CX2VSM CRYSTAL

16 kHz to 600 kHz

Miniature Surface Mount
Quartz Crystal for Pierce Oscillators

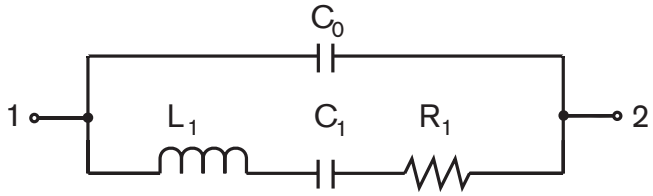
DESCRIPTION

The CX2VSM 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

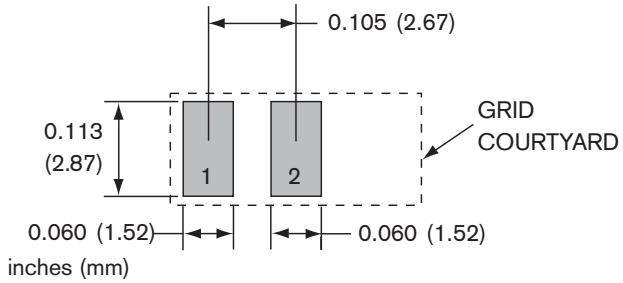
- Miniature tuning fork design
- High shock resistance
- Designed for low power applications
- Compatible with hybrid or PC board packaging
- Low aging
- Full military testing available
- Ideal for battery operated applications
- Designed and manufactured in the USA

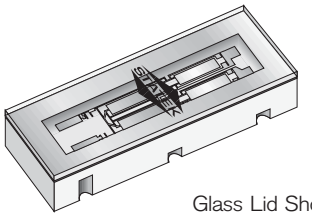
EQUIVALENT CIRCUIT



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

SUGGESTED LAND PATTERN



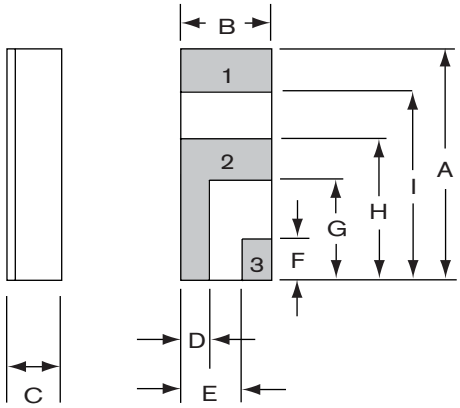


Glass Lid Shown

actual size

side view

PACKAGE DIMENSIONS



	TYP.		MAX.	
DIM	inches	mm	inches	mm
A	0.260	6.60	0.275	6.99
B	0.094	2.39	0.108	2.74
C	-	-	see below	
D	0.035	0.89	0.045	1.14
E	0.059	1.50	0.069	1.75
F	0.050	1.27	0.060	1.52
G	0.105	2.67	0.115	2.92
H	0.155	3.94	0.165	4.19
I	0.210	5.33	0.220	5.59

DIM "C"	GLASS LID		CERAMIC LID	
MAX	inches	mm	inches	mm
SM1	0.065	1.65	0.075	1.91
SM2	0.067	1.70	0.077	1.96
SM3	0.070	1.78	0.080	2.03

Note: Terminal 1 is electrically connected internally to terminal 3

10134 - Rev B

SPECIFICATIONS

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

Frequency Range	16 kHz to 600 kHz
Functional Mode	Tuning Fork (Flexure)
Standard Calibration Tolerance*	(see table below)
Motional Resistance, (R_1)	See Figure 1 MAX: 16-24.9 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)	2.0 pF MAX.
Drive Level	16-24.9 kHz 0.5 µW MAX 25-600 kHz 1.0 µW MAX
Turning Point, (T_0)**	Figure 4
Temperature Coefficient, (k)	-0.035 ppm/°C²
Aging, first year	5 ppm MAX
Shock, survival***	1,500 g peak, 0.3 ms, ½ sine
Vibration, survival***	10 g RMS, 20-2,000 Hz random
Operating Temp. Range	-10°C to +70°C (Commercial) -40°C to +85°C (Industrial) -55°C to +125°C (Military)
Storage Temp. Range	-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.

CX2V Standard Calibration Tolerance at 25°C

Frequency Range (kHz)			
16-74.9	75-169.9	170-249.9	250-600
± 30 ppm (0.003%)	± 50 ppm (0.005%)	± 100 ppm (0.01%)	±200 ppm (0.02%)
± 100 ppm (0.01%)	± 100 ppm (0.01%)	± 200 ppm (0.02%)	±500 ppm (0.05%)
± 1000 ppm (0.1%)	± 1000 ppm (0.1%)	± 2000 ppm (0.2%)	±5000 ppm (0.5%)

Load Capacitance (C_L), Used to Calibrate CX2V (other C_L available)

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 CX2VSM CRYSTALS

CX2V S C SM1 – 32.768K , 30 / M

- S: "S" if special or custom design. Blank if Srd.
- C: Blank = Glass Lid; C = Ceramic Lid
- SM1: SM1 = Gold Plated; SM2 = Solder Plated; SM3 = Solder Dipped
- 32.768K: Frequency K = kHz
- 30: Calibration Tolerance @ 25°C (in ppm)
- M: Operating Temp. Range: C = -10°C to +70°C; I = -40°C to +85°C; M = -55°C to +125°C; S = Customer Specified

FIGURE 1
CX2V TYPICAL MOTIONAL RESISTANCE (R_1)

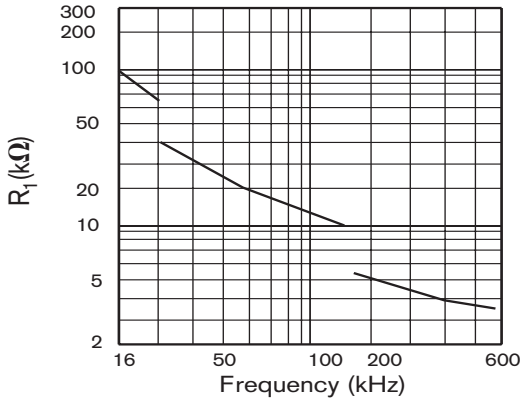


FIGURE 2
CX2V TYPICAL MOTIONAL CAPACITANCE (C_1)

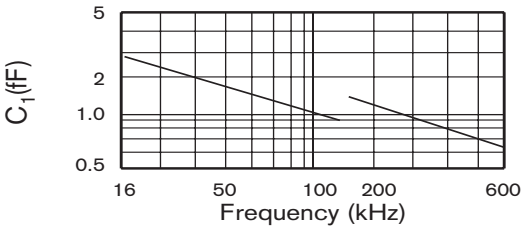


FIGURE 3
CX2V TYPICAL QUALITY FACTOR (Q)

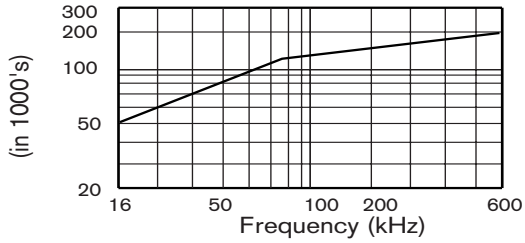
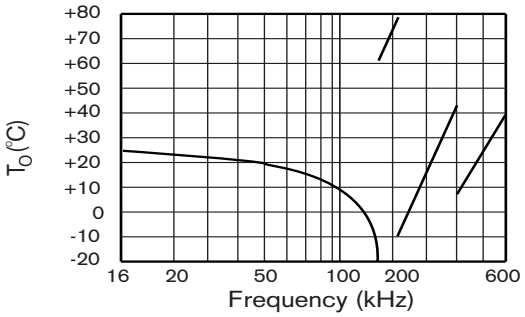


FIGURE 4
CX2V TYPICAL TURNING POINT TEMP. (T_o)



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

TERMINATIONS

Designation	Termination
SM1	Gold Plated
SM2	Solder Plated
SM3	Solder Dipped

PACKAGING OPTIONS

CX2VSM - Tray Pack
-16mm tape, 7" or 13" reels
(Reference tape and reel data sheet 10109)

10134 - Rev B