



## CX-6-SM CRYSTAL

9.6 MHz to 160 MHz

Ultra-Low Profile (1mm) Miniature  
Surface Mount Crystal

Fundamental Mode: 9.6 MHz - 70 MHz  
Third Overtone Mode: 70 MHz - 160 MHz

### DESCRIPTION

STATEK's miniature CX-6-SM AT-cut crystals in leadless ceramic packages are designed for surface mounting on printed circuit boards or hybrid circuits. These crystals have a very small land pattern and are the lowest profile in the World! They are manufactured using the STATEK-developed photolithographic process, and were designed utilizing the experience acquired by producing millions of crystals for industrial, commercial, military and medical applications. Maximum process temperature should not exceed 260°C.

### FEATURES

- Designed for surface mount applications using infrared, vapor phase, wave solder or epoxy mount techniques.
- Ultra profile (less than 1mm) 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

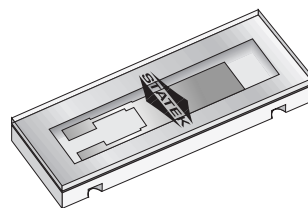
Industrial, Computer & Communications

- General purpose clock oscillator
- PCMCIA (FAX, Modem and LAN)
- Smart card

PDA and notebook computers

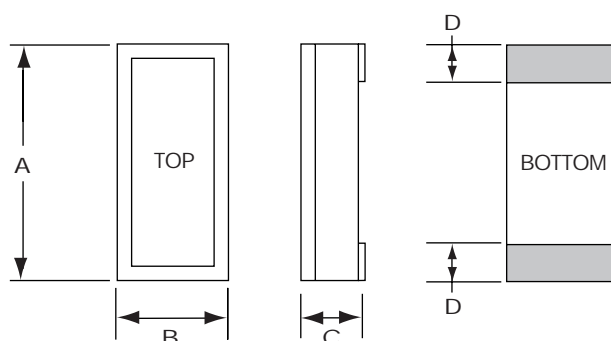
Military & Aerospace

- Airborne hybrid computer
- Military high speed modem
- MCM



actual size  
side view

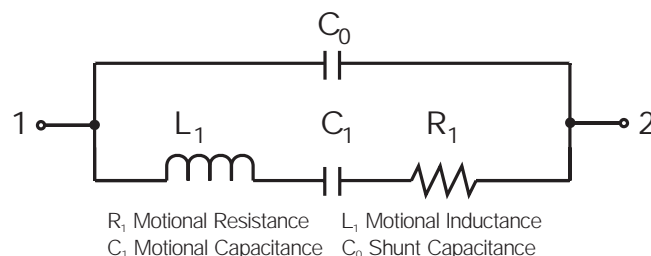
### PACKAGE DIMENSIONS



| DIM | TYP.   |      | MAX.      |      |
|-----|--------|------|-----------|------|
|     | INCHES | mm   | INCHES    | mm   |
| A   | .265   | 6.73 | .280      | 7.11 |
| B   | .103   | 2.62 | .114      | 2.90 |
| C   | -      | -    | see below |      |
| D   | .050   | 1.27 | .060      | 1.52 |

| DIM "C" | GLASS LID |      | CERAMIC LID |      |
|---------|-----------|------|-------------|------|
|         | INCHES    | mm   | INCHES      | mm   |
| SM1     | .039      | 0.99 | .053        | 1.35 |
| SM2     | .041      | 1.04 | .055        | 1.40 |
| SM3     | .044      | 1.12 | .058        | 1.47 |

### EQUIVALENT CIRCUIT



10117 - Rev A

## SPECIFICATIONS

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

|  | 10 MHz                          | 32MHz | 155.52 MHz |
|--|---------------------------------|-------|------------|
| Motional Resistance $R_1$ ( $\Omega$ ) | 60                              | 20    | 50         |
| Motional Capacitance $C_1$ (fF)        | 2.8                             | 7.8   | 0.5        |
| Quality Factor Q (k)                   | 95                              | 36    | 41         |
| Shunt Capacitance $C_0$ (pF)           | 1.4                             | 2.4   | 3.2        |
| Calibration Tolerance*                 | A $\pm 0.01\%$ ( $\pm 100$ ppm) |       |            |
|  | B $\pm 0.1\%$                   |       |            |
|  | C $\pm 1.0\%$                   |       |            |

Load Capacitance 20 pF (Unless specified by customer)

Drive Level 500  $\mu$ W MAX.

Frequency-Temperature Stability\*\*  
 -10°C to +70°C from  $\pm 10$ ppm  
 -40°C to +85°C from  $\pm 20$ ppm  
 -55°C to +125°C from  $\pm 30$ ppm

Aging, first year 5ppm MAX.

Shock, survival\*\*\* 3,000g peak, 0.3 msec., 1/2 sine

Vibration, survival 20g rms, 10-2,000 Hz random

Operating Temperature  
 -10°C to +70°C Commercial  
 -40°C to +85°C Industrial  
 -55°C to +125°C Military

Storage Temperature -55°C to +125°C

Max Process Temperature 260°C for 20 sec.

Note: The characteristics of the frequency temperature stability follow that of AT cut thickness-shear mode.

\* Tighter tolerances available as low as  $\pm 5$  ppm

\*\* Does not include calibration tolerance

\*\*\* Higher shock version available

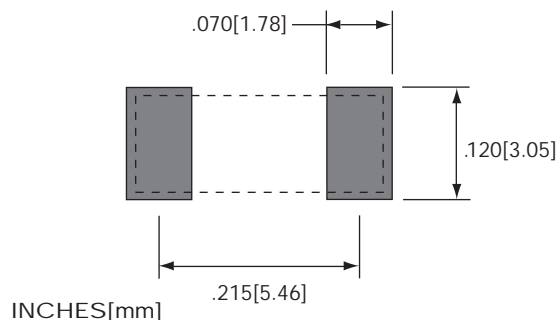
## TERMINATIONS

| Designation | Termination                             |
|-------------|---|
| SM1         | Gold Plated                             |
| SM2         | Nickel, Solder Plated                   |
| SM3         | Nickel, Solder Plated and Solder Dipped |

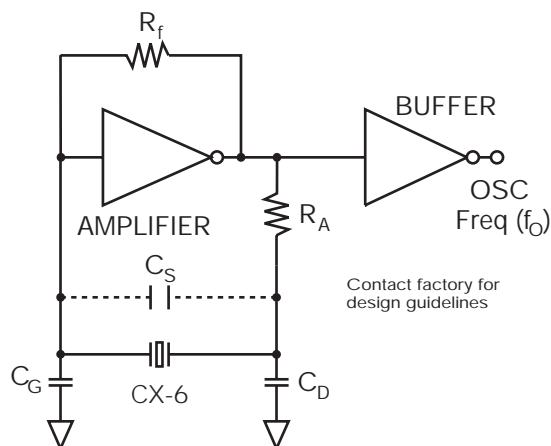
## PACKAGING

CX-6-SM - Tray Pack (Standard)  
 -16mm tape, 7" or 13" reels (Optional)  
 Per EIA 481 (see data sheet 10109)

## SUGGESTED LAND PATTERN



## CONVENTIONAL CMOS PIERCE OSCILLATOR CIRCUIT



Contact factory for design guidelines

## HOW TO ORDER CX-6-SM CRYSTALS

| CX-6  |  |                                  | SM1               | 32 MHz    | ( | 25ppm  | / | 25ppm                                | / | 50ppm                     | / | )   |
|---|--|----------------------------------|-------------------|-----------|---|--|---|--------------------------------------|---|---------------------------|---|---|
| "S" if special or custom design.<br>Blank if Std. | O.T.=3 <sup>RD</sup> O.T. Mode<br>Blank=Fundamental Mode | C=Ceramic Lid<br>Blank=Glass Lid | SM1<br>SM2<br>SM3 | Frequency |   | Calibration Tolerance*<br>@25°C<br>(A)<br>(B)<br>(C) |   | Frequency Stability over Temp. Range |   | Total Frequency Tolerance |   | Temp. Range:<br>C = Commercial<br>I = Industrial<br>M = Military<br>S = Specify |

\*Other calibration fill in ppm.