SiT8002

1 to 125 MHz Programmable Oscillator

Features

- ±60 ps Peak-Peak Period Jitter
- Wide frequency range
  - 1 MHz to 125 MHz
- Low frequency tolerance
  - ±30 ppm (-20°C to 70°C only)
  - ±50 ppm or ±100 ppm
- Operating voltage
  - 1.8V or 2.5 or 3.3 V
  - 2.25V to 3.6V (contact factory)
- Operating temperature range:
  - Industrial, -40°C to 85°C
  - Extended Commercial, -20°C to 70°C
- Small footprint
  - 2.5 x 2.0 x 0.85 mm
  - 3.2 x 2.5 x 0.85 mm
  - 5.0 x 3.2 x 0.85 mm
  - 7.0 x 5.0 x 0.85 mm
- All packages are Pb-free and ROHs compliant (QFN SMD)
- Ultra-reliable start up and greater immunity from interference
- High drive option: 30pF load (contact factory)

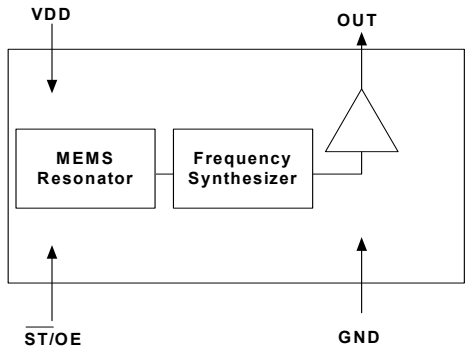
Benefits

- No crystal or capacitors required
- Eliminates crystal qualification time
- 50% + board saving space
- More cost effective than Quartz oscillators, Quartz crystals and Clock ICs.
- Completely quartz-free

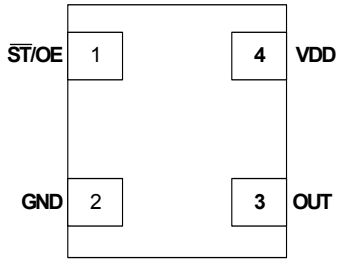
Applications

- Consumer Electronics
- Set Top Box, HDTV, DVR
- Office Automation: Scanners, Printers, Copiers
- Automotive Applications
- Industrial Applications: Interface Controllers, Graphics Cards.

Block Diagram



Pinout



Pin Description

Pin No.	Name	Pin Description
1	$\overline{\text{ST}}$/OE	$\overline{\text{Standby}}$/ Output Enable
2	GND	Connect to Ground
3	OUT	1 to 125 MHz Programmed Clock output
4	VDD	Connect to 1.8V or 2.5V or 3.3V

Pin1

Pin #1 Functionality
OE
H or Open; specified frequency output
L: output is high impedance
$\overline{\text{ST}}$
H or Open; specified frequency output
L: output is low level (weak pull down) oscillation stops

Description

The SiT8002 oscillator family is composed of the world's smallest, high-performance programmable oscillators. The SiT8002 is suitable for use in clock generation for consumer, portable, industrial, automotive, and computation applications.

This oscillator family is packaged in standard low-cost plastic QFN-type IC packages with footprints that match common quartz surface mount products.

MEMS resonators are 1000x smaller by volume than quartz resonators and are built in high volume CMOS fabs instead of small custom manufacturing facilities. Due to their small size, massive lot sizes, and simpler manufacturing processes MEMS oscillators are inherently more reliable, have more consistent performance and are always in stock.

The SiT8002, by eliminating the quartz crystals, has improved immunity to the environmental effects of vibration, shock, strain, and humidity.

To order samples, go to www.sitime.com and click on Request Sample" link.

Absolute Maximum Ratings

Attempted operation outside the absolute maximum ratings of the part may cause permanent damage to the part. Actual performance of the IC is only guaranteed within the operational specifications not absolute maximum ratings.

Absolute Maximum Table

Parameter	Min.	Max.	Unit
Storage Temperature	-65	150	°C
VDD	-0.5	+3.65	V
Electrostatic Discharge		6000	V
Theta JA (with copper plane on VDD and GND)	–	75	°C/W
Theta JC (with PCB traces of 0.010 inch to all pins)	–	24	°C/W
Soldering Temperature (follow standard Pb free soldering guidelines)		260	°C
Number of Program Writes		1	NA
Program Retention over -40 to 125C, Process, VDD (0 to 3.6V)		1,000+	years

Operating Conditions

Parameter	Min.	Typ.	Max.	Unit
Supply Voltages, VDD[1]	2.97	3.3	3.63	V
	2.25	2.5	2.75	V
	1.7	1.8	1.9	V
Extended Commercial OperatingTemperature	-20	-	70	°C
Industrial Operating Temperature	-40	-	85	°C
Maximum Load Capacitance[2]	-	-	15	pF
VDD Ramp Time	0	-	200	ms

Environmental Compliance

Parameter	Condition/Test Method
Mechanical Shock	MIL-STD-883F, Method 2002
Mechanical Vibration	MIL-STD-883F, Method 2007
Temperature Cycle	JESD22, Method A104
Solderability	MIL-STD-883F, Method 2003
Moisture Sensibility Level	MSL1 @ 260°C

Notes:
1. The 2.5V device can operate from 2.25V to 3.63V with higher output drive, however, the data sheet parameters cannot be guaranteed. Please contact factory for this option.
2. The output driver strenght can be programmed to drive up to 30pF load. Please contact factory for this option.

DC Electrical Specifications

@VDD = 3.3V ±10%, -40 to 85°C

Parameter	Condition	Min.	Typ.	Max.	Unit
Output Voltage High	IOH = -9 mA	90	-	-	%Vdd
Output Voltage Low	IOL = 9 mA	-	-	10	%Vdd
Input Voltage High	Pin 1	70	-	-	%Vdd
Input Voltage Low	Pin 1	-	-	30	%Vdd
Operating Current	Output frequency = 65 MHz, 15 pF load	-	-	22	mA
Standby Current	Output is weakly pulled down, $\overline{ST}$ = GND	-	30	50	uA
Power Up Time	Time from minimum power supply voltage	-	12	50	ms

@VDD = 2.5V ±10%, -40 to 85°C

Parameter	Condition	Min.	Typ.	Max.	Unit
Output Voltage High	IOH = -7 mA	90	-	-	%Vdd
Output Voltage Low	IOL = 7 mA	-	-	10	%Vdd
Input Voltage High	Pin 1	70	-	-	%Vdd
Input Voltage Low	Pin 1	-	-	30	%Vdd
Operating Current	Output frequency = 65 MHz, 15 pF load	-	-	22	mA
Standby Current	Output is weakly pulled down, $\overline{ST}$ = GND	-	30	50	uA
Power Up Time	Time from minimum power supply voltage	-	12	50	ms

@VDD = 1.8V ±5%, -40 to 85°C

Parameter	Condition	Min.	Typ.	Max.	Unit
Output Voltage High	IOH = -5 mA	90	-	-	%Vdd
Output Voltage Low	IOL = 5 mA	-	-	10	%Vdd
Input Voltage High	Pin 1	70	-	-	%Vdd
Input Voltage Low	Pin 1	-	-	30	%Vdd
Operating Current	Output frequency = 65 MHz, 15 pF load	-	-	19	mA
Standby Current	Output is weakly pulled down, $\overline{ST}$ = GND	-	30	50	uA
Power Up Time	Time from minimum power supply voltage	-	12	50	ms

AC Electrical Specifications

@VDD = 3.3V ±10%, -40 to 85°C

Parameter	Condition	Min.	Typ.	Max.	Unit
Clock Output Frequency		1	-	125	MHz
Frequency Tolerance[3]	Inclusive of initial tolerance, operating temperature, rated power supply voltage change, load change,aging, shock and vibration	-30	-	+30	ppm
		-50	-	+50	ppm
		-100	-	+100	ppm
Aging	First year	-	-	1	ppm
Clock Output Duty Cycle	Output frequency= 1 MHz to 125 MHz	45	-	55	%
Clock Output Rise Time	15 pF Load, 20% to 80% VDD	-	1.0	2.0	ns
Clock Output Fall Time	15 pF Load, 80% to 20% VDD	-	1.0	2.0	ns
Pk-pk Period Jitter	Output frequency = 24 MHz	-	-	±98	ps
	Output frequency = 100 MHz	-	-	±60	ps

@VDD = 2.5V ±10%, -40 to 85°C

Parameter	Condition	Min.	Typ.	Max.	Unit
Clock Output Frequency		1	-	125	MHz
Frequency Tolerance[3]	Inclusive of initial tolerance, operating temperature, rated power supply voltage change, load change,aging, shock and vibration	-30	-	+30	ppm
		-50	-	+50	ppm
		-100	-	+100	ppm
Aging	First year	-	-	1	ppm
Clock Output Duty Cycle	Output frequency= 1MHz to 125MHz	45	-	55	%
Clock Output Rise Time	15 pF Load, 20% to 80% VDD	-	1.0	2.0	ns
Clock Output Fall Time	15 pF Load, 80% to 20% VDD	-	1.0	2.0	ns
Pk-pk Period Jitter	Output frequency = 24 MHz	-	-	±130	ps
	Output frequency = 100 MHz	-	-	±60	ps

@VDD = 1.8V ±5%, -40 to 85°C

Parameter	Condition	Min.	Typ.	Max.	Unit
Clock Output Frequency		1	-	125	MHz
Frequency Tolerance[3]	Inclusive of initial tolerance, operating temperature, rated power supply voltage change, load change,aging, shock and vibration	-50	-	+50	ppm
		-100	-	+100	ppm
Aging	First year	-	-	1	ppm
Clock Output Duty Cycle	Output frequency= 1 MHz to 65MHz	45	-	55	%
	Output frequency= 65 MHz to 125MHz	40	-	60	%
Clock Output Rise Time	15 pF Load, 20% to 80% VDD	-	1.0	2.0	ns
Clock Output Fall Time	15 pF Load, 80% to 20% VDD	-	1.0	2.0	ns
Pk-pk Period Jitter	Output frequency = 24 MHz	-	-	±185	ps
	Output frequency = 100 MHz	-	-	±100	ps

Notes:
3. ±30 ppm is available only over extended commercial temperature range from-20 °C to +70 °C and VDD=2.5V or 3.3V.

Ordering Information

SiT8002AC - 14 - 33E - 123.12345T

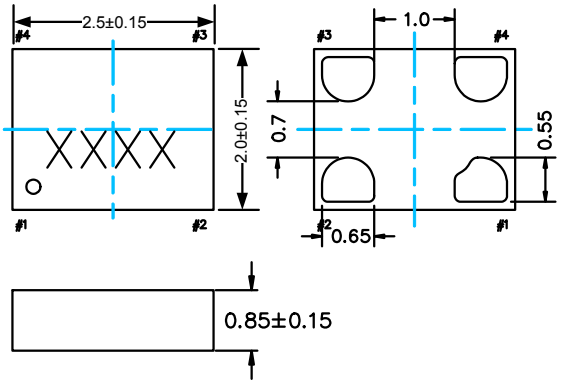
- **Part Family**
  - "SiT8002"
- **Revision Letter**
  - "A" is the revision of Silicon
- **Temperature Range**
  - "C" Commercial -20 to 70°C
  - "I" Industrial -40 to 85°C
- **Package Size**
  - "1" 2.5 x 2.0 mm
  - "2" 3.2 x 2.5 mm
  - "3" 5.0 x 3.2 mm
  - "4" 7.0 x 5.0 mm
- **Packaging:**
  - "T" for Tape & Reel
  - Blank for Bulk
- **Frequency**
  - 1.00000 to 125.00000 MHz
- **Feature Pin**
  - "E" for Output Enable
  - "S" for Standby
- **Voltage Supply**
  - "18" for 1.8 V +/- 5%
  - "25" for 2.5 V +/- 10%
  - "33" for 3.3 V +/- 10%
- **Frequency Tolerance**
  - "3" for +/- 50 ppm
  - "4" for +/- 100 ppm
  - "8" for +/- 30 ppm
    (Commercial Temp, 2.5V or 3.3V VDD only)

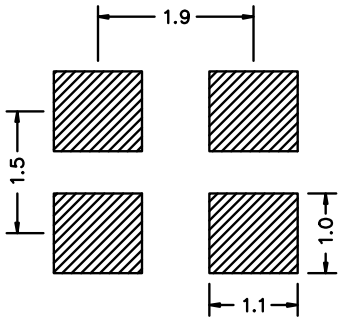
Package Information [4]

Dimension (mm)

Land Pattern (recommneded) (mm)[5]

2.5 x 2.0 x 0.85mm

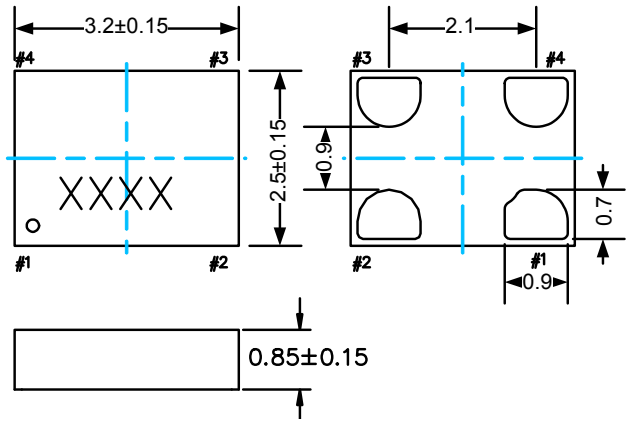


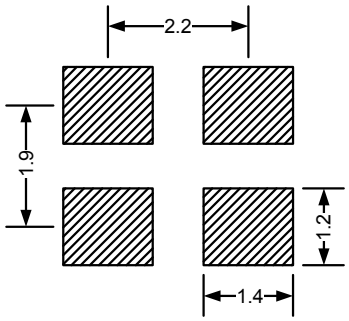


Package Information (continued)[4]

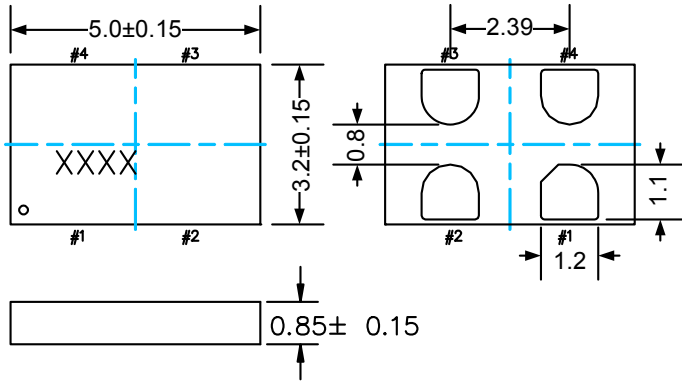
Dimension (mm) | **Land Pattern (recommneded) (mm)[5]**

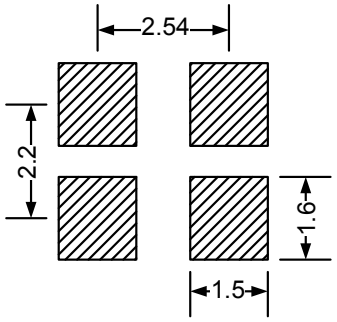
3.2 x 2.5 x 0.85mm



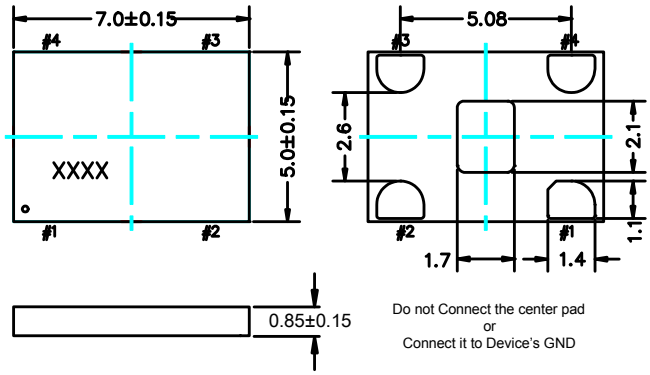


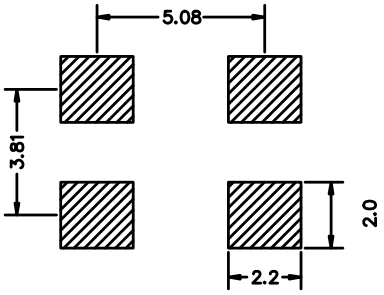
5.0 x 3.2 x 0.85mm





7.0 x 5.0 x 0.85mm





Note:
4. xxxx top marking denotes manufacturing lot number.
5. A capacitor of value 0.1μF between VDD and GND is recommended.

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- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
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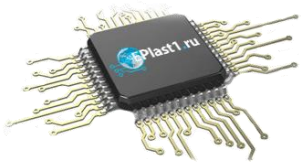
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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