

CX-2V

10kHz to 600kHz

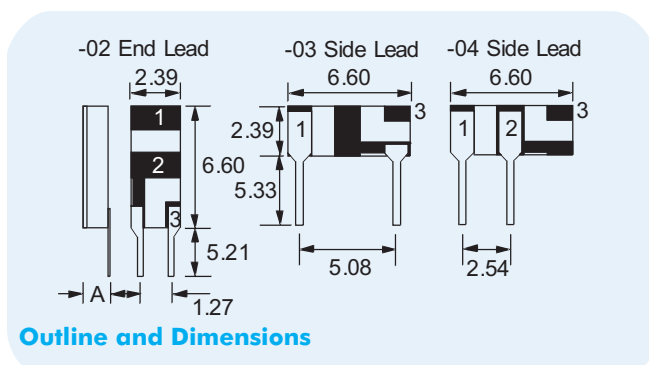
MINIATURE QUARTZ CRYSTAL
FOR PIERCE OSCILLATORS

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General Description

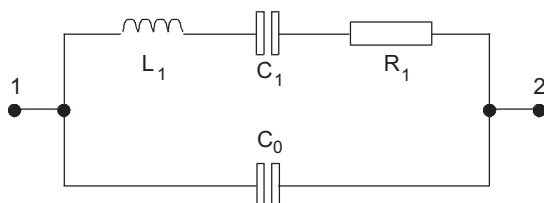
The CX-2V quartz crystal is a high quality tuning fork resonator designed for use in Pierce (single inverter) oscillators. The CX-2V is hermetically sealed in a rugged, miniature ceramic package, a quarter the size of an eight pin dual-in-line package. The crystal is manufactured utilizing a photo-lithographic process, ensuring consistency and repeatability of electrical characteristics.



Notes:

- Terminal 1 is electrically connected to terminal 3.
- Lead Dimensions: width 0.33mm typical, thickness 0.18mm.
- A = Glass Lid - 2.03mm max.
Ceramic Lid - 2.41mm max.

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 packaging
- Low ageing
- Full military environmental testing available

Specification

Frequency Range:	10kHz to 600kHz
Functional Mode:	Tuning Fork (Flexure)
Calibration Tolerance*:	A, B, or C (see table below)
Motional Resistance (R_1):	Figure 1 2x Typ. @ 16~24.9kHz 2.5x Typ. @ 25~600kHz
Motional Capacitance (C_1):	Figure 2
Quality Factor (Q):	Figure 3 (Minimum is 0.25x Typ.)
Shunt Capacitance (C_0):	2.0pF max.
Drive Level:	0.5 μ W max. @ 16~24.9kHz 1.0 μ W max. @ 25~600kHz
Turning Point (T_0)**:	Figure 4
Temperature Coefficient (k):	-0.035ppm/ $^{\circ}$ C ²
Ageing, first year:	\pm 5ppm max.
Shock, survival***:	1,000g 1ms, 1/2 sine
Vibration, survival***:	10g rms 20 - 2,000Hz
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:	Lead to Package temp. not to exceed 175 $^{\circ}$ C Glass lid to package seal rim temp. not to exceed 210 $^{\circ}$ C

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

* Closer calibration available

** Other turning point available

CX-2V Crystal Calibration Tolerance at 25 $^{\circ}$ C

Calibration	Frequency Range (kHz)			
	16~74.9	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%

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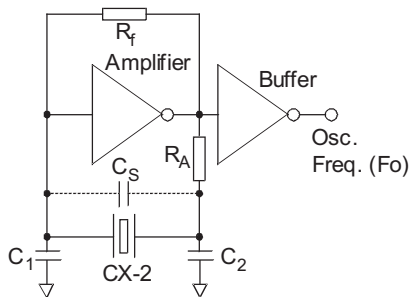
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Package Handling

The CX crystal is hermetically sealed in a ceramic package. Normal handling and soldering precautions for small, low thermal mass parts are adequate when installing or testing CX crystals. The crystals may be wave soldered, taking proper precautions to avoid desoldering the leads. A slow machine rate or too high a pre-heat temperature or solder bath temperature can damage the crystals. Lead to package solder interface temperature should not exceed 175°C, and glass lid to package seal rim temperature should not exceed 210°C. Should the seal rim temperature exceed these limits the package may lose its hermeticity. Loss of hermeticity results in a decrease of frequency and increase in motional resistance.

Conventional HCMOS Pierce Oscillator Circuit



Packaging

CX-2V - Bulk Pack (Standard)
Tray Pack (Optional)

Order Code

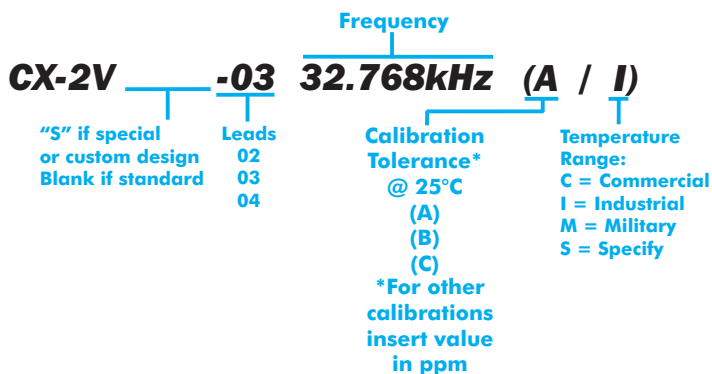


Figure 1 - CX-2V Typical Motional Resistance (R₁)

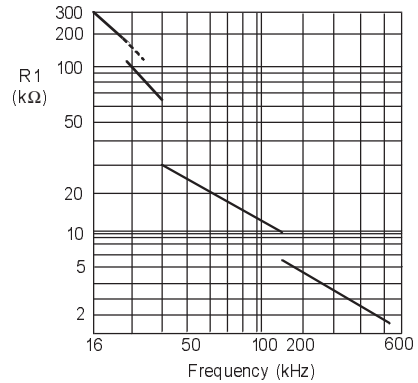


Figure 2 - CX-2V Typical Motional Capacitance (C₁)

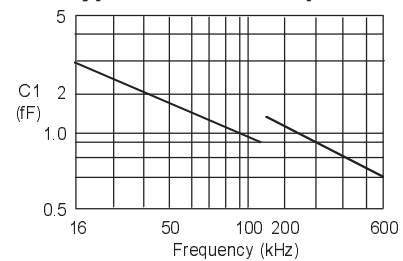


Figure 3 - CX-2V Typical Quality Factor (Q)

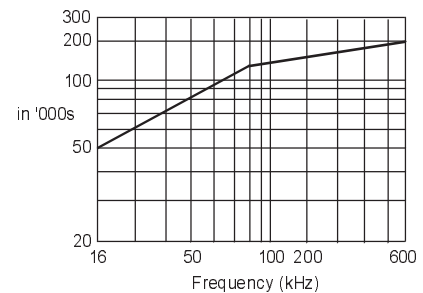
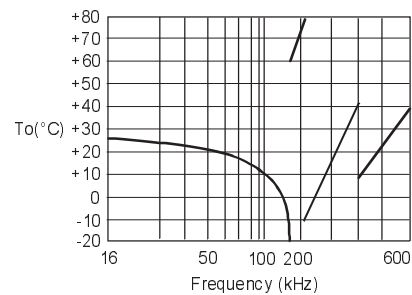


Figure 4 - CX-2V Typical Turning Point Temp. (°C)



$$\frac{f-f_0}{f_0} = k(T-T_0)^2$$