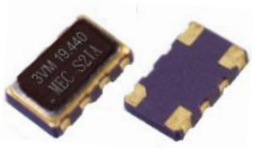
Temperature Compensated Crystal Oscillators [TCXO " M " and VCTCXO " VM "]

Clipped Sine Wave ; Waveform 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 [TA = +25°C , V_{DD}= at specified voltage , Load : 10K ohms//10 pF]

Output Waveform	Clipped Sine wave . Waveform code is " S "			
Suggested package	**M21S , VM21S**	**M22S , VM22S**	**M32S , VM32S**	**M53S , VM53S**
Package size	2.05 x 1.65 x 0.70 mm	2.5 x 2.0 x 0.8 mm	3.2 x 2.5 x 1.2 mm	5.0 x 3.2 x 1.3 mm
Supply voltage (V_{DD}) [unit : V]	1.8 , 2.5 , 2.8 , 3.0 , 3.3	1.8 , 2.5 , 2.8 , 3.0 , 3.3	1.8 , 2.5 , 3.0 , 3.3	1.8 , 2.5 , 2.8 , 3.0 , 3.3
Frequency Range	10.0 ~ 52.0 MHz	10.0 ~ 52.0 MHz	8.192 ~ 52.0 MHz	6.4 ~ 52.0 MHz

Suggested package	**M57S , VM57S**	**M572S , VM572S**	**M53S-AB , VM53S-AB**	**M57S-AB , VM57S-AB**
Package size	7.0 x 5.0 x 1.9 mm	7.0 x 5.0 x 2.3 mm	5.0 x 3.2 x 1.3 mm	7.0 x 5.0 x 1.4 mm
Supply voltage (V_{DD}) [unit : V]	2.5 , 3.0 , 3.3	1.8 , 2.5 , 2.8 , 3.0 , 3.3	1.8 , 2.5 , 2.8 , 3.0 , 3.3	1.8 , 2.5 , 2.8 , 3.0 , 3.3
Frequency Range	6.4 ~ 52.0 MHz	6.4 ~ 52.0 MHz	10.0 ~ 52.0 MHz	10.0 ~ 52.0 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	< ± 1 ppm. at + 25°C ± 2°C						
Frequency Stability (ppm)	± 0.5 ppm	± 1.0 ppm	± 1.5 ppm	± 2.0 ppm	± 2.5 ppm	± 3.0 ppm	○ : available ▷ : contact us X : not available
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 at Ta = +25°C	± 1.0 ppm / year (max.)
	vs Voltage Change	± 0.2 ppm (max.) , for a ±5% input voltage change .
	vs Load Change	± 0.2 ppm (max.) , for a ±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 ; 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	2.5 V	3.0 V / 3.3V
		0.9 V ± 0.6 V	1.4 V ± 1.0 V	1.5 V ± 1.0 V
	Frequency Deviation Range	± 5.0 ppm (min.)		
	Slope Polarity (Transfer Function)	Positive slope. Positive voltage for positive frequency shift.		
		Input Impedance : 1.0M Ω (min.)	Modulation Bandwidth : 3 KHz (min.)	Linearity : ± 10 % (max.)
Start-Up Time	2.0 msec. (typ.) , 5.0 msec. (max.) (reach 90% amplitude and at +25°C ± 2°C)			
Output Load	10 KΩ // 10 pF ± 10%			
Output Format	DC block , AC coupled. EX : (V) M53 and (V) M32 model.			

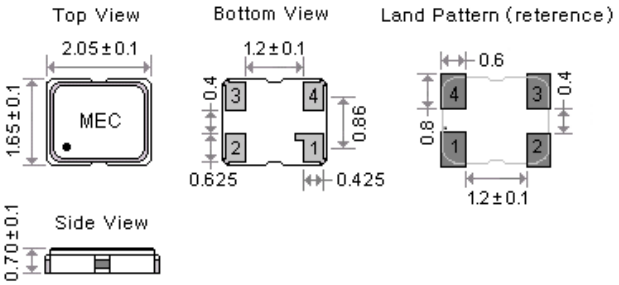
Phase Noise [dBc / Hz ; (typ.)]	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz
	13.000 MHz	-80	-115	-135	-148	-148
Storage Temperature	-40°C to +85°C or -55°C to +125°C (package dependent)					

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

Clipped Sine Wave Output Code " S " [SMD Type]

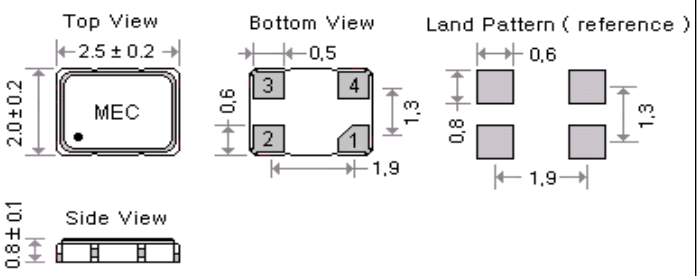
Outline Dimensions (Unit : mm) , Suggested pad Layout for SMDs

[M21S _ _] ; [VM21S _ _]



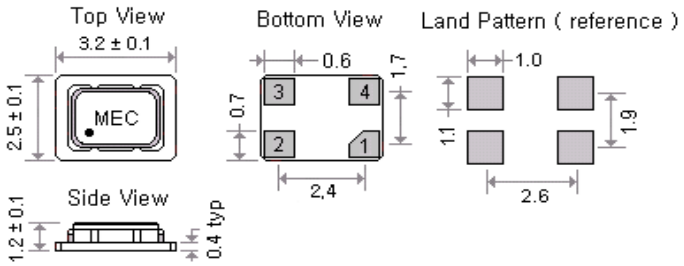
Pad Connections :
Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
Pad 2 : Ground ; Pad 3 : Output ; Pad 4 : Supply Voltage

[M22S _ _] ; [VM22S _ _]



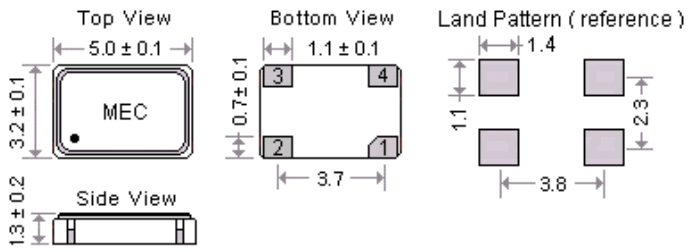
Pad Connections :
Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
Pad 2 : Ground ; Pad 3 : Output ; Pad 4 : Supply Voltage

[M32S _ _] ; [VM32S _ _]



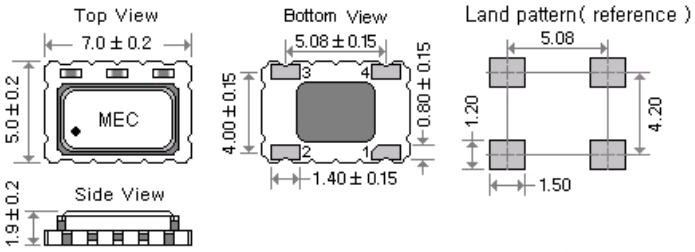
Pad Connections :
Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
Pad 2 : Ground ; Pad 3 : Output ; Pad 4 : Supply Voltage

[M53S _ _] ; [VM53S _ _]



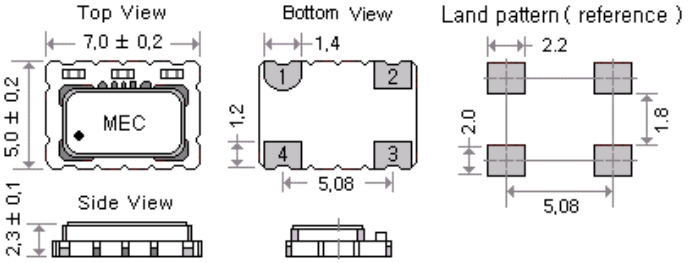
Pad Connections :
Pad 1 : Control voltage for VCTCXO ; Ground for TCXO .
Pad 2 : Ground ; Pad 3 : Output ; Pad 4 : Supply Voltage

[M57S _ _] ; [VM57S _ _]



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

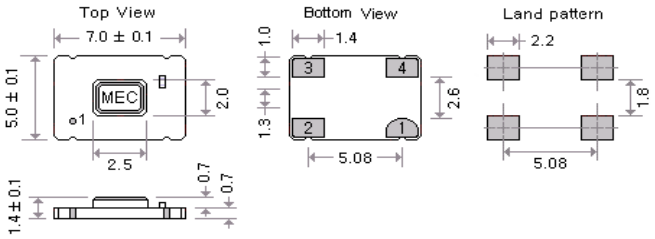
[M572S _ _] ; [VM572S _ _]



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

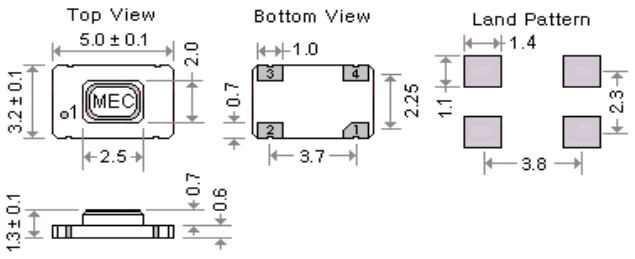
Outline Dimensions (Unit : mm) , Adapter Board Type

[M57S _ _ AB] ; [VM57S _ _ AB]



Pad Connections :
Pad 1 : Control voltage for VCTCXO ; No connection for TCXO
Pad 2 : Ground ; Pad 3 : Output ; Pad 4 : Supply Voltage
White marker is pad1 on PCB

[M53S _ _ AB] ; [VM53S _ _ AB]



Pad Connections :
Pad 1 : Control voltage for VCTCXO ; No connection for TCXO
Pad 2 : Ground ; Pad 3 : Output ; Pad 4 : Supply Voltage
White marker is pad1 on PCB

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

Clipped Sine Wave Output Code " S "

Part Number Format and Example

	[1] Holder Type	[2] Output Wave	[3] Supply Voltage	-	[4] Center Frequency	-	[5] Frequency Stability	/	[6] Operating Temp. Range	-	[7] Adapter Board
Examples (1)	VM21	S	3	-	10.000	-	1.5	/	-20+70		
(2)	M32	S	18	-	20.000	-	2.5	/	-30+75		
(3)	VM57	S	33	-	10.000	-	1.0	/	-20+70	-	AB
(4)	M53	S	18	-	16.384	-	2.5	/	-40+85	-	AB

Ex (1) : VM21S3 - 10.000 - 1.5 / -20+70 [VCTCXO , VM21 type , Clipped Sine Wave, 3.0V , 10.000MHz , ±1.5ppm from -20°C to 70°C]

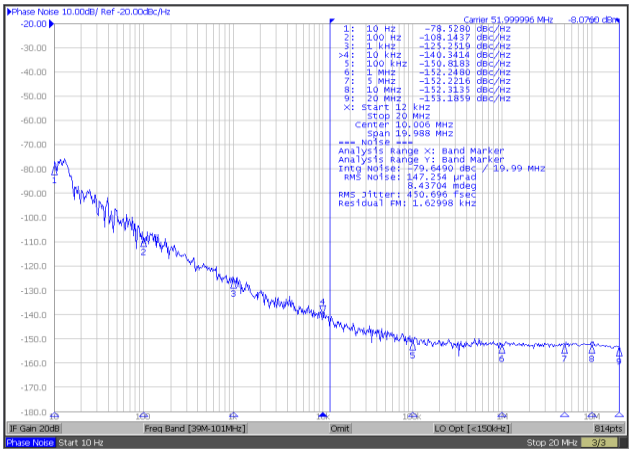
Ex (2) : M32S18 - 20.000 - 2.5 / -30+75 [TCXO , M32 type , Clipped Sine Wave , 1.8V , 20.000MHz , ±2.5ppm from -30°C to 75°C]

Ex (3) : VM57S33 - 10.000 - 1.0 / -20+70 - AB [VCTCXO , VM57 type , Clipped Sine Wave , 3.3V , 10.000MHz , ±1.0ppm from -20°C to 70°C , Adapter Board]

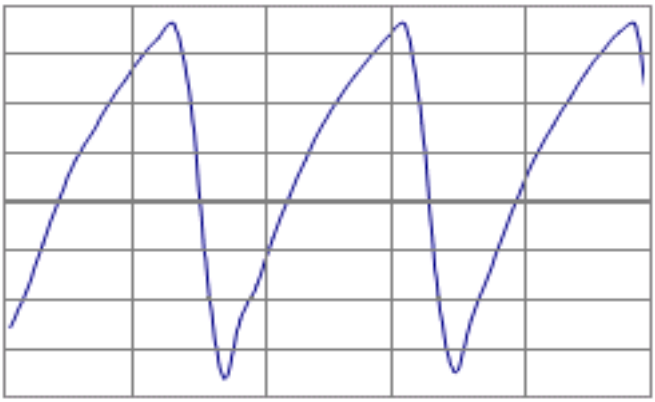
Ex (4) : M53S18 - 16.384 - 2.5 / -40+85 - AB [TCXO , M53 type , Clipped Sine Wave , 1.8V , 16.384MHz , ±2.5ppm from -40°C to 85°C , Adapter Board]

[1]	Holder Type
	" M " stands for TCXO , " VM " stands for VCTCXO
[2]	" S " stands for Clipped Sine Wave
[3]	Supply voltage , " 18 " stands for +1.8V ; " 25 " stands for +2.5V ; " 28 " stands for +2.8V ; " 3 " stands for +3.0V ; " 33 " stands for +3.3V
[4]	Center Frequency in MHz
[5]	Frequency stability in ± _ ppm ; ex 1 : ± 1.5ppm --- 1.5 , ex 2 : ± 2.5ppm --- 2.5 , ex 3 : ± 1.0ppm --- 1.0 , ex 4 : ± 2.5ppm --- 2.5
[6]	Operating temperature range in °C
	ex 1 : -20 °C to 70°C ----- -20+70 ; ex 2 : -30 °C to 75°C ----- -30+75 ; ex 3 : -20 °C to 70°C ----- -20+70 ; ex 4 : -40 °C to 85°C ----- -40+85
[7]	Adapter Board Type ----- AB

Clipped Sine Wave Typical Phase Noise (M22S33-52.000)

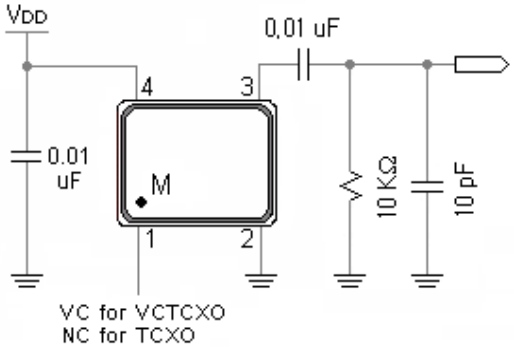


Clipped Sine Wave , " S " series

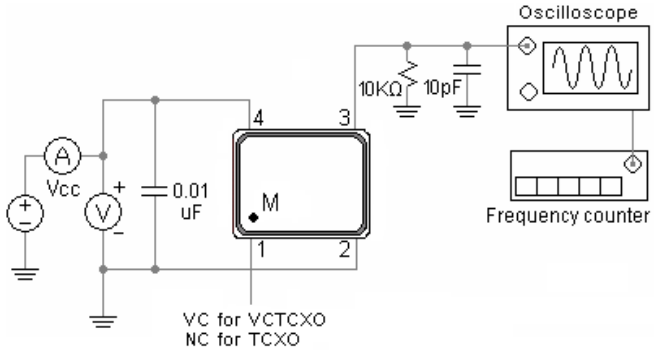


Test Circuits

(VC)TCXO with clipped sine wave Test Circuits

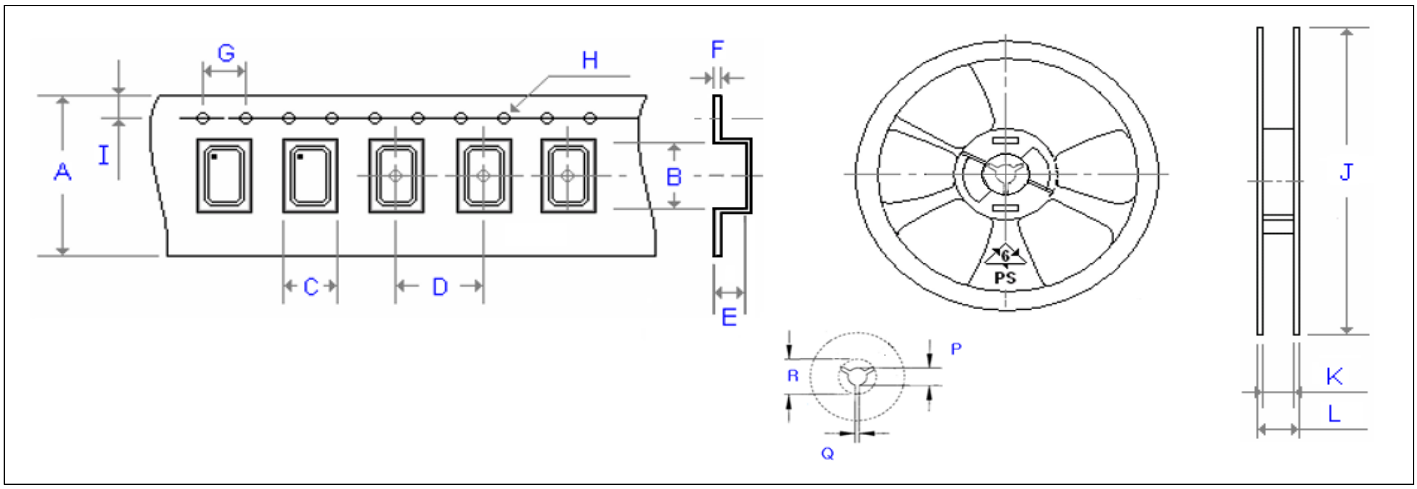


(VC)TCXO with clipped sine wave Test Circuits For [(V)M57S] ; [(V)M572S] ; [(V)M57S _ _ AB] ; DIP Type



Emboss Taping and Reel Specifications

[VCXO]	[(VC)TCXO]



Carrier Type Dimensions (unit : mm) ±0.3mm

	A	B	C	D	E	F	G	H	I	pcs / reel
G_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
G_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
G_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
G_576	16.00	7.30	5.30	8.00	1.90	0.30	4.00	Ø 1.50	1.75	1000
G_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	Ø 1.50	1.75	1000
G_578	16.00	7.30	5.30	8.00	1.90	0.30	4.00	Ø 1.50	1.75	1000
(V)M21	8.00	2.30	1.90	4.00	0.90	0.25	4.00	Ø 1.50	1.75	3000
ME21	8.00	2.30	1.50	4.00	1.35	0.25	4.00	Ø 1.50	1.75	3000
(V)M22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
(V)M_32	8.00	3.71	2.80	4.00	1.75	0.25	4.00	Ø 1.50	1.75	3000
(V)M_326	12.00	3.60	2.90	4.00	1.70	0.30	4.00	Ø 1.50	1.75	1000
(V)M_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
(V)M_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	Ø 1.50	1.75	1000
(V)M_57(2)	16.00	7.40	5.50	8.00	2.80	0.35	4.00	Ø 1.50	1.75	500
(V)M_43 (63)	24.00	11.80	10.00	16.00	5.00	0.30	4.00	Ø 1.50	1.75	500

Reel Dimensions (unit : mm) +2.0 / -0.0mm

	J	K	L	P	Q	R	pcs / reel
G_226	180.00	9.00	12.00	13.20	2.10	-	3000
G_326	180.00	9.00	12.00	13.20	2.10	-	3000
G_536	180.00	13.00	16.00	13.20	2.50	-	1000
G_576	180.00	17.20	19.30	13.30	2.20	22.00	1000
G_538	180.00	13.00	16.00	13.20	2.50	-	1000
G_578	180.00	17.20	19.30	13.30	2.20	22.00	1000
(V)M21	180.00	9.00	12.00	13.20	2.10	-	3000
ME21	180.00	9.00	12.00	13.20	2.10	-	3000
(V)M22	180.00	9.00	12.00	13.20	2.10	-	3000
(V)M_32	180.00	9.00	12.00	13.20	2.10	-	3000
(V)M_326	180.00	13.00	16.00	13.20	2.50	-	1000
(V)M_53	180.00	13.00	16.00	13.20	2.50	-	1000
(V)M_538	180.00	13.00	16.00	13.20	2.50	-	1000
(V)M_57(2)	180.00	17.20	19.30	13.30	2.20	22.00	500
(V)M_43 (63)	330.00	24.50	29.10	13.00	2.20	17.30	500