



THE PRECISION TIMING COMPANY



## MEMS Timing Solutions for Aerospace & Defense

### Endura™ Ruggedized Timing Solutions Guaranteed Performance in the Harshest Environments

- Best Resistance to Shock
  - 30,000 g Operational
  - 70,000 g (100 kg Future) Survivability
- Best Resistance to Vibration
  - 0.01 to 0.004 ppb/g
- Tightest Frequency Stability Over Temperature
  - $\pm 1$  ppb OCXO
  - $\pm 5$  ppb TCXO

“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

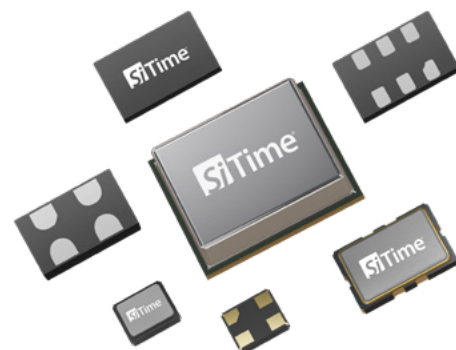
- $\pm 1$  ppb Endura OCXO consumes less than 420 mW power in 9 x 7 mm package (63 mm<sup>2</sup> footprint)
- $\pm 5$  ppb Endura Super-TCXOs™ replace fragile and bulky quartz OCXOs
- As low as 0.3 ppb/°C dF/dT over temperature range with TCXO
- As low as  $\pm 150$  ppb aging over 20 years with TCXO
- Low sensitivity to power supply noise and EMI

### Higher System Performance

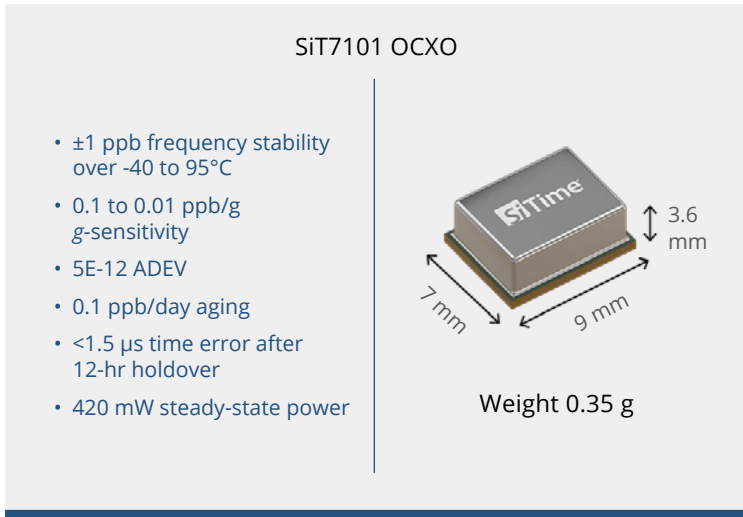
- Simplifies design and layout
- Eliminates vibration damping designs
- Reduces system size and power
- Minimizes GNSS jamming/spoofing
- Enables GNSS receivers to acquire satellite lock faster and maintain lock longer
- Survives higher level of shock
- Eliminates need for external temperature and vibration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

### Endura Quality and Reliability at COTS Pricing Level

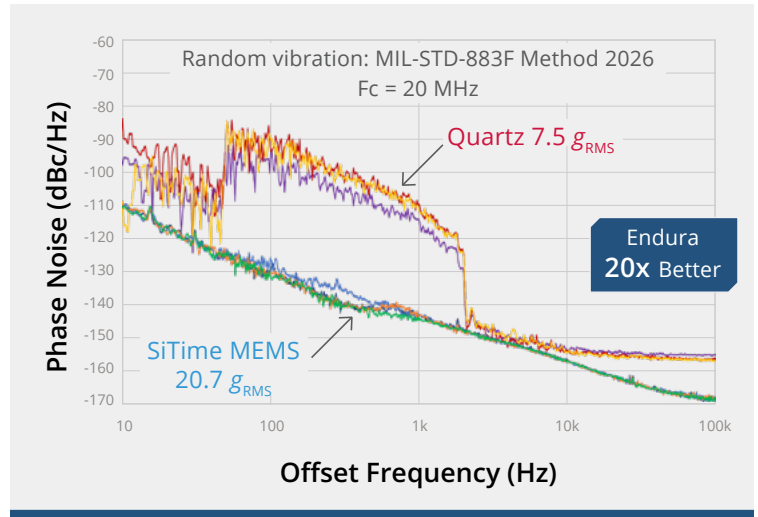
- Qualification IAW JESD47, JESD22, MIL-STD-883 and MIL-STD-202
- Less than 1 DPPM quality level
- Statistical process control and 6-sigma datasheet limits
- Endura process flow increases reliability
- >2 Billion hours MTBF



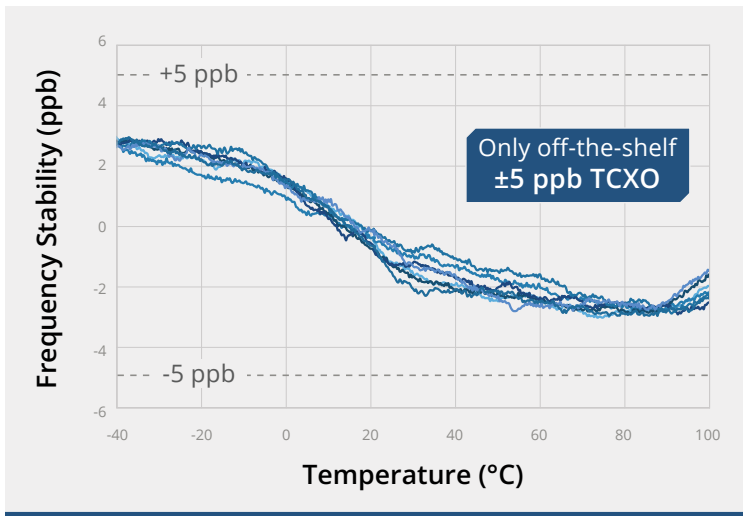
Best Ruggedized Holdover Solution



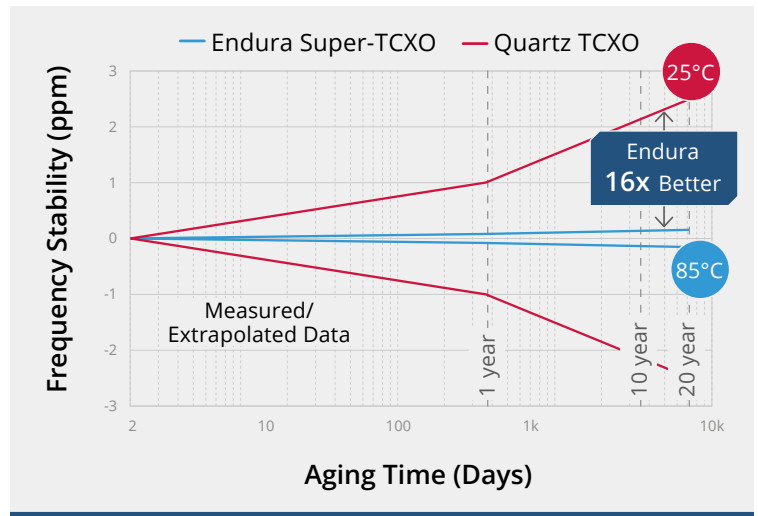
Best Phase Noise Under Random Vibration



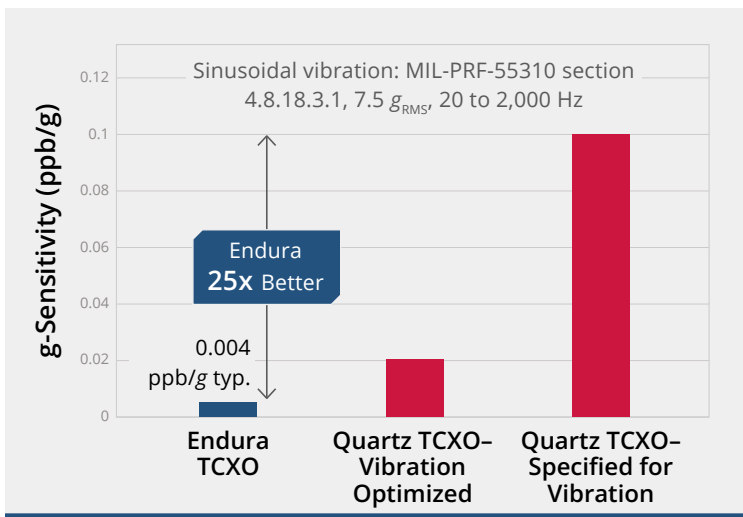
SiT5543 – Best TCXO Frequency Stability



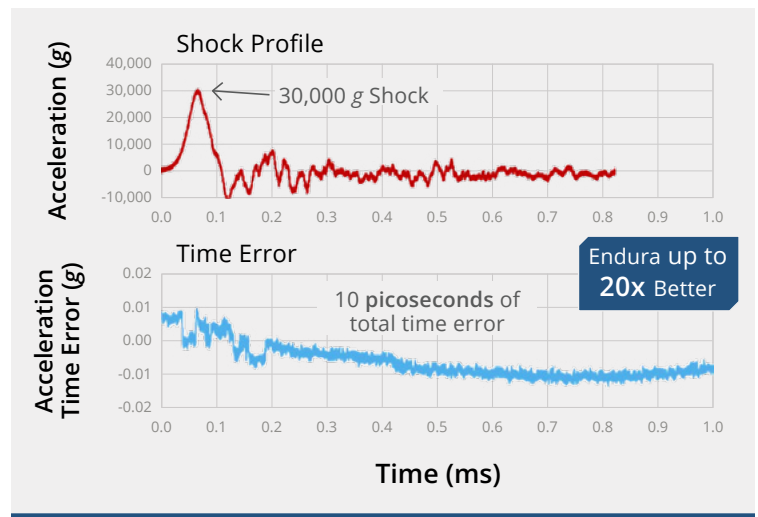
Best Aging



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
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**OCXOs** | 0.01 ppb/g | 5E-12 ADEV

SiT7101	10 to 250 MHz	±1 to ±5 ppb	-40 to 95	3.3	9.0 x 7.0	LVC MOS, Regulated Out, Clipped Sine	I <sup>2</sup> C & SPI frequency pull
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**Super-TCXOs** | ±6.25 to ±3200 ppm pull range | 5 ppt resolution frequency control | Better reliability | 0.004 ppb/g acceleration sensitivity

ENDR-TTT*	1 to 105 MHz	±50 to ±500 ppb	-55 to +125	1.8, 2.5, 2.8, 3.0, 3.3	5.0 x 3.2 Ceramic	LVC MOS, Regulated Out, Clipped Sine	0.004 ppb/g acceleration sensitivity, >100 kg shock survivability
SiT7201/02	1 to 220 MHz	±100 to ±250 ppb	-40 to +105	1.8, 2.5, 2.8, 3.0, 3.3	5.0 x 3.2 Ceramic	LVC MOS, Regulated Out, Clipped Sine	Digital frequency tuning through I <sup>2</sup> C or SPI, ±100 fs phase jitter & low g-sensitivity 0.01 ppb/g
SiT5146/47	1 to 220 MHz	±0.5, ±1, ±2.5 ppm	-55 to +105	2.5, 2.8, 3.0, 3.3	5.0 x 3.2 Ceramic	LVC MOS, Clipped Sine	0.009 ppb/g max, I <sup>2</sup> C & SPI programmable
SiT5348/49	1 to 220 MHz	±0.05 ppm	-40 to 105				
SiT5346/47		±0.1, ±0.2, ±0.25 ppm					

**Single-Ended Oscillators** | Better reliability | Pin-compatible footprints

SiT7601	4 to 125 MHz	±30 to ±50 ppm	-55 to 125	1.5, 1.8, 2.5, 3.3	2.0 x 1.6, 2.5 x 2.0, 3.2 x 2.5	LVC MOS	>100,000+ g shock, 70 g RMS vibration
SiT8944/45	1 to 137 MHz	±20, ±25 ±30, ±50 ppm	-40 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	LVC MOS	0.1 ppb/g, 1.3 ps RMS phase jitter

**Differential Low-Jitter Oscillators** | Better reliability | 0.2 ps/mV power supply noise rejection (PSNR)

SiT9356/57	1 to 990 MHz	±20 to ±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, HCSSL, Low-power HCSSL, FlexSwing	0.04 ppb/g, 150 fs RMS phase jitter
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\*Contact SiTime for datasheet



Learn more about timing solutions from SiTime



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