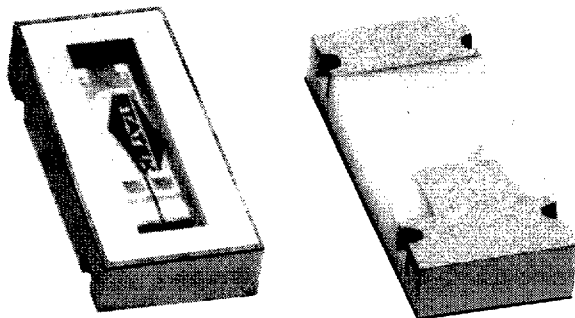




Actual Size  Side View 



## CX-3V-SM CRYSTAL

### 18 kHz to 600 kHz

**MINIATURE SURFACE MOUNT  
QUARTZ CRYSTAL  
FOR PIERCE OSCILLATOR**

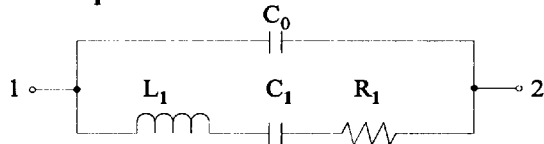
### DESCRIPTION

The CX-3V-SM quartz crystals are leadless devices designed for surface mounting on printed circuit boards or hybrid substrates. These miniature crystals are intended to be used in Pierce oscillators. They are hermetically sealed in rugged, miniature ceramic packages and are designed specifically for manufacturing temperatures up to 260°C.

### FEATURES

- ☐ Miniature tuning fork design
- ☐ High shock resistance
- ☐ Designed for low power applications
- ☐ Compatible with hybrid or PC board packaging
- ☐ Low aging
- ☐ Full military testing available
- ☐ Ideal for battery operated applications
- ☐ Designed and manufactured in the USA

FIGURE 1. Equivalent Circuit



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

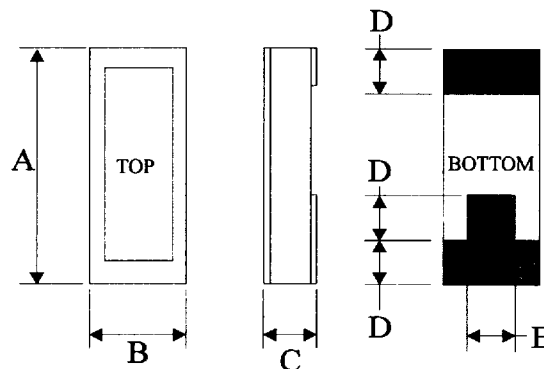
### PACKAGING

CX-3V -16mm Tape, 7" or 13" Reels,  
 Per EIA 481A (See data sheet 10109)  
 -Tray Pack  
 -Bulk Pack

### TERMINATIONS

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

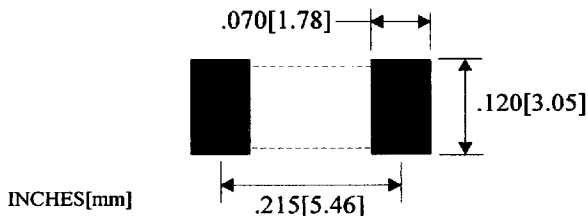
### PACKAGE DIMENSIONS



| 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 |           |      |
| E   | .052   | 1.32 |           |      |

| DIM "C" | GLASS LID |      | CERAMIC LID |      |
|---------|-----------|------|-------------|------|
| MAX.    | INCHES    | mm   | INCHES      | mm   |
| SM1     | .058      | 1.47 | .069        | 1.75 |
| SM2     | .060      | 1.52 | .071        | 1.80 |
| SM3     | .063      | 1.60 | .074        | 1.88 |

### SUGGESTED LAND PATTERN



STATEK CORPORATION

512 North Main Street, Orange, California 92868 (714) 639-7810 FAX (714) 997-1256

■ 8891940 0000424 6T6 ■

10104-7/96

## SPECIFICATIONS

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

|                                                |                                                                                    |
|------------------------------------------------|------------------------------------------------------------------------------------|
|                                                | 18-600 kHz                                                                         |
| <b>Functional Mode</b>                         | Tuning Fork (Flexure)                                                              |
| <b>Calibration Tolerance*</b>                  | See Tables 1 & 2                                                                   |
| <b>Motional Resistance (<math>R_1</math>)</b>  | See Figure 2<br>MAX: 2x Typ (18-25 kHz)<br>MAX: 2.5x Typ (25-600 kHz)              |
| <b>Motional Capacitance (<math>C_1</math>)</b> | Figure 3                                                                           |
| <b>Quality Factor (Q)</b>                      | Figure 4 (Min.: 0.25x Typ.)                                                        |
| <b>Shunt Capacitance (<math>C_0</math>)</b>    | 1.4 pF Typ.                                                                        |
| <b>Drive Level</b>                             | MAX: 0.5 $\mu$ W (18-25 kHz)<br>MAX: 1.0 $\mu$ W (25-600 kHz)                      |
| <b>Turning Point (<math>T_0</math>) **</b>     | Figure 5                                                                           |
| <b>Temperature Coefficient (k)</b>             | -0.035 ppm/°C <sup>2</sup>                                                         |
| <b>Aging, first year</b>                       | MAX. 5ppm                                                                          |
| <b>Shock ***</b>                               | 1500 g peak, 0.3 msec., 1/2 sine                                                   |
| <b>Vibration, survival ***</b>                 | 10 g rms, 20-2000 Hz random                                                        |
| <b>Operating Temperature</b>                   | -10°C to +70°C Commercial<br>-40°C to +85°C Industrial<br>-55°C to +125°C Military |
| <b>Storage Temperature</b>                     | -55°C to +125°C                                                                    |
| <b>Maximum Process Temperature</b>             | 260°C for 20 sec.                                                                  |

\*Tighter frequency calibration available.

\*\*Other turning point available.

\*\*\*Higher shock and vibration available.

**TABLE 1. CX-3V Crystal Calibration Tolerance at 25°C**  
Frequency Range (kHz)

| Calibration | 18-74.9 | 75-169.9 | 170-249.9 | 250-600 |
|-------------|---------|----------|-----------|---------|
| A           | ±0.003% | ±0.005%  | ±0.01%    | ±0.02%  |
| B           | ±0.01%  | ±0.01%   | ±0.02%    | ±0.05%  |
| C           | ±0.1%   | ±0.1%    | ±0.2%     | ±0.5%   |

\*Other calibration values available, consult factory.

**TABLE 2. Load Capacitance ( $C_L$ ), Used to Calibrate CX-3V**

| Frequency Range (kHz) | Load Capacitance (pF) | Frequency Range (kHz) | Load Capacitance (pF) |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 18-24.9               | 10                    | 100.1-179.9           | 5                     |
| 25-54.9               | 9                     | 180-600               | 4                     |
| 55-100.0              | 8                     |                       |                       |

## HOW TO ORDER CX-3V CRYSTALS

CX-3V \_\_\_\_\_ -SM1 32.768 kHz ( A / I )

"S" if special or custom design.  
Blank if Std.

SM1  
SM2  
SM3

Frequency

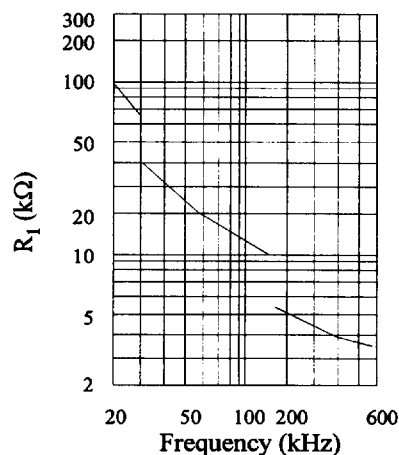
\*Calibration Tolerance @25°C  
(A)  
(B)  
(C)

Temp. Range:  
C = Commercial  
I = Industrial  
M = Military

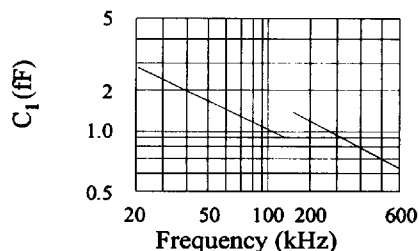
Blank=Glass Lid  
C=Ceramic Lid

\*Other calibration fill in ppm

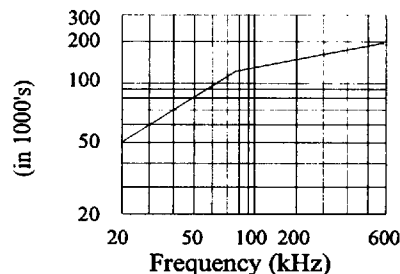
**FIGURE 2. CX-3V Typical Motional Resistance ( $R_1$ )**



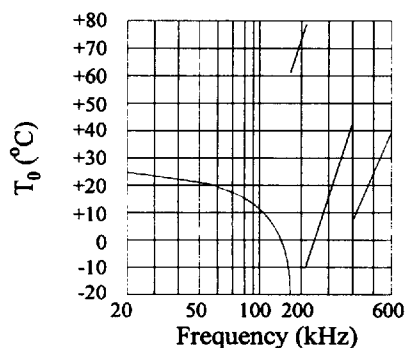
**FIGURE 3. CX-3V Typical Motional Capacitance ( $C_1$ )**



**FIGURE 4. CX-3V Typical Quality Factor (Q)**



**FIGURE 5. CX-3V Typical Turning Point Temperature ( $T_0$ )**



Note: Frequency deviation from frequency @ turning point temp.

$$\frac{f-f_0}{f_0} = k(T-T_0)^2$$