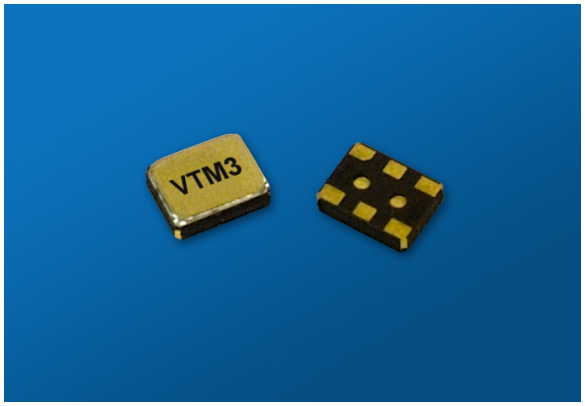
VTM3 series

Voltage Controlled Temperature Compensated Crystal Oscillator



The VTM3, VCTXCO

Features

- Small 3.2x2.5 package size
- Clipped Sine Wave Output
- Output Frequencies to 45 MHz
- Fundamental Crystal Design
- Optional VCXO Function available
- Gold over nickel contact pads
- Hermetically Sealed Ceramic SMD package
- Product is compliant to RoHS directive and fully compatible with lead free assembly

Applications

- GPS
- WiMAX, Wi-Fi, Wi-LAN
- Seismic Exploration
- Point to point radios
- Broadband Access
- Test Equipment
- PDA's

Description

Vectron's VTM3 Temperature Compensated Crystal Oscillator (TCXO) is a quartz stabilized, clipped sine wave output, analog temperature compensated oscillator, operating off either a 2.8, 3.0, or 3.3 volt supply.

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Performance Characteristics

Table 1. Electrical Performance

Parameter	Symbol	Min	Typical	Maximum	Units
Frequency	f_O	8.000		45.000	MHz
Typical Supply Voltage[1] *Ordering option, see last page*		2.8, 3.0, or 3.3			Vdc
Supply Current 8.000 MHz to < 20.000 MHz 20.000 MHz to < 32.00 MHz 32.000 MHz to 45.00 MHz	I_{DD}			 1.5 2.0 2.5	mA
Output Level[2]	Vp/p	0.8			V
Output Load			10K II 10pf		
Control Voltage Impedance	Z_{Vc}	500			Kohm
Control Voltage to reach pull *All options (3.3,3.0 and 2.8V)*		 0.5		 2.5	V
Pull Range *Ordering option, see last page*	TPR	±5, ±8, ±10, ±15			ppm
Temperature Stability *Ordering option, see last page.*		±0.5 to ±5.0			ppm
Initial Accuracy, "No Adjust" option			±0.5	±1.0	ppm
Power Supply Stability				±0.2	ppm
Load Stability				±0.2	ppm
Aging				±1.0	ppm/year
Operating temperature *Ordering option, see last page*		0/55, -10/60, -20/70, -30/80, -40/85			°C
Phase Noise, 12.000MHz 10 Hz offset 100 Hz offset 1 kHz offset 10 kHz offset 100 kHz offset 1 MHz offset 5 MHz offset			 -89 -117 -135 -148 -153 -154 -155		dBc/Hz
Start-up time				2	ms

1. A 0.01uF and a 0.1uF capacitor should be located as close to the supply as possible (to ground) is recommended.
2. Output is DC coupled.

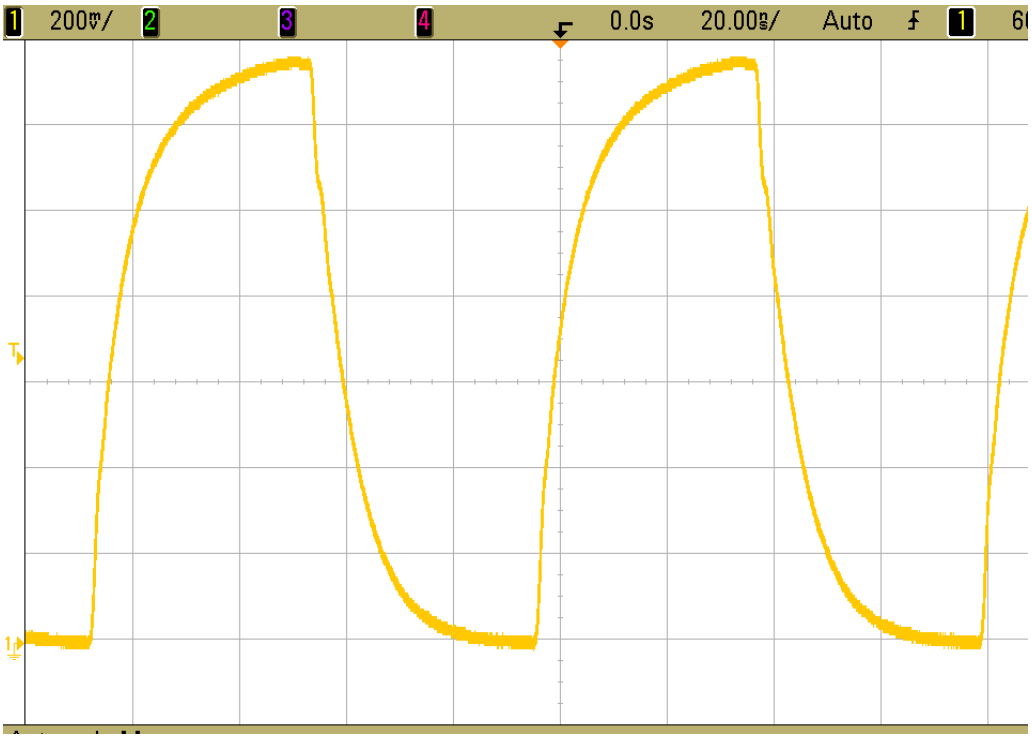


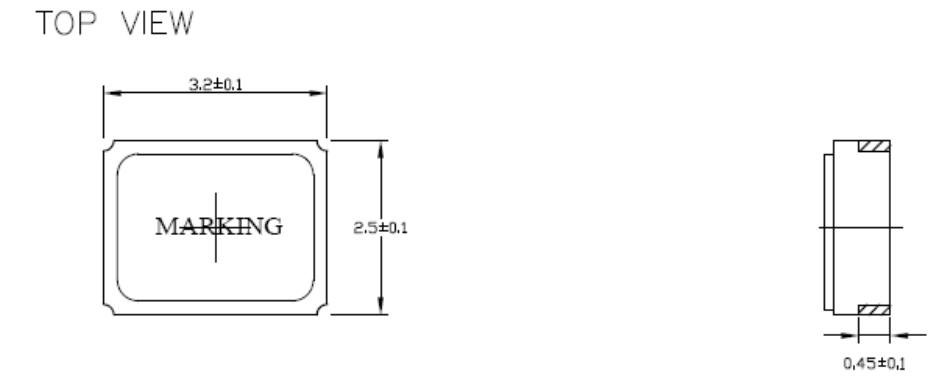
Figure 2. Clipped Sine Wave Output

VCXO Functional Description

VCXO Feature: The VTM3 can be ordered with a VCXO function for applications where it will be used in a PLL, or the output frequency needs fine tune adjustments. This is a high impedance input, 0.5 Mohm, and can be driven with an op-amp or terminated with adjustable resistors etc. **Pin 1 should not be left floating** on the VCXO optional devices.

"No Adjust" Feature: In applications where the VTM3 will not be used in a PLL, or the output frequency does not fine tune adjustments, the best device to use would be a VTM3-x0xx. By using the "no adjust" option, the circuit is simplified as Vc does not need to adjusted or set to a predetermined voltage and **pin 1 should be grounded** (pin 1 can be left open but should not be set to a voltage such as the supply).

Outline Diagrams, Pad Layout and Pin Out

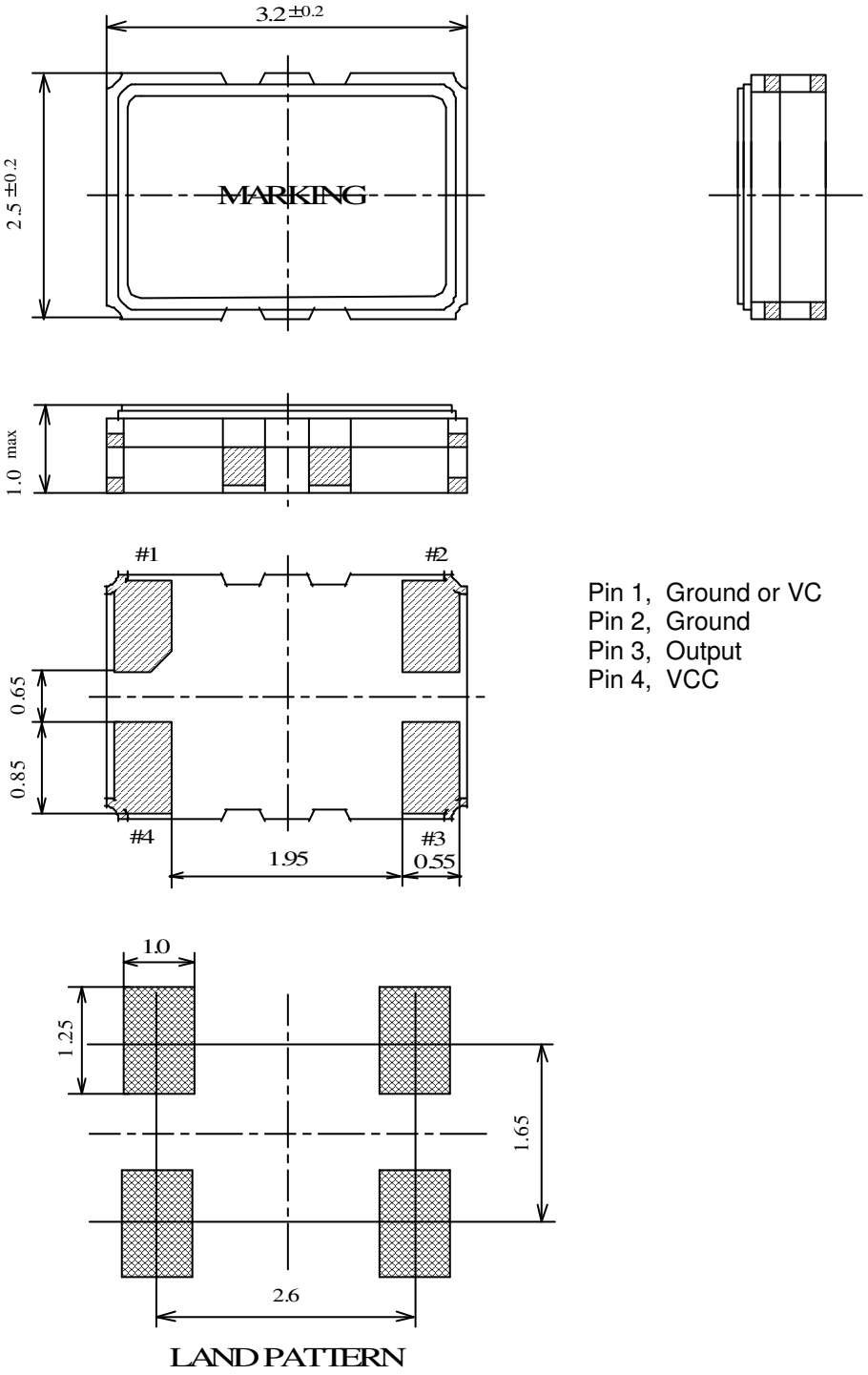


Pin 1, Ground or VC
Pin 2, NC
Pin 3, Ground
Pin 4, Output
Pin 5, NC
Pin 6, VCC
Pin 7, NC
Pin 8, NC

Contact Pads are gold over nickel
Devices will be marked with the frequency

Pin 2,5,6,7,8 are used to program and adjust the TCXO during manufacturing and should be left open; do not terminate these to the supply voltage and are a “make no connection” pad.

Figure 3, Package drawing



Pin 1, Ground or VC
Pin 2, Ground
Pin 3, Output
Pin 4, VCC

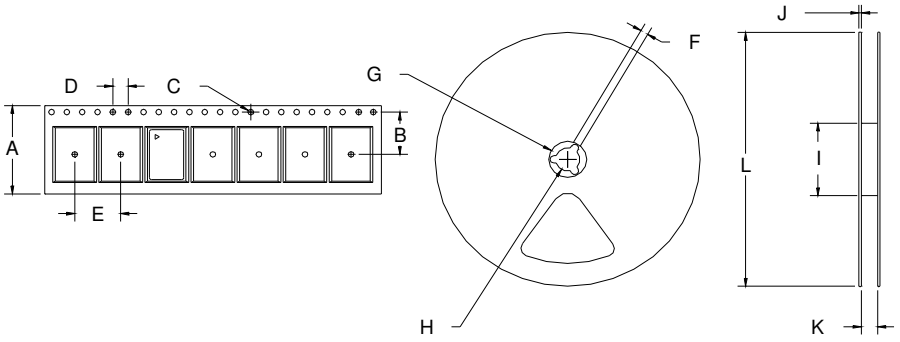
Contact Pads are gold over nickel
Devices will be marked with the frequency

Figure 4, Package drawing for ±0.5ppm over -30/80℃ and <±2ppm over -40/85℃

Tape and Reel

Table 3. Tape and Reel Dimensions (mm)

Tape Dimensions						Reel Dimensions							# Per
Product	A	B	C	D	E	F	G	H	I	J	K	L	Reel
VTM3	8	1.75	1.55	4	4	2.5	22	13	60	1.75	11.5	178	1000



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 4. Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Storage Temperature	Tstorage	-40/85	°C

Reliability

The VTM3 qualification tests have included:

Table 5. Environnemental Compliance

Parameter	Conditions
Mechanical Shock	MIL-STD-883 Method 2002
Mechanical Vibration	MIL-STD-883 Method 2007
Temperature Cycle	MIL-STD-883 Method 1010
Solderability	MIL-STD-883 Method 2003
Gross and Fine Leak	MIL-STD-883 Method 1014
Resistance to Solvents	MIL-STD-883 Method 2015
Moisture Sensitivity Level	1
Contact Pads	Gold over Nickel

Handling Precautions

Although ESD protection circuitry has been designed into the the VTM3, 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 6. ESD Ratings

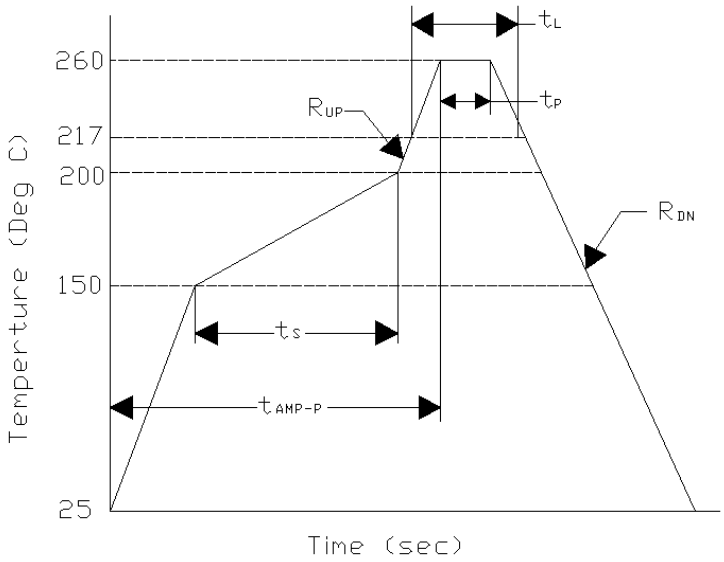
Model	Minimum	Conditions
Human Body Model	1000	MIL-STD-883 Method 3115
Charged Device Model	1000	JESD 22-C101

Suggested IR profile

Devices are built using lead free epoxy and can also be subjected to standard lead free IR reflow conditions, Table 7 shows max temperatures and lower temperatures can also be used e.g. peak temperature of 220C.

Table 7. Reflow Profile (IPC/JEDEC J-STD-020)

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
Time At 240 °C (max)	t_{p2}	60 sec Max
Ramp Down	R_{DN}	6 °C/sec Max



Ordering Information

Table 8. Standard Frequency List

10.000	12.000	12.800	13.000	13.568	14.000	14.7456	16.000
16.367	16.367667	16.367673	16.368	16.369	16.376	16.800	19.200
19.440	19.6608	19.680	20.000	23.104	24.5535	25.000	26.000
27.456	32.000	39.000					

VTM3 - B 0 2 C - 12M800

Product Family

TCXO, 3.2 x 2.5

Voltage Options

B: +3.3 Vdc ±5%, Clipped Sine Output

C: +3.0 Vdc ±5%, Clipped Sine Output

D: +2.8 Vdc ±5%, Clipped Sine Output

Pulling Range

0: Fixed TCXO, no adjust

1: ±5ppm

2: ±8ppm

3: ±10ppm

4: ±15ppm

Note: Not all combinations are available

Output Frequency

In MHz

Temperature Options

A: 0 to 55°C

B: -10 to 60°C

C: -20 to 70°C

D: -30 to 80°C

E: -40 to 85°C

Stability Options

A: ±0.5ppm

1: ±1.0ppm

B: ±1.5ppm

2: ±2.0ppm

C: ±2.5ppm

3: ±3.0ppm

D: ±3.5ppm

4: ±4.0ppm

5: ±5.0ppm

Vectron a Knowles company

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