



VX-504

### Features

- AT-Cut Crystal
- Surface Mount FR4 based package
- Low Phase Noise
- Low G-Sensitivity
- Tight Stabilities
- Frequency Range 30 - 160MHz
- Standard Frequencies 32,768; 38,4; 44,8; 61,44; 76,8; 81,92; 92,16; 100; 102,4; 112; 122,88; 125; 134,4; 153,6; 155,52; 160MHz

### Applications

- Wireless Communication
- Test & Measurement
- Harsh Environment
- Industrial
- Military

## Performance Specifications

Frequency Stabilities <sup>1</sup>						
Parameter	Min	Typical	Max	Units	Condition <sup>2</sup>	
vs. operating temperature range (referenced to +25°C)	-30		+30	ppm	-40 to +85°C	
Initial tolerance	-15		+15	ppm	@V <sub>C</sub> =V <sub>S</sub> /2 V <sub>S</sub> ±5% Load ±10%	
vs. supply voltage change	-3		+3	ppm		
vs. load change	-2		+2	ppm		
vs. aging / 1 Year	-2		+2	ppm		
vs. aging (15 years)	-7		+7	ppm		

## Performance Specifications

Supply Voltage (Vs)						
Parameter	Min	Typical	Max	Units	Condition <sup>2</sup>	
Supply voltage (standard)	3.135	3.3	3.465	VDC		Options <sup>5</sup>
Current consumption			25	mA	@ HCMOS	
Supply voltage	4.75	5	5.25	VDC		
Current consumption			20	mA	@ HCMOS	
RF Output						
Signal	HCMOS					Options <sup>5</sup>
Load		15		pF		
Rise and Fall time			5	ns	@ 15 pF 10 to 90%	
Duty cycle	40		60	%	@ Vs / 2	
Frequency Tuning (EFC)						
Tuning Range	±65.0	±80	±180.0	ppm		
Linearity	10 %					
Tuning Slope	Positive					
Control Voltage Range	0 0.5	1.65 2.5	3.3 4.5	VDC VDC	with Vs = 3.3V with Vs = 5V	
Frequency Control Input Impedance	100			kΩ		
Additional Parameters						
Phase Noise		-72 -103 -130 -150 -161		dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz	@122MHz LVCMOS 3.3V
Jitter		0.06		ps RMS	@ 12kHz .. 20MHz	
G-Sensitivity		0.3		ppb/g	@0.06g <sup>2</sup> /Hz	

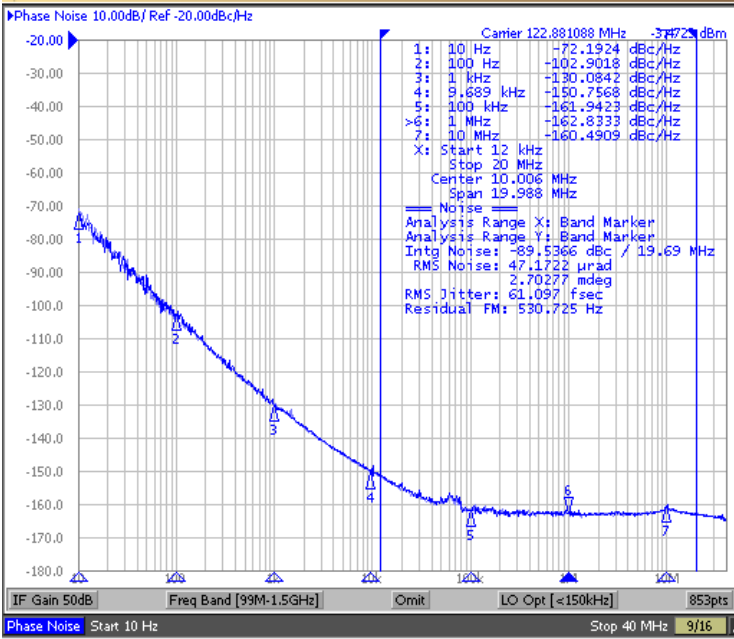
Additional Parameters						
Weight			2.0 g			
Processing & Packing	Handling & Processing Note					
Absolute Maximum Ratings						
Supply voltage (Vs)			6.0	V		
Operable Temperature Range	-40		+85	°C		
Storage Temperature Range	-40		+105	°C		

# Typical Phase Noise and Jitter

## Phase Noise

VX-504 @ 122.88 MHz LVCMOS

Agilent E5052A Signal Source Analyzer



Average

Averaging Restart

Avg Factor 16

Averaging ON

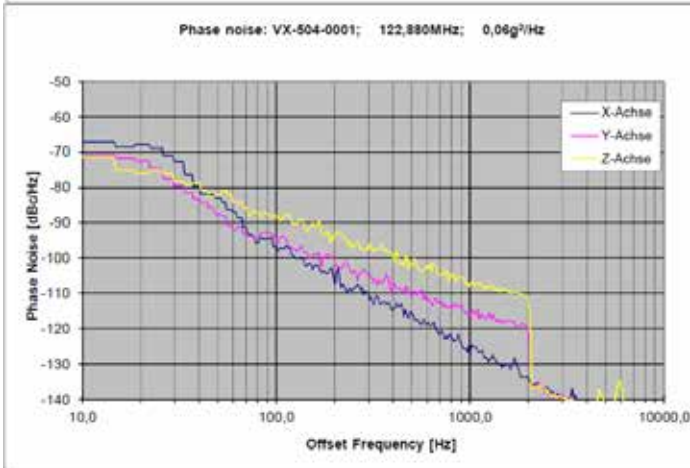
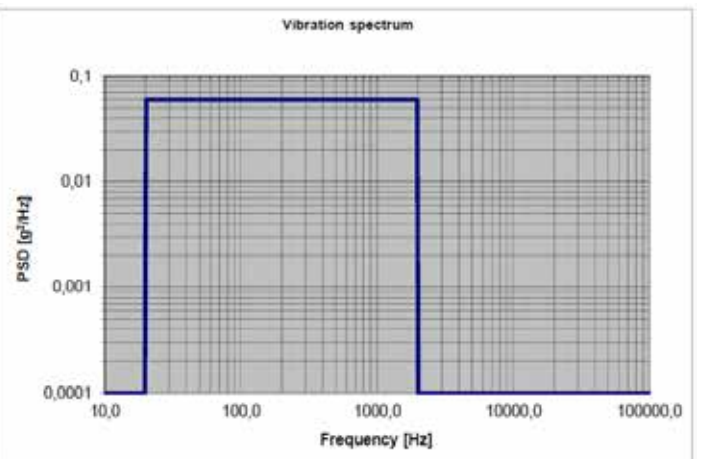
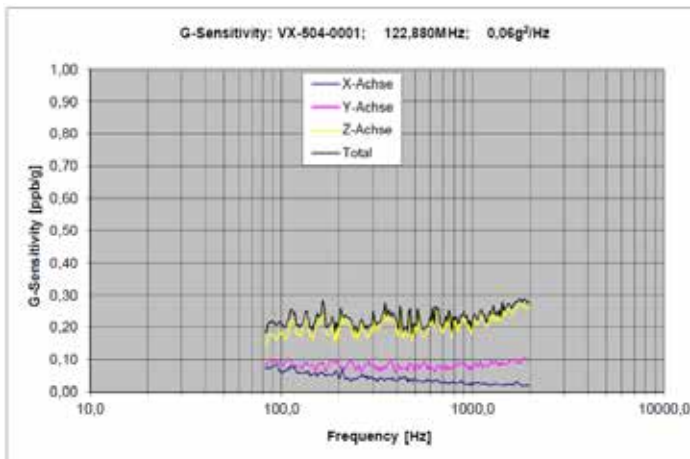
Correlation 1

Return

Phase Noise: Meas Cor Ctrl 1.65V Pow 3.3V Attn 0dB ExtRef Stop Svc 2014-12-03 12:12

## G-Sensitivity

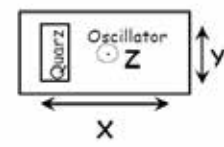
VX-504 @ 122.88 MHz LVCMOS



Calculation equation according to Vig-Tutorial

$$g\text{-sensitivity} = \frac{2 \cdot f_c}{A_{peak} \cdot f_0} \cdot 10^{\frac{L(f)}{20}}$$

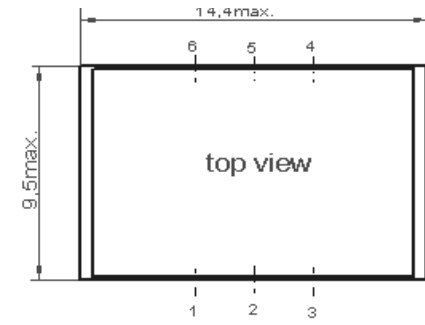
$$A_{peak} = \sqrt{PSD \cdot 2}$$



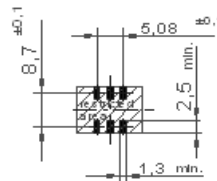
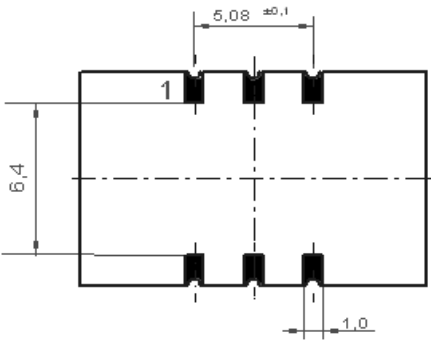
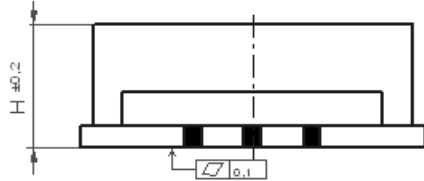
# Enclosure

## Package Codes

Type	Height "H"
G218C	2.8



G 218



Padvorschlag  
land pattern  
recommendation

## Pin Connections

1	Control Voltage (Vc)
2	N.C. / Enable (Option)
3	Ground
4	RF Output
5	N.C.
6	Supply Voltage Input (Vs)

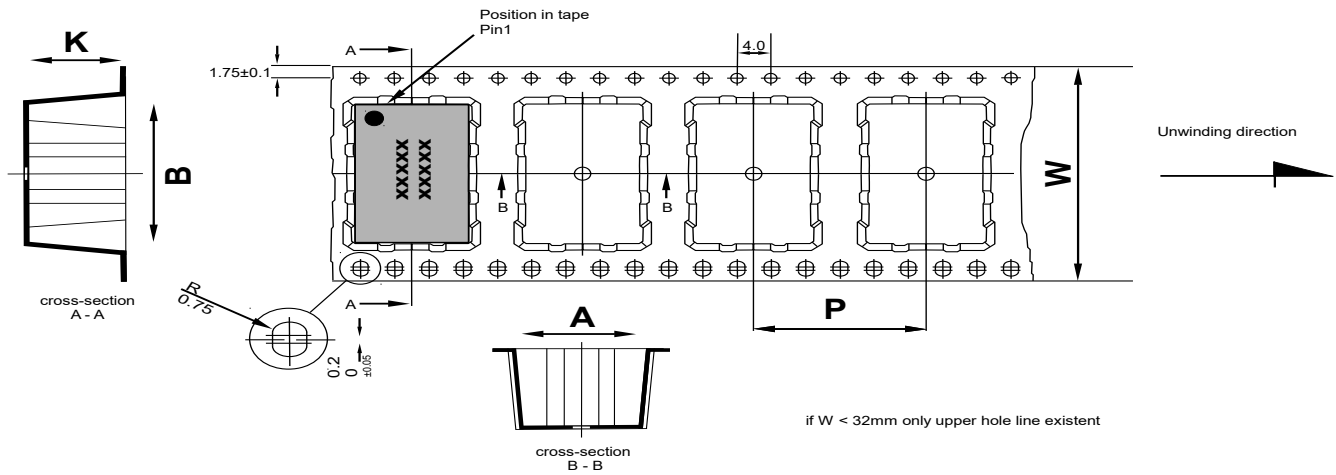
## Marking

VX-504-xxxx
Frequency
● AYYWW

## Enable true table (optional)

	HCMOS	
Pin 2	Pin 4	Pin 5
High	Data	N.C.
Open	Data	N.C.
Low	High Tristate	N.C.

# Standard Shipping Method



Dimension in mm:  
 A, B and K are dependent upon component dimensions  
 production tolerance complying DIN IEC 286-3

All dimensions in millimeters unless otherwise stated

Enclosure Type	Tape Width W (mm)	Quantity per meter	Quantity per reel	Dimension P
G218C	24	83.3	1700	12

# Recommended Reflow Profile

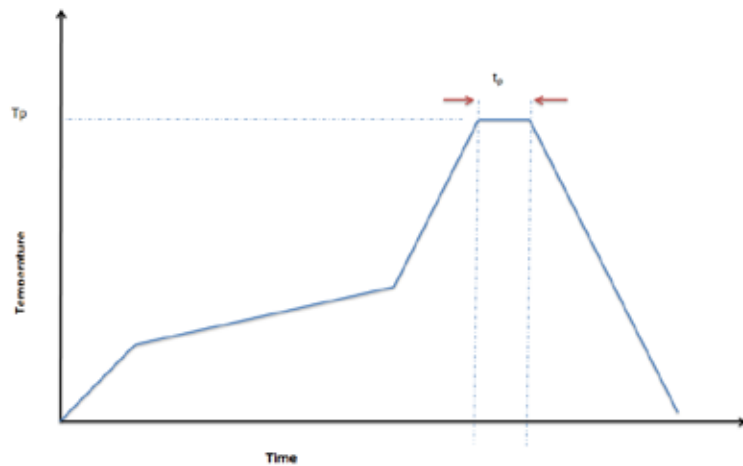
TP: max 250°C (@ solder joint, customer board level)

T<sub>p</sub>: max: 10...30 sec

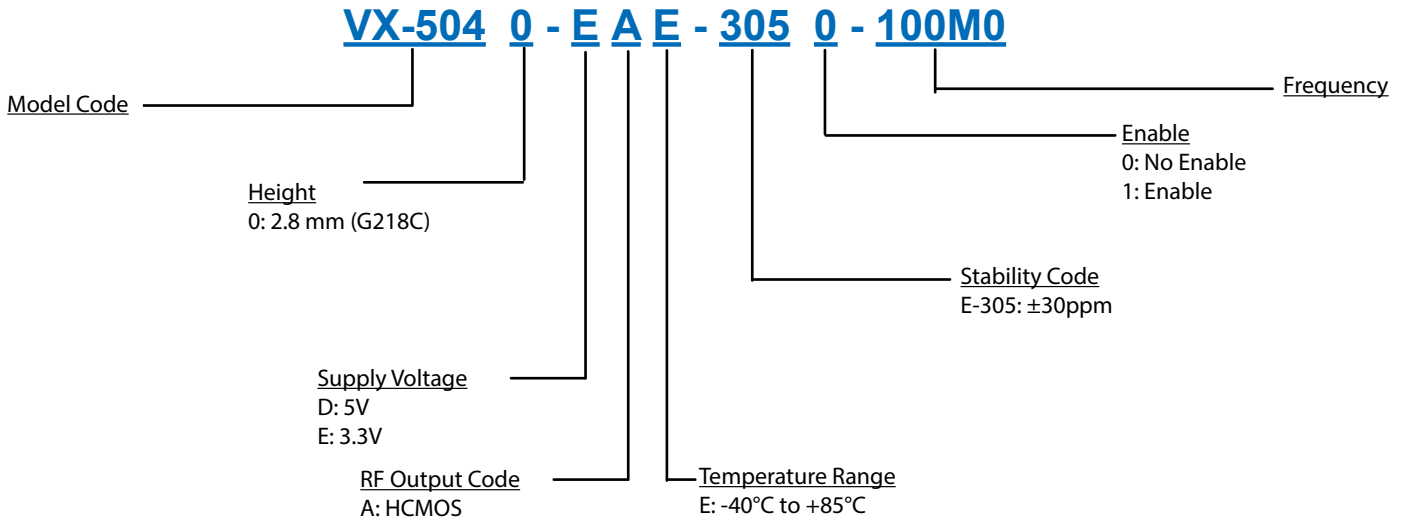
Additional Information:

This SMD oscillator has been designed for pick and place reflow soldering

SMD oscillators must be on the top side of the PCB during the reflow process.



# Ordering Information



**Notes:**

1. Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
2. Unless other stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
3. Phase noise degrades with increasing output frequency.
4. Subject to technical modification.
5. Contact factory for availability.



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](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.