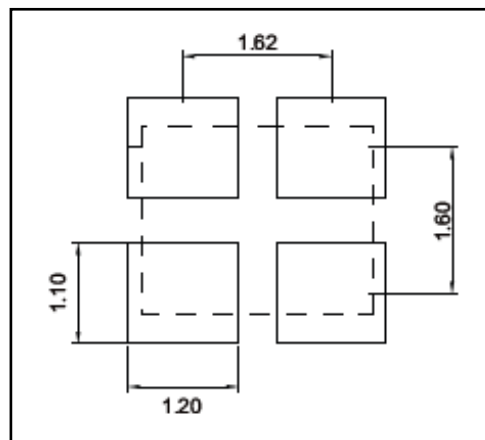
Contacts (pads): Gold (0.3 to 1µm) over Nickel (1.27 to 8.89 µm)

The chamfered pad may or may not be present and may be on any pad.

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

Pad Connections and Solder Layout


Pad	Note
2 + 4	Connected to the metal cover


Pad Layout (mm)

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

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

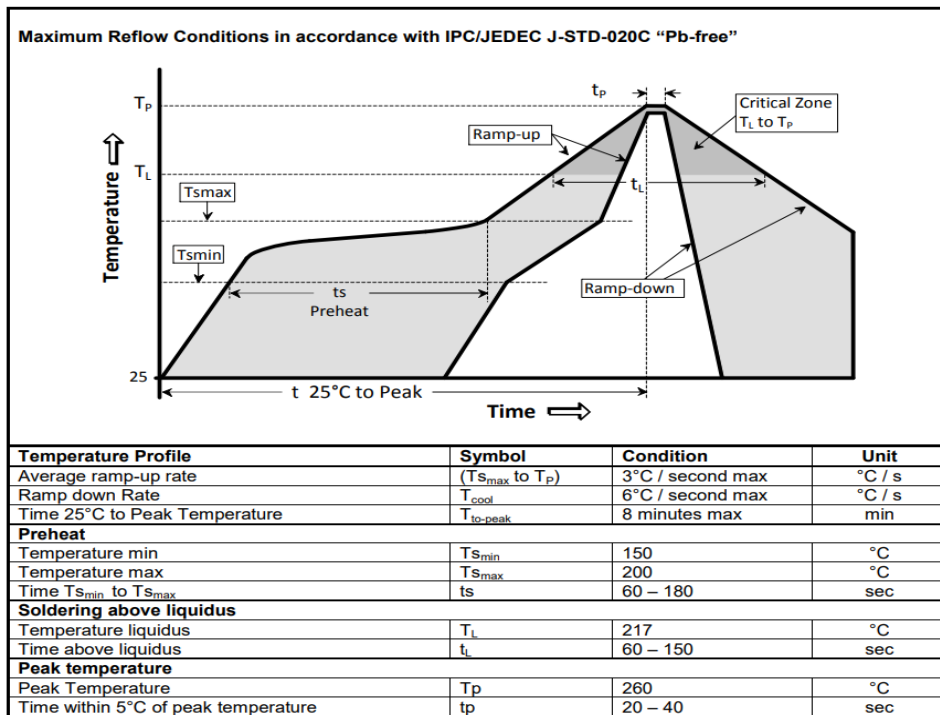
Cardinal Components Inc. certifies this device is in accordance with the RoHS and REACH directives.

Cardinal. guarantees the device does not contain the following:
Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.009 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

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.
- The package should be grounded for optimum performance, pad 2 or 4 connected to ground.
- 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.

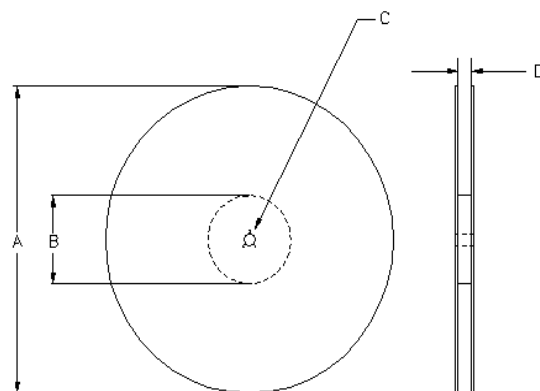
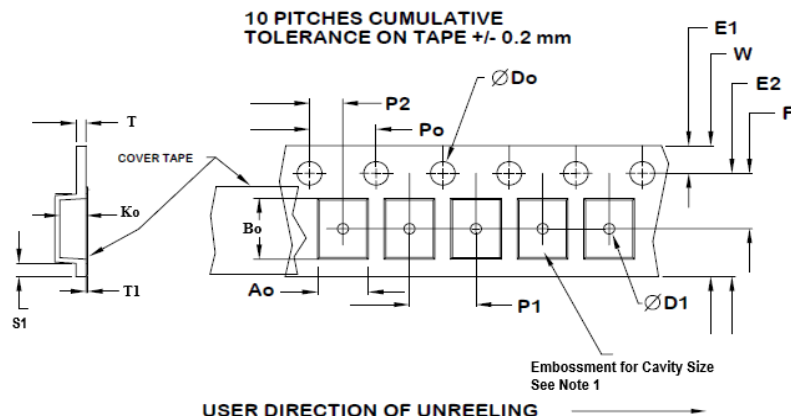
Reflow Cycle



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 3000 per reel, cut tape for < 1000. 8mm tape, 4mm pitch.



Tape Variable Dimensions Table 2

Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
8mm	6.25	3.5 ±0.05	4.0 ±0.1	8.2	2.25±0.1	2.75±0.1	1.15±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
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.6	0.25	0.1

Reel Dimensions (may vary) Table 3

	A	B	C	D
Reel Size	Inches	mm	Inches	mm
7	7.0	177.8	2.50	63.5

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