



STXO/STXOHG OSCILLATOR

10 MHz to 70 MHz
Surface Mount Quartz Crystal Oscillator

DESCRIPTION

Statek's STXO/STXOHG are small, low power, clean reference sources that fill the stability gap between conventional clock oscillators and TCXO reference sources. Manufactured for high-reliability applications that require a stable reference, these oscillators offer a total frequency tolerance as low as ± 5 ppm over -40°C to $+85^{\circ}\text{C}$ as well as high-shock survivability and exceptionally low phase noise and jitter.

FEATURES

- 3.2 x 2.5 mm hermetically sealed ceramic package
- High shock resistance (HG version) up to 100,000 g
- Tight frequency stability and low phase noise
- Ultra-low Allan deviation and phase jitter
- Ultra-low period jitter (1.4 ps rms)
- Low acceleration sensitivity
- Low current consumption; 3.0 mA max no load across temperature
- Full military testing available
- CMOS output; enable/disable with tri-state
- Fundamental frequency; no PLL artifacts
- IBIS model available
- Designed and manufactured in the USA

APPLICATIONS

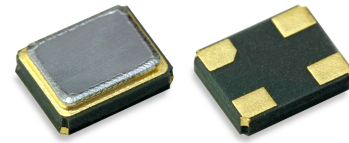
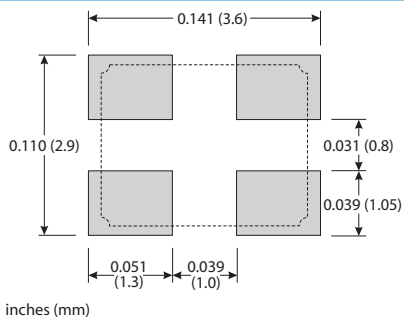
Industrial, Defense and Aerospace

- RF Telemetry
- Master Clock

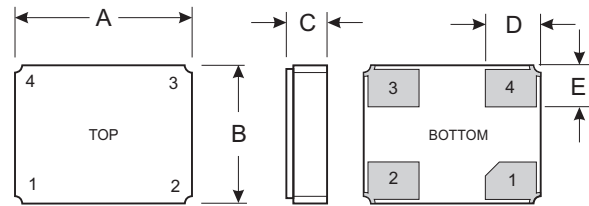
PACKAGING OPTIONS

- Tray Pack
- Tape and Reel (per EIA 481). See Tape and Reel datasheet 10109.

SUGGESTED LAND PATTERN



DIMENSIONS



| DIM | Termination | TYPICAL | | MAXIMUM | |
|-----|-------------|---------|------|---------|------|
| | | inches | mm | inches | mm |
| A | | 0.126 | 3.20 | 0.136 | 3.40 |
| B | | 0.099 | 2.50 | 0.107 | 2.70 |
| C | SM1 | 0.039 | 1.00 | 0.053 | 1.35 |
| | SM3/SM5 | 0.044 | 1.12 | 0.058 | 1.47 |
| D | | 0.040 | 1.00 | 0.041 | 1.10 |
| E | | 0.030 | 0.75 | 0.031 | 0.85 |

PIN CONNECTIONS

1. Output Enable/Disable (E)
2. Ground
3. Output
4. V_{DD}

ENABLE/DISABLE OPTION E

The E-version has a tri-State output and stops oscillating internally when the output is put into the high Z state. The following table describes the Enable/Disable option E.

ENABLE/DISABLE OPTION E FUNCTION TABLE

| | Enable (Pin 1 High*) | Disable (Pin 1 Low) |
|------------|----------------------|---------------------|
| Output | Frequency Output | High Z State |
| Oscillator | Oscillates | Stops |
| Current | Normal | Very Low |

*When PIN 1 is allowed to float, it is held high by an internal pull-up resistor.

10220 Rev I



SPECIFICATIONS

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

| | |
|-------------------------------------------------|------------------------------------------------------------------------------------------|
| Frequency Range | 10 MHz to 70 MHz |
| Supply Voltage | 2.5 V to 3.3 V \pm 10% |
| Total Frequency Tolerance | As low as \pm 5 ppm (Industrial) |
| Typical Supply Current ¹ | 3 mA |
| Output Voltage Levels | $V_{OH} > V_{DD} - 0.4 V$ $V_{OL} < 0.4 V$ |
| Output Load (CMOS) | 15 pF |
| Start-up Time | 5 ms MAX |
| Rise/Fall Time | 5 ns MAX |
| Duty Cycle | 45% MIN, 55% MAX |
| Aging, First Year | 2 ppm MAX |
| Shock Survival ² | STD: 5,000 g, 0.5 ms, 1/2 sine HG: Up to 100,000 g, 0.5 ms, 1/2 sine |
| Vibration Survival ³ | 20 g, 10-2,000 Hz swept sine |
| Operating Temperature Ranges | -10°C to +70°C (Commercial) -40°C to +85°C (Industrial) -55°C to +125°C (Military) |
| Typical Period Jitter (rms) | 1.4 ps over 10,000 cycles |
| Storage Temperature Range | -55°C to +125°C |
| Max Process Temperature | 260°C for 20 seconds |
| MIN/MAX Supply Voltage (V_{DD}) | -0.3 V / 4.0 V |
| MIN/MAX Enable/Disable Pin Voltage (V_{IN}) | -0.3 V / $V_{DD} + 0.3 V$ |
| Moisture Sensitivity Level (MSL) | This product is hermetically sealed and is not moisture sensitive. |

1. $V_{DD} = 3.3 V$, 15 pF load, frequency at 40 MHz.

2. HG options for frequencies up to 50 MHz. Contact factory for HG options above 50 MHz.

3. Per MIL-STD-202, Method 204, Condition D. Random vibration testing also available.

PHASE NOISE AND JITTER PERFORMANCE

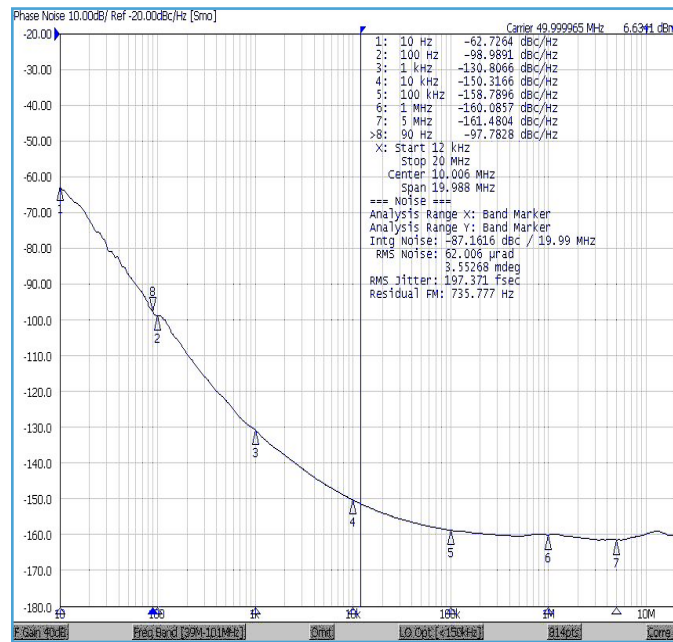
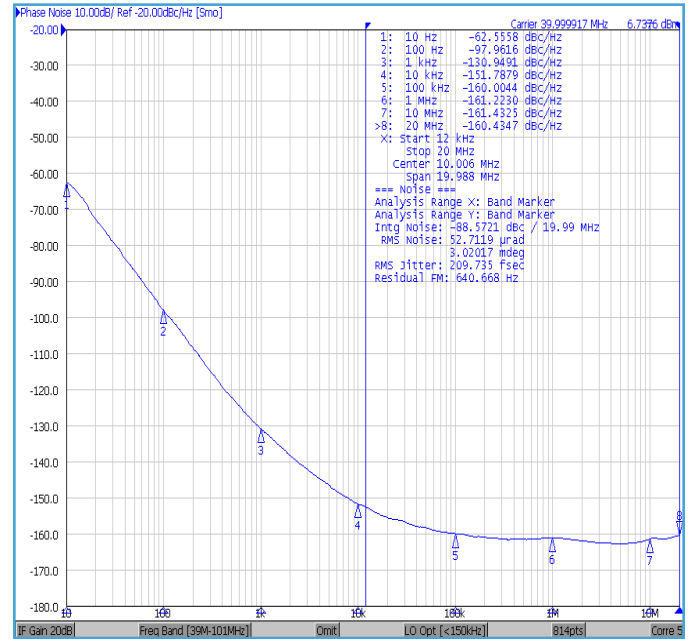
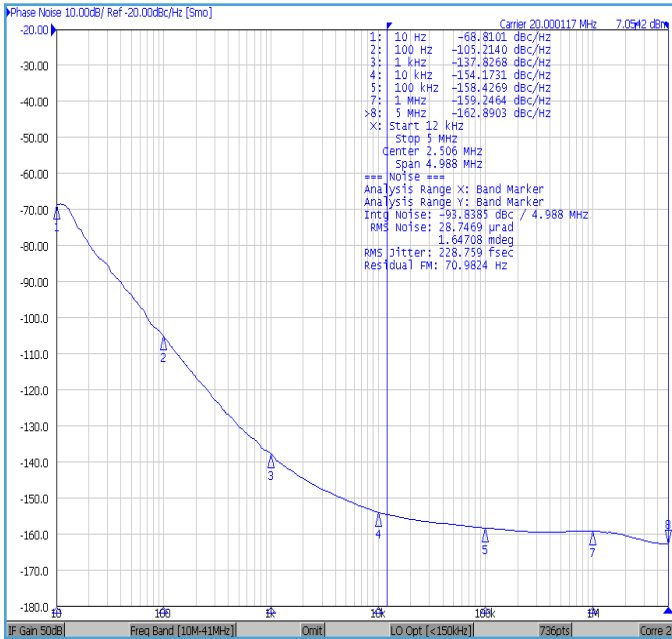
Typical phase noise for three oscillator frequencies [dBc/Hz]

| Offset Frequency | 20 MHz | 40 MHz | 50 MHz |
|------------------|--------|--------|--------|
| 10 Hz | -69 | -63 | -63 |
| 100 Hz | -105 | -98 | -99 |
| 1 kHz | -138 | -131 | -131 |
| 10 kHz | -154 | -152 | -151 |
| 100 kHz | -158 | -160 | -159 |
| 1 MHz | -159 | -161 | -160 |
| 5 MHz | -163 | -162 | -161 |
| 20 MHz | — | -160 | -161 |

Integrated RMS phase jitter¹

| Frequency | $V_{DD} = 2.5 V$ | $V_{DD} = 3.3 V$ |
|-----------|------------------|------------------|
| 20 MHz | 255 fs | 230 fs |
| 40 MHz | 230 fs | 210 fs |
| 50 MHz | 240 fs | 200 fs |

1. 12 kHz to 20 MHz, unless noted otherwise.



HOW TO ORDER STATEK STXO/STXOHG OSCILLATORS

STXO A HG 4 B S E SM3 — 40.0M , — / — / 10 / I

Package Size
A = 3.2 x 2.5 mm

High Shock
HG = High Shock
Blank = Standard

Supply Voltage
2 = 2.5 V
3 = 3.0 V
4 = 3.3 V

Shock Level Code
Blank = 5,000 g
B = 10,000 g
C = 20,000 g
D = 30,000 g
F = 50,000 g
G = 75,000 g
H = 100,000 g

Special
Blank = Standard
S = Special or Custom

Enable/Disable Option
E = Enable/Disable

Frequency
M = MHz

Terminations
Blank = Gold Plated (Lead Free)
SM3 = Solder (60/40 Sn-Pb)
SM5 = Solder (Lead Free)

Total Frequency Tolerance
(in ppm)

Operating Temp. Range
C = -10°C to +70°C
I = -40°C to +85°C
M = -55°C to +125°C
S = Customer Specified

