VT-820

Temperature Compensated Crystal Oscillator
Previous Vectron Model VTM3

Description

Vectron's VT-820 Temperature Compensated Crystal Oscillator (TCXO) is a quartz stabilized, clipped sine wave output, analog temperature compensated oscillator, operating off either 1.8, 2.8, 3.0 or 3.3 volt supply in a hermetically sealed 3.2x2.5mm ceramic package.

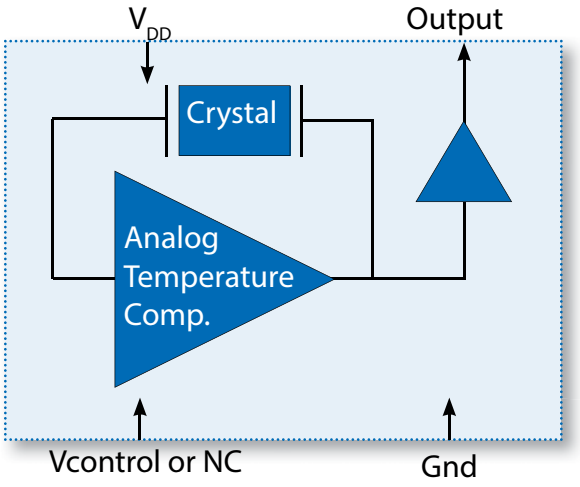
Features

- **±0.5ppm Temperature Stability**
- Clipped Sine Wave Output
- Output Frequencies to 50 MHz
- Fundamental Crystal Design
- Optional VCXO Function available
- 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
- Wireless Communications
- Base Stations
- Point to point radios
- Broadband Access
- Test Equipment
- Handsets

Block Diagram



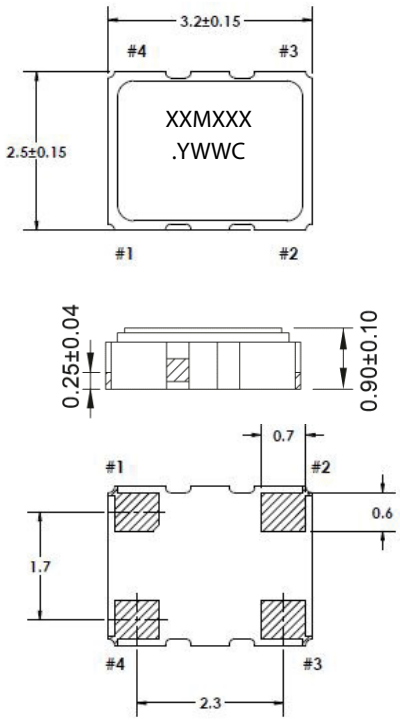
Specifications

Table 1. Electrical Performance

Parameter	Symbol	Min.	Typ	Max	Units
Output Frequency	f_O	8		45	MHz
Supply Voltage,[1] (Ordering Option)	V_{DD}	+1.8, 2.8, +3.0 or +3.3			V
Supply Current, 8 to 19.999MHz 20.000 to 31.9999MHz 32.000 to 45.000MHz	I_{DD}			1.5 2.0 2.5	mA
Operating Temperature, (Ordering Option)	T_{OP}	-20/70, -30/80, -40/85			°C
Stability Over T_{OP}, (Ordering Option)		±0.5, ±1.0, ±1.5, ±2.0, ±2.5			ppm
Initial Accuracy[2], "No Adjust" Option				±1.0	ppm
Power Supply Stability, ±5% change				±0.2	ppm
Load Stability				±0.2	ppm
Aging				±1.0	ppm/yr
Pull Range, (Ordering Option)	TPR	±5, ±10			ppm
Control Voltage to reach Pull Range 1.8V option		0.5 0.3		2.5 1.5	V V
Control Voltage Impedance		500			Kohm
Output Level[3]	V_O p/p	0.8			V
Output Load				10K II 10pF	
Phase Noise[4], 10.000MHz 10Hz 100Hz 1kHz 10kHz 100kHz			 -91 -116 -137 -149 -150		dBc/Hz
Start Up Time				2	ms

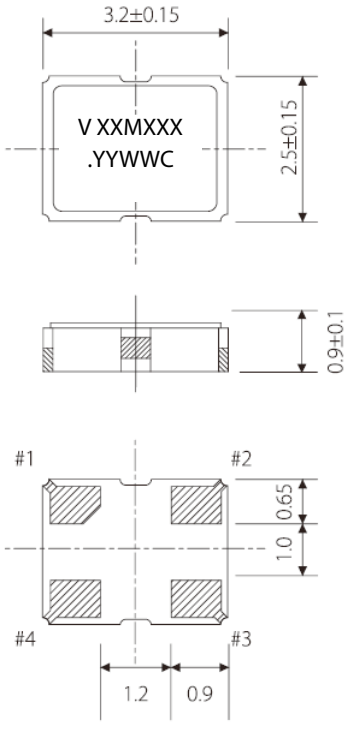
1. The VT-820 power supply pin should be filtered, eg, a 0.1 and 0.01uf capacitor.
2. Initial Accuracy is before IR reflow. Allow another 1ppm shift through 2 reflows and 24 hours.
3. The Output is DC coupled.
4. Measured at room ambient temperature using an Agilent E5052 Signal Source Analyzer.

Outline Drawing



Dimensions in mm

Marking
XXMXXX
XXMXXX = Frequency
.YWWC
YY = Year
WW = Week
C = Manufacturing Location

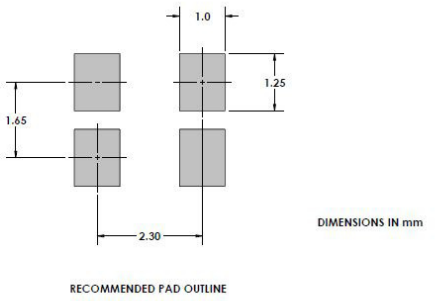


Primary Package

Marking
V XXMXXX
V = Vectron
XXMXXX = Frequency
.YYWWC
YY = Year
WW = Week
C = Manufacturing Location

Pinout and Recommended Pad Layout

Table 2. Pinout		
Pin #	Symbol	Function
1	V_C	TCXO Control Voltage or Ground
2	GND	Electrical and Lid Ground
3	f_o	Output Frequency
4	V_{DD}	Supply Voltage



VCXO Function

VCXO Feature: The VT-820 can be ordered with a VCXO function for applications were it will be used in a PLL, or the output frequency needs fine tune or calibration adjustments. This is a high impedance input, 500KMohm, 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 device.**

"No Adjust" Option: In applications were the VT-820 will not be used in a PLL, or the output frequency does not need fine tune adjustments, the best device to use would be a VT-820-xxx-xxx0. By using the "no adjust" option, the circuit is simplified as Vc does not need to be 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 an RF signal or power supply voltage.

Maximum Ratings

Absolute Maximum Ratings and Handling Precautions
Stresses in excess of the absolute maximum ratings can permanently damage the device. Functional operation is not implied or any other 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.

Although ESD protection circuitry has been designed into the VT-820, proper precautions should be taken when handling and mounting, Vectron employs a Human Body Model and Charged Device Model for ESD susceptibility testing and design evaluation.
ESD thresholds are dependent on the circuit parameters used to define the model. Although no industry standard has been adopted for the CDM a standard resistance of 1.5kOhms and capacitance of 100pF is widely used and therefor can be used for comparison purposes.

Table 3. Maximum Ratings			
Parameter	Symbol	Rating	Unit
Storage Temperature	T_{STORE}	-40/85	ºC
Supply Voltage	V_{DD}	6	V
Control Voltage	V_C	0/V_{DD}	V
ESD, Human Body Model		1000	V
ESD, Charged Device Model		1000	V

Table 4. Environmental Compliance	
Parameter	Condition
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
Fine and Gross Leak	MIL-STD-883 Method 1014
Resistance to Solvents	MIL-STD-883 Method 2015
Moisture Sensitivity Level	MSL1
Contact Pads	Gold (0.3um min -1.0um max) over Nickel
Weight	26 mg

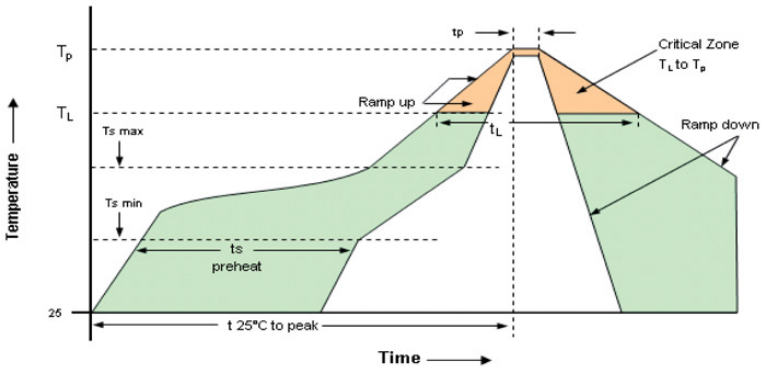
IR Compliance

Suggested IR Profile

Devices are built using lead free epoxy and can be subjected to standard lead free IR reflow conditions shown in Table 5. Contact pads are gold over nickel and lower maximum temperatures can also be used, such as 220C.

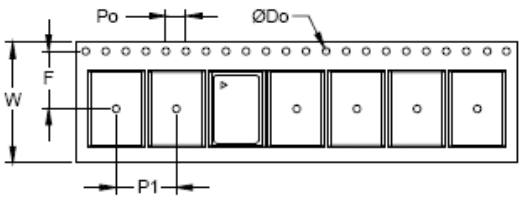
Table 5. Reflow Profile		
Parameter	Symbol	Value
PreHeat Time	ts	200 sec Max
Ramp Up	R_{UP}	3°C/sec Max
Time above 217°C	tL	150 sec Max
Time to Peak Temperature	tAMB-P	480 sec Max
Time at 260°C	tP	30 sec Max
Time at 240°C	tP2	60 sec Max
Ramp down	R_{DN}	6°C/sec Max

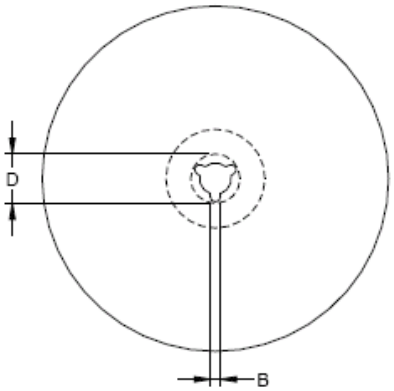
Solderprofile:



Tape and Reel

Table 10 . Tape and Reel Dimensions													
Tape Dimensions (mm)						Reel Dimensions (mm)							
Dimension	**W**	**F**	**Do**	**Po**	**P1**	**A**	**B**	**C**	**D**	**N**	**W1**	**W2**	**# Per Reel**
Tolerance	**Typ**	**Typ**	**Typ**	**Typ**	**Typ**	**Typ**	**Min**	**Typ**	**Min**	**Min**	**Typ**	**Max**	
VT-820	8	3.5	1.5	4	4	178	2	13	21	60	10	14	3000





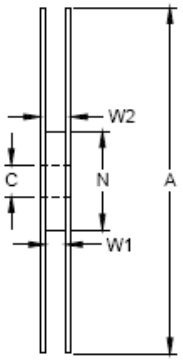


Table 7. Standard Frequencies (MHz)									
9.216	10.000	12.000	12.288	13.000	14.400	14.7456	15.360	16.000	16.368
16.369	16.384	16.386	19.200	20.000	21.500	22.5792	24.760	25.000	26.000
27.000	28.800	30.000	32.000	38.400	39.000	40.000	43.000	44.000	44.545
50.000									

Ordering Information

VT-820- E F G - 206 A- xxMxxxxxxXX

Product
TCXO

Package
3.2x2.5 mm Ceramic

Voltage Options,
E: +3.3 Vdc ±5%,
F: +3.0 Vdc ±5%
G: +2.8 Vdc ±5%
J: +1.8 Vdc ±5%

Output
F: Clipped Sine Wave

Temp Range
J: -20/70°C
G: -30/80°C
E: -40/85°C

Stability
507: ±0.5ppm
106: ±1ppm
156: ±1.5ppm
206: ±2.0ppm
256: ±2.5ppm

Tuning
0: Fixed, No tuning
A: ±5ppm
C: ±10ppm

Frequency in MHz

Packaging
TR: Tape and Reel
blank: Cut Tape / non Tape and Reel quantities
_SNPB: Tin lead solder dipped

**Note: not all combination of options are available.*
Other specifications may be available upon request.

Example:

VT-820-EFE-5070-24M5760000TR	**Tape and Reel**
VT-820-EFE-5070-24M5760000	**Cut Tape**
VT-820-EFE-5070-24M5760000_SNPB	**Tin lead solder dipped**

Revision Date	Description
10/21/2009	Add J=1.8V option, Vc=0.3 1.6V for 1.5Voption in table 1
8/08/2013	Removed 6pd package version (non-standard). Added two 4-pd package versions.
10/29/2013	Updated VI Asia Contact Information
02/11/2014	Updated new Vectron Logo and Hudson Address
01/17/2017	Updated IR Reflow Profile
08/10/2018	Update logo and contact information, optimize pad layout, add "SNPBDIP" ordering option
04/05/2019	Update logo and contact information, update package informtion, optimize pad layout, update frequency table, update ordering options, change "SNPBDIP" to "SNPB".
04/2020	Add tape and reel ordering option

Previous Ordering Information for Reference Only
Do Not Use to Build a New Part Number

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

The ordering codes for the VTM3 were changed in 2016. If you had ordered a specific code based off this ordering method, it is still available for purchase under the old code however no new part numbers will be created using this system.

Due to the change in the 8th character from numeric to alphabetic, there is no opportunity for overlap between the two ordering methods.

Contact Information

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