

### FEATURES

- Frequency Range 32.768kHz and 100kHz to 180kHz
- High shock resistance
- Ultra-small ceramic package
- Low ageing
- Designed for low power applications
- Full MIL testing available

### DESCRIPTION

CX11SM crystals are leadless devices designed for surface mounting on PCBs or hybrid substrates. The crystals have very small outline and low-profile and are suited for all low frequency applications.

### SPECIFICATION

Specifications stated are typical at 25°C unless otherwise indicated. Specifications may change without notice.

Parameters	Fundamental	
Frequency (kHz):	32.768	100.0
Motional Resistance R1 (kΩ):	50	20
Motional Capacitance C1 (ff):	3.5	1.0
Quality Factor Q (k):	25	70
Shunt Capacitance C0 (pF):	1.0	0.8
Load Capacitance (pF) <sup>1</sup> :	9	9
Mass (Ceramic lid, SM1)	12mg	12mg
Turnover Temperature (°C) <sup>2,3</sup> :	25	18
Calibration Tolerance <sup>4</sup> :	±20ppm	±100ppm

Drive Level:	0.5µW max.
Freq./Temperature Constant (k):	-0.035ppm/°C <sup>2</sup>
Ageing, first year:	3ppm maximum
Shock, Survival:	5,000g, 0.3ms, ½ sine
Vibration, survival:	20g rms, 10~2000Hz swept sine
Operating Temperature Range	
Commercial:	-10° to +70°C
Industrial:	-40° to +85°C
Military:	-55 to +125°C
Storage Temperature Range:	-55° to +125°C
Maximum Process Temperature:	+260°C for 20 seconds

1. Other load capacitance values are available.
2. The crystal frequency  $f$  as a function of temperature  $T$  follows the parabolic relationship:  

$$f(T) = f(T_0) [1 + k(T - T_0)^2]$$
 where  $T_0$  is the turnover temperature and  $k$  is the frequency-temperature constant.
3. Other turnover temperature available.
4. Tighter tolerances available.

### PACKAGING OPTIONS

CX11SM crystals are available either tray packed (<250pcs) or tape and reel (>250 pieces).  
12mm tape, 178mm or 330mm reels (EIA 418).

### HOW TO ORDER CX11SM CRYSTALS

**CX11 - S - C - SM1 - 32.768K, 100 / I**

'S' if special, custom design. Otherwise leave blank

Blank = glass lid  
C = ceramic lid

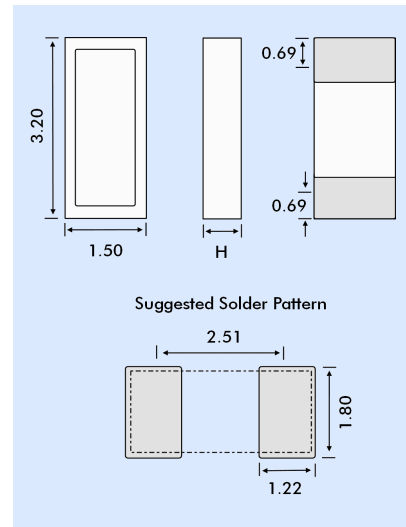
Terminations  
 SM1 = Gold plated \*  
 SM2 = Solder plated  
 SM3 = Solder dipped  
 SM4 = Solder plated \*  
 SM5 = Solder dipped \*  
 \* = Lead free

Frequency  
K = kHz

Calibration Tolerance\*  
 A  
 B  
 C

Temp. Range  
 C = -10° ~ +70°C  
 I = -40° ~ +85°C  
 M = -55° ~ +125°C  
 S = Customer specified

### OUTLINE & DIMENSIONS

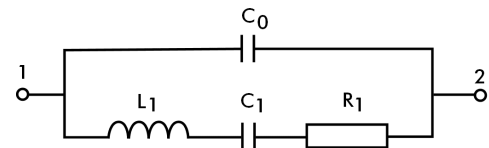


Dim. H	Glass Lid	Ceramic Lid	Thin Glass Lid
SM1	0.74	0.77	0.77
SM2	0.77	0.79	0.79
SM3	0.81	0.84	0.71
SM4	0.77	0.79	0.79
SM5	0.81	0.84	0.71

### TERMINATIONS - PLATING

Designation	Termination
SM1	Gold Plated (Lead Free)
SM2	Solder Plated
SM3	Solder Dipped
SM4	Solder Plated (Lead Free)
SM5	Solder Dipped (Lead Free)

### CRYSTAL EQUIVALENT CIRCUIT



R1 Motional Resistance      L1 Motional Inductance  
 C1 Motional Capacitance      C0 Shunt Capacitance