



CX11VSM CRYSTAL

32 kHz to 180 kHz
Surface Mount Quartz Crystal

DESCRIPTION

Designed and manufactured in the USA, Statek's CX11VSM tuning-fork quartz crystal has an extremely small footprint (3.2 mm x 1.5 mm) and a very low profile (under 1 mm). For applications where space or mass are a premium, the small size and low mass of the CX11VSM make it the ideal choice.

FEATURES

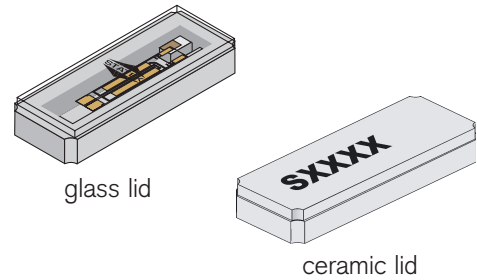
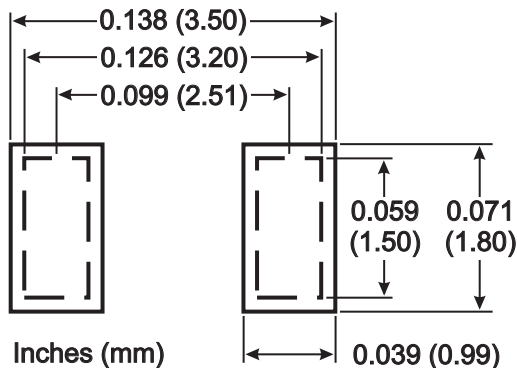
- Ultra-miniature
- Low profile (less than 1 mm)
- Low mass (12 mg for SM1 with ceramic lid)
- Surface mount
- Available with ceramic or glass lid
- High shock and vibration survival
- Excellent aging characteristics
- Ideal for low power applications
- Full military testing available
- Designed and manufactured in the USA

APPLICATIONS

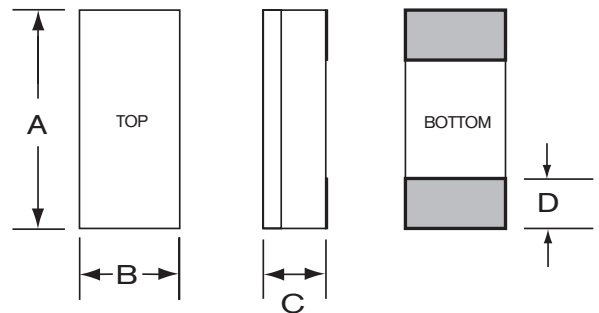
Medical

- CRM
- Infusion pumps
- Diabetes Control

SUGGESTED LAND PATTERN



PACKAGE DIMENSIONS



DIM	TYPICAL		MAXIMUM	
	inches	mm	inches	mm
A	0.127	3.20	0.135	3.43
B	0.060	1.50	0.068	1.73
C	-	-	see below	
D	0.027	0.69	0.037	0.94

THICKNESS (DIM C)

Lid	Termination	Typical		Maximum	
		inches	mm	inches	mm
Ceramic	SM1	0.030	0.77	0.035	0.90
	SM2/SM4	0.031	0.79	0.036	0.92
	SM3/SM5	0.033	0.84	0.038	0.97
Glass	SM1	0.029	0.74	0.034	0.87
	SM2/SM4	0.030	0.77	0.035	0.89
	SM3/SM5	0.032	0.81	0.037	0.94
Thin Glass	SM1	0.025	0.64	0.030	0.77
	SM2/SM4	0.026	0.66	0.031	0.79
	SM3/SM5	0.028	0.71	0.033	0.84

TERMINATIONS

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

10174 Rev B



SPECIFICATIONS

Specifications are typical at 25°C unless otherwise noted.
Specifications are subject to change without notice.

Fundamental Frequency	<u>32.768 kHz</u>	<u>50 kHz</u>	<u>100 kHz</u>
Motional Resistance R_1	50 k Ω	40 k Ω	20 k Ω
Motional Capacitance C_1	3.5 fF	1.4 fF	1.0 fF
Quality Factor Q	25,000	55,000	70,000
Shunt Capacitance C_0	1.0 pF	0.8 pF	0.8 pF
Load Capacitance ¹	9 pF	9 pF	9 pF
Mass (SM1, ceramic lid)	12 mg	12 mg	12 mg
Temperature Characterization ²			
Turnover Temperature ³ T_0	25 °C	17 °C	18 °C
Frequency - Temperature			
Constant k	-0.035 ppm/°C ²		
Standard Calibration Tolerance ⁴			
	± 20 ppm	±100 ppm	
Drive Level	0.5 μ W MAX		
Aging, first year	3 ppm MAX		
Shock, survival	5,000 g, 0.3 ms, 1/2 sine		
Vibration, survival	20 g, 10-2,000 Hz swept sine		
Operating Temp. Range	-10°C to +70°C (Commercial) -		
40°C to +85°C (Industrial)	-55°C to +125°C (Military)		
Storage Temp. Range	-55°C to +125°C		
Max Process Temperature	260°C for 20 sec.		

1. Other load capacitances 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 temperatures available.

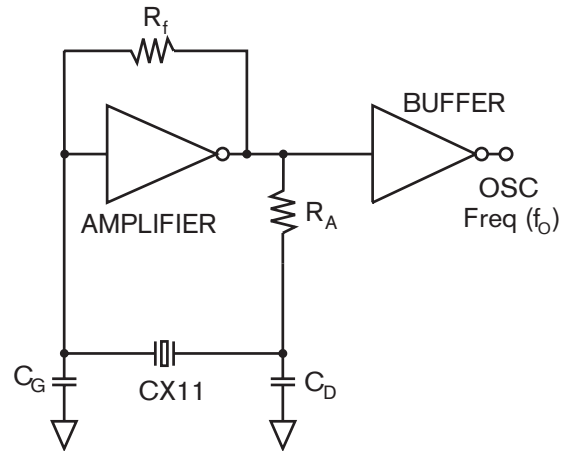
4. Tighter tolerances available.

HOW TO ORDER CX11VSM CRYSTALS

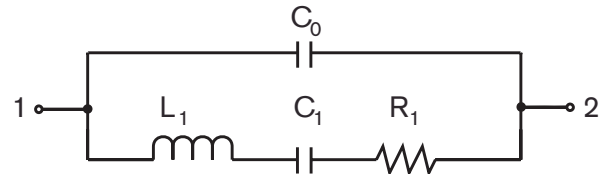
CX11V	S	C	SM1	-	32.768K	,	100	/	I	,	9pF
	"S" if special or custom design. Blank if Std.	Blank = Glass Lid T = Thin Glass Lid C = Ceramic Lid	SM1 = Gold Plated (Lead Free) SM2 = Solder Plated SM3 = Solder Dipped SM4 = Solder Plated (Lead Free) SM5 = Solder Dipped (Lead Free)		Frequency K = kHz		Calibration Tolerance @ 25°C (in ppm)		Temp. Range: C = -10°C to +70°C I = -40°C to +85°C M = -55°C to +125°C S = Customer Specified		Load Capacitance (Customer Specified)

Note: Crystals with SM1, SM4 or SM5 terminations are Pb-free.
Crystals with SM2 or SM3 terminations contain Pb.

CONVENTIONAL CMOS PIERCE OSCILLATOR CIRCUIT



EQUIVALENT CIRCUIT



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

PACKAGING OPTIONS

- Tray Pack
- 12 mm tape, 7" or 13" reels
Per EIA 481 (see Tape and Reel data sheet 10109)