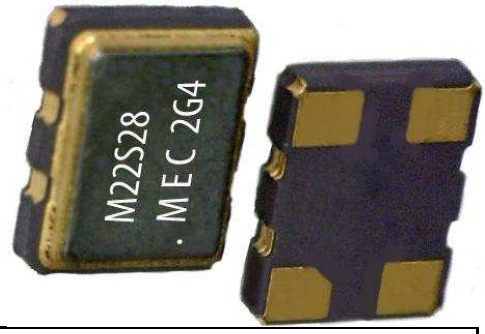
TCXO Temperature Compensated Crystal Oscillator
Series: M22S Output: Clipped Sine Wave Load: 10 K Ω // 10 pF

MERCURY
Since 1973

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.



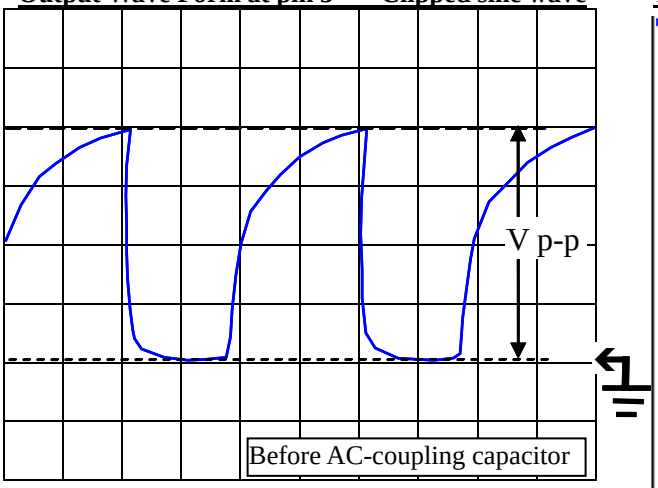
General Specifications (at+25°C and specified input voltage)

Mercury Product Series		M22S Refer to "VM22S" series (VCTCXO) if voltage control function is required.				
Output Wave From		**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**	From 0.5 ppm to ±2.5 ppm over operating temperature range. Referenced to frequency reading at +25°C. See table below for availability				
	vs Aging	±1.0 ppm max. first year at +25°C				
	vs Voltage Change	±0.2 ppm max. for a ±5% input voltage change				
	vs Load Change	±0.2 ppm max. for a ±10% loading condition change				
	vs Reflow	±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
	0 to +55°C	√	√	√	√	√
	-10 to +60°C	√	√	√	√	√
	-20 to +70°C	√	√	√	√	√
	-30 to +85°C	☎	√	√	√	STD
	-40 to +85°C	☎	☎	√	√	√
		√:Available ☎: Call us STD: Standard Spec.				
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.				
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				

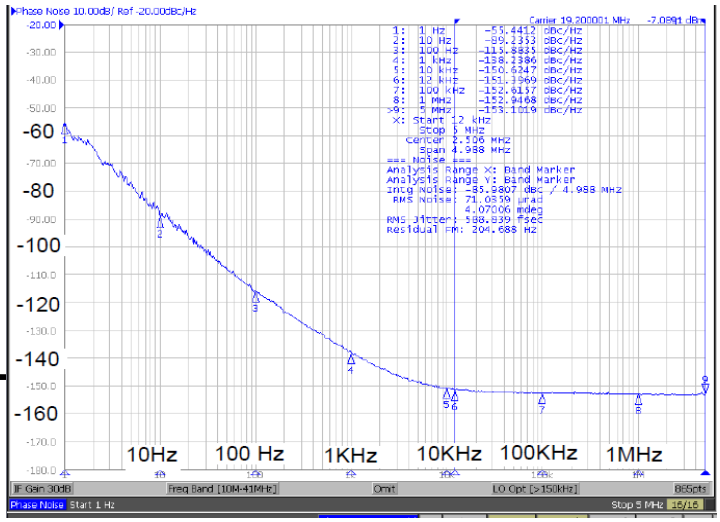
Environmental Performance Specifications

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 um) over nickel (1.27~8.89um)
Second level interconnect category	e4
Unit weight	0.12 grams

Output Wave Form at pin 3 – Clipped sine wave



Typical Phase Noise M22S28-19.200



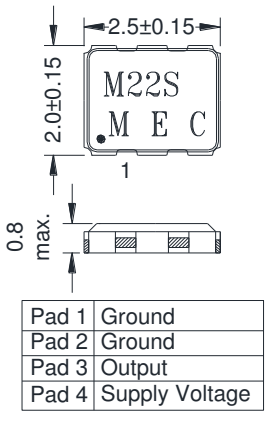
Part Number Format and Example:

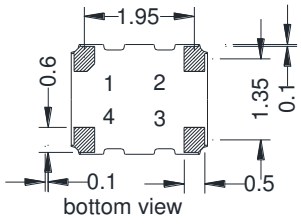
Example: M22S25-19.200-2.5/-30+85 ✍: Customer to specify

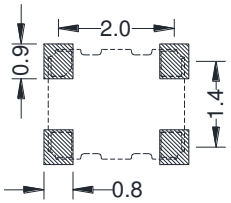
	✍		✍		✍		✍		
M22S	25	—	19.200	—	2.5	/	-30+85	P1	
❶	❷	dash	❸	dash	❹	slash	❺	❻	

❶ M22S series, "**S**" is wave form code for clipped sine wave
❷ Supply voltage code: "**28**" for +2.8V; "**25**" for "+2.5V; "**18**" for +1.8V.
❸ Frequency (MHz) ❹ Frequency stability (± x.x ppm)
❺ Operating temperature range (°C). ❻ Packaging: P1 for 1K pcs per reel; P3 for 3k pcs per reel.

Package Dimensions: (Unit: mm)

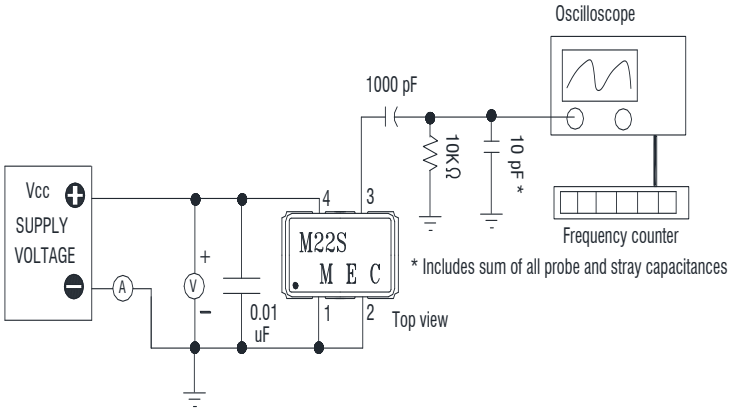




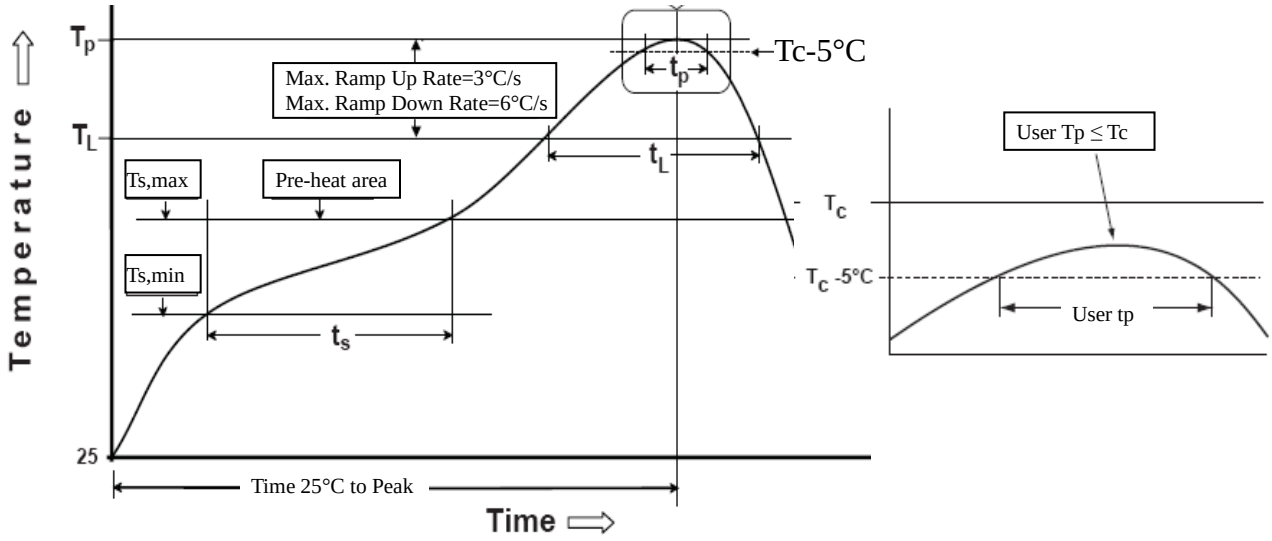


Pad 1	Ground
Pad 2	Ground
Pad 3	Output
Pad 4	Supply Voltage

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.) - Temperature max. (Ts max.) - Time (ts) (Ts min. to Ts max.)	 100°C 150°C 60 to 120 seconds	 150°C 200°C 60 to 180 seconds
Ramp-up rate (T_L to Tp)	3°C / sec. max.	3°C / sec. max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	183°C 60 to 150 seconds	217°C 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 T_L)	6°C / second max.	6°C / second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.