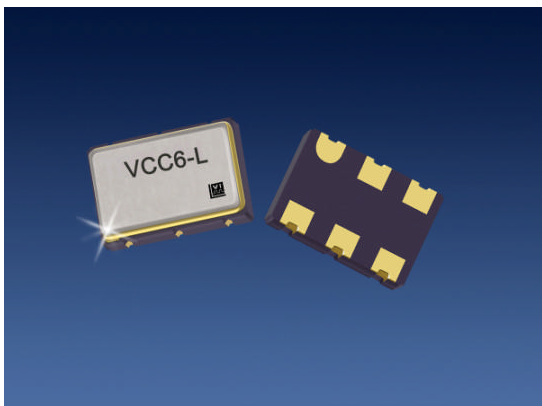


VCC6-L/V

2.5 or 3.3 volt LVDS Oscillator



The VCC6 Voltage Controlled Crystal Oscillator

Features

- 2.5 or 3.3 V LVDS
- 3rd Overtone Crystal for best jitter performance
- Output frequencies to 250 MHz
- Low Jitter < 1 pS rms, 12kHz to 20MHz
- Enable/Disable output for test and board debug
- -10/70 or -40/85 °C operating temperature
- Hermetically sealed ceramic SMD package
- RoHS compliant/Lead free construction

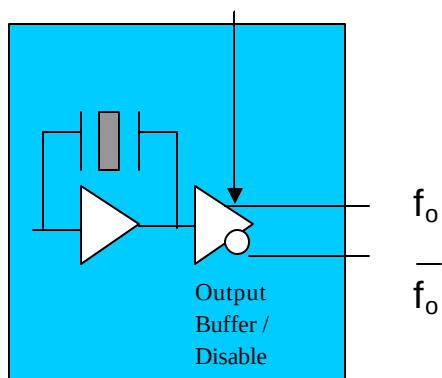
Applications

- SONET/SDH/DWDM
- Ethernet, Gigabit Ethernet
- Storage Area Network
- Digital Video
- Broadband Access

Description

Vectron's VCC6 Crystal Oscillator (XO) is quartz stabilized square wave generator with a LVDS output, operating off a 2.5 or 3.3 volt supply.

The VCC6 uses 3rd overtone crystals for output frequencies < 200MHz resulting in low jitter performance, typically 0.5pS rms in the 12 kHz to 20MHz band.



Performance Characteristics

Table 1. Electrical Performance					
Parameter	Symbol	Min	Typical	Maximum	Units
Frequency	f_o	40		250	MHz
Supply Voltage ¹ L option	V_{DD}	3.15	3.3	3.45	
Supply Voltage ¹ V option	V_{DD}	2.25	2.5	2.75	V
Supply Current, Output Enabled	I_{DD}			60	mA
Supply Current, Output Disabled	I_{DD}			30	uA
Output Logic Levels					
Output Logic High ²	V_{OH}		1.43	1.6	V
Output Logic Low ²	V_{OL}	0.9	1.10		V
Differential Output	V_{OD}	247	330	454	mV
Differential Output Error				50	mV
Offset Voltage	VOS	1.125	1.25	1.375	V
Offset Error	VOS			50	mV
Output Leakage Current				10	uA
Transition Times					
Rise Time ²	t_R			600	ps
Fall Time ²	t_F			600	ps
Symmetry or Duty Cycle ³	SYM	45	50	55	%
Operating temperature (<i>ordering option</i>)		-10/70 or -40/85			°C
Stability (<i>ordering option</i>) ⁴		+/-25, +/-50 or +/-100			ppm
RMS Jitter, 12kHz to 20 MHz			0.5	1	pS
RMS Jitter			2.5		pS
Output Enabled ⁵		0.7*VDD			V
Output Disabled ⁵				0.3*VDD	V
Output Enable/Disable time				400	nS
Package Size		5.0 x 7.0 x 1.5			mm

1. A 0.01uF and a 0.1uF capacitor should be located as close to the supply as possible (to ground) is recommended.
2. Figure 1 defines these parameters.
3. Symmetry is measured defined as Vs, On Time/Period.
4. Includes calibration tolerance, operating temperature, supply voltage variations, aging (40 degreesC/10 years) and shock and vibration (not under operation).
5. Output will be enabled if enable/disable is left open.

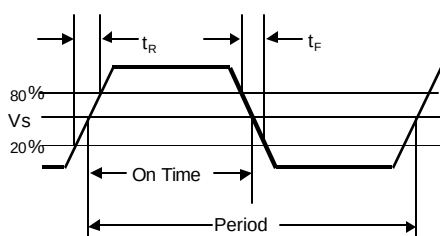
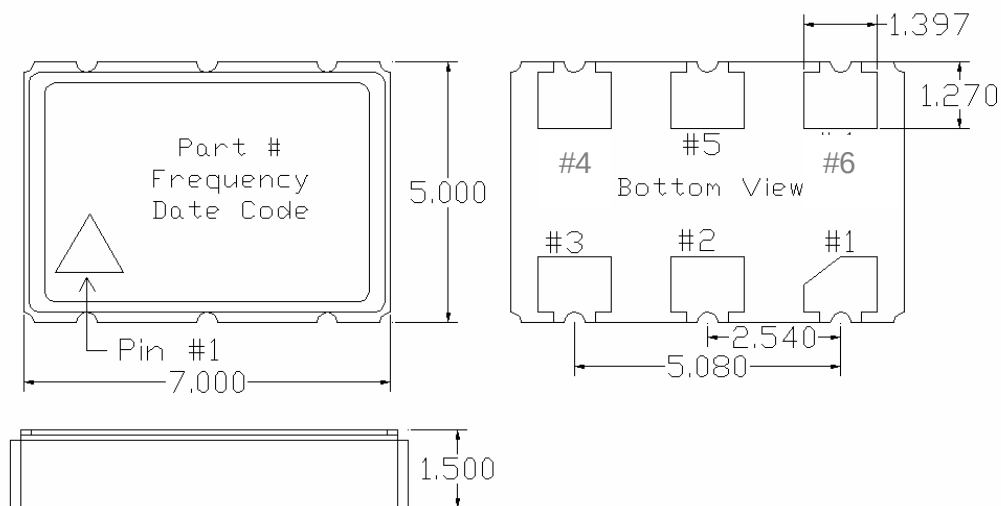


Figure 1. Output Waveform

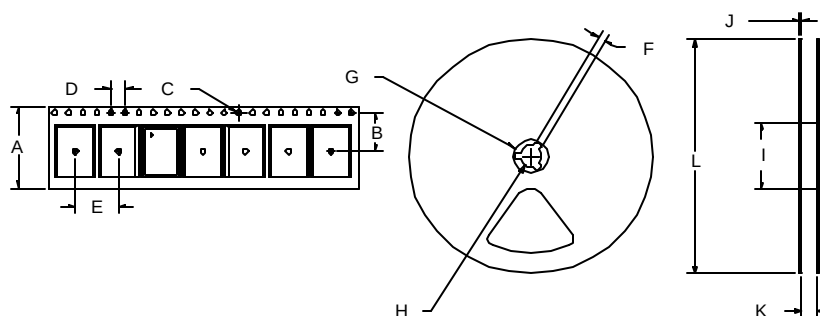
Outline Diagram, Pad Layout and Pin Out



Contact Pad Plating: gold over 1 um nickel

Pin #	Symbol	Function
1	E/D	Tristate function
2	NC	No Connection
3	GND	Ground
4	f_o	Output Frequency
5	Cf_o	Complementary Output Frequency
6	V_{DD}	Supply Voltage

Tape and Reel



Tape and Reel Dimensions (mm)

Tape Dimensions						Reel Dimensions							# Per Reel
Product	A	B	C	D	E	F	G	H	I	J	K	L	
VCC6	12	5.5	1.5	4	8	1.78	20.6	13	55	6	12.4	178	250

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can permanently damage the device. Functional operation is not implied at these or any other conditions in excess of conditions represented in the operational sections of this data sheet. Exposure to absolute maximum ratings for extended periods may adversely affect device reliability.

Table 2. Absolute Maximum Ratings			
Parameter	Symbol	Ratings	Unit
Power Supply	V _{DD}	-0.5 to +7.0	Vdc
Enable/Disable	V _{IN}	-0.5 to V _{DD} +0.5	Vdc
Storage Temperature	T _{storage}	-55/125	°C

Reliability

The VCC6 qualification tests include the following:

Table 3. Environmental Compliance	
Parameter	Conditions
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 Solvents	MIL-STD-883 Method 2016

Handling Precautions

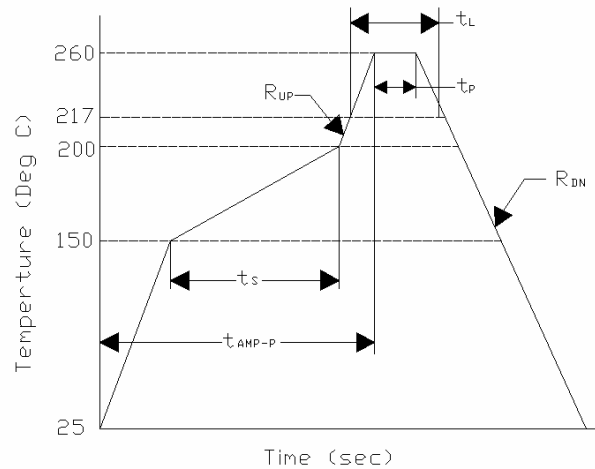
Although ESD protection circuitry has been designed into the the VCC6, proper precautions should be taken when handling and mounting. VI employs a Human Body Model and a Charged-Device Model (CDM) for ESD susceptibility testing and design protection evaluation. ESD thresholds are dependent on the circuit parameters used to define the model. Although no industry wide standard has been adopted for the CDM, a standard HBM of resistance = 1.5kohms and capacitance = 100pF is widely used and therefore can be used for comparison purposes.

Table 4. ESD Ratings		
Model	Minimum	Conditions
Human Body Model	1000	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

Suggested IR profile

The VCC6 has been qualified to meet the JEDEC standard for Pb-Free assembly. The temperatures and time intervals listed are based on the Pb-Free small body requirements and parameters are listed in Table 7. The VCC6 is hermetically sealed so an aqueous wash is not an issue.

Table 7. Reflow Profile		
Parameter	Symbol	Value
PreHeat Time	t_s	60 sec Min, 180 sec Max
Ramp Up	R_{UP}	3 °C/sec Max
Time Above 217 °C	t_L	60 sec Min, 150 sec Max
Time To Peak Temperature	t_{AMB-P}	480 sec Max
Time At 260 °C (max)	t_P	10 sec Max
Ramp Down	R_{DN}	6 °C/sec Max



Frequencies (MHz)

50.000	74.1758	74.250	77.760	80.000
100.000	106.250	125.000	133.000	136.000
153.850	155.520	156.250	161.1328	162.325
164.3555	166.6667	173.3708	173.438	175.000
180.000	187.500	200.00	212.500	

Other frequencies may be available upon request. Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position.

Ordering Information

VCC6-LCB – 125M000

Product Family

Crystal Oscillator

Output

L: LVDS 3.3 Volts

V: LVDS 2.5 Volts

Enable/Disable

C: Pin 1

Frequency

example: 125M000= 125.000 MHz

Stability Options/Temperature

A +/-100ppm -10 to 70 C

B: +/-50ppm -10 to 70 C

C: +/-100ppm -40 to 85 C

D: +/-50ppm -40 to 85 C

E: +/-25ppm -10 to 70 C

F: +/-25ppm -40 to 85 C



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VCC6-L (REVISION DATE: January 7 2005)