

# Miniature, Ceramic, Surface Mount Crystal SM60

Monitor's SM60 provides a miniature crystal in a highly reliable package that is specifically designed for surface mount applications. Hermetically-sealed construction ensures long term stability and exceptional aging characteristics.

## APPLICATIONS

- M Wireless RF
- M PCMCIA
- M Cameras
- M Disk Drives
- M PDAs

## FEATURES

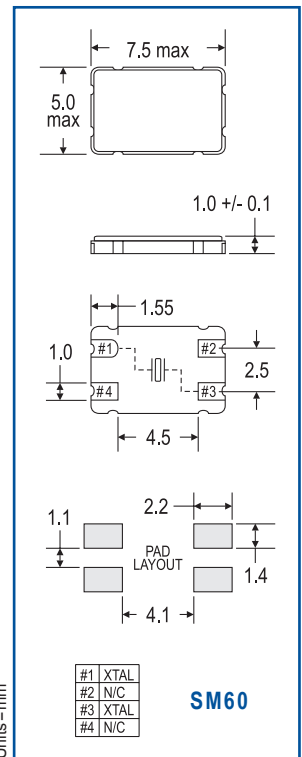
- M Ultra-slim 1.0mm profile
- M Surface Mount
- M Reflow solderable at 260°C for 10 secs max
- M Tape & Reel (1000pcs/reel)



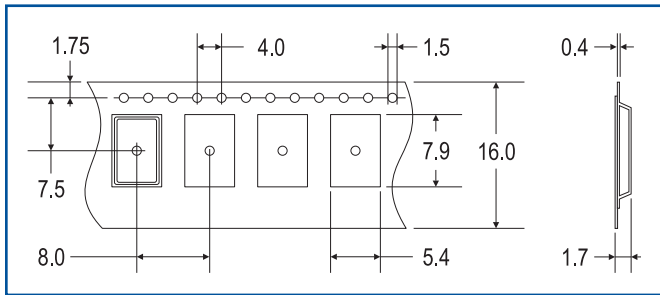
## SPECIFICATIONS

<b>Frequency Range</b>	9.8304 MHz ~ 100.0 MHz*
<b>Operating Temp Range</b>	-10°C ~ 60°C
<b>Storage Temp Range</b>	-40°C ~ 85°C
<b>Shunt Capacitance</b>	7.0 pF max
<b>Calibration Tolerance @ 25°C</b>	± 10ppm, ± 25ppm & ± 50ppm options available
<b>Frequency Tolerance vs Temp Range</b>	± 50ppm from -10°C ~ 60°C standard (call for other options)
<b>Equivalent Series Resistance</b> (MHz = Ω max) <small>Fundamental unless otherwise otherwise indicated</small>	9.8304 ~ 9.9999 = 80 10.0000 ~ 15.9999 = 60 16.0000 ~ 32.0000 = 40 28.0000 ~ 83.9999 = 60 (3rd Overtone) 84.0000 ~ 100.0000 = 80 (5th Overtone)
<b>Drive Level</b>	0.1 mW max
<b>Humidity</b>	85% RH, 85°C, 48 Hours
<b>Hermetic Seal</b>	Leak Rate 2 x 10 <sup>-8</sup> ATM-cm <sup>3</sup> /sec max
<b>Solderability</b>	MIL-STD-202F Method 208E
<b>Vibration</b>	MIL-STD-202F Method 204 / 35G, 50~2000 Hz (<25.0 MHz) / 20G, 50~2000 Hz (25.0 MHz)
<b>Shock</b>	MIL-STD-202F Method 213B Test Cond E, 1000G, 1/2 Sine Wave
<b>Packaging</b>	16mm Tape & Reel (1000pcs/reel std, or Bulk <1000pcs)

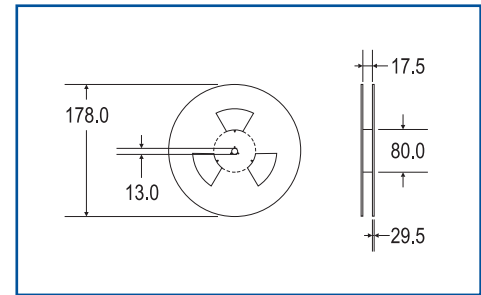
\* Call for your specific frequency requirement



# SM60



**TAPE DIMENSIONS (1000 pcs/reel)**



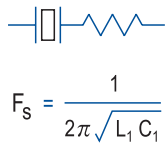
**REEL DIMENSIONS**

Units = mm

### CRYSTAL CORRELATION THEORY

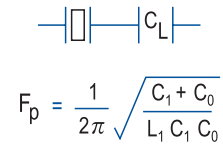
**Series Resonance:**

At series resonance, the crystal looks resistive in the circuit, and correlation of frequency is not a problem. It must be specified if unit is to be manufactured at series or at a particular load capacitance.

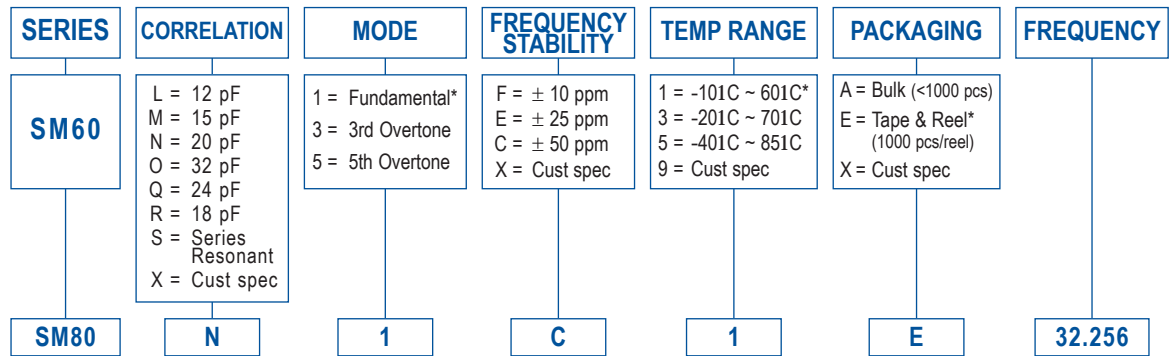


**Anti-Resonance Parallel:**

Crystals operating at anti-resonance will look inductive in the circuit. Changes of reactive values in the circuit will change the crystal frequency. If the crystal is to be used at anti-resonance, the load capacitance should always be specified. The load capacitance  $C_L$  is the dynamic capacitance of the total circuit as measured across the crystal terminals.



**PART NUMBERING KEY**



Sample Part Number

SM60N1C1E @ 32.256 MHz =

\* Standard

Call factory for additional options. Use full descriptive part number when ordering. Parts will be marked with series and frequency only.

Monitor Products has a proven track record as a pioneer manufacturer in the frequency control market. If our extensive selection of standard and engineered crystals and oscillators does not meet your spec, we will work with you towards a customized solution.