



CXOXLPN OSCILLATOR

10 MHz to 125 MHz
Ultra-Miniature, Low Phase Noise & Low Jitter
High Shock Crystal Oscillator

DESCRIPTION

Statek's ultra miniature and ultra low phase noise and jitter oscillators consist of a CMOS/TTL 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 50 MHz, typical RMS Jitter 12 kHz to 20 MHz - 153 femto seconds.

FEATURES

- High shock resistance (HG version) - 50,000 g option
- CMOS output with Enable/Disable
- Low phase noise and jitter
- Full military testing available
- Low acceleration sensitivity
- Wide supply voltage (1.8 V to 3.3 V)
- No PLL artifacts
- Hermetically sealed ceramic package
- Designed and manufactured in the USA

APPLICATIONS

Military & Aerospace

- Smart munitions
- Communications
- Navigation
- GPS

Industrial, Computer & Communications

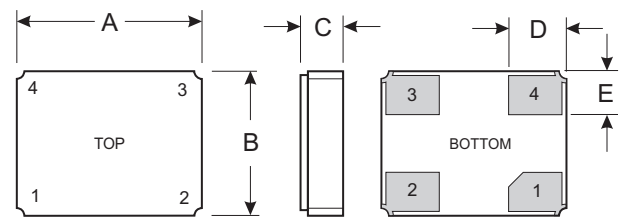
- Miniature clock oscillator
- Handheld instrumentation
- PDA
- Transponder/Animal migration

Medical

- Test & diagnostic equipment
- Handheld devices



DIMENSIONS

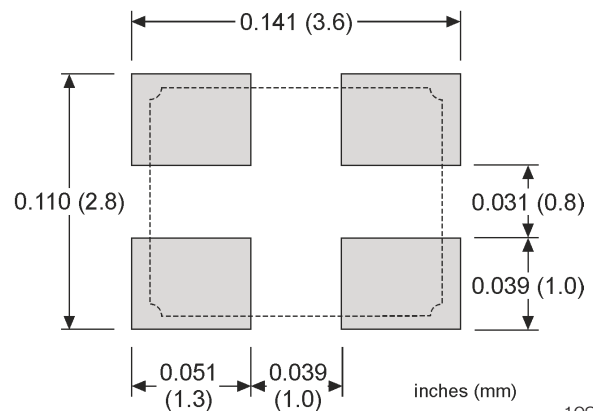


DIM	TYPICAL		MAXIMUM	
	inches	mm	inches	mm
A	0.126	3.20	0.136	3.40
B	0.099	2.50	0.107	2.70
C (SM1)	0.039	1.00	0.043	1.09
C (SM3/SM5)	0.044	1.12	0.048	1.21
D	0.040	1.00	0.041	1.10
E	0.030	0.75	0.031	0.85

PIN CONNECTIONS

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

SUGGESTED LAND PATTERN



10226 Rev B



SPECIFICATIONS

Specifications below are examples. Specifications are subject to change without notice. Tighter specifications available. Please contact factory.

Frequency Range	10 MHz to 125 MHz		
Supply Voltage	1.8 V to 3.3 V \pm 10%		
Calibration Tolerance ¹	\pm 50 ppm		
Frequency Stability Over Temperature ²	\pm 30 ppm for Industrial \pm 50 ppm for Military		
Supply Current (Typical)			
Load 15 pF	<u>1.8V</u>	<u>3.3V</u>	<u>2.5V</u>
10 MHz	1.1 mA	3.2 mA	1.9 mA
20 MHz	1.6 mA	5.0 mA	3.0 mA
25 MHz	1.3 mA	2.8 mA	1.8 mA
50 MHz	2.3 mA	4.7 mA	3.2 mA

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 ³	STD: 5,000 g, 0.3 ms, 1/2 sine High Shock Options in "How to Order"
Vibration, survival ⁴	20 g, 10-2,000 Hz swept sine
Operating Temp. Range	-40°C to 85°C (Industrial) -55°C to 125°C (Military)

1. Tighter tolerances available.
 2. Does not include calibration tolerances. Tighter tolerances available.
 3. Contact Statek for higher shock options for frequencies greater than 50 MHz.
 4. Per MIL-STD-202G, Method 204D, Condition D. Random vibration testing also available.
- Note: All parameters are measured at ambient temperature with a 10 M Ω , 15 pF load.

PHASE NOISE AND JITTER PERFORMANCE

Frequency Offset [Hz]	Typical Phase Noise [dBc/Hz] (3.3V)			
	Clock Frequency [MHz]			
	10 MHz	20 MHz	25 MHz	50 MHz
10 Hz	-105	-108	-106	-93
100 Hz	-137	-136	-133	-124
1 kHz	-154	-161	-151	-149
10 kHz	-159	-167	-160	-159
100 kHz	-162	-169	-161	-162
1 MHz	-163	-170	-162	-162
5 MHz	-164	-170	-162	-162
20 MHz	- - -	- - -	- - -	-162

ABSOLUTE MAXIMUM RATINGS

Supply Voltage V_{DD}	-0.3 V to 4.0 V
Storage Temperature	-55°C to 125°C
Maximum Process Temperature	260°C for 20 seconds

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 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.

PACKAGING OPTIONS

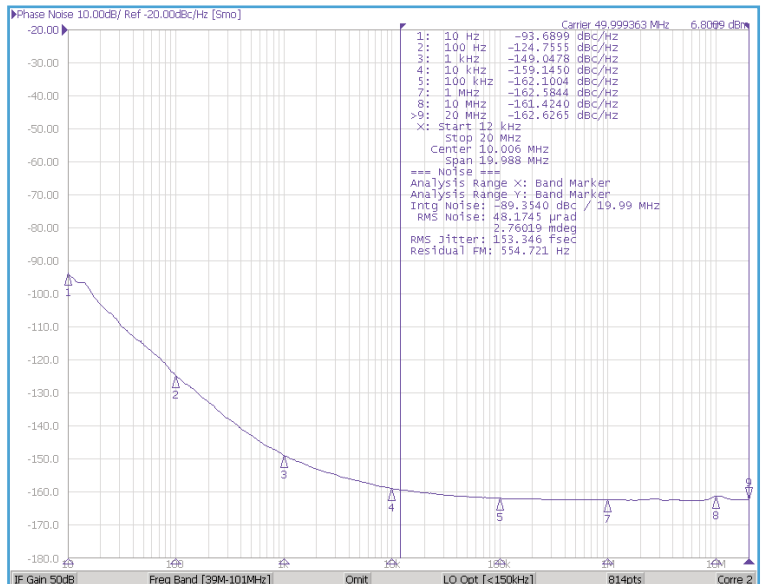
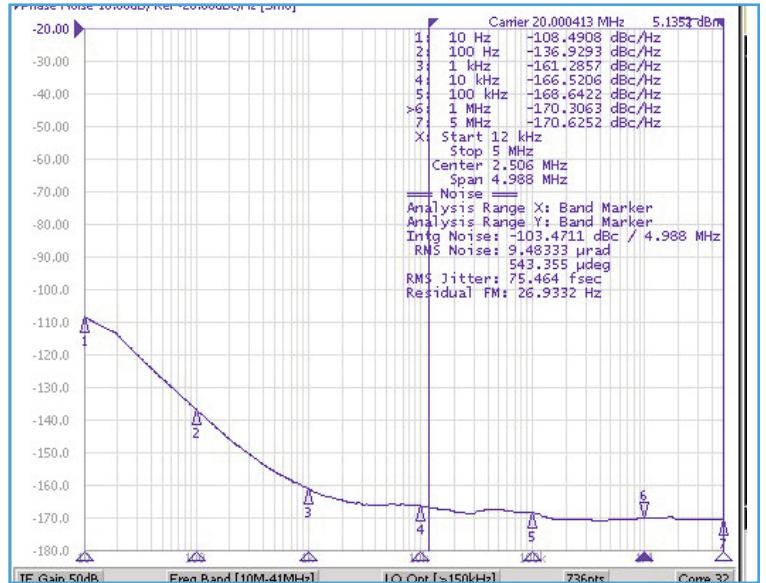
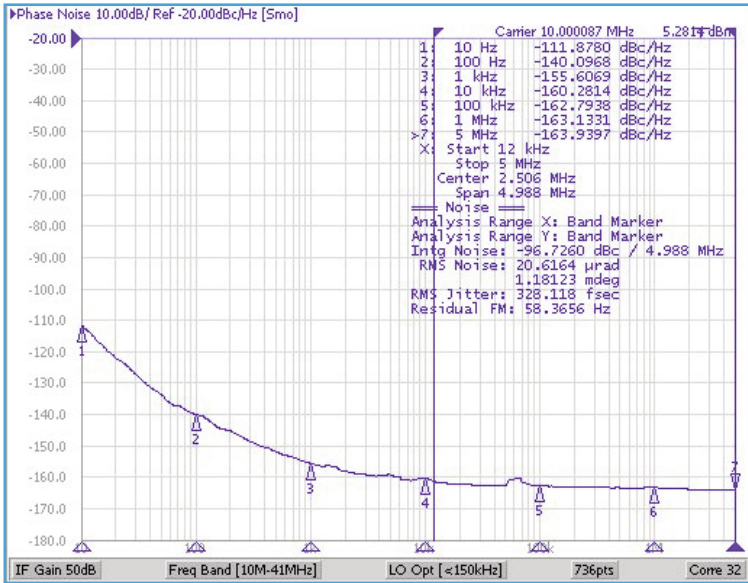
- CXOXLPN - Tray Pack
- 12 mm tape, 7" or 13" reels Per EIA 481

Integrated RMS Jitter (12 kHz to 20 MHz) ¹		
Frequency	$V_{DD} = 2.5V$	$V_{DD} = 3.3V$
10 MHz	625 femtosec.	329 femtosec.
20 MHz	115 femtosec.	75 femtosec.
25 MHz	160 femtosec.	151 femtosec.
50 MHz	179 femtosec.	153 femtosec.

1. Upper integration frequency is clock frequency dependent.

Period Jitter (Typical) 10,000 cycles (3.3V)		
Frequency	RMS	Peak to Peak
10 MHz	1.20 Pico seconds	9.1 Pico seconds
20 MHz	1.12 Pico seconds	8.5 Pico seconds
25 MHz	1.15 Pico seconds	9.6 Pico seconds
50 MHz	1.02 Pico seconds	8.1 Pico seconds

PHASE NOISE PERFORMANCE AT 10 MHz, 20 MHz, 25 MHz AND 50 MHz



HOW TO ORDER CXOXLPN SURFACE MOUNT CRYSTAL OSCILLATORS

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

Supply Voltage 1 = 1.8 V 2 = 2.5 V 3 = 3.0 V 4 = 3.3 V	Shock Level A = 5,000 g B = 10,000 g C = 20,000 g D = 30,000 g F = 50,000 g	"S" if special or custom design. Blank if Std.	Enable/Disable Option E or N	Terminations Blank = SM1 = Gold Plated (Lead Free) SM3 = Solder Dipped SM5 = Solder Dipped (Lead Free)	Frequency M = MHz	Calibration Tolerance @ 25°C (in ppm)	Frequency Stability over Temp. Range (in ppm)	Temp. 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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OR

Total Frequency Tolerance (in ppm)	Temp. 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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