

CX-1H-SM 10kHz to 600kHz

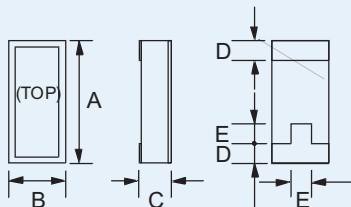
MINIATURE SMD CRYSTAL
FOR SERIES OSCILLATORS

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General Description

The miniature CX-1H-SM quartz crystal is a high quality tuning-fork resonator for use in series (two cascaded inverters) oscillators. The CX-1H-SM is hermetically sealed in a rugged, leadless ceramic package. The crystal has been designed for surface-mounting on printed circuit boards or hybrid circuits. The CX-1-SM crystal is manufactured using a photo-lithographic process, yielding consistently high quality production parts.



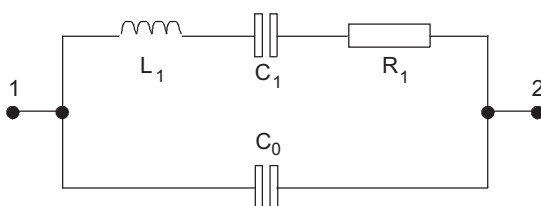
Outline

CX-1-SM Package Dimensions

Dimension	Typical (mm)	Maximum (mm)
A	8.00	8.38
B	3.56	3.94
C	-	see below
D	1.14	1.40
E	1.52	1.78

Dimension "C"	Glass Lid (mm max.)	Ceramic Lid (mm max.)
SM1	1.65	1.78
SM2	1.70	1.83
SM3	1.78	1.90

Equivalent Circuit



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

- Miniature tuning-fork design
- High shock resistance
- Designed for low-power applications
- Compatible with hybrid or PC board packaging
- Low ageing
- Full military environmental testing available
- Ideal for battery operated applications

Specification

Frequency Range:	10kHz to 600kHz
Calibration Tolerance*:	A, B or C (see table)
Motional Resistance (R_1):	Figure 1 Max.: 10 ~ 169.9kHz, 2x typ. 170~600kHz, 2.5x typ.
Motional Capacitance (C_1):	Figure 2
Quality Factor (Q):	Figure 3 Min. is 0.25x typ.
Shunt Capacitance (C_0):	2.0pF max.
Drive Level:	10~24.98kHz 1.5 μ W max. 25~600kHz 3.0 μ W max.
Turning Point (T_0)**:	Figure 4
Temperature Coefficient:	-0.035ppm/ $^{\circ}$ C ²
Ageing, first year:	\pm 5ppm max.
Shock, survival***:	1000g 1ms, 1/2 sine
Vibration, survival***:	20g rms, 10-2,000Hz random
Operating Temperature:	-10 $^{\circ}$ ~+70 $^{\circ}$ C (commercial) -40 $^{\circ}$ ~+85 $^{\circ}$ C (industrial) -55 $^{\circ}$ ~+125 $^{\circ}$ C (military)
Storage Temperature:	-55 $^{\circ}$ C~+125 $^{\circ}$ C
Process Temperature:	260 $^{\circ}$ C for 20 seconds

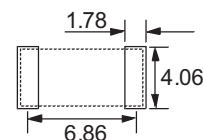
Specifications are typical at 25 $^{\circ}$ C unless otherwise indicated.

- * Tighter frequency calibration available
- ** Other turning point available
- *** Higher shock and vibration version available

CX-1H-SM Crystal Calibration Tolerance at 25 $^{\circ}$ C

Calibration	Frequency Range (kHz)			
	10~74.9	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%

Solder Pad Layout



CX-1H-SM 10kHz to 600kHz

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Circuit Design

Conventional Series Oscillator Circuit

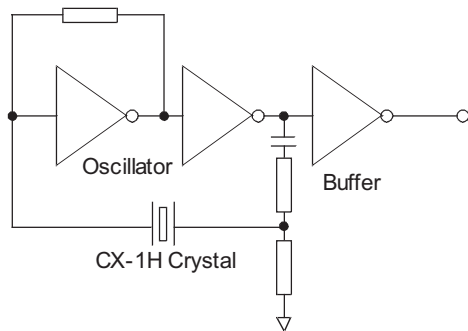


Figure 1 - CX-1H Typical Motional Resistance (R_1)

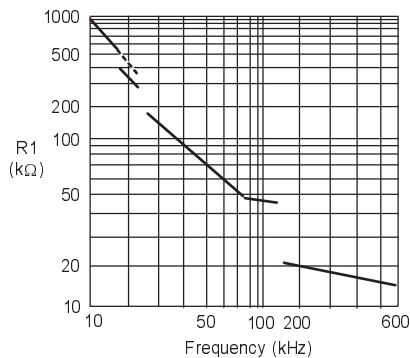


Figure 2 - CX-1H Typical Motional Capacitance (C_1)

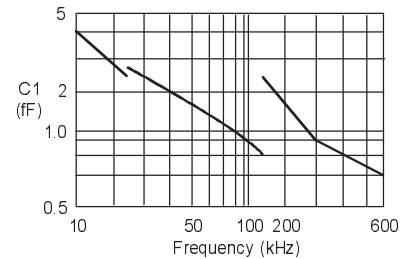


Figure 3 - CX-1H Typical Quality Factor (Q)

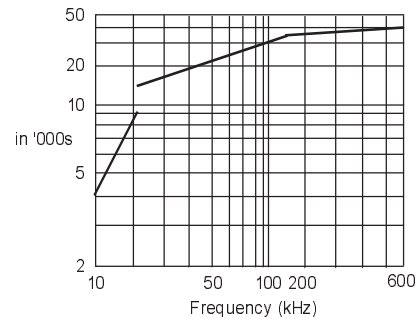
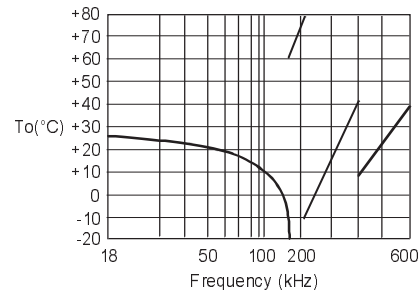


Figure 4 - CX-1H Typical Turning Point Temp. (T_0)



Packaging

- CX-1H-SM - Bulk Pack (Standard)
- 16mm tape, 178mm or 330mm reels (Optional) per EIA 481
- Tray Pack (Optional)

Order Code

CX-1H C = Ceramic Lid
Blank = Glass Lid Frequency **-SM1 32.768kHz** (**A** / **I**)

"S" if special or custom design
Blank if standard

SM1
SM2
SM3

Calibration Tolerance* @ 25°C
A, B, C

Temperature Range:
C = Commercial
I = Industrial
M = Military
S = Specify

*For other calibration tolerances enter figure in ppm

Terminations

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