



# CXOX/CXOXHG OSCILLATOR

16 kHz to 160 MHz  
Surface Mount Quartz Crystal Oscillator

## DESCRIPTION

Miniature, high performance quartz crystal oscillator designed and manufactured for high-reliability applications.

## FEATURES

- 3.2 x 2.5 mm hermetically sealed ceramic package
- High shock resistance (HG version) up to 100,000 g
- Low acceleration sensitivity (0.1 ppb/g option)
- Fast start-up time (0.6 ms) for low frequency parts
- Low phase noise and jitter
- Full military testing available
- IBIS model available
- Designed and manufactured in the USA

## APPLICATIONS

### Medical

- Test & Diagnostic Equipment
- Handheld Devices
- Patient Monitoring Devices

### Military & Aerospace

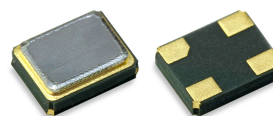
- Communications
- Navigation
- GPS

### Industrial, Computer & Communications

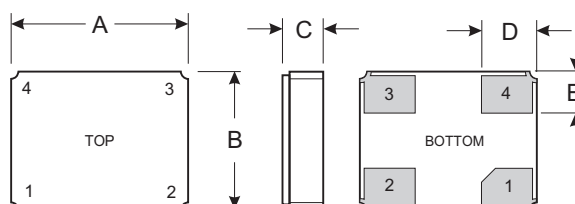
- Miniature Clock Requirements
- Handheld Instrumentation
- Transponder/Animal Migration

## PACKAGING OPTIONS

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



## PACKAGE DIMENSIONS

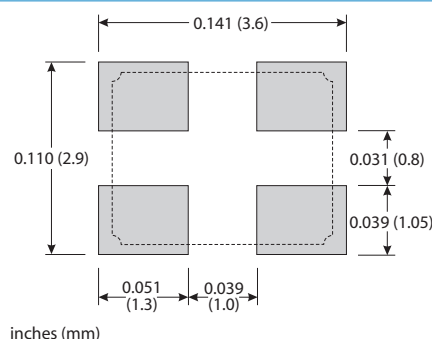


DIM	TERMINATION	TYPICAL		MAXIMUM	
		inches	mm	inches	mm
A		0.126	3.20	0.136	3.40
B		0.099	2.50	0.107	2.70
C	SM1	0.039	1.00	0.043	1.09
C	SM3/SM5	0.044	1.12	0.048	1.21
D		0.040	1.00	0.041	1.10
E		0.030	0.75	0.031	0.85

## PIN CONNECTIONS

1. Output Enable/Disable (E) or no connection (N)
2. Ground
3. Output
4.  $V_{DD}$

## SUGGESTED LAND PATTERN



## SPECIFICATIONS

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

Frequency <sup>1</sup>	32.768 kHz		1 MHz to 160 MHz		
Supply Voltage	1.8 V to 5.0 V ± 10%		1.8 V to 5.0 V ± 10%		
Calibration Tolerance <sup>2</sup>	±100 ppm to ±25 ppm				
Frequency-Temperature Stability <sup>3,4</sup>	±50 ppm to ±10 ppm (Commercial) ±100 ppm to ±20 ppm (Industrial) ±100 ppm to ±30 ppm (Military)				
Typical Supply Current (mA)	<u>1.8 V</u> 0.068	<u>3.3 V</u> 0.075		<u>1.8 V</u>	<u>3.3 V</u>
			24 MHz	1.4	2.3
			32 MHz	1.8	3.0
			50 MHz	2.6	4.5
			130 MHz	12.0	23.0
Output Load (CMOS) <sup>5</sup>	15 pF				
Start-up Time (ms)	0.6 MAX		5 MAX		
Rise/Fall Time (ns)	20 MAX		6 MAX		
Duty Cycle	45% MIN 55% MAX				
Aging, First Year	3 ppm MAX				
Shock Survival	STD: 5,000 g, 0.3 ms, 1/2 sine HG: 100,000 g, 0.5 ms, 1/2 sine				
Vibration Survival <sup>6</sup>	20 g, 10-2,000 Hz swept sine				
Operating Temperature Range <sup>4</sup>	-10°C to +70°C (Commercial) -40°C to +85°C (Industrial) -55°C to +125°C (Military)				
Storage Temperature Range <sup>4</sup>	-55°C to +125°C				
Max Process Temperature	260°C for 20 seconds				
Max Supply Voltage V <sub>DD</sub> <sup>7</sup>	-0.3 V to 7.0 V		-0.5 V to 7.0 V		
Moisture Sensitivity Level (MSL)	This product is hermetically sealed and is not moisture sensitive.				

1. Not all frequencies available at all voltages. Contact factory.

2. Tighter tolerances available.

3. Does not include calibration tolerance. Tighter tolerances available.

4. Broader temperature ranges available. Contact factory.

5. Higher CMOS loads and TTL loads available. Contact factory.

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

7. The supply voltage is -0.5 V to 4.0 V for some frequencies. Contact factory.

## HOW TO ORDER CXOX/CXOXHG OSCILLATORS

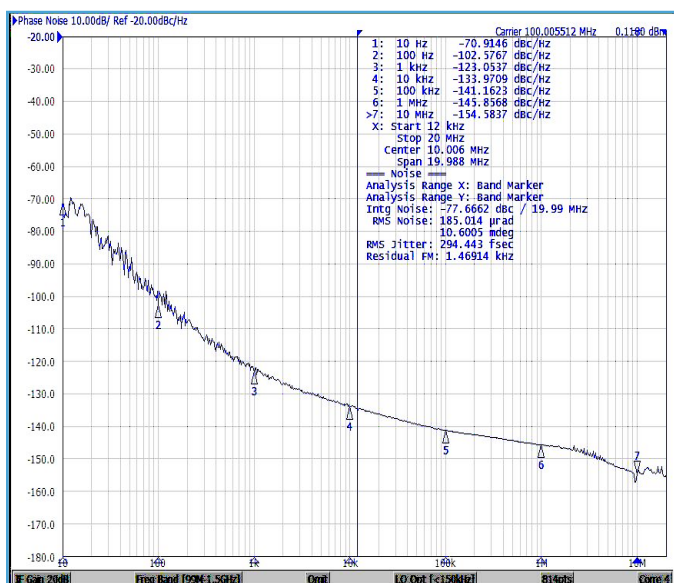
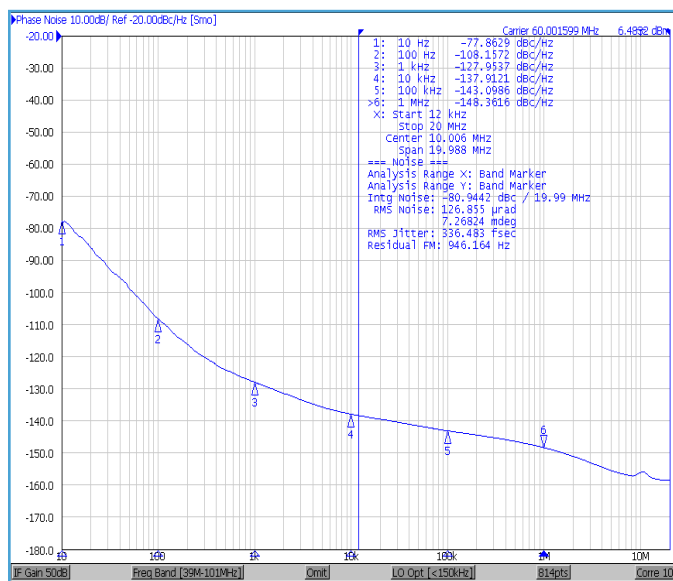
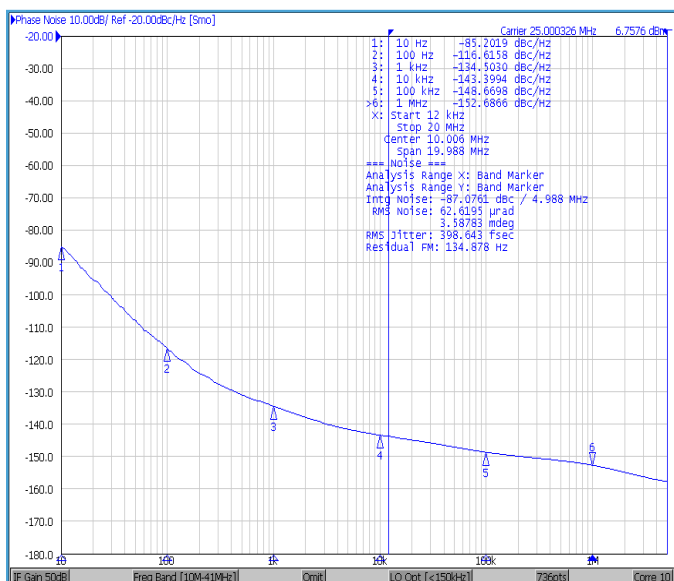
CXOX	HG	4	B	S	N	SM3	—	40.0M	,	50	/	50	/	—	/	I
<b>High Shock</b> Blank = Standard HG = High Shock		<b>Special</b> Blank = Standard S = Special or Custom		<b>Enable/Disable Option</b> E or N		<b>Frequency</b> K = kHz M = MHz		<b>Calibration Tolerance</b> @ 25°C (in ppm)		<b>Frequency Stability over Temp. Range</b> (in ppm)		<b>Operating Temp. Range</b> C = -10°C to +70°C I = -40°C to +85°C M = -55°C to +125°C S = Customer Specified				
<b>Supply Voltage</b> 1 = 1.8 V 2 = 2.5 V 3 = 3.0 V 4 = 3.3 V 5 = 5.0 V		<b>Shock Level Code</b> 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		<b>Terminations</b> Blank = Gold Plated (Lead Free) SM3 = Solder (60/40 Sn-Pb) SM5 = Solder (Lead Free)		<b>OR</b> — / — / 100 / I										
											<b>Total Frequency Tolerance</b> (in ppm)		<b>Operating Temp. Range</b> 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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10168 Rev G

# PHASE NOISE AND JITTER PERFORMANCE AT 25 MHz, 60 MHz, AND 100 MHz



Typical Phase Noise (dBc/Hz) (3.3 V)		
Frequency Offset [Hz]	Clock Frequency (MHz)	
	25 MHz	100 MHz
10 Hz	-84	-71
100 Hz	-114	-102
1 kHz	-130	-123
10 kHz	-142	-134
100 kHz	-148	-141
1 MHz	-153	-146
5 MHz	-157	-154

Integrated RMS Jitter (12 kHz to 20 MHz) <sup>1</sup>	
Frequency	VDD = 3.3 V
25 MHz	411 femtoseconds
60 MHz	352 femtoseconds
100 MHz	295 femtoseconds

1. Upper integration frequency point is clock frequency dependent.

Period Jitter (Typical) 10,000 cycles (3.3 V)		
Frequency	RMS	Peak to Peak
25 MHz	1.3 picoseconds	11.6 picoseconds
60 MHz	1.3 picoseconds	11.0 picoseconds
100 MHz	1.6 picoseconds	24.6 picoseconds

## ENABLE/DISABLE OPTIONS (E/N)

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 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.