# LFXOTF OSCILLATOR

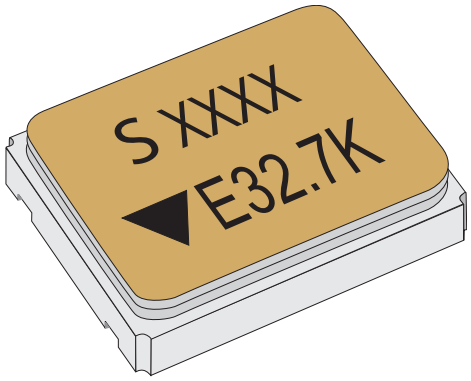
32.768 kHz

**Low Current Consumption**

Miniature Surface Mount Crystal Oscillator

## DESCRIPTION

Statek's 32.768 kHz LFXOTF oscillator is designed for applications requiring low current consumption (as low as 600 nA). It consist of a Statek miniature tuning fork quartz crystal and a CMOS compatible IC in a ceramic package. The ceramic packaged crystal used in the LFXOTF oscillator is pre-qualified before assembly through electrical tests and characterization over temperature



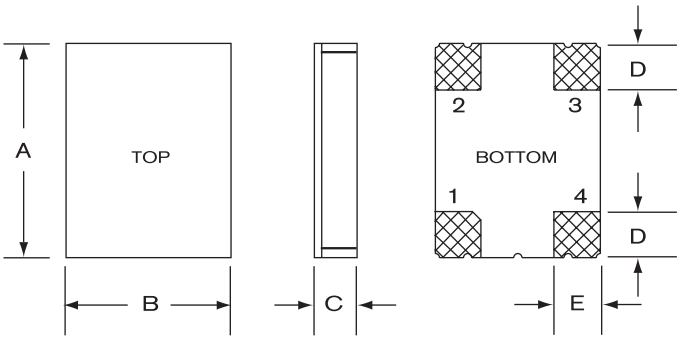

## FEATURES

- Ultra-low power
- Low aging (double hermetic seal)
- CMOS output
- Optional output enable/disable with tri-state
- Low EMI emission
- Full military testing available
- High temperature option

## APPLICATIONS

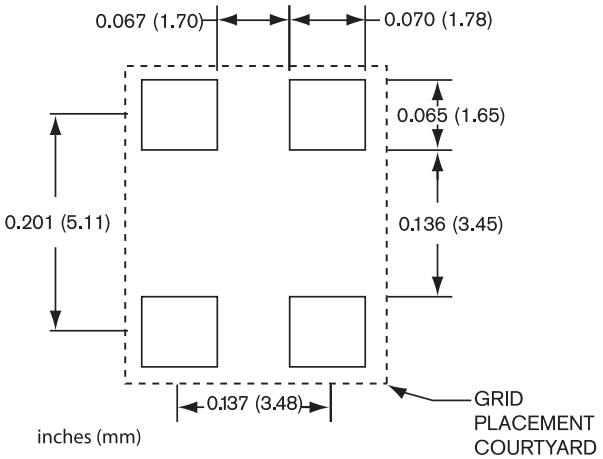
- Medical
- Military & Aerospace
- Industrial controls
- Instrumentation

## DIMENSIONS




| | TYPICAL | | MAXIMUM | |
|---|---|---|---|---|
| DIM | inches | mm | inches | mm |
| A | 0.256 | 6.50 | 0.263 | 6.68 |
| B | 0.197 | 5.00 | 0.204 | 5.18 |
| C (SM1) | 0.063 | 1.60 | 0.065 | 1.65 |
| C (SM3/SM5) | 0.067 | 1.70 | 0.073 | 1.85 |
| D | 0.055 | 1.40 | 0.065 | 1.65 |
| E | 0.060 | 1.52 | 0.070 | 1.78 |

## SUGGESTED LAND PATTERN




## PIN CONNECTIONS

1. Not connected (N) or Enable/Disable (T)
2. Ground
3. Output
4. $V_{DD}$



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## SPECIFICATIONS

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

| | |
|---|---|
| Supply Voltage[1] | 1.8 V to 5 V ($V_{DD}$) |
| Current Consumption | See Table 1 |
| Calibration Tolerance[2] | ±10 ppm<br>±30 ppm<br>±100 ppm |
| Frequency Stability[3] | Follows that of a 32.768 kHz tuning fork crystal |
| Aging | ±1 ppm/year TYP<br>±3 ppm/year MAX |
| Shock | 5,000 g, 0.3 ms, 1/2 sine |
| Vibration | 20 g, 10 - 2000 Hz swept sine |
| Operating Temperature Ranges | -10°C to +70°C (Commercial)<br>-40°C to +85°C (Industrial)<br>-55°C to +125°C (Military)<br>+25°C to +150°C (High Temperature) |

1. Available voltages: 1.8 V, 2.5 V, 3.0 V, 3.3 V, and 5.0 V at ±10% tolerance.
2. Other tolerances available.
3. Frequency stability over the temperature range based on the formula: $-0.035\ ppm/°C^2 x (T - 25°C)^2$

## ELECTRICAL CHARACTERISTICS

All parameters are measured at ambient temperature with a 10 MΩ and 15 pF load with $V_{DD}$ 1.6 V to 5.5 V.

| PARAMETER | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|
| Output Voltage High | $V_{DD}$ - 0.4 V | $V_{DD}$ | | V |
| Output Voltage Low | | 0 | 0.4 | V |
| Rise Time (10%-90%) | | | 100 | ns |
| Fall Time (10%-90%) | | | 100 | ns |
| Duty Cycle | 45 | 50 | 55 | % |

## ABSOLUTE MAXIMUM RATINGS

| | |
|---|---|
| Supply Voltage $V_{DD}$ | 0.5 V to 7 V |
| Storage Temperature | -55° C to +125° C |
| Process Temperature | 260° C for 20 s |

## TYPICAL CURRENT CONSUMPTION - TABLE 1

| $V_{DD}$ (V) | $I_{DD}$ (µA) No load | $I_{DD}$ (µA) 15 pF load |
|---|---|---|
| 1.8 | 0.6 | 1.5 |
| 2.5 | 0.8 | 2.0 |
| 3.0 | 0.9 | 2.5 |
| 3.3 | 1.0 | 2.8 |
| 5.0 | 1.7 | 4.5 |

The current consumption $I_{DD}$ under a capacitive load $C_L$ is higher than the current $I_0$ under no load by $I_{DD} = I_0 + f\,C_L\,V_{DD}$, where $f = 32.768$ kHz.

## ENABLE/DISABLE OPTIONS (T/N)

For the 32.768 kHz LFXOTF, Statek offers two enable/disable options: T and N. The T-version has a tri-state output and continues to run internally when the output is put into the high Z state. So, the T-version offers very fast output recovery when the oscillator is re-enabled. The N-version does not have PIN 1 connected internally and so has no enable/disable capability.

## HOW TO ORDER 32.768 kHz LFXOTF OSCILLATORS/ULTRA LOW POWER

LFXOTF **4** **S** **N** **SM5** – **32.768K** , **30** / **I**

- **4**: 1 = 1.8V; 2 = 2.5V; 3 = 3.0V; 4 = 3.3V; 5 = 5.0V
- **S**: Blank = Standard; S = Special
- **N**: Enable/Disable Option T or N
- **SM5**: Termination — Blank = SM1 = Gold Plated (Pb Free); SM3 = Solder Dipped; SM5 = Solder Dipped (Pb Free)
- **32.768K**: Frequency K = kHz
- **30**: Calibration Tolerance @ 25°C (in ppm)
- **I**: Operating Temperature Range — C = -10°C to +70°C; I = -40°C to +85°C; M = -55°C to +125°C; S = Customer Specified



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