

## VS9P: PLL LVPECL SERIES: LOW COST UHF/HF VCXO, LVPECL, +3.3 VDC

**DESCRIPTION:** A low cost voltage control crystal oscillator, high frequency, highly stable oscillator, adhering to Low Voltage Differential Signaling (LVPECL) Standards. The output can be Tri-stated to facilitate testing or combined multiple clocks. The device is contained in a sub-miniature, very low profile, leadless ceramic SMD package with 6 gold contact pads. This miniature oscillator is ideal for today's automated assembly environments.

### APPLICATIONS AND FEATURES:

- **Infiniband; Fiber Channel; SATA; 10GbE; Network Processors; SOHO Routing; Switches;**
- **Common Frequencies: 150 MHz; 156.25 MHz; 155.52 MHz; 161.1328 MHz; 212.5MHz; 312.5MHz**
- **+3.3 VDC LVPECL**
- **Frequency Range from 750KHz to 800 MHz**
- **PLL multiplication (F>25MHz)**
- **Miniature Ceramic SMD Package Available on Tape and Reel**
- **Lead Free and ROHS Compliant**

### ■ ABSOLUTE MAXIMUM RATINGS:

| PARAMETER                   | SYMBOL | VALUE             | UNIT |
|-----------------------------|--------|-------------------|------|
| Operating temperature range | Ta     | -40...+85         | °C   |
| Storage temperature range   | T(stg) | -55...+90         | °C   |
| Supply voltage              | Vcc    | +4.6              | VDC  |
| Maximum Input Voltage       | Vi     | Vss-0.5...Vcc+0.5 | VDC  |
| Maximum Output Voltage      | Vo     | Vss-0.5...Vcc+0.5 | VDC  |

### ■ ELECTRICAL PARAMETERS:

| PARAMETER  | SYMBOL     | TEST CONDITIONS <sup>1</sup>                                     | VALUE  | UNIT   |    |
|--|------------|--|--|--|----|
| Nominal Frequency  | fo         |  | 0.75 to 800  | MHz  |    |
| Supply Voltage   | Vcc        |  | +3.3 ±5%   | VDC  |    |
| Supply Current   | Is         |  | 100.0 MAX  | mA   |    |
| Output Logic Type  |            |  | LVPECL   |  |    |
| Load   |            | Connected between each output and Vcc – 2.0 VDC                  | 50   | Ω  |    |
| Output Voltage Levels  | Voh<br>Vol | min<br>max   | Vcc-1.025<br>Vcc-1.620   | VDC<br>VDC                                     |    |
| Duty Cycle   | DC         | Measured at 50% of output voltage swing                          | 40/60 to 60/40 or 45/55 to 55/45   | %  |    |
| Rise / Fall Time   | tr / tf    | Measured at 20/80% and 80/20% output voltage swing               | 0.7 TYP 1.0 MAX <sup>2</sup>   | ns   |    |
| Jitter   | J          | Integrated Phase tji RMS,<br>Fj = 12 kHz...20 MHz <sup>5</sup>   | Fo=155.52MHz   | 2.6 TYP**                                      | ps |
|  |            |  | Fo=622.08MHz   | 2.5 TYP**                                      |    |
|  |            | Random period Jitter Rj using<br>wavecrest analyzer <sup>4</sup> | Fo=155.52MHz.  | 4 TYP **                                       | ps |
|  |            |  | Fo=622.08MHz   | 6 TYP **                                       |    |
| Acumm. Peak to Peak Jitter Tp-p<br>using wavecrest analyzer <sup>4</sup> |            | Fo=155.52MHz.  | 30 TYP**   | ps   |    |
|  |            | Fo=622.08MHz   | 40 TYP**   |  |    |
| Phase Noise  | £(Δf)      | typ. @155.52MHz <sup>6</sup>                                     | Δf=10 Hz -60<br>Δf=100 Hz -90<br>Δf=1 KHz -120<br>Δf=10 KHz -125<br>Δf=100 KHz -121<br>Δf=1M Hz -121<br>Δf=10M Hz -140<br>Δf≥20M Hz -145 | dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz |    |
| Overall Frequency Stability typ.   | Δf/fc      | Op. Temp., Aging, Load, and Supply Variations                    | <±50*(Note 7)  | ppm  |    |
| Control Voltage Range  | VC         | Positive slope; 10% linearity MAX                                | 0 to +3.3  | VDC  |    |
| Settability  | Vfo        |  | +1.65 ± 0.25   | VDC  |    |
| Absolute Pull Range  | APR        | Minimum guaranteed freq. pull over Δf/fc, over all conditions    | See Part Numbering   | ppm  |    |
| Input Impedance  | Zin        |  | 10 MIN   | kΩ   |    |
| Modulation Bandwidth   | BW         | -3 dB  | 10 MIN   | KHz  |    |
| <b>Enable High Option;</b><br>Pin 2 Output Enabled<br>Output Disabled    | En<br>Dis  | High Voltage or No Connect<br>Ground                             | 0.7•Vcc MIN<br>0.3•Vcc MAX   | VDC<br>VDC                                     |    |
| <b>Enable Low Option;</b><br>Pin 2 Output Disabled<br>Output Enabled     | Dis<br>En  | High Voltage<br>Ground or No Connect                             | 0.7•Vcc MIN<br>0.3•Vcc MAX   | VDC<br>VDC                                     |    |

- \*1 Test Conditions Unless Stated Otherwise: Nominal Vcc, Nominal Load, +25 ±3°C
- \*2 Frequency Dependent
- \*3 May not be Available With All Temperature Ranges or Frequencies — Please Consult Factory
- \*4 Measured with Wavecrest SIA-3000A 10,000, Cycles no filtering
- \*5 Calculated from Agilent 5500 phase noise measurements
- \*6 Measured with Agilent 5500
- \*7 Tighter stabilities may be available upon request – please consult factory

### ■ PART NUMBERING SYSTEM:

| SERIES  | SYMMETRY                                 | TEMPERATURE RANGE (°C)                                   | ABSOLUTE PULL RANGE  | FREQUENCY (MHz) | Enable/Disable   |
|---|--|--|--|-----------------|--|
| VS9P: UHF +3.3Vdc VCXO with LVPECL Comp. Output | A: 40/60 to 60/40%<br>T: 45/55 to 55/45% | R: 0...+50<br>S: 0...+70<br>U: -20...+70<br>V: -40...+85 | K: ±20 ppm<br>L: ±25 ppm<br>F: ±32 ppm<br>H: ±50 ppm<br>G: ±80 ppm<br>J: ±100 ppm*(note 3) | 0.75...800.000  | Enable High – standard (Omit Suffix)<br>EL; Enable Low |

### EXAMPLE: VS9PASH -155.520

VCXO, 7x5mm Package, +3.3 VDC Supply Voltage, LVPECL Output, Standard Symmetry, 0...+70°C Operating Temperature Range, ±50 ppm APR, 25 ppm stability, 155.520 MHz

### ■ MECHANICAL PARAMETERS:

**OUTLINE TOLERANCE:**  
±0.006" / 0.15mm  
(Unless otherwise specified)

**PIN FUNCTIONS:**  
[1] VOLTAGE CONTROL  
[2] ENABLE/ DISABLE, OR NO CONNECT  
[3] CASE GROUND  
[4] OUTPUT  
[5] COMP. OUTPUT  
[6] SUPPLY VOLTAGE

**MARKING:**  
VS9PASH  
155.52  
RAL D/C

\*0.01µF external by-pass filter is recommended as seen on solder pattern.

**SOLDER PATTERN**

■ REFLOW PROFILE:

