PLETRONICS SM8S Series
Miniature SMD Crystal

SM8S
3.2 x 1.5 x 1.0 mm
Ceramic Package

Features

- Pletronics' SM8S Series is a 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

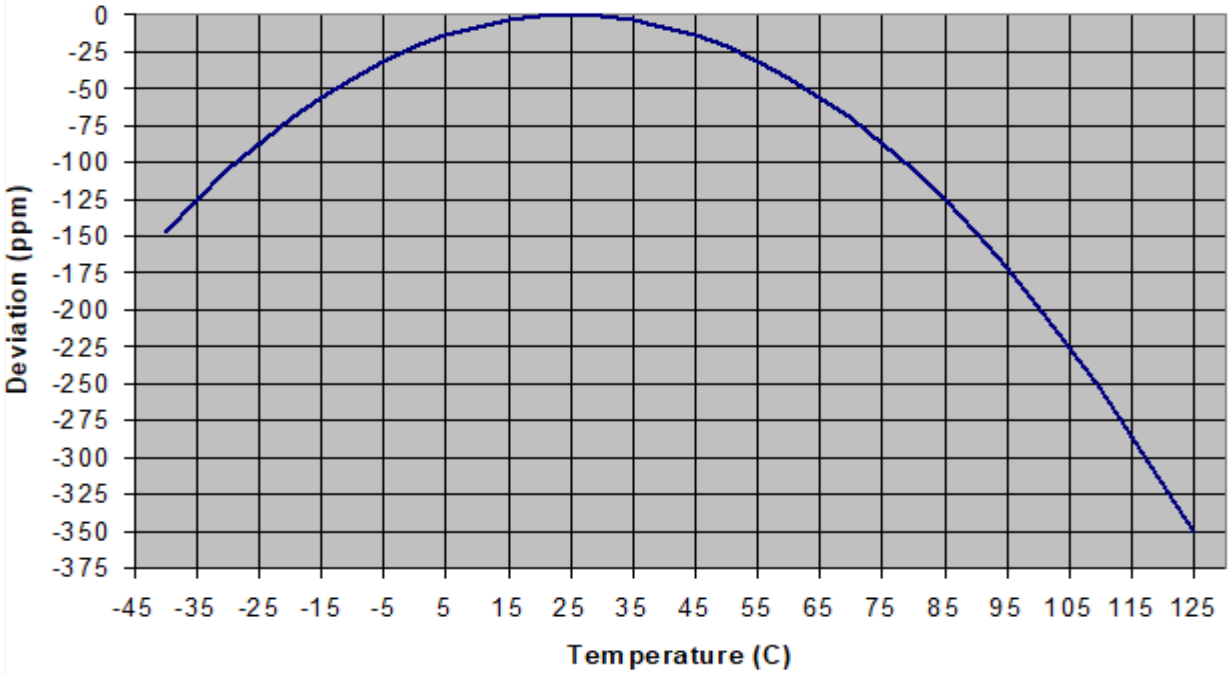
Applications

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	-0.028	-0.034	-0.04	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)	-	-	70	kΩ	At 25°C
Drive Level	-	-	1	µW	
Q Factor	30000	-	-		
Shunt Capacitance (C0)	-	1.7	-	pF	Pad to Pad Capacitance
Motional Capacitance (C1)	-	2.9	-	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

Series Model	Load Capacitance (CLoad) in pF	Frequency in kHz	Frequency Calibration Tolerance
SM8S	-9	-32.768k	-20
	Blank = 12.5pF 9 = 9pF 7 = 7pF 6 = 6pF		10 = ±10 ppm 20 = ±20 ppm

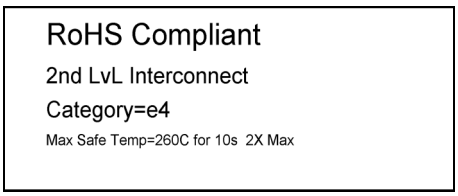
Device Marking

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

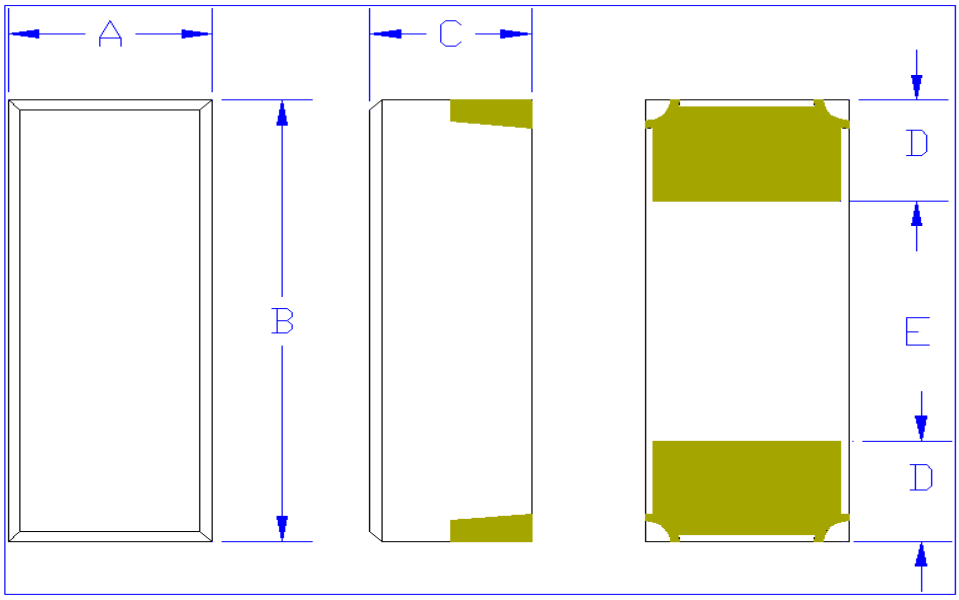
Reliability

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

Mechanical Dimensions/Solder Pad Layout

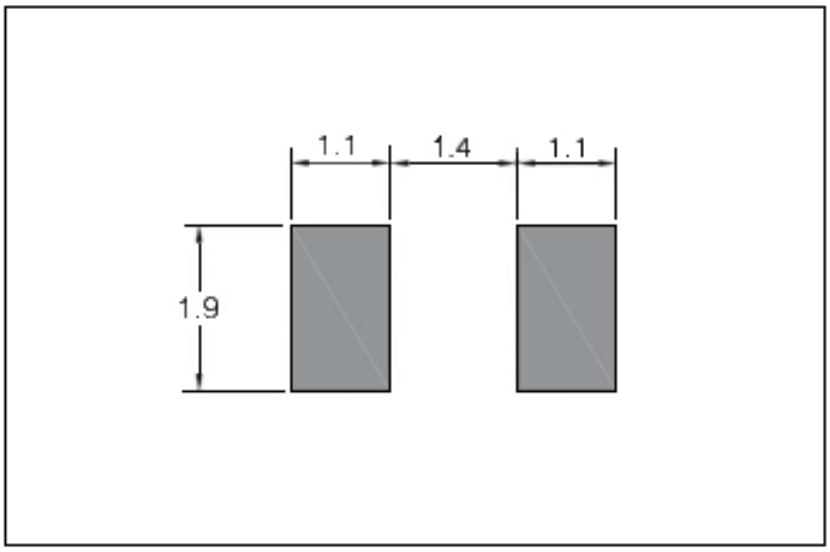
	mm
A	1.5 ± 0.1
B	3.2 ± 0.1
C	1.0 max
D[1]	0.7
E[1]	1.8

[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 either pad.
The crystal is symmetrical. The part can be rotated 180° when being assembled on the PCB and will still perform correctly. Either pad may have a chamfered corner.

Solder Pad Layout



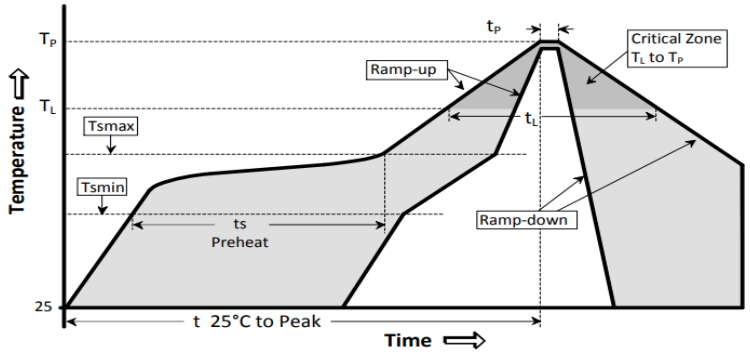
Pad Layout
Disclaimer: Recommended layout shown. Adjust layout as needed for individual process requirements.

For Optimum Jitter 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.

Reflow Cycle

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

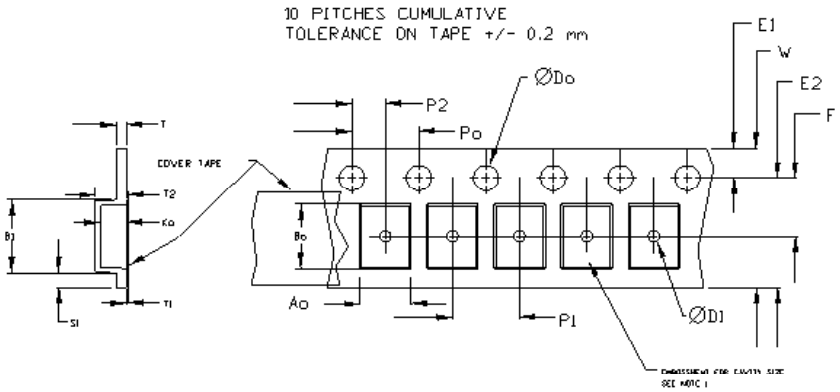


Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time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

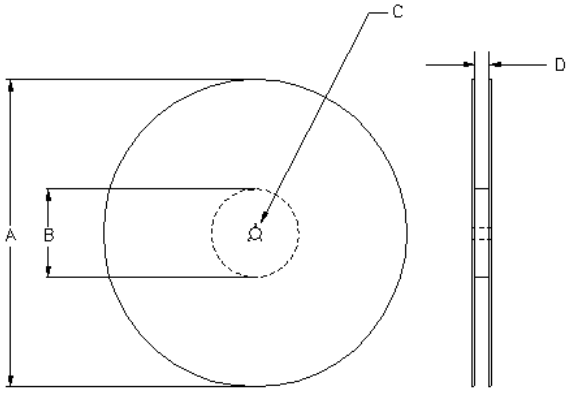
The part may be reflowed 2 times without degradation
(typical for lead free processing).

Tape and Reel

Tape and Reel available for quantities of 250 to 3000 per reel, cut tape for < 1000. 8mm tape, 4mm pitch.



USER DIRECTION OF UNREELING



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

Tape Variable Dimensions Table 2							
Tape Size	B1 max	E2 min	F	P1	T2 max	W max	Ao, Bo & Ko
8mm	3.5	6.4	1.7 ±0.1	4.0 ±0.1	1.0	8.9	Note 1

Dimensions in mm Drawing Not to scale

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

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	177.8	2.50	63.5	13.0 +0.5 -0.2	Tape size +0.4 +2.0 -0.0

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