CARDINAL COMPONENTS

CP1610
Miniature SMD Watch Crystal

CP1610
1.6 x 1.0 x 0.5 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

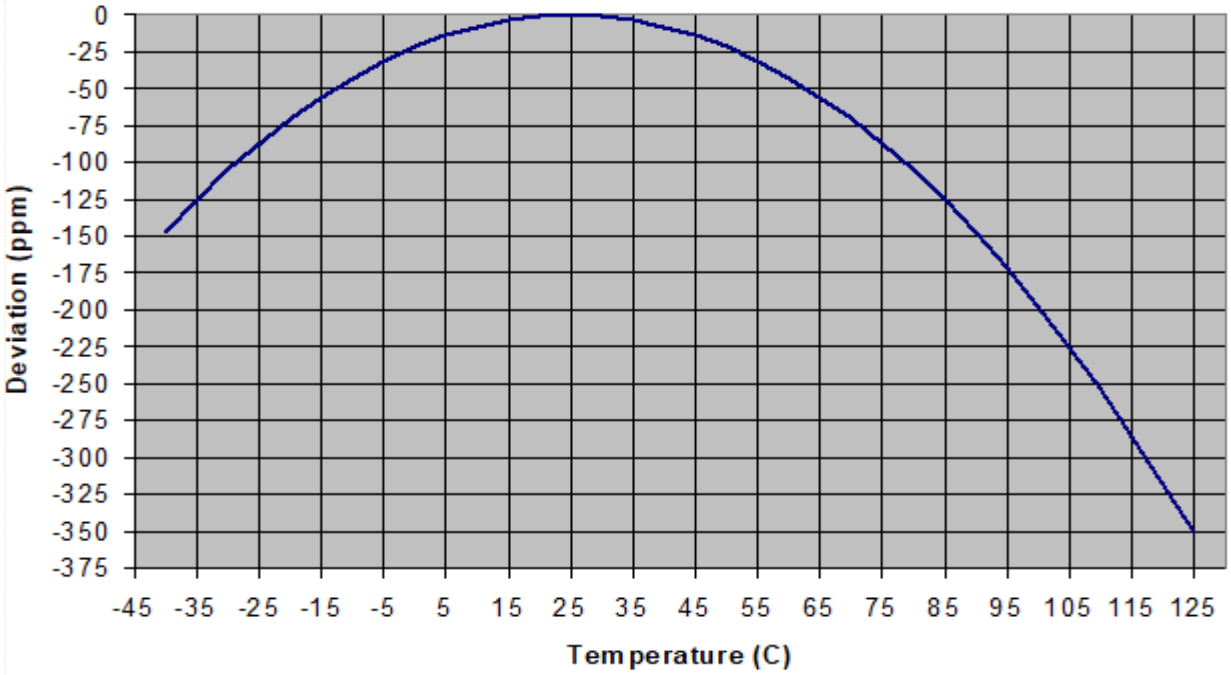
Applications

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	-0.032	-0.036	-0.040	ppm/Δ°C^2	
Turnover Temperature	20	25	30	°C	
Operating Temperature Range	-40	-	+85	°C	
Storage Temperature Range	-55	-	+125	°C	
Equivalent Series Resistance (ESR)	-	-	90	kΩ	
Drive Level	-	0.1	0.5	µW	
Q Factor	30000	-	-		
Shunt Capacitance (C0)	-	1.2	-	pF	Pad to Pad Capacitance
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: CP1610Z-A2C590-32.768D12.5)

Series Model	Packaging		Operating Temperature	Frequency Calibration Tolerance	Equivalent Series Resistance (ESR in kΩ)		Frequency (kHz)	Load Capacitance (CL)
CP1610	Z	-	A2	C5	90	-	32.768	D12.5
	Z=Tape/Reel		A2 = -40 to +85°C	C5 = ±20 ppm				D12.5 = 12.5pF D9 = 9pF D7 = 7pF D6 = 6pF

Device Marking

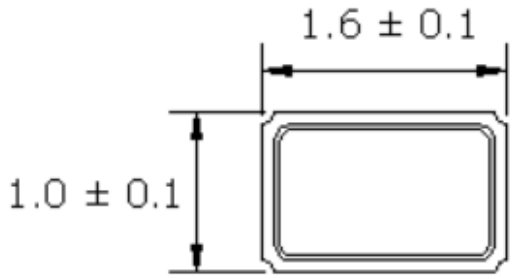
1.Marking consists of a manufacturing date code
2.Orientation of marking may be mixed on the tape
3.Traceability of part's specification is lost once removed from reel

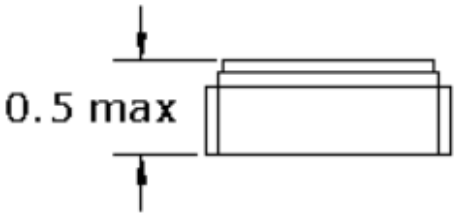
Reliability

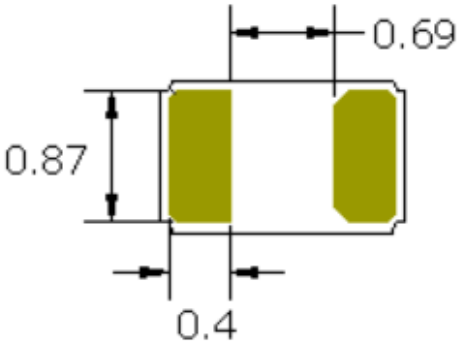
Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A

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: 0.004 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

Mechanical Dimensions

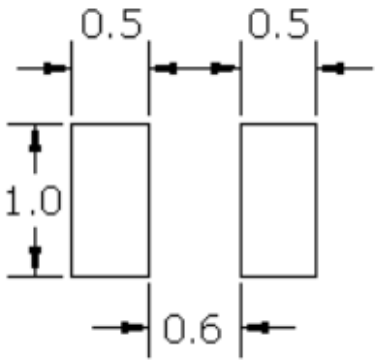






Dimensions in mm

Solder Pad Layout



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

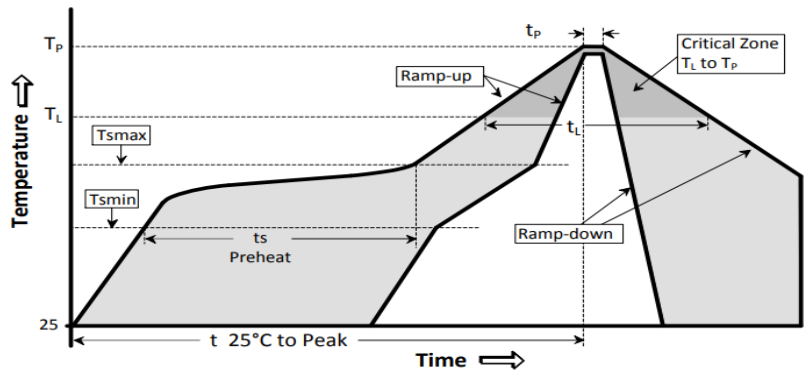
Contacts (pads): Gold (0.3 to 1µm) over Nickel (1.27 to 8.89 µm)

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

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

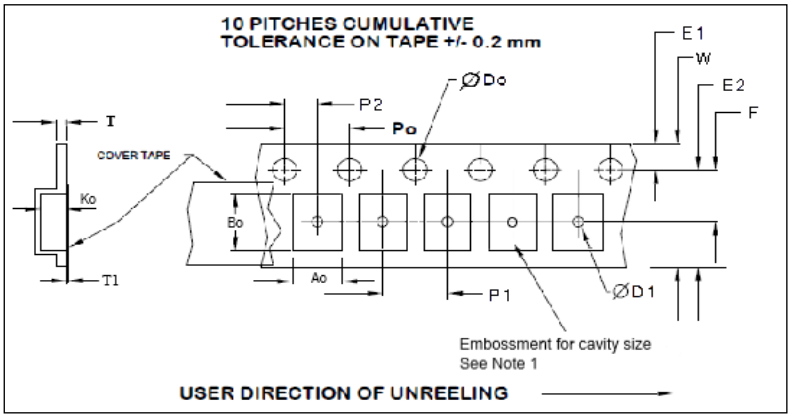


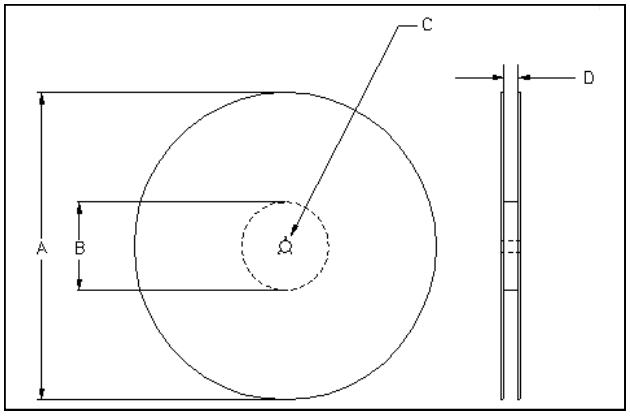
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time 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

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 Dimensions Table 1							
Tape Size	E2 typ	F	P1	W	Ao	Bo	Ko
8mm	6.25	3.5 ±0.05	4.0 ±0.1	8.2	1.2 ± 0.05	1.8 ± 0.05	0.6 ± 0.05

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	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	0.3	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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