

CX-1-03

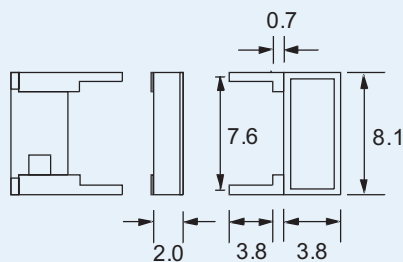
8MHz to 160MHz
MINIATURE AT-CUT
QUARTZ CRYSTAL

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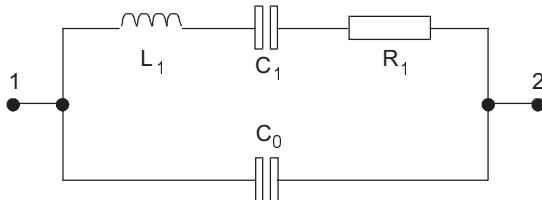
General Description

The CX-1 quartz crystal is a high quality miniature AT-cut resonator. The CX-1 is hermetically sealed in a rugged, miniature ceramic package, a quarter of 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.



Outline and Dimensions

Equivalent Circuit



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

Standard Frequencies (MHz)

| | | |
|---------|---------|---------|
| 10.0 | 19.6608 | 32.0 |
| 11.0592 | 20.0 | 35.2512 |
| 12.0 | 24.0 | 36.0 |
| 14.318 | 24.576 | 40.0 |
| 16.0 | 30.0 | |

- Low-profile hermetically sealed package
- Excellent ageing characteristics
- Fundamental or 3rd Overtone mode
- High shock resistance
- Full military environmental testing available

Specification

| | |
|---|--|
| Frequency Range: | 8MHz to 160MHz |
| Calibration Tolerance*: | A $\pm 0.01\%$ (± 100 ppm) B $\pm 0.1\%$ C $\pm 1.0\%$ |
| Load Capacitance: | 20pF (unless other required) |
| Motional Resistance (R_1): | See table |
| Motional Capacitance (C_1): | See table |
| Quality Factor (Q): | See table |
| Shunt Capacitance (C_0): | See table |
| Drive Level: | 500 μ W max. |
| Temperature Stability**: | -10 $^\circ$ to +70 $^\circ$ C (Commercial) -40 $^\circ$ to +85 $^\circ$ C (Industrial) -55 $^\circ$ to +125 $^\circ$ C (Military) ± 5 ppm max. |
| Ageing, first year: | ± 5 ppm max. |
| Shock, survival***: | 3000g 0.3ms, 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: | 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. The characteristics of the frequency stability parameter follow that of AT-cut, thickness-shear mode crystals.

* Closer calibration available, as low as ± 5 ppm

** Does not include calibration tolerance

*** A higher shock version is available, refer to data sheet for the model CX-1HG

CX-1 Motional Parameters, Q and C_0

| Frequency | Motional Resistance R_1 (Ω) | Motional Capacitance C_1 (fF) | Quality Factor '000s | Shunt Capacitance C_0 (pF) |
|-----------|---|------------------------------------|-------------------------|---------------------------------|
| 10.0MHz | 50 | 5.5 | 80 | 2.2 |
| 32MHz | 20 | 7.8 | 36 | 2.6 |
| 155MHz | 50 | 0.5 | 41 | 3.2 |

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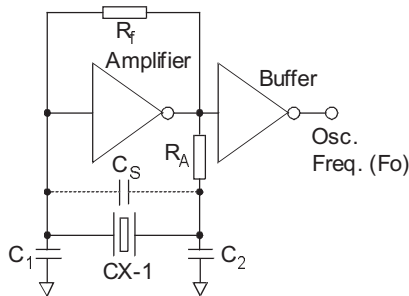
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Circuit Design

Typical HCMOS Pierce Oscillator

A conventional HCMOS Pierce oscillator is shown below. The crystal oscillates at a frequency f_o above the crystal's series-resonant frequency. The crystal is effectively inductive and in combination with R_f , C_1 and C_2 in the feedback loop, provides approximately 180° of the phase shift necessary to ensure oscillation.

Conventional HCMOS Pierce Oscillator Circuit



Packaging

CX-1-03 - Bulk Pack (Standard)
 Tray Pack (Optional)

Order Code

| | | | | | | |
|---|---|------------|---------------------------|--|--|--|
| CX-1 | O.T.=3rd O.T. Mode Blank = Fundamental | -03 | Frequency 32MHz | (A / 25ppm / 50ppm / I) | Total Frequency Tolerance | |
| "S" if special or custom design Blank if standard | C = Ceramic Lid Blank = Glass Lid | Side leads | | Calibration Tolerance* @ 25°C A, B, C | Frequency Stability over Temperature Range | Temperature Range: C = Commercial I = Industrial M = Military S = Specify |
| | | | | *For other calibration tolerances enter figure in ppm | | |