VT-800

Temperature Compensated Crystal Oscillator
Previous Vectron Model VTC4

Description

Vectron's VT-800 Temperature Compensated Crystal Oscillator (TCXO) is a quartz stabilized, clipped sine wave output, temperature compensated oscillator, operating off either 2.8, 3.0, 3.3 or 5.0 volt supply, hermetically sealed 5x3.2 mm ceramic package.

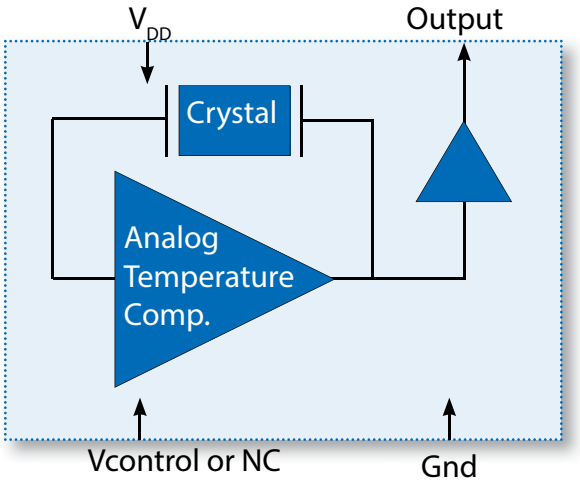
Features

- Clipped Sine Wave Output
- Output Frequencies to 40 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

- Wireless Communications
- Base Stations
- Point to point radios
- Broadband Access
- Test Equipment
- Handsets

Block Diagram

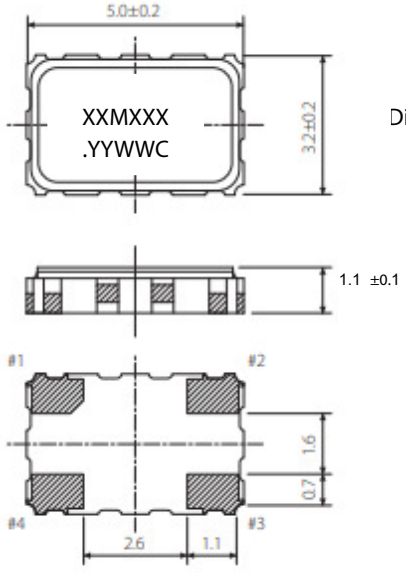


Specifications

Table 1. Electrical Performance					
Parameter	Symbol	Min.	Typ	Max	Units
Output Frequency, +5V option +2.8, +3.0, +3.3V options	f_O	10 10		27 40	MHz
Supply Voltage[1]	V_{DD}	+2.8, +3.0, +3.3 or +5.0			V
Supply Current, 10 to 14.999MHz 15.000 to 25.999MHz 26.000 to 40.000MHz	I_{DD}			1.5 2.0 2.5	mA
Operating Temperature, *ordering option*	T_{OP}	0/55, -10/60, -20/70, -30/80, -40/85			°C
Stability Over T_{OP}, *ordering option*		±0.5, ±1.0, ±1.5, ±2.0, ±2.5, ±3.0, ±4.0, ±5.0			ppm
Initial Accuracy[2], " No Adjust" Option				±1.0	ppm
Power Supply Stability				±0.2	ppm
Load Stability				±0.2	ppm
Aging				±1.0	ppm/yr
Pull Range, *ordering option*	TPR	±5.0, ±8.0, ±10.0, ±12.0			ppm
Control Voltage to Reach Pull Range		0.5		2.5	V
Control Voltage Impedance		1			Mohm
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				10	ms
Package		5.0x3.2x1.5			mm

1. The VT-800 power supply pin should be filtered, eg, a 0.1 and 0.01uf capacitor
2. Intial Accuracy is before IR reflow. Allow an additional ±1ppm shift through 2 reflows, after 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 = Frequency
.YY = Year
WW = Week
C = Manufacturing Location

Recommended Pad Layout

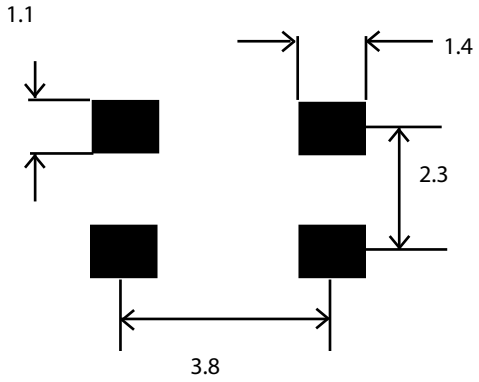
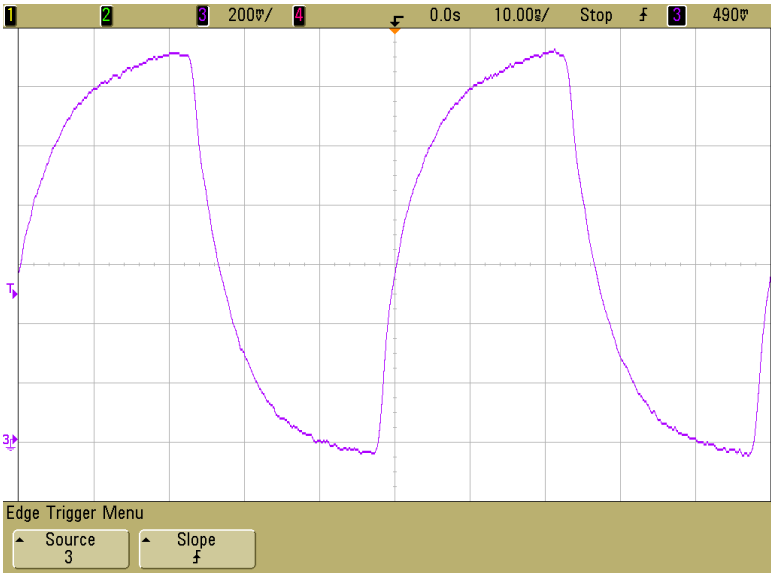


Table 2. Pinout		
Pin #	Symbol	Function
1	V_C	TCXO Control Voltage or No Connect
2	GND	Electrical and Lid Ground
3	f_o	Output Frequency
4	V_{DD}	Supply Voltage

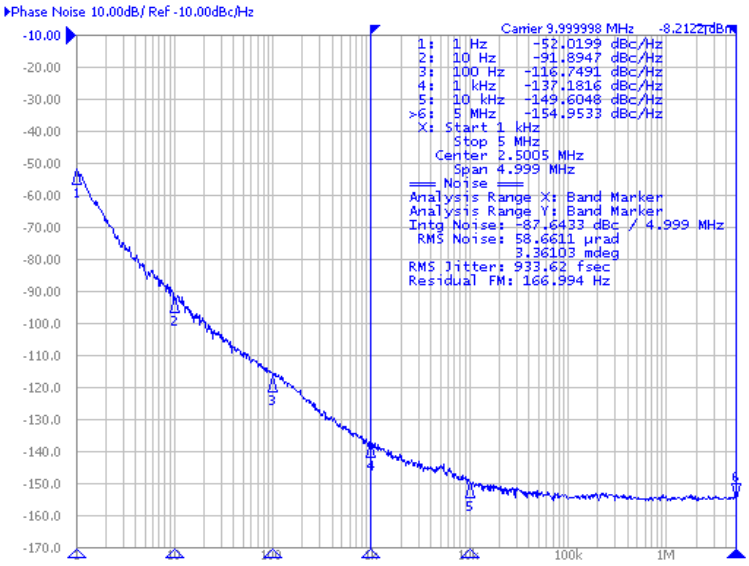
VCXO Feature: The VT-800 can be ordered with a VCXO function for applications were it will be used in a PLL, or the output frequency needs fine tune or calibration adjustments. This is a high impedance input , 1Mohm, and can be driven with an op-amp or terminated with adjustable resistors etc. **Pin 1 should not be left floating on the VCXO optional device.**

"No Adjust" Option: In applications were the VT-800 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-800-xxx-xxx0. By using the "no adjust" option, the circuit is simplified as V_C 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.)

Clipped Sine Wave Output



Phase Noise at 10MHz



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-800, proper precautions should be taken when handling and mounting, VI 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}	-55/125	ºC
Supply Voltage	V_{DD}	-0.6/6	V
Control Voltage	V_C	-0.6/V_{DD}+0.6	V
ESD, Human Body Model		1500	V
ESD, Charged Device Model		1000	V

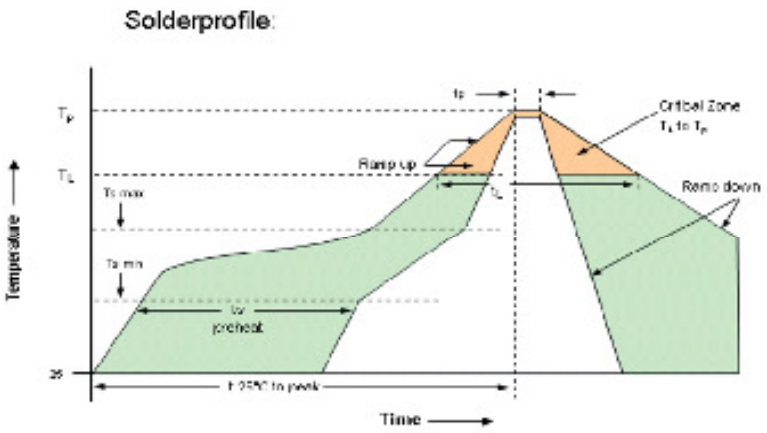
Table 4. Environmental Compliance	
Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002
Mechanical Vibration	MIL-STD-883 Method 2007
Temperature Cycle	MIL-STD-883 Method 1010
Solderability	MIL-STD-883 Method 2003
Fine and Gross Leak	MIL-STD-883 Method 1014
Resistance to Solvents	MIL-STD-883 Method 2015
Moisture Sensitivity Level	MSL1
Contact Pads	Gold (0.3um min - 1.0um max) over Nickel
Weight	60 mg

IR Compliance

Suggested IR Profile

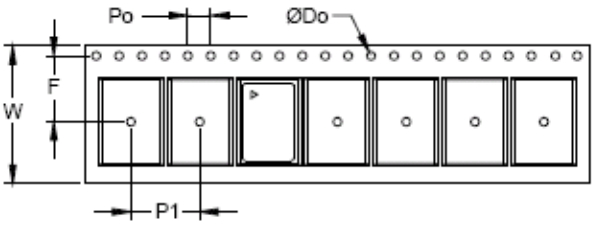
Devices are built using lead free epoxy and can be subjected to standard lead free IR reflow conditions shown in Table 5. Contact pads are gold over nickel and lower maximum temperatures can also be used, such as 220C.

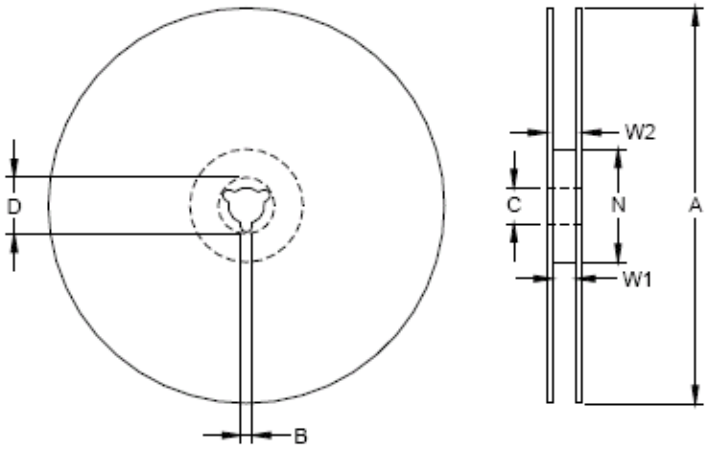
Table 5. Reflow Profile		
Parameter	Symbol	Value
PreHeat Time	ts	200 sec Max
Ramp Up	R_{UP}	3°C/sec Max
Time above 217°C	tL	150 sec Max
Time to Peak Temperature	tAMB-P	480 sec Max
Time at 260°C	tP	30 sec Max
Time at 240°C	tP2	60 sec Max
Ramp down	R_{DN}	6°C/sec Max



Tape & Reel

Table 6. Tape and Reel Information												
Tape Dimensions (mm)					Reel Dimensions (mm)							
W	F	Do	Po	P1	A	B	C	D	N	W1	W2	#/Reel
12	7.5	1.5	4	8	180	1.5	13	20.2	60	16.4	20.4	1000





Ordering Information

Table 7. Standard Frequencies (MHz)									
10.000	10.245	12.504	12.800	13.000	13.568	14.000	14.31818	14.4844	14.7456
15.000	16.000	16.325291	16.36625	16.367667	16.3683	16.396	16.800	17.500	18.414
19.200	19.440	19.6608	19.680	19.800	20.000	20.910	21.250	23.104	24.000
24.5454	24.5535	24.576	25.000	25.600	26.000	27.000	27.456	28.800	32.768
40.000									

VT-800- E F G - 206 A- xxMxxxxxxXX

Product
TCXO

Package
5.0x3.2 mm Ceramic

Voltage Options
D: +5.0 Vdc ±5%
E: +3.3 Vdc ±5%
F: +3.0 Vdc ±5%
G: +2.8 Vdc ±5%

Output
F: Clipped Sine Wave

Temp Range
R: 0/55 °C
K: -10/60 °C
J: -20/70 °C
G: -30/80 °C
E: -40/85 °C

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

Stability
507: ±0.5ppm
106: ±1.0ppm
156: ±1.5ppm
206: ±2.0ppm
256: ±2.5ppm
306: ±3.0ppm
356: ±3.5ppm
406: ±4.0ppm
506: ±5.0ppm

Tuning
0: Fixed, No tuning
A: ±5ppm
B: ±8ppm
C: ±10ppm
D: ±12ppm

Frequency in MHz

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

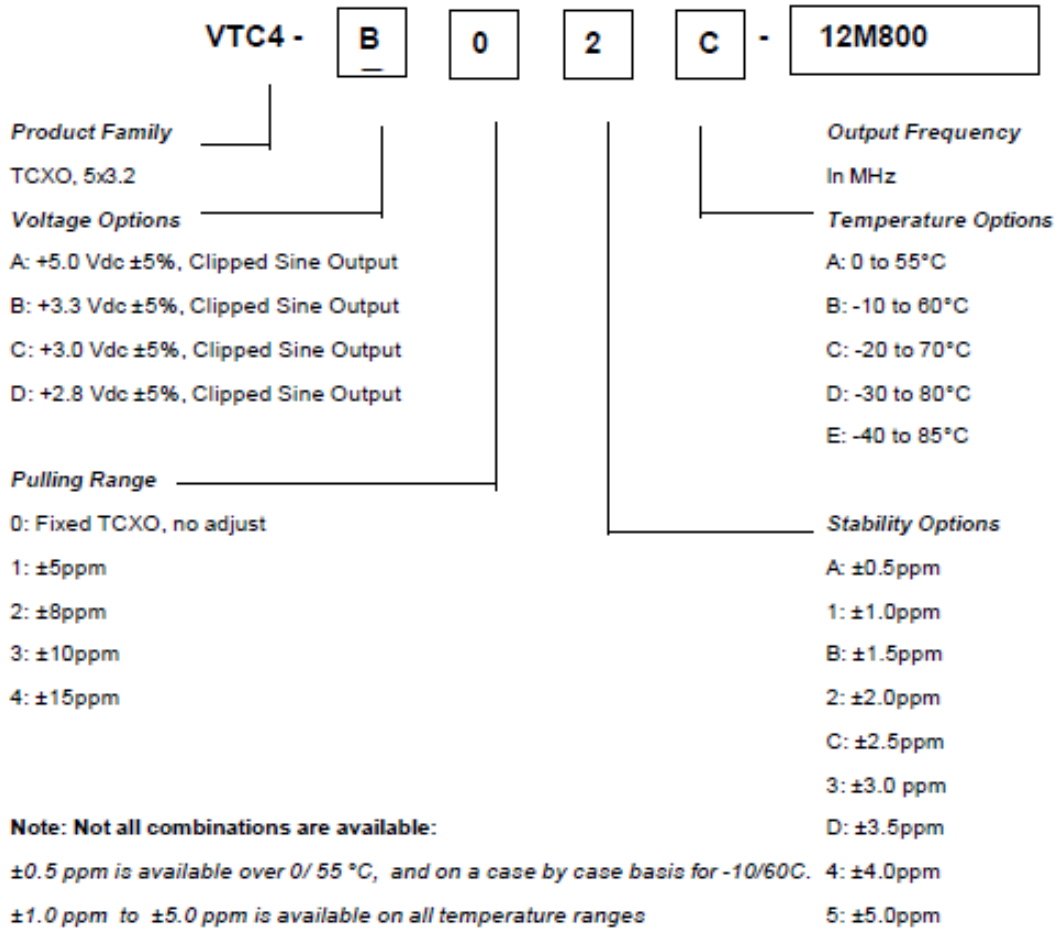
Example:

VT-800-EFE-2060-24M5760000TR	**Tape and Reel**
VT-800-EFE-2060-24M5760000	**Cut Tape**
VT-800-EFE-2060-24M5760000_SNPB	**Tin lead solder dipped**

Revision History

Revision Date	Approved	Description
Aug 10, 2018	FB	Update logo and contact information, add "SNPBDIP" ordering option
June 10, 2019	FB	Update logo and contact information, change "SNPBDIP" ordering option to "SNPB," update tape and reel width to 12mm
April 30, 2020	FB	Add tape and reel ordering option

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



The ordering codes for the VTC4 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

USA:
100 Watts Street
Mt Holly Springs, PA 17065
Tel: 1.717.486.3411
Fax: 1.717.486.5920

Europe:
Landstrasse
74924 Neckarbischofsheim
Germany
Tel: +49 (0) 7268.801.0
Fax: +49 (0) 7268.801.281