# SiT9003

**Preliminary Information**

## Low Power Programmable Spread Spectrum Oscillator

### Up to 12 dB EMI Reduction

SiTime™ It's About Time

## Features

- The world's lowest power programmable oscillator with 3.0 mA typical active current
- 1-110 MHz frequency range. Contact SiTime for frequencies between 80 MHz - 110 MHz
- Extremely fast start-up time of 3 ms
- <30 ps cycle-cyle jitter
- High frequency stability of ±50 PPM, ±100 PPM (when spread is off)
- Center spread options: ±0.75%, ±0.5%, ±0.25%
- Down spread options: -1.5%, -1%, -0.5%
- Up to 12 dB typical EMI reduction
- Outstanding mechanical robustness for portable applications
- Programmable standby, output enable, or spread off mode
- Available in four industry standard packages: 2.5 x 2.0, 3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0 mm
- All-silicon device with outstanding reliability of 2 FIT (10x improvement over quartz-based devices), enhancing system mean-time-to-failure (MTBF)
- Ultra short lead time
- Ideal for printers, flat panel drivers, PCI, USB, and microprocessors

## Specifications

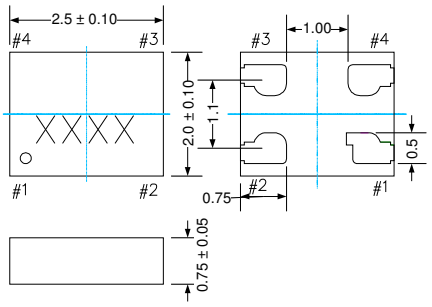
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Output Frequency Range | f | 1 | – | 110 | MHz | Contact SiTime for frequencies between 80 MHz - 110 MHz |
| Frequency Tolerance | F_tol | -50 | – | +50 | PPM | Applicable only spread feature is off. Inclusive of: Initial tolerance, operating temperature, rated power, supply voltage change, load change, aging (1st yr@ 1 ppm), shock and vibration. |
| | | -100 | – | +100 | PPM | |
| Aging | Ag | – | – | 1.0 | PPM | 1st year at 25°C |
| Storage Temperature Range | | -55 | – | +125 | °C | |
| Operating Temperature Range | T_use | -20 | – | +70 | °C | Extended Commercial |
| | | -40 | – | +85 | °C | Industrial |
| Supply Voltage | Vdd | 1.71 | 1.8 | 1.89 | V | |
| | | 2.25 | 2.5 | 2.75 | V | |
| | | 2.52 | 2.8 | 3.08 | V | |
| | | 2.97 | 3.3 | 3.63 | V | |
| Current Consumption | Idd | | 3.0 | 3.5 | mA | No load condition, f = 20 MHz, Vdd = 1.8 V |
| | | | 3.5 | 4 | mA | No load condition, f = 20 MHz, Vdd = 2.5 V, 2.8 V or 3.3 V |
| Standby Current | I_std | – | 3 | 10 | µA | Output is Weakly Pulled Down, $\overline{ST}$ = GND, Vdd = 1.8 V |
| | | – | 7 | 10 | µA | Output is Weakly Pulled Down, $\overline{ST}$ = GND, Vdd = 2.5 V, 2.8 V or 3.3 V |
| Duty Cycle | SYM | 45 | – | 55 | % | All Vdds. f <= 70 MHz |
| | | 40 | – | 60 | % | All Vdds. f >70 MHz |
| Rise/Fall Time | Tr, Tf | – | 1.0 | 2 | ns | 10% - 90% Vdd level |
| Output Voltage High | VOH | 90 | – | – | %Vdd | IOH = -4 mA (Vdd = 3.3 V)<br>IOH = -3 mA (Vdd = 2.8 V and Vdd = 2.5 V)<br>IOH = -2 mA (Vdd = 1.8 V) |
| Output Voltage Low | VOL | – | – | 10 | %Vdd | IOL = 4 mA (Vdd = 3.3 V)<br>IOL = 3 mA (Vdd = 2.8 V and Vdd = 2.5 V)<br>IOL = 2 mA (Vdd = 1.8 V) |
| Input Voltage High | VIH | 70 | – | - | %Vdd | Pin 1, OE or $\overline{ST}$ or SD |
| Input Voltage Low | VIL | – | – | 30 | %Vdd | Pin 1, OE or $\overline{ST}$ or SD |
| Input Current | I_in | – | – | 10 | µA | |
| Output Load | Ld | – | – | 15 | pF | Maximum frequency and supply voltage. Contact SiTime for higher output load strength option |
| Start-up Time | T_osc | – | – | 3 | ms | Measured from the time Vdd reaches its rated minimum value |
| Cycle-cycle Jitter | T_cyc | – | – | 26 | ps | f = 50 MHz, Spread = ON |
| | | – | – | 26 | ps | f = 50 MHz, Spread = OFF |

**Spread Spectrum Modes**

| | | | | |
|---|---|---|---|---|
| **Center Spread** | Code | **F** | **D** | **B** |
| | Percentage | ±0.75% | ±0.5% | ±0.25% |
| | | | | |
| **Down Spread** | Code | **S** | **Q** | **O** |
| | Percentage | -1.5% | -1.0% | -0.5% |

## ■ Dimensions, Pin Description and Land Pattern

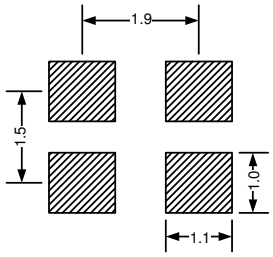
**Dimensions** (Unit: mm)[1]
**2.5 x 2.0 x 0.75 mm**



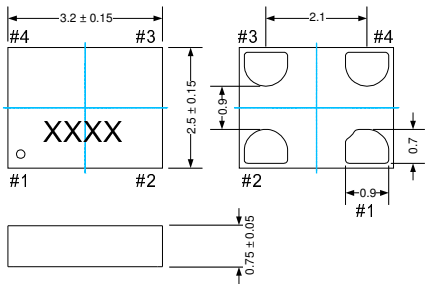

| Pin #1 Functionality |
|---|
| **OE** |
| H or Open; specified frequency output |
| L: output is high impedance |
| **$\overline{ST}$** |
| H or Open; specified frequency output |
| L: output is low level (weak pull down) |
| **SD** (Down Spread Mode Only) |
| H or Open; Spread Spectrum = ON |
| L: Spread Spectrum = OFF |

| Pin Map | |
|---|---|
| **Pin** | **Connection** |
| 1 | OE/$\overline{ST}$/SD |
| 2 | GND |
| 3 | CLK |
| 4 | Vdd |

**Recommended Land Pattern** (Unit: mm)[2]




**Dimensions** (Unit: mm)[1]
**3.2 x 2.5 x 0.75 mm**

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|---|---|
| **Pin** | **Connection** |
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| 2 | GND |
| 3 | CLK |
| 4 | Vdd |

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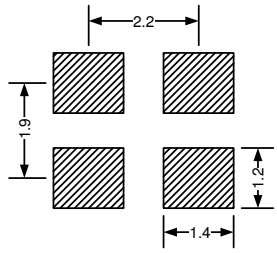
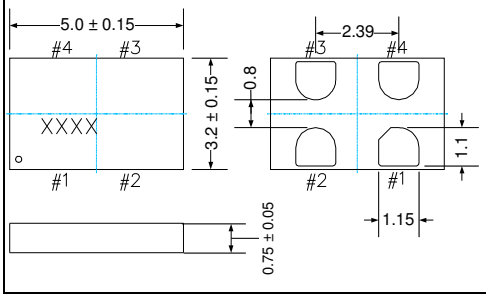



**Dimensions** (Unit: mm)[1]
**5.0 x 3.2 x 0.75 mm**

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|---|---|
| **Pin** | **Connection** |
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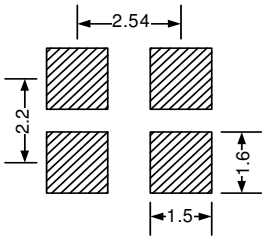
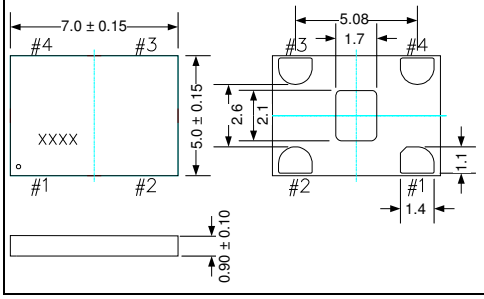
| 2 | GND |
| 3 | CLK |
| 4 | Vdd |

**Recommended Land Pattern** (Unit: mm)[2]




**Dimensions** (Unit: mm)[1]
**7.0 x 5.0 x 0.90 mm**

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| **Pin** | **Connection** |
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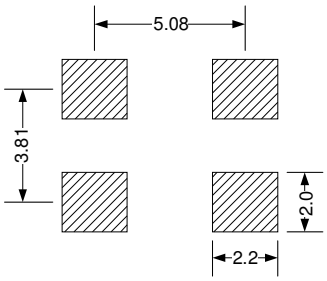


**Notes:**
1. XXXX top marking denotes manufacturing lot number.
2. A capacitor of value 0.1µF between Vdd and GND is recommended.

## Part No. Guide- How to Order