



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



SINGLE-ENDED OUTPUT SILICON OSCILLATOR

Features

- Quartz-free, MEMS-free, and PLL-free all-silicon oscillator
- Any output frequencies from 0.9 to 200 MHz
- Short lead times
- Excellent temperature stability (± 20 ppm)
- Highly reliable startup and operation
- High immunity to shock and vibration
- Low jitter: < 1.5 ps rms
- 0 to 85 °C operation includes 10-year aging in hot environments
- Footprint compatible with industry-standard 3.2 x 5.0 mm XOs
- CMOS and SSTL versions available
- Driver stopped, tri-state, or powerdown operation
- RoHS compliant
- 1.8, 2.5, or 3.3 V options
- Low power
- More than 10x better fit rate than competing crystal solutions



Specifications

Parameters	Condition	Min	Typ	Max	Units
Frequency Range		0.9	—	200	MHz
Frequency Stability	Temperature stability, 0 to +70 °C	—	± 10	—	ppm
	Temperature stability, 0 to +85 °C	—	± 20	—	ppm
	Total stability, 0 to +70 °C operation ¹	—	—	± 150	ppm
	Total stability, 0 to +85 °C operation ²	—	—	± 250	ppm
Operating Temperature	Commercial	0	—	70	°C
	Extended commercial	0	—	85	°C
Storage Temperature		-55	—	+125	°C
Supply Voltage	1.8 V option	1.71	—	1.98	V
	2.5 V option	2.25	—	2.75	V
	3.3 V option	2.97	—	3.63	V

Notes:

1. Inclusive of 25 °C initial frequency accuracy, operating temperature range, supply voltage change, output load change, first-year aging at 25 °C, shock, vibration, and one solder reflow.
2. Inclusive of 25 °C initial frequency accuracy, operating temperature range, supply voltage change, output load change, ten-year aging at 85 °C, shock, vibration, and one solder reflow.
3. See “AN409: Output Termination Options for the Si500S and Si500D Silicon Oscillators” for further details regarding output clock termination recommendations.
4. $V_{TT} = .5 \times V_{DD}$.
5. $V_{TT} = .45 \times V_{DD}$.

Si500S

Parameters	Condition	Min	Typ	Max	Units
Supply Current	1.8 V option, 40 pF, 40 MHz, CMOS	—	13.9	16	mA
	1.8 V option, 10 pF, 200 MHz, CMOS	—	16.7	19	mA
	2.5 V option, 40 pF, 40 MHz, CMOS	—	15.8	18	mA
	2.5 V option, 10 pF, 200 MHz, CMOS	—	19.3	22	mA
	3.3 V option, 40 pF, 40 MHz, CMOS	—	17.7	20	mA
	3.3 V option, 10 pF, 200 MHz, CMOS	—	21.5	24	mA
	SSTL-3.3, 200 MHz	—	18.1	20.2	mA
	SSTL-2.5, 200 MHz	—	18.0	19.7	mA
	SSTL-1.8, 200 MHz	—	16.8	18.7	mA
	Output Stopped, CMOS	—	11.8	13.1	mA
	Tri-State	—	9.7	10.7	mA
Powerdown	—	1.0	1.9	mA	
Output Symmetry	$0.5 \times V_{DD}$	$46 - 13 \text{ ns}/T_{CLK}$	—	$54 + 13 \text{ ns}/T_{CLK}$	%
Rise and Fall Times ³	CMOS, $C_L = 15 \text{ pF}$ measured from 20 to 80% of V_{DD}	—	1.4	2.0	ns
	SSTL	—	—	0.6	ns
CMOS Output Voltage	V_{OH} , sourcing 9 mA	$V_{DD} - 0.5$	—	—	V
	V_{OL} , sinking 9 mA	—	—	0.5	V
SSTL-1.8 Output Voltage ⁴	V_{OH}	$V_{TT} + 0.375$	—	—	V
	V_{OL}	—	—	$V_{TT} - 0.375$	V
SSTL-2.5 Output Voltage ⁴	V_{OH}	$V_{TT} + 0.48$	—	—	V
	V_{OL}	—	—	$V_{TT} - 0.48$	V
SSTL-3.3 Output Voltage ⁵	V_{OH}	$V_{TT} + 0.48$	—	—	V
	V_{OL}	—	—	$V_{TT} - 0.48$	V
Powerup Time	From time V_{DD} crosses min spec supply	—	—	2	ms
OE Deassertion to Clk Stop		—	—	$250 + 3 \times T_{CLK}$	ns
Return from Output Driver Stopped Mode		—	—	$250 + 3 \times T_{CLK}$	ns
Return from Tri-State Time		—	—	$12 + 3 \times T_{CLK}$	μs
Return from Powerdown Time		—	—	2	ms
Period Jitter (1-sigma)	SSTL ³	—	1	2	ps RMS
Integrated Phase Jitter	1 MHz – $0.4 \times F_{OUT}$, SSTL or CMOS and $C_L \leq 7 \text{ pF}$, $F_{OUT} > 2.5 \text{ MHz}$	—	0.7	1.5	ps RMS

Notes:

1. Inclusive of 25 °C initial frequency accuracy, operating temperature range, supply voltage change, output load change, first-year aging at 25 °C, shock, vibration, and one solder reflow.
2. Inclusive of 25 °C initial frequency accuracy, operating temperature range, supply voltage change, output load change, ten-year aging at 85 °C, shock, vibration, and one solder reflow.
3. See “AN409: Output Termination Options for the Si500S and Si500D Silicon Oscillators” for further details regarding output clock termination recommendations.
4. $V_{TT} = .5 \times V_{DD}$.
5. $V_{TT} = .45 \times V_{DD}$.

Package Specifications

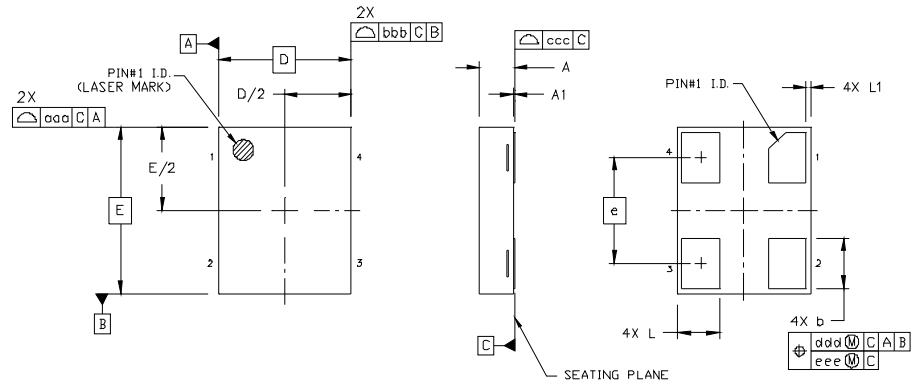


Table 1. Package Diagram Dimensions (mm)

Dimension	Min	Nom	Max
A	0.80	0.85	0.90
A1	0.00	0.03	0.05
b	1.15	1.20	1.25
D	3.20 BSC		
e	2.54 BSC		
E	4.00 BSC		
L	0.95	1.00	1.05

Dimension	Min	Nom	Max
L1	0.00	0.05	0.10
aaa			0.10
bbb			0.10
ccc			0.08
ddd			0.10
eee			0.05

Table 2. Pad Connections

1	OE
2	GND
3	Output
4	VDD

Table 3. Tri-State/Powerdown/Driver Stopped Function on OE (3rd Option Code)

	A	B	C	D	E	F
Open	Active	Active	Active	Active	Active	Active
1 Level	Active	Tri-State	Active	Power-down	Active	Driver Stopped
0 Level	Tri-State	Active	Power-down	Active	Driver Stopped	Active

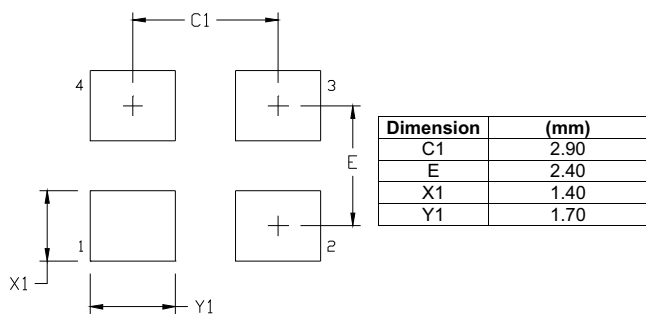
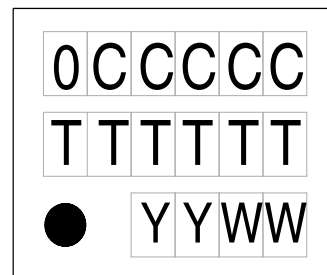


Figure 1. Recommended Land Pattern



0 = Si500
 CCCCC = mark code
 TTTTTT = assembly manufacturing code
 YY = year
 WW = work week

Figure 2. Top Mark

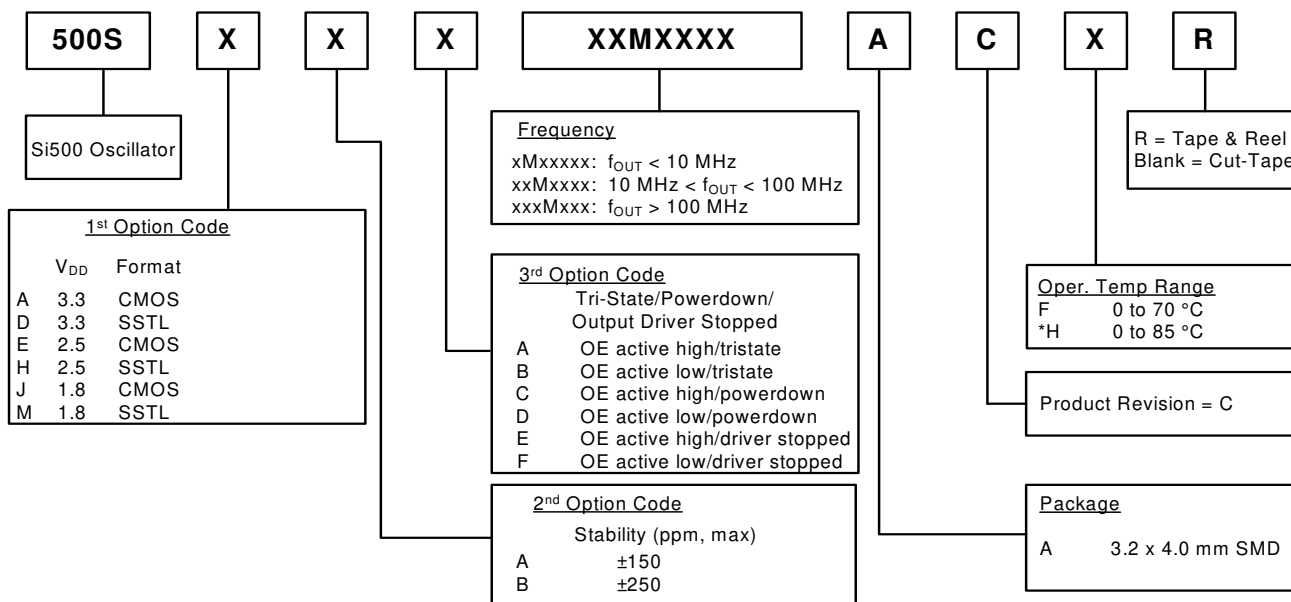
Si500S

Environmental Compliance

Parameter	Conditions/Test Method
Mechanical Shock	MIL-STD-883, Method 2002.4
Mechanical Vibration	MIL-STD-883, Method 2007.3 A
Resistance to Soldering Heat	MIL-STD-202, 260 C° for 8 seconds
Solderability	MIL-STD-883, Method 2003.8
Damp Heat	IEC 68-2-3
Moisture Sensitivity Level	J-STD-020, MSL 3

Ordering Information

The Si500S supports a variety of options including frequency, output format, supply voltage, and tri-state/powerdown/output driver stopped mode. Specific device configurations are programmed into the Si500S at time of shipment. Configurations are specified using the figure below. Silicon Labs provides a web-based part number utility that can be used to simplify part number configuration. Refer to www.silabs.com/SiliconXOPartnumber to access this tool. The Si500S silicon oscillator is supplied in a ROHS-compliant, 4-pad, 3.2 x 4.0 mm package. Tape and reel packaging is available as an ordering option.



*Note: Only ±250 ppm is supported.

DOCUMENT CHANGE LIST

Revision 0.3 to Revision 0.4

- Revision B to Revision C updated in Ordering Information
- 0 to 85 C° Operating Temperature Range option added
- Multiple CMOS output format codes removed

Revision 0.4 to Revision 1.0

- Clarified SSTL specifications.
- Revised CMOS supply current max values .

Revision 1.0 to Revision 1.1

- Updated Ordering information for ± 250 ppm from 0 to +85 °C.
- Updated jitter from 1.5 ps to 1.5 ps rms.
- Updated operating temperature to include extended commercial at 0 to +85 °C.



ClockBuilder Pro

One-click access to Timing tools, documentation, software, source code libraries & more. Available for Windows and iOS (CBGo only).

www.silabs.com/CBPro



Timing Portfolio
www.silabs.com/timing



SW/HW
www.silabs.com/CBPro



Quality
www.silabs.com/quality



Support and Community
community.silabs.com

Disclaimer

Silicon Laboratories intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Laboratories products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and "Typical" parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Laboratories reserves the right to make changes without further notice and limitation to product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Silicon Laboratories shall have no liability for the consequences of use of the information supplied herein. This document does not imply or express copyright licenses granted hereunder to design or fabricate any integrated circuits. The products must not be used within any Life Support System without the specific written consent of Silicon Laboratories. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Laboratories products are generally not intended for military applications. Silicon Laboratories products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons.

Trademark Information

Silicon Laboratories Inc., Silicon Laboratories, Silicon Labs, SiLabs and the Silicon Labs logo, CMEMS®, EFM, EFM32, EFR, Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Ember®, EZLink®, EZMac®, EZRadio®, EZRadioPRO®, DSPLL®, ISOmodem®, Precision32®, ProSLIC®, SiPHY®, USBXpress® and others are trademarks or registered trademarks of Silicon Laboratories Inc. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keil is a registered trademark of ARM Limited. All other products or brand names mentioned herein are trademarks of their respective holders.



Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701
USA

<http://www.silabs.com>