



PLETRONICS SM6S Series Miniature SMD Crystal



SM5S
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

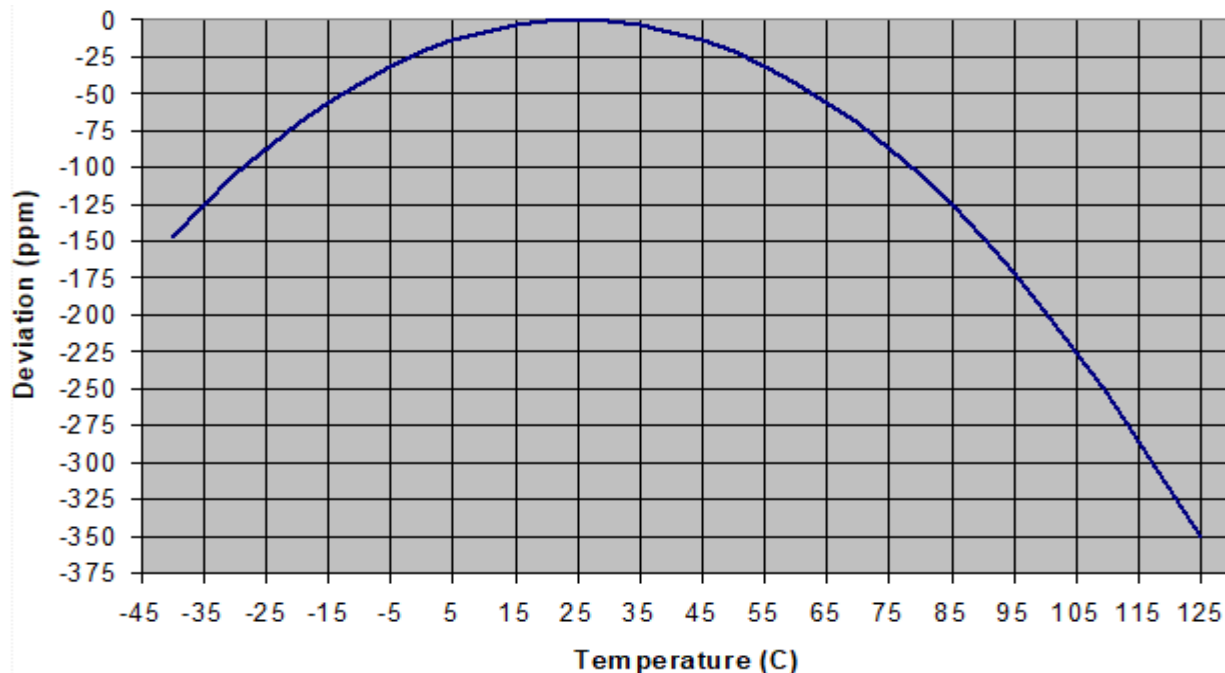
Applications

RTC

Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Frequency Range	-	32.768	-	kHz	
Calibration Frequency Tolerance	±10	-	±20	ppm	Standard at 25°C ± 3°C. See page 2 for all options
Frequency Stability	-0.032	-0.036	-0.04	ppm/Δ°C ²	
Load Capacitance (CL)	-	-	-	pF	Available: 6pF, 7pF, 9pF, 12.5pF; Check sales for other available CL.
Turnover Temperature	+20	+25	+30	°C	
Operating Temperature Range	-40	-	+85	°C	
Storage Temperature Range	-55	-	+125	°C	
Equivalent Series Resistance (ESR)	-	-	90	kΩ	At 25°C
Drive Level	-	0.1	0.5	μW	
Shunt Capacitance (C0)	-	1.2	-	pF	Pad to Pad Capacitance
Insulation Resistance	500	-	-	MΩ	@100VDC
Aging at 25°C	-	-	± 3	ppm	for the first year

Frequency versus Temperature - Typical Performance





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Part Numbering

Series Model	Load Capacitance (CLoad) in pF	Frequency in kHz	Frequency Calibration Tolerance
SM6S	-9	-32.768K	-20
	Blank = 12.5pF 9 = 9pF 7 = 7pF 6 = 6pF		10 = ± 10 ppm 20 = ± 20 ppm

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

P/N:		PLE Part Number
Customer P/N:		12345678
Qty:		D/C
MSL: 1	5000	2A1

RoHS Compliant
2nd Lvl Interconnect
Category=e4
Max Safe Temp=260C for 10s 2X Max

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

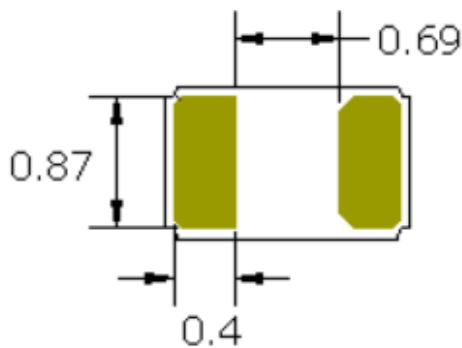
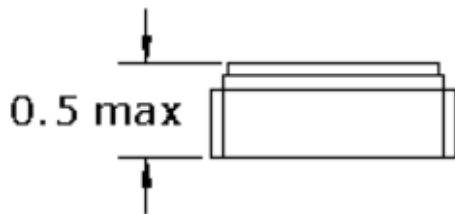
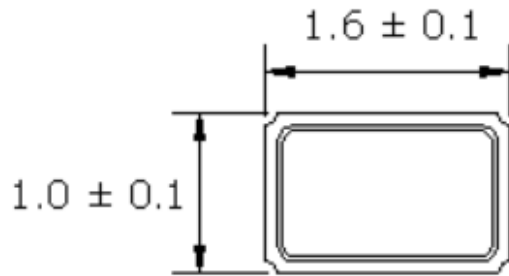
Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.003 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

Reliability

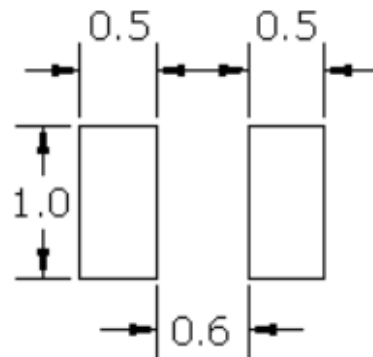
Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A



Mechanical Dimensions/Solder Pad Layout



Solder Pad Layout



Dimensions in mm

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)

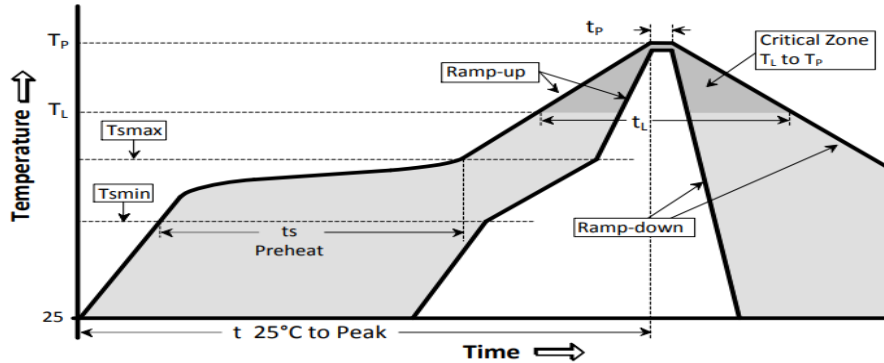
Please ensure no circuit pattern under the crystal.

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"

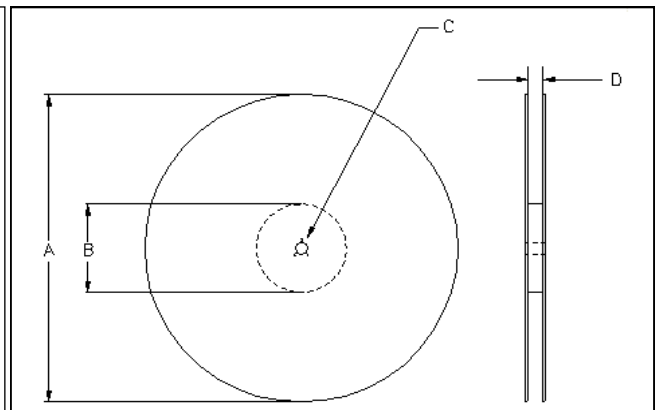
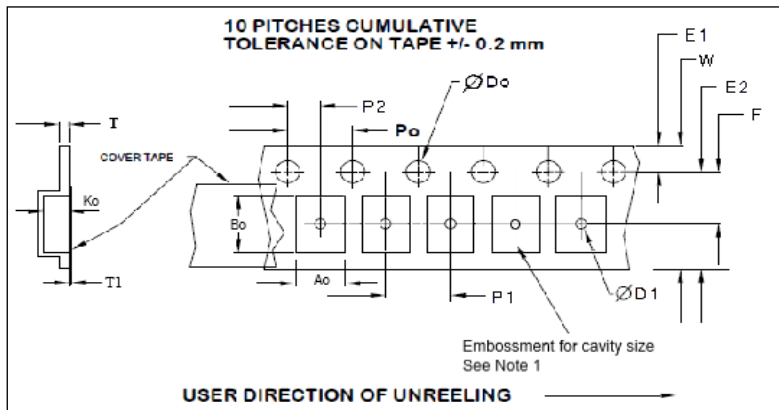


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	($T_{S_{max}}$ 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	$T_{to-peak}$	8 minutes max	min
Preheat			
Temperature min	$T_{S_{min}}$	150	°C
Temperature max	$T_{S_{max}}$	200	°C
Time $T_{S_{min}}$ to $T_{S_{max}}$	t_s	60 – 180	sec
Soldering above liquidus			
Temperature liquidus	T_L	217	°C
Time above liquidus	t_L	60 – 150	sec
Peak temperature			
Peak Temperature	T_P	260	°C
Time within 5°C of peak temperature	t_P	20 – 40	sec

Tape and Reel

Tape and Reel standard quantity = 5000 per reel. 8mm tape, 4mm pitch.



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

Reel Size	A		B		C	D
	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

Dimensions in mm Drawing Not to scale
Note 1: Embossed cavity to conform to EIA-481-B

Tape Size	Do	D1	E1	Po	P2	T max	T1 max
8mm	1.5 +0.1 -0.0	0.5	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.28	0.1



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