Silicon MEMS Timing Solutions
Product Selector 2018

- More features
- Highest performance
- Smallest size
- Lowest power
- Best reliability
### MEMS Oscillator Product Portfolio

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<tr>
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<td>SiT8208/9*</td>
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<td>0.21 ps Jitter**</td>
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<td>SOT23-5</td>
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<td>1-150 MHz</td>
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<td>SiT9002*</td>
<td>1-220 MHz</td>
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<tr>
<td>SiT9003*</td>
<td>Low Power</td>
<td>1-110 MHz</td>
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<tr>
<td>SiT9120</td>
<td>25-125.5 MHz</td>
<td>0.6 ps Jitter**</td>
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<tr>
<td>SiT9121/2*</td>
<td>1-725 MHz</td>
<td>±10 to 50 ppm</td>
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<tr>
<td>SiT9365</td>
<td>Elite Platform</td>
<td>0.21 ps Jitter**</td>
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<tr>
<td>SiT9366/7*</td>
<td>Elite Platform</td>
<td>1-725 MHz</td>
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<tr>
<td><strong>µPower 32 kHz Oscillators</strong></td>
<td>±50 ppm</td>
<td>1 Hz-4 MHz</td>
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<td>SiT1532/3</td>
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<tr>
<td>SiT1572</td>
<td>±50 ppm</td>
<td>1 Hz-2 MHz</td>
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<td>SiT1580/1*</td>
<td>±50 ppm</td>
<td>1 Hz-4 MHz</td>
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<td>SiT2001/2*</td>
<td>±50 ppm</td>
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<td>SiT2018/9*</td>
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<td>1 Hz-13 MHz</td>
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<tr>
<td>SiT2020/1*</td>
<td>±50 ppm</td>
<td>1 Hz-13 MHz</td>
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<tr>
<td><strong>µPower 32 kHz Oscillators</strong></td>
<td>±50 ppm</td>
<td>1 Hz-4 MHz</td>
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<tr>
<td>SiT1532/3</td>
<td>1508 &amp; 2012</td>
<td></td>
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<tr>
<td>SiT1572</td>
<td>±50 ppm</td>
<td>1 Hz-2 MHz</td>
<td></td>
<td></td>
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<tr>
<td>SiT1579*</td>
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<td>1 Hz-2 MHz</td>
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<td>SiT2018/9*</td>
<td>±50 ppm</td>
<td>1 Hz-13 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SiT2020/1*</td>
<td>±50 ppm</td>
<td>1 Hz-13 MHz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Any frequency programmable within the frequency range with 6 decimals of accuracy
** Integrated rms phase jitter, see datasheet for integration range
Elite Platform families use DualMEMS™ technology for best dynamic performance

**Notes:**
- NanoDrive™ output for lowest power
- LVPECL, LVDS, HCSL output
- Pin-to-pin compatible with quartz devices
- Available as field programmable for use with Time Machine II Programmer
SiTime’s Analog Expertise Enables Unique Features

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.

**SiTime’s Analog Expertise Enables Unique Features**

- **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**

**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

**Oscillator or TCXO**
- Clock IC
- SiTime MEMS

**Clk Generator**
- Clock IC

**SiTime MEMS**
- Clock IC

**Oscillating Circuit**
- 32 kHz
- 1.5 x 0.8 mm Oscillator

**32-Bit Low-Power Processor RTC**

**BlueTooth Low-Energy (BLE) Sleep Clock**

**Audio DAC or Codec**

**Available in 1 Hz to 32 kHz Oscillators and TCXO**

**VDD**
- 400 mV
- 200 mV

**Rail-to-Rail (VCMOS)**

**Spreadspectrum to Reduce EMI**

**Amplitude (dB)**

**Amplitude (V)**

**Time (ns)**

**Active IC**
- Needs ext. clock reference
- Many terminals/outputs

**Clk Generator**
- Clock IC
<table>
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<th>MEMS Oscillator Product Selector</th>
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### µPower 32 kHz Oscillators & TCXOs

**Replace XTAL, XO, TCXO** | Smallest size | Drive two or more loads | Best accuracy (stability) | Best reliability

- **SiT1532/33**
  - 32.768 kHz
  - ±50 ppm
  - 1.5 V
  - 1.2 to 3.63 mA
  - 1508
  - NanoDrive, LVCMOS
  - Smart meters
  - Health & wellness monitors
  - 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, 2.5 ns rms phase jitter

- **SiT1572**
  - ±50 ppm
  - 1.62 to 3.63 mA
  - 1508
  - LCMOS
  - Smallest XO

- **SiT1630**
  - ±10, ±13, ±22, all-inclusive
  - 1.5 V
  - 1.6 to 3.63 mA
  - 2012, SOT23-5
  - LCMOS
  - Smallest XO

- **SiT1552**
  - ±100, ±200
  - 1.5 V
  - 1.0 µA
  - 2012
  - NanoDrive, LVCMOS
  - 2.5 ns rms phase jitter

- **SiT1566**
  - ±5 all-inclusive
  - 1.62 to 3.63 mA
  - 0.99 µA
  - 1508
  - NanoDrive, LVCMOS
  - 2.5 ns rms phase jitter

- **SiT1568**
  - ±5 all-inclusive
  - 1.62 to 3.63 mA
  - 4.5 µA
  - 1508
  - LCMOS
  - Smallest XO

### µPower Oscillators & TCXOs

**Smallest size** | **Lowest power** | **Lightest weight** | Drive two or more loads | Best accuracy (stability) | Best reliability

- **SiT1534**
  - 1 Hz to 32.768 kHz
  - 75, 100, 250 over temp (20 room temp)
  - 1.2 to 3.63 mA
  - 0.90 µA
  - 1508, 2012
  - NanoDrive, LVCMOS
  - Health & wellness monitors
  - Industrial data loggers & sensor interface
  - IoT beacons
  - Smart pens
  - Wearables & IoT
  - Industrial & medical sensors
  - Portable audio
  - Smallest XO

- **SiT1569**
  - 1 Hz to 462.5 kHz
  - ±50
  - 1.62 to 3.63 mA
  - 2.0 µA (100 kHz)
  - 1508
  - LCMOS
  - Smallest XO

- **SiT1576**
  - 1 Hz to 2.5 MHz
  - ±5 all inclusive
  - 1.62 to 3.63 mA
  - 8.0 µA (100 kHz)
  - 1508
  - LCMOS
  - Smallest XO

- **SiT1579**
  - 1 Hz to 2.5 MHz
  - ±50
  - 1.62 to 3.63 mA
  - 8.0 µA (100 kHz)
  - 1508
  - LCMOS
  - Smallest XO

- **SiT8021**
  - 1 MHz to 26 MHz
  - ±100
  - 1.8, 2.5 to 3.3
  - 60 to 280 µA
  - 0.7 µA stby
  - LVCMOS
  - 0.21 ps rms phase jitter

### Low-Power Oscillators

**Best reliability** | Pin-compatible QFN or SOT-23 package for best solder-joint reliability

- **SiT1602**
  - 52 standard freq.
  - ±20, ±25, ±50
  - 1.8, 2.5 to 3.3
  - 3.1 to 5.5 mA
  - (0.6 - 1.0 µA stby)
  - 2016, 2520, 3225, 5032, 7050
  - LVCMOS
  - Consumer, industrial and audio video equipment
  - Networking, storage & servers
  - Industrial sensors, PLC & motor server
  - Microprocessor & FPGA clocking
  - FP*

- **SiT8008/09**
  - 1 MHz to 137 MHz
  - ±20, ±25, ±50
  - 1.8, 2.5 to 3.3
  - 3.6 to 5.4 mA
  - (1.8 µA stby)
  - SOT23-5
  - LVCMOS
  - 0.5/0.6 ps rms phase jitter

### Low-Jitter Oscillators

**0.1 ppb/g (g-sensitivity, vibration immunity)** | **Best reliability**

- **SiT9365**
  - 32 standard freq.
  - ±10, ±20, ±25, ±50
  - 2.5 to 3.3
  - 76 to 89 mA
  - 3225, 5032, 7050
  - LVPECL, LVDS, HCSL
  - Computing
  - Networking, storage, servers, & telecom
  - Optical modules
  - Industrial control
  - Instrumentation
  - FPGA clocking
  - 0.21 ps rms phase jitter

- **SiT9366/67**
  - 1 MHz to 725 MHz
  - ±10, ±20, ±25, ±50
  - 2.5 to 3.3
  - 54 to 69 mA
  - 3225, 5032, 7050
  - LVPECL, LVDS
  - 0.5/0.6 ps rms phase jitter

- **SiT9120**
  - 31 standard freq.
  - ±10, ±20, ±25, ±50
  - 2.5 to 3.3
  - 54 to 69 mA
  - 3225, 5032, 7050
  - LVPECL, LVDS
  - 0.5/0.6 ps rms phase jitter

- **SiT9121/22**
  - 1 MHz to 625 MHz
  - ±10, ±20, ±25, ±50
  - 2.5 to 3.3
  - 54 to 69 mA
  - 3225, 5032, 7050
  - LVPECL, LVDS
  - 0.5/0.6 ps rms phase jitter

- **SiT8208/09**
  - 1 MHz to 220 MHz
  - ±10, ±20, ±25, ±50
  - 2.5 to 3.3
  - 29 to 36 mA
  - (10 µA stby)
  - 2520, 3225, 5032, 7050
  - LVCMOS
  - 0.21 ps rms phase jitter
  - FP*
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<th>Supply Volt. (V)</th>
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<th>Package</th>
<th>Output Logic</th>
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<td>2016, 2520, 3225, 5032, 7050</td>
<td>LVCOS</td>
<td>High-temp industrial equipment such as industrial control systems &amp; industrial sensors</td>
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<td>LVCOS</td>
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<td>FP*, -55 to +125°C</td>
</tr>
<tr>
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<td>±20, ±25, ±30, ±50</td>
<td>1.8, 2.5 to 3.3</td>
<td>3.6 to 5.4 mA (1.0 µA stby)</td>
<td>2016, 2520, 3225, 5032, 7050</td>
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<td>1.8, 2.5 to 3.3</td>
<td>3.6 to 5.4 mA (1.0 µA stby)</td>
<td>2016, 2520, 3225, 5032, 7050</td>
<td>LVCOS</td>
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<tr>
<td>SiT9386/87</td>
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<td>±20, ±25, ±30, ±50</td>
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<td>70 to 89 mA</td>
<td>3225, 7050</td>
<td>LVPECL, LVDS, HCSL</td>
<td>Audio/video</td>
<td>0.21 ps rms phase jitter</td>
</tr>
<tr>
<td>SiT3372/73</td>
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<td>±15, ±25, ±30, ±50</td>
<td>2.5 to 3.3</td>
<td>76 to 92 mA</td>
<td>3225, 5032, 7050</td>
<td>LVPECL, LVDS, HCSL</td>
<td>Wireless &amp; telecom equipment</td>
<td>0.5 ps rms phase jitter, FP*</td>
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<tr>
<td>SiT3807</td>
<td>31 standard freq.</td>
<td>±10, ±25, ±30, ±50</td>
<td>1.8, 2.5 to 3.3</td>
<td>29 to 34 mA (10 to 70 µA stby)</td>
<td>2520, 3225, 5032, 7050</td>
<td>LVCOS</td>
<td>Instrumentation</td>
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<tr>
<td>SiT3808/09</td>
<td>1 MHz to 220 MHz</td>
<td>±10, ±25, ±30, ±50</td>
<td>1.8, 2.5 to 3.3</td>
<td>29 to 34 mA (10 to 70 µA stby)</td>
<td>2520, 3225, 5032, 7050</td>
<td>LVCOS</td>
<td>Instrumentation &amp; networking</td>
<td>0.6 ps rms phase jitter</td>
</tr>
<tr>
<td>SiT3521/22</td>
<td>1 MHz to 725 MHz</td>
<td>±0.05</td>
<td>2.5, 2.8, 3.0, 3.3</td>
<td>40 to 45 mA</td>
<td>5032</td>
<td>LVCOS, Clipped Sinewave</td>
<td>Communication &amp; broadcasting</td>
<td>I2C, 1 ppb/°C slope, 0 to +70°C</td>
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<tr>
<td>SiT3535/59</td>
<td>1 MHz to 220 MHz</td>
<td>±0.1, ±0.2, ±0.25</td>
<td>2.5, 2.8, 3.0, 3.3</td>
<td>40 to 45 mA</td>
<td>5032</td>
<td>LVCOS, Clipped Sinewave</td>
<td>Communication &amp; broadcasting</td>
<td>I2C programmable, 1 ppb/°C slope, -40 to +105°C</td>
</tr>
<tr>
<td>SiT3536/57</td>
<td>13 standard freq.</td>
<td>±0.5, ±1, ±2.5</td>
<td>2.5, 2.8, 3.0, 3.3</td>
<td>40 to 45 mA</td>
<td>5032</td>
<td>LVCOS, Clipped Sinewave</td>
<td>Communication &amp; broadcasting</td>
<td>I2C programmable, 0.21 ps rms phase jitter</td>
</tr>
<tr>
<td>SiT5021/22</td>
<td>1 MHz to 625 MHz</td>
<td>±5</td>
<td>2.5, 3.3, 2.25 to 3.63</td>
<td>55 to 69 mA</td>
<td>3225, 5032, 7050</td>
<td>LVPECL, LVDS</td>
<td>Instrumentation &amp; networking</td>
<td>0.5 ps rms phase jitter</td>
</tr>
<tr>
<td>SiT3907</td>
<td>1 MHz to 220 MHz</td>
<td>±10, ±25, ±30, ±50</td>
<td>1.8, 2.5, 2.8, 3.3</td>
<td>32 mA</td>
<td>3225, 5032, 7050</td>
<td>LVCOS</td>
<td>Communication &amp; broadcasting</td>
<td>I2C programmable, 0.21 ps rms phase jitter</td>
</tr>
<tr>
<td>SiT3908</td>
<td>31 standard freq.</td>
<td>±10, ±25, ±30, ±50</td>
<td>1.8, 2.5, 2.8, 3.3</td>
<td>32 mA</td>
<td>3225, 5032, 7050</td>
<td>LVCOS</td>
<td>Communication &amp; audio/video</td>
<td>0.5 ps rms phase jitter, FP*</td>
</tr>
<tr>
<td>SiT19005</td>
<td>1 MHz to 141 MHz</td>
<td>±20, ±25, ±50</td>
<td>1.8, 2.5 to 3.3</td>
<td>4.0 to 5.6 mA</td>
<td>2016, 2520, 3225</td>
<td>LVCMOS</td>
<td>Printers &amp; flat panels</td>
<td>Smallest SSXO, FP*</td>
</tr>
<tr>
<td>SiT19002</td>
<td>1 MHz to 220 MHz</td>
<td>±25, ±50</td>
<td>1.8, 2.5 to 3.3</td>
<td>48 to 75 mA</td>
<td>5032, 7050</td>
<td>LVPECL, CML, LVDS, HCSL</td>
<td>Printers &amp; flat panels</td>
<td>FP*</td>
</tr>
</tbody>
</table>

All families have programmable frequency within the output frequency range with 6 decimals of accuracy, except 32.768 kHz products and those indicated as having standard frequencies. All families are available in -40 to +85°C unless otherwise noted.

*Field programmable with Time Machine II Programmer

**Elite Platform products with DualMEMS™ technology for best dynamic performance
<table>
<thead>
<tr>
<th>Segment</th>
<th>Application</th>
<th>SiTime Benefits</th>
<th>SiTime Oscillator Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networking, Servers,</td>
<td>4G/5G RRH, small cells, macro cells, microwave backhaul, other RF systems</td>
<td>Best dynamic stability 1ppb/°C, resistant to airflow and rapid thermal transients Most robust against shock/vibration, no activity dips</td>
<td>SiT5356/57/58/59, SiT5155/56/57</td>
</tr>
<tr>
<td>Storage &amp; Telecom</td>
<td>Carrier-grade routers &amp; switches, SyncE, IEEE 1588</td>
<td>Best dynamic stability 1ppb/°C, resistant to airflow and rapid thermal transients Best resilience (EMI susceptibility, PSRR), no activity dips</td>
<td>SiT5356/57/58/59, SiT9121/22, SiT9365/66/67</td>
</tr>
<tr>
<td></td>
<td>Servers, storage, SATA, SAN, PCIe, fibre channel</td>
<td>±10 to 25 ppm stability over industrial temperature Best resilience (EMI susceptibility, PSRR)</td>
<td>SiT9120, SiT9365/66/67, SiT8008</td>
</tr>
<tr>
<td></td>
<td>100/200/400G ONT, SFP &amp; optical modules</td>
<td>Smallest package (3.2 x 2.5 mm) for LVPECL/LVDS Best dynamic stability, no activity dips</td>
<td>SiT9365/66/67, SiT5356/57/58/59</td>
</tr>
<tr>
<td></td>
<td>G.fast, DOCSIS 3.1, cable modems</td>
<td>High frequencies with 6 digits of accuracy Best PSRR, shock/vibration resistance</td>
<td>SiT5356/57/58/59, SiT3521/22, SiT9365/66/67</td>
</tr>
<tr>
<td>Automotive</td>
<td>ADAS and around view cameras</td>
<td>Smallest package (2.0 x 1.6 mm) EMI reduction up to 17 dB</td>
<td>SiT8924/25, SiT9025</td>
</tr>
<tr>
<td></td>
<td>ADAS computer, connected car</td>
<td>Ultra-low jitter under harsh condition (0.215 ps) Best stability under high temperature (±20 ppm at 105°C)</td>
<td>SiT9386/87</td>
</tr>
<tr>
<td></td>
<td>Infotainment</td>
<td>Reliable startup at -40°C EMI reduction up to 17 dB</td>
<td>SiT8924/25, SiT9025</td>
</tr>
<tr>
<td></td>
<td>LED headlights</td>
<td>Best stability under high temperature Best EMI control</td>
<td>SiT8924/25</td>
</tr>
<tr>
<td></td>
<td>Wireless charger</td>
<td>Programmability for short lead times, even for custom frequencies</td>
<td>SiT8924/25</td>
</tr>
<tr>
<td></td>
<td>Post-solder optical inspection</td>
<td>Small package (3.2 x 2.5 mm) for LVPECL/LVDS Best dynamic stability, no activity dips</td>
<td>SiT2024/25</td>
</tr>
<tr>
<td>Industrial</td>
<td>Precision GNSS</td>
<td>Best location accuracy under shock, vibration, rapid thermal transients, &amp; EMI</td>
<td>SiT5155/56/57, SiT5356/57/58/59</td>
</tr>
<tr>
<td></td>
<td>Multi-function printers</td>
<td>Reduce EMI in system Customizable frequencies with 6 digits of accuracy</td>
<td>SiT9002/03/05, SiT8008</td>
</tr>
<tr>
<td></td>
<td>IP camera, security/CCTV system, VoIP camera</td>
<td>Smallest packages (2.0 x 1.6 mm, 2.5 x 2.0 mm) Best resilience (shock, vibration, EMS immunity) Customizable frequencies with 6 digits of accuracy</td>
<td>SiT8008, SiT1602</td>
</tr>
<tr>
<td></td>
<td>FPGA subsystem</td>
<td>Customizable frequencies with 6 digits of accuracy</td>
<td>SiT8008/09, SiT9121/22</td>
</tr>
<tr>
<td></td>
<td>Industrial computers, PLCs, motor control</td>
<td>Best stability under high temperature (+125°C) 30 times better reliability, best resilience</td>
<td>SiT2018/19/20, SiT8008</td>
</tr>
<tr>
<td>Mobile, Wearables,</td>
<td>Activity tracker, smartwatch</td>
<td>80% smaller than quartz Drive 2 to 3 loads with one chip</td>
<td>SiT1532, SiT1566/68/69, SiT1572</td>
</tr>
<tr>
<td>&amp; IoT</td>
<td>Activity tracker, smartwatch</td>
<td>20 to 40% longer battery life Most accurate time reference</td>
<td>SiT1552, SiT1569, SiT1572</td>
</tr>
<tr>
<td></td>
<td>Activity tracker, smartwatch, IoT</td>
<td>Up to 3 times faster startup than quartz (0.5s vs. 1.5s for quartz)</td>
<td>SiT1532/52, SiT1569, SiT1579</td>
</tr>
<tr>
<td></td>
<td>Bluetooth headset</td>
<td>Best resilience (shock, vibration, EMS immunity)</td>
<td>SiT1532/52, SiT1566/68/69</td>
</tr>
<tr>
<td></td>
<td>Medical electronics</td>
<td>Most accurate 32 kHz for time-stamping 80% smaller than quartz</td>
<td>SiT1552, SiT1566/68/69</td>
</tr>
<tr>
<td>Consumer</td>
<td>DSC, DVR, DSLR, IP camera, 100M to 10G Ethernet</td>
<td>Smallest package (2.0 x 1.6 mm) ±20 ppm stability over industrial temperature</td>
<td>SiT8008, SiT1602</td>
</tr>
<tr>
<td></td>
<td>Wearables, health monitors, mobile phones, ultra-small notebook PCs</td>
<td>Drive 32 kHz to multiple loads with one chip</td>
<td>SiT1532/33, SiT1566/68/69, SiT1572/76/79</td>
</tr>
</tbody>
</table>
MEMS Oscillators Outperform Quartz

**Performance in Presence of Board Noise**

- **Phase Jitter per mV**
  - SiTime
  - Quartz K
  - Quartz E

- **Noise Frequency (kHz)**
  - 0
  - 10
  - 100
  - 1,000
  - 10,000

**Reliability (Million Hours)**

- SiTime
- Quartz K
- Quartz E

**Performance in Presence of Vibration**

- **Vibration Sensitivity (ppb/g)**
  - SiTime
  - MEMS 2
  - Quartz K
  - Quartz E

- **Vibration Frequency (Hz)**
  - 10
  - 100
  - 1,000

**Performance in Presence of EMI**

- **EMI Spur (dB)**
  - Quartz K
  - Quartz E
  - Quartz I
  - SiTime
Instant 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**: ±0.125 to ±2.0% center spread and -0.25 to -4.0% down spread

Additional Options

- **Packages**: QFN: 2016, 2520, 3225, 5032, 7050; SOT23-5: 2928
- **Temperature Range**: -20 to +70°C, -40 to +85°C, -40 to +105°C, -40 to +125°C, 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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