

## SM8S Series Low Frequency Crystal

October 2013

**Lead Free**



- 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<br><b>20</b> = ±20ppm at 25°C                                                       |
|      |     |           |     |     | <b>Nominal Frequency in KHz</b>                                                                                   |
|      |     |           |     |     | <b>Load Capacitance</b><br>Blank = 12.5pF<br><b>9</b> = 9pF<br><b>7</b> = 7pF<br>(other values are special order) |
|      |     |           |     |     | <b>Model Number</b>                                                                                               |

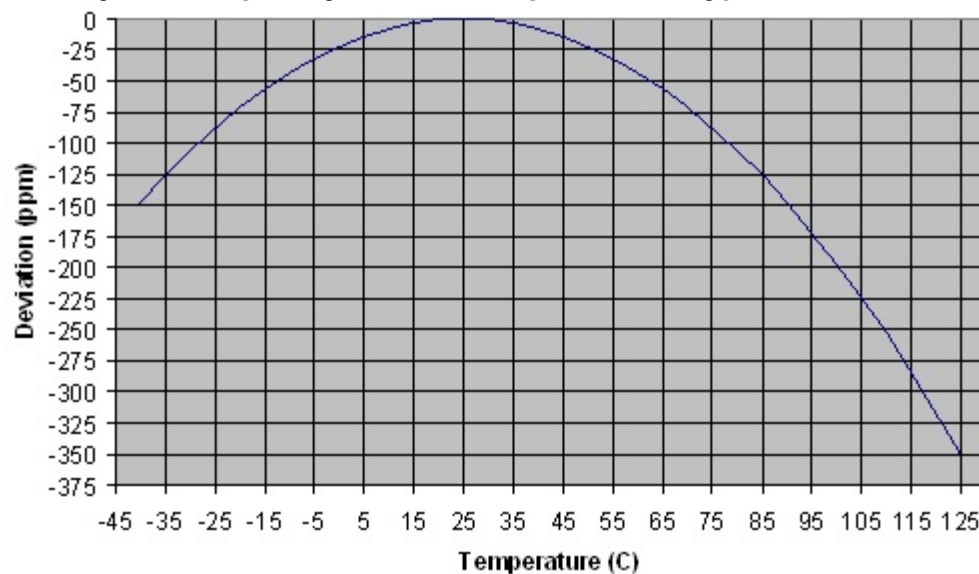
### Reliability: Environmental Compliance

| 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 |

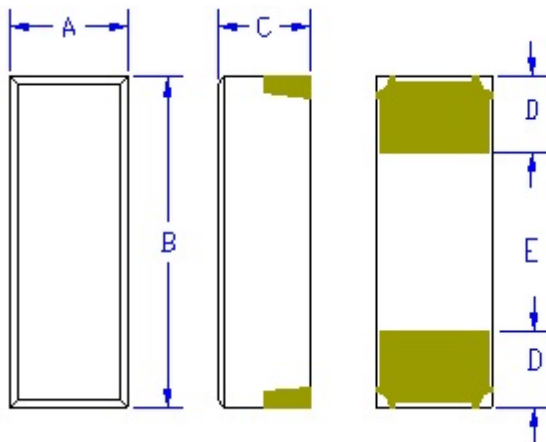
**Electrical Specification:**

| Item                            | Min        | Max        | Unit                | Condition                          |
|---------------------------------|------------|------------|---------------------|------------------------------------|
| Frequency                       | 32.768     |            | kHz                 |                                    |
| Calibration Frequency Tolerance | -30<br>-20 | +30<br>+20 | ppm                 | standard at 25°C $\pm$ 3°C<br>"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 $\pm$ 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              | $0.059 \pm 0.004$ | $1.5 \pm 0.1$ |
| B              | $0.126 \pm 0.004$ | $3.2 \pm 0.1$ |
| 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

|               |     |        |
|---------------|-----|--------|
| P/N:          |     |        |
| SM8S-32.768K  |     |        |
| Customer P/N: |     |        |
| Qty:          | D/C |        |
| 1000          |     | C48-SM |

|                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------|
| <p><b>RoHS Compliant</b></p> <p>2nd LVL Interconnect</p> <p>Category=e4</p> <p>Max Safe Temp=260C for 10s 2X Max</p> |
|----------------------------------------------------------------------------------------------------------------------|

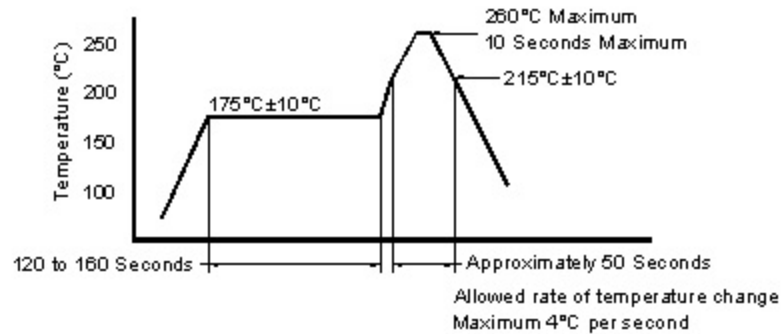
## Part Marking:

- 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)



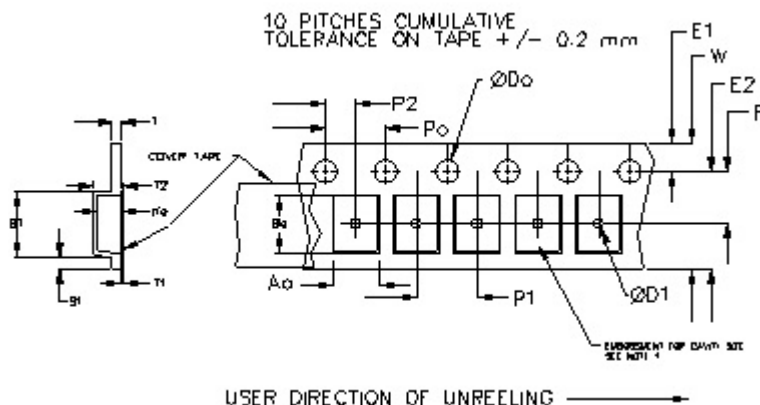
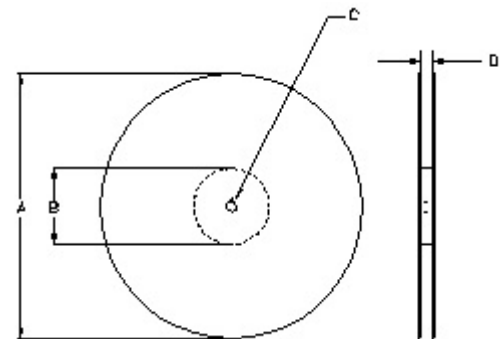
The part may be reflowed 2 times without degradation.

### 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<br><br>+0.1<br>-0.0 | 1.0    | 1.75<br><br>±0.1 | 4.0<br><br>±0.1 | 2.0<br>±0.05 | 0.6    | 0.25  | 0.1    |
| 12mm                        |                         | 1.5    |                  |                 |              |        |       |        |
| 16mm                        |                         | 1.5    |                  |                 | 2.0<br>±0.1  |        |       |        |
| 24mm                        |                         | 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 |        |                      |                      |                      | Tape Width |
|-----------------|--------|----------------------|----------------------|----------------------|------------|
| A               | inches | 7.0                  | 10.0                 | 13.0                 |            |
|                 | 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<br>+2.0<br>-0.0 | 12.4<br>+2.0<br>-0.0 | 12.4<br>+2.0<br>-0.0 |            |

Reel dimensions may vary from the above

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