



**STATEK**

**MILITARY PRODUCTS**  
HIGH FREQUENCY OSCILLATORS WITH  
STANDARD MILITARY TESTING



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## OVERVIEW

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For over 35 years, Statek has supported military programs with both standard products (normally purchased without a drawing and without modifications or special testing) and specialized products (normally purchased to a drawing and requiring modifications or special testing). For those desiring standard products (not governed by a source control document) but still desiring construction and testing to military standards, Statek offers a portfolio of oscillators manufactured and tested to MIL-PRF-55310, Product Level B. Because of our dedication to servicing specialized needs and continued support of the military market over the years, Statek is a preferred supplier to a number of major defense contractors.

## GUIDELINES FOR MILITARY PRODUCTS

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### ■ Materials

Statek uses only the highest quality materials from carefully selected suppliers. Whenever possible, we use domestic suppliers and try to cultivate a long-term relationship to provide stable sources of high-quality materials. Statek's incoming inspection assures compliance to our requirements. We manufacture our crystals with ultra-pure synthetically grown alpha-quartz bars. (Swept quartz is also available, e.g., for applications requiring radiation hardness.) To simplify and minimize the device circuitry, we use oscillator-dedicated integrated circuits. Lastly, we design our own ceramic packages, which are then manufactured for us by our package supplier.

### ■ Assembly

Statek optimizes its manufacturing process to guarantee high quality. Our time-proven assembly process includes many proprietary techniques to ensure robust parts suitable for the harshest environments. All military oscillators are inspected to MIL-STD-883 prior to seal.

### ■ Testing

In order to meet COTS (commercial-off-the-shelf) requirements, Statek offers oscillators meeting the testing requirements of MIL-PRF-55310 Product Level B. However, Statek gladly accepts fully customized testing to meet your needs; just contact us with your requirements.

### ■ Continuity

Statek offers the continuity of support required for long-term military programs. We maintain records so that we can trace each delivery back through its manufacturing history. Statek also has production redundancy and an established Business Continuity Plan, which will allow us to recover in the event of an unforeseen occurrence.

### ■ Quality Assurance

Statek uses the ISO 9001:2000 process approach model and plans its continual improvements in order to achieve total customer satisfaction.

## IN-HOUSE TEST CAPABILITIES FOR OSCILLATORS: (INCLUDE BUT NOT LIMITED TO)

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- Aging (Elevated Temp) .....(MIL-PRF-55310, Paragraph 4.8.35)
- Burn-in .....(MIL-PRF-55310, Table III)
- Die Shear Strength .....(MIL-STD-883, Method 2019)
- Fine/Gross Leak Testing .....(MIL-STD-883, Method 1014; MIL-STD-202, Method 112)
- Lead Integrity .....(MIL-STD-883, Method 2004)
- Mechanical Shock .....(MIL-STD-883, Method 2002)
- Moisture Resistance .....(MIL-STD-202, Method 106)
- PIND (Particle Impact Noise Detection) .....(MIL-STD-883, Method 2020; MIL-STD-202, Method 217)
- Salt Atmosphere .....(MIL-STD-883, Method 1009)
- Solderability .....(MIL-STD-883, Method 2003)
- Temperature Cycling .....(MIL-STD-883, Method 1010)
- Temperature Range .....(MIL-PRF-55310, Paragraph 1.2.1.3, Table III)
- Thermal Shock .....(MIL-STD-202, Method 107)
- Vibration .....(MIL-STD-202, Method 204)
- Wirebond Pull Test .....(MIL-STD-883, Method 2023)

## PRODUCT FAMILY DESCRIPTIONS

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Statek's high-frequency military grade oscillators are designed specifically to meet the demanding requirements of today's precision military applications.

■ The CXO oscillator is compatible with conventional soldering, epoxy attachment, wirebonding, has high shock resistance, and excellent long-term reliability.

■ The CXOM oscillator is a miniaturized version of the CXO, with a low profile ceramic package and one of the smallest footprints available in the industry.

■ The CXOHG and CXOMHG oscillators are high-shock versions of the CXO and CXOM that can survive shocks up to 10,000 g (and higher if required).

■ The HGXO is a miniature surface mount oscillator that can survive extremely high shocks up to 100,000 g.

■ The LXOAT, LXOMAT, and SOXO2AT are thru-hole oscillators.

■ For applications requiring other types of crystals, oscillators, or sensors, please contact the factory.

## MILITARY APPLICATIONS

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- Smart Munitions
- Airborne Communication Systems
- Battlefield Simulation
- Portable Field Equipment
- Projectile Electronics
- Robust Computing Platform
- Telemetry
- Navigation
- GPS

## MILITARY PROGRAM PARTICIPATION

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- AMRAAM (Advanced Medium-Range Air to Air Missile)
- ASRAAM (Advance Short-Range Air to Air Missile)
- CSEL (Combat Survivor Evader Locator)
- DAS (Distributed Aperture System)
- ERGM (Extended Range Guided Munitions)
- EXCALIBER (Next Generation Fuze)
- JASSM (Joint Air to Surface Standoff Missile)
- JCM (Joint Common Missile)
- JTRS (Joint Tactical Radio System)
- JSF (Joint Strike Fighter)
- LGB (Laser Guided Bomb)
- MRM (Medium Range Munition)
- PAC-3 (Patriot Advanced Capabilities)
- PREDATOR (Hand-Held Missile)
- SFW (Sensor Fuzed Weapons)
- WCMD (Wind Corrected Munitions Dispenser)

## MAXIMUM RATINGS

Supply Voltage $V_{DD}$	-0.5 V to 7.0 V
Storage Temperature	-55°C to +125°C

## ENABLE/DISABLE OPTIONS (E/T/N)

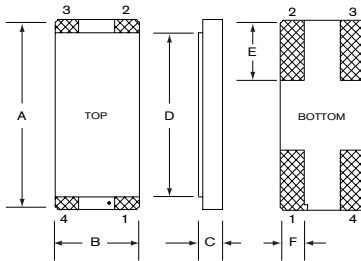
Statek offers three enable/disable options: E, T, and N. Both the E-version and T-version have Tri-State outputs and differ in whether the oscillator continues to run internally when the output is put into the high Z state: it stops in the E-version and continues to run in the T-version. So, the E-version offers very low current consumption when the oscillator is disabled and 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. The following table summarizes the three options.

**SUMMARY OF ENABLE/DISABLE OPTIONS E/T/N**

	E	T	N
When enabled (PIN 1 is high*)			
Output	Freq. output	Freq. output	Freq. output
Oscillator	Oscillates	Oscillates	Oscillates
Current consumption	Normal	Normal	Normal
When disabled (PIN 1 is low)			
Output	High Z state	High Z state	Freq. output
Oscillator	Stops	Oscillates	Oscillates
Current consumption	Very low	Lower than normal	Normal
When re-enabled (PIN 1 changes from low to high)			
Output recovery	Delayed	Immediate	N/A

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

### CXO/CXOHG



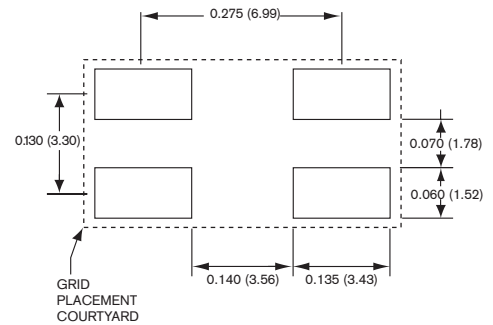
#### PIN CONNECTIONS

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

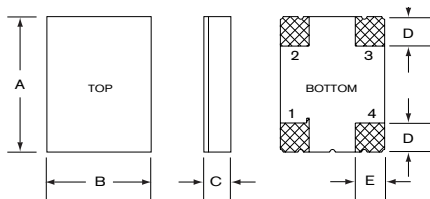
#### DIMENSIONS

DIM	TYP.		MAX.	
	inches	mm	inches	mm
A	0.400	10.16	0.405	10.29
B	0.180	4.57	0.190	4.83
C*	0.051	1.30	0.055	1.40
D	0.340	8.64	0.350	8.89
E	0.125	3.18	0.135	3.43
F	0.050	1.27	0.060	1.52

\* SM1 Termination



### CXOM/ CXOMHG



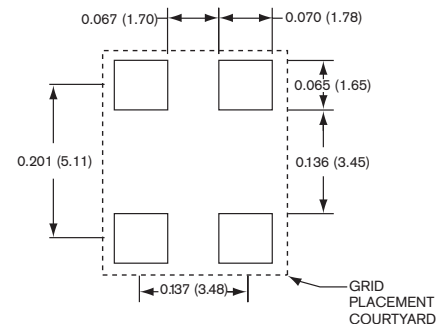
#### PIN CONNECTIONS

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

#### DIMENSIONS




DIM	TYP.		MAX.	
	inches	mm	inches	mm
A	0.256	6.50	0.263	6.68
B	0.197	5.00	0.204	5.18
C*	0.051	1.30	0.055	1.40
D	0.055	1.40		
E	0.060	1.52	0.070	1.78

\* SM1 Termination



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

**SURFACE MOUNT PRODUCTS**

	<b>CXO/CXOHG</b>		<b>CXOM/CXOMHG</b>		<b>HGXO</b>	
						
Frequency Range	300 kHz to 120 MHz (up to 220 MHz for 3.3V)		300 kHz to 120 MHz (up to 220 MHz for 3.3V)		460 kHz to 50 MHz	
Supply Voltage	1.8 V to 5.0 V		1.8 V to 5.0 V		1.8 V to 5.0 V	
Standard Calibration Tolerances <sup>1</sup>	± 25 ppm, ± 50 ppm, ± 100 ppm		± 25 ppm, ± 50 ppm, ± 100 ppm		± 25 ppm, ± 50 ppm, ± 100 ppm	
Frequency Stability Over Temp. Range <sup>2</sup>	± 25 ppm to ± 100 ppm		± 25 ppm to ± 100 ppm		± 25 ppm to ± 100 ppm	
Supply Current (Typical)	5.0 V 14 mA for 50 MHz 12 mA for 40 MHz 10 mA for 30 MHz 8 mA for 24 MHz	3.3 V 10 mA for 50 MHz 8 mA for 40 MHz 6 mA for 30 MHz 4 mA for 24 MHz	5.0 V 14 mA for 50 MHz 12 mA for 40 MHz 10 mA for 30 MHz 8 mA for 24 MHz	3.3 V 10 mA for 50 MHz 8 mA for 40 MHz 6 mA for 30 MHz 4 mA for 24 MHz	5.0 V 14 mA for 50 MHz 12 mA for 40 MHz 10 mA for 30 MHz 8 mA for 24 MHz	3.3 V 10 mA for 50 MHz 8 mA for 40 MHz 6 mA for 30 MHz 4 mA for 24 MHz
Output Load (CMOS) <sup>3</sup>	15 pF		15 pF		15 pF	
Start-up Time	5 ms MAX		5 ms MAX		5 ms MAX	
Rise/Fall Time	3 ns TYP, 6 ns MAX		3 ns TYP, 6 ns MAX		8 ns MAX	
Duty Cycle <sup>1</sup>	40% MIN, 60% MAX		40% MIN, 60% MAX		40% MIN, 60% MAX	
Aging, first year	For high frequency oscillators, aging is dependent on frequency and					
Shock, survival <sup>4</sup>	3,000 g / 10,000 g, 0.3 ms, 1/2 sine		3,000 g / 10,000 g, 0.3 ms, 1/2 sine		Up to 100,000 g, 0.5 ms, 1/2 sine	
Vibration, survival <sup>5</sup>	20 g, 10-2000 Hz swept sine		20 g, 10-2000 Hz swept sine		20 g, 10-2000 Hz swept sine	
Maximum Process Temperature	260°C for 20 seconds		260°C for 20 seconds		260°C for 20 seconds	

1. Other tolerances available

2. Does not include calibration tolerance. Other tolerances available.

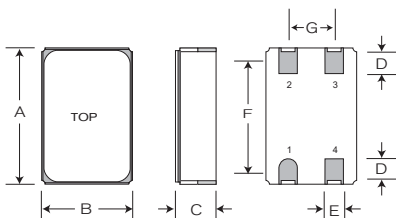
3. TTL loads and higher CMOS loads available. Contact Factory.

4. Higher shock version available.

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

NOTE: All combinations may not be available. All parameters are measured at an ambient temperature with a 10 MΩ, 15 pF load.

**HGXO**



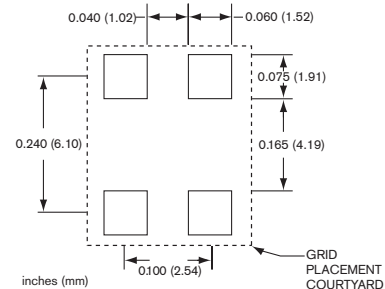
**PIN CONNECTIONS**

1. Enable/Disable (E or T) or not connected (N)
2. Ground
3. Output
4. V<sub>DD</sub>

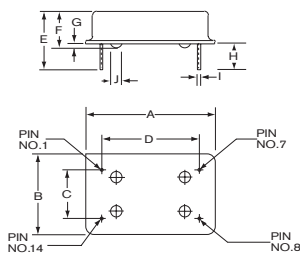
**DIMENSIONS**

DIM	TYP.		MAX.	
	inches	mm	inches	mm
A	0.295	7.50	0.302	7.68
B	0.197	5.00	0.204	5.18
C*	0.089	2.25	0.098	2.50
D	0.055	1.40		
E	0.040	1.02		
F	0.240	6.10		
G	0.100	2.54		

\* SM1 Termination



**LXOAT**






**PIN CONNECTIONS**

1. Enable/Disable (E or T) or not connected (N)
7. Ground
8. Output
14. V<sub>DD</sub>

**DIMENSIONS**

DIM	inches	mm
A	0.810 MAX	20.57 MAX
B	0.510 MAX	12.95 MAX
C	0.300 ± 0.005	7.62 ± 0.13
D	0.600 ± 0.005	15.24 ± 0.13
E	0.430 TYP	10.92 TYP
F	0.240 MAX	6.10 MAX
G	0.040 TYP	1.02 TYP
H	0.150 MIN	3.81 MIN
I	0.018 ± 0.002	0.46 ± 0.05
J	0.070 TYP	1.78 TYP

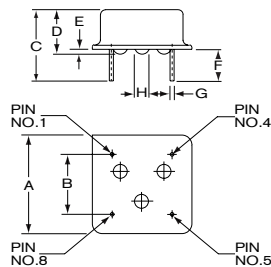
## THRU-HOLE PRODUCTS

LXOAT		LXOMAT		SQXO2AT	
					
250 kHz to 120 MHz (up to 220 MHz for 3.3V)		250 kHz to 120 MHz (up to 220 MHz for 3.3V)		250 kHz to 120 MHz (up to 220 MHz for 3.3V)	
1.8 V to 5.0 V		1.8 V to 5.0 V		1.8 V to 5.0 V	
$\pm 25$ ppm, $\pm 50$ ppm, $\pm 100$ ppm		$\pm 25$ ppm, $\pm 50$ ppm, $\pm 100$ ppm		$\pm 25$ ppm, $\pm 50$ ppm, $\pm 100$ ppm	
$\pm 25$ ppm to $\pm 100$ ppm		$\pm 25$ ppm to $\pm 100$ ppm		$\pm 25$ ppm to $\pm 100$ ppm*	
5.0 V 14 mA for 50 MHz 12 mA for 40 MHz 10 mA for 30 MHz 8 mA for 24 MHz	3.3 V 10 mA for 50 MHz 8 mA for 40 MHz 6 mA for 30 MHz 4 mA for 24 MHz	5.0 V 14 mA for 50 MHz 12 mA for 40 MHz 10 mA for 30 MHz 8 mA for 24 MHz	3.3 V 10 mA for 50 MHz 8 mA for 40 MHz 6 mA for 30 MHz 4 mA for 24 MHz	5.0 V 14 mA for 50 MHz 12 mA for 40 MHz 10 mA for 30 MHz 8 mA for 24 MHz	3.3 V 10 mA for 50 MHz 8 mA for 40 MHz 6 mA for 30 MHz 4 mA for 24 MHz
15 pF		15 pF		15 pF	
5 ms MAX		5 ms MAX		5 ms MAX	
6 ns TYP, 10 ns MAX		6 ns TYP, 10 ns MAX		3 ns TYP, 6 ns MAX	
40% MIN, 60% MAX		40% MIN, 60% MAX		40% MIN, 60% MAX	

other design considerations. Please contact factory.

1,000 g peak, 1 ms, 1/2 sine	1,000 g peak, 1 ms, 1/2 sine	1,000 g peak, 0.3 ms, 1/2 sine
20 g, 10-2000 Hz swept sine	20 g, 10-2000 Hz swept sine	20 g, 10-2000 Hz swept sine
175°C for 20 seconds	175°C for 20 seconds	260°C for 20 seconds

### LXOMAT



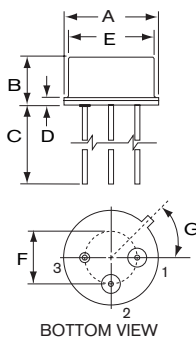
#### PIN CONNECTIONS

1. Enable/Disable (E or T) or not connected (N)
4. Ground
5. Output
8.  $V_{DD}$

#### DIMENSIONS

DIM	inches	mm
A	0.505 MAX	12.83 MAX
B	$0.300 \pm 0.005$	$7.62 \pm 0.13$
C	0.430 TYP	10.92 TYP
D	0.225 MAX	5.72 MAX
E	0.025 MAX	0.64 MAX
F	0.150 MIN	3.81 MIN
G	$0.018 \pm 0.002$	$0.46 \pm 0.05$
H	0.063 TYP	1.60 TYP

### SQXO2AT



#### DIMENSIONS

DIM	inches	mm
A	0.380 MAX	9.65 MAX
B	0.185 MAX	4.70 MAX
C	0.500 MIN	12.70 MIN
D	0.029	0.74
E	0.326 MAX	8.28 MAX
F	0.200 REF	5.08 REF
G	45°	45°

#### PIN CONNECTIONS

1.  $V_{DD}$
2. Output
3. Ground

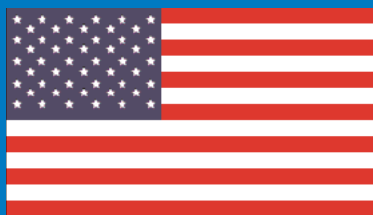




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All products made in the USA.

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