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 3.2x5 ceramic package.

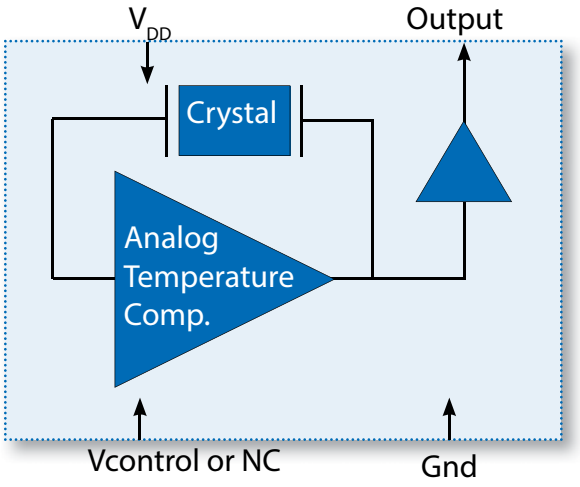
Features

- 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

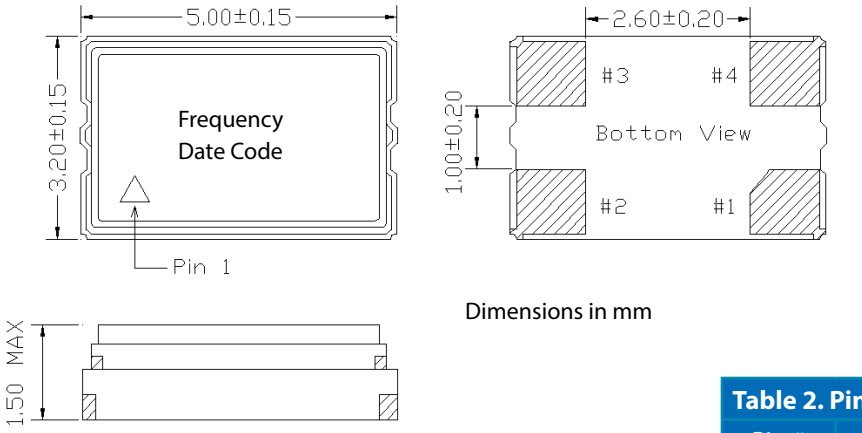


Specifications

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, " 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[2]	V_O p/p	0.8			V
Output Load				10K II 10pF	
Phase Noise, 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. The Output is DC coupled

Outline Drawing



Dimensions in mm

Recommended Pad Layout

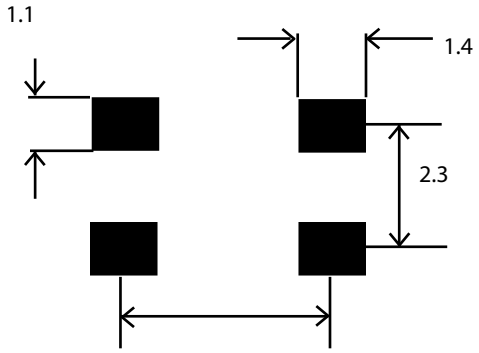
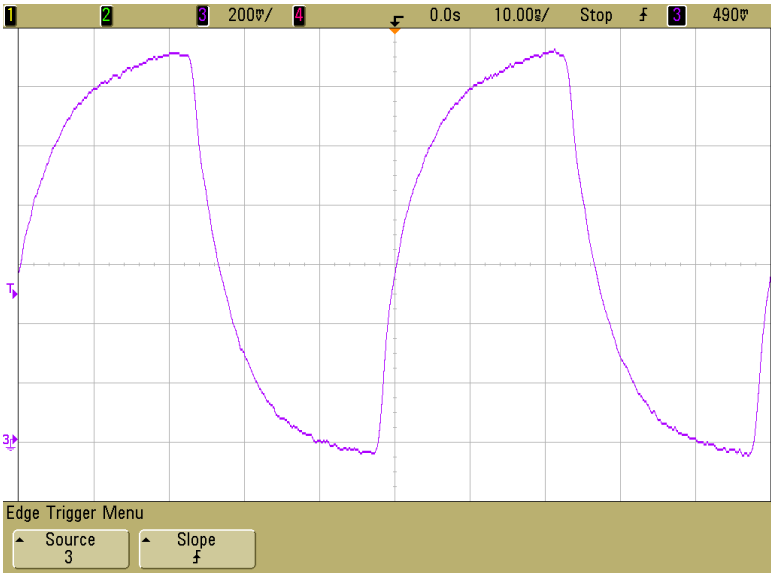


Table 2. Pinout		
Pin #	Symbol	Function
1	V_C	TCXO Control Voltage or No Connect
2	GND	Electrical and Lid Ground
3	f_o	Output Frequency
4	V_{DD}	Supply Voltage

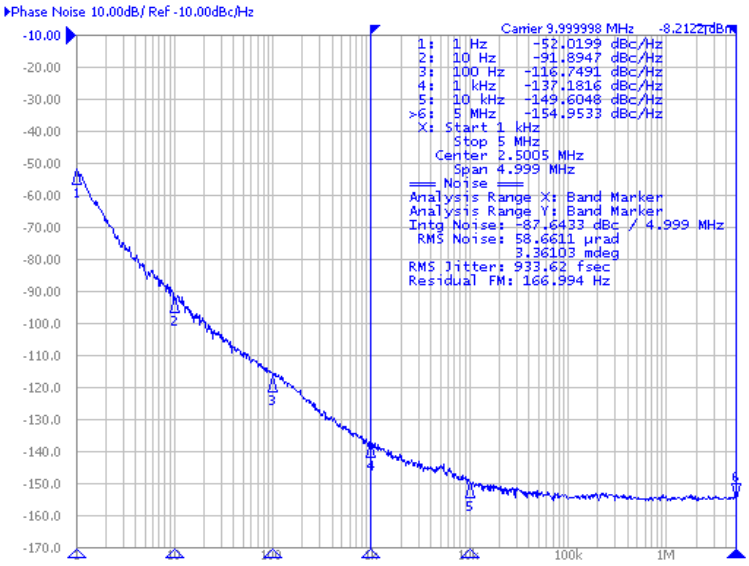
VCXO Feature: The VT-800 can be ordered with a VCXO function for applications were it will be used in a PLL, or the output frequency needs fine tune or calibration adjustments. This is a high impedance input , 1Mohm, and can be driven with an op-amp or terminated with adjustable resistors etc. **Pin 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

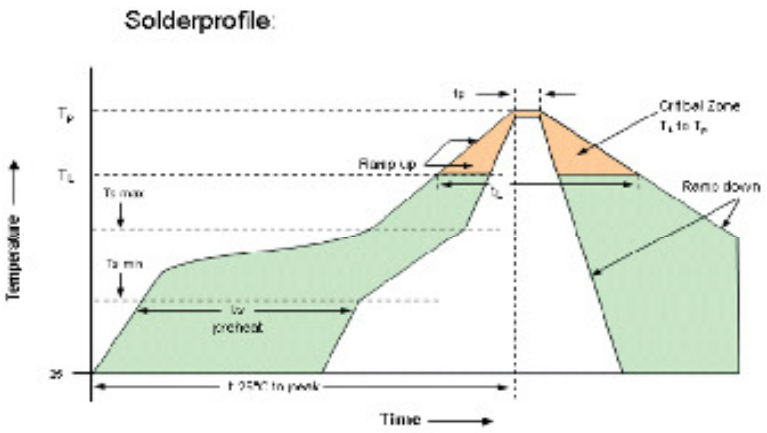
Table 4. Environmental Compliance	
Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002
Mechanical Vibration	MIL-STD-883 Method 2007
Temperature Cycle	MIL-STD-883 Method 1010
Solderability	MIL-STD-883 Method 2003
Fine and Gross Leak	MIL-STD-883 Method 1014
Resistance to Solvents	MIL-STD-883 Method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

IR Compliance

Suggested IR Profile

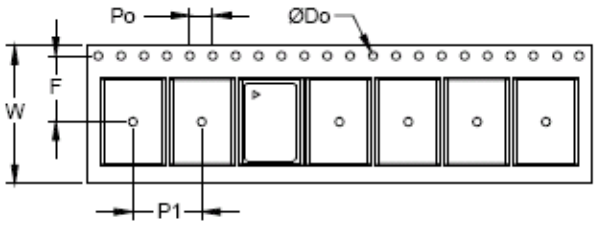
Devices are built using lead free epoxy and can be subjected to standard lead free IR reflow conditions shown in Table 5. Contact pads are gold over nickel and lower maximum temperatures can also be used, such as 220C.

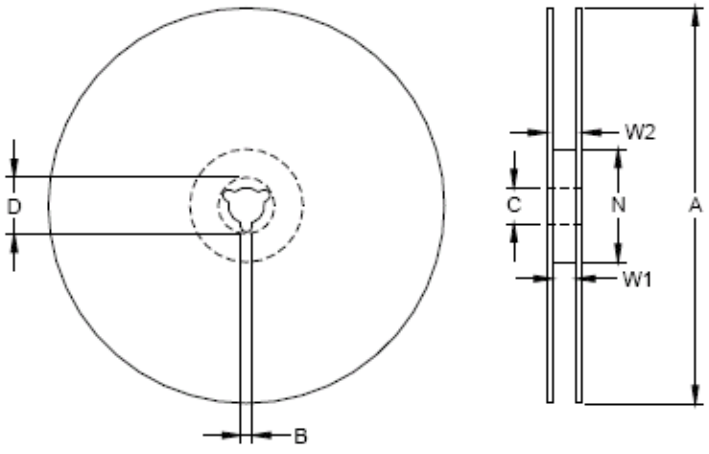
Table 5. Reflow Profile		
Parameter	Symbol	Value
PreHeat Time	ts	200 sec Max
Ramp Up	R_{UP}	3°C/sec Max
Time above 217°C	tL	150 sec Max
Time to Peak Temperature	tAMB-P	480 sec Max
Time at 260°C	tP	30 sec Max
Time at 240°C	tP2	60 sec Max
Ramp down	R_{DN}	6°C/sec Max



Tape & Reel

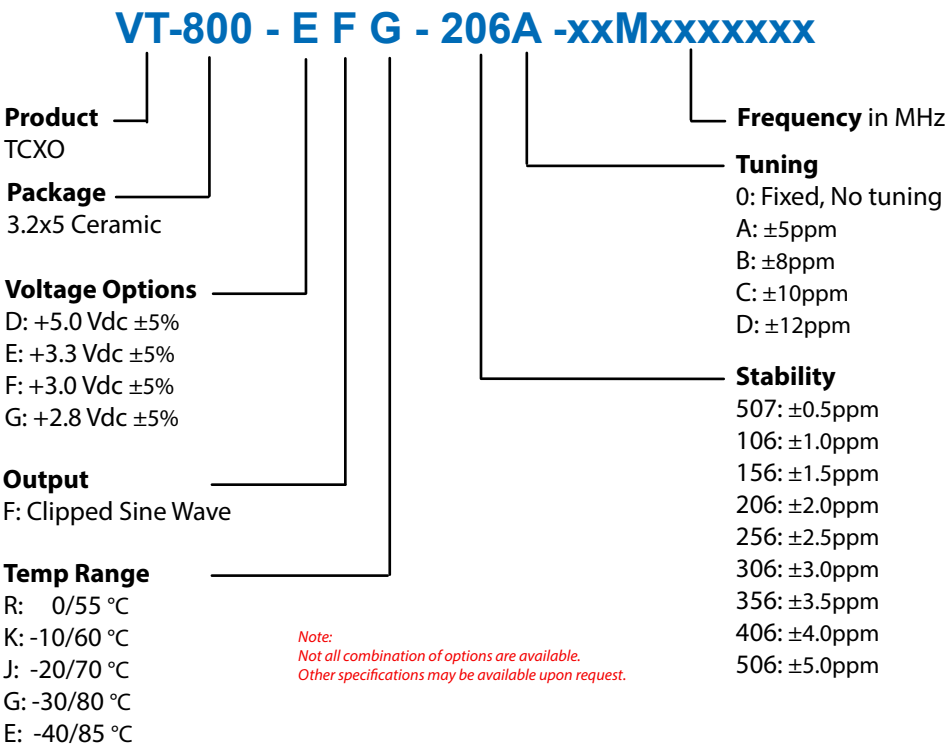
Table 6. Tape and Reel Information												
Tape Dimensions (mm)					Reel Dimensions (mm)							
W	F	Do	Po	P1	A	B	C	D	N	W1	W2	#/Reel
16	7.5	1.5	4	8	180	1.5	13	20.2	60	16.4	20.4	1000





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									



Example: VT-800-EFG-206A-26M0000000

* Add **_SNPBDIP** for tin lead solder dip

Example: VT-800-EFG-206A-26M0000000_SNPBDIP

Revision History

Revision Date	Approved	Description
Aug 10, 2018	FB	Update logo and contact information, add "SNPBDIP" ordering option

Microsemi, a wholly owned subsidiary of Microchip Technology Inc. (Nasdaq: MCHP), offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Learn more at www.microsemi.com.

Microsemi Headquarters
One Enterprise, Aliso Viejo, CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Sales: +1 (949) 380-6136
Fax: +1 (949) 215-4996
email: sales.support@microsemi.com
www.microsemi.com

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.

©2018 Microsemi, a wholly owned subsidiary of Microchip Technology Inc. All rights reserved. Microsemi and the Microsemi logo are registered trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.