DESCRIPTION

The CXOXULPHT 32.768 kHz oscillator achieves the low power comparable with a tuning fork design and the fast start-up and tight frequency stability attained by an AT cut crystal design. Designed for applications requiring ultra-low current (55 µA), fast start-up time (2 ms), and a tight frequency stability (200 ppm) for high temperature operation up to +200°C. These oscillators are also capable of withstanding significantly higher shock than a standard tuning fork design.

FEATURES

- High temperature operation up to +200°C
- Ultra-low current (typical 55 µA)
- Fast start-up (typical 2 ms)
- High shock resistance up to 10,000 g
- Low aging
- CMOS output
- Optional Output Enable/Disable with Tri-State
- Low EMI emission
- Hermetically sealed ceramic package
- Full military testing available
- Designed and manufactured in the USA

APPLICATIONS

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

DIMENSIONS

<table>
<thead>
<tr>
<th>DIM</th>
<th>TYPICAL</th>
<th>MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.126</td>
<td>0.136</td>
</tr>
<tr>
<td></td>
<td>3.20</td>
<td>3.40</td>
</tr>
<tr>
<td>B</td>
<td>0.099</td>
<td>0.107</td>
</tr>
<tr>
<td></td>
<td>2.50</td>
<td>2.70</td>
</tr>
<tr>
<td>C (SM1)</td>
<td>0.039</td>
<td>0.043</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>1.09</td>
</tr>
<tr>
<td>C (SM3/SM5)</td>
<td>0.044</td>
<td>0.048</td>
</tr>
<tr>
<td></td>
<td>1.12</td>
<td>1.21</td>
</tr>
<tr>
<td>D</td>
<td>0.040</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>1.10</td>
</tr>
<tr>
<td>E</td>
<td>0.030</td>
<td>0.031</td>
</tr>
<tr>
<td></td>
<td>0.75</td>
<td>0.85</td>
</tr>
</tbody>
</table>

PIN CONNECTIONS

1. Output Enable/Disable (E) or no connection (N)
2. Ground
3. Output
4. VDD

SUGGESTED LAND PATTERN
SPECIFICATIONS
Specifications are typical at 25°C unless otherwise noted. Specifications are subject to change without notice. Tighter specifications available (contact factory).

Supply Voltage
3.3 V ±10%

Calibration Tolerance
±100 ppm

Frequency Stability
±100 ppm for 25°C to 150°C
±150 ppm for 25°C to 175°C
±175 ppm for 25°C to 200°C

Total Tolerance
±200 ppm for 25°C to 200°C

Output Load (CMOS)
15 pF

Aging, first year
10 ppm max at +25°C

Aging, 1,000 hours
100 ppm max at +200°C

Shock
Std: 5,000 g, 0.3 ms, ½ sine
HG: 10,000 g, 0.3 ms, ½ sine

Vibration
20 g, 10-2,000 Hz swept sine

Operating Temp. Range
-55°C up to 200°C

Electrical characteristics:

<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 High</td>
<td>0.9V_{DD}</td>
<td>V</td>
<td></td>
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<tr>
<td>V_{OL}</td>
<td>Output Voltage Low</td>
<td>0.1V_{DD}</td>
<td>V</td>
<td></td>
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<tr>
<td>t_{startup}</td>
<td>Start-up Time</td>
<td>2.0</td>
<td>ms</td>
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<td>t_{r}</td>
<td>Rise Time (10% - 90%)</td>
<td>4.0</td>
<td>ns</td>
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<td></td>
</tr>
<tr>
<td>t_{f}</td>
<td>Fall Time (10% - 90%)</td>
<td>5.0</td>
<td>ns</td>
<td></td>
<td></td>
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<tr>
<td>Duty Cycle</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>%</td>
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<tr>
<td>I_{DD}</td>
<td>Input Current</td>
<td>55μA</td>
<td></td>
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</table>

1. Other voltages available. Contact factory.
2. Other tolerances available.
3. Does not include calibration tolerance. Other tolerances available.
4. Shock at room temperature. Contact factory for requirements above 10,000 g.
6. Expected life at 200°C is in excess of 1,500 hours.
7. All parameters are measured at 25°C with a 10 MΩ and 15 pF load with V_{DD} = 3.3 V.

ABSOLUTE MAXIMUM RATINGS
Supply Voltage V_{DD} -0.3 V to 5.0 V
Storage Temperature -55°C to 125°C
Maximum Process Temperature 260°C for 20 seconds

ENABLE/DISABLE OPTIONS (E/N)
For the 32.768 kHz CXOXULPHT, Statek offers two enable/disable options: E and N. The E-version has a Tri-State output and stops oscillating internally when the output is put into the high Z state. The N-version does not have PIN 1 connected internally and so has no enable/disable capability. The following table summarizes the Enable/Disable option E.

<table>
<thead>
<tr>
<th>ENABLE/DISABLE OPTION E/N FUNCTION TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYMBOL</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Output</td>
</tr>
<tr>
<td>Oscillator</td>
</tr>
</tbody>
</table>

PACKAGING OPTIONS
CXOXULPHT - Tray Pack
- 12 mm tape, 7” or 13” reels
Per EIA 481 (see Tape and Reel data sheet #10109)

HOW TO ORDER CXOXULPHT 32.768 kHz SURFACE MOUNT CRYSTAL OSCILLATORS

CXOXULPHT
HG
4
S
N
SM3

HG = High Shock. Otherwise leave blank
Supply Voltage
4 = 3.3 V
“S” if special or customer design. Blank if Std.
Enable/Disable Option E or N
Terminations
Blank = SM1 = Gold Plated (Lead Free)
SM5 = Solder Dipped (Lead Free)

Frequency k = kHz
Total Frequency Tolerance (in ppm)
Frequency Stabilty over Temp. Range (in ppm)
Temp. Range:
H = +25°C to +200°C
S = Customer Specified

OR
Calibration Tolerance @ 25°C (in ppm)
Frequency Stabilty over Temp. Range (in ppm)
Temp. Range:
H = +25°C to +200°C
S = Customer Specified