



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

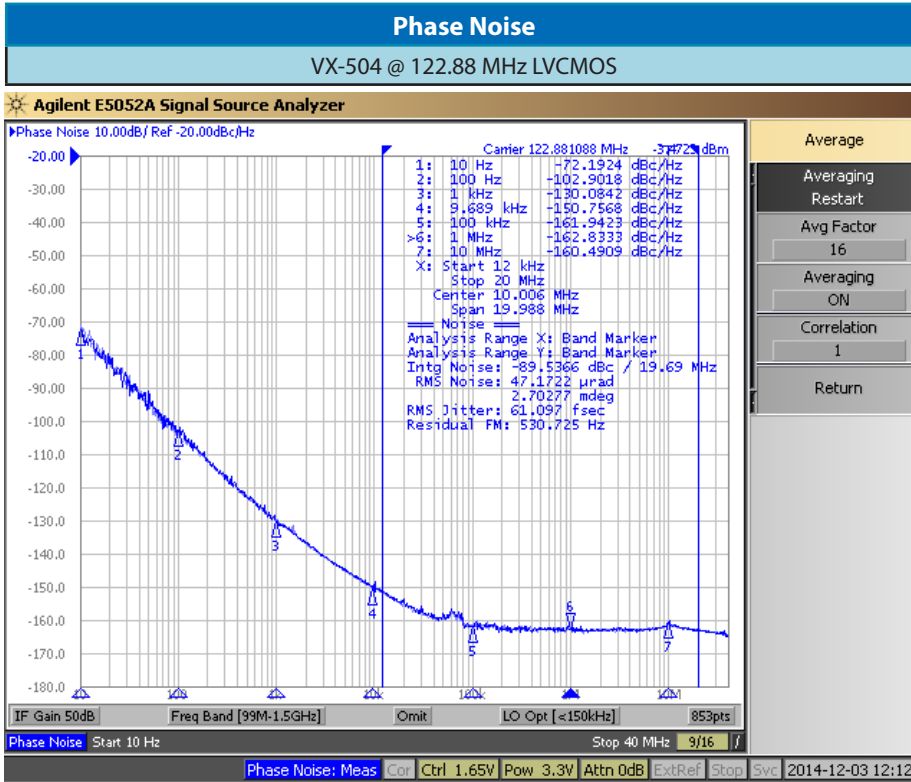
Parameter	Frequency Stabilities <sup>1</sup>				Condition <sup>2</sup>	
	Min	Typical	Max	Units		
vs. operating temperature range (referenced to +25°C)	-30		+30	ppm	-40 to +85°C	
Initial tolerance	-15		+15	ppm	@V <sub>C</sub> =V <sub>S</sub> /2 V <sub>S</sub> ±5% Load ±10%	
vs. supply voltage change	-3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

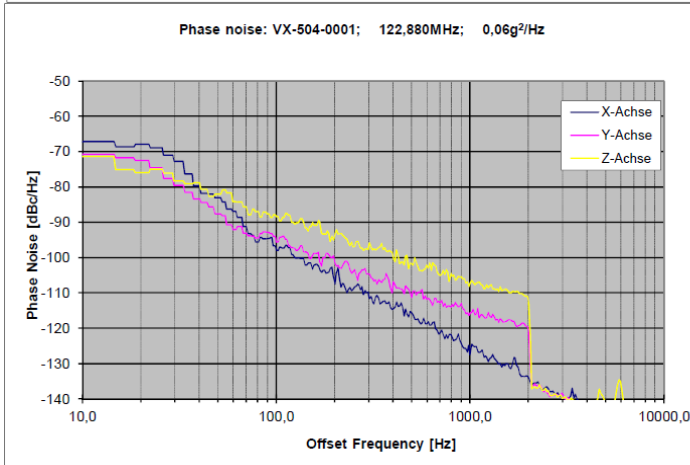
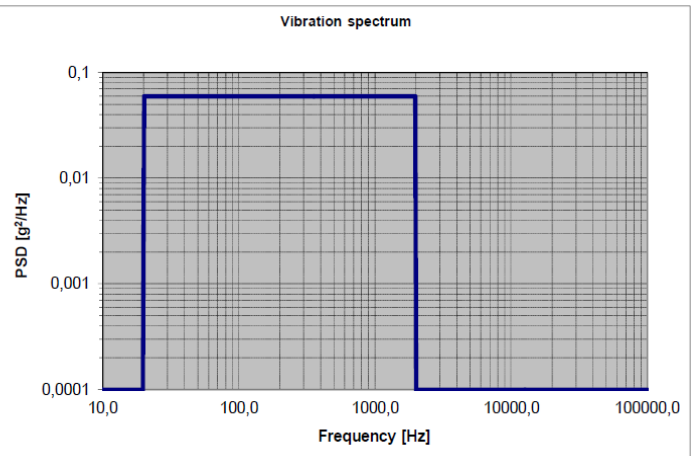
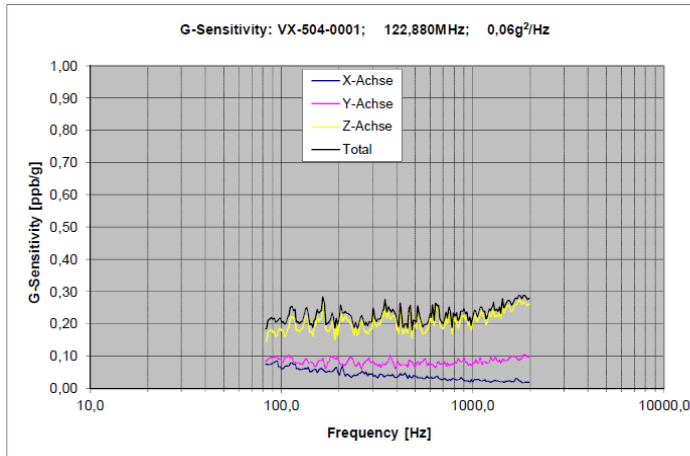
Additional Parameters						
Weight			2.0 g			
Processing & Packing	Handling & Processing Note					
Absolute Maximum Ratings						
Supply voltage (Vs)			6.0	V		
Operable Temperature Range	-40		+85	°C		
Storage Temperature Range	-40		+105	°C		

# Typical Phase Noise and Jitter



## G-Sensitivity

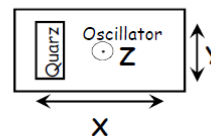
VX-504 @ 122.88 MHz LVCMOS



Calculation equation according to Vig-Tutorial

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

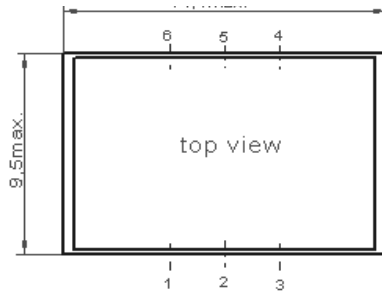
$$\text{Peak g-level: } A_{peak} = \sqrt{PSD \cdot 2}$$



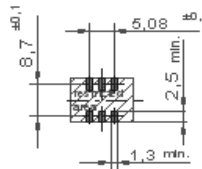
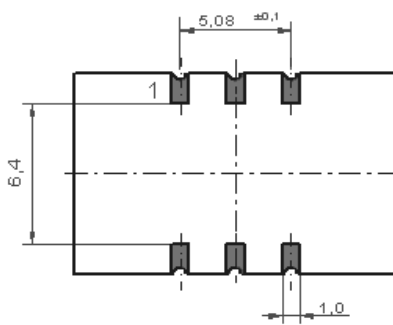
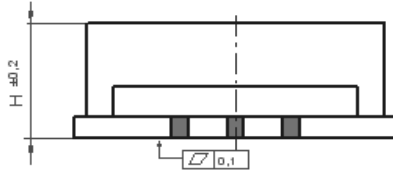
# Enclosure

## 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)

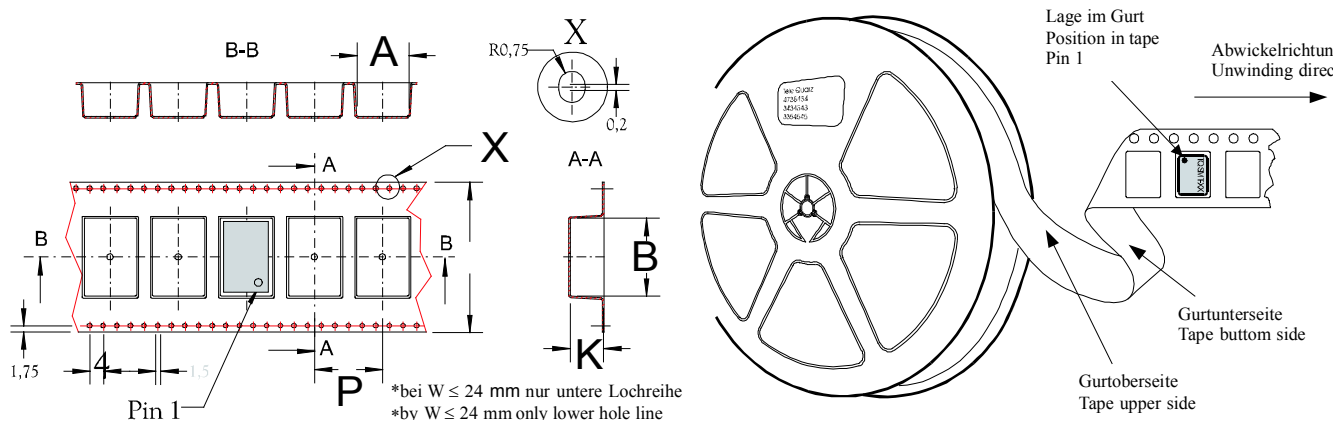
## Marking

VX-504-xxxx
Frequency
● AYYWW

## Enable true table (optional)

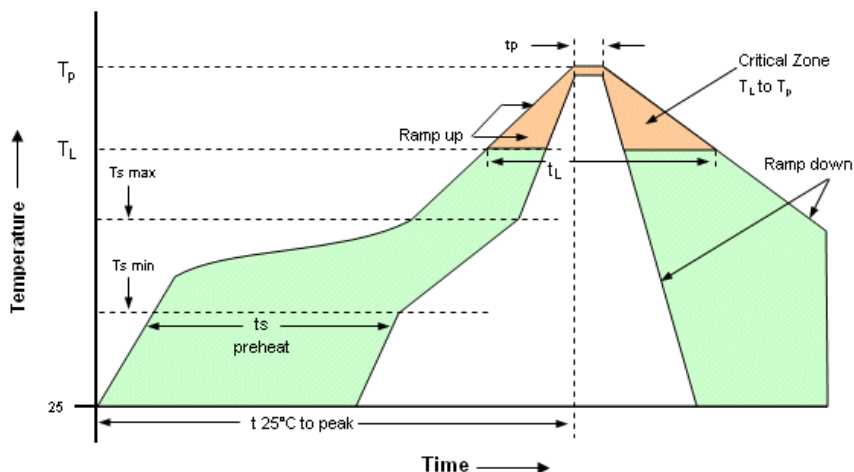
	HCMOS	
Pin 2	Pin 4	Pin 5
High	Data	N.C.
Open	Data	N.C.
Low	High Tristate	N.C.

## Standard Shipping Method



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

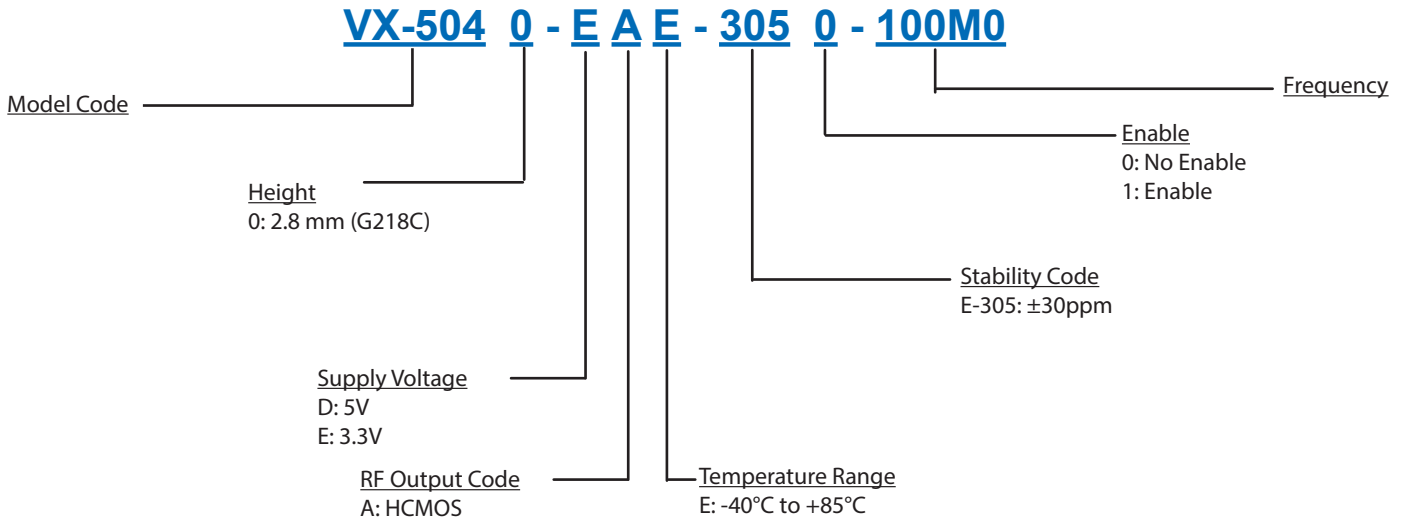
## Recommended Reflow Profile



Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly	Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly
Average ramp-up rate ( $T_L$ to $T_p$ )	3°C/second max.	Time 25°C to Peak Temperature	8 minutes max.
Preheat -Temperature Min $T_{smin}$ -Temperature Min $T_{smax}$ -Time (min to max) $t_s$	150°C 200°C 60-180 seconds	Time maintained above -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds
$T_{smax}$ to $T_L$ -Ramp-up Rate	3°C/second max		
Time maintained above -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds	Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Peak Temperature ( $T_p$ )	max 260°C	Ramp-down Rate	6°C/ second max

**Note:** All temperatures refer to topside of the package, measured on the package body surface. 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.

## For Additional Information, Please Contact

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