SiTime

MEMS Timing Solutions for

Aerospace & Defense

Endura™ COTS Ruggedized Timing Solutions

Innovative MEMS technology

Leading clock performance

Best-in-class acceleration sensitivity

High shock and vibration survivability

> "MEMS Timing doesn't just outperform quartz—it's enabling things that are new and could never be done before."
>
> —Chief, Time and Frequency Division, NIST

Endura Oscillators | OCXOs | Super-TCXOs | VCXOs | DCXOs

Timing devices are critical to the performance of aerospace and military equipment that operates in dynamic environments. SiTime Endura ruggedized timing solutions are specifically engineered and qualified for tough operating conditions—providing best-in-class stability and reliability over a wide temperature range and under severe shock and vibration.

Application Circuits

- Local oscillator
- Reference clock
- Time keeping
- Time synchronization
- Time transfer
- Digital system clocking

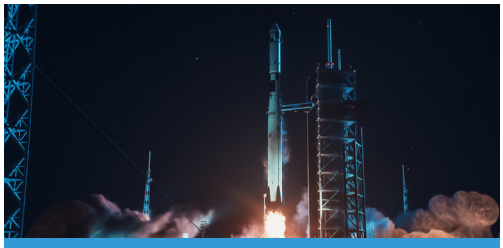
PRECISION GNSS TIMING

AVIONICS & NAVIGATION SYSTEMS

UAVs AND VTOL

TACTICAL COMMUNICATIONS

SATCOM RECEIVERS



LAUNCHERS

Endura Performance for Tough Environments

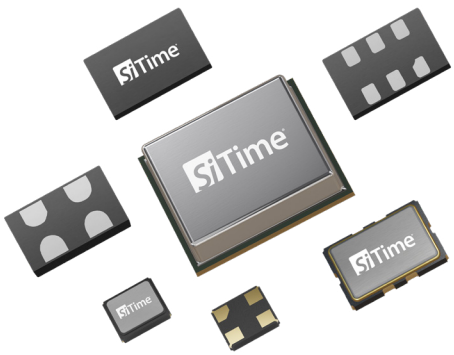
- ±1 ppb Endura OCXO consumes less than 420 mW power in 9 x 7 mm^2 package
- ±5 ppb Endura Super-TCXOs™ replace fragile and bulky quartz OCXOs
- As low as 0.3 ppb/°C dF/dT over temperature range with TCXO
- Ultra-low acceleration sensitivity and high shock survivability
- As low as ±150 ppb aging over 20 years with TCXO
- Low sensitivity to power supply noise and EMI
- Smallest industry-standard packages
- Programmable frequency eliminates NRE for custom parts

Higher System Performance

- Simplifies design and layout
- Eliminates vibration damping designs
- Reduces system size and power
- Lowers bit error rate
- Enables GNSS receivers to acquire satellite lock faster and maintain lock longer
- Survives higher level of shock
- Eliminates need for external temperature and vibration compensation

Endura Quality and Reliability at COTS Pricing Level

- Qualification IAW JESD47, JESD22, MIL-STD-883 and MIL-STD-202
- Less than 1 DPPM quality level
- Statistical process control and 6-sigma datasheet limits
- Endura process flow increases reliability
- >2 Billion hours MTBF

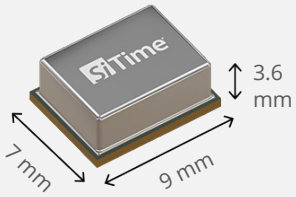


Endura MEMS Timing Outperforms Quartz

Best Ruggedized Holdover Solution

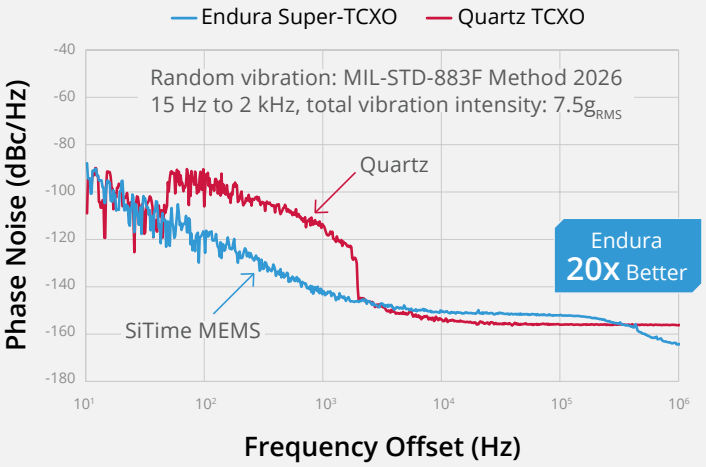
SiT71xx OCXO

- ±1 ppb frequency stability over -40 to 95°C
- 0.01 ppb/g g-sensitivity
- 5E-12 ADEV
- 0.1 ppb/day aging
- <1.5 µs time error after 12-hr holdover
- 420 mW steady-state power

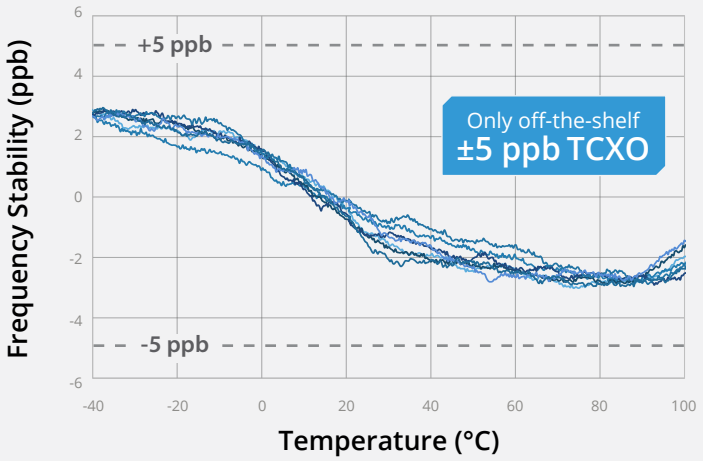


Weight 0.35 g

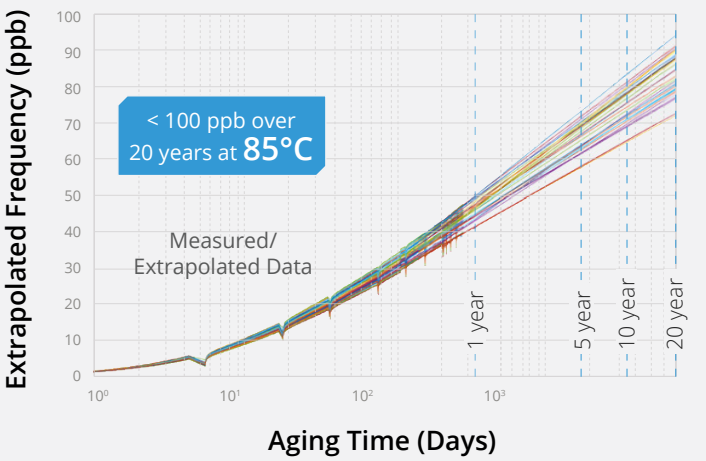
Best Phase Noise Under Vibration



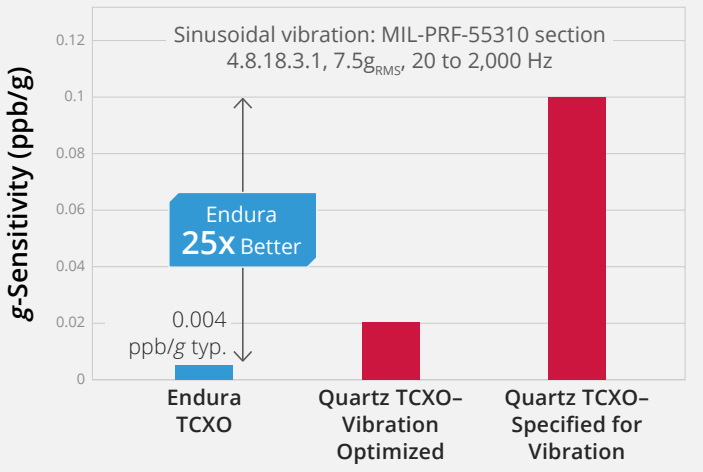
Best TCXO Frequency Stability



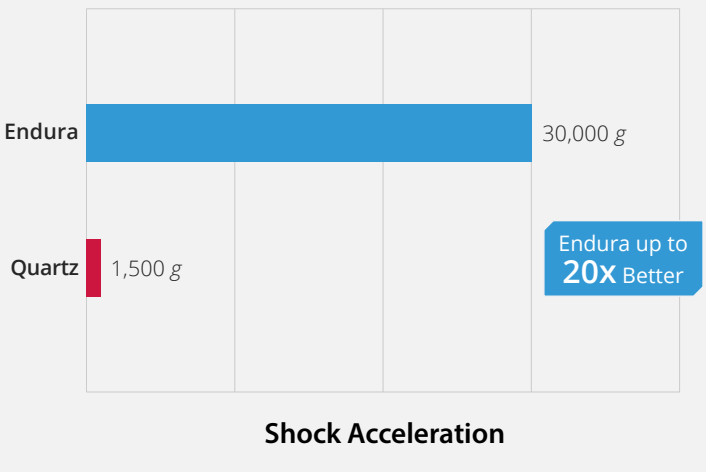
Best Aging



Best Frequency Stability under Vibration



Best Shock Survivability



SiTime Base Part No.	Output Frequency	Frequency Stability	Temperature Range (°C)	Supply Volt. (V)	Packages (mm x mm)	Output Logic	Features
OCXOs | 0.01 ppb/g | 5E-12 ADEV							
SiT7111/12	10 to 220 MHz	±1 ppb	-40 to 95	2.5, 3.3	9.0 x 7.0	LVCMOS	I2C & SPI frequency pull
SiT7101/02		±3 ppb					
TCXOs | ±6.25 to ±3200 ppm pull range | 5 ppt resolution frequency control | Better reliability | 0.004 ppb/g acceleration sensitivity							
SiT5543	1 MHz to 60 MHz	±5 ppb	-40 to 95	2.5, 3.3	7.0 x 5.0 Ceramic	LVCMOS, Clipped Sinewave	0.01 ppb/g, I2C & SPI frequency pull
SiT5541		±10 ppb	-40 to 105	2.5, 2.8, 3.0, 3.3			0.01 ppb/g max, I2C programmable
SiT5348/49	1 MHz to 220 MHz	±0.05 ppm	-40 to 105	2.5, 2.8, 3.0, 3.3	5.0 x 3.2 Ceramic	LVCMOS, Clipped Sinewave	0.009 ppb/g max, I2C & SPI programmable
SiT5346/47		±0.1, ±0.2, ±0.25 ppm					
SiT5146/47	1 MHz to 220 MHz	±0.5, ±1, ±2.5 ppm					
DIFFERENTIAL LOW-JITTER OSCILLATORS | Better reliability | 0.2 ps/mV power supply noise rejection (PSNR)							
SiT9551	25 MHz to 644 MHz	±20, ±50 ppm	-55 to 125	1.71 to 3.63	2.0 x 1.6, 2.5 x 2.0, 3.2 x 2.5	LVPECL, LVDS, HCSL, Low-power HCSL, FlexSwing	0.04 ppb/g, 70 fs RMS phase jitter
SiT9346/47	1 MHz to 725 MHz	±10, ±20, ±25, ±50 ppm	-40 to 105	2.5 to 3.3	3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0	LVPECL, LVDS, HCSL	0.1 ppb/g, 210 fs RMS phase jitter
SiT9356/57	1 MHz to 220 MHz, 220 MHz to 920 MHz	±20, ±50 ppm	-55 to 125	1.71 to 3.63	2.0 x 1.6, 2.5 x 2.0, 3.2 x 2.5	LVPECL, LVDS, HCSL, Low-power HCSL, FlexSwing	0.04 ppb/g, 150 fs RMS phase jitter
SINGLE-ENDED OSCILLATORS | Better reliability | Pin-compatible footprints							
SiT8944	1 MHz to 110 MHz	±20, ±25, ±30, ±50 ppm	-55 to 125	1.8, 2.5 to 3.3	2.0 x 1.6, 2.5 x 2.0, 3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0	LVCMOS	0.1 ppb/g, 1.3 ps RMS phase jitter
SiT8945	115 MHz to 137 MHz						
VCXOs | ±25 to ±3200 ppm pull range, <1% linearity | Better reliability							
SiT3342/43	1 MHz to 725 MHz	±15, ±25, ±30, ±50 ppm	-40 to 105	2.5 to 3.3	3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0	LVPECL, LVDS, HCSL	0.21 ps RMS phase jitter
DCXOs (In-System Programmable) | Digital pull for lowest noise | Up to ±1600 ppm pull range, 5 ppt pull resolution, <1% linearity							
SiT3541/42	1 MHz to 725 MHz	±20, ±25, ±50 ppm	-40 to 105	2.5 to 3.3	5.0 x 3.2	LVPECL, LVDS, HCSL	I2C programmable, 0.21 ps RMS phase jitter
32 kHz TCXO | Industry-best stability | 6.0 µA, 30x lower power than quartz							
SiT7910	32.768 kHz	±0.1, ±0.2 ppm	-40 to 85, -55 to 105	1.62 to 3.63	2.5 x 2.0	LVCMOS	±5 ppm, 20-yr aging, 2 ns RMS phase jitter

Learn more about Aerospace & Defense solutions from SiTime

SiTimeDirect Store | Contact Us | sitime.com

Subscribe