



PLETRONICS SM8S-AEC Series Automotive RTC Crystal



SM8S-AEC
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

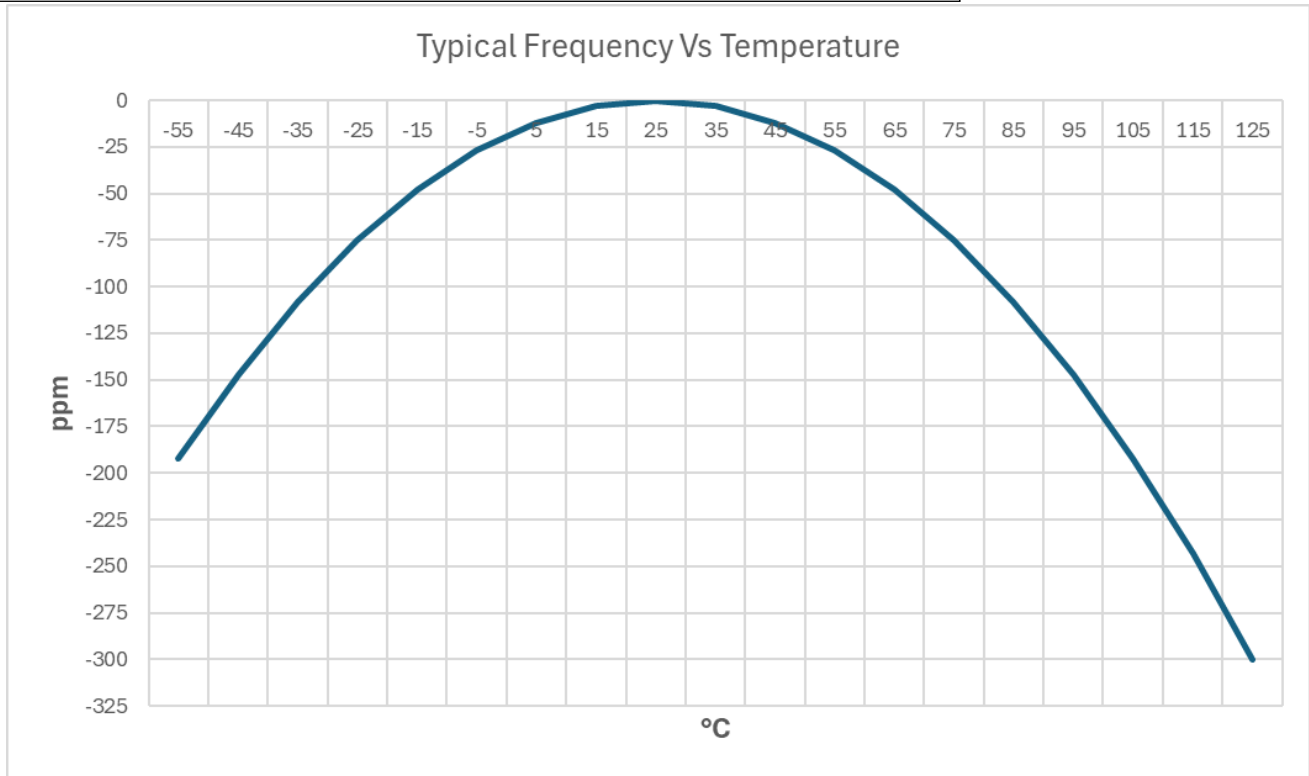
Applications

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. See page 2 for all options
Frequency Stability	-0.027	-0.03	-0.033	ppm/Δ°C ²	
Turnover Temperature	20	25	30	°C	
Operating Temperature Range	-55	-	+125	°C	
Storage Temperature Range	-55	-	+125	°C	
Equivalent Series Resistance (ESR)	-	-	70	kΩ	At 25°C
Drive Level	-	0.1	1	μW	
Q Factor	30000	-	-		
Shunt Capacitance (C0)	-	1.0	-	pF	Pad to Pad Capacitance
Insulation Resistance	500	-	-	MΩ	@100VDC
Aging at 25°C ± 3°C	-	-	±3	ppm	for the first year

Frequency versus Temperature - Typical Performance





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Part Numbering

Series Model	Load Capacitance (C _L) in pF	Frequency in kHz	Frequency Calibration Tolerance	Automotive Grade
SM8S	-9	-32.768K	-20	-AEC
	Blank = 12.5 pF 9 = 9 pF 7 = 7 pF 6 = 6 pF		20 = ± 20 ppm Contact PLE for other options	

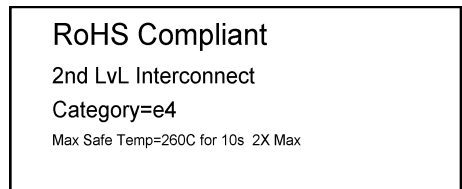
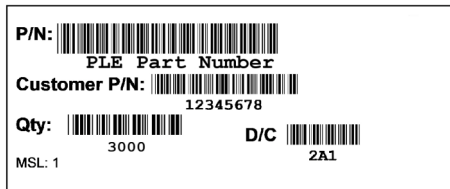
Device Marking

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

Package Labeling

P/N Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII

RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial



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

Pletronics Inc. 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

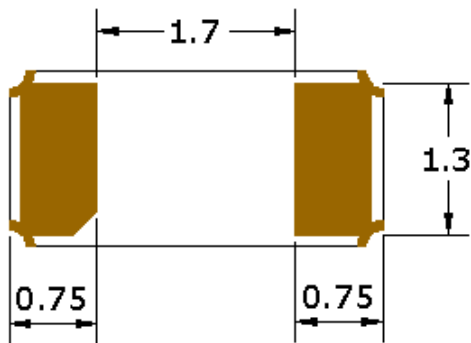
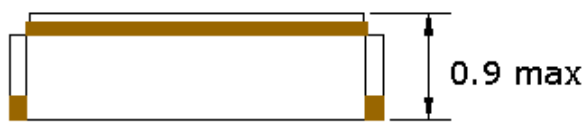
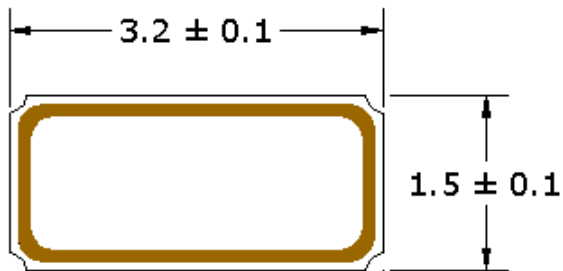
Reliability

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



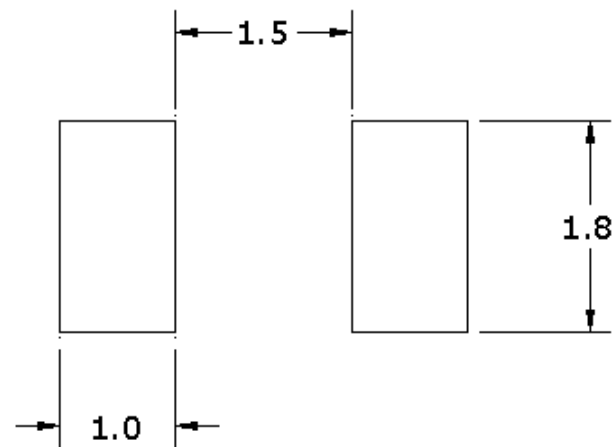
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Mechanical Dimensions/Solder Pad Layout



Dimensions in mm

Suggested Solder Pad layout



Pad Layout

Disclaimer: Suggested 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)

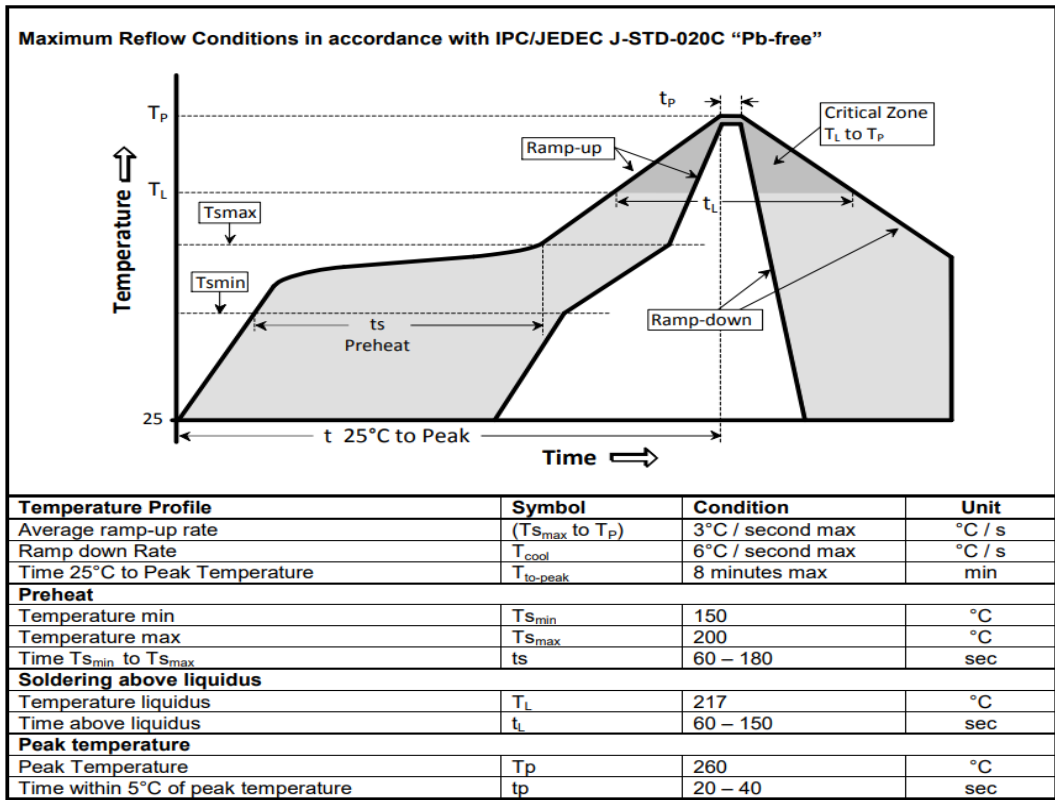
For Optimum Performance, Pletronics recommends:

- 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.
- No traces to be run under the crystal



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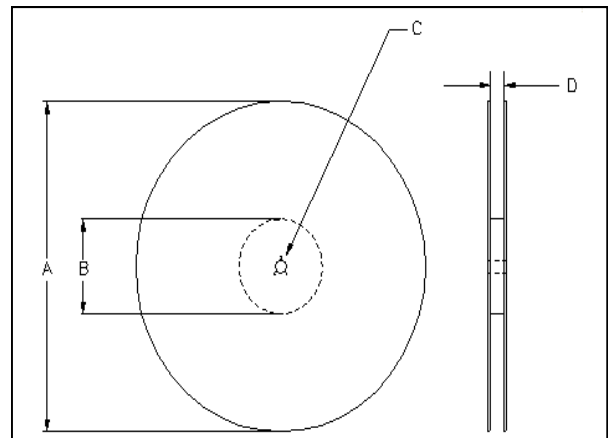
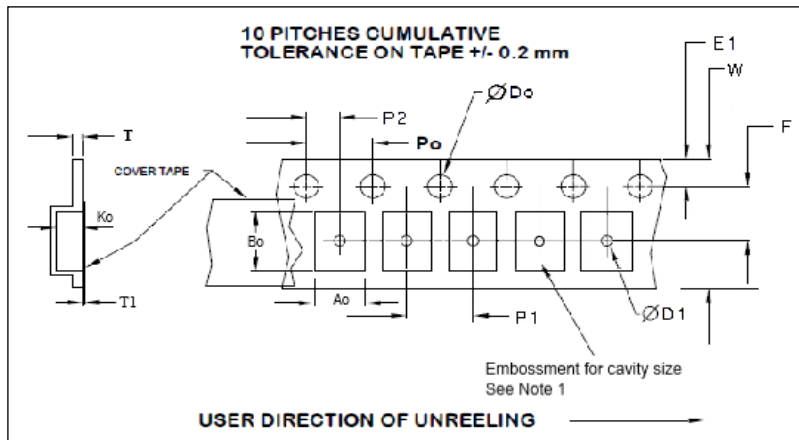
Reflow Cycle



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

Tape and Reel

Tape and Reel standard quantity = 3000 per reel. 12mm tape, 4mm pitch.



Tape Size	F	P1	W max	Ao	Bo	Ko	Do	D1	E1	Po	P2	T	T1
12mm	5.5 ±0.1	4.0 ±0.1	12.3	1.7	3.4	1.2	1.5 +1.0 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.3	0.1

Dimensions in mm

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



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