

**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**

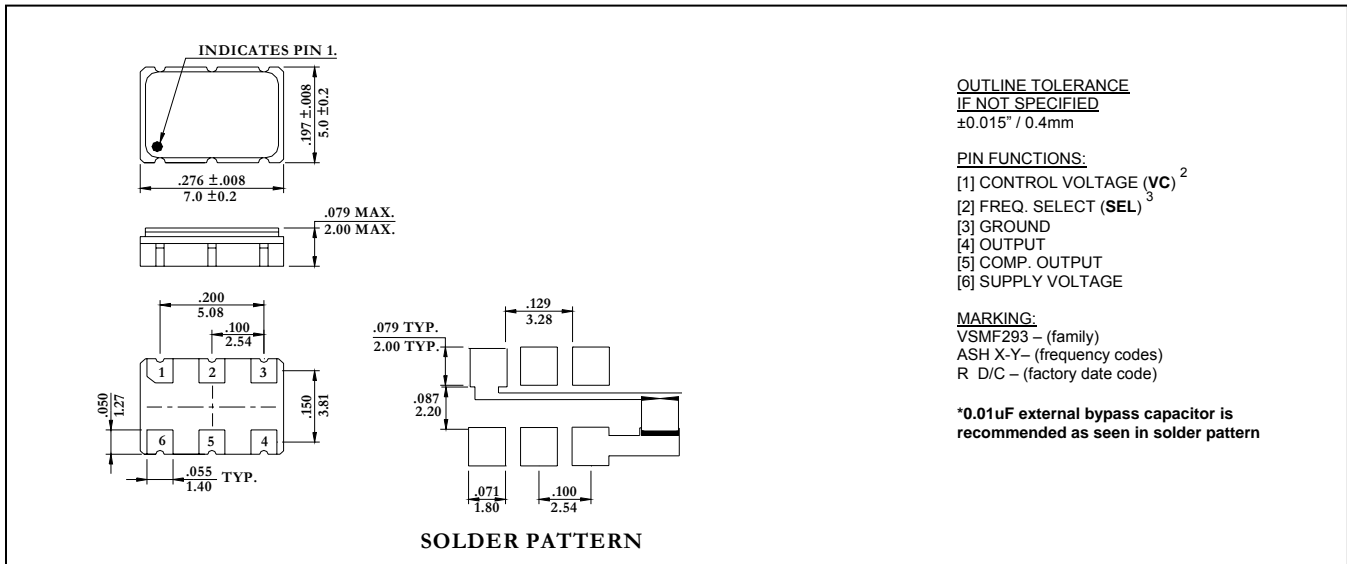
- SONET/SDH
- FIBRE CHANNEL
- 10G,100G, GIGABIT ETHERNET
- CLOCK / DATA RECOVERY
- TEST AND MEASUREMENT

■ **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	$V_{cc} - 1.4 \sim V_{cc} - 0.9$	V
	VOL		$V_{cc} - 2.0 \sim V_{cc} - 1.7$	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	$0.7V_{cc} / 0.3V_{cc}$	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 $\Delta f/f_c$	$\pm 32, 50, 80, 100$	ppm
Control Voltage	VC	Centered = $\frac{1}{2} (V_{cc})$	1.25, 1.65	V
Control Voltage Range		Positive Slope; 10% Linearity, max	$0.3 \sim 0.9 (V_{cc})$	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	$\pm 20 \sim \pm 100$.	ppm
Enable / Disable	En / Dis	Min (logic 1) / Max (logic 0)	$0.7 (V_{cc}) / 0.3 (V_{cc})$	V
Operating temperature	Ta		-40 ~ +85	°C
Storage temperature	T(stg)	Absolute max	-45 ~ +100	°C
Absolute voltage range	$V_{cc(ABS)}$		$V_{cc} \pm 0.5$	V

Notes¹See part numbering table²Contact 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

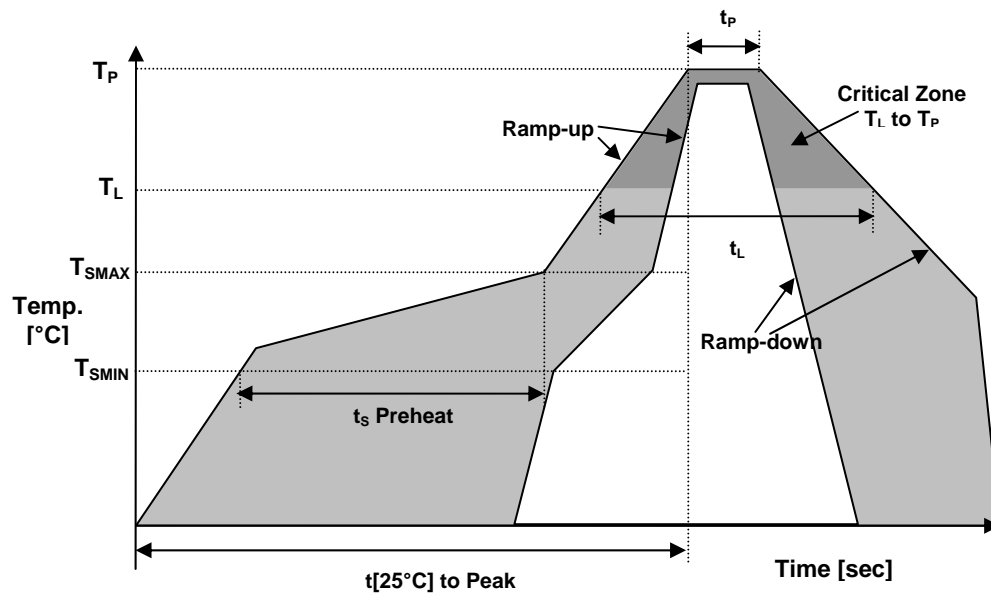
⁴ ± 100ppm APR may not be available with all frequencies and operating temperature ranges

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.