

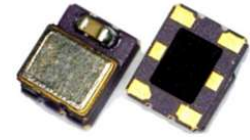
# Temperature Compensated Crystal Oscillators [ TCXO " M " and VCTCXO " VM " ]



TCXO			VCTCXO			Min.	Max.
MQF_T	MQF_P	MQF_D	VMQF_T	VMQF_P	VMQF_D	10	1.5
CMOS	LVPECL	LVDS	CMOS	LVPECL	LVDS	MHz	GHz

## Features

**1.5 pS Phase Jitter ( typical )**



The (V)MQF326T, (V)MQF326P and (V)MQF326D Series are members of Mercury's Q-Family Quick-Turn Temperature Compensated oscillators that can be delivered within days. With low current consumption (44 mA for LVPECL 212.500 MHz at 3.3V) and an integrated phase jitter performance of 1.5 pS RMS, they have gained its precision frequency control market position by providing engineers with next-day samples for prototypes and low cost, fast delivery for volume production ( ± 2.5 ppm over -30°C to +85°C ).

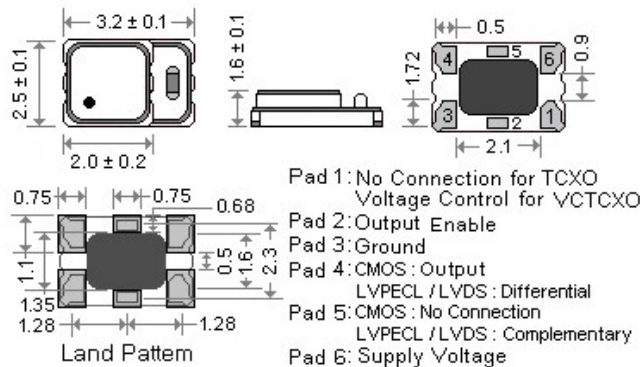
General specifications, at Ta = +25°C, CL = 15pF

Model	(V)MQF326T	(V)MQF326P	(V)MQF326D						
<b>Output Logic</b>	<b>LVCMOS / LVTTTL</b>	<b>LVPECL</b>	<b>LVDS</b>						
Supply Voltage V <sub>DD</sub> ( code )	+ 2.5 V <sub>DD</sub> ± 5% ( voltage code " 25 " ) + 3.3 V <sub>DD</sub> ± 5% ( voltage code " 33 " )	+ 2.5 V <sub>DD</sub> ± 5% ( voltage code " 25 " ) + 3.3 V <sub>DD</sub> ± 5% ( voltage code " 33 " )	+ 2.5 V <sub>DD</sub> ± 5% ( voltage code " 25 " ) + 3.3 V <sub>DD</sub> ± 5% ( voltage code " 33 " )						
Available Frequency Range	10 ~ 250 MHz	10 ~ 1.5 GHz	10 ~ 1.5 GHz						
Load	15 pF	50 Ω into V <sub>cc</sub> - 2V or Thevenin equivalent	100 Ω						
Output Logic " High ", " 1 "	90 % V <sub>DD</sub>	V <sub>DD</sub> - 1.03 ( min. ), V <sub>DD</sub> - 0.6 ( max. )	1.4 V Typical, 1.6 V max.						
Output Logic " Low ", " 0 "	10 % V <sub>DD</sub>	V <sub>DD</sub> - 1.85 ( min. ), V <sub>DD</sub> - 1.6 ( max. )	1.1 V Typical, 0.9 V min.						
( V <sub>DD</sub> = + 2.5V )	50 MHz : 24 mA 125 MHz : 28 mA 200 MHz : 30 mA	156 MHz : 36 mA 600 MHz : 40 mA 800 MHz : 46 mA 1G MHz : 50 mA	156 MHz : 22 mA 600 MHz : 30 mA 800 MHz : 30 mA 1G MHz : 34 mA						
( V <sub>DD</sub> = + 3.3V )	50 MHz : 26 mA 125 MHz : 30 mA 200 MHz : 34 mA	156 MHz : 40 mA 600 MHz : 45 mA 800 MHz : 48 mA 1G MHz : 52 mA	156 MHz : 25 mA 600 MHz : 30 mA 800 MHz : 32 mA 1G MHz : 36 mA						
Current Consumption	All values are typical and over the operating temperatures.								
Current with Output Disabled	18 mA ( typical )	18 mA ( typical )	18 mA ( typical )						
Rise Time / Fall Time	1.5 nS. ( Typical ), 3.0 nS. ( max. ) Tr / Tf : 10% ↔ 90% waveform	0.2 nS. ( Typical ), 0.5 nS. ( max. ) Tr / Tf : 20% ↔ 80% waveform	0.2 nS. ( Typical ), 0.4 nS. ( max. ) Tr / Tf : 20% ↔ 80% waveform						
Initial Calibration Tolerance	±1.0 ppm. max. at +25°C ± 2°C. ( at the shipment )								
Frequency Stability Codes	Temperature ( refer to +25°C )	± 2.5 ppm over -30°C to +85°C ( default for Quick - Turn ) ± 1.0 ppm over -40°C to +85°C ( available )							
	Aging	± 1.0 ppm max. , per year at 25°C							
	Voltage Change	± 0.2 ppm max. , for a ±5% input voltage change.							
	Load Change	± 0.2 ppm max. , for a ±10% load condition change.							
Duty Cycle	50 % ± 5%								
Start-up Time	5 m sec. ( max. )								
Aging at Ta = +25°C	± 2 ppm max. first year at 25°C ; ± 10 ppm max. over 10 years								
Storage Temperature	-55°C to + 150°C								
SSB Phase Noise [ dBc / Hz ( typical ) ]	Offset	10 Hz	100 Hz	1K Hz	10K Hz	100K Hz	1M Hz	10M Hz	Phase Jitter ( 12KHz ~ 20 MHz )
	156.25 MHz	-65	-92	-108	-114	-117	-139	-147	0.9 pS
	212.5 MHz	-61	-90	-106	-110	-112	-133	-142	1.2 pS
622.08 MHz	-51	-79	-97	-102	-103	-125	-134	1.1 pS	

Control Voltage Function on Pad 1		Output Enable Function on pad 2	
Control Voltage Center and Range	+1.5V ± 1.0V for both V <sub>DD</sub> = 2.5V and 3.3V	OE Control on Pad 2	70% of V <sub>DD</sub> (min.) to enable output. (Open connection prohibit.)
Frequency Pulling Range	± 8 ppm min.		30% of V <sub>DD</sub> (max.) to disable output.
Linearity	± 1 % typical. ± 10% max.	Output Enable Time / Disable Time	200 nS. Max. / 50 nS. Max.
Transfer Function	Positive Transfer	Integrated Phase Jitter	1.5 pS typical ( 12 KHz to 20 MHz ) < 400 fS ( 1.875 KHz to 20 MHz )
Absolute Voltage	4.0 V max.		
Input Impedance	770 KΩ typical.		
Harmonics	-5.0 dBc max.		

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

[ MQF326T ] , [ MQF326P ] , [ MQF326D ]



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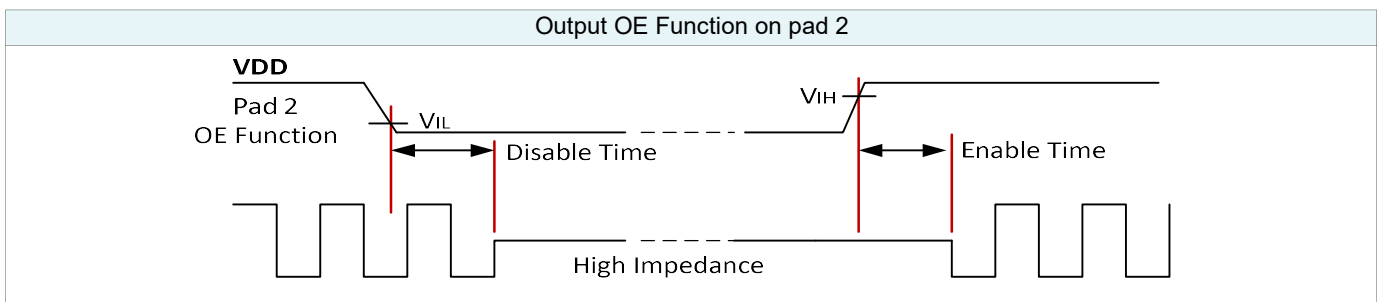
## Part Number Format and Example

Example : VMQN326D33 - 622.080 - 2.0 / -40+85

VMQN	326	D	33	-	622.080	-	2.0	/	-40+85
Hold Type	Package	T : CMOS	Supply Voltage		Center Freq. ( MHz )		Freq. Stability		Operating Temperature Range
" MQF " : TCXO	" 326 "	P : LVPECL	" 33 " for 3.3V						
" VMQF " : VCTCXO	( 3.2 * 2.5 mm )	D : LVDS	" 25 " for 2.5V						

## Test Circuits and Output Waveforms

CMOS	LVPECL	LVDS
<p>No Connection for TCXO Voltage Control for VCTCXO</p>	<p>No Connection for TCXO Voltage Control for VCTCXO</p> <p>VDD = 3.3 V : R1 = R3 = 127Ω ; R2 = R4 = 82.5Ω VDD = 2.5 V : R1 = R3 = 250Ω ; R2 = R4 = 62.5Ω</p>	<p>No Connection for TCXO Voltage Control for VCTCXO</p>



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