

Temperature Compensated Crystal Oscillators [TCXO " M "]

CMOS Output

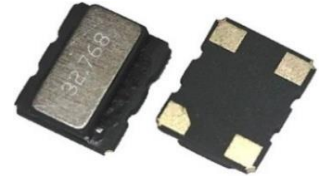
TCXO	ME_T	uA Current 32.768 KHz	± 8 ppm -40 to +105 °C	CMOS	SMD	15 pF	1.8V 3.0V	2.5V 3.3V
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Features

- CMOS 32.768 KHz TCXO with a maximum frequency stability of ± 5 ppm (± 2.62 minutes / year) over -40 to +85°C, providing a much better timekeeping accuracy than the competition
- A proprietary temp. compensation technique is applied to the built-in 32.768 KHz tuning fork crystal & temp. sensor
- A 1.5 µA typical current consumption makes it ideal for battery-operated devices
- Small ceramic SMD package, ideal for new miniaturizing applications

Applications:

- Frequency reference for real time clocks (RTCs)
- Smart metering, data loggers
- Portable instruments
- GPS receivers. Telematics.
- Timing synchronization for networks, servers, hubs, routers and switches



General specifications of all available packages , at Ta=+25°C , CL=15pF

Output Waveform	Square wave [CMOS] , Waveform code is " T "	
Model	ME21T	ME32T
Package size	2.1 x 1.3 x 1.0 mm	3.2 x 2.5 x 1.3 mm

Supply Voltage V _{DD} (code)	+1.8 V ± 5% (code is " 18 ")	+2.5 V ± 5% (code is " 25 ")	+3.0 V ± 5% (code is " 3 ")	+3.3 V ± 5% (code is " 33 ")
Start-up Time	1.0 sec (max.)			
Nominal Frequency	32.768 KHz			
Initial Calibration Tolerance (at +25°C ± 3°C)	± 2.5 ppm (max.)			
Current Consumption (With No Load)	1.0 uA (typ.) , 2.0 uA (max.)			
Frequency Stability over Temperature (max.)	± 5.0 ppm (-40°C to +85°C) ± 8.0 ppm (-40°C to +105°C)			
Timing error over time [± 5 ppm (-40°C to +85°C)]	± 0.432 sec/day ; ± 12.960 sec / month ; ± 2.628 minutes / year , w.r.t fo at +25°C.			
Frequency Stability	vs Aging	± 3.0 ppm / year (max.) first year at +25°C		
	vs Load Change	± 0.2 ppm (max.) for a ± 10% loading condition change		
	vs Supply Voltage Delta Freq / V	± 1.0 ppm / V (max.)		
Output Load	15 pF			
Output Voltage Level	V _{OH}	90% V _{DD} (min.)		
	V _{OL}	10% V _{DD} (max.)		
Rise Time and Fall Time	100 ns (max.) Measured at 20% ↔ 80% of the waveform			
Duty Cycle	50% ± 10%			
Output Enable / Disable Function (Open connection is prohibited)	V _{DD} of 80% (min.) to enable output			
	V _{DD} of 20% (max.) to disable output			

Part Number Format and Example

[1]	[2]	[3]		[4]		[5]		[6]
Holder Type	Waveform Code	Supply Voltage	-	Nominal Frequency	-	Frequency Stability	/	Operating Temp. Range

Examples	(1)	ME32	T	33	-	32.768 K	-	8.0	/	-40+105
	(2)	ME21	T	18	-	32.768 K	-	5.0	/	-40+85

Ex (1): ME32T33 - 32.768K - 8.0 / -40+105 [ME series 3225 type , CMOS , 3.3V , 32.768 KHz , ± 8.0 ppm from -40°C to +105°C]

Ex (2): ME21T18 - 32.768K - 5.0 / -40+85 [ME series 2113 type , CMOS , 1.8V , 32.768 KHz , ± 5.0 ppm from -40°C to +85°C]

[1]	Holder Type "ME32" stands for TCXO 3225 type ; "ME21" stands for TCXO 2113 type
[2]	"T" stands for CMOS waveform
[3]	Supply voltage , "18" stands for +1.8V ; "25" stands for +2.5V ; "3" stands for +3.0V ; "33" stands for +3.3V
[4]	Nominal Frequency , "K" stands for KHz
[5]	Frequency stability in ±_ ppm ; ex 1 : ± 8.0ppm --- 8.0 , ex 2 : ± 5.0ppm --- 5.0
[6]	Operating temperature range in °C ex 1 : -40 °C to +105°C ----- -40+105 ; ex 2 : -40 °C to +85°C ----- -40+85

Package Dimensions (Unit : mm)

[ME21T]	[ME32T]

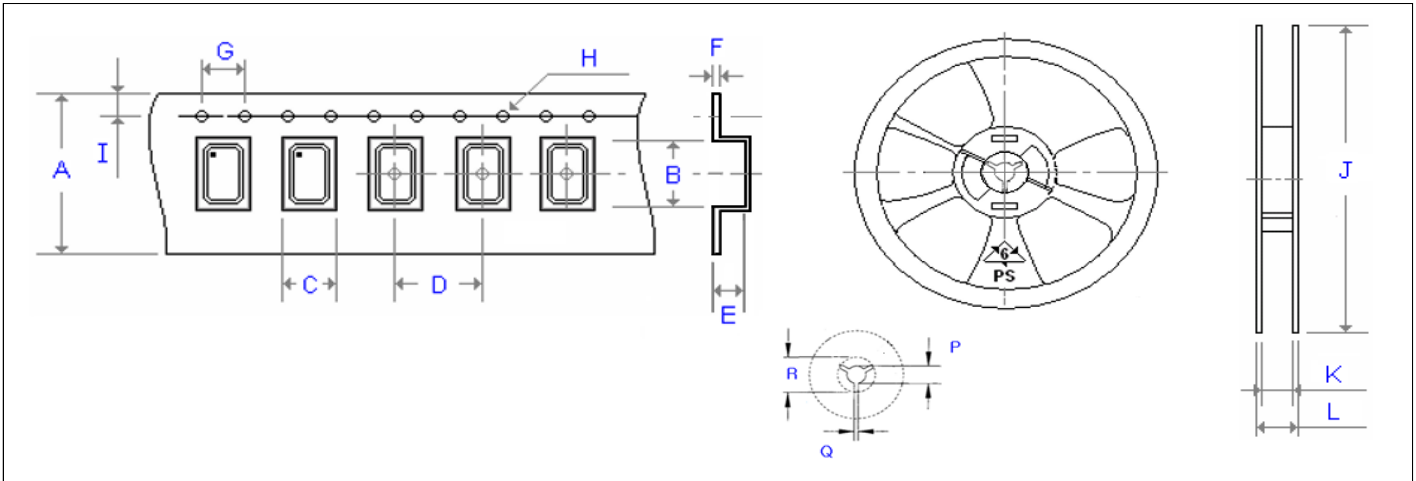
Test Circuit and Output Waveform

Test Circuit	CMOS Output Waveform

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