CX3HSM CRYSTAL

18 kHz to 600 kHz

Low Profile Surface Mount
Quartz Crystal for Series Oscillators

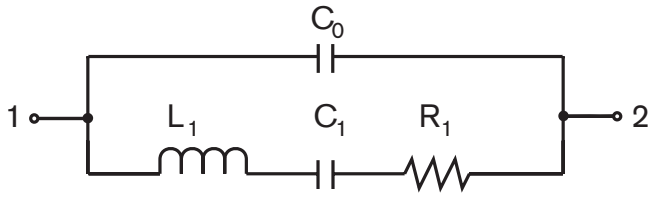
DESCRIPTION

The CX3HSM 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 Series 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

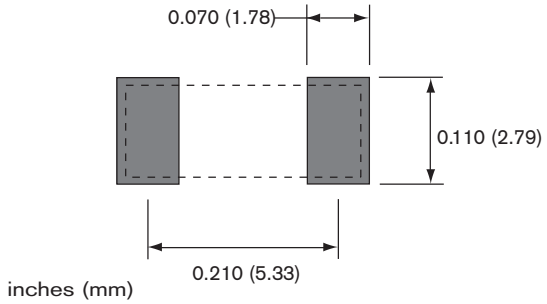
- Miniature tuning fork design
- High shock resistance
- Designed for low power applications
- Compatible with hybrid or PC board packaging
- Low aging
- Full military testing available
- Designed and manufactured in the USA

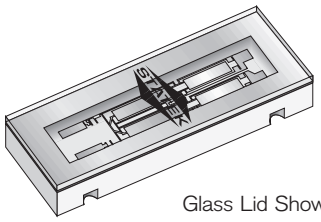
EQUIVALENT CIRCUIT



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

SUGGESTED LAND PATTERN



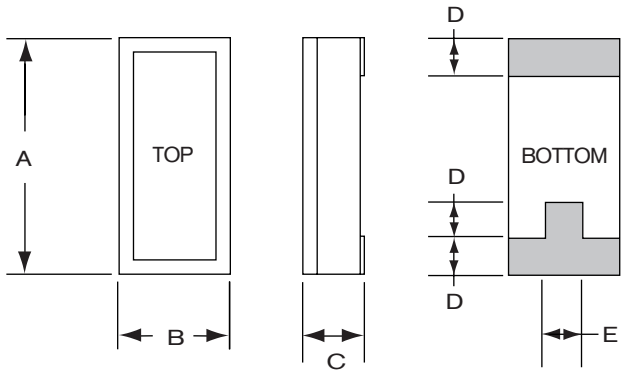


Glass Lid Shown

actual size

side view

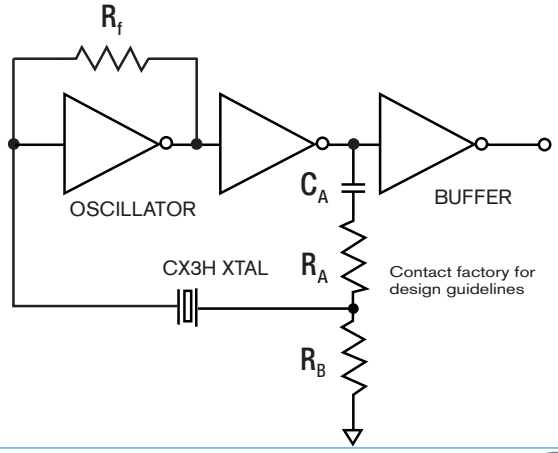
PACKAGE DIMENSIONS



DIM	TYP. inches	TYP. mm	MAX. inches	MAX. mm
A	0.263	6.68	0.270	6.86
B	0.097	2.46	0.104	2.64
C	-	-	see below	
D	0.052	1.32	0.058	1.47
E	0.030	0.76	0.035	0.89

DIM "C"	GLASS LID		CERAMIC LID	
MAX	inches	mm	inches	mm
SM1	0.053	1.35	0.067	1.70
SM2/SM4	0.055	1.40	0.069	1.75
SM3/SM5	0.058	1.47	0.072	1.83

CONVENTIONAL SERIES OSCILLATOR CIRCUIT



10146 - Rev E

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)
Standard Calibration Tolerance[1]	(see table 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	18-24.9 kHz 0.5 µW MAX. 25-600 kHz 1.0 µW MAX.
Turning Point (T_0)[2]	Figure 4
Temperature Coefficient (k)	-0.035 ppm/°C[2]
Aging, first year	5 ppm MAX
Shock, survival[3]	1,500 g, 0.3 ms, 1/2 sine
Vibration, survival[3]	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.

1. Other calibration values available, consult factory.
2. Other turning point available.
3. Higher shock and vibration available.

CX3H Standard Calibration Tolerance at 25°C

Frequency Range (kHz)			
18-74.9	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%)

PACKAGING OPTIONS

CX3HSM - Tray Pack

- Tape and Reel
  (Reference tape and reel data sheet 10109)

HOW TO ORDER CX3HSM CRYSTALS

CX3H S C SM1 – 32.0K , 30 / I

- S: "S" if special or custom design. Blank if Std.
- C: Blank = Glass Lid; C = Ceramic Lid
- SM1: SM1 = Gold Plated; SM2 = Solder Plated; SM3 = Solder Dipped; SM4 = Solder Plated (Lead Free); SM5 = Solder Dipped (Lead Free)
- 32.0K: Frequency K = kHz
- 30: Calibration Tolerance @ 25°C (in ppm)
- I: 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
CX3H TYPICAL MOTIONAL RESISTANCE (R_1)

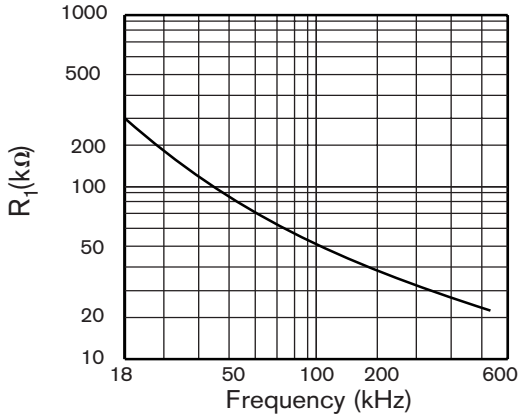


FIGURE 2
CX3H TYPICAL MOTIONAL CAPACITANCE (C_1)

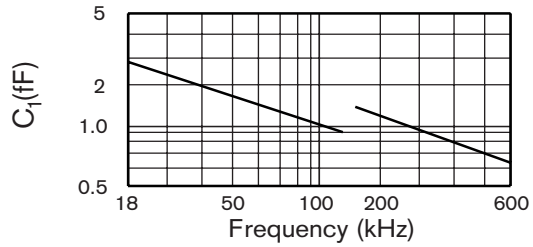


FIGURE 3
CX3H TYPICAL QUALITY FACTOR (Q)

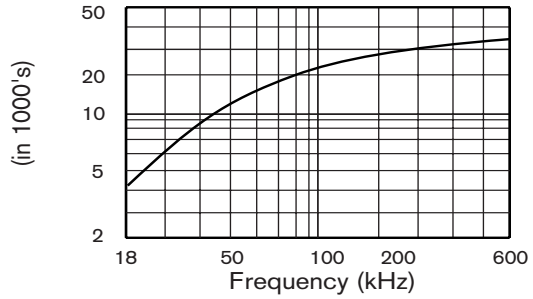
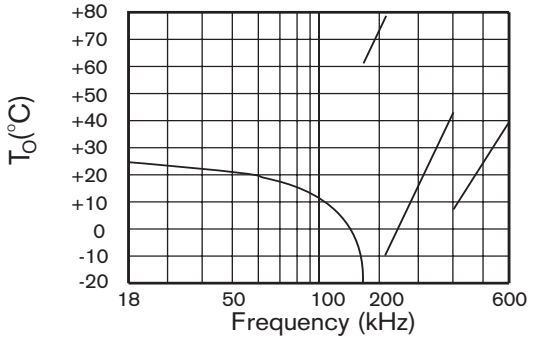


FIGURE 4
CX3H TYPICAL TURNING POINT TEMP. (T_o)



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
SM4	Solder Plated (Lead Free)
SM5	Solder Dipped (Lead Free)

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