

CX1VSM CRYSTAL

10 kHz to 600 kHz

Miniature Surface Mount Quartz Crystal for Pierce Oscillators

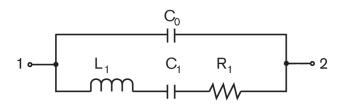
DESCRIPTION

The CX1VSM quartz crystal is a high quality tuning fork resonator for use in Pierce (single inverter) oscillators. The CX1VSM is hermetically sealed in a rugged, miniature ceramic package. The CX1VSM crystal is manufactured using the STATEK-developed photolithographic process, and was 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

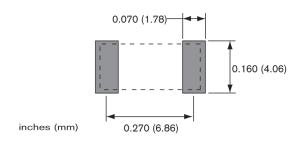
- Miniature tuning fork design
- High shock resistance
- Designed for low power applications
- Compatible with hybrid or PC board packaging
- Low aging
- Full military testing available
- Ideal for battery operated applications
- Designed and manufactured in the USA

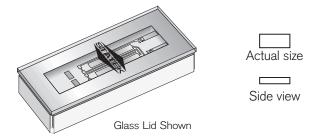
EQUIVALENT CIRCUIT



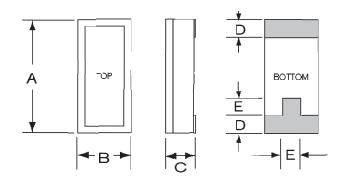
R₁ Motional Resistance L₁ Motional Inductance C₁ Motional Capacitance C₀ Shunt Capacitance

SUGGESTED LAND PATTERN





PACKAGE DIMENSIONS



	TYP.		MAX.		
DIM	inches	mm	inches	mm	
Α	0.315	8.00	0.330	8.38	
В	0.140	3.56	0.155	3.94	
С	-	-	see	below	
D	0.045	1.14	0.055	1.40	
Е	0.060	1.52	0.070	1.78	
DIM "C"	GLASS LID		CERAMIC LID		
MAX	inches	mm	inches	mm	
SM1	0.065	1.65	0.070	1.78	

1.70

1.78

0.072

0.075

1.83

1.90

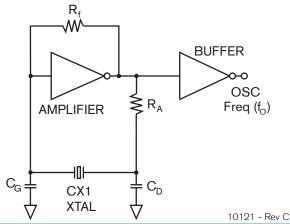
CONVENTIONAL CMOS PIERCE OSCILLATOR CIRCUIT

0.067

0.070

SM2/SM4

SM3/SM5



SPECIFICATIONS

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

Frequency Range 10 kHz to 600 kHz Standard Calibration Tolerance (see table below)

Motional Resistance (R₁) Figure 1

MAX: 10-169.9 kHz, 2x Typ.

170-600 kHz, 2.5x Typ.

Motional Capacitance (C₁) Figure 2 Quality Factor (Q) Figure 3

Min. is 0.25x Typ.

Shunt Capacitance (C_0) 2.0 pF MAX.

Drive Level 10-24.9 kHz 0.5 μW MAX.

 $25-600 \text{ kHz} 1.0 \mu\text{W MAX}.$

Turning Point $(T_0)^2$ Figure 4

Temperature Coefficient (k) -0.035 ppm/°C² Aging, first year 5 ppm MAX.

Shock, survival³ 1,000 g, 1ms, $\frac{1}{2}$ sine Vibration, survival³ 20 g RMS, 10-2,000 Hz

Operating Temp. Range -10°C to +70°C (Commercial)

 -40° C to $+85^{\circ}$ C (Industrial) -55° C to $+125^{\circ}$ C (Military)

Storage Temp. Range -55°C to +125°C Max Process Temperature 260°C for 20 sec.

- 1. Tighter frequency calibration available.
- 2. Other turning point available.
- 3. Higher shock and vibration available.

CX1VSM Standard Calibration Tolerance at 25°C

	Frequency Range (kHz)		
10-74.9	75-169.9	170-249.9	250-600
± 30 ppm	[±] 50 ppm	± 100 ppm	±200 ppm
(0.003%)	(0.005%)	(0.01%)	(0.02%)
± 100 ppm	± 100 ppm	± 200 ppm	±500 ppm
(0.01%)	(0.01%)	(0.02%)	(0.05%)
± 1000 ppm	± 1000 ppm	± 2000 ppm	±5000 ppm
(0.1%)	(0.1%)	(0.2%)	(0.5%)

Load Capacitance (C_L), Used to Calibrate CX1VSM (other C_L available)

Frequency Range (kHz)	Load Capacitance (pF)	Frequency Range (kHz)	Load Capacitance (pF)
10-15.9	11	55-99.9	8
16-24.9	10	100-179.9	5
25-54.9	9	180-600	4

HOW TO ORDER CX1VSM CRYSTALS

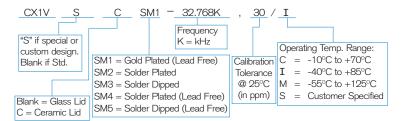


FIGURE 1
CX1V TYPICAL MOTIONAL RESISTANCE (R₁)

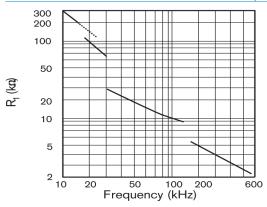


FIGURE 2 CX1V TYPICAL MOTIONAL CAPACITANCE (C₁)

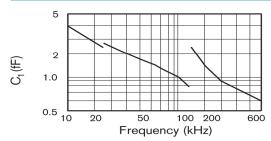


FIGURE 3 CX1V TYPICAL QUALITY FACTOR (Q)

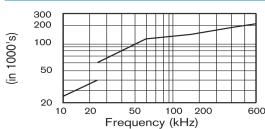
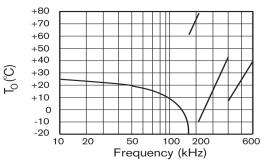


FIGURE 4 CX1V TYPICAL TURNING POINT TEMP. (T_o)



Note: Frequency f at temperature T is related to frequency f_0 at turning point temperature T_0 by: $\frac{f-f_0}{r} = k(T-T_0)^2$

TERMINATIONS

<u>Designation</u>	<u>Termination</u>
SM1	Gold Plated (Lead Free)
SM2	Solder Plated
SM3	Solder Dipped
SM4	Solder Plated (Lead Free)
SM5	Solder Dipped (Lead Free)

PACKAGING OPTIONS

CX1VSM - Tray Pack

- 16mm tape, 7" or 13" reels (Reference tape and reel data sheet 10109)



