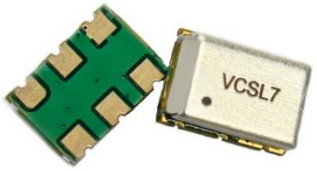
# VCSL7 SERIES




RoHS Compliant

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | CONDITION | VALUE | | | UNIT |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Frequency Range | $F_o$ | | 400 | | 1000 | MHz |
| Absolute Pull Range[1] | APR | 0.3 ≤ VC ≤ 3.0 | ±25, ±50 | | | ppm |
| Linearity | Lin | 0 ≤ VC ≤ 2.5 | | 5 | 15 | % |
| Gain Transfer | Kv | | +100 | | | ppm/V |
| Supply Voltage | $V_{cc}$ | (±10%) | 2.97 | 3.3 | 3.63 | V |
| Spurious Suppression | sp | Delta ref. to carrier | | -60 | -50 | dBc |
| Vc Input Range | Vc | Vc center=1.65V | 0.0 | | 3.3 | V |
| Modulation Bandwidth | Bw | MBW(-3db) | 50 | | | kHz |
| Vc Input Impedance | Zin | Vcc = 3.3, 0 ≤ VC ≤ Vcc | 75 | | | kΩ |
| Enable/Disable, PIN #2 | OE | ENABLE: HIGH LEVEL OR OPEN | 2.475 | | 3.63 | V |
| | | DISABLE: LOW LEVEL OR GND | GND | | 0.3 | V |
| Start-Up Time | $t_{start}$ | $T_a$=25°C | | | 10 | ms |
| Operating Temperature Range | $T_a$ | | -40 | | +85 | °C |
| Storage Temperature Range | $T_{(stg)}$ | Absolute max | -55 | | +125 | °C |
| Maximum Voltage | $V_{cc(abs)}$ | | 0 | | 4.5 | *V* |
| Moisture Sensitivity Level | MSL | JEDEC J-STD-2 | 1 | | | |
| Termination Finish | | | 5x7mm FR5 package, Nickel Silver cover, Gold plating contacts | | | |
| ESD Sensitivity | HBM | Human body model JESD22-A114 | | 3 | | kV |

1. Value of pulling guaranteed over + 25°C calibration tolerance, and variation with operating temperature range, input voltage, load, aging, shock and vibration.

# VCSL7 SERIES

## OUTPUT CHARACTERISTICS

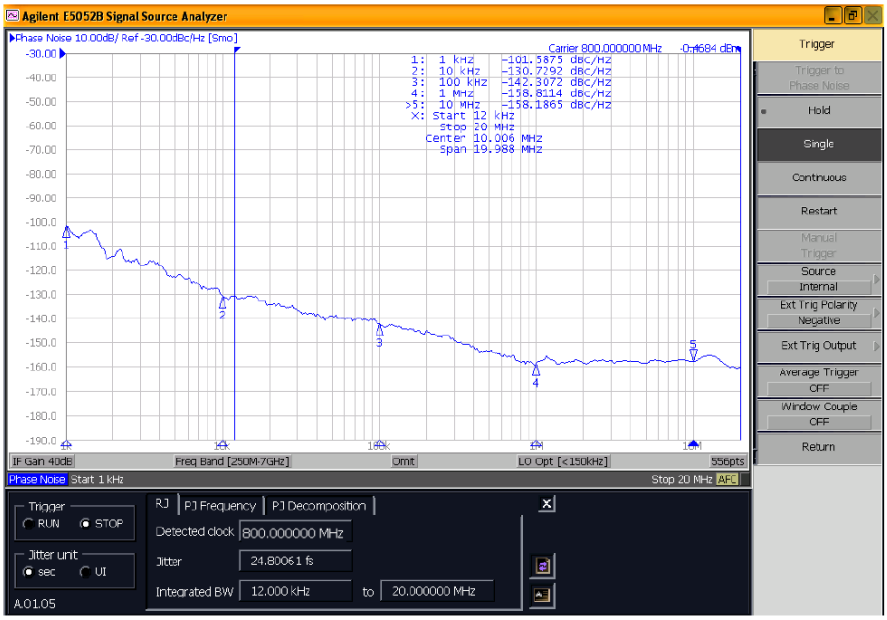
| | PARAMETER | SYMBOL | CONDITION | | VALUE Min | VALUE Typ. | VALUE Max | UNIT |
|---|---|---|---|---|---|---|---|---|
| LVPECL | Output Current | $I_{out}$ | | | | | 20 | mA |
| | Mid- Level | Vm | Output termination 50Ω to $V_{cc}$ -2.0V, 3.3V ±10% | | $V_{CC}$-1.4 | $V_{CC}$-1.25 | $V_{CC}$-1.0 | mV |
| | Single Ended Swing | | | | 450 | 600 | 750 | mV-pp |
| | Differential Swing | | | | | 1.5 | | V-pp |
| | Rise/Fall Time | Tr/Tf | 20% to 80% | @ 400 ~ 849 MHz | | | 400 | ps |
| | | | | @ 850 ~ 1000 MHz | | | 300 | ps |
| | Duty Cycle/ Symmetry | $D_{CY\%}$ | @ 50% signal level | Standard | 40 | | 60 | % |
| | | | | Tight* | 45 | | 55 | % |
| | Supply Current | Is | Output termination 50Ω to $V_{cc}$ -2.0V, 3.3V ±10%, +25°C | | | | 100 | mA |
| | Output Load | $O_{CL}$ | to $V_{cc}$ -2.0V | | | 50 | | Ω |

*Available for frequency higher than 600 MHz only.

## PHASE NOISE

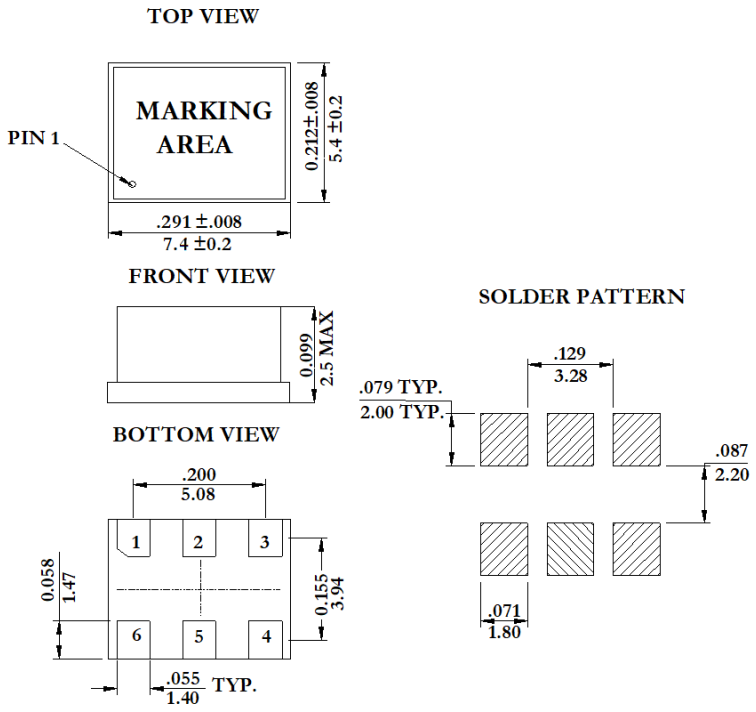
| PARAMETER | SYMBOL | CONDITION | VALUE Min | VALUE Typ | VALUE Max | UNIT |
|---|---|---|---|---|---|---|
| SSB Phase noise* | Σ(Δf) | Δf=1kHz | | -98 | | dBc/Hz |
| | | Δf=10kHz | | -126 | | |
| | | Δf=100kHz | | -145 | | |
| | | Δf=1.0MHz | | -155 | | |
| | | Δf=10.0MHz | | -156 | | |
| Phase Jitter (12kHz~20MHz BW) | ϕ J | | | 0.03 | | ps -rms |
| Period Jitter, RMS | ϕ J | | | 2.5 | | ps |

*Example for 800 MHz



# VCSL7 SERIES

## MECHANICAL DIMENSIONS, PIN FUNCTIONING & P/N



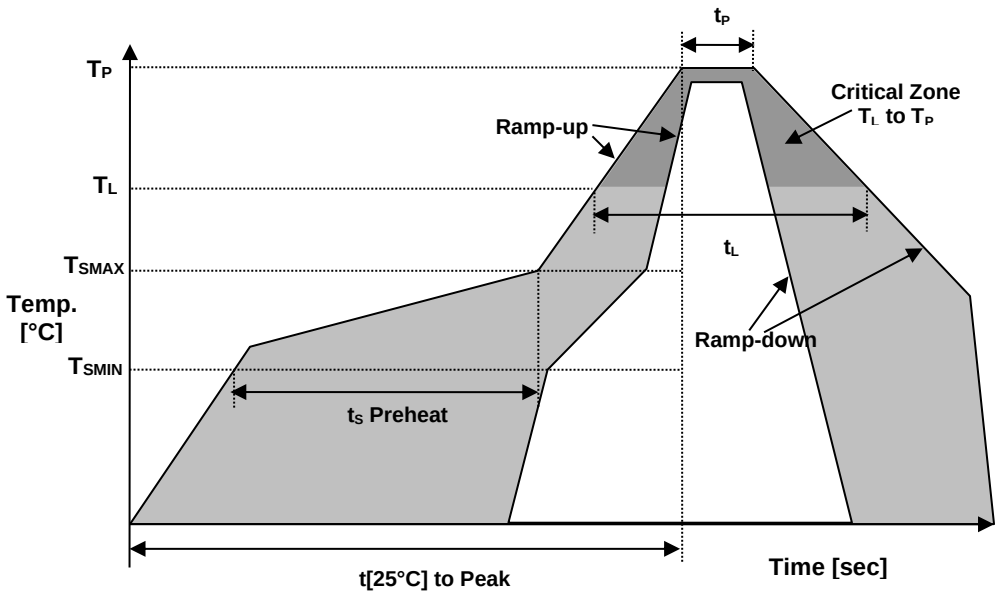

| PIN | SYMBOL | FUNCTION |
|---|---|---|
| 1 | Vc | Voltage Control |
| 2 | OE | Enable/Disable<br>High = Enable<br>Low = Disable |
| 3 | GND | Case and Electrical Ground |
| 4 | Q | Output |
| 5 | /Q | Complementary output |
| 6 | Vcc | Power Supply Voltage |

■ **Marking**:

VCSL7
FFF.FFF
- D/C

# VCSL7 SERIES

## REFLOW PROFILE




| Recommended Solder Reflow Profile | | |
|---|---|---|
| Temperature Min Preheat | $T_{SMIN}$ | 150°C |
| Temperature Max Preheat | $T_{SMAX}$ | 175°C |
| Time ($T_{SMIN}$ to $T_{SMAX}$) | $t_S$ | 60-180 sec. |
| Temperature | $T_L$ | 217°C |
| Peak Temperature | $T_P$ | 260°C |
| Ramp-up rate | $R_{UP}$ | 3°C/sec max. |
| Ramp-down rate | $R_{DOWN}$ | 6°C/sec max. |
| Time within 5°C of Peak Temperature | $t_P$ | 10 sec max. |
| Time t[25°C] to Peak Temperature | t[25°C] to Peak | 480 sec. |
| Time | $t_L$ | 60-150 sec. |

## PART NUMBERING SYSTEM

| TYPE | SERIES | - | VOLTAGE (V) | - | TEMPERATURE RANGE (°C) | - | APR (ppm) | - | SYMMETRY (%) | - | FREQUENCY (MHz) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| VCSL | 7 | - | 3: 3.3 | - | JZ: -10 ~+70<br>HZ: -20 ~+70<br>D3: -40 ~+85 | - | 25: ±25<br>50: ±50 | - | **blank:** 40 to 60%<br>**T:** 45 to 55% | - | 400 ~ 1000 |

**EXAMPLE: VCSL3-3-D3-25-T-698.000**

Surface Mount VCSL7 Series, LVDS (7.4 x 5.4 mm), 3.3 VDC Supply Voltage, Operating Temperature Range -40°C to +85°C, APR ±25 ppm, Symmetry 45% to 55%, 698.000 MHz

April, 2019