



VX-505

### Features

- AT-Cut Crystal
- Surface Mount FR4 based package
- Reflow Process Compatible
- Extended temperature range -55...+125°C
- Low Phase Noise
- Tight Stabilities
- Frequency Range 20 - 800MHz
- Standard Frequencies 20; 20.48; 30,72; 61.44; 65; 80; 100; 120; 122.88; 125; 128; 153.6; 156.25; 160; 200; 245.76; 256; 300; 320; 400; 448; 491.52; 1000; 1200.1 MHz

### Applications

- Communication
- Industrial
- Harsh Environmental
- 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) | -45 |         | +45 | ppm   | -55 to +125°C                                                         |
| Initial tolerance                                     | -30 |         | +30 | ppm   | @V <sub>c</sub> =V <sub>s</sub> /2<br>V <sub>s</sub> ±5%<br>Load ±10% |
| vs. supply voltage change                             | -2  |         | +2  | ppm   |                                                                       |
| vs. load change                                       | -1  |         | +1  | ppm   |                                                                       |
| vs. aging / 20 Years                                  | -8  |         | +8  | 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               |          |                                             | 40     | mA                                                       | @ HCMOS                                                |                                 |
| Current consumption               |          |                                             | 90     | mA                                                       | @ PECL                                                 |                                 |
| 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                                               |                                 |
| Signal                            | PECL     |                                             |        |                                                          |                                                        |                                 |
| Load                              |          | 50                                          |        | Ω                                                        |                                                        |                                 |
| Rise and Fall time                |          |                                             | 1      | ns                                                       | 20 to 80%                                              |                                 |
| Duty cycle                        | 45       |                                             | 55     | %                                                        |                                                        |                                 |
| Frequency Tuning (EFC)            |          |                                             |        |                                                          |                                                        |                                 |
| Tuning Range                      | ±60.0    |                                             | ±200.0 | ppm                                                      |                                                        |                                 |
| Linearity                         | 10 %     |                                             |        |                                                          |                                                        |                                 |
| Tuning Slope                      | Positive |                                             |        |                                                          |                                                        |                                 |
| Control Voltage Range             | 0        | 1.65                                        | 3.3    | VDC                                                      | with Vs = 3.3V                                         |                                 |
| Frequency Control Input Impedance | 2        |                                             |        | MΩ                                                       |                                                        |                                 |
| Additional Parameters             |          |                                             |        |                                                          |                                                        |                                 |
| Phase Noise                       |          | -76<br>-112<br>-138<br>-153<br>-161<br>-166 |        | dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz | 10 Hz<br>100 Hz<br>1 kHz<br>10 kHz<br>100 kHz<br>1 MHz | @100MHz<br>LVCMOS<br>3.3V       |
| Jitter                            |          | 0.049                                       |        | ps RMS                                                   | @ 12kHz .. 20MHz                                       |                                 |
| Phase Noise                       |          | -75<br>-105<br>-130<br>-145<br>-153         |        | dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz           | 10 Hz<br>100 Hz<br>1 kHz<br>10 kHz<br>100 kHz          | @ 153.6<br>MHz<br>PECL<br>3.3V  |
| Jitter                            |          | 0.1                                         |        | ps RMS                                                   | @ 12kHz .. 20MHz                                       |                                 |
| Phase Noise                       |          | -60<br>-95<br>-121<br>-141<br>-150          |        | dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz           | 10 Hz<br>100 Hz<br>1 kHz<br>10 kHz<br>100 kHz          | @ 491.52<br>MHz<br>PECL<br>3.3V |
| Jitter                            |          | 0.03                                        |        | ps RMS                                                   | @ 12kHz .. 20MHz                                       |                                 |

# Performance Specifications

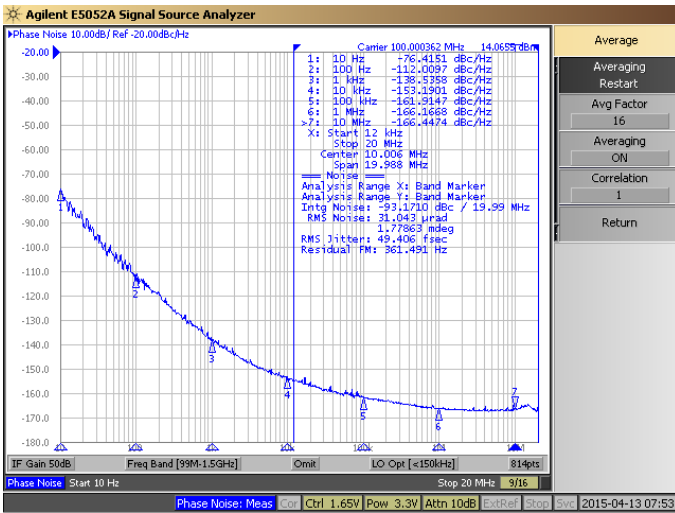
## Additional Parameters

|                            |                            |       |     |                 |
|----------------------------|----------------------------|-------|-----|-----------------|
| Subharmonics               |                            | -40   | dBc | For f > 200 MHz |
| Weight                     |                            | 2.0 g |     |                 |
| Processing & Packing       | Handling & Processing Note |       |     |                 |
| Absolute Maximum Ratings   |                            |       |     |                 |
| Supply voltage (Vs)        |                            | 6.0   | V   |                 |
| Operable Temperature Range | -55                        | +125  | °C  |                 |
| Storage Temperature Range  | -55                        | +125  | °C  |                 |

## Typical Phase Noise and Jitter

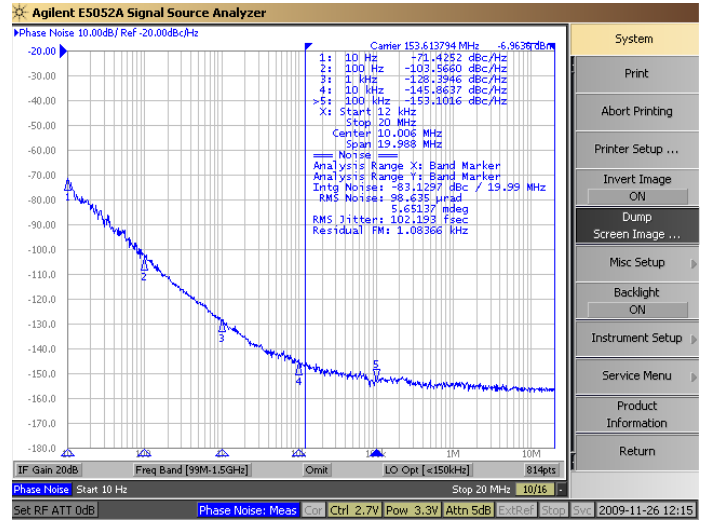
### Phase Noise

VX-501 @ 100 MHz LVCMOS



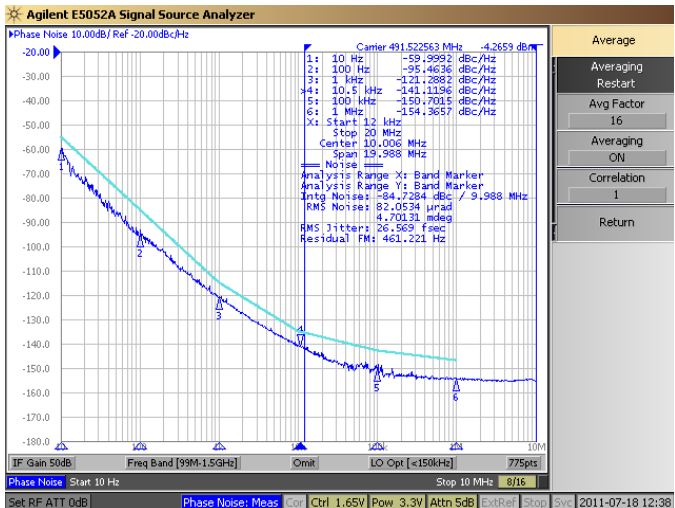
### Phase Noise

VX-501 @ 153.6 MHz LVPECL



### Phase Noise

VX-501 @ 491.52 MHz LVPECL

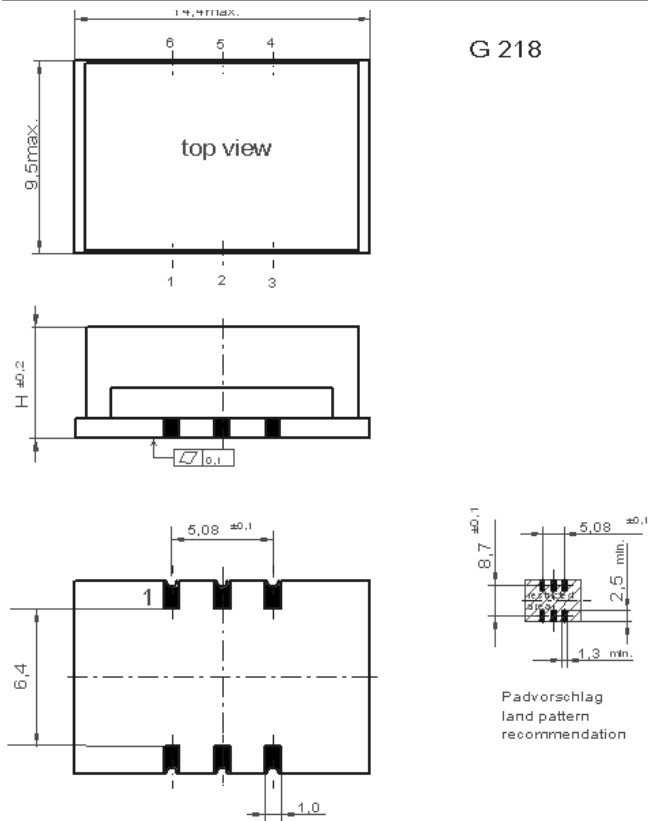


# Enclosure

## Package Codes

| Type  | Height "H" |
|-------|------------|
| G218C | 2.8        |

G 218



## Pin Connections

|   |                                               |
|---|-----------------------------------------------|
| 1 | Control Voltage (Vc)                          |
| 2 | N.C. / Enable (Option)                        |
| 3 | Ground                                        |
| 4 | RF Output                                     |
| 5 | RF Output complementary (PECL)<br>N.C. (CMOS) |
| 6 | Supply Voltage Input (Vs)                     |

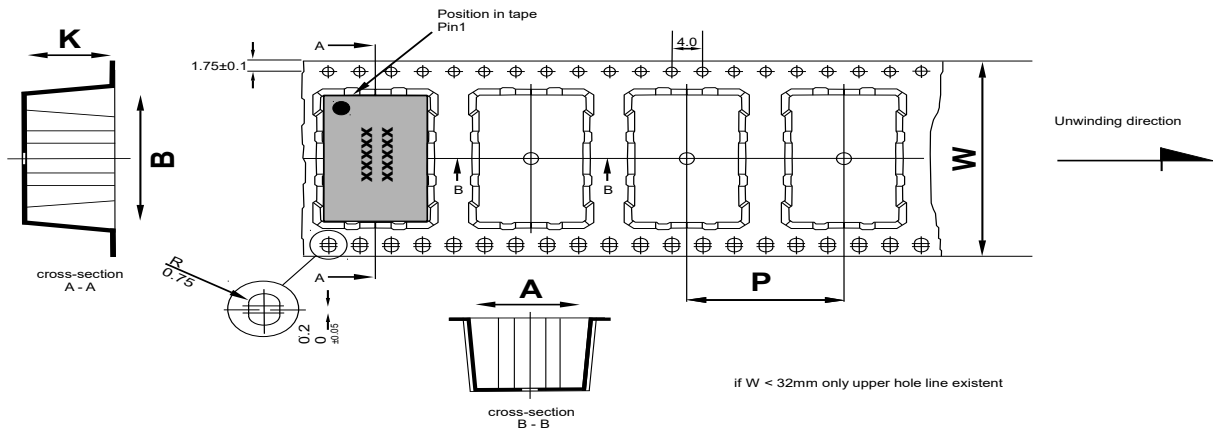
## Marking

|             |
|-------------|
| VX-505-xxxx |
| Frequency   |
| ● AYYWW     |

## Enable true table (optional)

|       | HCMOS         |       | LVPECL  |             |
|-------|---------------|-------|---------|-------------|
| Pin 2 | Pin 4         | Pin 5 | Pin 4   | Pin 5       |
| High  | Data          | N.C.  | No Data | No Data     |
| Open  | Data          | N.C.  | Data    | Compl. Data |
| Low   | High Tristate | N.C.  | Data    | Compl. Data |

### 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

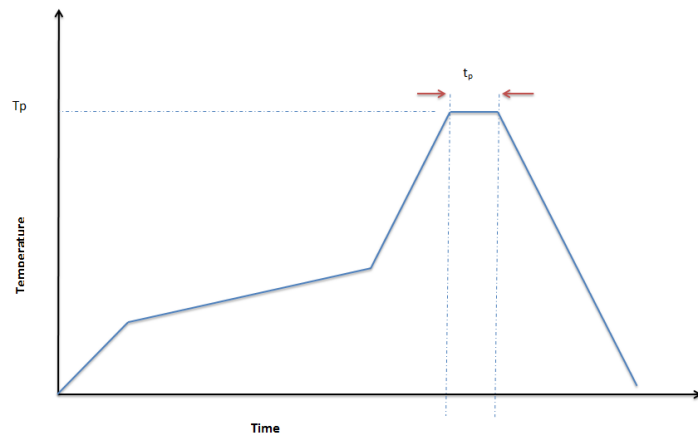
TP: max 250°C (@ solder joint,  
customer board level)

$T_p$ : max: 10...30 sec

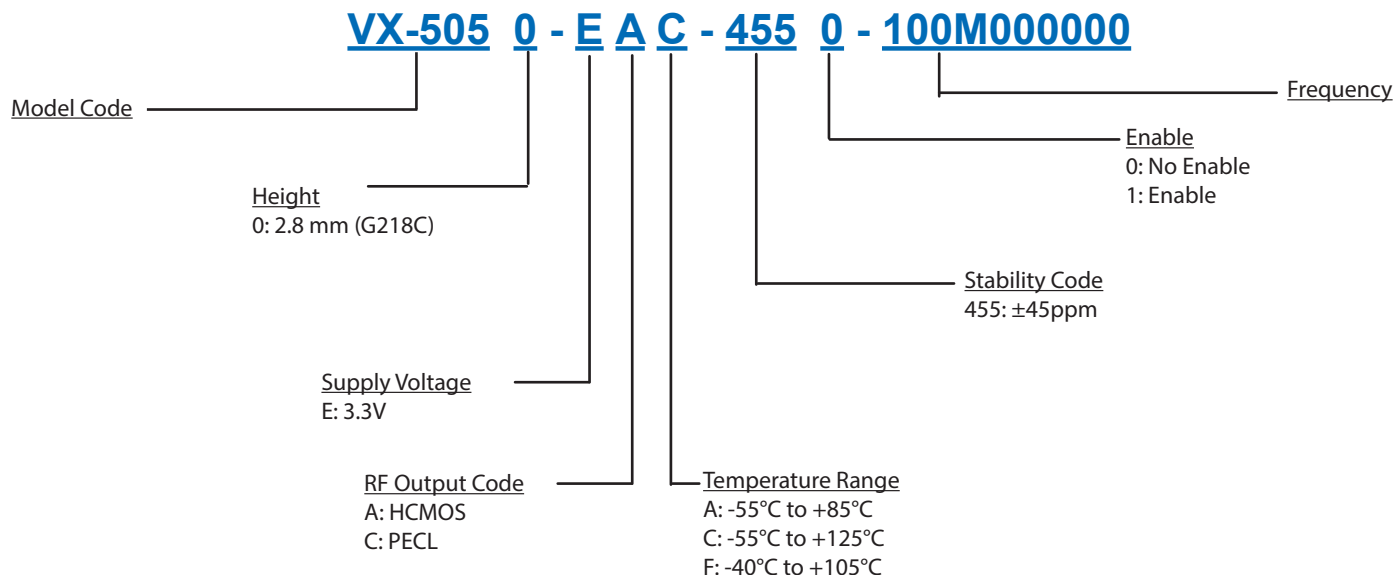
Additional Information:

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.

## Contact Information

### USA:

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

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