




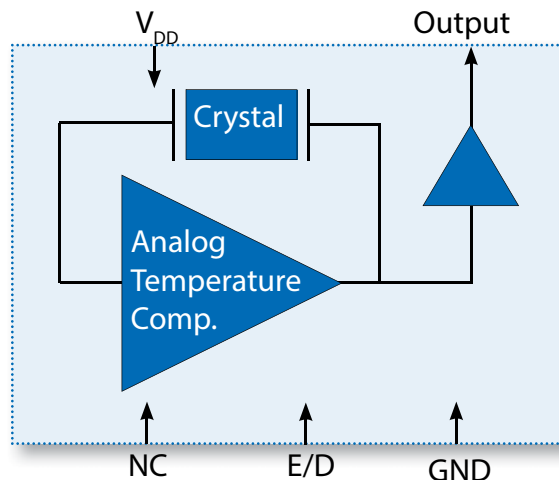
## Description

Microsemi's VT-803-0051-20M0000000 Temperature Compensated Crystal Oscillator (TCXO) is a quartz stabilized, CMOS output, 5th order analog temperature compensated oscillator, operating off a 3.3 volt supply in a hermetically sealed 3.2 x 5.0 mm ceramic package.

## Features

- 20MHz Output Frequency
- $\pm 4.6$ ppm accuracy over all conditions including 20 years aging
- 280ppb temperature stability over -40/85 °C
- Fundamental Crystal Design with CMOS output
- Stratum 3 Compliant
- Gold over nickel contact pads
- Hermetically Sealed Ceramic SMD package
- Product is compliant to RoHS directive  and fully compatible with lead free assembly

## Block Diagram



# Specifications

**Table 1. Electrical Performance**

Parameter	Symbol	Min.	Typ	Max	Units
Output Frequency	$f_o$		20.000		MHz
Supply Voltage <sup>1</sup>	$V_{DD}$	3.135	3.3	3.465	V
Supply Current	$I_{DD}$			3.5	mA
Operating Temperature	$T_{OP}$	-40		85	°C
<b>Frequency Stability</b>					
Stability Over $T_{OP}$ <sup>2</sup>	$F_{STAB}$			0.280	ppm
Initial Accuracy <sup>3</sup>	$F_{TOL}$			±1.5	ppm
Frequency Slope				±0.05	ppm/°C
Power Supply Stability, ±5% change	$F_{SUP}$			±0.05	ppm
Load Stability	$F_{LOAD}$			±0.10	ppm
Holdver Stability at Constant Temperature <sup>4</sup> , 1 day				±0.01	ppm
Holdover Stability <sup>5</sup>				±0.37	ppm
Overall Frequency Stability <sup>6</sup>				±4.6	ppm
<b>RF Output (CMOS)</b>					
Output Level High	$V_{OH}$	0.9* $V_{DD}$			V
Output Level Low	$V_{OL}$			0.1* $V_{DD}$	V
Output Load	$C_L$	13.5	15	16.5	pF
Duty Cycle		45		55	%
Start Up Time	$T_{SUP}$			2	ms
Rise / Fall Times	$t_R / t_F$			5	ns
Output Enable	$V_{IH}$	0.7* $V_{DD}$			V
Output Disable	$V_{IL}$			0.3* $V_{DD}$	V
<b>Phase Noise</b>					
Phase Noise <sup>7</sup> , 20MHz					dBc/Hz
10Hz			-90		
100Hz			-113		
1kHz			-137		
10kHz			-152		
100kHz			-157		
Phase Jitter <sup>8</sup> (12k-5MHz)			0.28		ps

1. The VT-803 power supply pin should be filtered, eg, a 0.1 and 0.01 uf capacitor

2. (Fmax+Fmin)/2 value over the operating temperature range.

3. Measured at 25 °C.

4. Constant temperature = ± 1.0 C, after 1 day of power on.

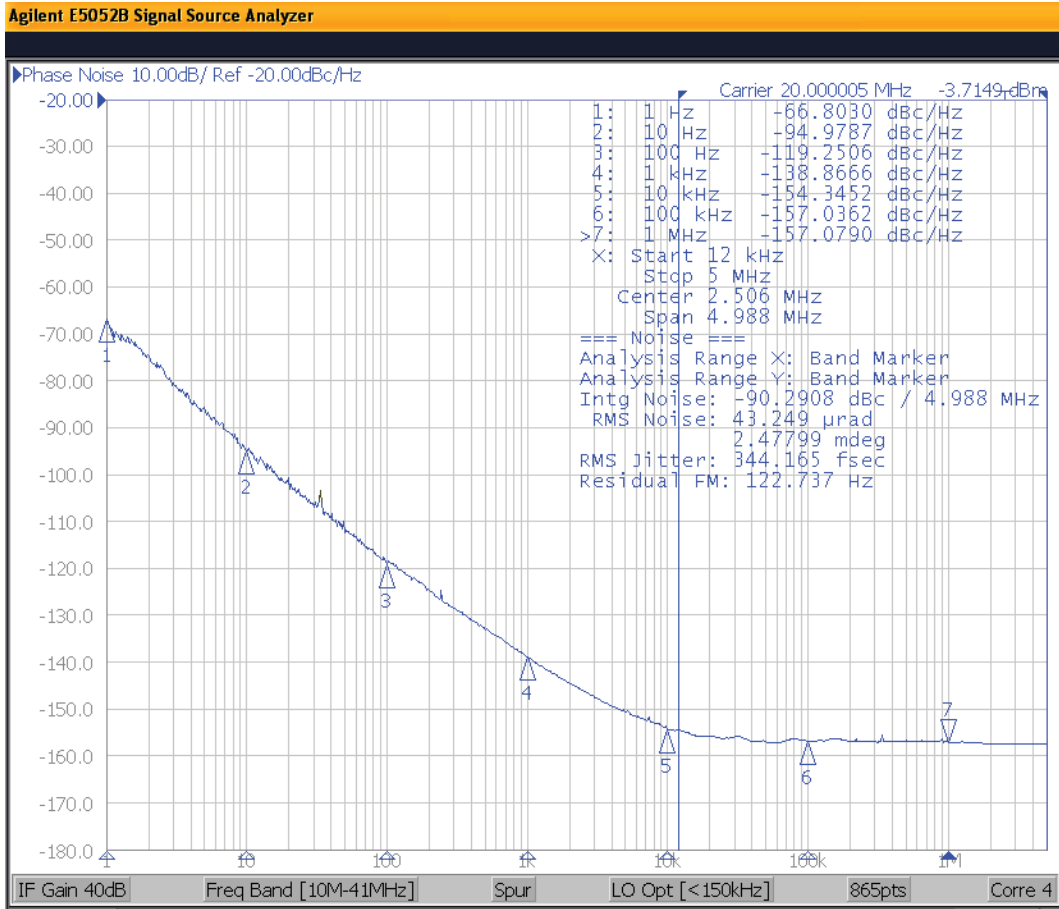
5. Over operating temperature range for 24 hours after 7 days of continuous operation.

6. Includes calibration @ 25 °C, supply voltage, load, reflow, 20 year aging and frequency stability over temperature.

7. The total load on the output in the application should be 15 pF, for best Top stability.

8. Measured using E5052 Signal Source Analyzer.

# Phase Noise



## Package Outline Drawing

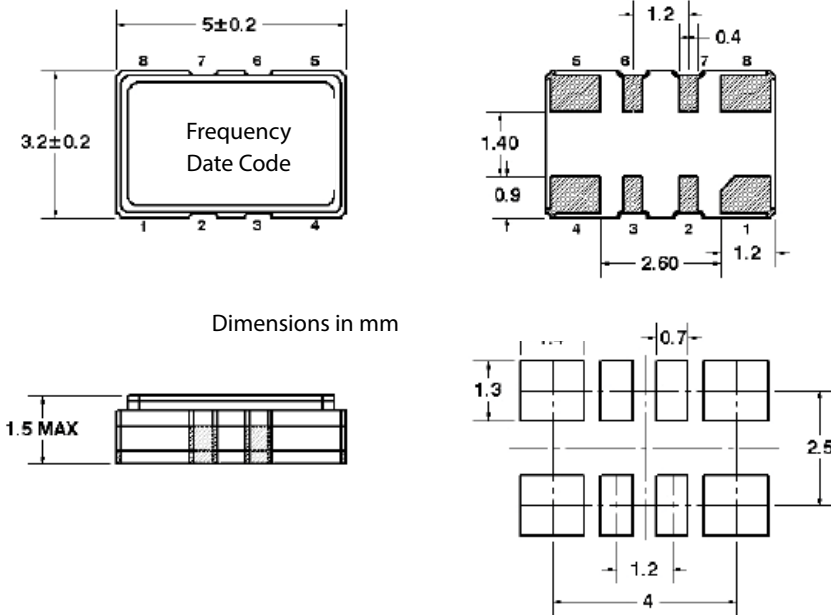


Table 2. Pinout

Pin #	Symbol	Function
1	NC	No Connection
2	NC	Make No Connection
3	NC	Make No Connection
4	GND	Ground
5	OUT	RF Output
6	E/D	Enable / Disable
7	NC	Make No Connection
8	V <sub>DD</sub>	Supply Voltage

Table 3. Enable Disable Function (optional)

Pin 6	Pin 5 Output
High	Clock Output
Open	Clock Output
Low	High Impedance

# 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-803, 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.

Parameter	Symbol	Rating	Unit
Storage Temperature	$T_{STORE}$	-55/125	°C
Supply Voltage	$V_{DD}$	-0.6 to 6.0	V
Control Voltage	$V_C$	0/ $V_{DD}$	V
ESD, Human Body Model	HBM	1500	V
ESD, Charged Device Model	CDM	1000	V

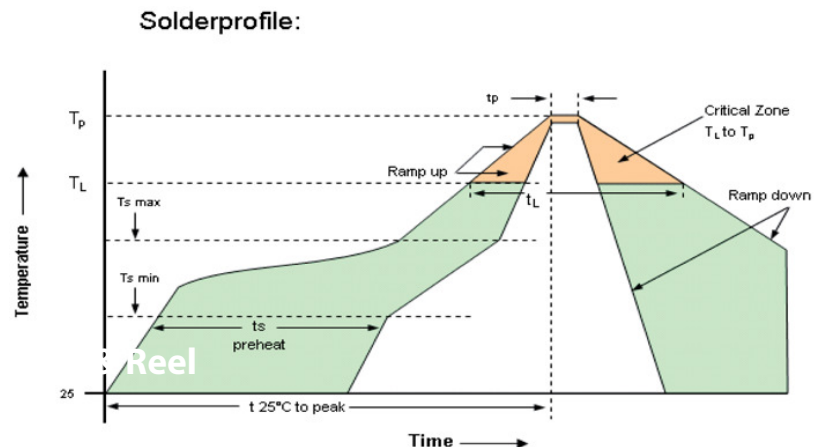
Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002
Mechanical Vibration	MIL-STD-883 Method 2007
Temperature Cycle	MIL-STD-883 Method 1010
Solderability	MIL-STD-883 Method 2003
Fine and Gross Leak	MIL-STD-883 Method 1014
Resistance to Solvents	MIL-STD-883 Method 2015
Moisture Sensitivity Level	MSL1
Contact Pads	Gold (0.3-1.0um) over Nickel
Weight	70 mg
ThetaJC (bottom of case)	6 °C/W

# IR Reflow

## 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.

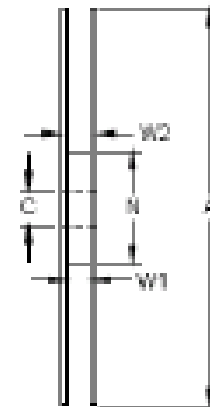
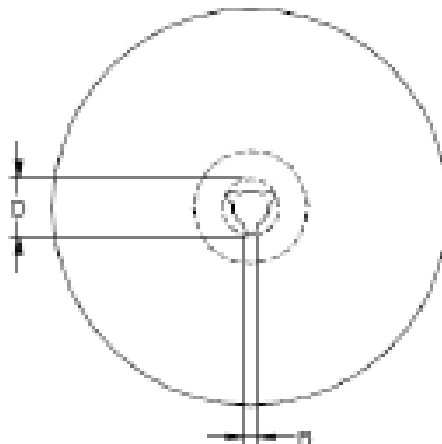
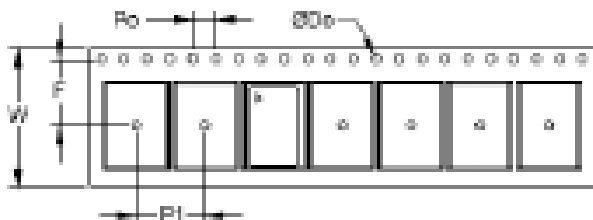
Parameter	Symbol	Value
PreHeat Time Ts-min Ts-max	$t_s$	200 sec Max 150°C 200°C
Ramp Up	$R_{UP}$	3°C/sec Max
Time above 217C	$t_L$	150 sec Max
Time to Peak Temperature	$t_{25C\ to\ peak}$	480 sec Max
Time at 260C	$t_p$	10 sec Max
Time at 240C	$t_{p2}$	60 sec Max
Ramp down	$R_{DN}$	6°C/sec Max



## Tape & Reel Information

**Table 7. Tape and Reel Information**

Tape Dimensions (mm)					Reel Dimensions (mm)							
W	F	Do	Po	P1	A	B	C	D	N	W1	W2	#/Reel
12	5.5	1.5	4	8	254	2.5	13	21	100	13.5	17.5	2000



## Ordering Information

**VT-803- 0051- 20M0000000**

**Product**

TCXO

**Package**

5.0x3.2mm Ceramic

**Source Control Drawing**

Frequency in MHz

## Revision History

Revision Date	Approved	Description
Jan 30, 2019	FB	Rev 0.1 - Initial datasheet

## 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) 7268.281



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-lamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans, as well as custom design capabilities and services. Learn more at [www.microsemi.com](http://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](mailto:sales.support@microsemi.com)  
[www.microsemi.com](http://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.