

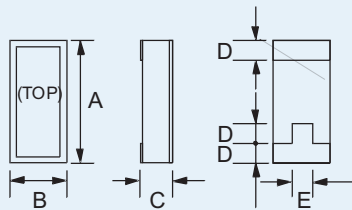
CX-3V-SM 18kHz to 600kHz MINIATURE SMD CRYSTAL

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General Description

The miniature CX-3V-SM crystals are leadless devices designed for surface-mounting on printed circuit boards or hybrid substrates. These crystals are intended for use in Pierce oscillators. Hermetically sealed in a rugged, miniature ceramic package the crystals are produced using a photo-lithographic process giving repeatability and consistency.



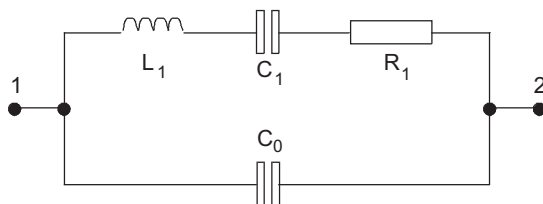
Outline

CX-3V-SM Package Dimensions

Dimension	Typical (mm)	Maximum (mm)
A	6.73	7.11
B	2.62	2.90
C	-	see below
D	1.27	1.52
E	1.32	1.57

Dimension "C"	Glass Lid (mm max.)	Ceramic Lid (mm max.)
SM1	1.47	1.75
SM2	1.52	1.80
SM3	1.60	1.88

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 PCB mounting
- Low ageing
- Full military environmental testing available
- Ideal for battery operated applications

Specification

Frequency Range:	18kHz to 600kHz
Functional Mode:	Tuning Fork (Flexure)
Calibration Tolerance*:	A, B, or C (see below)
Motional Resistance (R_1):	See Figure 1 Max: 18-25kHz, 2 x typ. 25-600kHz, 2.5 x typ.
Motional Capacitance (C_1):	See Figure 2
Quality Factor (Q):	See Figure 3 min. is 0.25 x typ.
Shunt Capacitance (C_0):	1.8pF max.
Drive Level:	18-25kHz 0.5µW max. 25-600kHz 1.0µW max.
Turning Point (T_0)**:	See Figure 4
Temperature Coefficient:	-0.035ppm/°C
Ageing, first year:	±5ppm max.
Shock***:	1,500g peak, 0.3ms, ½ sine
Vibration, survival:	10g rms 20-2,000Hz random
Operating Temperature:	-10°~+70°C (commercial) -40°~+85°C (industrial) -55°~+125°C (military)
Storage Temperature:	-55°C~+125°C
Max. Process Temperature:	260°C for 20 seconds

Specifications are typical at 25°C unless otherwise indicated.

- * Closer frequency calibration available
- ** Other turning point available
- *** A higher shock and vibration version is available.

CX-3V Crystal Calibration Tolerance at 25°C

Calibration	Frequency Range (kHz)			
	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%

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Circuit Design

Conventional HCMOS Pierce Oscillator Circuit

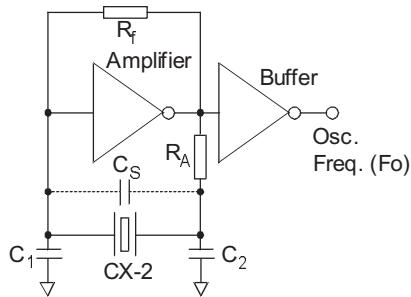


Figure 1 - CX-3V Typical Motional Resistance (R₁)

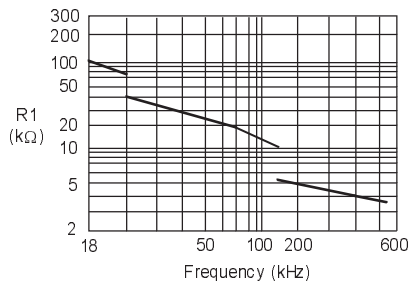
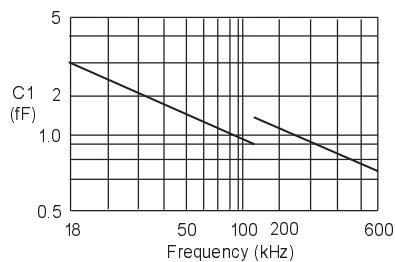


Figure 2 - CX-3V Typical Motional Capacitance (C₁)



Packaging

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

Order Code

CX-3V O.T.=3rd O.T. Mode
Blank = Fundamental Frequency
"S" if special or custom design
Blank if standard C = Ceramic Lid
Blank = Glass Lid **-SM1 32.768kHz** (**A** / **I**)
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

Figure 3 - CX-3V Typical Quality Factor (Q)

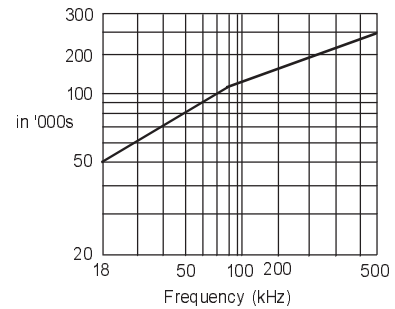
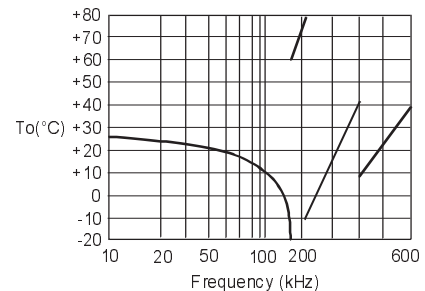
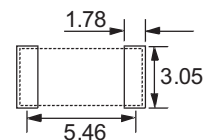


Figure 4 - CX-3V Typical Turning Point Temp. (°C)



Solder Pad Layout



Terminations

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