

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

CMOS Output

TCXO	VCTCXO	MHz range	CMOS	SMD	15pF	2.5 V 3.3 V	3.0 V 5.0 V	Min. 1.25 MHz	Max. 52.0 MHz
M _ T	VM _ T								

Features

- Wide frequency range : [1.25 MHz ~ 52.0 MHz]
- Frequency stability as tight as ± 0.5 ppm over 0°C to 50°C
- Frequency stability as tight as ± 1.0 ppm over -40°C to 85°C



General specifications of all available packages , at $T_a=+25^{\circ}\text{C}$, $C_L=15\text{pF}$

Output Wave Form				Square wave [CMOS] . Wave form code is " T "							
Type				M32T , VM32T		(V)M53T , VM53T		M572T , VM572T			
Package (Size)				(3.2 x 2.5 x 1.0 mm)		(5.0 x 3.2 x 1.3 mm)		(7.0 x 5.0 x 2.3 mm)			
Frequency Range				8.192 ~ 52.0 MHz		6.4 ~ 52.0 MHz		1.25 ~ 52.0 MHz			
Input Voltage Range		Standard		+2.5 V (code is " 25 ")		+3.0 V (code is " 3 ")		+3.3 V (code is " 33 ")		+5.0 V (code is " 5 ")	
Current Consumption. (max.) (Over operating temperature range .)		Package	M32T	6 mA		6 mA		6 mA		-----	
			M53T	6 mA		6 mA		6 mA		-----	
			M572T	10 mA		13 mA		13 mA		27 mA	
Output Logic Levels		Logic High " 1 " (min.)		2.25 V		2.7 V		2.97 V		4.5 V	
		Logic Low " 0 " (max.)		0.25 V		0.3 V		0.33 V		0.5 V	
Standard Frequency (Partial list) [MHz]				10.000	12.800	13.000	14.7456	16.000	16.384		
				19.200	19.440	19.680	20.000	25.000	27.000		
Initial Calibration Tolerance				Models with mechanical trimmer : < ± 1.0 ppm. +25°C ± 2°C. Models without mechanical trimmer : ± 2.0 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 △ : please 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	X	○	○	○	○	○			
		-30°C to 75°C	X	○	○	○	○	○			
		-30°C to 85°C	X	○	○	○	○	○			
		-40°C to 85°C	X	△	○	○	○	○			
Frequency Stability		vs Aging	± 1.0 ppm max., per year at 25°C .								
		vs Voltage Change	± 0.3 ppm max. , for a ± 5% input voltage change .								
		vs Load Change	± 0.3 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)				CMOS							
Mechanical Frequency Tuning		Standard	± 3.0 ppm (min.) tuning								
			Note: VM57 has no mechanical trimmer built-in.								
		Option	No mechanical trimmer built-in (for aqueous washing cycles).								
			To order please add " 1 " after the regular model prefix . Example: M381T.								
Electrical Frequency Tuning (EFC) by external control voltage		Control Voltage Center		Standard: +1.5 V ± 1.0 V for all input voltages.							
		Frequency Deviation Range		± 5.0 ppm. (min.) with Vcon = +1.5 V±1.0 V							
		Slope Polarity (Transfer Function)		Positive slope. Positive voltage for positive frequency shift.							
				Input Impedance : 1 M Ω min.		Modulation Bandwidth : 20 KHz min.		Linearity : ± 10 % max.			
Rise Time and fall time				10.0 n sec. max. ; 20% → 80% of the wave form.							
Duty Cycle				Standard: 50 % ± 10 % ; Option: 50 % ± 5 %							
Start-Up Time.				5.0 m sec. (typ.) , 10.0 m sec. (max.) (reach 90% amplitude and at+25°C ± 2°C)							
Output Load				15 pF							
SSB Phase Noise at 25°C , 15pF		Offset / dBc / Hz [typical]		10 Hz	100 Hz	1 KHz	10 KHz	100 KHz			
		M572T33 - 10.000		-96 dBc / Hz	-122 dBc / Hz	-138 dBc / Hz	-145 dBc / Hz	-150 dBc / Hz			
Storage Temperature				-55°C to +125°C							

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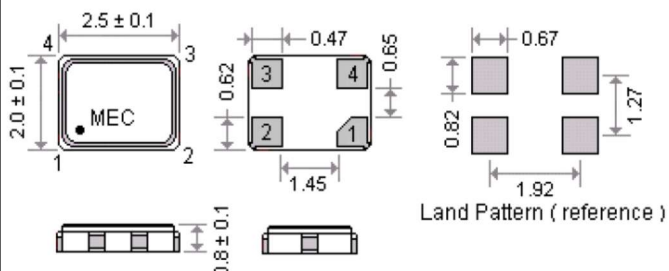
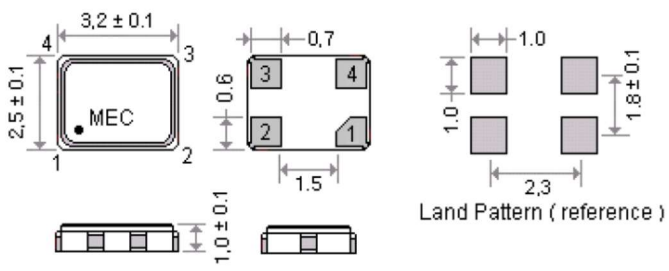
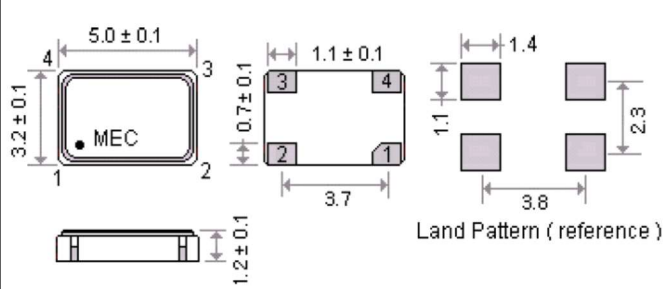
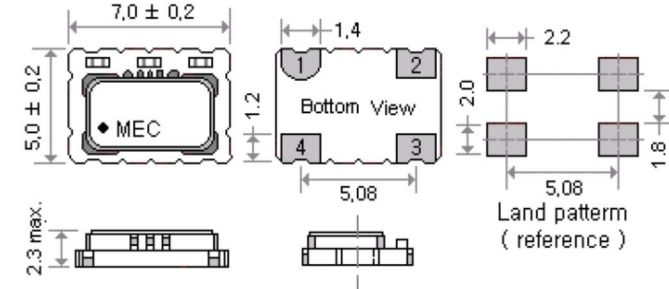
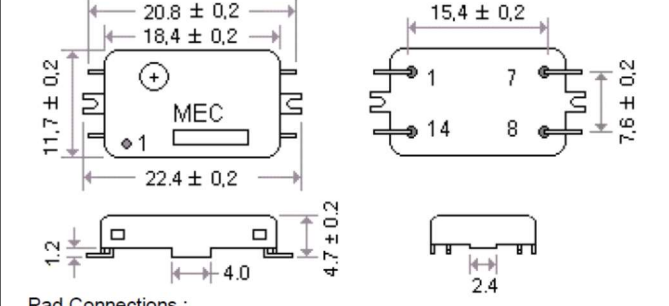
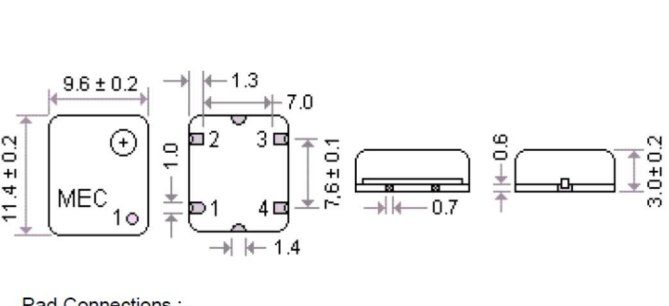
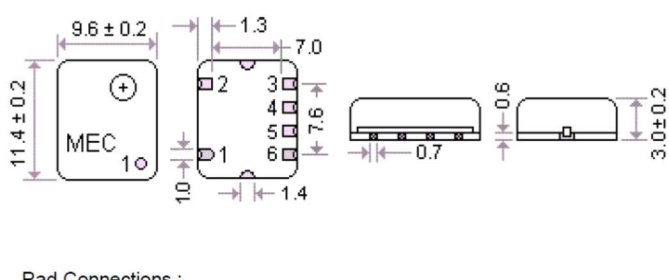
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Temperature Compensated Crystal Oscillators [TCXO " M " and VCTCXO " VM "]

CMOS wave output code " T "

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

[(V) M22T]	[(V) M32T]
 Pad Connections : Pad 1 : Control voltage for VCTCXO ; Ground for TCXO . Pad 2 : Ground ; Pin 3 : Output , Pin 4 : Supply Voltage	 Pad Connections : Pad 1 : Control voltage for VCTCXO ; Ground for TCXO . Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage
[(V) M53T]	[(V) M572T] , [(V) M_572T]
 Pad Connections : Pad 1 : Control voltage for VCTCXO ; Ground for TCXO . Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage	 Pad Connections : Pad 1 : NC --- TCXO ; Vcon --- VCTCXO Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage
[(V) M47T] ; [(V) M_47T]	[(V) M43T] ; [(V) M_43T]
 Pad Connections : Pad 1 : Control voltage for VCTCXO. Make no connection if TCXO. Pad 7 : Ground ; Pad 8 : Output , Pad 14 : Supply Voltage	 Pad Connections : Pad 1 : Control voltage for VCTCXO ; Ground for TCXO . Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage
[(V) M63T] ; [(V) M_63T]	[(V) M63T] ; [(V) M_63T]
	 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.

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CMOS wave output code " T "

Part Number Format and Example

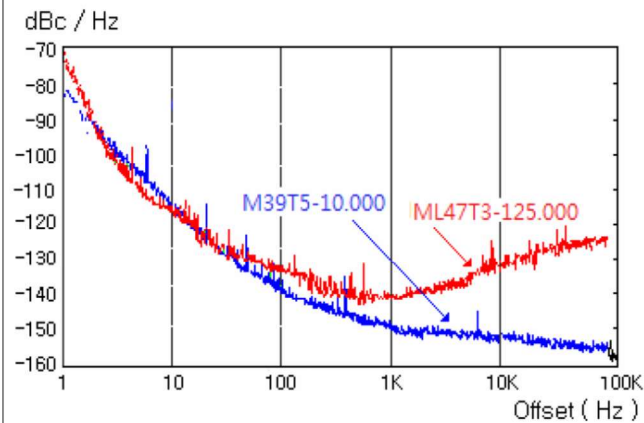
	[1]	[2]	[3]		[4]		[5]		[6]
	Holder Type	Output Wave	Supply Voltage	-	Center Frequency	-	Frequency Stability	/	Operating Temp. Range
Examples	(1) VM39	T	5	-	10.000	-	1.5	/	-20+70
	(2) M572	T	3	-	20.000	-	2.5	/	-30+85

Ex (1) : VM39T5 - 10.000 - 1.5 / -20+70 [VCTCXO , VM38 type , RoHS , CMOS output , 5.0V , 10.000MHz , $\pm 1.5\text{ppm}$ from -20°C to 70°C]

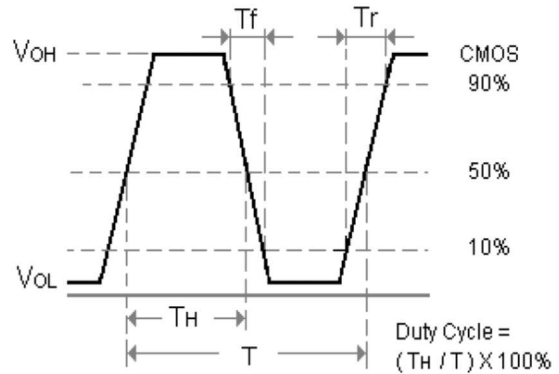
Ex (2) : M572T3 - 20.000 - 2.5 / -30+85 [TCXO , M572 type , CMOS output , 3.0V , 20.000MHz , $\pm 2.5\text{ppm}$ from -30°C to 85°C]

[1]	Holder Type " M " stands for TCXO , " VM " stands for VCTCXO
[2]	" T " stands for Square Wave ex : M43T --- TCXO , M43 package , CMOS output
[3]	Supply voltage , " 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 $\pm$ ppm ; ex 1 : $\pm 2.5\text{ppm}$ --- 2.5 , ex 2 : $\pm 1.0\text{ppm}$ --- 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 : -40 °C to 85°C ----- -40+85

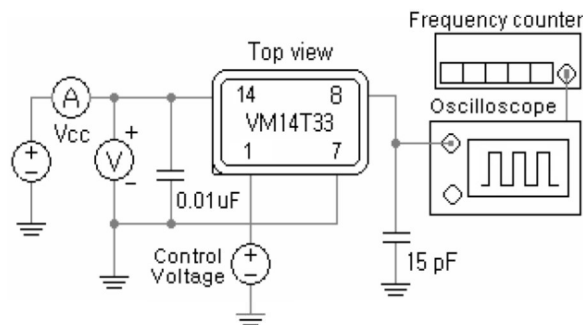
CMOS Typical Phase Noise (M38T5 Series)



CMOS Output Wave , " T " series



(VC)TCXO with CMOS square wave: Ex. VM14T33



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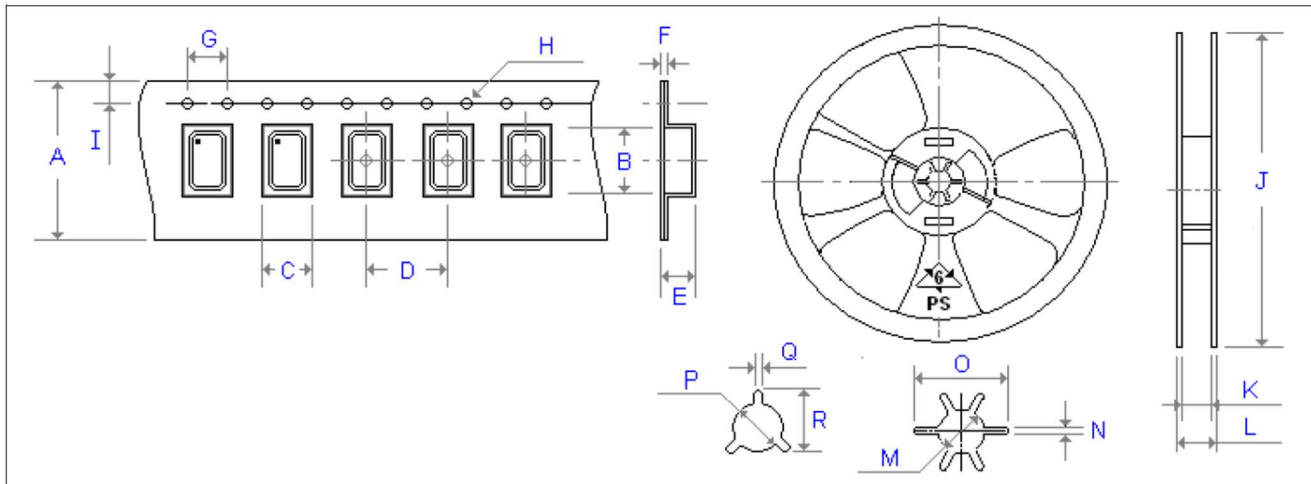
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Emboss Taping and Reel Specifications

[VCXO]

[(VC)TCXO]



Carrier Type Dimensions (unit : mm)

	A	B	C	D	E	F	G	H	I	pcs / reel
G_324 (6)	8.0	3.4	2.7	4.0	1.4	0.3	4.0	Ø 1.50	1.75	3000
G_534	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
G_576	16.0	7.3	5.3	8.0	1.9	0.3	4.0	Ø 1.55	1.75	1000
G_42	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_43	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_62	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_63	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_22	8.0	2.8	2.3	4.0	1.1	0.3	4.0	Ø 1.50	1.75	3000
(V)M_32	8.0	3.4	2.7	4.0	1.4	0.3	4.0	Ø 1.50	1.75	3000
(V)MQ_326	12.0	3.6	2.9	4.0	1.7	0.3	4.0	Ø 1.55	1.75	3000
(V)M_53	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
(V)M_57	16.0	7.4	5.5	8.0	2.8	0.4	4.0	Ø 1.50	1.75	500
(V)M_42	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_43	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_62	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_63	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500

Reel Dimensions (unit : mm)

	J	K	L	P	Q	R	pcs / reel
G_324 (6)	180.0	9.0	12.0	13.2	2.1	-	3000
G_534	180.0	13.0	16.0	13.2	2.5	-	1000
G_576	180.0	17.2	19.3	13.3	2.2	22.0	1000
G_42	330.0	30.0	25.0	13.4	2.5	19.5	500
G_43	330.0	30.0	25.0	13.4	2.5	19.5	500
G_62	330.0	30.0	25.0	13.4	2.5	19.5	500
G_63	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_22	180.0	9.0	12.0	13.2	2.1	-	3000
(V)M_32	180.0	9.0	12.0	13.2	2.1	-	3000
(V)MQ_326	180.0	9.0	12.0	13.2	2.1	-	3000
(V)M_53	180.0	13.0	16.0	13.2	2.5	19.5	1000
(V)M_57	180.0	17.2	19.3	13.3	2.2	22.0	500
(V)M_42	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_43	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_62	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_63	330.0	30.0	25.0	13.4	2.5	19.5	500

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