



CPS  
3.2 x 1.5 x 0.9 mm  
Ceramic Package

### Features

- Miniature low profile surface mount watch crystal.
- Package is ideal for automated surface mount assembly and reflow practices.
- Tape and Reel Packaging.
- 32.768 kHz

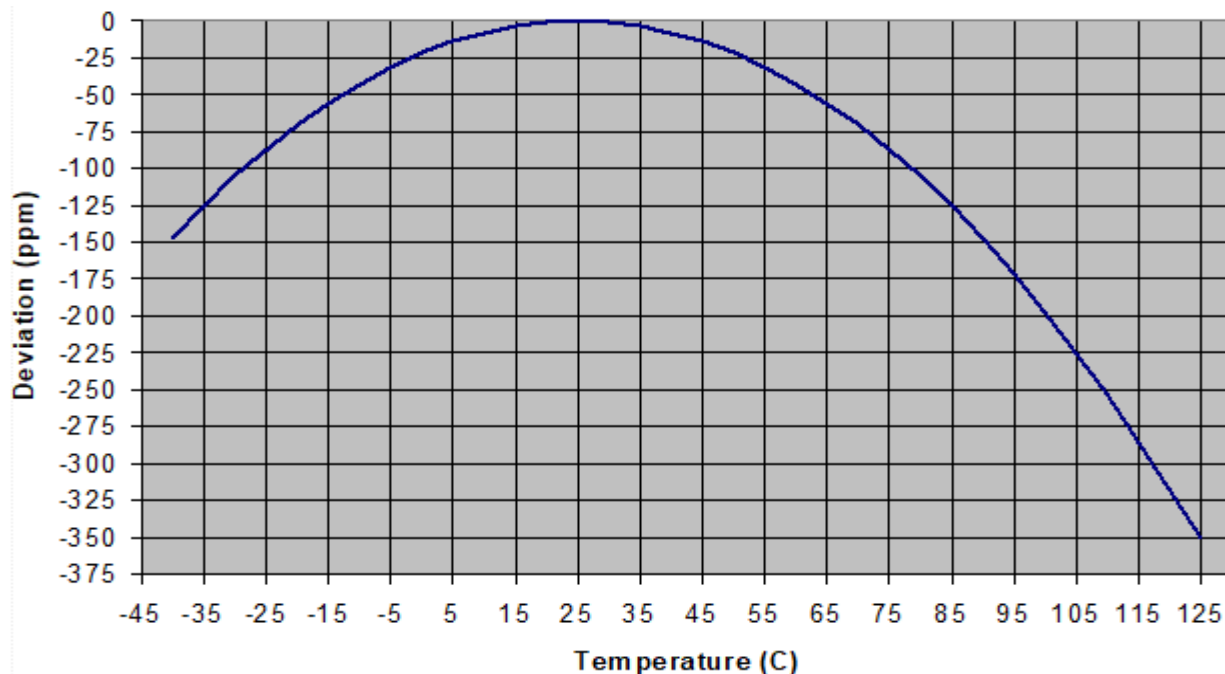
### Applications

RTC

### Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition (Consult factory for other options)
Frequency Range	-	32.768	-	kHz	
Calibration Frequency Tolerance	-	-	±20	ppm	Standard at 25°C ± 3°C.
Frequency Stability	-0.028	-0.034	-0.04	ppm/Δ°C <sup>2</sup>	
Turnover Temperature	20	25	30	°C	
Operating Temperature Range	-40	-	+85	°C	
Storage Temperature Range	-55	-	+125	°C	
Equivalent Series Resistance (ESR)	-	-	70	kΩ	
Drive Level	-	-	1	μW	
Q Factor	30000	-	-		
Shunt Capacitance (C0)	-	1.2	-	pF	Pad to Pad Capacitance
Motional Capacitance (C1)	-	3.7	-	fF	
Insulation Resistance	500	-	-	MΩ	@100VDC
Aging at 25°C ± 3°C	-	-	±3	ppm	for the first year at +25°C ± 3°C

### Frequency versus Temperature - Typical Performance





### Part Numbering (Example: CPSZ-A2C570-32.768D12.5)

Series Model	Packaging		Operating Temperature	Frequency Calibration Tolerance	Equivalent Series Resistance (ESR in k $\Omega$ )		Frequency (kHz)	Load Capacitance (CL)
CPS	Z	-	A2	C5	70	-	32.768	D12.5
	Z=Tape/Reel		A2 = -40 to +85°C	C5 = $\pm 20$ ppm				D12.5 = 12.5pF D9 = 9pF D7 = 7pF D6 = 6pF

### Device Marking

1. Marking consists of a manufacturing date code
2. Orientation of marking may be mixed on the tape
3. Traceability of part's specification is lost once removed from reel

### Reliability

Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A

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

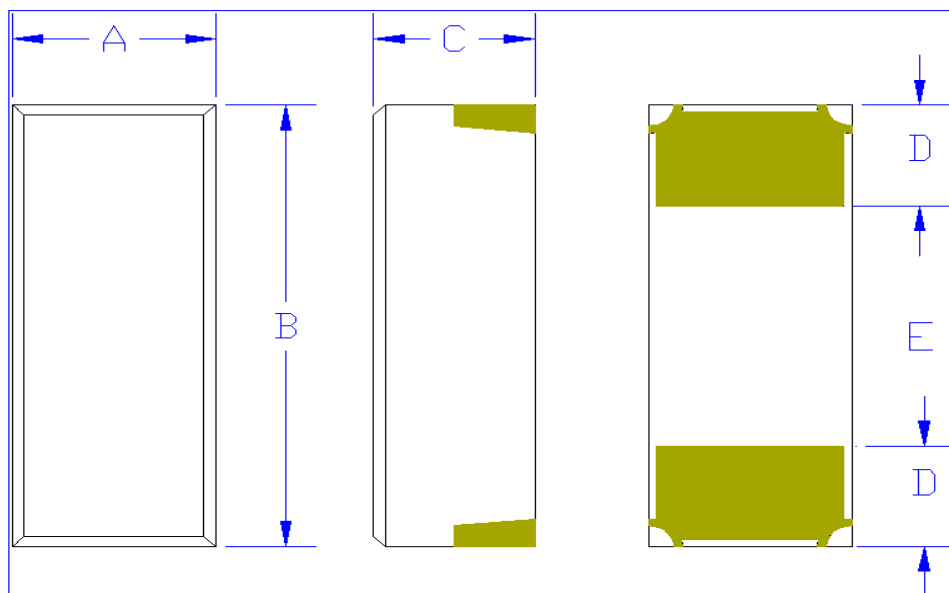
Cardinal guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
Weight of the Device: 0.011 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020D  
Second Level Interconnect code: e4



### Mechanical Dimensions

	mm
A	$1.5 \pm 0.1$
B	$3.2 \pm 0.1$
C	1.0 max
D <sup>1</sup>	0.75
E <sup>1</sup>	1.7

<sup>1</sup> Typical dimensions



(Not to Scale)

**Contacts (pads):** Gold 11.8 to 39.4  $\mu$ inches (0.3 to 1  $\mu$ m) over Nickel 50 to 350  $\mu$ inches (1.27 to 8.89  $\mu$ m)

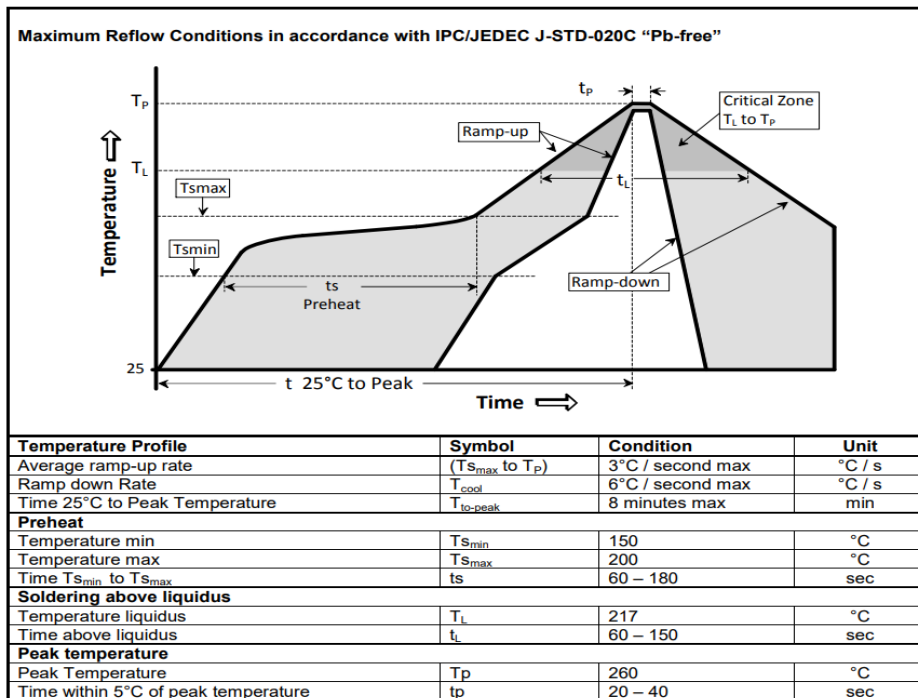
**The chamfered pad may or may not be present and may be on either pad.**

The crystal is symmetrical. The part can be rotated 180° when being assembled on the PCB and will still perform correctly.

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.

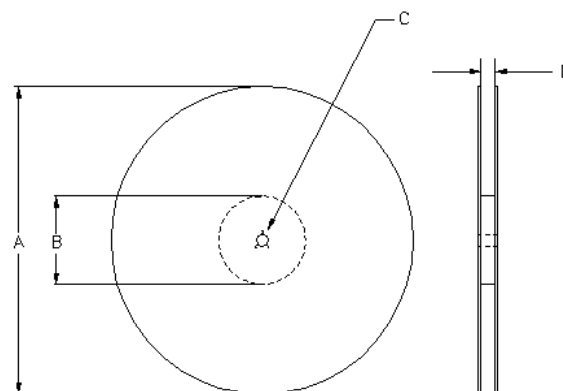
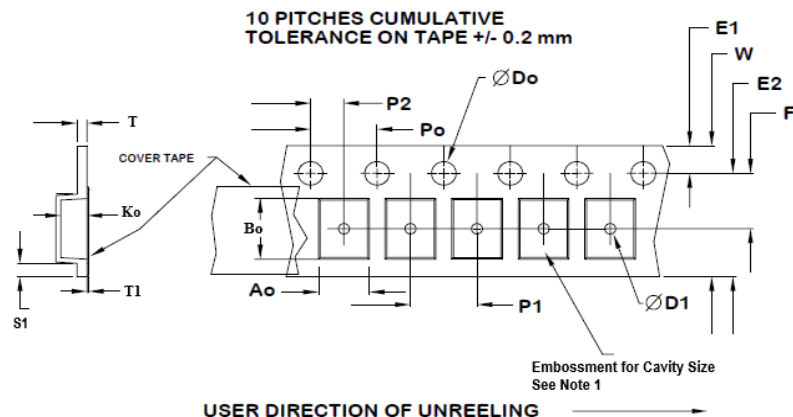
## Reflow Cycle



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. 12mm tape, 4mm



Tape Dimensions Table 1							
Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
12mm	10.25	5.5 ±0.05	4.0 ±0.1	12.2	3.4	1.7	1.2

Dimensions in mm Drawing Not to scale

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

Tape Dimensions Table 2								
Tape Size	Do	D1	E1	Po	P2	S1 min	T max	T1 max
12mm	1.5 +0.1 -0.0	1.0	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	180	2.30	60	13.0 +0.5 -0.2	Tape size +2.0 -0.0

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