DESCRIPTION

An increasing number of applications require the use of high-temperature crystals. For these applications, Statek offers the CX1VHT/CX1HHT, CX4VHT, and CX9VHT crystals. These crystals are designed to operate at temperatures up to and including 200°C, and feature an expected life in excess of 1,000 hours at these temperatures. The frequency range offered is 10 kHz to 600 kHz for CX1VHT and CX1HHT crystals, 30 kHz to 250 kHz for CX4VHT crystals, and 32 kHz to 160 kHz for CX9VHT crystals.

FEATURES

- High temperature operation up to 200°C
- High shock resistance
- Hermetically sealed ceramic package

APPLICATIONS

Industrial
- Downhole instrumentation
- Rotary shaft sensors
- Underground boring tools

DIMENSIONS

<table>
<thead>
<tr>
<th></th>
<th>CX1VHT/ CX1HHT MAXIMUM</th>
<th>CX4VHT MAXIMUM</th>
<th>CX9VHT MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIM A</td>
<td>0.330 inches (8.38)</td>
<td>0.210 inches (5.33)</td>
<td>0.170 inches (4.32)</td>
</tr>
<tr>
<td>DIM B</td>
<td>0.155 inches (3.94)</td>
<td>0.085 inches (2.16)</td>
<td>0.068 inches (1.73)</td>
</tr>
<tr>
<td>DIM C (SM1)</td>
<td>0.070 inches (1.78)</td>
<td>0.050 inches (1.27)</td>
<td>0.038 inches (0.97)</td>
</tr>
<tr>
<td>DIM C (SM5)</td>
<td>0.075 inches (1.90)</td>
<td>0.053 inches (1.35)</td>
<td>0.040 inches (1.02)</td>
</tr>
<tr>
<td>DIM D</td>
<td>0.055 inches (1.40)</td>
<td>0.046 inches (1.16)</td>
<td>0.038 inches (0.97)</td>
</tr>
<tr>
<td>DIM E</td>
<td>0.070 inches (1.78)</td>
<td>0.020 inches (0.51)</td>
<td></td>
</tr>
<tr>
<td>DIM F</td>
<td>0.070 inches (1.78)</td>
<td>0.025 inches (0.64)</td>
<td></td>
</tr>
</tbody>
</table>

PACKAGE DIMENSIONS

SUGGESTED LAND PATTERN
**SPECIFICATIONS**

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

**Frequency Range**

See Specifications Table below

**Calibration Tolerance**

See Standard Calibration Table at right

**Operating Temperature Range**

-55°C up to +200°C

**Frequency Stability**

\[ \frac{f(T) - f(T_o)}{f(T_o)} = k(T-T_o) \]

**Over Temperature**

-0.035 ppm/°C²

**Temperature Coefficient (k)**

Aging, first year 5 ppm at 25°C

**Shock, survival**

CX1VHT: 1,000 g, 1 ms, \( \frac{1}{2} \) sine

CX1HHT: 1,000 g, 1 ms, \( \frac{1}{2} \) sine

CX4VHT: 5,000 g, 0.3 ms, \( \frac{1}{2} \) sine

CX9VHT: 5,000 g, 0.3 ms, \( \frac{1}{2} \) sine

**Vibration, survival**

20 g RMS, 10-2000 Hz

1. Tighter frequency calibration available. Contact factory.
2. Where \( f(T) \) = Frequency at temperature \( T \)
   \( T = \) Temperature
   \( T_o = \) Turnover temperature
   \( f_o = \) Frequency at turnover temperature \( T_o \)

**PACKAGING OPTIONS**

- Tray Pack
- 7" or 13" reels

Per EIA 481 (see Tape and Reel data sheet # 10109)

**SPECIFICATIONS TABLE**

(Specifications shown are typical unless otherwise noted.)

<table>
<thead>
<tr>
<th>Product</th>
<th>Frequency Range</th>
<th>Typical for 32.768 kHz at 25°C</th>
<th>Typical Motional Resistance at</th>
<th>Drive Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Motional</td>
<td>Motional</td>
<td>Quality Factor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resistance</td>
<td>Capacitance</td>
<td>Capacitance</td>
</tr>
<tr>
<td>CX1VHT</td>
<td>10 kHz to 600 kHz</td>
<td>40 kΩ</td>
<td>2.3 fF</td>
<td>53 k</td>
</tr>
<tr>
<td>CX4VHT</td>
<td>30 kHz to 250 kHz</td>
<td>70 kΩ</td>
<td>2.3 fF</td>
<td>31 k</td>
</tr>
<tr>
<td>CX9VHT</td>
<td>32 kHz to 160 kHz</td>
<td>100 kΩ</td>
<td>2.2 fF</td>
<td>22 k</td>
</tr>
</tbody>
</table>

1. CX1HHT available from 10 kHz to 600 kHz.
2. Other load capacitance available.

**FREQUENCY SHIFT VS. TIME**

- Frequency shift after:
  - 1,008 hours Actual Data
  - 1,824 hours Actual Data
  - 4,320 hours Projected Data
  - 8,760 hours Projected Data

**ABSOLUTE MAXIMUM RATINGS**

- Storage Temperature: -55°C to 125°C
- Maximum Process Temperature: 260°C for 20 seconds

**Standard Calibration Tolerances at 25°C**

<table>
<thead>
<tr>
<th>Frequency Range (kHz)</th>
<th>10-74.9</th>
<th>75-169.9</th>
<th>170-249.9</th>
<th>250-600</th>
</tr>
</thead>
<tbody>
<tr>
<td>±30 ppm</td>
<td>±50 ppm</td>
<td>±100 ppm</td>
<td>±200 ppm</td>
<td></td>
</tr>
<tr>
<td>±100 ppm</td>
<td>±100 ppm</td>
<td>±200 ppm</td>
<td>±500 ppm</td>
<td></td>
</tr>
<tr>
<td>±1000 ppm</td>
<td>±1000 ppm</td>
<td>±2000 ppm</td>
<td>±5000 ppm</td>
<td></td>
</tr>
</tbody>
</table>

**HOW TO ORDER CX1VHT, CX1HHT, CX4VHT and CX9VHT CRYSTALS**

- CX4V
- CX1V
- CX1H
- CX4V
- CX9V

- S
- SM5
- 32.786K
- 100
- H

**Terminations**

- SM1 = Gold Plated
- SM5 = Solder Dipped (Lead Free)

**Frequency K = kHz**

**Calibration Tolerance @ 25°C**

**Temp. Range:**

H = 0°C to 200°C

S = Customer Specified Temp. Range

*Special terminations per customer requirements will be considered. Contact factory.