

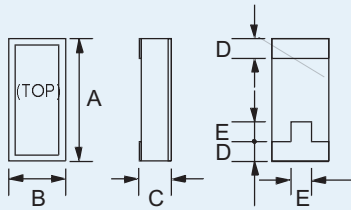
CX-1-SM 8MHz to 160MHz MINIATURE AT-CUT SMD CRYSTAL

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Telephone: +44(0)1460 230000
Fax: +44(0)1460 230001
Email: sales@euroquartz.co.uk
Web: www.euroquartz.co.uk

General Description

The miniature CX-1-SM crystals in leadless ceramic packages have been designed for surface-mounting on printed circuit boards or hybrid circuits. It is a robust crystal that has gained widespread acceptance in the industry.



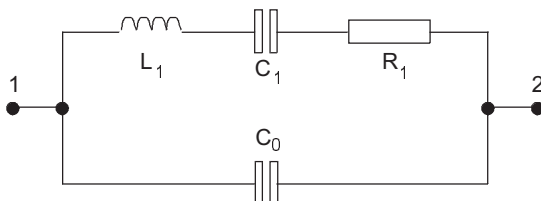
Outline

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

- Surface-mount - infrared, vapour phase, wave solder or epoxy mount techniques
- Low profile, hermetically sealed package
- Available with glass or ceramic lid
- High shock and vibration resistance
- Custom designs available
- 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 from ± 10 ppm -40 $^\circ$ to +85 $^\circ$ C from ± 20 ppm -55 $^\circ$ to +125 $^\circ$ C from ± 30 ppm
Ageing, first year:	± 5 ppm max.
Shock, survival***:	3000g 0.3ms, $\frac{1}{2}$ 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. 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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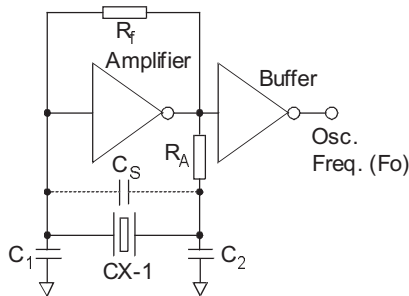
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Circuit Design

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



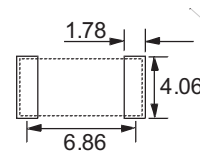
Terminations

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

Packaging

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

Suggested Solder Pad Layout



Order Code

