

2123JP

2840DM

Actual Size

Side View

STATEK

CX-2V-SM CRYSTAL

16 kHz to 600 kHz

MINIATURE SURFACE MOUNT
QUARTZ CRYSTAL
FOR PIERCE OSCILLATOR

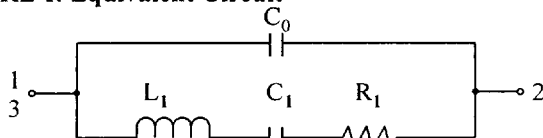
DESCRIPTION

The CX-2V-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

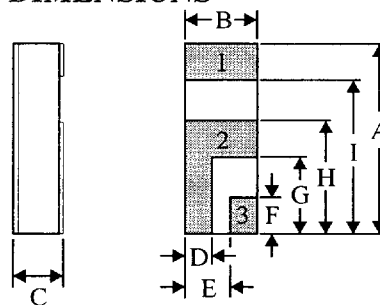
PACKAGING

CX-2V -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



TYP.

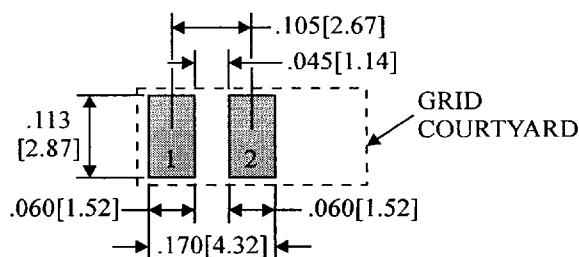
MAX.

DIM	INCHES	mm	INCHES	mm
A	.260	6.60	.275	6.99
B	.094	2.39	.108	2.74
C	----	----	SEE BELOW	
D	.035	0.89		
E	.059	1.50		
F	.050	1.27		
G	.105	2.67		
H	.155	3.94		
I	.210	5.33		

Note:
 Terminal 1 is
 electrically connected
 internally to terminal 3

DIM "C"	GLASS LID		CERAMIC LID	
MAX.	INCHES	mm	INCHES	mm
SM1	.065	1.65	.075	1.91
SM2	.067	1.70	.077	1.96
SM3	.070	1.78	.080	2.03

SUGGESTED LAND PATTERN



STATEK CORPORATION

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10134-9/96

SPECIFICATIONS

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

	16-600 kHz
Functional Mode	Tuning Fork (Flexure)
Calibration Tolerance*	See Tables 1 & 2
Motional Resistance (R_1)	See Figure 2 MAX: 2x Typ (16-24.9 kHz) MAX: 2.5x Typ (25-600 kHz)
Motional Capacitance (C_1)	Figure 3
Quality Factor (Q)	Figure 4 (Min.: 0.25x Typ.)
Shunt Capacitance (C_0)	1.6 pF Typ.
Drive Level	MAX: 0.5 μ W (16-24.9 kHz) MAX: 1.0 μ W (25-600 kHz)
Turning Point (T_0) **	Figure 5
Temperature Coefficient (k)	-0.035 ppm/ $^{\circ}$ C ²
Aging, first year	MAX. 5ppm
Shock ***	1500 g peak, 0.3 msec., 1/2 sine
Vibration, survival***	10 g rms, 20-2000 Hz random
Operating Temperature	-10 $^{\circ}$ C to +70 $^{\circ}$ C Commercial -40 $^{\circ}$ C to +85 $^{\circ}$ C Industrial -55 $^{\circ}$ C to +125 $^{\circ}$ C Military
Storage Temperature	-55 $^{\circ}$ C to +125 $^{\circ}$ C
Maximum Process Temperature	260 $^{\circ}$ C for 20 sec.

*Tighter frequency calibration available.

**Other turning point available.

***Higher shock and vibration available.

TABLE 1. CX-2V Crystal Calibration Tolerance at 25°C
Frequency Range (kHz)

Calibration	16-74.9	75-169.9	170-249.9	250-600
A	$\pm 0.003\%$	$\pm 0.005\%$	$\pm 0.01\%$	$\pm 0.02\%$
B	$\pm 0.01\%$	$\pm 0.01\%$	$\pm 0.02\%$	$\pm 0.05\%$
C	$\pm 0.1\%$	$\pm 0.1\%$	$\pm 0.2\%$	$\pm 0.5\%$

*Other calibration values available, consult factory.

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

Frequency Range (kHz)	Load Capacitance (pF)	Frequency Range (kHz)	Load Capacitance (pF)
16-24.9	10	100.1-179.9	5
25-54.9	9	180-600	4
55-100.0	8		

HOW TO ORDER CX-2V-SM CRYSTALS

CX-2V _____ -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-2V Typical Motional Resistance (R_1)

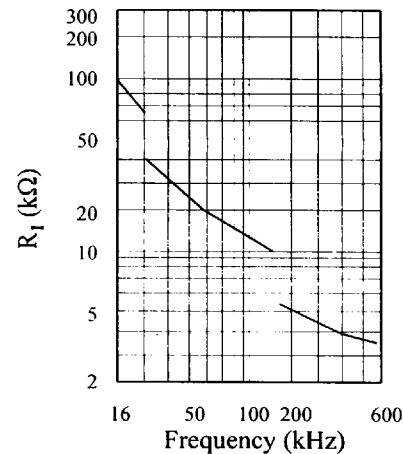


FIGURE 3. CX-2V Typical Motional Capacitance (C_1)

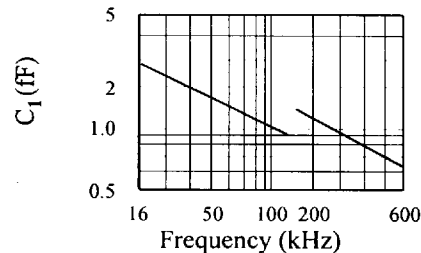


FIGURE 4. CX-2V Typical Quality Factor (Q)

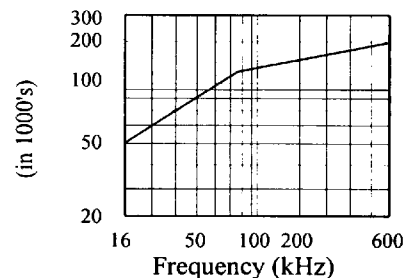
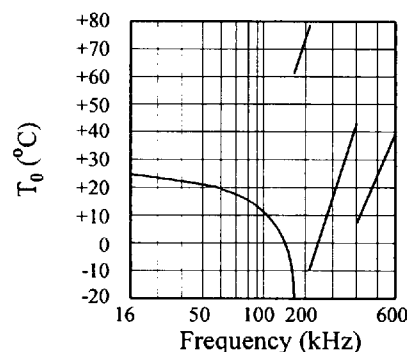


FIGURE 5. CX-2V Typical Turning Point Temperature (T_0)



Note: Frequency deviation from frequency @ turning point temp.

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