**DESCRIPTION**

The LQXO-4 oscillator design consists of a CMOS-compatible hybrid circuit, packaged in a standard TO-39 metal package. Permanent, precision tuning of the oscillator allows for very tight calibration tolerance and eliminates the need for a trimming capacitor, a major source of long-term frequency drift. The specifications and characteristics of the LQXO-4 vary with frequency. The characteristics of the 32.768 kHz model are presented in this data sheet.

**FEATURES**

- Very low power consumption
- Low aging
- CMOS compatible
- Double hermetically sealed package
- Full military testing available
- 3 Volt operation available

**APPLICATIONS**

Industrial, Computer & Communications
- General purpose clock oscillator
- Tone generators
- Data loggers
- Telephone equipment
- Ultrasonic detectors
- Airborne hybrid computer
- Flight recorder

**PIN CONNECTIONS**

1. \( V_{DD} \)
2. Output
3. Ground

**PACKAGE DIMENSIONS**

*Consult factory for other frequencies.*
SPECIFICATIONS-LQXO-4 32.768 kHz
Specifications are typical at 25°C unless otherwise noted. Specifications are subject to change without notice.

Supply Voltage (V_DD) 5V ± 10% (3.3V available)
Calibration
A: ± 0.01% (100ppm)
B: ± 0.03%
C : ± 0.1%

Frequency Stability**
0°C to +50°C -0.0025% Typ. ± 25 ppm
-0.004% MAX. ± 40 ppm
-20°C to +70°C -0.007% Typ. ± 70 ppm
-0.01% MAX ± 100 ppm

Voltage Coefficient 1 ppm/V Typ.
3 ppm/V MAX.

Aging, first year 1 ppm/year Typ.
3 ppm/year MAX.

Shock 1,000g, 1 msec., 1/2 sine 3 ppm MAX.
Vibration 10g rms 10-2000 Hz 3 ppm MAX.

Frequency change vs. 10% Output Load Change 1 ppm MAX.

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

* Tighter tolerances available.
** Does not include calibration tolerance. Positive variations small compared to negative variations.

ABSOLUTE MAXIMUM RATINGS
Supply Voltage V_DD -0.3V to 7.0V
Storage Temperature -55°C to +125°C
Maximum Process Temp. 260°C, 10 seconds

ELECTRICAL CHARACTERISTICS
LQXO-4 32.768 kHz
All parameters are measured at ambient temperature with a 10MΩ and 10pF load at 5V.

<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</td>
<td>Output Voltage Hi</td>
<td>4.8</td>
<td>4.95</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Output Voltage Lo</td>
<td>0.05</td>
<td>0.2</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>t_r</td>
<td>Rise Time (10% - 90%)</td>
<td>12</td>
<td>25</td>
<td>nsec.</td>
<td></td>
</tr>
<tr>
<td>t_f</td>
<td>Fall Time (10% - 90%)</td>
<td>12</td>
<td>25</td>
<td>nsec.</td>
<td></td>
</tr>
<tr>
<td>SYM</td>
<td>Duty Cycle</td>
<td>40</td>
<td>50</td>
<td>60 %</td>
<td></td>
</tr>
<tr>
<td>I_DDD</td>
<td>Supply Current</td>
<td>7</td>
<td>15</td>
<td>μA</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>=5V</td>
<td>5</td>
<td>10</td>
<td>μA</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>=3V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Models with faster rise and fall time available, consult factory.

PACKAGING
LQXO-4 - Tray Pack (Standard)

OUTPUT WAVE FORM

HOW TO ORDER LQXO-4 CRYSTAL OSCILLATORS

| LQXO-4 | S | 32,768 kHz | ( | A | / | I | ) |
|--------|---|------------|---|---|---|---|
|        | “S” if special or custom design. Blank if Std. | Frequency | *Calibration Tolerance @25°C | (A) | (B) | (C) |
|        | Temp. Range: C = Commercial | I = Industrial | M = Military | S = Specify |

*Other calibration fill in ppm