



## SM20S Series Low Frequency Crystal

March 2012



- The Pletronics' SM20S 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
- 3.8 x 8 mm 4 pad
- XY Cut Crystal

### Pletronics Inc. certifies this device is in accordance with the RoHS (2002/95/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: 0.118 grams  
Moisture Sensitivity Level: 1 As defined in J-STD-020C  
Second Level Interconnect code: e3

#### Part Number:

SM20S	- 32.768K	- 6PF	-XX	
				Internal code or blank
				<b>Load Capacitance</b> Blank = 12.5pF <b>6</b> = 6pF
				<b>Nominal Frequency in KHz</b>
				<b>Model Number</b>

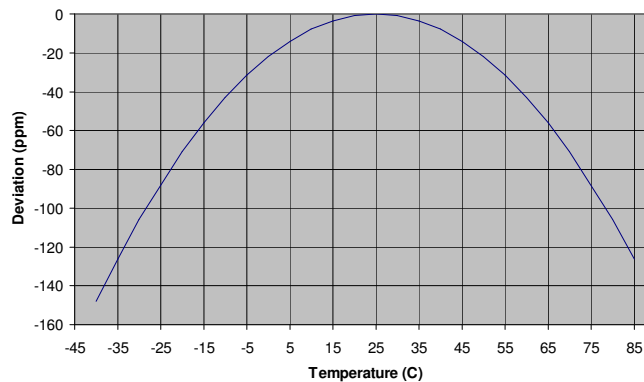
#### Reliability: Environmental Compliance

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

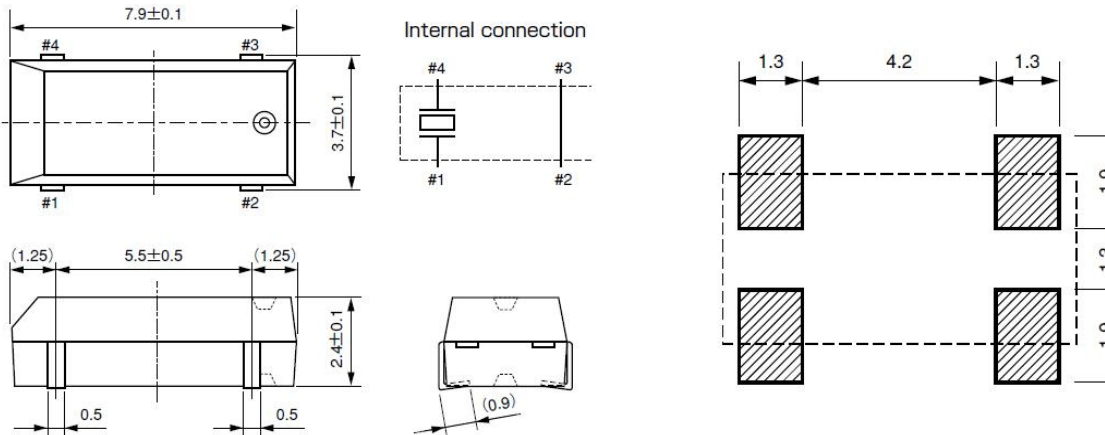
## Electrical Specification:

Item	Min	Max	Unit	Condition
Frequency	32.768		kHz	
Calibration Frequency Tolerance	-20	+20	ppm	at +25°C
Equivalent Series Resistance	--	50K	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	50000	--	Q	
Shunt Capacitance	1.0		pF	Pin to Pin Capacitance, typical
Motional Capacitance	1.9		fF	typical
Aging (for first year)	-5	+5	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:

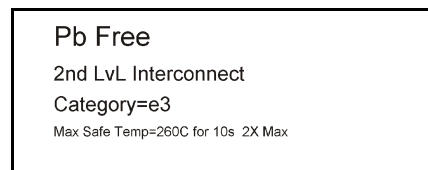
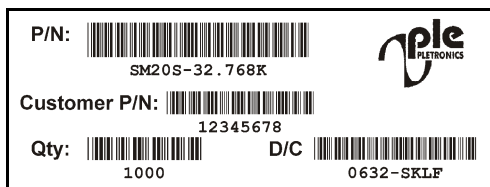


Dimensions specified are typical

## 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



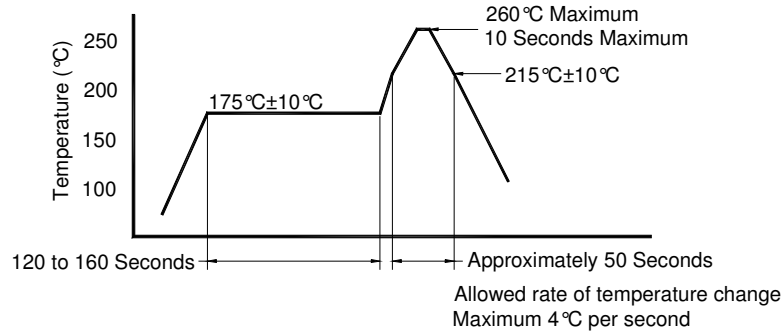
## Part Marking:

- Marking consists of an internal 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.

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



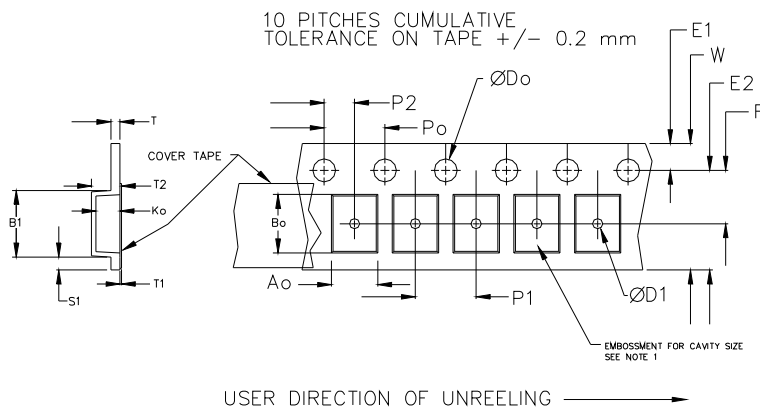
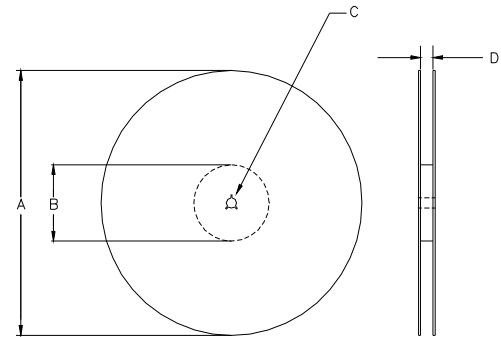
The part may be reflowed 2 times without degradation.

### Tape and Reel: available for quantities of 250 to 1000 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
16 mm	12.1	14.25	5.5 ± 0.1	8.0 ± 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	16.4	16.4	16.4	
		+2.0	+2.0	+2.0	
		-0.0	-0.0	-0.0	
	mm	---	---	24.4	24.0
				+2.0	
				-0.0	
	mm	---	---	32.4	32.0
				+2.0	
				-0.0	

Reel dimensions may vary from the above

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