

VSMF SERIES: Multi-Frequency Voltage Control Crystal Oscillator with Low Jitter Output 10MHz – 1200MHz

■ PRODUCT DESCRIPTION

The VSMF clock series is a cutting edge family of High Frequency, Low Jitter Output, Multi-Frequency VCXO based on an advanced digital PLL platform. The VSMF oscillators are available in a 7x5mm ceramic package with output frequency from 10MHz to 1.2 GHz. The VSMF units are pre-programmed with up to 2 different output frequencies, any of which are user selected. Such flexibility significantly reduces design cycle time and overall cost. The VSMF oscillator design incorporates a low frequency crystal along with low Jitter frequency synthesizer to provide a wide range of frequencies. The VSMF Clocks are available in LVCMOS, LVPECL and LVDS outputs, making them suitable for a wide range of applications.

■ APPLICATION

- SONET/SDH
- FIBRE CHANNEL
- 10G,100G, GIGABIT ETHERNET
- CLOCK / DATA RECOVERY
- TEST AND MEASUREMENT

■ ELECTRICAL SPECIFICATION

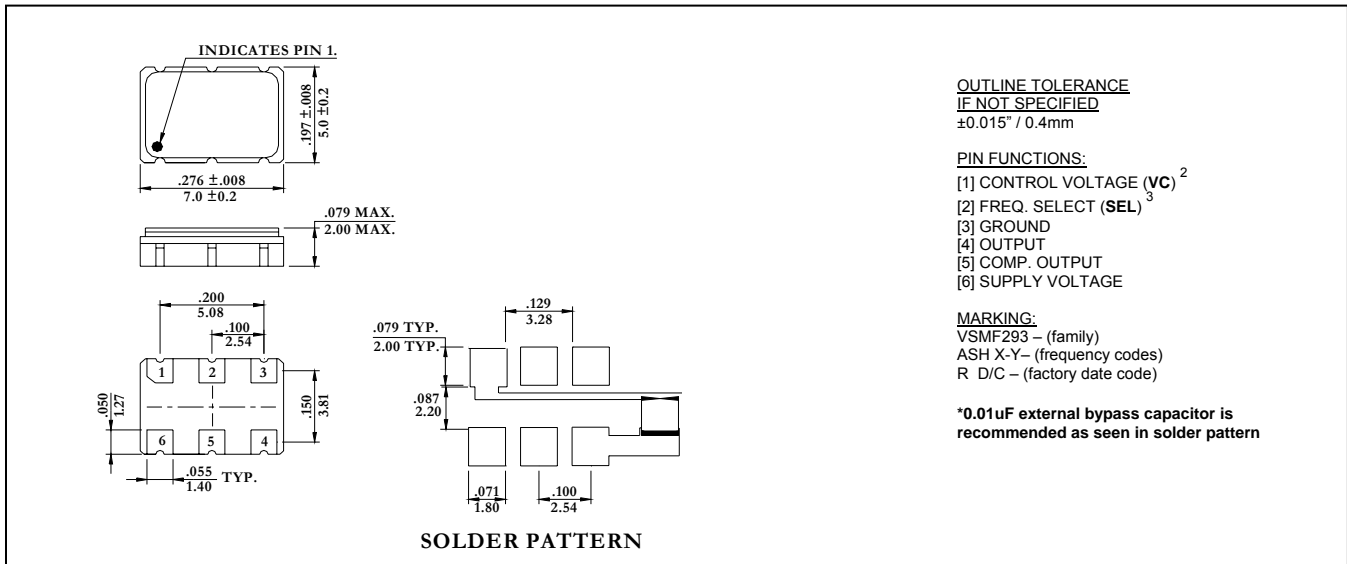
| PARAMETER | SYMBOL | CONDITIONS | VALUE | UNIT |
|--|-----------------|---|-----------------------|------|
| Frequency, nominal | f_o | Up to 2 available output frequencies | 10 -1200 | MHz |
| Supply voltage, nom. | V_{CC} | | 2.5 or 3.3 | V |
| Supply current | I_s | Typical (depending on output) | 35 ~ 45 | mA |
| LVPECL output levels | VOH | Output termination 50Ω ~ Vcc - 2.0V | Vcc -1.4 ~ Vcc - 0.9 | V |
| | VOL | | Vcc - 2.0 ~ Vcc - 1.7 | V |
| LVPECL output voltage swing | V_{p-p} | Output termination 50Ω ~ Vcc - 2.0V | 0.6 ~ 1.0 | V |
| LVDS differential output voltage | ΔV_{OD} | 100Ω termination between outputs | 350 | mV |
| LVDS offset voltage, typical | V_{OS} | | 1.25 | V |
| LVCMOS / LVTTTL output levels | VOH / VOL | min/max | 0.7Vcc / 0.3Vcc | V |
| Duty cycle | DC | Load = 10kΩ // 20pF | 40/60 or 45/55 | % |
| Rise/ fall time, max. | tr / tf | 20% - 80% (VOL, VOH) | 0.6 | ns |
| Absolute Pull Range | APR | Min guaranteed freq. pull over $\Delta f/f_c$ | ±32,50,80,100 | ppm |
| Control Voltage | VC | Centered = ½ (Vcc) | 1.25, 1.65 | V |
| Control Voltage Range | | Positive Slope; 10% Linearity, max | 0.3 ~ 0.9 (Vcc) | V |
| Modulation Bandwidth, min | BW | -3dB | 10 | KHz |
| RMS phase jitter | J | Typical | 0.8 | ps |
| Overall freq. stability, max. ¹ | $\Delta f/f_c$ | Various available, specified when ordered | ±20 ~ ±100. | ppm |
| Enable / Disable | En / Dis | Min (logic 1) / Max (logic 0) | 0.7 (Vcc) / 0.3 (Vcc) | V |
| Operating temperature | Ta | | -40 ~ +85 | °C |
| Storage temperature | T(stg) | Absolute max | -45 ~ +100 | °C |
| Absolute voltage range | Vcc(abs) | | Vcc ± 0.5 | V |

Notes

¹See part numbering table

²Contact factory

MECHANICAL SPECIFICATION



Notes

² V_C available on pin 1 or 2. See options on part numbering table.

³ Frequency Select pin (SEL)

Logic 1 (NC) = Output Frequency 1 (First frequency listed in part # is automatically available. Customer specified at time of order)

Logic 0 = Output Frequency 2 (Second frequency listed in part # is available. Customer sets SEL pin to Low)

PART NUMBERING SYSTEM:

| SERIES | NUMBER OF OUTPUTS | OUTPUT | SUPPLY VOLTAGE (V) | SYMMETRY (%) | TEMP RANGE (°C) | APR (ppm) | V _C and SEL Option | OUTPUT FREQUENCY (MHz) | |
|--|------------------------------------|-----------------------------------|--|----------------------|--|--|---|----------------------------------|----------------|
| Surface mount Multi-frequency Clock Oscillator | 1: Single Output 2: Dual Output | 9: LVPECL 8: LVDS 4: LVCMOS | 1: V _{CC} = 2.5 3: V _{CC} = 3.3 | A: 40/60 T: 45/55 | R: 0~50 S: 0~70 U: -20~70 V: -40~85 | F: ±32 H: ±50 G: ±80 J: ±100 ⁴ | 1 ⁵ : Pin 1 = V _C 2: Pin 1 = SEL | XXX.XXX-YYY.YYY Freq1- Freq 2 | |
| VSMF | 2 | 9 | 3 | A | S | H | 2 | - | XXX-YYY |

Notes

⁴ ± 100ppm APR may not be available with all frequencies and operating temperature ranges

⁵ Pin 1 = V_C is default configuration.

EXAMPLE: VSMF293ASH2-622-311

Clock Oscillator, 7x5mm package, Dual output, LVPECL, +3.3V Supply, 40/60 Symmetry, 0~+70°C Operating Temperature Range, ±50ppm APR, Select on pin 1, 622.080 MHz and 311.040MHz output frequency.

■ REFLOW PROFILE:



| Reflow profile IPC/JEDEC J-STD-020 REV. C | | | |
|---|-------------------|--|--------------|
| Temperature Min Preheat | T_{SMIN} | | 150°C |
| Temperature Max Preheat | T_{SMAX} | | 200°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 | | 20-40 sec. |
| Time $t[25°C]$ to Peak Temperature | $t[25°C]$ to Peak | | 480 sec. |
| Time | t_L | | 60-150 sec. |