



# CX2SM AT CRYSTAL

9.6 MHz to 250 MHz

Low Profile, Miniature Surface Mount AT Quartz Crystal

Fundamental Mode: 9.6 MHz - 250 MHz  
Third Overtone: 48 MHz - 160 MHz

## DESCRIPTION

STATEK's miniature CX2SM AT crystals in leadless ceramic packages are designed for surface mounting on printed circuit boards or hybrid substrates. These crystals are low profile and have a small footprint. The CX2SM crystal is manufactured using the STATEK-developed photolithographic process, and was designed utilizing the experience acquired by producing millions of crystals for industrial, commercial, military and medical applications.

## FEATURES

- Designed for surface mount applications using infrared, vapor phase, or epoxy mount techniques.
- Hermetically sealed ceramic package
- Excellent aging characteristics
- Available with glass or ceramic lid
- High shock and vibration resistance
- Custom designs available
- Full military testing available
- Designed and manufactured in the USA

## APPLICATIONS

### Medical

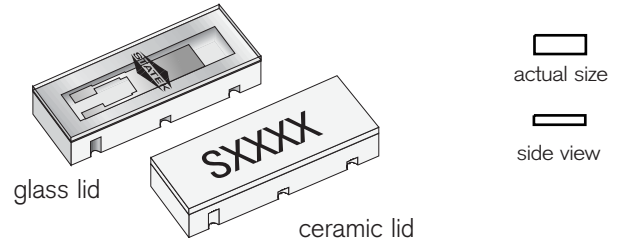
- Infusion Pumps

### Industrial, Computer & Communications

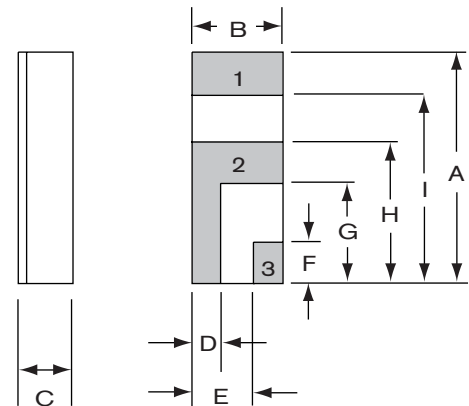
- Engine Control
- Down-hole Data Recorder

### Military & Aerospace

- Communications
- Smart Munitions
- Timing Devices (Fuzes)
- Surveillance Devices



## PACKAGE DIMENSIONS



DIM	TYPICAL		MAXIMUM	
	inches	mm	inches	mm
A	0.260	6.60	0.275	6.99
B	0.094	2.39	0.108	2.74
C	-	-	see below	
D	0.035	0.89	0.045	1.14
E	0.059	1.50	0.069	1.75
F	0.050	1.27	0.060	1.52
G	0.105	2.67	0.115	2.92
H	0.155	3.94	0.165	4.19
I	0.210	5.33	0.220	5.59

## THICKNESS (DIM C) MAXIMUM

	GLASS LID		CERAMIC LID	
	inches	mm	inches	mm
SM1	0.065	1.65	0.075	1.91
SM2/SM4	0.067	1.70	0.077	1.96
SM3/SM5	0.070	1.78	0.080	2.03

Note: Terminal 1 is electrically connected internally to terminal 3



## SPECIFICATIONS

Specifications are typical at 25°C unless otherwise noted.  
Specifications are subject to change without notice.

	10 MHz	32 MHz	155.52 MHz
Fundamental Frequency	10 MHz	32 MHz	155.52 MHz
Motional Resistance ( $R_1$ )	60	25	10
Motional Capacitance $C_1$ (fF)	2.8	6.2	4.0
Quality Factor Q (k)	95	30	30
Shunt Capacitance $C_0$ (pF)	1.4	2.3	2.3

Calibration Tolerance<sup>1</sup> ± 100 ppm, or tighter as required

Load Capacitance<sup>2</sup> 20 pF for  $f \leq 50$  MHz

10 pF for  $f > 50$  MHz

Drive Level 500  $\mu$ W MAX for  $f \leq 50$  MHz

200  $\mu$ W MAX for  $f > 50$  MHz

Frequency-Temperature Stability<sup>1,3</sup> ± 50 ppm to ± 10 ppm (Commercial)  
± 100 ppm to ± 20 ppm (Industrial)

± 100 ppm to ± 30 ppm (Military)

Aging, first year<sup>4</sup> 5 ppm MAX (better than 1 ppm available)

Shock, survival<sup>5</sup> 3,000 g, 0.3 ms, 1/2 sine

Vibration, survival<sup>6</sup> 20 g, 10-2,000 Hz swept sine

Operating Temp. Range -10°C to +70°C (Commercial)  
-40°C to +85°C (Industrial)  
-55°C to +125°C (Military)

Storage Temp. Range -55°C to +125°C

Max Process Temperature 260°C for 20 sec.

- Other tolerances available. Contact factory.
- Unless specified otherwise.
- Does not include calibration tolerance. The characteristics of the frequency stability over temperature follow that of the AT thickness-shear mode.
- 5 ppm MAX for frequencies below 40 MHz. For tighter tolerances and higher frequencies contact factory.
- Higher shock version available.
- Per MIL-STD-202G, Method 204D, Condition D. Random vibration testing also available.

## TERMINATIONS

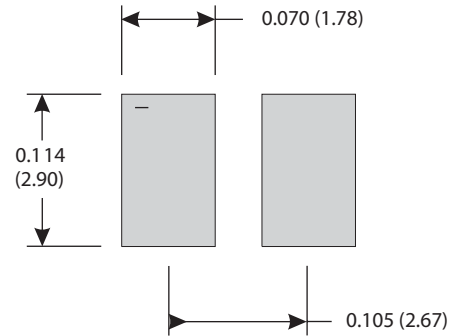
Designation	Termination
SM1	Gold Plated (Lead Free)
SM2	Solder Plated
SM3	Solder Dipped
SM4	Solder Plated (Lead Free)
SM5	Solder Dipped (Lead Free)

Max Process Temperature 260°C for 20 sec.

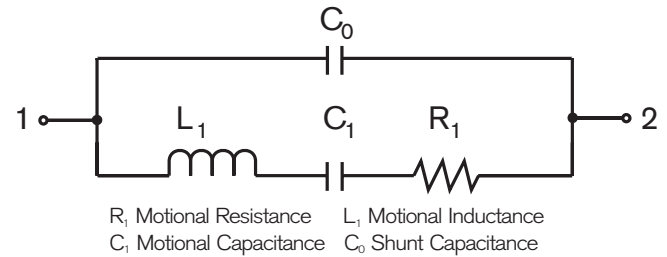
## PACKAGING OPTIONS

- Tray Pack
- 16mm tape, 7" or 13" reels  
Per EIA 481 (see Tape and Reel data sheet 10109)

## SUGGESTED LAND PATTERN



## EQUIVALENT CIRCUIT



## HOW TO ORDER CX2SM AT CRYSTALS

