

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

CMOS Output

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

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 : $< \pm 1.0$ ppm. $+25^\circ\text{C} \pm 2^\circ\text{C}$. Models without mechanical trimmer : ± 2.0 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		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 $\pm 5\%$ input voltage change .				
	vs Load Change		± 0.3 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)			T T L / 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.				
Output Logic Levels	Logic High " 1 "		90% of V_{DD} min.				
	Logic Low " 0 "		10% of V_{DD} max.				
Electrical Frequency Tuning (EFC) by external control voltage	Control Voltage Center		Standard: $+1.5\text{ V} \pm 1.0\text{ V}$ for all input voltages.				
	Frequency Deviation Range		± 5.0 ppm. (min.) with $V_{con} = +1.5\text{ V} \pm 1.0\text{ V}$				
	Slope Polarity (Transfer Function)		Positive slope. Positive voltage for positive frequency shift.				
			Input Impedance : 50M Ω min.	Modulation Bandwidth : 20 KHz min.	Linearity : $\pm 10\%$ max.		
Rise Time and fall time			10.0 n sec. max. ; 20% \leftrightarrow 80% of the wave form.				
Duty Cycle			Standard: 50 % $\pm 10\%$; Option: 50 % $\pm 5\%$				
Start-Up Time.			5.0 m sec. (typ.) , 10.0 m sec. (max.) (reach 90% amplitude and at $+25^\circ\text{C} \pm 2^\circ\text{C}$)				
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			-40°C to +85°C or -55°C to +125°C (package dependent)				

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

<p style="text-align: center;">[(V) M22T__]</p> <p>Pad Connections : Pad 1 : Control voltage for VCTCXO ; Ground for TCXO . Pad 2 : Ground ; Pin 3 : Output , Pin 4 : Supply Voltage</p>	<p style="text-align: center;">[(V) M32T__]</p> <p>Pad Connections : Pad 1 : Control voltage for VCTCXO ; Ground for TCXO . Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage</p>
<p style="text-align: center;">[(V) M53T__]</p> <p>Pad Connections : Pad 1 : Control voltage for VCTCXO ; Ground for TCXO . Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage</p>	<p style="text-align: center;">[(V) M572T__] , [(V) ML572T__]</p> <p>Pad Connections : Pad 1 : NC --- TCXO ; Vcon --- VCTCXO Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage</p>
<p style="text-align: center;">[M_47T__] ; [VM_47T__]</p> <p>Pad Connections : Pad 1 : Control voltage for VCTCXO. Make no connection if TCXO. Pad 7 : Ground ; Pad 8 : Output , Pad 14 : Supply Voltage</p>	<p style="text-align: center;">[M_43T__] ; [VM_43T__]</p> <p>Pad Connections : Pad 1 : Control voltage for VCTCXO ; Ground for TCXO . Pad 2 : Ground ; Pad 3 : Output , Pad 4 : Supply Voltage</p>
	<p style="text-align: center;">[M_63T__] ; [VM_63T__]</p> <p>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.</p>

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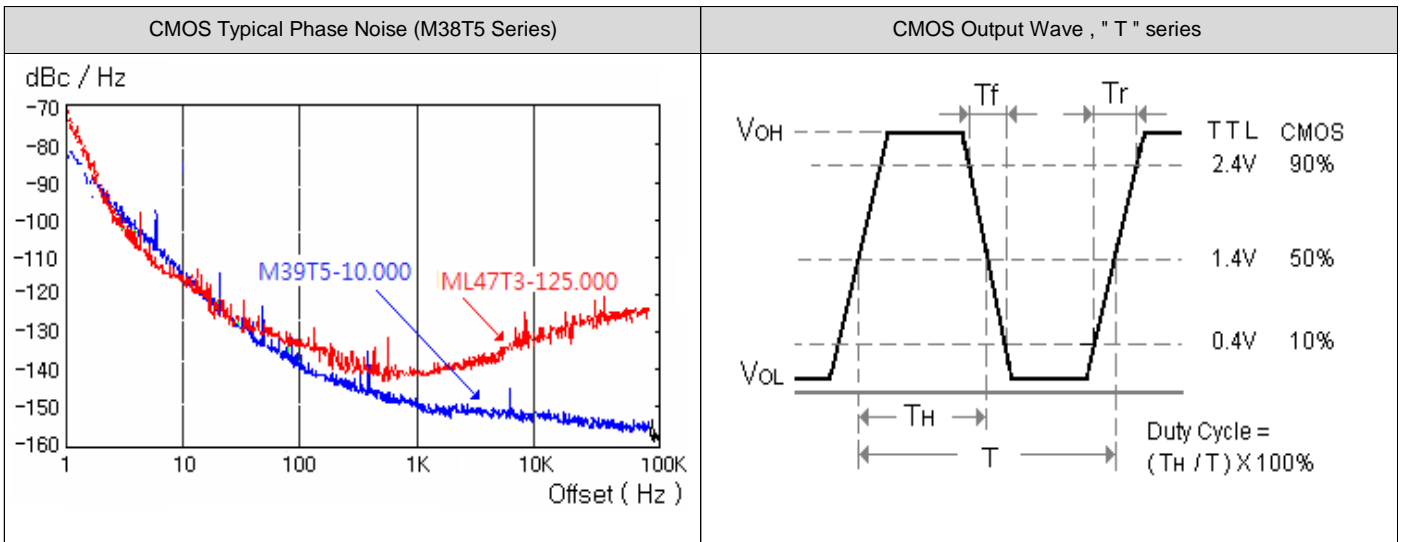
Part Number Format and Example

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

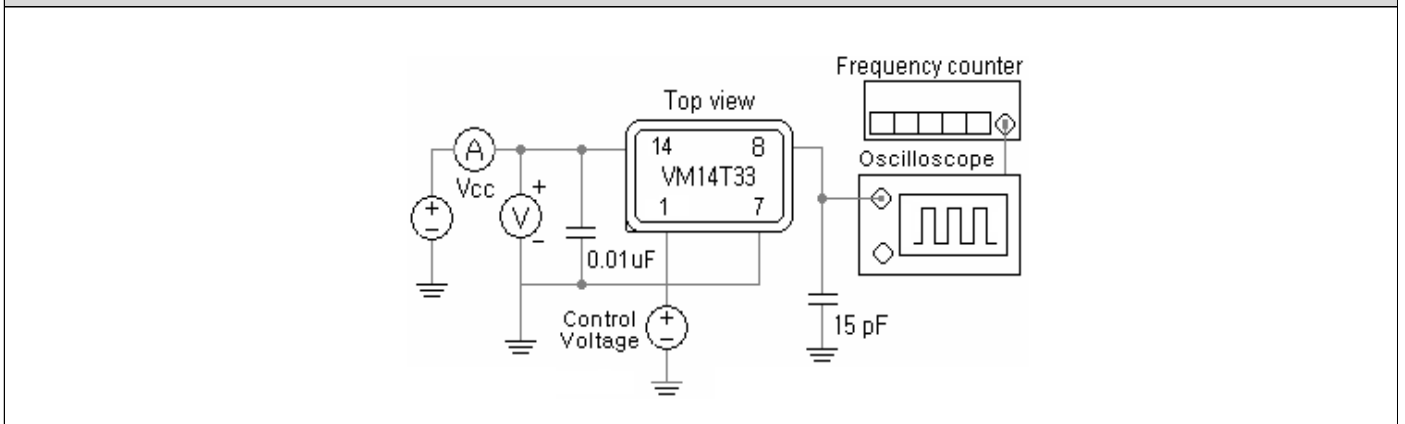
Ex (1) : VM39T5 - 10.000 - 1.5 / -20+70 [VCTCXO , VM38 type , RoHS , CMOS output , 5.0V , 10.000MHz , ±1.5ppm from -20°C to 70°C]

Ex (2) : M572T3 - 20.000 - 2.5 / -30+85 [TCXO , M572 type , CMOS output , 3.0V , 20.000MHz , ±2.5ppm from -30°C to 85°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 ex 1 : M43T --- TCXO , M43 package , CMOS output ; ex 2 : VM39P --- VCTCXO , VM39 package , PECL differential
[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 ± 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 : -40 °C to 85°C ----- -40+85



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



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