



# CXOXLPN OSCILLATOR

10 MHz to 125 MHz  
Ultra Low Phase Noise, High Shock Quartz  
Crystal Oscillator

## DESCRIPTION

Statek's miniature and ultra low phase noise and jitter oscillators consist of a CMOS compatible hybrid circuit and a state-of-the-art, miniature, fundamental-mode crystal. At 20 MHz, a noise floor of -170 dBc/Hz at 1 MHz offset and -160 dBc/Hz at 1 kHz offset with high shock survivability. At 125 MHz, typical RMS phase jitter over 12 kHz to 20 MHz is 75 fs.

## FEATURES

- 3.2 x 2.5 mm hermetically sealed ceramic package
- High shock resistance (HG version) up to 100,000 g
- CMOS output with Enable/Disable
- Low phase noise, jitter and Allan deviation
- Operation over -55°C to +125°C
- Low acceleration sensitivity
- Wide supply voltage options (1.8 V to 5.0 V)
- No PLL artifacts
- Full military testing available
- IBIS model available
- Designed and manufactured in the USA

## APPLICATIONS

### Military & Aerospace

- Communications
- Navigation
- GPS

### Industrial, Computer & Communications

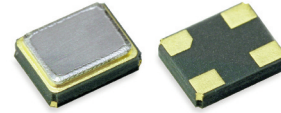
- Miniature clock oscillator
- Handheld instrumentation

### Medical

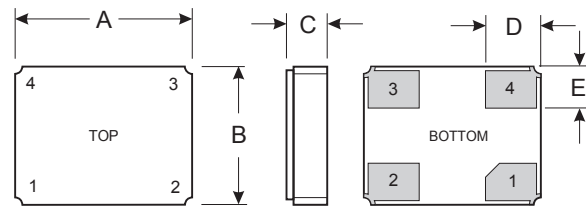
- Test & diagnostic equipment
- Handheld devices

## PACKAGING OPTIONS

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



## PACKAGE DIMENSIONS

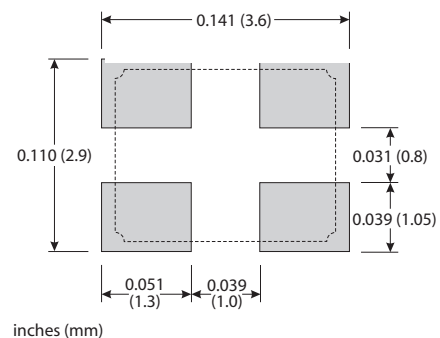


DIM	Termination	TYPICAL		MAXIMUM	
		inches	mm	inches	mm
A		0.126	3.20	0.136	3.40
B		0.099	2.50	0.107	2.70
C	SM1	0.039	1.00	0.043	1.09
	SM3/SM5	0.044	1.12	0.048	1.21
D		0.040	1.00	0.041	1.10
E		0.030	0.75	0.031	0.85

## PIN CONNECTIONS

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

## SUGGESTED LAND PATTERN



10226 REV F



## SPECIFICATIONS

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

Frequency	10 MHz to 125 MHz			
Supply Voltage <sup>1</sup>	1.8 V to 5.0 V ± 10%			
Calibration Tolerance <sup>2</sup>	±100 ppm to ±50 ppm			
Frequency-Temperature Stability <sup>3,4</sup>	±50 ppm to ±10 ppm (Commercial) ±100 ppm to ±30 ppm (Industrial) ±100 ppm to ±50 ppm (Military)			
Typical Supply Current @ 15 pF Output Load (mA)		<u>1.8V</u>	<u>2.5V</u>	<u>3.3V</u>
	10 MHz	1.1	1.9	3.2
	20 MHz	1.6	3.0	5.0
	25 MHz	1.3	1.8	2.8
	50 MHz	2.3	3.2	4.7
	100 MHz	4.5	6.1	8.3
125 MHz	7.2	10.0	12.9	
Output Load (CMOS)	15 pF			
Start-up Time	5 ms MAX			
Rise/Fall Time	2 ns TYP			
Duty Cycle	45% MIN, 55% MAX			
Aging, First Year	3 ppm MAX			
Shock Survival <sup>5</sup>	STD: 5,000 g, 0.3 ms, 1/2 sine HG: up to 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	-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> )	-0.3 V to 4.0 V			
Moisture Sensitivity Level (MSL)	This product is hermetically sealed and is not moisture sensitive.			

1. 5.0 V available 10 MHz to 60 MHz (3.8 mA @ 25 MHz).
2. Tighter tolerances available.
3. Does not include calibration tolerance. Tighter tolerances available.
4. Broader temperature ranges available. Contact factory.
5. Contact factory for high shock options for frequencies greater than 50 MHz.
6. Per MIL-STD-202, Method 204, Condition D. Random vibration testing also available.

### 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.

10226 REV F

# PHASE NOISE AND JITTER PERFORMANCE

Typical phase noise for various oscillator frequencies and voltages [dBc/Hz]

Offset Frequency	V <sub>DD</sub> = 3.3 V						V <sub>DD</sub> = 5.0 V
	10 MHz	20 MHz	25 MHz	50 MHz	100 MHz	125 MHz	50 MHz
10 Hz	-105	-108	-106	-93	-78	-71	-87
100 Hz	-137	-136	-133	-124	-111	-100	-118
1 kHz	-154	-161	-151	-149	-137	-128	-146
10 kHz	-159	-167	-160	-159	-152	-145	-159
100 kHz	-162	-169	-161	-162	-159	-156	-162
1 MHz	-163	-170	-162	-162	-161	-160	-163
5 MHz	-164	-170	-162	-162	-162	-160	-163
20 MHz	—	—	—	-162	-163	-165	—

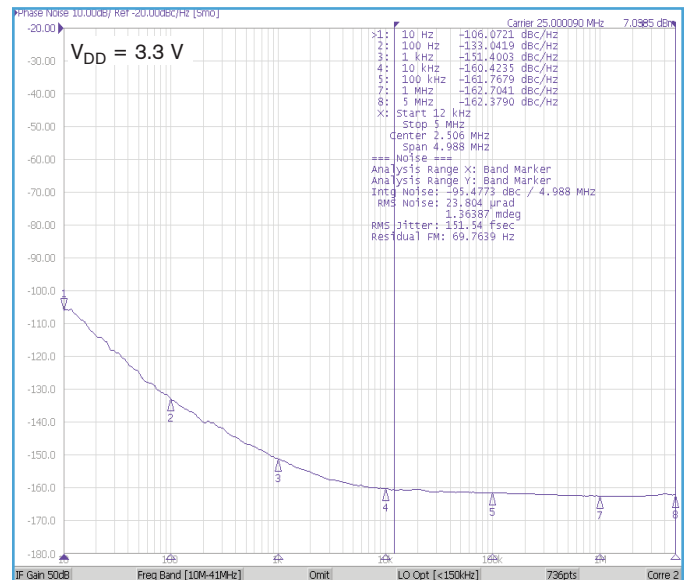
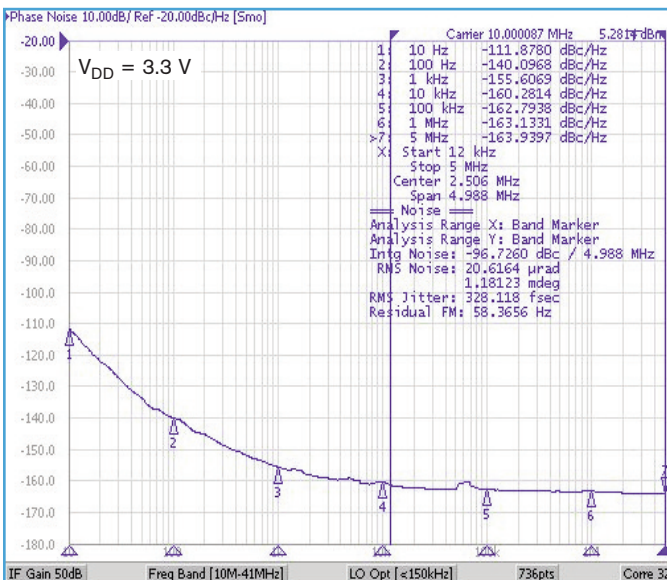
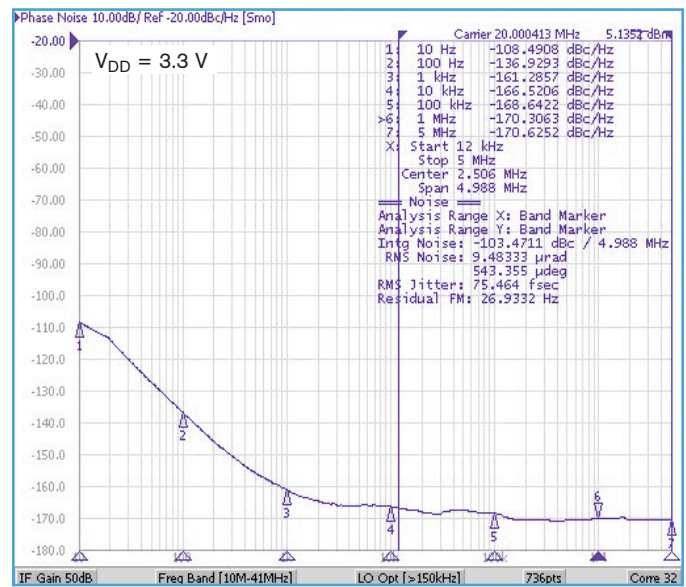
Integrated RMS phase jitter<sup>1</sup>

Frequency	V <sub>DD</sub> = 2.5 V	V <sub>DD</sub> = 3.3 V
10 MHz	625 fs	329 fs
20 MHz	115 fs	75 fs
25 MHz	160 fs	151 fs
50 MHz	179 fs	153 fs
100 MHz	100 fs	76 fs
125 MHz	106 fs	75 fs

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

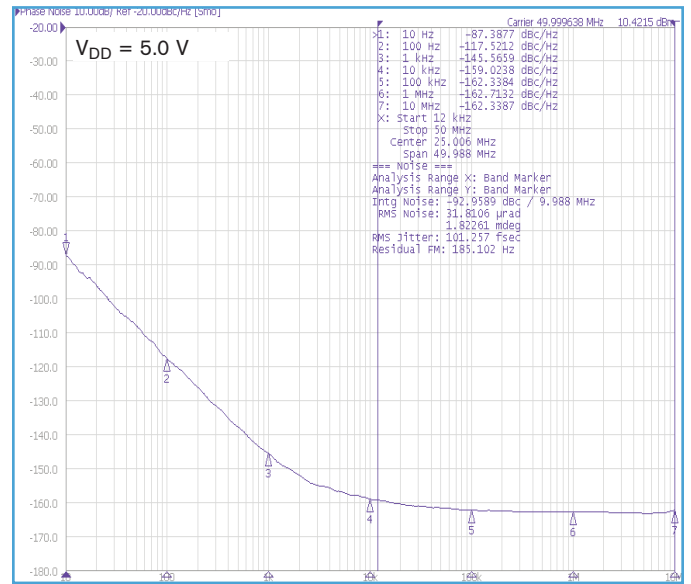
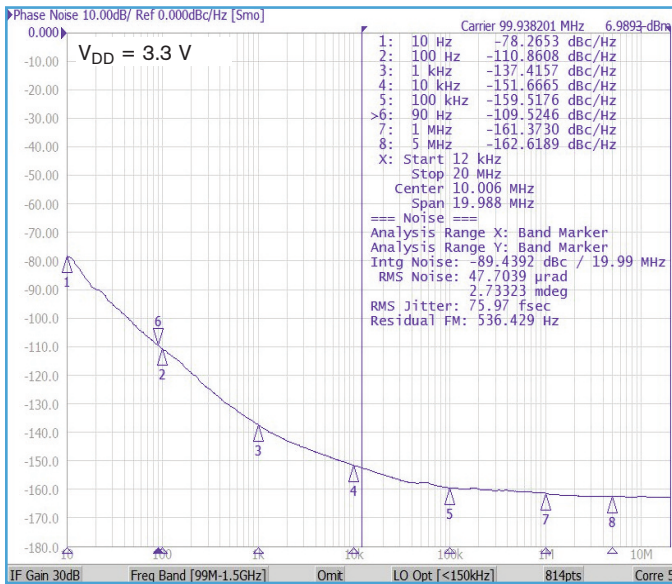
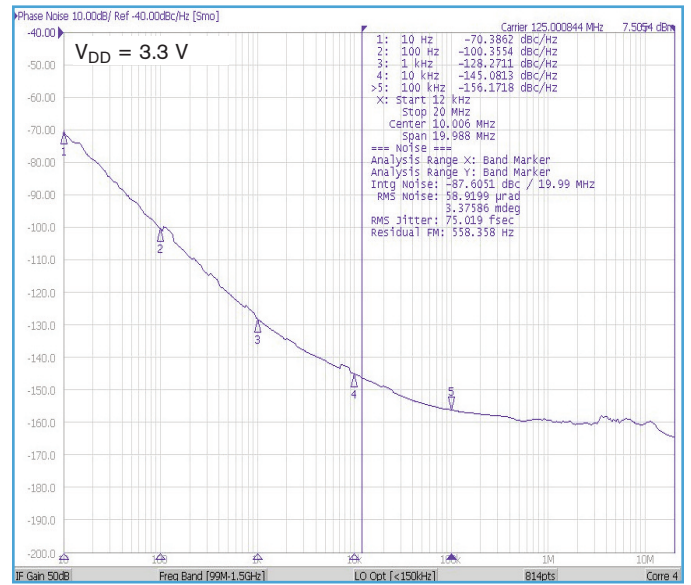
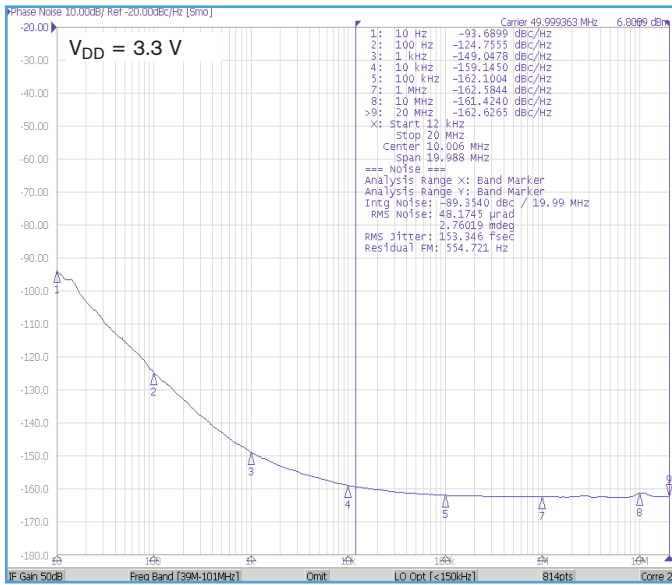
Period jitter (typical) over 10,000 cycles (3.3 V)

Frequency	RMS	Peak-to-Peak
10 MHz	1.20 ps	9.1 ps
20 MHz	1.12 ps	8.5 ps
25 MHz	1.15 ps	9.6 ps
50 MHz	1.02 ps	8.1 ps
100 MHz	1.02 ps	8.3 ps
125 MHz	0.90 ps	7.0 ps



10226 REV F





## HOW TO ORDER STATEK CXOXLPN OSCILLATORS

CXOXLPN HG 4 D S N SM3 - 25.0M , 50 / 50 / - / I

<b>High Shock</b> HG = High Shock Blank = Standard	<b>Special</b> Blank = Standard S = Special or Custom	<b>Enable/Disable Option</b> E = Enable/Disable N = No Connection	<b>Frequency</b> K = kHz M = MHz	<b>Calibration Tolerance @ 25°C (in ppm)</b>	<b>Frequency Stability over Temp. Range (in ppm)</b>	<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* <small>*10 MHz to 60 MHz</small>	<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 (in ppm)</b>	<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	

