



# CX4HGSM AT CRYSTAL

14 MHz to 50 MHz

High Shock, Ultra-Miniature, Low Profile  
Surface Mount AT Quartz Crystal

## DESCRIPTION

Intended for applications requiring shock survivability up to 100,000 g, Statek's surface-mount CX4HGSM crystals are high-shock versions of the CX4SM crystals.

## FEATURES

- High shock and vibration resistance
- Designed for surface mount applications using infrared, vapor phase, or epoxy mount techniques.
- Low profile (less than 1.2 mm) hermetically sealed ceramic package
- Available with glass or ceramic lid
- Custom designs available
- Full military testing available
- Designed and manufactured in the USA

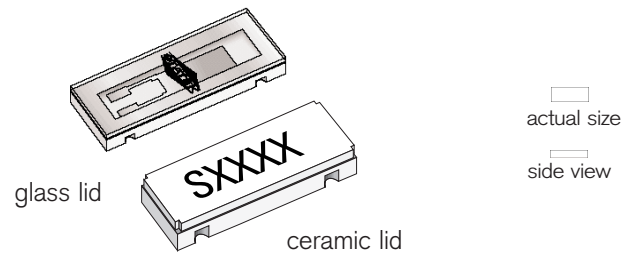
## APPLICATIONS

### Industrial & Communications

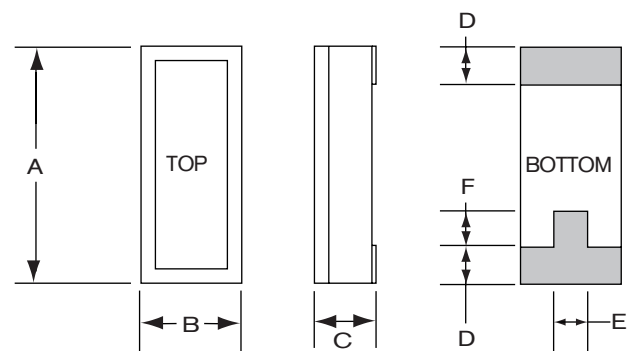
- Down-hole Data Recorder
- Process Control
- Environmental Control
- Engine Control
- Telemetry
- Ruggedized Instrumentation
- Automotive Control

### Military & Aerospace

- Smart Munitions
- Timing Devices (Fuzes)
- Surveillance Devices
- Missile Telemetry
- Ruggedized Communications
- Aviation Equipment



## PACKAGE DIMENSIONS



DIM	TYPICAL		MAXIMUM	
	inches	mm	inches	mm
A	0.197	5.00	0.210	5.33
B	0.072	1.83	0.085	2.16
C	—	—	see below	
D	0.036	0.91	0.046	1.16
E	0.020	0.51	—	—
F	0.025	0.64	—	—

## THICKNESS (DIM C) MAXIMUM

	GLASS LID		CERAMIC LID	
	inches	mm	inches	mm
SM1	0.045	1.14	0.050	1.27
SM2/SM4	0.046	1.17	0.051	1.30
SM3/SM5	0.048	1.22	0.053	1.35



## SPECIFICATIONS

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

Fundamental Frequency	14.7456 MHz	16MHz	20 MHz	32 MHz	40 MHz
Motional Resistance $R_1$ ( $\Omega$ )	60	75	50	30	30
Motional Capacitance $C_1$ (ff)	1.4	1.5	1.4	2.5	1.5
Quality Factor Q (k)	120	90	110	70	90
Shunt Capacitance $C_0$ (pF)	0.8	0.9	0.9	1.1	1.0

Frequency Range <sup>1</sup>	14 MHz to 50 MHz
Calibration Tolerance <sup>2</sup>	± 100 ppm, or tighter as required
Load Capacitance	10 pF (unless specified otherwise)
Drive Level	200 $\mu$ W MAX
Frequency-Temperature Stability <sup>2,3</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>	10 ppm MAX
Shock, survival	Up to 100,000 g, 0.5 ms, 1/2 sine
Vibration, survival <sup>5</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

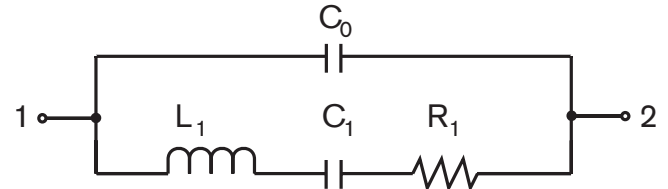
- Other frequencies available. Contact factory.
- Other tolerances available. Contact factory.
- Does not include calibration tolerance. The characteristics of the frequency stability over temperature follow that of the AT thickness-shear mode.
- Lower aging available at low shock levels.
- Per MIL-STD-202G, 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)

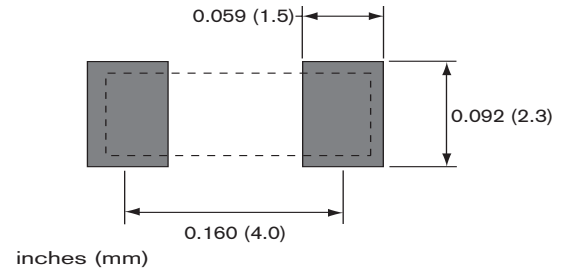
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## EQUIVALENT CIRCUIT



$R_1$ , Motional Resistance     $L_1$ , Motional Inductance  
 $C_1$ , Motional Capacitance     $C_0$ , Shunt Capacitance

## SUGGESTED LAND PATTERN



## PACKAGING OPTIONS

- Tray Pack
- Tape and Reel  
Per EIA 481 (see Tape and Reel data sheet 10109)

## HOW TO ORDER CX4HGSM AT CRYSTALS

CX4	S	HG1	C	SM1	-	32.0M	,	100	/	100	/	-	/	I
	"S" if special or custom design. Blank if standard	Shock Level HG1 = 10,000 g HG2 = 20,000 g HG3 = 30,000 g HG4 = 50,000 g HG5 = 75,000 g HG6 = 100,000 g	C = Ceramic Lid Blank = Glass Lid	Termination SM1 = Gold Plated SM2 = Solder Plated SM3 = Solder Dipped SM4 = Solder Plated (Lead Free) SM5 = Solder Dipped (Lead Free)		Frequency M = MHz		Calibration Tolerance @25°C (in ppm)		Frequency Stability over Temp. Range				Operating Temp. Range: C = -10°C to +70°C I = -40°C to +85°C M = -55°C to +125°C S = Customer Specified
OR														
										200	/		/	I
										Total Frequency Tolerance (in ppm)				Operating Temp. Range: C = -10°C to +70°C I = -40°C to +85°C M = -55°C to +125°C S = Customer Specified

10165 Rev B