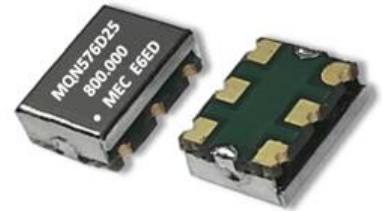


QMQF576 Series Temperature Compensated Crystal Oscillator (TCXO)
QVMQF576 Series TCXO with Voltage Control Function (VCTCXO)



MERCURY
Since 1973

QMQF576 and **QVMQF576** are **QuikXO™** (Quick-turn Crystal Oscillator) versions of the MQF576 (TCXO) and VMQF576 (VCTCXO) series, respectively. **QuikXO™** standard and custom frequency oscillators are manufactured and drop-shipped from Southern California USA in 3 to 5 days. This package size measures 7.0 x 5.0 x 2.5 mm SMD, while the supply voltage can be either +2.5 V or +3.3 V and the output logics include differential LVPECL or LVDS (up to 1.5 GHz). The typical phase jitter measures 0.8 ~ 1.6 ps with a low current consumption (43 mA typical for LVPECL 622.080 MHz at 3.3 V) as compared to other oscillators. Ideal for multimedia, Ethernet, and networking applications.



General Specifications: at Ta = +25°C

Output Logic Type	LVPECL (code "P")		LVDS (code "D")		
	TCXO Models	MQF576P25	MQF576P33	MQF576D25	MQF576D33
VCTCXO Models	VMQF576P25	VMQF576P33	VMQF576D25	VMQF576D33	
Frequency Range	10 ~ 1500 MHz		10 ~ 1500 MHz		
Supply Voltage (V _{DD})	+2.5 V ±5%	+3.3 V ±5%	+2.5 V ±5%	+3.3 V ±5%	
	Code "25"	Code "33"	Code "25"	Code "33"	
Current Consumption (mA; typical)	18 MHz: 28	18 MHz: 35	11 MHz: 19	11 MHz: 22	
	156 MHz: 30	156 MHz: 38	190 MHz: 23	155.5 MHz: 26	
	622 MHz: 33	622 MHz: 43	390 MHz: 24	250 MHz: 26	
	1289 MHz: 37	1289 MHz: 51	1289 MHz: 31	1080 MHz: 32	
	1500 MHz: 43	1500 MHz: 52	1500 MHz: 34	1500 MHz: 35	
Load; typical	50 Ω into Vcc - 2.0 V or Thevenin equivalent		100 Ω across the outputs		
Output "High" Voltage; (V _{OH})	V _{DD} -1.03 V min.; V _{DD} -0.6 V max.		1.4 V typical; 1.6 V max.		
Output "Low" Voltage; V _{OL}	V _{DD} -1.85 V min.; V _{DD} -1.6 V max		1.1 V typical; 0.9 V min.		
Rise Time (Tr) / Fall Time (Tf)	0.2 nS Typ.; 0.5 nS max. (20% ↔ 80% waveform)		0.2 nS Typ.; 0.4 nS max. (20% ↔ 80% waveform)		
Additional Output AC Characteristics for LVDS output (LVDS only)	N/A		Differential Output Voltage (V _{OD}): 175 mV min.; 350 mV typ. V _{OD} Magnitude Change (ΔV _{OD}): 50 mV max. Offset Voltage (V _{OS}): 1.25 V typical V _{OS} Magnitude Change (ΔV _{OS}): 50 mV max.		
Frequency Stability	Stability Temperature	±1.0 ppm	±2.0 ppm	±2.5 ppm	QuikXO products are standardized to 1.0/-40+85 ^{note 2} , 2.0A , and 2.5B stabilities.
	-30 to +85°C (B)	Available	Available	2.5B	
	-40 to +85°C (A)	1.0/-40+85	2.0A	Available	
^{note 2} Part number example for the ±1.0 ppm: MQF574T33-125.000-1.0/-40+85					



MERCURY www.MercuryUnited.com

Taiwan: TEL (886)-2-2406-2779, e-mail: sales-tw@mercury-crystal.com

U.S.A.: TEL (1)-909-466-0427, e-mail: sales-us@MercuryUnited.com

	Voltage Change	±0.2 ppm max. for a ±5% input voltage change										
	Load Change	±0.2 ppm max. for a ±10% load condition change										
	Aging at Ta = +25°C	±2 ppm max. first-year; ±10 ppm max. over 10 years										
	Reflow	±1.0 ppm max., one reflow and measured 24 hours afterward.										
Initial Calibration Tolerance (Initial Frequency Accuracy)	±1.0 ppm typical; ±2.0 ppm. max. at +25°C±2°C.											
Duty Cycle	50% ±5%. At 50% V _{DD} .											
Current with Output Disabled	18 mA typical											
Start-up Time	5 m. sec. max.											
Output Enable Time	200 ns max.											
Output Disable Time	50 ns max.											
Control Voltage Function on Pad 1 (VCTCXOs only)												
Control Voltage (V_{control})	V _{control} center and range: +1.5 V ± 1.0 V. For both 2.5 V _{DD} and 3.3 V _{DD}											
Frequency Pulling Range	High pull: +8 ppm min. for V _{control} from 1.5 V to +2.5V Low pull: -8 ppm min. for V _{control} from 0.5 V to +1.5V											
Linearity	±5% typical. ±10% max.											
Transfer Function	Positive Transfer											
Input Impedance	500 KΩ min.											
Bandwidth	10 kHz min. Measured at -3 dB.											
Tri-State function on Pad 2												
Output HIGH Enable (OE)	70% of V _{DD} (min.) to enable output. CMOS level. Do not leave this pin floating. If no connection is desired, please contact Mercury.											
	30% of V _{DD} (max.) to disable the output. Output is high impedance.											
Output Enable Time	200 n. sec. max.											
Output Disable Time	50 n. sec. max.											
Single Side-band Phase Noise (dBc/Hz; typical)	Frequency (MHz)	25	49.152	50	100	156.250	600	1030	1080	1270	1450	
	Supply Voltage	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	
	Output Logic	P	D	D	D	P	P	P	D	D	D	
	Offset	10 Hz	-61	-85	-80	-73	-63	-59	-53	-49	-49	-52
		100 Hz	-106	-108	-103	-96	-91	-81	-75	-81	-78	-78
		1 kHz	-125	-121	-117	-109	-109	-96	-93	-93	-91	-89
		10 kHz	-132	-126	-124	-119	-115	-102	-94	-98	-94	-92
		100 kHz	-133	-127	-127	-120	-116	-104	-97	-99	-97	-94
		1 MHz	-151	-146	-145	-138	-137	-125	-119	-120	-117	-118
		5 MHz	-153	-154	-148	-143	-147	-132	-129	-128	-128	-129
10 MHz		-	-157	-150	-145	-150	-136	-133	-133	-133	-133	
20 MHz	-	-160	-152	-144	-155	-139	-	-142	-142	-		
Integrated Phase Jitter, RMS 12 kHz to 20 MHz; picosecond		1.0	1.0	1.1	1.3	1.1	1.1	1.4	1.1	1.2	1.4	

For 0.6 ps typical phase jitter requirement: Please choose MQN576 (TCXOs) and VMQN576 (VCTCXO) series.

Absolute Maximum Rating:

Input Voltage	-0.5 V to $V_{DD} + 0.5$ V
Output Voltage	-0.5 V to $V_{DD} + 0.5$ V
Positive Supply Voltage	4.2 V
Electrostatic Discharge (ESD)	Human Body Model (HBM): Exceeds 2000 V. Class 2 per MIL-STD-1686C
	Machine Model (MM): Exceeds 120 V. Class M2 per MIL-STD-1686C. Note: Power, ground, and outputs are 200 V.
	Charged-Device Model (CDM): Exceeds 2000 V. Class C6 per MIL-STD-1686C

Environmental Performance Specifications

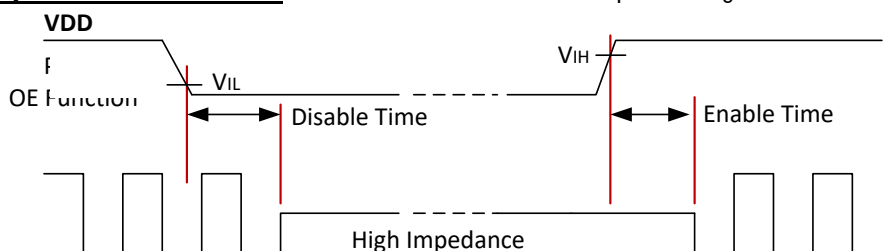
Green Requirement	RoHS compliant, Pb (lead) free per EU Directive 2002/95/EC 6/6 (2002/95/EC) and WEEE (2002/96/EC). Free of halide, cadmium, hexavalent chromium, lead, mercury, PBB's, and PBDE's.
Moisture Sensitivity Level	Level 2 per IPC/JEDEC J-STD-020D.1
Storage temperature range	-55 to +125°C
Humidity	85% RH, 85°C, 48 hours
Fine Leak / Gross Leak	MIL-Std-883, method 1014, condition A / MIL-Std-883, method 1014, condition C
Solderability	MIL-STD-202F method 208E
Reflow	260°C for 10 sec. 2X.
Vibration	MIL-STD-202F method 204, 35G, 50 to 2000 Hz
Shock	MIL-STD-202F method 213B, test condition. E, 1000GG ½ sine wave
Resistance to Solvent	MIL-STD-202, method 215
Temperature Cycling	MIL-STD-883, method 1010
Pad Surface Finish	Gold (0.3 um to 1.0 um) over nickel (1.27 um to 8.89 um)

Part Number Format and Examples:

Example 1: QVMQF576D33-2.0A-125.000; Example 2: QMQF576P25-2.5B-148.500;

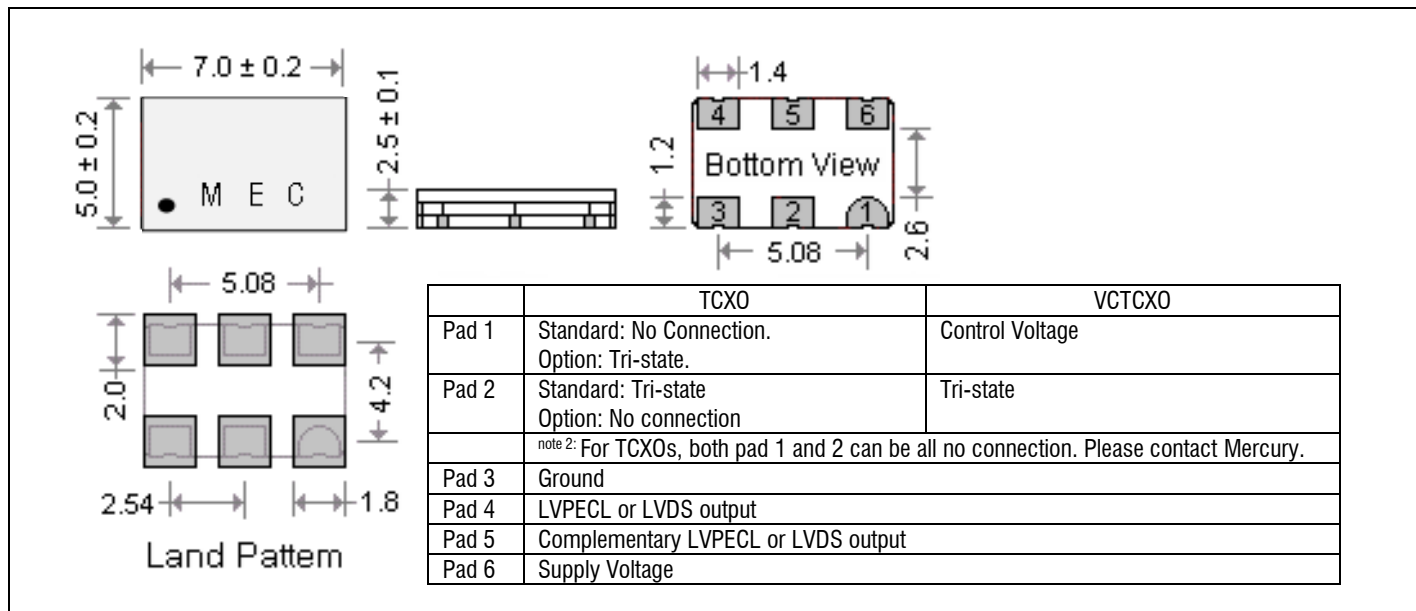
QVMQF	576	D	33	-	2.0A	-	125.000
QMQF	576	P	25	-	2.5B	-	148.500
Product Series "QMQF": TCXO "QVMQF": VCTCXO	Package Code "576": 7.0x5.0 mm 6-pad SMD	Output Logic "P": LVPECL "D": LVDS	Voltage code "33" for 3.3V "25" for 2.5V	-	"2.0A": The freq. stability is ±2.0 ppm over -40 to +85°C "2.5B": The freq. stability is ±2.5 ppm over -30 to +85°C	-	The nominal Frequency in MHz. 3 places minimum after the decimal point.

Output Tri-state Function Note: Do not leave the Tri-state pad floating.



Package Dimensions and Recommended Solder Pad Layout

unit: (mm)



Related Products:

QuikXO (Quick-turn Build in 3 to 5 Days)	Non-QuikXO (High Volume Standard Lead Time)
QM576 and QVM576	M576 and VM576
<ul style="list-style-type: none"> No re-qualification required if M576 or VM576 are approved ^{note 1} <p>If smaller footprint is desired: Please choose QM326 and QVM326. Identical electrical specs. with a 6-pad 3.2x2.5x1.6 mm package</p>	<ul style="list-style-type: none"> No re-qualification required if M576 or VM576 are approved ^{note 1} <p>If even lower phase noise is required: Please choose. MN576 and VMN576</p> <p>If smaller footprint is desired: Please choose M326 and VM326. Identical electrical specs. with a 3.2x2.5x1.6 mm package</p>

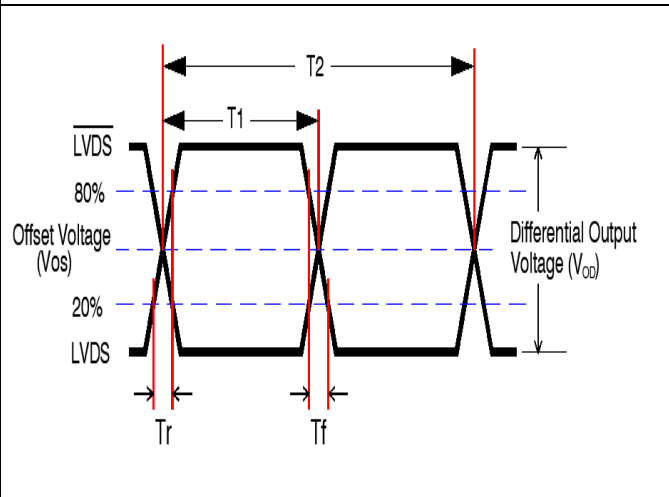
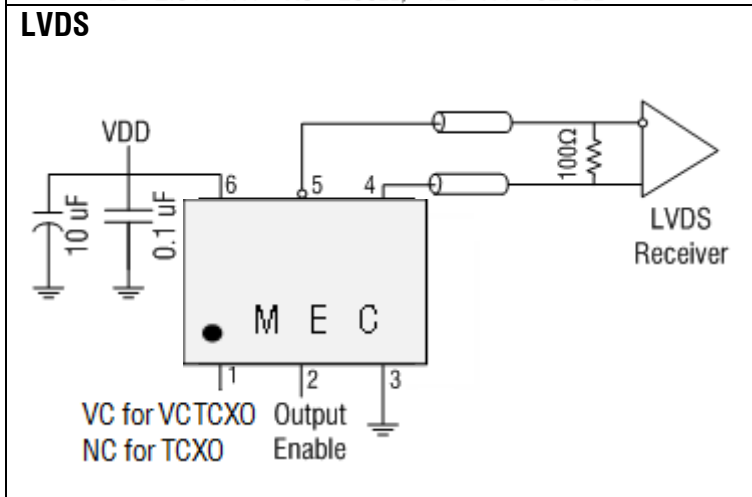
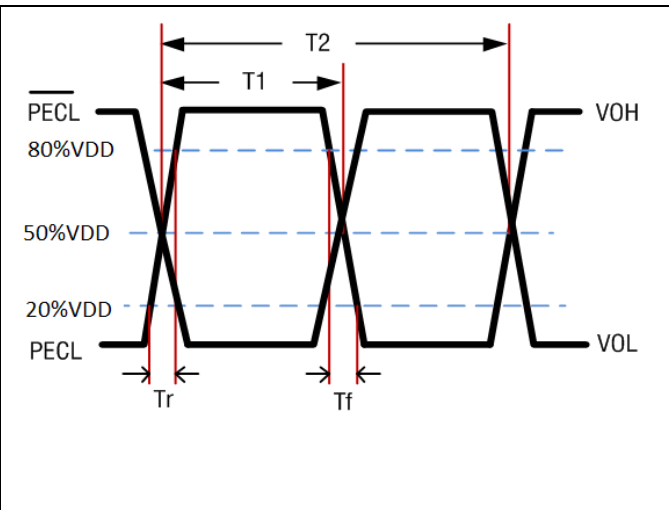
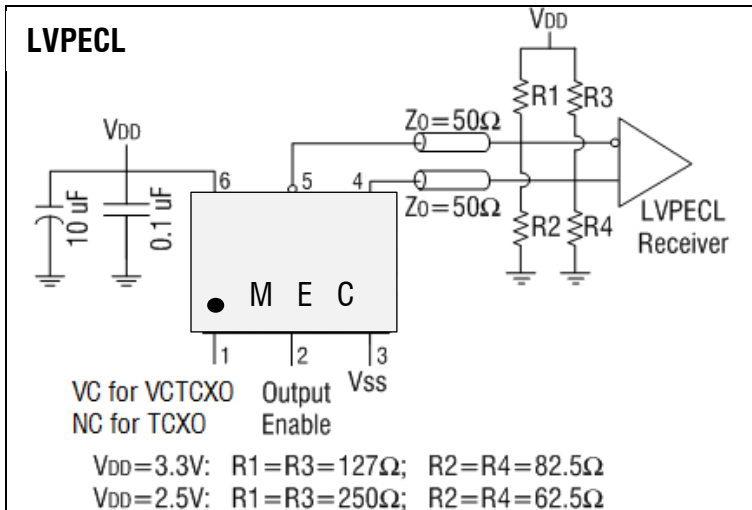
note 1 Q(V)M576 and (V)M576 are manufactured at different Mercury facilities using the identical designs, raw materials and production processes. Once either one is approved, Mercury recommends to include both the **QuikXO** and the **Non-QuikXO** part numbers of your referenced part on your BOM to take advantage of the **QuikXO** short lead- times and the **Non-QuikXO** low-cost high-volume production offerings.

E.g. 1, if the **QuikXO** QVM576D33-2.0A-125.000 oscillator is qualified, then the **Non-QuikXO** VM576D33-125.000-2.0/-40+85 should also be on the same BOM.

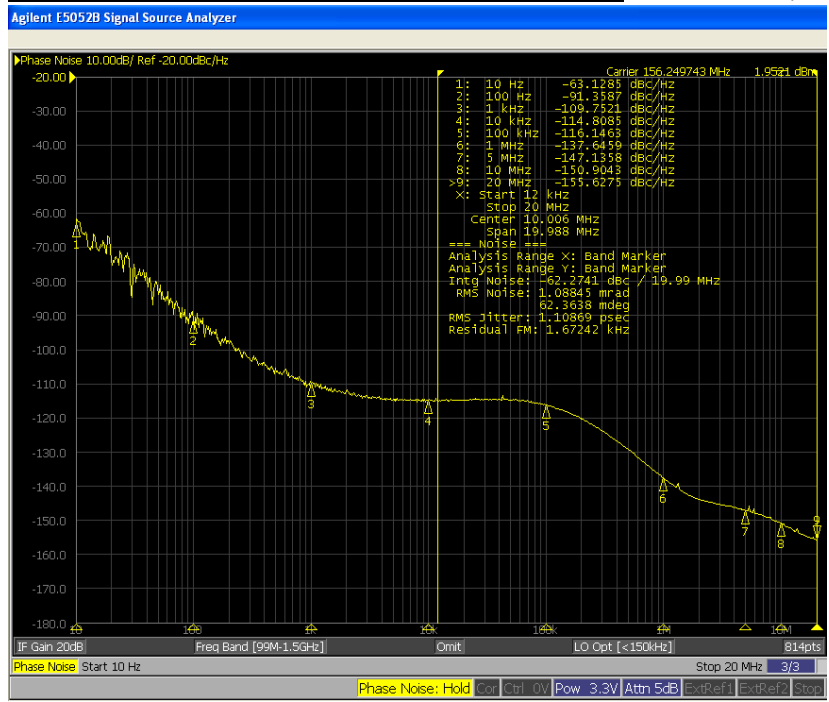
E.g. 2, if the **QuikXO** QM576P25-2.5B-148.500 oscillator is qualified, then the **Non-QuikXO** M576P25-148.500-2.5/-30+85 should also be on the same BOM.

Test Circuits and Output Waveforms

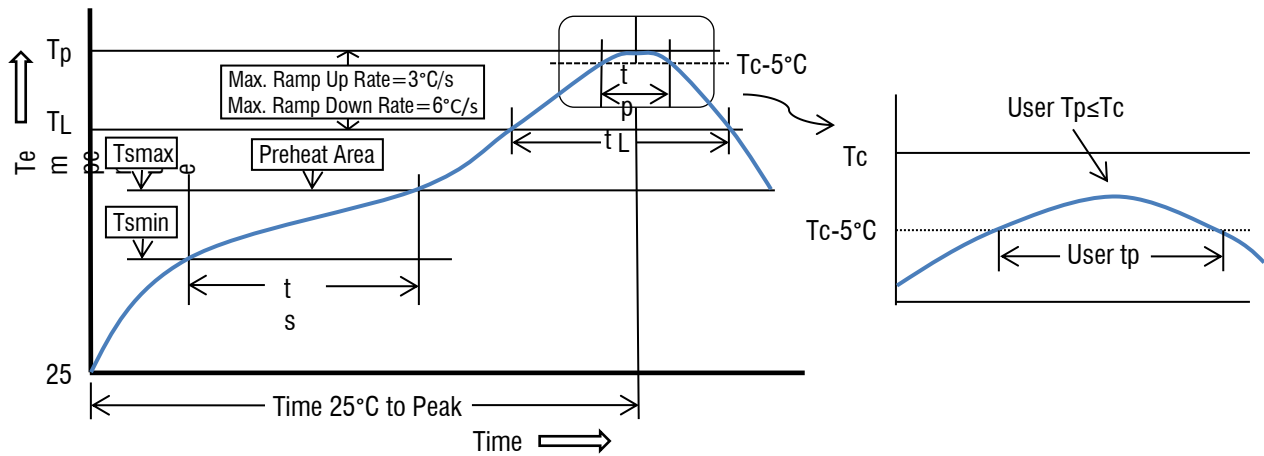
Duty cycle = $\left(\frac{T1}{T2}\right) * 100\%$. Measured at 50% V_{DD}



Phase Noise Plot of QMQF576P33-156.250 MHz, V_{DD}= +3.3V, LVPECL



Recommended Solder Reflow Profile (per IPC/JEDEC J-STD-020D.1)



Profile Feature	Sn-Pb Eutectic Assembly	Pb-free Assembly
Preheat/Soak		
- Temperature min. (Ts min.)	100°C	150°C
- Temperature max. (Ts max.)	150°C	200°C
- Time (ts) (Ts min. to Ts max.)	60 to 120 seconds	60 to 180 seconds
Ramp-up rate (TL to Tp)	3°C / sec. max.	3°C / sec. max.
Liquidous temperature (TL)	183°C	217°C
Time (tL) maintained above TL	60 to 150 seconds	60 to 150 seconds
Peak package body temperature (Tp)	235°C	260°C
Time (Tp) within 5°C of the classification temperature Tc	10 to 30 seconds	20 to 40 seconds
Ramp-down rate (Tp to TL)	6°C / second max.	6°C / second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.

All temperatures refer to the topside of the package, measured on the package body surface.