Si530/Si531

10 MHz to 1.4 GHz Crystal Oscillator (XO) Series

Description

The Si530/531 XO utilizes Silicon Laboratories' advanced DSPLL circuitry to provide a low-jitter clock at high frequencies. The Si530/531 is available with any-rate output frequency from 10 to 945 MHz and select frequencies to 1400 MHz. Unlike a traditional XO, where a different crystal is required for each output frequency, the Si530/531 uses one fixed-frequency crystal to provide a wide range of output frequencies. This IC-based approach allows the crystal resonator to provide exceptional frequency stability and reliability. In addition, DSPLL clock synthesis provides superior supply noise rejection, simplifying the task of generating low-jitter clocks in noisy environments typically found in communication systems. The Si530/531 IC-based XO is factory-configurable for a wide variety of user specifications including frequency, supply voltage, output format, and temperature stability. Specific configurations are factory-programmed at time of shipment, thereby eliminating long lead times associated with custom oscillators.

Features

- Available with any-rate output frequencies from 10 to 945 MHz and select frequencies to 1.4 GHz
- Ultra-low jitter: 0.3 ps RMS (12 kHz–20 MHz)
- 3x tighter stability than SAW oscillators
- 3.3 V, 2.5 V and 1.8 V V_{DD} supply operation
- Differential (LVPECL, LVDS, CML) or CMOS output options
- Standard frequencies in stock and available for rapid delivery
- Custom frequencies available with < 2 week lead times

Applications

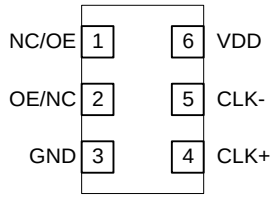
- SONET/SDH/OTN
- Networking
- HD-SDI/3G-SDI Video
- Test and measurement
- Clock and data recovery
- FPGA/ASIC Clock generation

Product Selector Guide

XO Series	Description
Si530	Single frequency oscillator, OE pin 2
Si531	Single frequency oscillator, OE pin 1

A complete Si530-531 data sheet can be found here:
http://www.silabs.com/Support%20Documents/TechnicalDocs/si530.pdf

Pin-out



(top view)

Pin Description

Pin	Description
1	Si530: NC = No Connect Si531: OE = Output Enable
2	Si530: OE = Output Enable Si531: OE = No Connect
3	GND = Ground
4	CLK+ = Clock output
5	CLK- = Complementary Clock output
6	VDD = Power Supply

Selected Electrical Specifications

V_{DD} = 2.5 or 3.3 V ±10%, T_A = -40 to 85 ºC

Parameter	Symbol	Test Condition/Comment	Min	Typ	Max	Unit
Frequency Range[1]	F_{CLK}	LVPECL/LVDS	10	—	945	MHz
Supply Voltage	V_{DD}	3.3 V option	2.97	3.3	3.63	V
		2.5 V option	2.25	2.5	2.75	V
Supply Current	I_{DD}	LVPECL (output enabled)	—	111	121	mA
		LVDS (output enabled)	—	90	98	mA
		Tristate (output disabled)	—	60	75	mA
Total Stability	F_{STAB}	Temperature stability: ±7 ppm	-20	—	20	ppm
Rise/Fall Time	T_R/T_F	LVPECL/LVDS option	—	—	350	ps
Phase Jitter (RMS) for F_{CLK} ≥ 500 MHz	ϕ_J	12 kHz to 20 MHz integration BW[2]	—	0.25	0.40	ps
Phase Jitter (RMS) for F_{CLK} of 125 to 500 MHz	ϕ_J			0.36	0.50	ps
Duty Cycle	DC	All formats	45	—	55	%
Output Enable (OE)[3]	V_{IH}		0.75 x V_{DD}	—	—	V
	V_{IL}		—	—	0.5	V
LVPECL Output Option[4]	V_{OC}	mid-level	V_{DD} – 1.42	—	V_{DD} – 1.25	V
	V_O	swing (diff)	1.1	—	1.9	V_{PP}
LVDS Output Option[5]	V_{OC}	mid-level	1.125	1.20	1.275	V
	V_O	swing (diff)	0.5	0.7	0.9	V_{PP}

Notes:

1. Also available in frequencies from 970 to 1134 MHz and 1213 to 1417 MHz.
2. All Crystal Oscillator (XO) devices are screened for jitter at production test.
3. OE pin includes a 17 kΩ pullup resistor to VDD.
4. 50 Ω to VDD – 2.0 V.
5. R_{term} = 100 Ω (differential).

Absolute Maximum Ratings[1]

Parameter	Symbol	Rating	Unit
Maximum Operating Temp.	T_{AMAX}	85	ºC
Storage Temperature	T_S	-55 to 125	ºC
Supply Voltage	V_{DD}	-0.5 to 3.8	ºC
Input Voltage	V_{IN}	0.5 to V_{DD} +0.3	V
ESD HBM (JESD22-A114)	HBM	2.5	kV
Solder Temperature[2]	T_{PEAK}	260	ºC
Solder Time at T_{PEAK}[2]	T_P	20-40	sec

1. Stresses beyond those listed in this table may cause permanent damage to the device. Functional operation specification compliance is not implied at these conditions. Exposure to maximum rating conditions for extended periods may affect device reliability.
2. The device is compliant with JEDEC J-STD-020.

Environmental Compliance and Package Information

Parameter	Test Condition
Mechanical Shock	MIL-STD-883, Method 2002
Mechanical Vibration	MIL-STD-883, Method 2007
Solderability	MIL-STD-883, Method 2003
Gross and Fine Leak	MIL-STD-883, Method 1014
Resistance to Solder Heat	MIL-STD-883, Method 2036
Moisture Sensitivity Level (MSL)	1
Contact Pads	Gold over Nickel

Thermal Conditions

Parameter	Symbol	Test Condition	Value	Unit
Thermal Impedance	Θ_{JA}	Still air	84.6	ºC/W

Standard Frequency Orderable Part Numbers

Si530 5x7mm	106.25 MHz	125 MHz	148.3517 MHz	148.5 MHz	155.52 MHz	156.25 MHz
3.3V LVPECL	530AC106M250DG	530AC125M000DG	530AC000110DG	530AC148M500DG	530AC155M520DG	530AC156M250DG
3.3V LVDS	530BC106M250DG	530BC125M000DG	530BC000110DG	530BC148M500DG	530BC155M520DG	530BC156M250DG
2.5V LVPECL	530EC106M250DG	530EC125M000DG	530EC000110DG	530EC148M500DG	530EC155M520DG	530EC156M250DG
2.5V LVDS	530FC106M250DG	530FC125M000DG	530FC000110DG	530FC148M500DG	530FC155M520DG	530FC156M250DG
Si531 5x7mm	**106.25 MHz**	**125 MHz**	**148.3517 MHz**	**148.5 MHz**	**155.52 MHz**	**156.25 MHz**
3.3V LVPECL	531AC106M250DG	531AC125M000DG	531AC000110DG	531AC148M500DG	531AC155M520DG	531AC156M250DG
3.3V LVDS	531BC106M250DG	531BC125M000DG	531BC000110DG	531BC148M500DG	531BC155M520DG	531BC156M250DG
2.5V LVPECL	531EC106M250DG	531EC125M000DG	531EC000110DG	531EC148M500DG	531EC155M520DG	531EC156M250DG
2.5V LVDS	531FC106M250DG	531FC125M000DG	531FC000110DG	531FC148M500DG	531FC155M520DG	531FC156M250DG

Si530 5x7mm	187.5 MHz	200 MHz	250 MHz	311.04 MHz	312.5 MHz	622.08 MHz
3.3V LVPECL	530AC187M500DG	530AC200M000DG	530AC250M000DG	530AC311M040DG	530AC312M500DG	530AC622M080DG
3.3V LVDS	530BC187M500DG	530BC200M000DG	530BC250M000DG	530BC311M040DG	530BC312M500DG	530BC622M080DG
2.5V LVPECL	530EC187M500DG	530EC200M000DG	530EC250M000DG	530EC311M040DG	530EC312M500DG	530EC622M080DG
2.5V LVDS	530FC187M500DG	530FC200M000DG	530FC250M000DG	530FC311M040DG	530FC312M500DG	530FC622M080DG
Si531 5x7mm	**187.5 MHz**	**200 MHz**	**250 MHz**	**311.04 MHz**	**312.5 MHz**	**622.08 MHz**
3.3V LVPECL	531AC187M500DG	531AC200M000DG	531AC250M000DG	531AC311M040DG	531AC312M500DG	531AC622M080DG
3.3V LVDS	531BC187M500DG	531BC200M000DG	531BC250M000DG	531BC311M040DG	531BC312M500DG	531BC622M080DG
2.5V LVPECL	531EC187M500DG	531EC200M000DG	531EC250M000DG	531EC311M040DG	531EC312M500DG	531EC622M080DG
2.5V LVDS	531FC187M500DG	531FC200M000DG	531FC250M000DG	531FC311M040DG	531FC312M500DG	531FC622M080DG

For customized frequencies: http://www.silabs.com/custom-timing

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https://www.silabs.com/support/pages/contacttechnicalsupport.aspx
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