

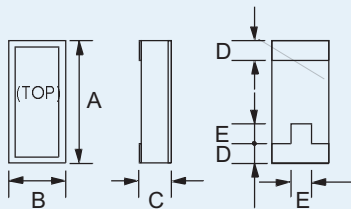
## CX-1-SM 8MHz to 160MHz MINIATURE AT-CUT SMD CRYSTAL

Page  
1 of 2

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.



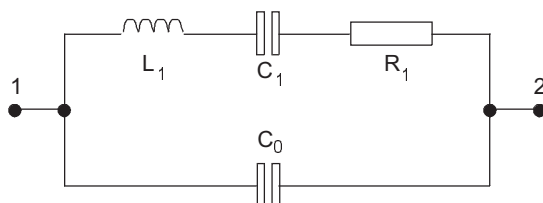
Outline

### 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

<b>Frequency Range:</b>	8MHz to 160MHz
<b>Calibration Tolerance*:</b>	A $\pm 0.01\%$ ( $\pm 100$ ppm) B $\pm 0.1\%$ C $\pm 1.0\%$
<b>Load Capacitance:</b>	20pF (unless other required)
<b>Motional Resistance (<math>R_1</math>):</b>	See table
<b>Motional Capacitance (<math>C_1</math>):</b>	See table
<b>Quality Factor (Q):</b>	See table
<b>Shunt Capacitance (<math>C_0</math>):</b>	See table
<b>Drive Level:</b>	500 $\mu$ W max.
<b>Temperature Stability**:</b>	-10 $^\circ$ to +70 $^\circ$ C from $\pm 10$ ppm -40 $^\circ$ to +85 $^\circ$ C from $\pm 20$ ppm -55 $^\circ$ to +125 $^\circ$ C from $\pm 30$ ppm
<b>Ageing, first year:</b>	$\pm 5$ ppm max.
<b>Shock, survival***:</b>	3000g 0.3ms, 1/2 sine
<b>Vibration, survival:</b>	20g rms 10-2,000Hz random
<b>Operating Temperature:</b>	-10 $^\circ$ ~+70 $^\circ$ C (commercial) -40 $^\circ$ ~+85 $^\circ$ C (industrial) -55 $^\circ$ ~+125 $^\circ$ C (military)
<b>Storage Temperature:</b>	-55 $^\circ$ C~+125 $^\circ$ C
<b>Process Temperature:</b>	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  $\pm 5$ 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 $R_1$ ( $\Omega$ )	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

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

Page  
 2 of 2

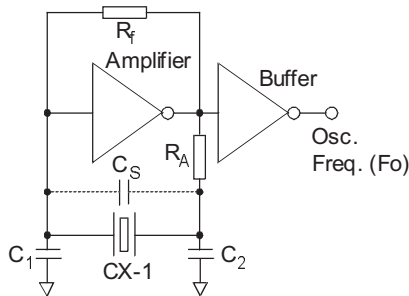
Telephone: +44(0)1460 230000  
 Fax: +44(0)1460 230001  
 Email: sales@euroquartz.co.uk  
 Web: www.euroquartz.co.uk

## 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  $180^\circ$  of the phase shift necessary to ensure oscillation.

### Conventional HCMOS Pierce Oscillator Circuit



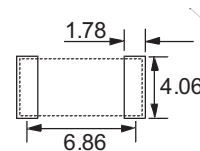
## Terminations

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

