

**QUAD FREQUENCY XO (10 MHz TO 1.4 GHz)****Features**

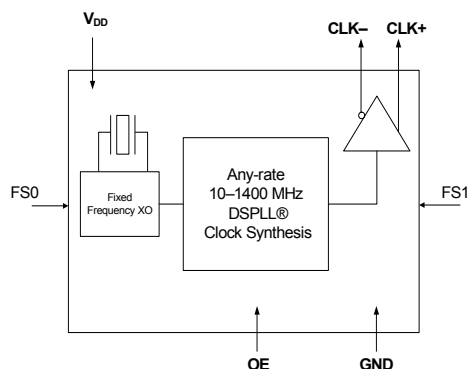
- Available with any-rate output frequencies from 10 to 945 MHz and selected frequencies to 1.4 GHz
- Four selectable output frequencies
- Industry standard 7x5 mm package
- Available CMOS, LVPECL, LVDS & CML outputs
- 3x better frequency stability than SAW based oscillators
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- 3rd generation DSPLL[®] with superior jitter performance
- Internal fixed crystal frequency ensures high reliability and low aging
- Lead-free/RoHS-compliant

Applications

- SONET / SDH
- xDSL
- 10 GbE LAN / WAN
- Low jitter clock generation
- Optical modules
- Test and measurement

Description

The Si534 quad frequency XO utilizes Silicon Laboratories advanced DSPLL[®] circuitry to provide a very low jitter clock for all output frequencies. The Si534 is available with any-rate output frequency from 10 to 945 MHz and selected frequencies to 1400 MHz. Unlike traditional XOs where a different crystal is required for each output frequency, the Si534 uses one fixed crystal frequency to provide a wide range of output frequencies. This IC based approach allows the crystal resonator to be optimized for superior 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 often found in communication systems. The Si534 IC based XO is factory configurable for a wide variety of user specifications including frequency, supply voltage and output format. Specific configurations are factory programmed into the Si534 at time of shipment, thereby eliminating the long lead times associated with custom oscillators.

Functional Block Diagram**Ordering Information:**

See page 7.

1. Electrical Specifications

Table 1. Si534 Electrical Specifications

Parameter	Min	Typ	Max	Units	Notes
Frequency					
Nominal Frequency					Specified at time of order by P/N. Also available in bands from 970 to 1134 MHz and 1213 to 1417 MHz.
LVDS/CML/LVPECL	10	—	945	MHz	
CMOS	10	—	160		
Initial Accuracy	-1.5	—	1.5	ppm	Measured at +25 °C at time of shipping
Temperature Stability	-20	—	+20	ppm	Selectable option by P/N. See Section 4. "Ordering Information" on page 7.
	-50	—	+50		
	-100	—	+100		
Aging	—	—	±10	ppm	Frequency drift over projected 15 year life
Outputs					
Symmetry	45	—	55	%	LVPECL: $V_{DD} - 1.3$ V (differential) LVDS: 1.25 V (differential) CMOS: $V_{DD}/2$
RMS Jitter for $F_{OUT} \geq 500$ MHz	12 kHz to 20 MHz	—	0.27	ps	$F_{OUT} \geq 500$ MHz Differential Modes: LVPECL/LVDS/CML
	50 kHz to 80 MHz	—	0.30		
RMS Jitter for F_{OUT} of 125 to 500 MHz	12 kHz to 20 MHz	—	0.5	ps	$125 < F_{OUT} < 500$ MHz Differential Modes: LVPECL/LVDS/CML
Period Jitter for $F_{OUT} \leq 160$ MHz	Peak-to-Peak	—	5	ps	Any output N = 1000 cycles
	RMS	—	1		
LVPECL Output Option	mid-level swing (diff)	$V_{DD} - 1.42$	—	$V_{DD} - 1.25$	50 Ω to $V_{DD} - 2.0$ V
	swing (single-ended)	1.1	—	1.9	
		0.5	—	0.93	
LVDS Output Option	mid-level swing (diff)	1.125	1.2	1.275	$R_{term} = 100 \Omega$ (differential)
		0.5	0.7	0.9	
CML Output Option	mid-level swing	0.35	$V_{DD} - 0.36$	0.5	$R_{term} = 100 \Omega$ (differential)
		—	0.425	—	

Table 1. Si534 Electrical Specifications (Continued)

Parameter	Min	Typ	Max	Units	Notes
CMOS Output Option V _{OH} V _{OL}	0.8xV _{DD} —	— —	V _{DD} 0.4	V	C _L = 15 pF
Rise/Fall time	— — —	— — —	350 2 8	ps ns ns	CML/LVPECL/LVDS at 20%/80% CMOS with V _{DD} = 1.8 V & CL = 15 pF CMOS with V _{DD} = 3.3 V & CL = 15 pF
Inputs					
Voltage (V _{DD}) 3.3 V option 2.5 V option 1.8 V option	2.97 2.25 1.71	3.3 2.5 1.8	3.63 2.75 1.89	V	Optional parameter specified by P/N
Current Output enabled TriState mode	— —	90 60	— —	mA	
Frequency Select[1:0] V _{IH} V _{IL}	0.75 x V _{DD} 0	— —	V _{DD} 0.5	V	00 selects F0 01 selects F1 10 selects F2 11 selects F3
Output Enable V _{IH} V _{IL}	0.75 x V _{DD} 0	— —	V _{DD} 0.5	V	

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Supply Voltage	V _{DD}	-0.5 to +3.8	V
Storage Temperature	T _S	-55 to +125	°C

Table 3. Environmental Conditions

Parameter	Conditions/ Test Method
Operating Temperature	-40 to +85 °C
Mechanical Shock	MIL-STD-883F, Method 2002.3 B
Mechanical Vibration	MIL-STD-883F, Method 2007.3 A
Solderability	MIL-STD-883F, Method 203.8
Gross & Fine Leak	MIL-STD-883F, Method 1014.7
Resistance to Solvents	MIL-STD-883F, Method 2016

Table 4. Pinout

Pin	Symbol	Function
1	—	No Connection
2	OE	Output Enable Enabled when "1"
3	GND	Ground
4	CLK+	Output
5	CLK- (N/A for CMOS)	Complementary Output (N/C for CMOS)
6	V _{DD}	Power Supply Voltage
7	FS[1]	Frequency Select MSB
8	FS[0]	Frequency Select LSB

2. Outline Diagram and Suggested Pad Layout

Figure 1 illustrates the package details for the Si534. Table 5 lists the values for the dimensions shown in the illustration.

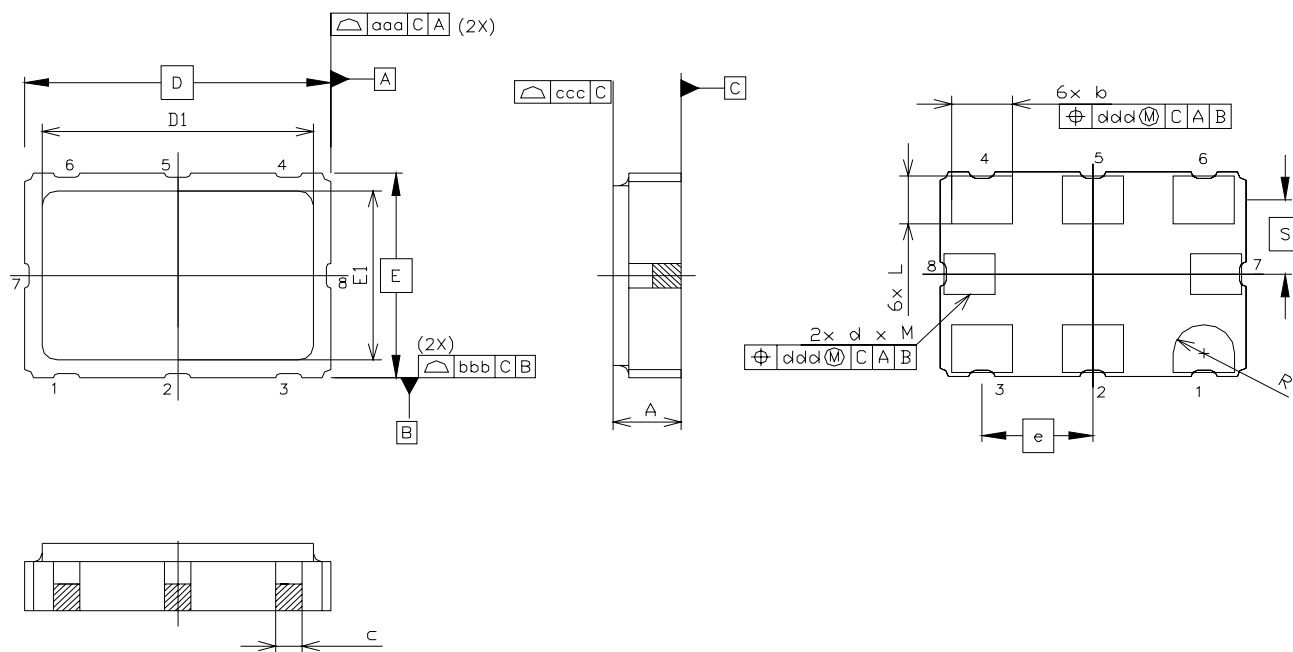


Figure 1. Si534 Outline Diagram

Table 5. Package Diagram Dimensions (mm)

Dimension	Min	Nom	Max
A	1.45	1.65	1.85
b	1.2	1.4	1.6
c	0.60 TYP.		
d	0.97	1.17	1.37
D	7.00 BSC.		
D1	6.10	6.2	6.30
e	2.54 BSC.		
E	5.00 BSC.		
E1	4.30	4.40	4.50
L	1.07	1.27	1.47
M	0.8	1.0	1.2
S	1.815 BSC.		
R	0.7 REF.		
aaa	—	—	0.15
bbb	—	—	0.15
ccc	—	—	0.10
ddd	—	—	0.10

3. 8-Pin PCB Land Pattern

Figure 2 illustrates the 8-pin PCB land pattern for the Si534. Table 6 lists the values for the dimensions shown in the illustration.

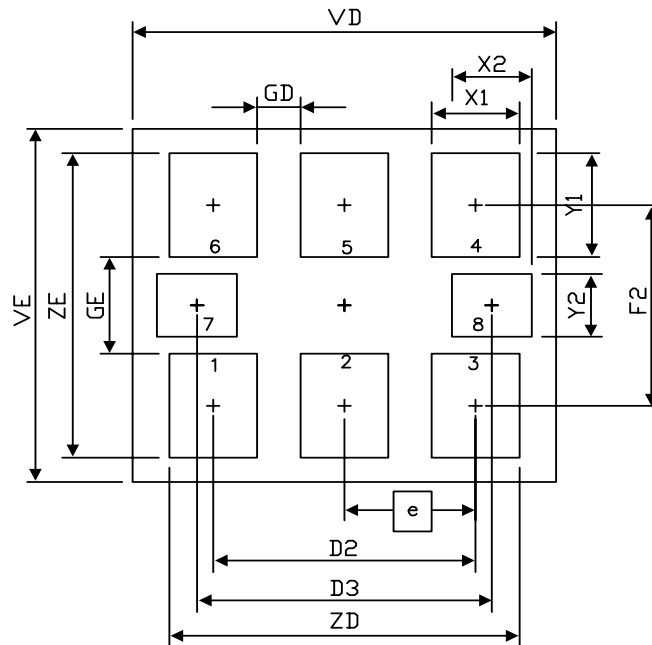


Figure 2. Si534 PCB Land Pattern

Table 6. PCB Land Pattern Dimensions (mm)

Dimension	Min	Max
D2	5.08 REF	
e	2.54 BSC	
E2	4.20 REF	
GD	0.84	—
GE	2.00	—
VD	8.20 REF	
VE	7.30 REF	
X1	1.70 TYP	
X2	1.545 TYP	
Y1	2.15 TYP	
X2	1.3 TYP	
ZD	—	6.78
ZE	—	6.30

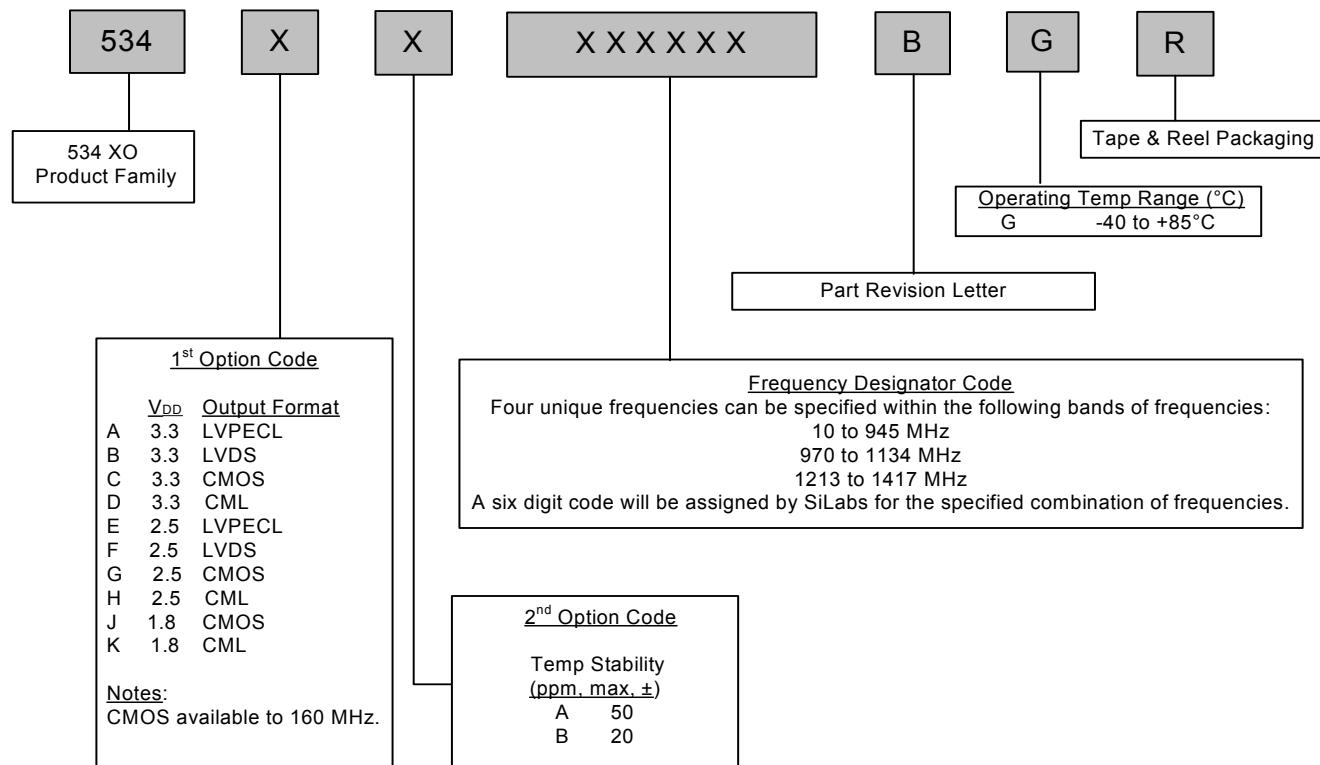
Notes:

1. Dimensioning and tolerancing per the ANSI Y14.5M-1994 specification.
2. Land pattern design follows IPC-7351 guidelines.
3. All dimensions shown are at maximum material condition (MMC).
4. Controlling dimension is in millimeters (mm).

4. Ordering Information

The Si534 Quad Frequency XO was designed to support a variety of options including frequency, tuning slope, output format, and V_{DD} . Specific device configurations are programmed into the Si534 at time of shipment. A unique part number associated with these options and frequencies will be assigned. The Si534 Quad Frequency XO series is supplied in an 8-pad, 7x5 mm package.

Part numbers for the Si534 Quad Frequency XO series are determined by following configuration tables. Silicon Labs provides a Windows-based part number configuration tool to simplify this process. Refer to www.silabs.com/VCXO to access this tool and for further ordering instructions.



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