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

Clipped Sine Wave ; Wave form code " **S** " [Dip 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 Wave Form	Clipped Sine wave . Wave form code is " *S* "					
Suggested package (Dip type)	**M8S , VM8S**	**M9S , VM9S**	**M14S , VM14S**	**M15S , VM15S**	**M39S , VM39S**	
Model with Trimmer	- - - - -	with Trimmer	- - - - -	with Trimmer	with Trimmer	
Package size	12.8 x 12.8 x 5.5 mm	12.8 x 12.8 x 5.5 mm	20.2 * 12.8 * 7.0	20.2 * 12.8 * 7.0	18.4 x 11.7 x 4.7 mm	
Supply voltage (V_{DD}) [unit : V]	2.5 , 3.0 , 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	2.5 , 3.0 , 3.3 , 5.0	
Frequency Range	6.4 ~ 52.0 MHz	6.4 ~ 52.0 MHz	6.4 ~ 52.0 MHz	6.4 ~ 52.0 MHz	6.4 ~ 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 for model with trimmer < ± 2 ppm. at + 25°C ± 2°C for model without trimmer						
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	± 1.0 ppm / year max. at 25C
	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 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	2.5 V	1.4 V ± 1.0 V	3.0 V	1.5 V ± 1.0 V
		3.3 V	1.5 V ± 1.0 V	5.0 V	1.5 V ± 1.0 V
	Frequency Deviation Range	± 5.0 ppm (min.) , Vcontrol = +1.5 V±1.0 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 : ± 10 % max.	
Start-Up Time.		2.0 m sec. (typ.) , 5.0 m sec. (max.) (reach 90% amplitude and at +25°C ± 2°C)			
Output Load		10 KΩ // 10 pF			

Phase Noise (13.0 MHz as example)	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz
[dBc / Hz ; typical]	-80	-115	-135	-148	-148
Storage Temperature	-40°C to +85°C or -55°C to +125°C (package dependent)				

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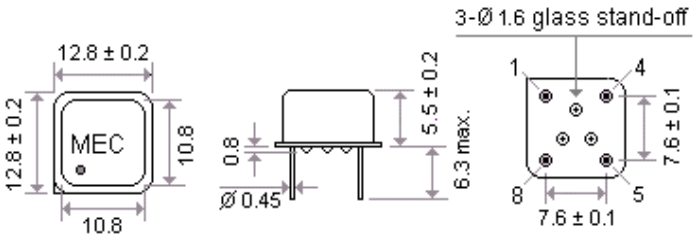
Clipped Sine wave output code " **S** " [Dip Type]

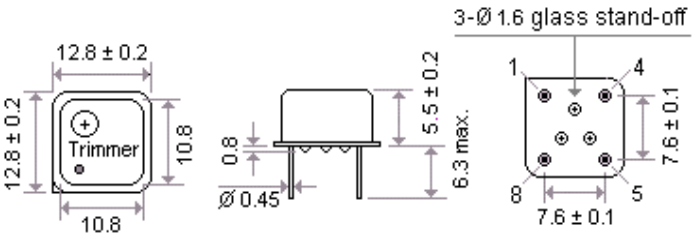
Outline Dimensions (Unit : mm) , Suggested pin Layout for SMDs

[(V) M8S]



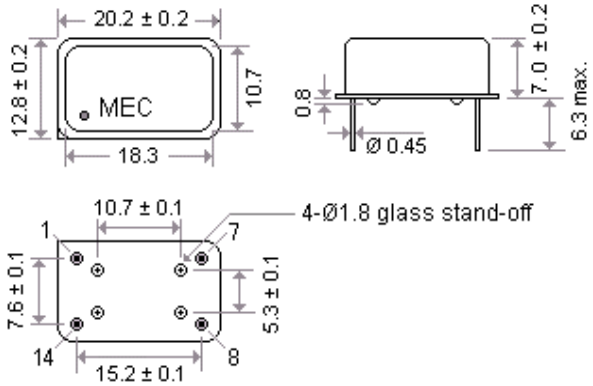
Pin Connections :
Pin 1 : Control voltage for VCTCXO ; No connection for TCXO.
Pin 4 : Ground ; Pin 5 : Output , Pin 8 : Supply Voltage

[(V) M9S]



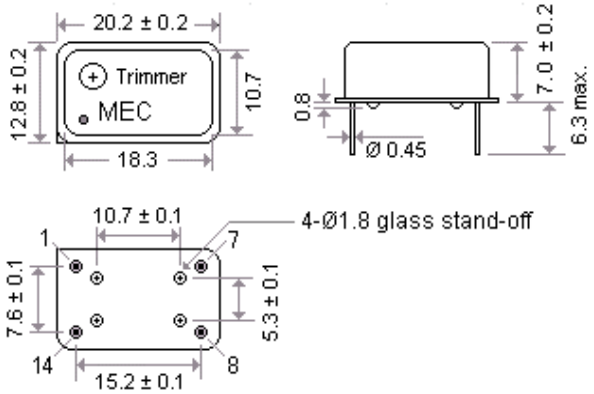
Pin Connections :
Pin 1 : Control voltage for VCTCXO ; No connection for TCXO.
Pin 4 : Ground ; Pin 5 : Output , Pin 8 : Supply Voltage

[(V) M14S]



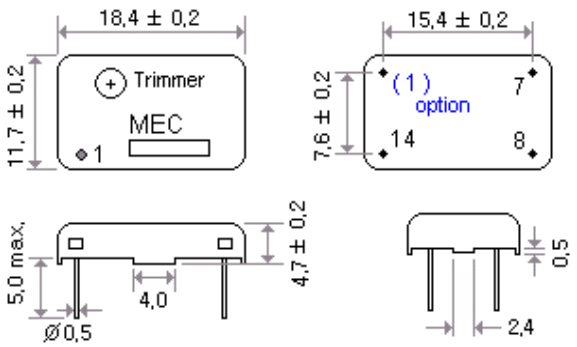
Pin Connections :
Pin 1 : Control voltage for VCTCXO , No connection for TCXO .
Pin 7 : Ground ; Pin 8 : Output , Pin 14 : Supply Voltage

[(V) M15S]



Pin Connections :
Pin 1 : Control voltage for VCTCXO , No connection for TCXO .
Pin 7 : Ground ; Pin 8 : Output , Pin 14 : Supply Voltage

[(V) M39S]



Pin Connections :
Pin 1 : Control voltage for VCTCXO
[No physical pin 1 for TCXO. (3 pins only).]
Pin 7 : Ground ; Pin 8 : Output , Pin 14 : Supply Voltage

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

Clipped Sine wave output code " **S** "

Part Number Format and Example

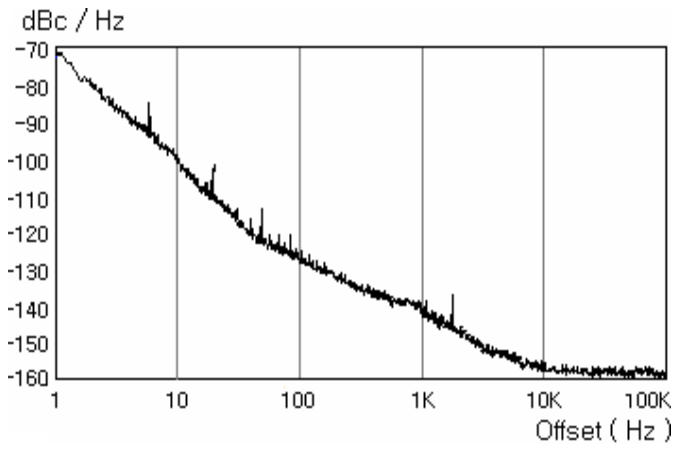
[1]	[2]	[3]		[4]		[5]		[6]
Holder Type	Output Wave	Supply Voltage	-	Center Frequency	-	Frequency Stability	/	Operating Temp. Range
Examples (1)	V M 39	S	5	-	10.000	-	1.5	/	-20+70
(2)	M 32	S	18	-	20.000	-	2.5	/	-30+75

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]

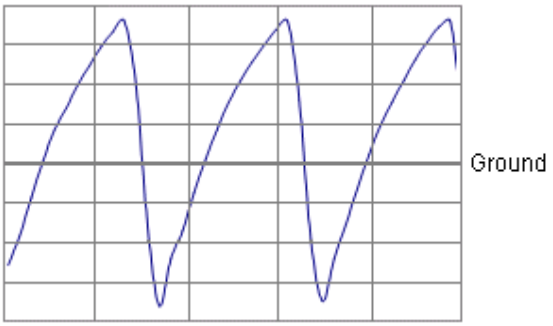
Ex (2) : M32S18 - 20.000 - 2.5 / -30+75 [TCXO , M32 type , Clipped Sine Wave , 1.8V , 20.000MHz , ±2.5ppm from -30°C to 75°C]

[1]	Holder Type
	" M " stands for TCXO , " VM " stands for VCTCXO
[2]	" S " stands for Clipped Sine Wave
[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

Clipped Sine Wave Typical Phase Noise (M38S5-10.000)



Clipped Sine Wave , " S " series



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