

Temperature Compensated Crystal Oscillators [TCXO " M "]

CMOS Output

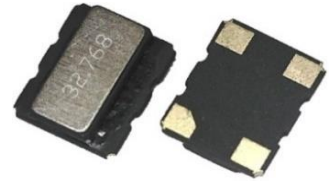
TCXO	uA Current 32.768 KHz	± 8 ppm -40 to +105 °C	CMOS	SMD	15 pF	1.6 V	1.8 V	2.5 V
ME _ T						3.0 V	3.3 V	5.0 V

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		2.15 x 1.35 x 1.1 mm	3.28 x 2.5 x 1.4 mm
Standard Supply Voltages		1.6V , 1.8V , 2.5V , 3.0V , 3.3V	2.5V , 3.0V , 3.3V , 5.0V
Start-up Time		0.5 sec (max.)	1.0 sec (max.) , 3.0 sec (max.) over -40°C to +105°C
Nominal Frequency		32.768 KHz	
Current Consumption (With No Load)		1.0 uA (typ.) , 2.0 uA (max.)	
Initial Calibration Tolerance		± 2.5 ppm (max.) at +25° C ± 3° C	
Frequency Stability over Temperature (max.)		± 3.8 ppm (-10°C to +60°C)	
		± 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 Reflow	± 3.0 ppm (max.) 1 reflow and measured 24 hours afterwards	
	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		V _{DD} of 80% (min.) to enable output	
		V _{DD} of 20% (max.) to disable output	
		(open connection prohibit)	

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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 , "16" stands for +1.6V ; "18" stands for +1.8V ; "25" stands for +2.5V ; "3" stands for +3.0V ; "33" stands for +3.3V ; "5" stands for +5.0V
[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]

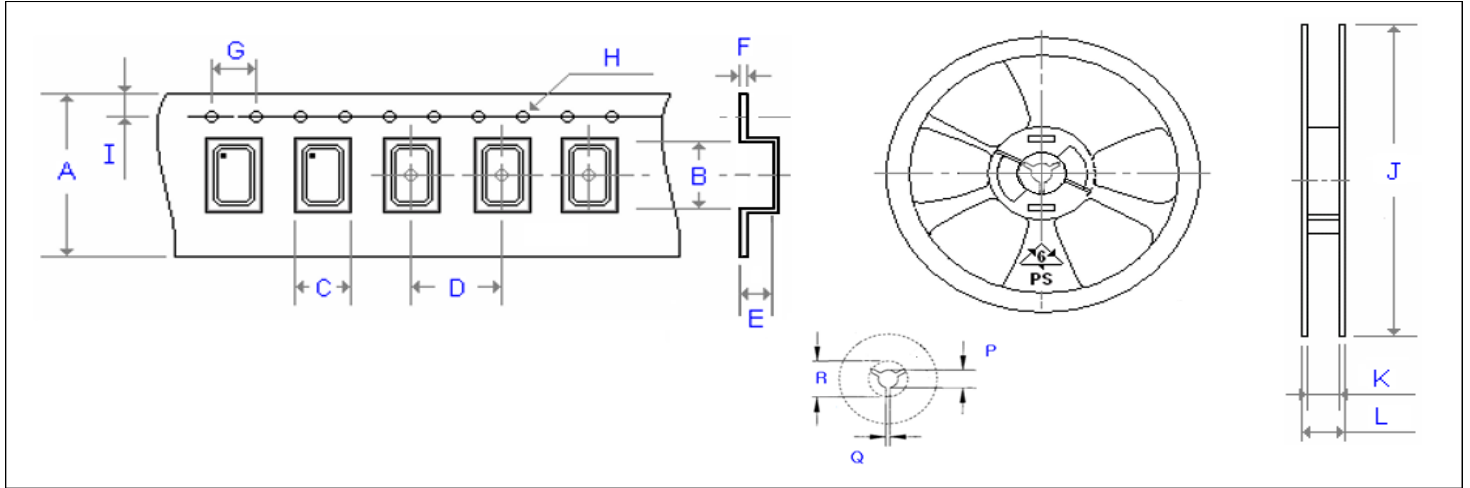
Test Circuit and Output Waveform

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_534	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	0.32	4.00	Ø 1.50	1.75	1000
G_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	Ø 1.50	1.75	500
G_63	24.00	11.80	10.00	16.00	5.00	0.30	4.00	Ø 1.50	1.75	500
G_JF538	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
G_JF578	16.00	7.30	5.30	8.00	1.90	0.32	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
(V)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)MQ_326	12.00	3.60	2.90	4.00	1.70	0.30	4.00	Ø 1.50	1.75	3000
(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_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) ±2mm

	J	K	L	P	Q	R	pcs / reel
G_226	180.00	8.40	11.40	13.00	2.50	20.20	3000
G_326	180.00	9.00	12.00	13.00	2.50	20.20	3000
G_534	180.00	13.00	16.00	13.00	2.50	20.20	1000
G_576	180.00	17.20	19.30	13.00	2.50	20.20	1000
G_43	330.00	24.50	29.10	13.00	2.50	20.20	500
G_63	330.00	24.50	29.10	13.00	2.50	20.20	500
G_JF538	180.00	13.00	16.00	13.00	2.50	20.20	1000
G_JF578	180.00	17.20	19.30	13.00	2.50	20.20	1000
(V)M21	180.00	8.40	11.40	13.00	2.50	20.20	3000
(V)ME21	180.00	9.00	12.00	13.00	2.50	20.20	3000
(V)M22	180.00	8.40	11.40	13.00	2.50	20.20	3000
(V)M_32	180.00	9.00	11.40	13.00	2.50	20.20	3000
(V)MQ_326	180.00	13.00	16.00	13.00	2.50	20.20	3000
(V)M_53	180.00	13.00	16.00	13.00	2.50	20.20	1000
(V)M_57(2)	180.00	17.20	19.30	13.00	2.50	20.20	500
(V)M_43 (63)	330.00	24.50	29.10	13.00	2.50	20.20	500

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