

■ Features, Benefits and Applications

- Any frequency between 80.000001 and 220 MHz with 6 decimal places of accuracy
- Excellent total frequency stability of ± 2.5 PPM or ± 5 PPM
- 0.6 ps of phase jitter over 12 kHz to 20 MHz integration bandwidth
- Voltage control option with pull range of ± 12.5 PPM or ± 25 PPM
- LVCMOS/HCMOS or clipped sinewave output
- Voltage control, standby or output enable modes
- Three industry-standard 4-pin packages: 3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0 mm
- Contact SiTime for 6-pin packages
- Outstanding silicon reliability of 2 FIT (10x improvement over quartz-based devices)
- Outstanding mechanical robustness for portable applications
- Ultra short lead time
- Ideal for telecom, networking, smart meter and wireless applications

■ Specifications

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Output Frequency Range	f	80.000001	–	220	MHz	
Frequency Stability						
Initial tolerance	F_init	0.5	–	0.5	PPM	at 25°C
Overall Stability	F_stab	-2.5	–	+2.5	PPM	Inclusive of Initial tolerance (F_init), operating temperature, rated power, supply voltage change, load change
		-5	–	+5	PPM	
Aging	F_aging	-1.0	–	1.0	PPM	1st year, 25°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	
Pull Range	PR	$\pm 12.5, \pm 25$			PPM	
Upper Control Voltage	VC_U	3	–	3.3	V	Vdd = 3.3 V, Voltage at which maximum deviation is guaranteed.
		2.52	–	2.8	V	Vdd = 2.8 V, Voltage at which maximum deviation is guaranteed.
		2.25	–	2.5	V	Vdd = 2.5 V, Voltage at which maximum deviation is guaranteed.
		1.62	–	1.8	V	Vdd = 1.8 V, Voltage at which maximum deviation is guaranteed.
Lower Control Voltage	VC_L	0	–	0.1	V	Voltage at which maximum deviation is guaranteed.
Frequency Change Polarity	–	Positive slope			–	
Control Voltage Bandwidth(-3dB)	V_BW	–	–	8	kHz	
Current Consumption	Idd	–	33	TBD	mA	No load condition, f = 100MHz, Vdd = 2.5 V, 2.8 V or 3.3 V
		–	32	TBD	mA	No load condition, f = 100MHz, Vdd = 1.8 V
Standby Current	I_std	–	–	TBD	μA	\overline{ST} = GND, All Vdd, Output is Weakly Pulled Down
Duty Cycle	DC	45	–	55	%	All Vdds.
Rise/Fall Time	Tr, Tf	–	1.5	–	ns	15 pF load, 10% - 90% Vdd
Output Voltage High	VOH	90%	–	–	Vdd	IOH = TBD mA
Output Voltage Low	VOL	–	–	10%	Vdd	IOL = TBD mA
Output Load	Ld	–	–	15	pF	At maximum frequency and supply voltage. Contact SiTime for higher output load option
Input Voltage High	VIH	70%	–	–	Vdd	Pin 1, OE or \overline{ST}
Input Voltage Low	VIL	–	–	30%	Vdd	Pin 1, OE or \overline{ST}
Startup Time	T_start	–	6	10	ms	Measured from the time Vdd reaches its rated minimum value
OE Enable/Disable Time	T_oe	–	–	TBD		
Resume Time	T_resume	–	3	TBD	ms	Measured from the time ST pin crosses 50% threshold
RMS Period Jitter	T_jitt	–	2	–	ps	f = 156.25 MHz, Integration bandwidth = 12 kHz to 20MHz, all Vdds
RMS Phase Jitter (random)	T_phj	–	0.6	–	ps	f = 156.25 MHz, Integration bandwidth = 12 kHz to 20MHz, all Vdds

Specifications (Cont.)

Pin Description Tables

Pin #1 Functionality
VIN
0 - Vdd: produces voltage dependent frequency change
OE
H or Open ^[1] : specified frequency output
L: output is high impedance
ST
H or Open: specified frequency output
L: output is low level (weak pull down). Oscillation stops

Pin Map	
Pin	Connection
1	OE/VC/ST/NC
2	GND
3	CLK
4	VDD

Absolute Maximum Table

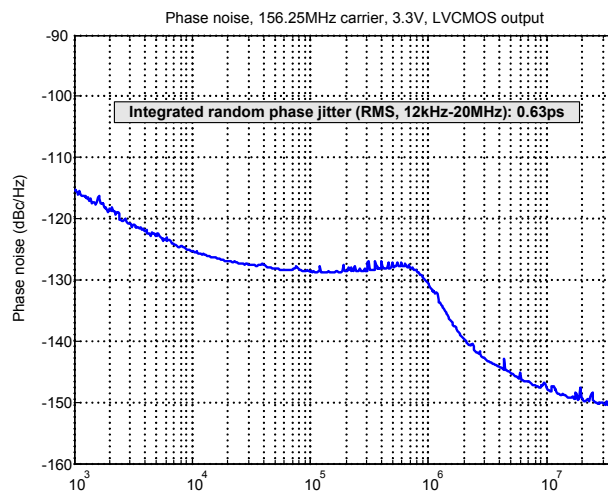
Attempted operation outside the absolute maximum ratings of the part may cause permanent damage to the part. Actual performance of the IC is only guaranteed within the operational specifications, not at absolute maximum ratings.

Parameter	Min.	Max.	Unit
Storage Temperature	-65	150	°C
VDD	-0.5	4	V
Electrostatic Discharge	–	2000	V
Soldering Temperature (follow standard Pb free soldering guidelines)	–	260	°C
Number of Program Writes	–	1	NA
Program Retention over -40 to 125°C, Process, VDD (0 to 3.65 V)	1,000+	–	years

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 Sensitivity Level	MSL1 @ 260°C

Phase Noise Plot



Note:

- In 1.8 V mode, a resistor of <100 kΩ between OE pin and VDD is recommended.

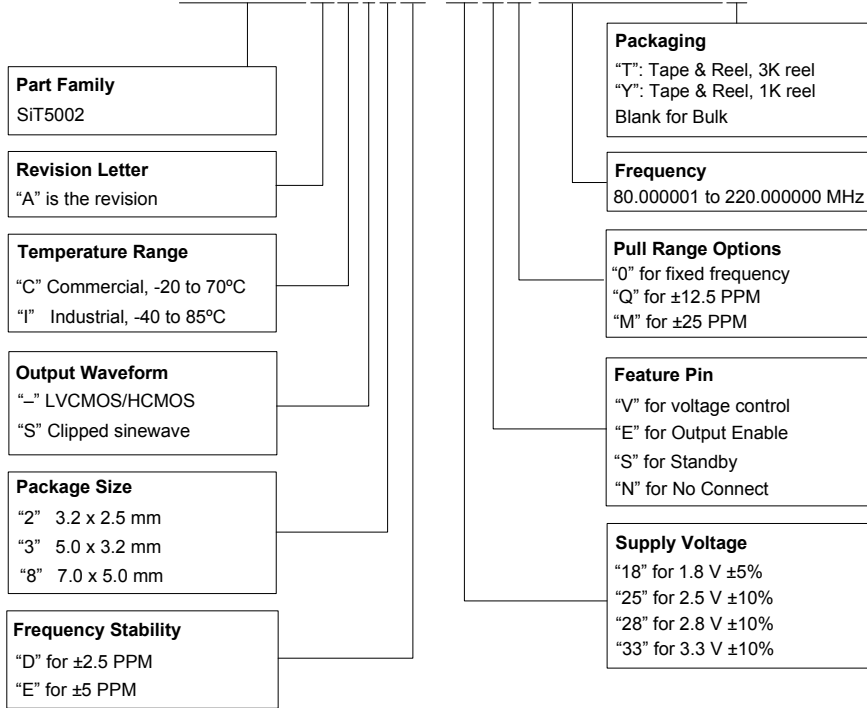
■ Dimensions and Land Patterns

Package Size – Dimensions (Unit: mm) ^[2]	Recommended Land Pattern (Unit: mm) ^[3]
<p>3.2 x 2.5 x 0.75 mm</p>	
<p>5.0 x 3.2 x 0.75 mm</p>	
<p>7.0 x 5.0 x 0.90 mm</p>	

Notes:

2. Y denotes manufacturing origin and XXXX denotes manufacturing lot number. The value of "Y" will depend on the assembly location of the device.
3. A capacitor of value 0.1 μ F between Vdd and GND is recommended.

SiT5002AC-2D-18VQ155.520000T



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