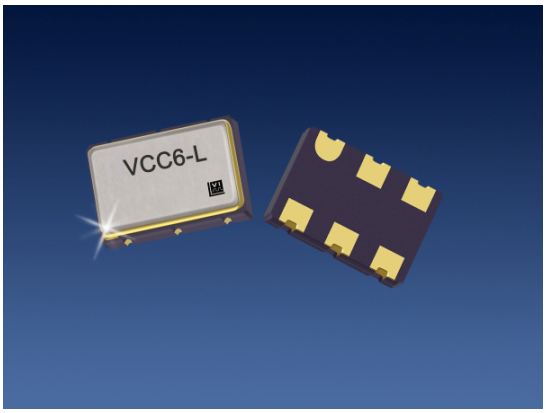
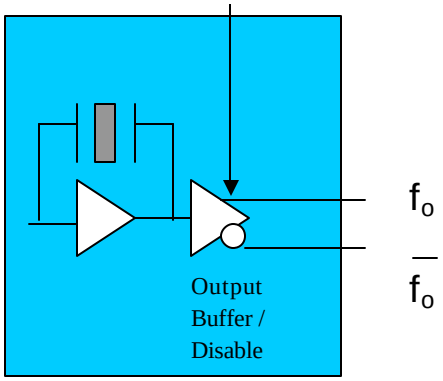
VECTRON INTERNATIONAL
A DOVER COMPANY

VCC6-L

3.3 volt LVDS Oscillator, >270MHz



The VCC6 Crystal Oscillator



Features

- 3.3 V LVDS
- Output frequencies from 270-800 MHz
- Enable/Disable output for test and board debug
- -10/70 or –40/85 °C operating temperature
- Hermetically sealed ceramic SMD package
- Product is compliant to RoHS directive and fully compatible with lead free assembly

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 3.3 volt supply.

Performance Characteristics

Table 1. Electrical Performance

Parameter	Symbol	Min	Typical	Maximum	Units
Frequency	f_O	270		800	MHz
Supply Voltage [1]	V_{DD}	3.15	3.3	3.45	
Supply Current, Output Enabled	I_{DD}			80	mA
Supply Current, Output Disabled	I_{DD}			10	uA
Output Logic Levels					
Output Logic High[2]	V_{OH}		1.40	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
Differential Output Skew				200	ps
Load (differential)			100		ohms
Offset Voltage	V_{OS}	1.125	1.25	1.375	V
Offset Error	V_{OS}			25	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 (*ordering option*)			-10/70 or –40/85		°C
Stability (*ordering option)*[4]			±25, ±50 or ±100		ppm
RMS Jitter, 12kHz to 20 MHz			2		ps
Period RMS Jitter			4		ps
Period P/P Jitter			30		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 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.

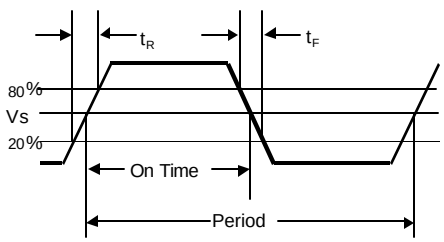
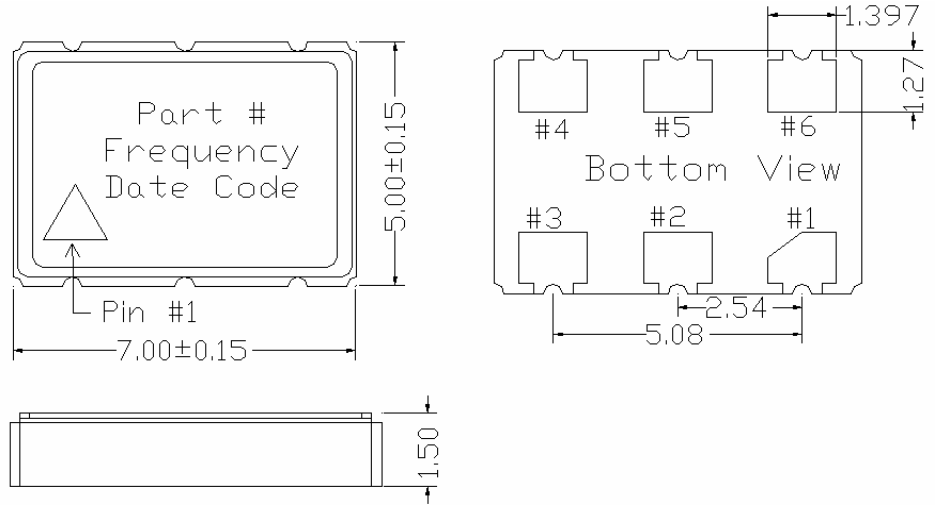


Figure 1. Output Waveform

Outline Diagram, Pad Layout and Pin Out



Contact Pad Plating: gold over nickel

Table 2. VCC6-LCx Pinout

Pin #	Symbol	Function
1	E/D	Tristate Function
2	NC	This pin has no internal connection and is floating.
3	GND	Ground
4	f_O	Output Frequency
5	Cf_o	Complementary Output Frequency
6	V_{DD}	Supply Voltage

Table 3. VCC6-LAx Pinout

Pin #	Symbol	Function
1	NC	This pin has no internal connection and is floating.
2	ED	Tristate Function
3	GND	Ground
4	f_O	Output Frequency
5	Cf_o	Complementary Output Frequency
6	V_{DD}	Supply Voltage

Tape and Reel

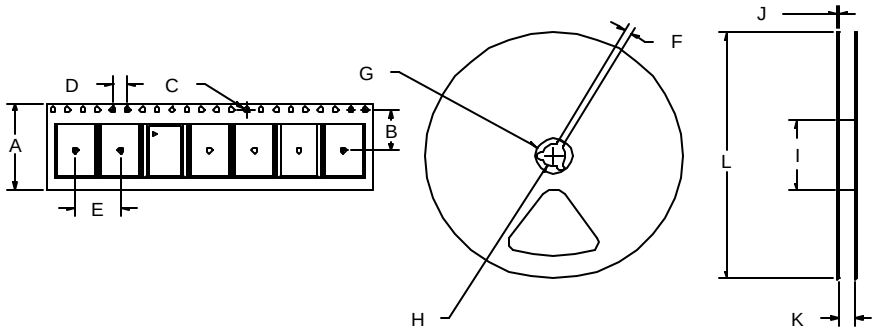


Table 4. Tape and Reel Dimensions (mm)

Tape Dimensions						Reel Dimensions							# Per
Product	A	B	C	D	E	F	G	H	I	J	K	L	Reel
VCC6	16	7.5	1.5	4	8	2	21	13	60	2	17	180	250

Enable/Disable Functional Description

Under normal operation the Enable/Disable is left open, or set to a logic high state, and the VCC6 is an oscillation mode with active outputs. When the E/D is set to a logic low, the oscillator stops and the both the output and complementary output are in a high impedance state. This helps facilitate board testing and troubleshooting.

Absolute 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 5. Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Power Supply	V_{DD}	-0.5 to +4.6	Vdc
Enable/Disable	V_{IN}	-0.5 to V_{DD}+0.5	Vdc
Storage Temperature	Tstorage	-55/125	°C

Reliability

The VCC6 qualification tests include the following:

Table 6. Environnemental 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
Moisture Sensitivity Level	MSL1

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 7. ESD Ratings

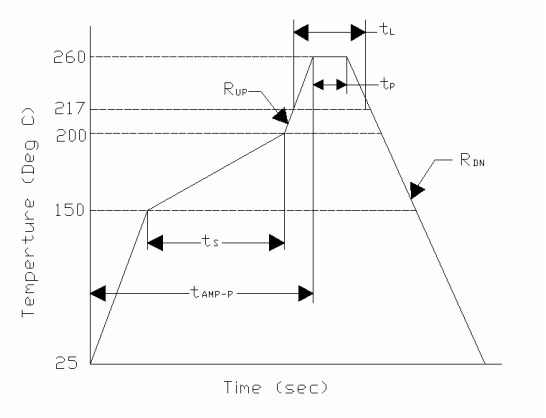
Model	Minimum	Conditions
Human Body Model	1000	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

Suggested IR profile

Table 8 shows max temperatures and lower temperatures can also be used e.g. peak temperature of 220C. Termination finish is gold over nickel. The VCC6 is hermetically sealed so an aqueous wash is not an issue.

Table 8. 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	15 sec Max
Ramp Down	R_{DN}	6 °C/sec Max



VCC6-L Output Frequencies > 270MHz

Frequencies (MHz)				
311.040	312.500	320.000	322.2656	332.000
333.000	350.000	400.000	446.000	472.000
500.000	600.000	622.080	625.000	644.5313
666.5413	669.3236	693.3265	693.4829	693.750
700.000	779.5686			

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 – 622M080

Product Family

Crystal Oscillator

Output

L: LVDS 3.3 Volts

Enable/Disable

A: E/D is on Pin 2, Pin 2 is a NC

C: E/D is on Pin 1, Pin 2 is a NC

Frequency

example: 622M080= 622.080 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

NOTE: Not all combinations are available.

A ±20ppm over -10 to 70°C, +3.3V, E/D on pin 1, VCC6-109-frequency, is available.

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VCC6-L >270MHz (REVISION DATE: Janaury26, 2007)