

# SM8S Series Low Frequency Crystal

October 2013



- The Pletronics' SM8S Series is a miniature surface mount crystal.
- The package is ideal for automated surface mount assembly and reflow practices.
- Tape and Reel packaging
- 32.768 KHz only
- 1.5 x 3.2 mm 2 pad
- XY Cut Crystal

## Pletronics Inc. certifies this device is in accordance with the RoHS 6/6 (2011/65/EC) and WEEE (2002/96/EC) directives.

Pletronics Inc. guarantees the device does not contain the following:  
 Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's  
 Weight of the Device: 0.014 grams  
 Moisture Sensitivity Level: 1 As defined in J-STD-020D.1  
 Second Level Interconnect code: e4

### Part Number:

SM8S	-9	-32.768K	-20	-XX	
					Internal code or blank
					<b>blank</b> = ±30ppm at 25°C <b>20</b> = ±20ppm at 25°C
					<b>Nominal Frequency in KHz</b>
					<b>Load Capacitance</b> Blank = 12.5pF <b>9</b> = 9pF <b>7</b> = 7pF (other values are special order)
					<b>Model Number</b>

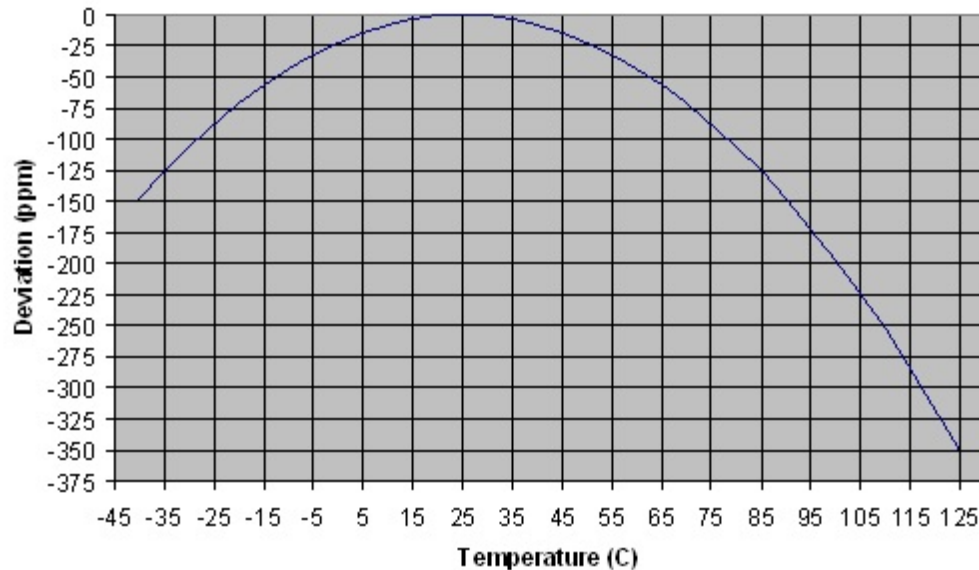
### Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

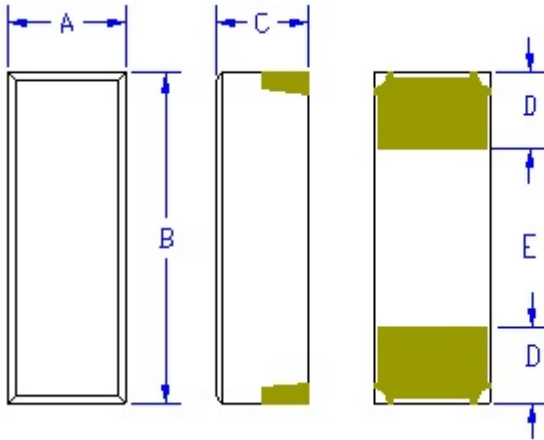
## Electrical Specification:

Item	Min	Max	Unit	Condition
Frequency	32.768		kHz	
Calibration Frequency Tolerance	-30 -20	+30 +20	ppm	standard at 25°C ± 3°C "20"
Equivalent Series Resistance	--	70K	Ohms	
Drive Level	--	1.0	uW	
Turn Over Temperature	20	30	°C	Nominal is 25°C
Temperature Coefficient	-0.035		ppm/°C <sup>2</sup>	typical
Q Factor	30000	--	Q	
Shunt Capacitance	1.7		pF	Pin to Pin Capacitance, typical
Motional Capacitance	2.9		fF	typical
Aging (for first year)	-3	+3	ppm/Yr	at 25°C ± 3°C
Insulation Resistance	500M	--	Ohms	at 100V DC
Crystal Cut				XY Cut
Operating Temperature Range	-40	+85	°C	
Storage Temperature Range	-55	+125	°C	
Shock Resistance	-10	+10	ppm	
Vibration Resistance	-5	+5	ppm	
Reflow Resistance	-5	+5	ppm	

## XY Crystal Frequency versus Temperature - Typical Performance:



### Mechanical:



	Inches	mm
A	0.059 ± 0.004	1.5 ± 0.1
B	0.126 ± 0.004	3.2 ± 0.1
C	0.039 max	1.0 max
D <sup>1</sup>	0.0295	0.75
E <sup>1</sup>	0.067	1.7

<sup>1</sup> Typical dimensions

#### Contacts :

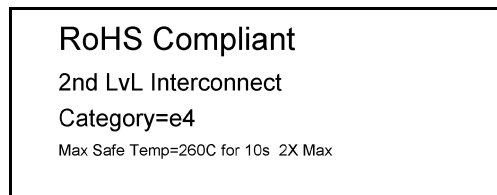
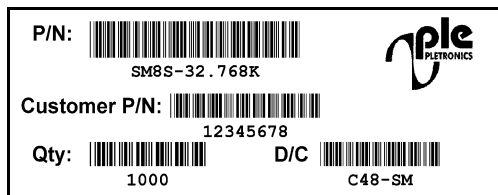
Gold 11.8 μinches 0.3 μm minimum over  
 Nickel 50 to 350 μinches 1.27 to 8.89 μm

**Not to Scale**

### Package Labeling

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

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



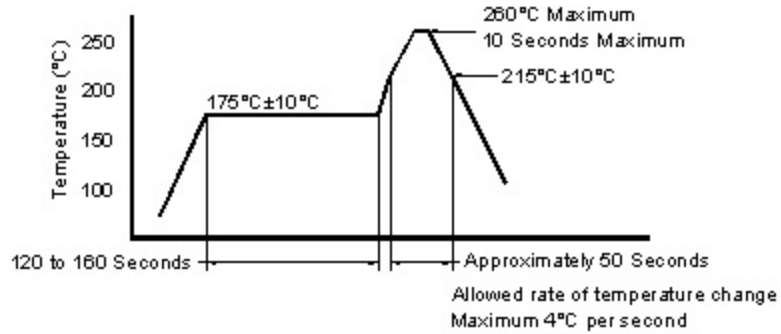
### Part Marking:

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

### Layout and application information

- Trace lengths to the crystal should be kept as short as possible.
- The crystal connections are sensitive to noise.
- The signal leads to the SM8S, in most oscillator applications, are exceptionally high impedance. Remember to protect these leads from moisture and contamination as leakage paths can inhibit proper oscillator function.

### Reflow Cycle (typical for lead free processing)



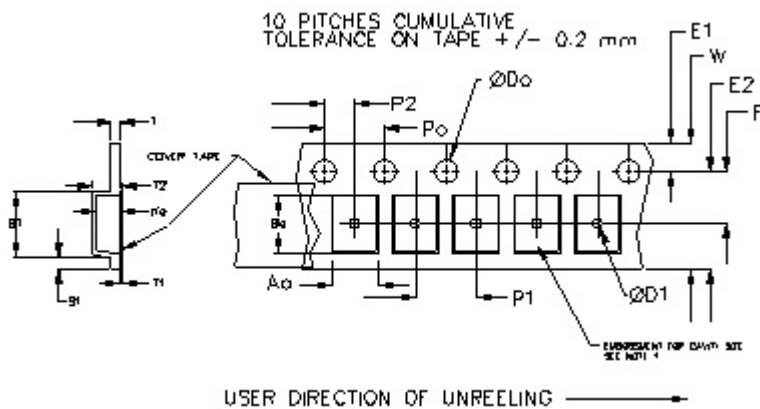
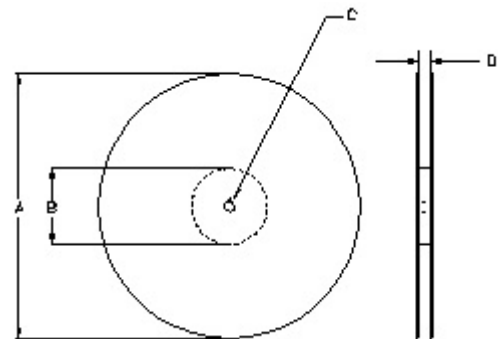
The part may be reflowed 2 times without degradation.

### Tape and Reel: available for quantities of 3000 per reel

Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5	1.0	1.75	4.0	2.0 ± 0.05	0.6	0.25	0.1
12mm		1.5			2.0 ± 0.1			
16mm		+0.1 -0.0			1.5			
24mm		1.5			1.5			

Variable Dimensions Table 2							
Tape Size	B1 Max	E2 Min	F	P1	T2 Max	W Max	Ao, Bo & Ko
12 mm	12.1	14.25	5.5 ± 0.1	4.0 ± 0.1	1.2	12.3	Note 1

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



REEL DIMENSIONS					
A	inches	7.0	10.0	13.0	Tape Width
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	Tape Width
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			Tape Width
D	mm	12.4 +2.0 -0.0	12.4 +2.0 -0.0	12.4 +2.0 -0.0	

Reel dimensions may vary from the above

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