VECTRON
INTERNATIONAL
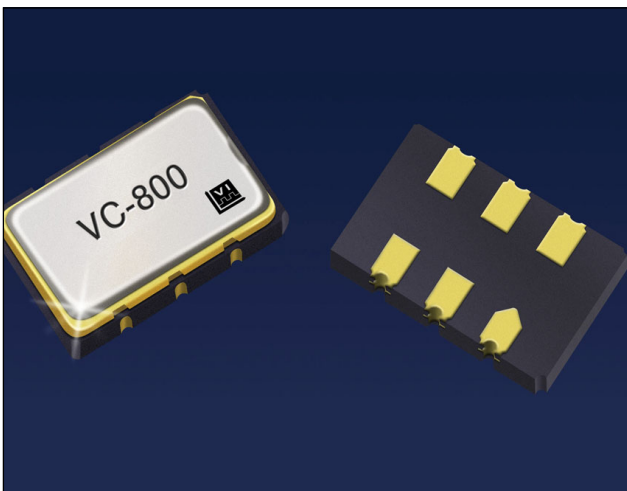### A ꭰDOVER TECHNOLOGIES COMPANY

VC-800
Voltage Controlled Crystal Oscillator

Features

- **Worlds Smallest VCXO, 5.0 x 3.2 x 1.5 mm**
- **High Frequencies to 51.84 MHz**
- **5 or 3.3 V operation**
- **Linearity ≤10%**
- **Tri-State Output**
- **Low jitter < 6ps rms**
- **VCXO with CMOS outputs**
- **0/70 or –40/85°C temperature range**
- **Hermetically sealed ceramic SMD package**

Applications

- **SONET/SDH**
- **DWDM**
- **xDSL/PCMCIA cards**
- **Digital Video**

Description

Vectron's VC-800 Voltage Controlled Crystal Oscillator (VCXO) is a quartz stabilized square wave generator with a CMOS output and is tested at CMOS and TTL (5 volt operation) logic levels.

The VC-800 is the smallest available VCXO making it ideally suitable for PCMCIA applications as well as any other where size is limited but performance is required.

ESD Diodes

Vc

Input Buffer

Output Buffer/ Tri-state

f_O
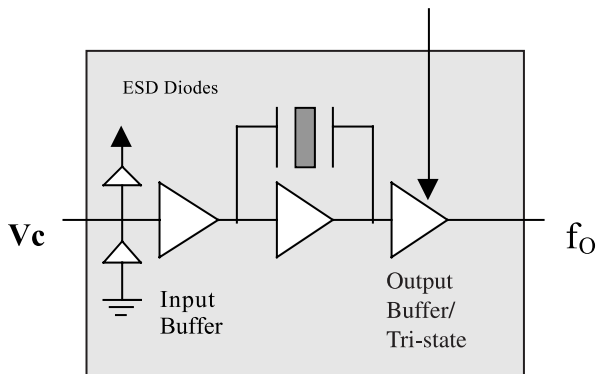
VC-800 Voltage Controlled Crystal Oscillator

Performance Characteristics

Electrical Performance

Parameter	Symbol	Minimum	Typical	Maximum	Units
Frequency	f_O	1.544		51.84	MHz
Supply Voltage[1] (+3.3 V)	V_{DD}	2.97	3.3	3.63	V
(+5.0 V)		4.5	5.0	5.5	
Supply Current	I_{DD}		12	25	mA
Output Logic Levels Output Logic High[2] Output Logic Low[2]	V_{OH} V_{OL}	$0.9*V_{DD}$		$0.1V_{DD}$	V
Transition Times Rise Time[2] Fall Time[2]	t_R t_F			5 5	ns ns
Symmetry or Duty Cycle[3]	SYM	40	50	60	%
Operating temperature (ordering option)		0/70 or −40/85			°C
Test Conditions for APR (+5V option)	V_C	0.5		4.5	V
Test Conditions for APR (+3.3V option)	V_C	0.3		3.0	V
Absolute Pull Range (ordering option)	APR	+/-50 +/- 80			ppm
Gain Transfer (See Figure 3)		Positive			
Control Voltage Leakage Current	I_{VCXO}			±1	uA
Control Voltage Bandwidth (-3dB)	BW	10			kHz
Package Size		5.0 x 3.2 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. Figure 2 illustrates the equivalent five gate TTL load and operating conditions under which these parameters are tested and specified.

3. Symmetry is defined as (ON TIME/PERIOD with Vs = 1.4 V for TTL and Vs=2.5 V for CMOS, 5 volt operation, and Vs=1.65V for 3.3 Volt operation.

4. Load Capacitor will depend on frequency.

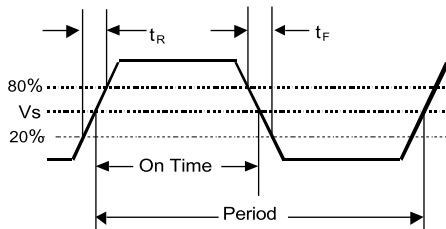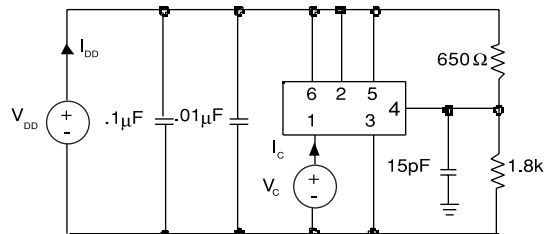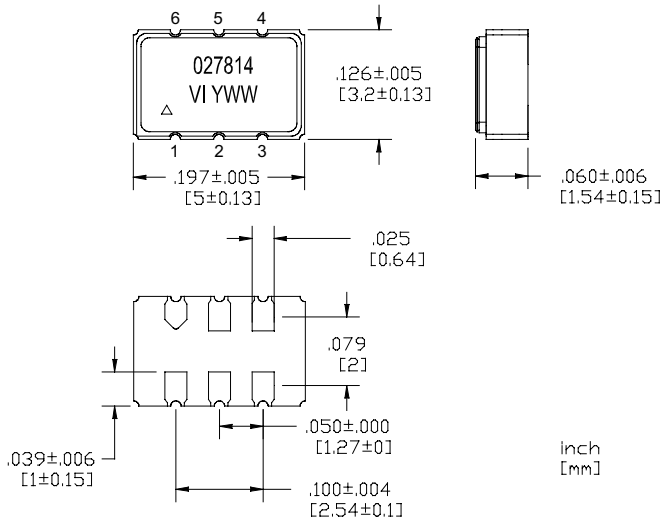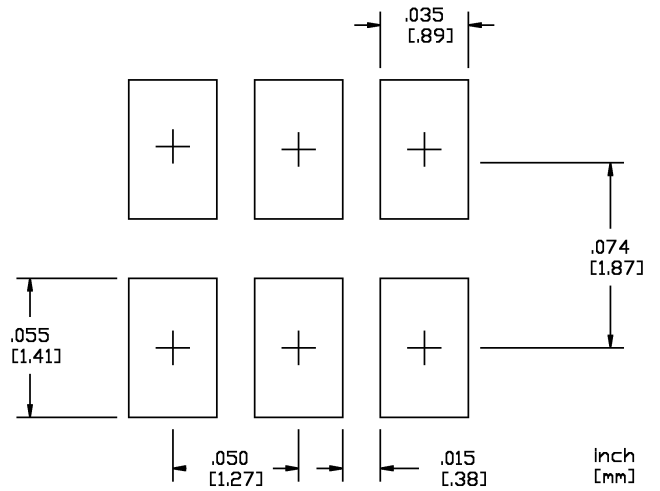**Figure 1. Output Waveform Conditions (25±5°C)**

Figure 2. Typical Output Test

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Outline Diagram

Pad Layout

Pin Out

Pin #	Symbol	Function
1	VC	Control Voltage
2	Tri-state	Logic low disables output. Logic high or N/C enables output waveform.
3	GND	Ground
4	fo	Output Frequency
5	CMOS/TTL	Logic low for CMOS optimized symmetry. Logic high or N/C for TTL optimized symmetry.
6	V_{DD}	Supply Voltage

Tape and Reel
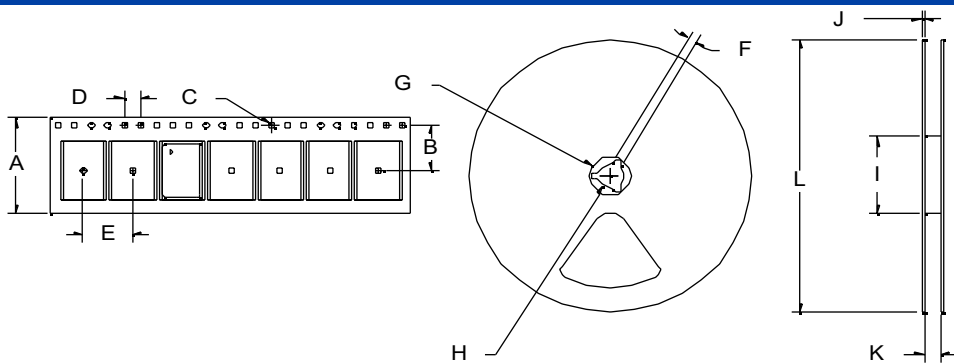
Tape and Reel Dimensions (mm)

Tape Dimensions					Reel Dimensions							# Per Reel
Product	A	B	C	D	E	F	G	H	I	J	K	L	
VC-800	12	5.5	1.5	4	8	1.78	20.6	13	55	6	12.4	178	500

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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.

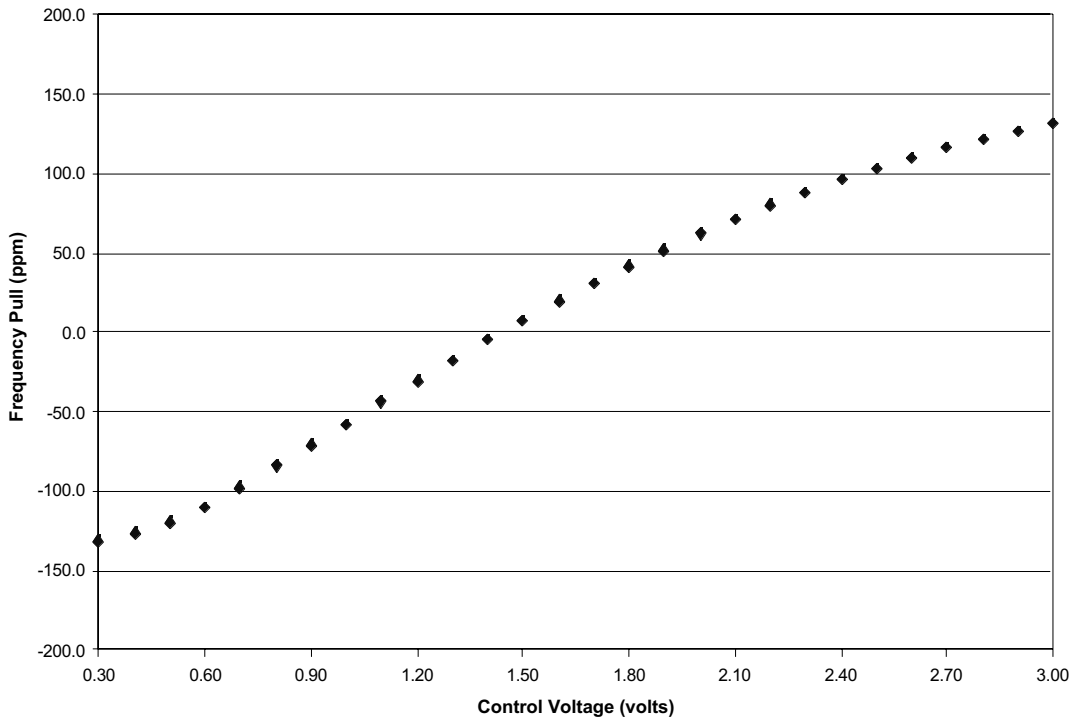| Parameter	Symbol	Ratings	Unit
Power Supply	V_{DD}	6	Vdc
Storage Temperature	Tstorage	-55/125	°C
Voltage Control Range	V_C	0 to V_{DD}	V

Figure 3. Typical Frequency Pull Versus Control Voltage, 35.328MHz Output, 3.3 Volt Supply

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Reliability

The VC-800 is capable of meeting the following qualification tests.

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 VC-800, 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.

ESD Ratings

Model	Minimum	Conditions
Human Body Model	1500	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

Recommended Solder Reflow Profile
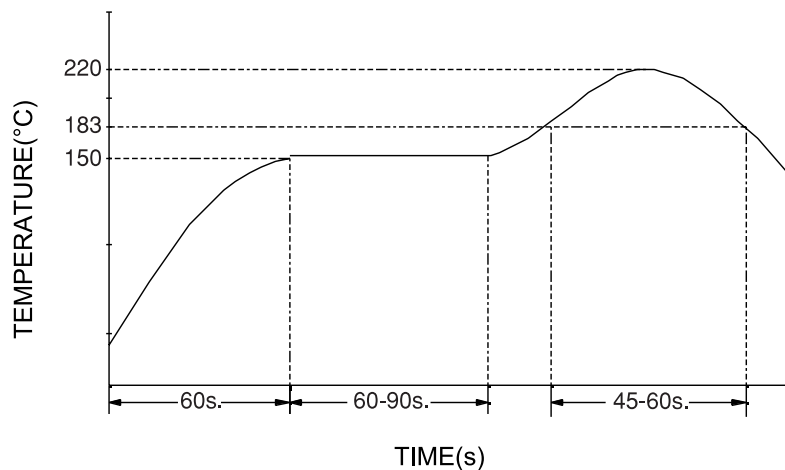
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Standard Frequencies - MHz

4.096	8.192	12.960	13.500	16.000
16.384	17.664	25.920	27.000	32.000
32.768	35.328	44.736	51.840	

Other frequencies may be available upon request

Ordering Information

VC-800 — K A C — G T J — XX.XXX MHz

Product Family
VC=VCXO

Package
800: 5.0 x 3.2 x 1.5 mm

Input
K: 5.0V (±10%)
L: 3.3V (±10%)

Output
A: CMOS

Frequency

Symmetry
J: 50 ±5%
K: 50 ±10%

Tri-state
T: Pin #2

Absolute Pull Range
G: ±50 ppm
N: ±80 ppm

Temperature Range
C: 0 to 70°C
F: -40 to 85°C
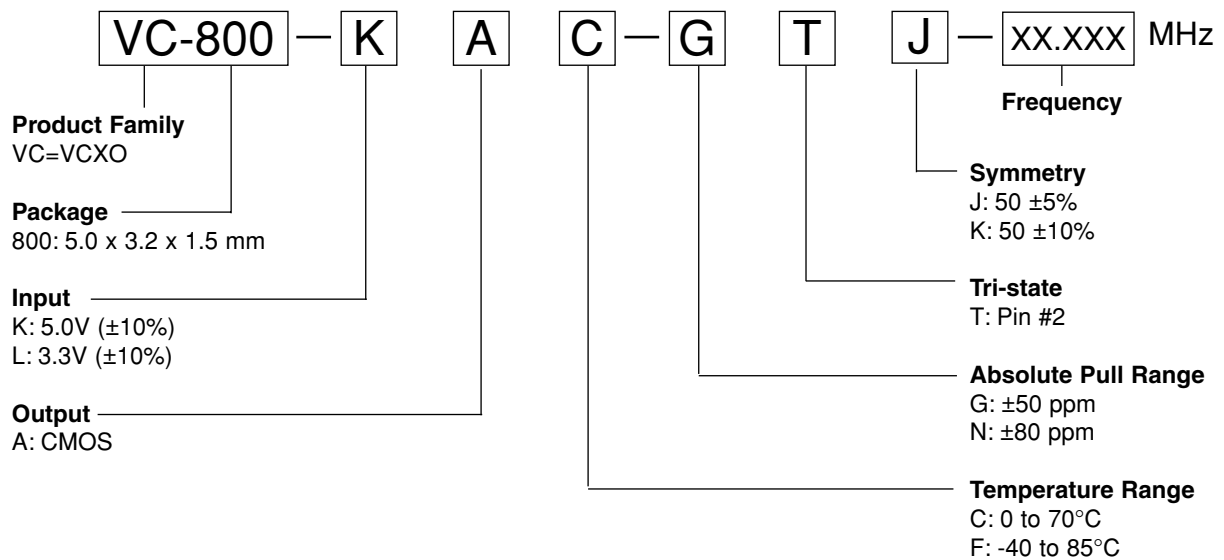
NOTE: Not all combinations of options are available.

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