CXOU OSCILLATOR
32.768 kHz - 100.000 kHz
Ultra-Low Current, Miniature Quartz Crystal Oscillator

DESCRIPTION
CXOU is an ultra-miniature (2.0 x 1.2 mm), ultra-low current quartz crystal oscillator developed for high reliability applications. Hermetically sealed in a highly reliable ceramic housing, this oscillator is available at start-up voltages in the range of 0.9 V - 5.0 V.

FEATURES
- Ultra-low current consumption
- Helium impermeable ceramic package and lid
- Non-magnetic
- Typical start-up time of 200 ms
- Typical rise and fall times of 30 ns
- Optional output enable/disable with Tri-State
- Full military testing per MIL-PRF-55310 available
- Designed, manufactured, and tested in the USA

APPLICATIONS
- Medical
  - Implantable pacemakers
  - Implantable defibrillators
  - Implantable neuro devices
  - Other implantable and external medical devices
- Military
- Industrial

DIMENSIONS

<table>
<thead>
<tr>
<th>DIM</th>
<th>inches</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.079</td>
<td>2.00</td>
</tr>
<tr>
<td>B</td>
<td>0.047</td>
<td>1.20</td>
</tr>
<tr>
<td>C (SM1)</td>
<td>0.030</td>
<td>0.76</td>
</tr>
<tr>
<td>D</td>
<td>0.013</td>
<td>0.33</td>
</tr>
<tr>
<td>E</td>
<td>0.017</td>
<td>0.43</td>
</tr>
<tr>
<td>F</td>
<td>0.025</td>
<td>0.64</td>
</tr>
<tr>
<td>G</td>
<td>0.029</td>
<td>0.73</td>
</tr>
</tbody>
</table>

SUGGESTED LAND PATTERN

PIN CONNECTIONS
1. Output
2. Ground
3. Output Enable/Disable (T) or no connection (N)
4. V_DD
**SPECIFICATIONS: CXOU**

Specifications are typical at 25°C 1.7 V unless otherwise noted. Specifications are subject to change without notice.

- **Current Consumption**
  - 32.768 kHz (1.75 µA)\(^1\)
  - 32.768 kHz (0.4 µA)\(^2\)
  - 100.0 kHz (3.9 µA)\(^1\)
  - 100.0 kHz (0.5 µA)\(^2\)

- **Calibration Tolerance**
  - ±20 ppm, ±50 ppm or ±100 ppm

- **Voltage Coefficient**
  - ±1 ppm/V

- **Output load (CMOS)**
  - 10 pF

- **Aging, first year**
  - ±2 ppm

- **Shock, survival**
  - 5000 g peak, 0.3 ms, 1/2 sine

- **Vibration, survival**
  - 20 g, 10 - 2000 Hz swept sine

- **Startup Time**
  - 200 ms

- **Operating Temperature**
  - -10°C to +70°C (Commercial)
  - -40°C to +85°C (Industrial)
  - -55°C to +125°C (Military)

1. \(V_{DD} = 1.7 \text{ V and } 10 \text{ pF load.}
2. \(V_{DD} = 1.7 \text{ V, 10 pF load and OE is low.}
3. Tighter calibration tolerances available. Please contact factory.
4. Other loads available. Please contact factory.

**ELECTRICAL CHARACTERISTICS**

**CXOU 32.768 kHz**

All parameters were measured at 25°C with a 10MΩ and 10pF load with \(V_{DD} 1.7 \text{ V.}

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(V_{OH})</td>
<td>Output Voltage Hi</td>
<td>(V_{DD}-0.4)</td>
<td>(V_{DD})</td>
<td>0.4</td>
<td>V</td>
</tr>
<tr>
<td>(V_{OL})</td>
<td>Output Voltage Lo</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>V</td>
</tr>
<tr>
<td>SYM</td>
<td>Duty Cycle</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>%</td>
</tr>
<tr>
<td>(t_r)</td>
<td>Rise Time (10%-90%)</td>
<td>50</td>
<td>50</td>
<td>nsec.</td>
<td></td>
</tr>
<tr>
<td>(t_f)</td>
<td>Fall Time (10%-90%)</td>
<td>50</td>
<td>50</td>
<td>nsec.</td>
<td></td>
</tr>
</tbody>
</table>

**PIN CONNECTIONS**

- **Pin**
  - 1: Output
  - 2: Ground
  - 3: Output Enable (T) or NC
  - 4: \(V_{DD}\)

**TRISTATE/DISABLE OPTIONS (T/N)**

Statek offers two enable/disable options: T and N. The T-version has a Tri-State output and continues oscillating internally when the output is put into the high Z state. The N-version does not have PIN 3 connected internally and so has no Tri-State/Disable capability. The following table describes the Tri-State/Disable option T.

**TRISTATE/DISABLE OPTION T FUNCTION TABLE**

<table>
<thead>
<tr>
<th>Output</th>
<th>Frequency Output</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tri-State (Pin 3 High(^*))</td>
<td>High Z State</td>
<td>Normal</td>
</tr>
<tr>
<td>Disable (Pin 3 Low)</td>
<td>Oscillates</td>
<td>Lower than Normal</td>
</tr>
</tbody>
</table>

*When PIN 3 is allowed to float, it is held high by an internal pull-up resistor.

**HOW TO ORDER CXOL SURFACE MOUNT CRYSTAL OSCILLATORS**

<table>
<thead>
<tr>
<th>CXOU</th>
<th>3</th>
<th>S</th>
<th>N</th>
<th>SM3</th>
<th>Frequency</th>
<th>Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>CXOU</td>
<td>3</td>
<td>S</td>
<td>N</td>
<td>SM3</td>
<td>-</td>
<td>32.768K</td>
</tr>
<tr>
<td>1 = 1.2V - 1.7V</td>
<td>2 = 2.5V</td>
<td>3 = 3.0V</td>
<td>4 = 3.3V</td>
<td>5 = 5.0V</td>
<td>(F) kHz</td>
<td>@ 25°C (in PPM)</td>
</tr>
</tbody>
</table>

- Tri-State (Pin 3 High\(^*\))
- Disable (Pin 3 Low)
- Frequency
- Calibration Tolerance
- Temp. Range:
  - C = -10°C to +70°C
  - I = -40°C to +85°C
  - M = -55°C to +125°C