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SPECIAL EDITION

Endrich Bauelemente GmbH – SiTime's standard MEMS Oscillators available in a week

Dear readers,

As an authorized distributor in Europe, Endrich GmbH now offers a fast delivery option for SiTime's standard MEMS oscillators. Customers can use our newly created online Oscillator Shop to select their desired specifications, find the required component, and have product shipped in less than a week.

MEMS oscillators from SiTime, an analog semiconductor company revolutionizing the timing industry, are rapidly replacing legacy quartz crystal products by offering higher performance and reliability at a lower cost.

Configure device to your exact spefification in seconds.

With robust MEMS resonators and high performance analog ICs, SiTime has developed breakthrough solutions that overcome the limitations of quartz devices. The oscillators are 100% drop-in replacements for quartz oscillators without any design changes. Plus, the programmable architecture enables the most flexible products with more features and ultra-fast lead-times. SiTime is enabling the miniaturization of electronic products. MEMS oscillators are used as high-precision clocks in automotive applications (as AEC-Q100 qualified oscillators), telecom and network applications that require ppb-level tolerances. SiTime is the market leader, shipping more than 700 million units to date.

MEMS oscillators are produced using standard semiconductor processes and packaging. This guarantees an almost unlimited availability and extreme short lead times. Designers no longer need to waste time searching and waiting for oscillators. By using the Time Machine II programmer, designer engineers can configure devices to match their specification needs in seconds.

The new MEMS Oscillator Shop delivers almost every desired quantity from single samples up to production quantities within the shortest time. You have the choice of eight product families with a wide range of features including low power, low jitter and differential oscillators.

Using the online Part Number Generator, an easy-to-use tool that defines the full part number for your custom configured device, you can order programmed SiTime oscillators at www.endrich.com with just a few clicks.

Best regards,
W. ENDRICH · August, 2017

MEMS Oscillators Product Portfolio

Product Selector 2017

SiTime

µPower 32 kHZ TCXO
1.2 mm²

- **SiT1552** ±10, 13, 22 ppm
- **SiT1566/8** ±3, 5 ppm 2.5 ns_{RMS} IPJ

µPower 32 kHz Oscillators

- **SiT1532/3** 1508 & 2012
- **SiT1572** ±50 ppm 1508
- **SiT1630** -40 to +105°C 2012, SOT23

µPower TCXO
1.2 mm²

- **SiT1576** ±5 ppm 1 Hz-2 MHz 2.5 ns_{RMS} IPJ

µPower Oscillators
1.2 mm²

- **SiT1569** 1 Hz-462 kHz ±50 ppm
- **SiT1579** 1 Hz-2 MHz ±50 ppm
- **SiT1534** 1 Hz-32 kHz 2012 Option
- **SiT8021** 1-26 MHz 60-280 µA 2.5 ns_{RMS} IPJ

Low Power Oscillators

- **SiT1602** 3.75-77.76 MHz 3.1-4.9 mA
- **SiT8008/9** 1-137 MHz 3.1-5.9 mA
- **SiT8003XT** 0.25 mm thin 1-110 MHz 3.1-5.9 mA
- **SiT2001/2** 1-137 MHz SOT23-5

High Temp Oscillators

- **SiT1618** 7.3728-48 MHz -40 to +125°C
- **SiT8918/9** 1-137 MHz -40 to +125°C
- **SiT8920/1** 1-137 MHz -55 to +125°C
- **SiT2018/9** 1-137 MHz -40 to +125°C SOT23-5
- **SiT2020/1** 1-137 MHz -55 to +125°C SOT23-5

AEC-Q100 Automotive Oscillators

- **SiT8924** 1-110 MHz -55 to +125°C
- **SiT8925** 115.20-137 MHz -55 to +125°C
- **SiT2024** 1-110 MHz -55 to +125°C SOT23-5
- **SiT2025** 115.20-137 MHz -55 to +125°C SOT23-5

Spread Spectrum Oscillators

- **SiT9005** 17 dB Reduction 1-141 MHz
- **SiT9003** Low Power 1-110 MHz
- **SiT9002** 1-220 MHz

Elite Low Jitter Oscillators

- **SiT9365** 25-325 MHz 0.23 ps Jitter*
- **SiT9366/7** 1-700 MHz 0.23 ps Jitter*

Low Jitter Oscillators

- **SiT8208/9** 1-220 MHz 0.5 ps Jitter*
- **SiT9120** 25-212.5 MHz 0.6 ps Jitter*
- **SiT9121/2** 1-625 MHz 0.6 ps Jitter*

Elite VCXO

- **SiT3372** 10-220 MHz ±10 to 50 ppm
- **SiT3373** 220-700 MHz ±10 to 50 ppm

VCXO

- **SiT3807** 1.5-45 MHz
- **SiT3808/9** 1-220 MHz

Elite Super-TCXO

- **SiT5356/7** 1-220 MHz ±0.1 to 0.25 ppm
- **SiT5155** 1-40 MHz ±0.5 ppm 0.35 ps Jitter*
- **SiT5156/7** 1-220 MHz ±0.5 to 2.5 ppm 0.35 ps Jitter*

TCXO

- **SiT5021** 1-220 MHz ±5 ppm
- **SiT5022** 220-625 MHz ±5 ppm

DCXO

- **SiT3907** 1-220 MHz
- **SiT3921/2** 1-625 MHz

NanoDrive™ output for lowest power

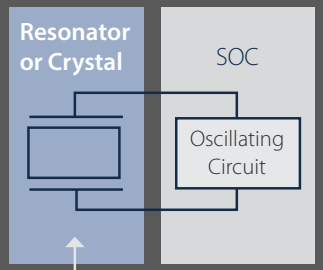
LVPECL, LVDS, HCSL output

LVCMOS output

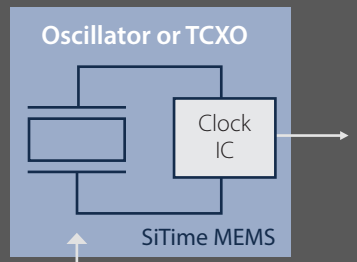
Pin-to-pin compatible with quartz devices

Available as field programmable for use with Time Machine II Programmer

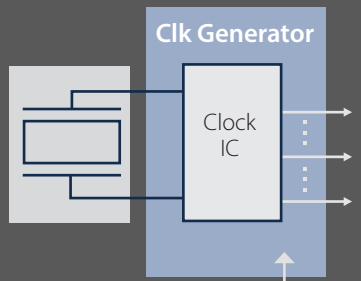
* Integrated RMS Phase Jitter (12 kHz to 20 MHz)



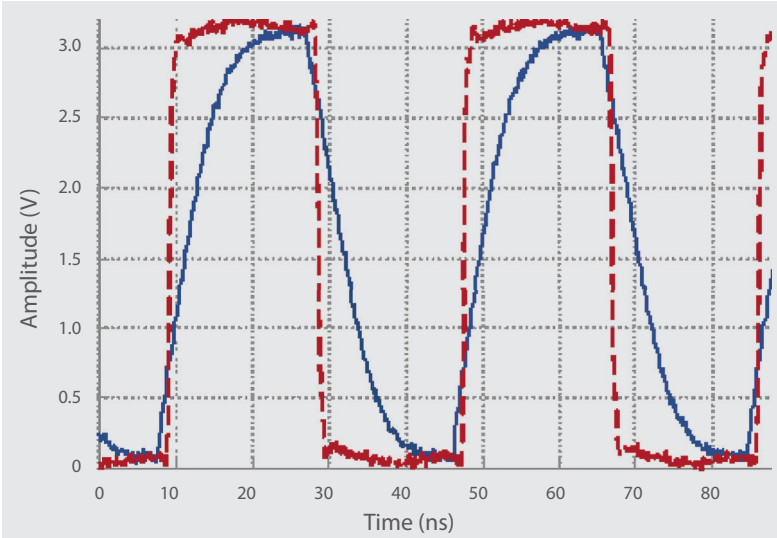
Passive Device
Needs ext. oscillating circuit
2 terminals used



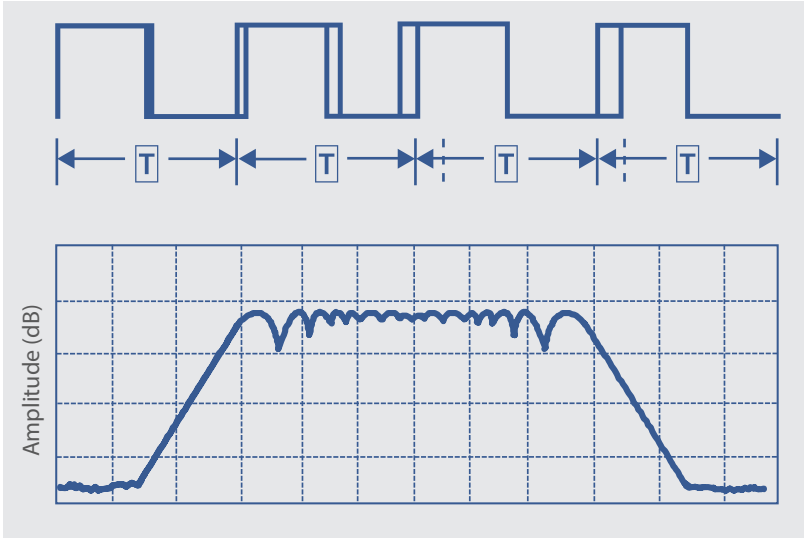
Active Device
2 chips in package
4, 6, 10 terminals



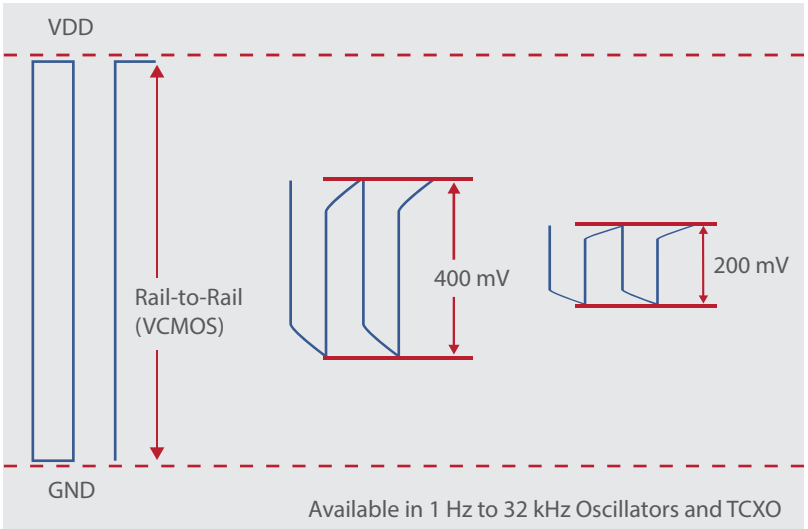
Active IC
Needs ext. clock reference
Many terminals/outputs



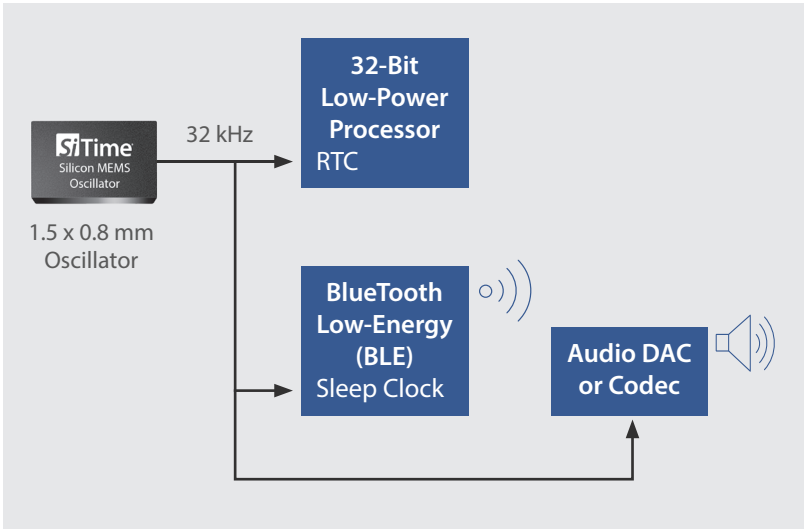
Configurable Rise/Fall Time to Reduce EMI



Spread Spectrum to Reduce EMI



NanoDrive™ Output to Optimize Swing and Lower Power



Drive Multiple Loads to Minimize BOM and Board Space

SiTime oscillators comprise a resonator and oscillator IC in one active device as shown in the middle diagram on the left. As a MEMS and analog company, SiTime has combined man-decades of MEMS expertise with analog CMOS circuit design, resulting in flexible products with the most features and highest performance.

MEMS Oscillator Product Selector

Product Selector 2017

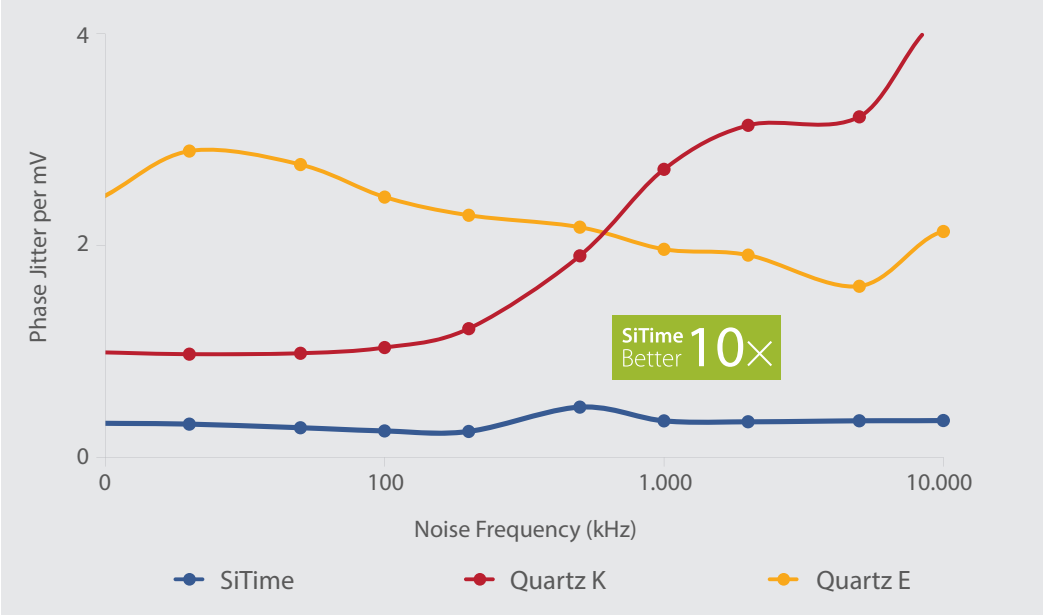
SiTime

SiTime Base Part No.	Output Freq.	Frequency Stability (ppm)	Supply Volt. (V)	Supply Current (Typical)	Packages (mm x mm)	Output Logic	Target Applications	Features
µPower 32 kHz Oscillators & TCXOs | Replace XTAL, XO, TCXO | Smallest Size | Drive Two or More Loads | Best Accuracy (Stability) | Best Reliability | Best Vibration Immunity								
SiT1532, SiT1533	32.768 kHz	10, 20 room; 75, 100 over temp	1.2 to 3.63	0.90 µA	1.5x0.8x0.6H (CSP), 2.0x1.2x0.6H (QFN)	NanoDrive™ LVCMOS	• Smart meters • Health & wellness monitors • RTC reference clock • Industrial timekeeping & battery management • Multi-drop 32 kHz clock distribution • Bluetooth & WiFi modules • Internet of Things (IoT), cellular connectivity • Smart utility water, gas & electricity meters (AMR) • Connectivity modules	Smallest XO
SiT1572		±50	1.62 to 3.63	4.5 µA	1.5x0.8x0.6H (CSP)	LVCMOS		Smallest XO
SiT1630		20 room; 75,100,150 over temp	1.5 to 3.63	1.0 µA	2.0x1.2x0.6H (DFN), 2.9 x 2.8 (SOT23-5)	LVCMOS		-40 to +105°C
SiT1552 TCXO		±10, ±13, ±22 all-inclusive	1.5 to 3.63	0.99 µA	1.5x0.8x0.6H (CSP)	NanoDrive™ LVCMOS		Smallest TCXO
SiT1566 Super-TCXO		±3 all-inclusive, ±5 all-inclusive	1.8 ±10%, 3.3 ±10%	4.5 µA		LVCMOS		Smallest XO, 2.5 ns RMS phase jitter
SiT1568 Super-TCXO		±5 all-inclusive, after overmold/underfill	1.8 ±10%					
µPower Oscillators & TCXOs | Smallest Size | Lowest Power | Lightest Weight | Drive Two or More Loads								
SiT1534	1 Hz to 32.768 kHz	20 room; 75, 100 over temp	1.2 to 3.63	0.90 µA	1.5x0.8x0.6H (CSP), 2.0x1.2x0.6H (QFN)	NanoDrive™ LVCMOS	• Health & wellness monitors • Industrial data loggers & sensor interface • IoT beacons • Smart pens	Smallest XO
SiT1569	1 Hz to 462 kHz	±50	1.62 to 3.63	2.0 µA (100 kHz)	1.5x0.8x0.6H (CSP)	LVCMOS		Smallest XO, 2.5 ns RMS phase jitter
SiT1576 Super-TCXO	1 Hz to 2 MHz	±5 all inclusive	1.8 ±10%, 3.3 ±10%	8.0 µA (100 kHz)				
SiT1579	1 Hz to 2 MHz	±50	1.62 to 3.63	8.0 µA (100 kHz)				
SiT8021	1 to 26 MHz	±100	1.8	60 to 280 µA (0.9 µA stby)			• Wearables & IoT • Industrial & medical sensors • Portable audio	
Low-Power Oscillators | Best Reliability | Pin Compatible QFN or SOT-23 Package for Best Solder Joint Observability								
SiT1602	52 standard frequencies	±20, ±25, ±50	1.8, 2.5 to 3.3	3.1 to 5.5 mA (0.6 - 1.0 µA stby)	2.0x1.6, 2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVCMOS	• DSC, DVC, DVR & IP cam • Tablets • Networking, storage & servers • Industrial sensors, PLC & motor server • Microprocessor & FPGA clocking • Audio video equipment	FP*
SiT8008, SiT8009	1 to 137 MHz							
SiT2001, SiT2002	1 to 137 MHz			3.6 to 5.4 mA (1.0 µA stby)	2.9 x 2.8 (SOT23-5)	LVCMOS		
Low-Jitter Oscillators | 0.1 ppb/g (g-sensitivity, Vibration Immunity) | Best Reliability								
SiT9365 Elite Platform	32 standard frequencies	±10, ±20, ±25, ±50	2.5 to 3.3	76 to 84 mA	3.2x2.5, 7.0x5.0 (QFN)	LVPECL, LVDS, HCSL	• Computing • Storage • Networking • Telecom • Industrial control • Servers • Instrumentation • FPGA clocking	0.1 ps RMS phase jitter
SiT9366/67 Elite Platform	1 to 700 MHz							
SiT9120	31 standard frequencies		2.5 to 3.3	54 to 69 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVPECL, LVDS		0.5/0.6 ps RMS phase jitter, FP*
SiT9121, SiT9122	1 to 625 MHz							
SiT8208, SiT8209	1 to 220 MHz		1.8, 2.5 to 3.3	29 to 36 mA (10 µA stby)	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVCMOS		

SiTime Base Part No.	Output Freq.	Frequency Stability (ppm)	Supply Volt. (V)	Supply Current (Typical)	Packages (mm x mm)	Output Logic	Target Applications	Features
High-Temperature and Automotive Oscillators | 0.1 ppb/g (g-sensitivity, Vibration Immunity) | Best Reliability | Pin Compatible QFN or SOT-23 Package for Best Solder Joint Observability								
SiT1618	33 standard frequencies	±20, ±25, ±30, ±50	1.8, 2.5 to 3.3	3.6 to 5.4 mA (1.0 µA stby)	2.0x1.6, 2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVCMOS	• High-temp industrial equipment such as industrial control systems & industrial sensors • Servo motor, PLC & high-temp networking gears • Outdoor systems (medical & health monitoring) • Asset tracking systems	-40 to +125°C, FP*
SiT8918, SiT8919	1 to 122 MHz							
SiT2018, SiT2019					2.9 x 2.8 (SOT23-5)			
SiT8920, SiT8921	1 to 137 MHz				2.0x1.6, 2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVCMOS	• Ruggedized applications in harsh environments • Applications in extreme temperature conditions • Avionics equipment	-55 to +125°C, FP*
SiT2020, SiT2021					2.9 x 2.8 (SOT23-5)			
SiT8924, SiT8925					2.0x1.6, 2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVCMOS	• AEC-Q100 automotive applications • ADAS, camera modules, i nfotainment, automotive Ethernet & LED headlights • ECUs (engine & transmission control units)	
SiT2024, SiT2025					2.9 x 2.8 (SOT23-5)			
VCXO (Voltage Controlled Oscillators) | ±25 to ±3200 ppm Pull Range, <1% Linearity | 0.1 ppb/g (g-sensitivity, Vibration Immunity) | Best Reliability								
SiT3372/73 Elite Platform	10 to 700 MHz	±15, ±25, ±30, ±50	2.5 to 3.3	76 to 84 mA	3.2x2.5, 7.0x5.0 (QFN)	LVPECL, LVDS, HCSL	• Networked video & networked audio systems • Wireless & telecom equipment • Instrumentation • Jitter cleaner • FPGA data recovery	0.23 ps RMS phase jitter
SiT3807, SiT3808, SiT3809	1 to 220 MHz	±10, ±25, ±50	1.8, 2.5 to 3.3	29 to 34 mA (10 to 70 µA stby)	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVCMOS		0.5 ps RMS phase jitter, FP*
DCXO (Digitally-Controlled Oscillators) | Digital Pull for Lowest Noise | ±25 to ±1600 ppm Pull Range, <1% Linearity								
SiT3907	1 to 220 MHz	±10, ±25, ±50	1.8, 2.5 to 3.3	32 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVCMOS	• Networked video & networked audio systems • Instrumentation • Low bandwidth analog phase locked loops (PLL) • FPGA data recovery	0.5 ps RMS phase jitter, FP*
SiT3921, SiT3922	1 to 625 MHz		2.5 to 3.3	55 to 69 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVPECL, LVDS		
TCXO/VCTCXO | ±6.25 to ±50 ppm Pull Range | 0.1 ppb/g (g-sensitivity, Vibration Immunity) | Best Reliability								
SiT5356/57 Elite Super-TCXO**	1 to 220 MHz	±0.1, ±0.2, ±0.25	2.5, 2.8, 3.0, 3.3	40 to 45 mA	6.0x4.9 (SOIC-8)	LVCMOS, Clipped Sinewave	• High-reliability telecom & networking • Broadband satellite, Industrial & test instrumentation	-40 to +105°C, 0.35 ps RMS phase jitter
SiT5155/56/57 Elite Super-TCXO**		±0.5, ±1, ±2.5					• High-reliability industrial, server, storage, networking & telecom • Industrial/automotive/Telecom GNSS	
SiT5021, SiT5021	1 to 625 MHz	±5	2.5, 3.3, 2.25 to 3.63	55 to 69 mA	3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)	LVPECL, LVDS	• Instrumentation • Embedded systems • Networking	0.6 ps RMS phase jitter
SSXO (Spread Spectrum Oscillators) | ±0.125 to ±2.0% center spread | -0.25% to -4.0% down spread | Lowest Cycle-Cycle Jitter								
SiT9005	1 to 141 MHz	±20, ±25, ±50	1.8, 2.5 to 3.3	4.0 to 5.6 mA	2.0x1.6, 2.5x2.0, 3.2x2.5	LVCMOS	• Printers & flat panels • IP cameras • PCI Express • Microprocessors	Smallest SSXO FP*
SiT9003	1 to 110 MHz	±25, ±50	1.8, 2.5, 3.3	3.2 to 4.1 mA (0.4 to 4.0µA stby)	2.5x2.0, 3.2x2.5, 5.0x3.2, 7.0x5.0 (QFN)			FP*
SiT9002	1 to 220 MHz			48 to 75 mA	5.0x3.2, 7.0x5.0 (QFN)	LVPECL, CML LVDS, HCSL		

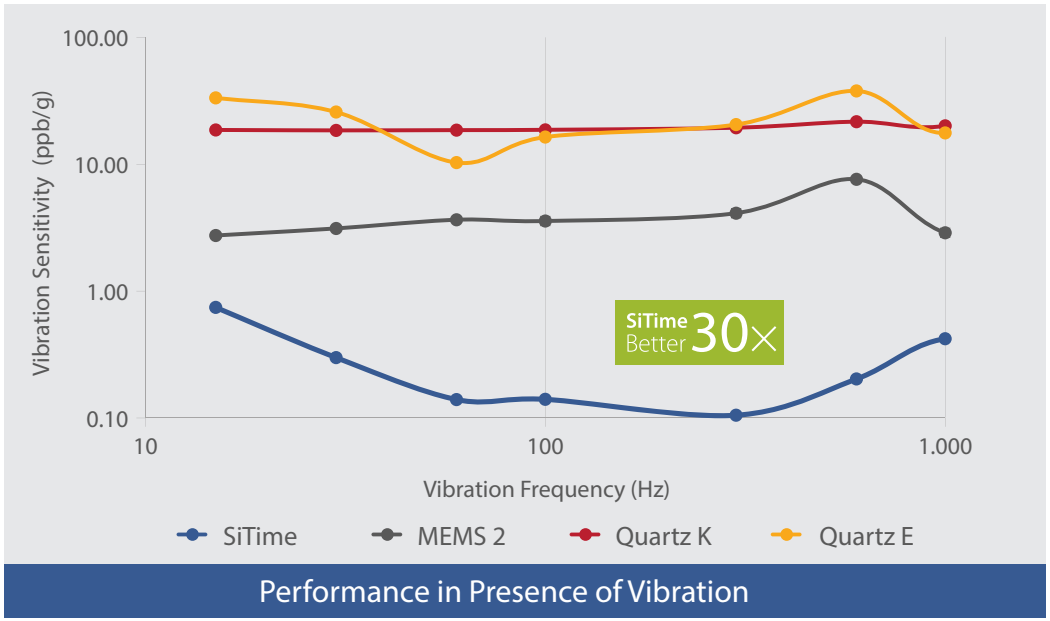
*Field programmable with Time Machine II Programmer; **Limited Sampling; All products are available in -40 to +85°C unless otherwise noted.

Segment	Application	SiTime Benefits	SiTime Base Part No.
NSST (Networking, Servers, Storage & Telecom)	PON, 10GB Ethernet	Customizable frequencies with 6 digits of accuracy Best PSRR, shock/vibration resistance to minimize BER	SiT1602 SiT9120, SiT9365/6/7
	Servers, NIC cards	30x better reliability than quartz Best PSRR, shock/vibration resistance	SiT8008 SiT9121/2, SiT9365/6/7
	Storage, RAID, SAN, NAS	±10 to 25 PPM stability over industrial temperature Best resilience (EMI susceptibility, PSRR)	SiT9120, SiT9365/6/7
	SFP, Optical transport	Smallest package (2016) for LVCMOS Smallest package (3225) for LVPECL/LVDS	SiT8008 (LVCMOS) SiT9365/6/7 (LVPECL/LVDS/HCSL)
	G.fast, DOCSIS 3.1	High freuencies with 6 digits of accuracy Best PSRR, shock/vibration resistance	SiT3372/3 SiT9365/6/7
Consumer	DSC, DVC, DSLR	Smallest package (2016) 1.8V operation Best stability (20 PPM) over industrial temperature	SiT8008 SiT1602
	Fish finder	Customizable frequencies with 6 digits of accuracy	SiT8008
	Tablets, e-readers	Drive 32 kHz to multiple loads with one chip	SiT1532/33
Industrial	Multi-function printers	Reduce EMI in system Customizable frequencies with 6 digits of accuracy	SiT900x SiT8008
	IP camera, security/CCTV system, VoIP camera	Smallest packages (2016, 2520) Best resilience (shock, vibration, EMS immunity) Customizable frequencies with 6 digits of accuracy	SiT8008 SiT1602
	FPGA subsystem	Customizable frequencies with 6 digits of accuracy	SiT8008/9 SiT9121/22
	Industrial computers, PLCs, motor control	Best stability under high temperature (+125°C) 30x better reliability, best resilience	SiT202x SiT8008
Automotive	ADAS	Best resilience (shock, vibration, EMS immunity)	SiT8924/25
	Powertrain, infotainment	Reliable startup at -40°C Best vibration immunity	SiT89xx SiT20xx
	Active safety	Best vibration immunity Best aging	SiT1602 SiT8008
	LED headlights	Best stability under high temperature Best EMI control	SiT8924/25
	Post-solder optical inspection	SOT-23 leaded (not SMD) package ensures easy post-solder optical inspection	SiT2024/25
	EMI mitigation	Spread spectrum to reduce EMI Frequency configurability to generate clocks with slight offsets to reduce EMI	SiT89xx SiT20xx
Mobile, Wearables and IoT	Activity tracker, smartwatch	80% smaller than quartz Drive 2 to 3 loads with one chip	SiT1532
	Activity tracker, smartwatch	20 to 40% longer battery life Most accurate time reference	SiT1552
	Activity tracker, smartwatch, IoT	Up to 3x faster startup than quartz (0.5s vs. 1.5s for quartz)	SiT1532/52
	Bluetooth headset	Best resilience (shock, vibration, EMS immunity)	SiT1532/52
	Medical electronics	Most accurate 32 kHz for time-stamping 80% smaller than quartz	SiT1552
All	ASIC/SOC on-chip clock	Eliminate ASIC/SOC tapeout (i.e. cost, delays)	All

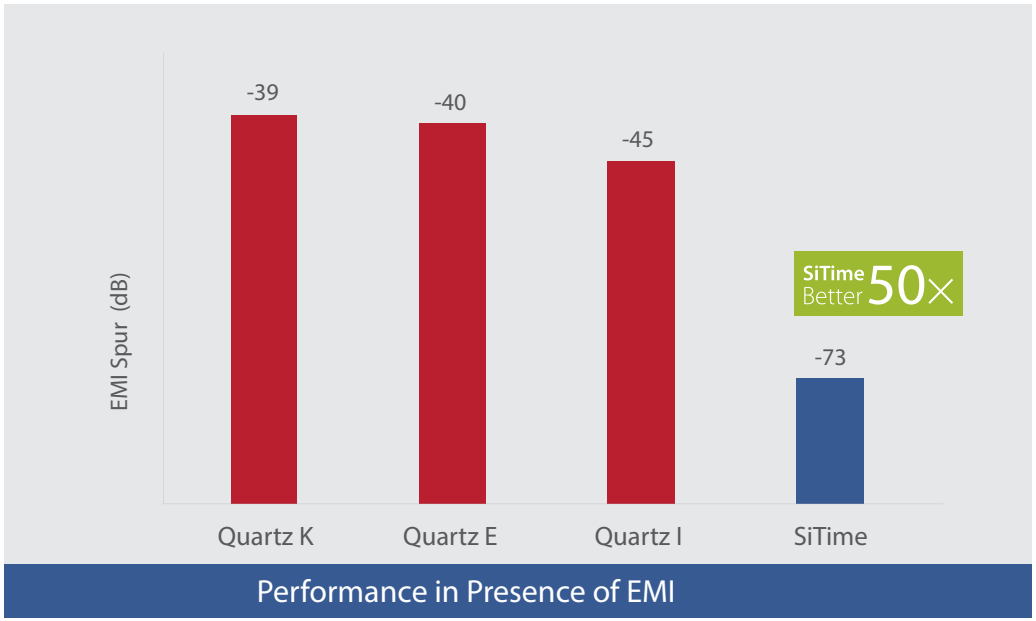


Performance in Presence of Board Noise

Reliability (Million Hours)



Performance in Presence of Vibration



Performance in Presence of EMI

endrich
components of life

SiTime

Silicon MEMS Timing Solutions

Field Programmable Oscillators and
Time Machine II Programmer

Instant Oscillators

Any Frequency **Any Voltage** **Any Stability**

Complete easy-to-use programming kit for SiTime's field programmable oscillators

Programmable Features	
Customizable Frequency	1 to 625 MHz, 6 decimals of accuracy
Frequency Stability	±20 to ±50 PPM
Supply Voltage	1.8V, 2.5 to 3.3V
Pull Range	±25 to ±1600 ppm in VCXO and DCXO
Drive Strength Control	25 to 40 ns rise/fall time for low to high output drive
Spread Spectrum	±0.25 to ±2.0% center spread and -0.5 to -4.0% down spread
Additional Options	
Packages	QFN: 2016, 2520, 3225, 5032, 7050; SOT23-5: 2928
Temperature Range	-20 to +70ºC, -40 to +85ºC, -40 to +105ºC, -40 to +125ºC, or -55 to +125°C
Output Signaling	Differential: LVPECL, LVDS or HCSL, Single-ended: LVCMOS

Don't waste time searching and waiting for oscillators

- Reduce design time with always-in-stock field programmable oscillators
- Optimize system performance with custom frequencies
- Reduce EMI with programmable drive strength

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