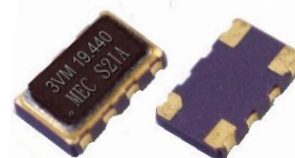


Temperature Compensated Crystal Oscillators [TCXO " M " and VCTCXO " VM "]

Clipped Sine Wave ; Wave form code " S " [SMD Type]

Features

- Frequency stability as tight as ± 0.5 ppm over -30°C to 85°C
- Frequency stability as tight as ± 1.0 ppm over -40°C to 85°C



General Specifications [$T_A = +25^{\circ}\text{C}$, $V_{DD} =$ at specified voltage , Load : 10K ohms/10 pF]

Output Wave Form	Clipped Sine wave . Wave form code is " S "			
Suggested package (SMD type)	M22S , VM22S	M32S , VM32S	M53S , VM53S	M57S , VM57S
Pads	4	4	4	4
Package size	2.5 x 2.0 x 0.8 mm	3.2 x 2.5 x 1.0 mm	5.0 x 3.2 x 1.3 mm	7.0 x 5.0 x 2.0 mm
Supply voltage (V_{DD}) [unit : V]	1.8 , 2.5 , 2.8 , 3.0 , 3.3	1.8 , 2.5 , 3.0 , 3.3	2.5 , 3.0 , 3.3 , 5.0	3.3 , 5.0
Frequency Range	10.0 ~ 52.0 MHz	8.192 ~ 52.0 MHz	6.4 ~ 52.0 MHz	1.25 ~ 52.0 MHz

Suggested package (SMD type)	M572S , VM572S	M43S , VM43S	M63S , VM63S	M47S , VM47S
Pads	4	4	6	4 (Gull - Wing)
Package size	7.0 x 5.0 x 2.3 mm	11.4 x 9.6 x 3.0 mm	11.4 x 9.6 x 3.0 mm	22.4 x 11.7 x 4.7 mm
Supply voltage (V_{DD}) [unit : V]	3.3 , 5.0	2.5 , 3.0 , 3.3 , 5.0	2.5 , 3.0 , 3.3 , 5.0	2.5 , 3.0 , 3.3 , 5.0
Frequency Range	6.4 ~ 52.0 MHz	6.4 ~ 40.0 MHz	6.4 ~ 40.0 MHz	6.4 ~ 40.0 MHz

Standard Frequency (Partial list) [MHz]	10.000	12.800	13.000	14.400	14.7456	15.360	16.367667
	16.384	19.200	19.440	20.000	25.000	26.000	27.000
Initial Calibration Tolerance	$< \pm 1$ ppm. at $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$						
Frequency Stability (ppm)	± 0.5 ppm	± 1.0 ppm	± 1.5 ppm	± 2.0 ppm	± 2.5 ppm	± 3.0 ppm	
Frequency Stability vs Temperature (examples)	0°C to 50°C	○	○	○	○	○	○
	-10°C to 60°C	△	○	○	○	○	○
	-20°C to 70°C	△	○	○	○	○	○
	-30°C to 75°C	△	○	○	○	○	○
	-30°C to 85°C	△	○	○	○	○	○
	-40°C to 85°C	△	△	○	○	○	○
Frequency Stability	vs Aging	± 1.0 ppm / year max. at 25°C					
	vs Voltage Change	± 0.2 ppm max. , for a $\pm 5\%$ input voltage change .					
	vs Load Change	± 0.2 ppm max. , for a $\pm 10\%$ load condition change .					
	vs Reflow (SMD type)	± 1.0 ppm max. , 1 reflow and measured 24 hours afterwards .					
Output Voltage Level (peak to peak)	0.8 V p-p (min.)						
Current Consumption. (max.)	10.0 ~ 15 MHz: 1.5 mA max.		15.1 ~ 26.0 MHz : 2.0 mA			26.1 ~ 52.0 MHz : 3.5 mA	
Electrical Frequency Tuning (EFC) by external control voltage	Control Voltage Center	1.8 V	0.9 V \pm 0.6 V		2.5 V	1.4 V \pm 1.0 V	
		3.0 V	1.5 V \pm 1.0 V		5.0 V	1.5 V \pm 1.0 V	
	Frequency Deviation Range	± 5.0 ppm (min.) , $V_{\text{control}} = +1.5 \text{ V} \pm 1.0 \text{ V}$					
	Slope Polarity (Transfer Function)	Positive slope. Positive voltage for positive frequency shift.					
	Input Impedance : 1.0M Ω min.		Modulation Bandwidth : 3 KHz min.		Linearity : $\pm 10\%$ max.		
Start-Up Time.	2.0 m sec. (typ.) , 5.0 m sec. (max.) (reach 90% amplitude and at $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$)						
Output Load	10 K Ω // 10 pF $\pm 10\%$						
Phase Noise (13.0 MHz as example) [dBc / Hz ; typical]	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz		
	-80	-115	-135	-148	-148		
Storage Temperature	-40°C to $+85^{\circ}\text{C}$ or -55°C to $+125^{\circ}\text{C}$ (package dependent)						

Mercury www.mercury-crystal.com ■ Taiwan : Tel: (+886)-2-2406-2779 / sales-tw@mercury-crystal.com

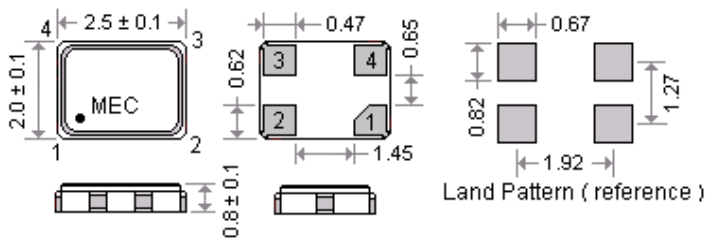
■ USA : Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■ China : Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

Temperature Compensated Crystal Oscillators [TCXO " M " and VCTCXO " VM "]

Clipped Sine wave output code " S " [SMD Type]

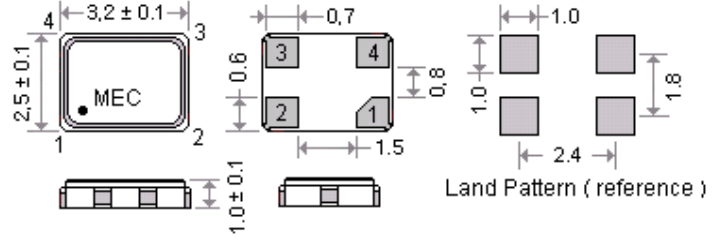
Outline Dimensions (Unit : mm) , Suggested pad Layout for SMDs

[M22S __] ; [VM22S __]



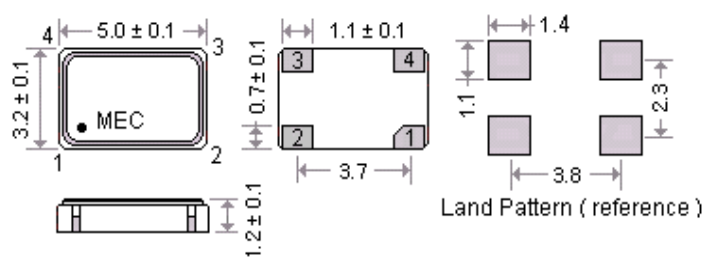
Pad Connections :
 Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
 Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage

[M32S __] ; [VM32S __]



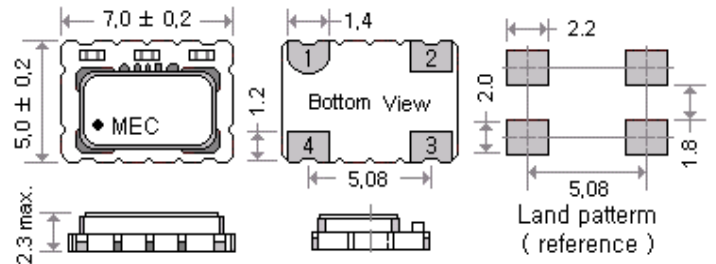
Pad Connections :
 Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
 Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage

[M53S __] ; [VM53S __]



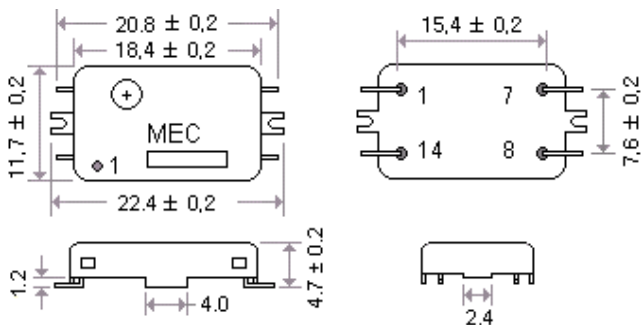
Pad Connections :
 Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
 Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage

[M572S __] ; [VM572S __]



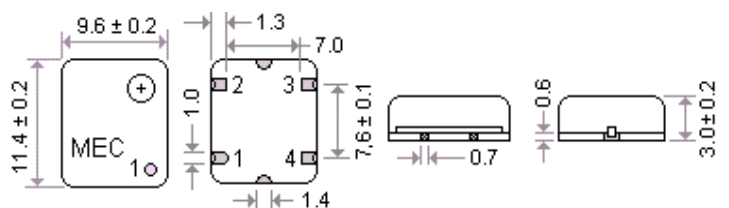
Pad Connections :
 Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
 Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage

[M47S __] ; [VM47S __]



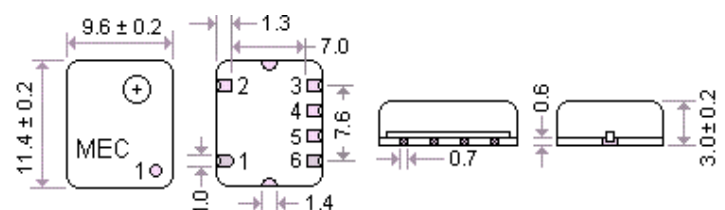
Pad Connections :
 Pad 1 : Control voltage for VCTCXO. Make no connection if TCXO.
 Pad 7 : Ground ; Pad 8 : Output , Pad 14 : Supply Voltage

[M43S __] ; [VM43S __]



Pad Connections :
 Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
 Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage

[M63S __] ; [VM63S __]



Pad Connections :
 Pad 1 , 2 , 4 : Ground , Pad 3 : Output , Pad 6 : Supply Voltage
 Pad 5 : Control voltage for VCTCXO. Make no connection if TCXO.

Temperature Compensated Crystal Oscillators [TCXO " M " and VCTCXO " VM "]

Clipped Sine wave output code " S "

Part Number Format and Example

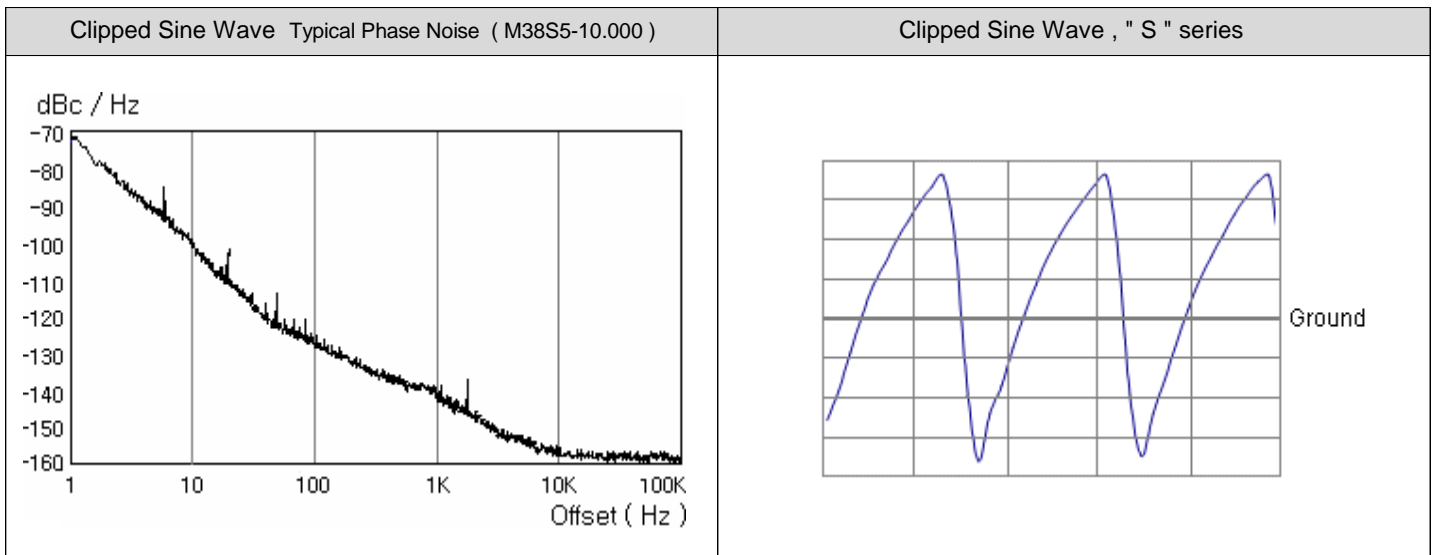
	[1]	[2]	[3]		[4]		[5]		[6]
	Holder Type	Output Wave	Supply Voltage	-	Center Frequency	-	Frequency Stability	/	Operating Temp. Range

Examples	(1)	V M 39	S	5	-	10.000	-	1.5	/	-20+70
	(2)	M 32	S	18	-	20.000	-	2.5	/	-30+75

Ex (1) : VM39S5 - 10.000 - 1.5 / -20+70 [VCTCXO , VM39 type , Clipped Sine Wave , 5.0V , 10.000MHz , ±1.5ppm from -20°C to 70°C]

Ex (2) : M32S18 - 20.000 - 2.5 / -30+75 [TCXO , M32 type , Clipped Sine Wave , 1.8V , 20.000MHz , ±2.5ppm from -30°C to 75°C]

[1]	Holder Type " M " stands for TCXO , " VM " stands for VCTCXO
[2]	" S " stands for Clipped Sine Wave ; " T " stands for Square Wave ; " D " stands for LVDS differential ; " P " stands for PECL differential
[3]	Supply voltage , " 18 " stands for +1.8V ; " 28 " stands for +2.8V ; " 3 " stands for +3.0V ; " 33 " stands for +3.3V ; " 5 " stands for +5.0V
[4]	Center Frequency in MHz
[5]	Frequency stability in ± _ ppm ; ex 1 : ± 2.5ppm --- 2.5 , ex 2 : ± 1.0ppm --- 1.0
[6]	Operating temperature range in °C ex 1 : -10 °C to 60°C ----- -10+60 ; ex 2 : -20 °C to 70°C ----- -20+70 ; ex 3 : -30 °C to 85°C ----- -30+85



(VC)TCXO with clipped sine wave Test Circuits : Ex. VM14S5

