

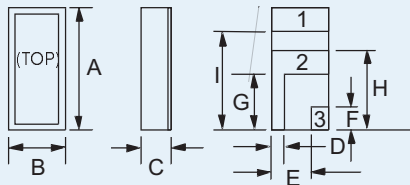
## CX-2-SM 9.6MHz to 160MHz MINIATURE AT-CUT SMD CRYSTAL

Page  
1 of 2

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## General Description

The miniature CX-2-SM AT-cut crystals in leadless ceramic packages have been designed for surface-mounting on printed circuit boards or hybrid circuits. These crystals have a low profile and a very small footprint. Manufactured by a photo-lithographic process, the CX-2-SM is a robust crystal that has gained widespread acceptance in the industry.



Terminal 1 is electrically connected to terminal 3

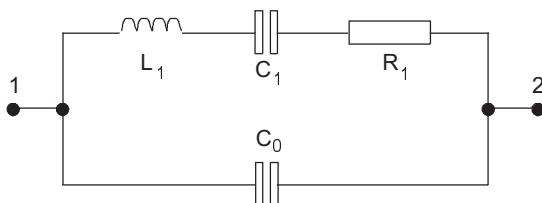
### Outline

### CX-2-SM Package Dimensions

Dimension	Typical (mm)	Maximum (mm)
A	6.60	6.99
B	2.39	2.74
C	-	see below
D	0.89	1.14
E	1.50	1.75
F	1.27	1.52
G	2.67	2.92
H	3.94	4.19
I	5.33	5.59

Dimension "C"	Glass Lid (mm max.)	Ceramic Lid (mm max.)
SM1	1.65	1.91
SM2	1.70	1.96
SM3	1.78	2.03

### 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>	9.6MHz 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. Frequency stability characteristics 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-2-SM 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	60	2.8	95	1.4
32MHz	20	7.8	36	2.4
155MHz	50	0.5	41	3.2

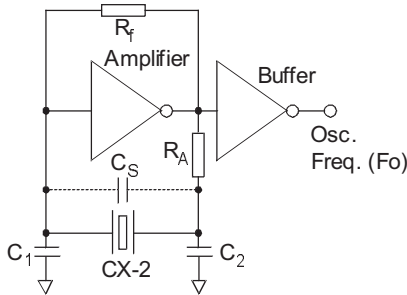
**CX-2-SM**  
**9.6MHz to 160MHz**  
 MINIATURE AT-CUT  
 SMD CRYSTAL

Page  
 2 of 2

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## Circuit Design

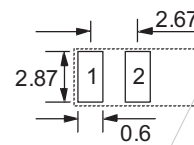
### Conventional HCMOS Pierce Oscillator Circuit



## Packaging

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

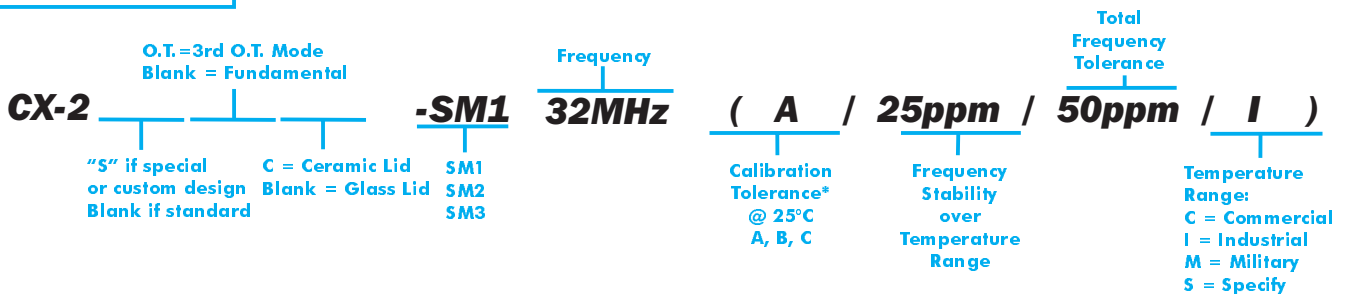
## Solder Pad Layout



## Terminations

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

## Order Code



\*For other calibration tolerances enter figure in ppm