



CX-3V-SM CRYSTAL

18 kHz to 600 kHz

Miniature Surface Mount
Quartz Crystal for Pierce Oscillators

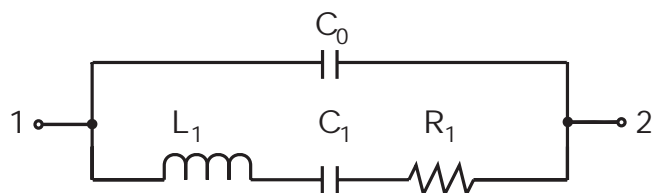
DESCRIPTION

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 a rugged, miniature ceramic package. 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

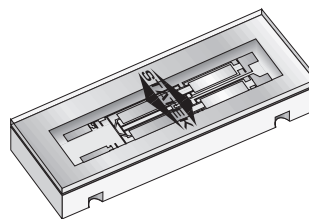
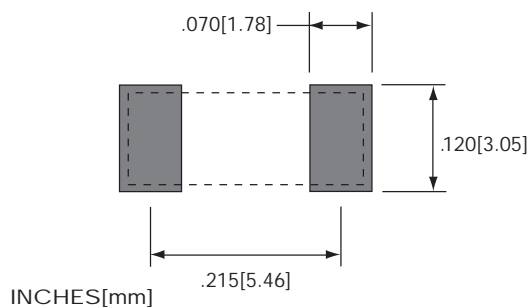
- Miniature tuning fork design
- High shock resistance
- Designed for low power applications
- Compatible with hybrid or PC board packaging
- Low aging
- Full military testing available
- Ideal for battery operated applications
- Designed and manufactured in the USA

EQUIVALENT CIRCUIT



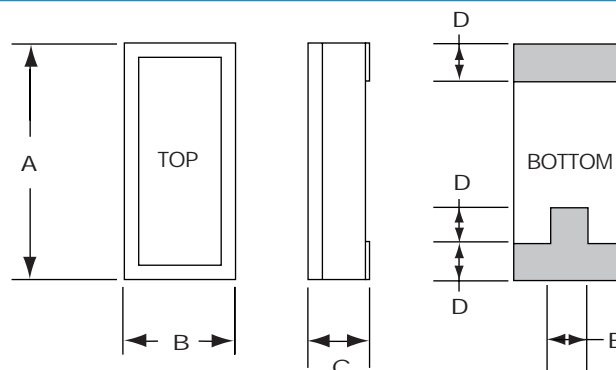
R_1 Motional Resistance L_1 Motional Inductance
 C_1 Motional Capacitance C_0 Shunt Capacitance

SUGGESTED LAND PATTERN



actual size
side view

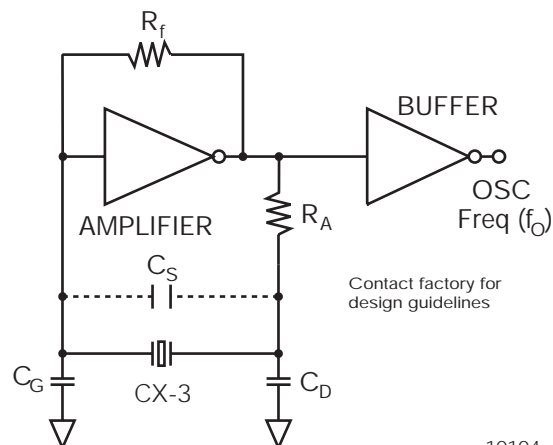
PACKAGE DIMENSIONS



	TYP.		MAX.	
DIM	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
E	.052	1.32	.062	1.57

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

CONVENTIONAL CMOS PIERCE OSCILLATOR CIRCUIT



Contact factory for
design guidelines

10104 - Rev A

SPECIFICATIONS

Specifications are typical at 25°C unless otherwise noted.

Specifications are subject to change without notice.

Frequency Range 18 kHz to 600 kHz
 Functional Mode Tuning Fork (Flexure)
 Calibration Tolerance* A, B or C
 (see below)
 Motional Resistance (R_1) See Figure 1
 MAX.: 18-25 kHz, 2x Typ.
 25-600 kHz, 2.5x Typ.

Motional Capacitance (C_1) Figure 2
 Quality Factor (Q) Figure 3
 Min. is 0.25x Typ.

Shunt Capacitance (C_0) 1.8 pF MAX.
 Drive Level 18-25 kHz 0.5 μ W MAX.
 25-600 kHz 1.0 μ W MAX.

Turning Point (T_0 **) Figure 4
 Temperature Coefficient (k) -0.035 ppm/°C²
 Aging, first year 5ppm MAX.
 Shock*** 1,500g peak, 0.3 msec., 1/2 sine
 Vibration, survival*** 10g rms, 20-2,000 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.

* Tighter frequency calibration available.

** Other turning point available.

*** Higher shock and vibration available.

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.

Load Capacitance (C_L), Used to Calibrate CX-3V (other C_L available)

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-SM 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 S = Specify
	Blank = Glass Lid C=Ceramic Lid			

*Other calibration fill in ppm.

FIGURE 1
CX-3V TYPICAL MOTIONAL RESISTANCE (R_1)

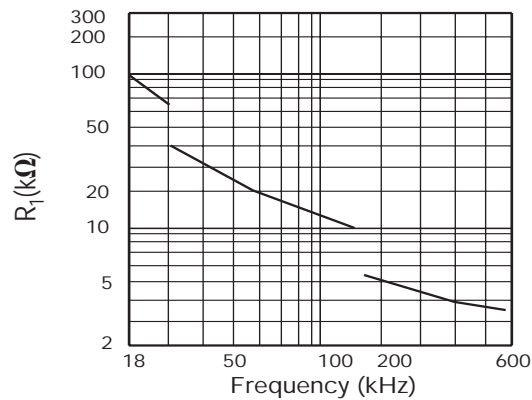


FIGURE 2
CX-3V TYPICAL MOTIONAL CAPACITANCE (C_1)

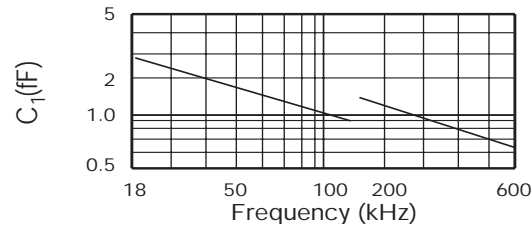


FIGURE 3
CX-3V TYPICAL QUALITY FACTOR (Q)

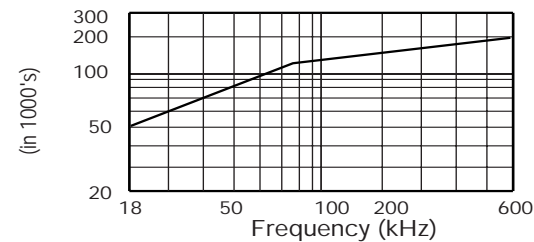
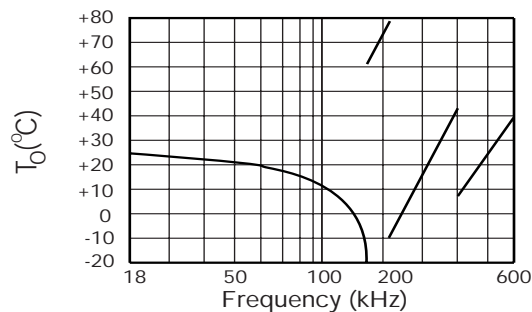


FIGURE 4
CX-3V TYPICAL TURNING POINT TEMP. (T_0)



Note: Frequency (f) deviation from frequency (f_0) @ turning point

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

TERMINATIONS

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

PACKAGING

CX-3V-SM - Tray Pack (Standard)

-16mm tape, 7" or 13" reels (Optional)
 Per EIA 481 (see data sheet 10109)