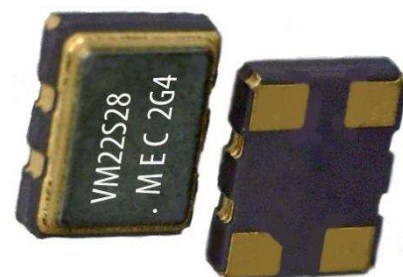


VCTCXO (Voltage Controlled Temperature Compensated Crystal Oscillator)
Series: VM22S Output: Clipped Sine Wave Load: 10 K Ω // 10 pF



Features:

- 2.5x2.0x0.8 (H) mm miniature ceramic SMD.
- Low supply voltage: 1.8, 2.5 or 2.8V
- Miniature, light weight and compact.
- Ideal for portable devices such as GPS and handsets.



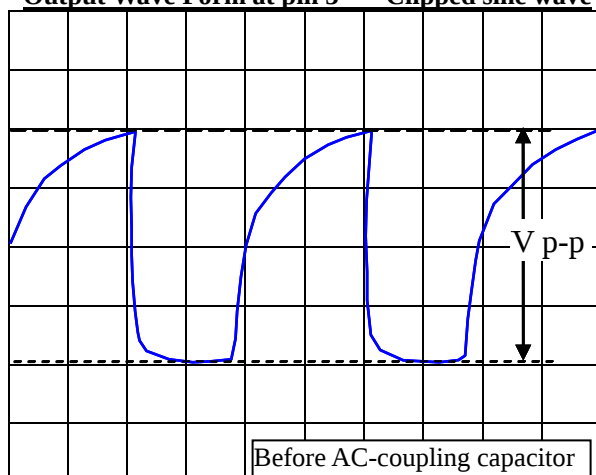
General Specifications (at +25°C and specified input voltage)

Mercury Product Series		VM22S Refer to “M22S” series (TCXO) if voltage control function is not required.					
Output Wave Form		Clipped Sine wave. Wave form code is “S”					
Supply Voltage		1.8V±5% (1.71V ~ 1.89V)		2.5V±5% (2.37V ~ 2.62V)		2.8V±5% (2.66V ~ 2.94V)	
Frequency Range (fo)		13 MHz ~ 52 MHz					
Initial Calibration Tolerance		±2 ppm. Max. +25°C, 1 hour after reflow.					
Frequency Stability vs Temperature vs Aging vs Voltage Change vs Load Change vs Reflow		From 0.5 ppm to ±2.5 ppm over operating temperature range. Referenced to frequency reading at +25°C. See table below for availability ±1.0 ppm max. first year at +25°C ±0.2 ppm max. for a ±5% input voltage change ±0.2 ppm max. for a ±10% loading condition change ±1 ppm max. 1 reflow and measured 24 hours afterwards					
Available Frequency stability vs Operating Temperature Range	Temp ppm	±0.5 ppm	±1.0 ppm	±1.5 ppm	±2.0 ppm	±2.5 ppm	√: Available
	0 to +55°C	√	√	√	√	√	☎: Call us
	-10 to +60°C	√	√	√	√	√	STD: Standard Spec.
	-20 to +70°C	√	√	√	√	√	
	-30 to +85°C	☎	√	√	√	STD	
	-40 to +85°C	☎	☎	√	√	√	
Output Voltage Level (peak to peak)		0.8 V p-p min. 2.0V p-p max. Load is 10 K Ω // 10 pF ±10%.					
Output format		DC coupled. See next page for the output waveform. Requires an external AC-Coupling capacitor at pin 3. 1000 pF is recommended.					
Current Consumption. (Over operating temperature range)		fo < 26 MHz: 2 mA max. fo ≥ 26 MHz: 2.5 mA max.					
Pin 1	VCTCXO only	Control voltage (Vcon)	0.9V (center) ± 0.6 V		1.4V (center) ± 1.0 V		
		Frequency Deviation Range (Pullability)	±5 ppm min.				
		Linearity	±10 % max				
		Slope Polarity	Positive slope. Positive voltage change for positive frequency shift.				
		Input Impedance	500 KΩ min.				
Start-up Time.		2 m. sec. max. (reach 90% amplitude and at+25°C±2°C)					
Packaging		8.0 mm tape; 4.0 mm pitch; 180 mm reel; 1000 pcs (code=P1) or 3000 pcs (code =P3) per reel. Cut tape for < 1K pcs					

Environmental Performance Specifications

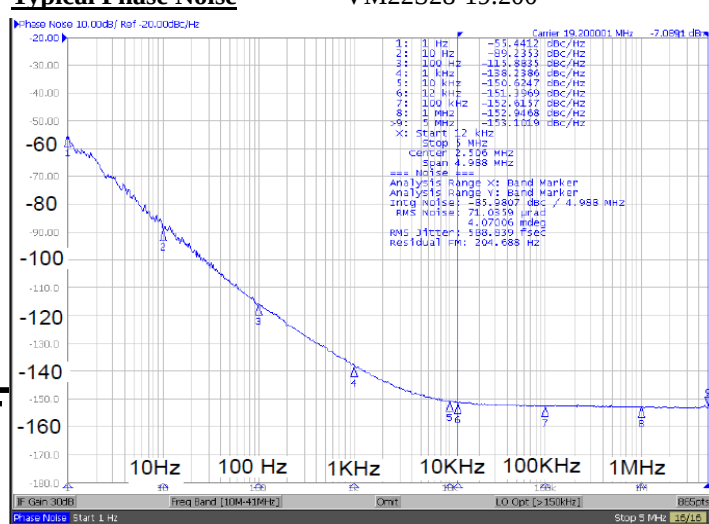
Green Requirement	RoHS compliant, Pb (lead) free. Free of Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's and PBDE's
Moisture sensitivity level	MSL=1 per IPC/JEDEC J-STD-020D.1
Humidity	85% RH, 85°C, 48 hours
Hermeticity, fine leak	MIL-STD-883, method 1014, condition A
Hermeticity, gross leak	MIL-STD-883, method 1014, condition C
Solderability	MIL-STD-202F, method 208E
Vibration	MIL-STD-883, method 2007, condition A, 10~2000 Hz, 1.52 mm, 20Gs, each axis for 4 hours
Mechanical shock	MIL-STD-883, method 2002, test condition B 1500Gs, half sine, 0.5 ms, each axis for 3 times
Resistance to solvent	MIL-STD-202, method 215
Resistance to soldering heat	MIL-STD-202, method 210
Temperature cycling	MIL-STD-883, Method 1010
Thermal shock	MIL-STD-883F, method 1011.9, Condition B -55~+125°C, 10 min sock time, 200 cycles
H.A.S.T. (Highly Accelerated Stress Test)	JESD22-A110
Storage temperature range	-55 to +125°C
ESD protection	1.5 KV min. Human body model.
Solder pad surface finish	Gold (0.3~1.0 μ m) over nickel (1.27~8.89 μ m)
Second level interconnect category	e4
Unit weight	0.12 grams

Output Wave Form at pin 3 – Clipped sine wave



Typical Phase Noise

VM22S28-19.200



Part Number Format and Example:

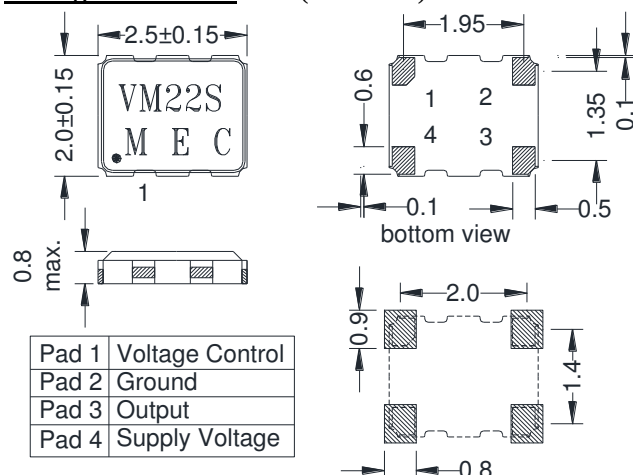
Example: VM22S25-19.200-2.5/-30+85								: Customer to specify	
VM22S	25	—	19.200	—	2.5	/	-30+85	P1	
①	②	dash	③	dash	④	slash	⑤	⑥	
① VM22S series, “S” is wave form code for clipped sine wave ② Supply voltage code: “28” for +2.8V, “25” for +2.5V, “18” for +1.8V ③ Frequency (MHz) ④ Frequency stability ($\pm$ x.x ppm) ⑤ Operating temperature range (°C). ⑥ Packaging: P1 for 1K pcs per reel; P3 for 3k pcs per reel.									

VCTCXO (Voltage Controlled Temperature Compensated Crystal Oscillator)
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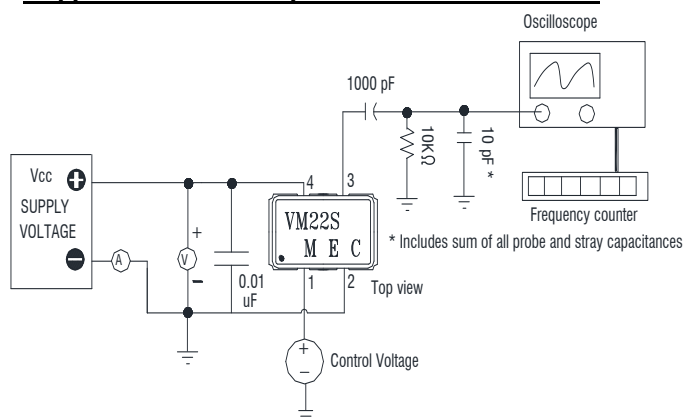


Package Dimensions:

(Unit: mm)

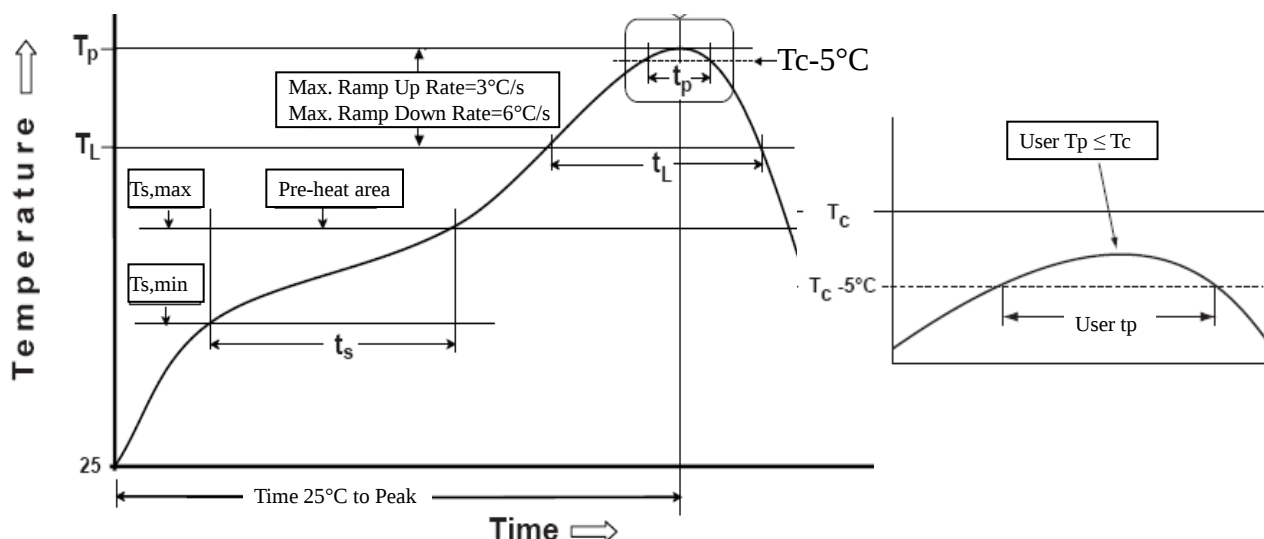


Clipped Sine Wave Output VCTCXO Test Circuit:



Recommended Reflow Soldering Profile

(per IPC/JEDEC J-STD-020D.1)



Profile Feature	Sn-Pb Eutectic Assembly	Pb-free Assembly
Preheat/Soak		
- Temperature min. (Ts min.)	100°C	150°C
- Temperature max. (Ts max.)	150°C	200°C
- Time (ts) (Ts min. to Ts max.)	60 to 120 seconds	60 to 180 seconds
Ramp-up rate (TL to Tp)	3°C / sec. max.	3°C / sec. max.
Liquidous temperature (TL)	183°C	217°C
Time (tl) maintained above TL	60 to 150 seconds	60 to 150 seconds
Peak package body temperature (Tp)	235°C	260°C
Time (Tp) within 5°C of the classification temperature Tc	10 to 30 seconds	20 to 40 seconds
Ramp-down rate (Tp to TL)	6°C / second max.	6°C / second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.