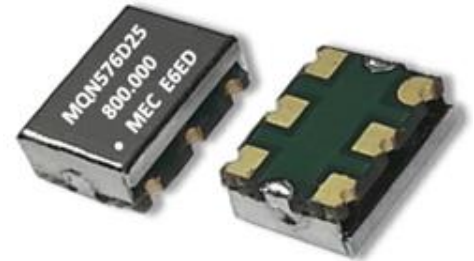




**QMQF576** and **QVMQF576** are quick-turn delivery versions of the MQF576 (a TCXO) and VMQF576 (a VCTCXO) series, respectively. quick-turn delivery products, either standard or custom frequencies are produced and shipped from Taiwan in 10 days and available at Mercury eCommerce. They are 7.0x5.0x2.5 mm SMD, the supply voltage can be either 2.5 V or 3.3 V and output logics include differential LVPECL or LVDS (up to 1.5 GHz). The 0.8 ~ 1.6 ps typical phase jitter and lower current consumption (43 mA typical for LVPECL 622.080 MHz at 3.3 V) compared to competitions make the series ideal for multimedia, Ethernet, and networking applications.



**Relevant Categories:**

- For lower cost with regular lead time, please refer to the non- quick-turn delivery equivalent the **MQF576** and the **VMQF576** series
- For lower phase noise and phase jitter (0.6 p. sec. typical), please refer to the **MQN576** and **VMQN576** series.
- For smaller footprint, 3.2 x 2.5 x 1.6 mm 6-pad SMD, with the same electrical performance, please refer to the **MQF326**, and the **VMQF326** series.

**General Specifications:** at Ta= +25°C

Output Logic Type	LVPECL (code "P")		LVDS (code "D")	
TCXO Models	<b>QMQF576P25</b>	<b>QMQF576P33</b>	<b>QMQF576D25</b>	<b>QMQF576D33</b>
VCTCXO Models	<b>QVMQF576P25</b>	<b>QVMQF576P33</b>	<b>QVMQF576D25</b>	<b>QVMQF576D33</b>
Frequency Range	10 ~ 1500 MHz		10 ~ 1500 MHz	
Supply Voltage (V <sub>DD</sub> )	+2.5 V ±5%	+3.3 V ±5%	+2.5 V ±5%	+3.3 V ±5%
	Code " <b>25</b> "	Code " <b>33</b> "	Code " <b>25</b> "	Code " <b>33</b> "
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 <sub>OH</sub> )	V <sub>DD</sub> -1.03 V min.; V <sub>DD</sub> -0.6 V max.		1.4 V typical; 1.6 V max.	
Output "Low" Voltage; V <sub>OL</sub>	V <sub>DD</sub> -1.85 V min.; V <sub>DD</sub> -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)	

**MERCURY** [www.mercury-crystal.com](http://www.mercury-crystal.com)

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

<b>Additional Output AC Characteristics for LVDS output (LVDS only)</b>	Differential Output Voltage ( $V_{OD}$ ): 175 mV min.; 350 mV typical $V_{OD}$ Magnitude Change ( $\Delta V_{OD}$ ): 50 mV max. Offset Voltage ( $V_{OS}$ ): 1.25 V typical $V_{OS}$ Magnitude Change ( $\Delta V_{OS}$ ): 50 mV max.											
<b>Frequency Stability vs</b>	Operating Temperature	$\pm 2.0$ ppm over -40 to +85°C. Spec. code: "2.0A".										
		$\pm 2.5$ ppm over -30 to +85°C. Spec. code: "2.5B".										
		Custom specification: The code is replaced with a control number assigned by Mercury										
	Voltage Change	$\pm 0.2$ ppm max. for a $\pm 5\%$ input voltage change										
	Load Change	$\pm 0.2$ ppm max. for a $\pm 10\%$ load condition change										
Aging at $T_a = +25^\circ\text{C}$	$\pm 2$ ppm max. first-year; $\pm 10$ ppm max. over 10 years											
Reflow	$\pm 1.0$ ppm max., one reflow and measured 24 hours afterward.											
<b>Initial Calibration Tolerance (Initial Frequency Accuracy)</b>	$\pm 1.0$ ppm typical; $\pm 2.0$ ppm max. at $+25^\circ\text{C} \pm 2^\circ\text{C}$ .											
<b>Duty Cycle</b>	50% $\pm 5\%$ . At 50% $V_{DD}$ .											
<b>Current with Output Disabled</b>	18 mA typical											
<b>Start-up Time</b>	5 m. sec. max.											
<b>Output Enable Time</b>	200 ns max.				Output Disable Time				50 ns max.			
<b>Single Side-band Phase Noise (dBc/Hz; typical)</b>	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	-		
<b>Integrated Phase Jitter, RMS 12 kHz to 20 MHz; picosecond</b>	1.0	1.0	1.1	1.3	1.1	1.1	1.4	1.1	1.2	1.4		
<b>Control Voltage Function on Pad 1 (VCTCXOs only)</b>												
<b>Control Voltage (<math>V_{control}</math>)</b>	$V_{control}$ center and range: $+1.5\text{ V} \pm 1.0\text{ V}$ . For both 2.5 $V_{DD}$ and 3.3 $V_{DD}$											
<b>Frequency Pulling Range</b>	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											
<b>Linearity</b>	$\pm 5\%$ typical. $\pm 10\%$ max.											
<b>Transfer Function</b>	Positive Transfer											
<b>Input Impedance</b>	500 K $\Omega$ min.											
<b>Bandwidth</b>	10 kHz min. Measured at -3 dB.											
<b>Tri-State function on Pad 2</b>												
<b>Output Enable (OE) Control</b>	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.											
<b>Output Enable Time</b>	200 n. sec. max.											
<b>Output Disable Time</b>	50 n. sec. max.											

### Absolute Maximum Rating:

<b>Input Voltage</b>	-0.5 V to $V_{DD} + 0.5$ V
<b>Output Voltage</b>	-0.5 V to $V_{DD} + 0.5$ V
<b>Positive Supply Voltage</b>	4.2 V
<b>Electrostatic Discharge (ESD)</b>	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

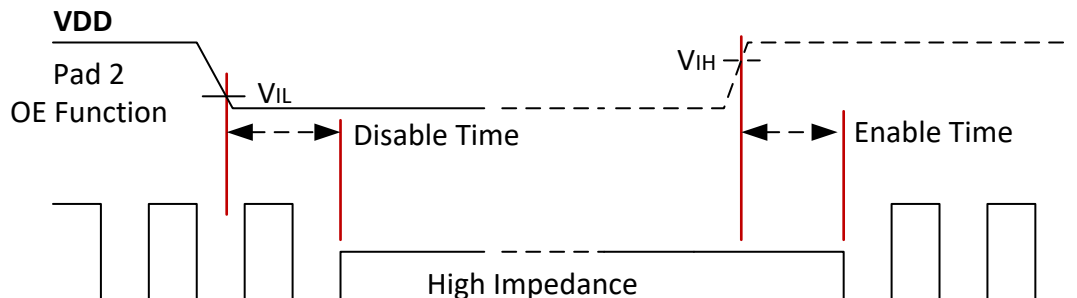
<b>Green Requirement</b>	RoHS compliant, Pb (lead) free per EU Directive 2002/95/EC 6/6 (2002/95/EC) and WEEE (2002/96/EC). Free of halide, cadmium, hexavalent chromium, lead, mercury, PBB's, and PBDE's.
<b>Moisture Sensitivity Level</b>	Level 1 (infinite) according to IPC/JEDEC J-STD-020D.1
<b>Storage temperature range</b>	-55 to +125°C
<b>Humidity</b>	85% RH, 85°C, 168 hours
<b>Fine Leak / Gross Leak</b>	MIL-Std-883, method 1014, condition A / MIL-Std-883, method 1014, condition C
<b>Solderability</b>	MIL-STD-202G method 210F
<b>Reflow</b>	260°C for 40 sec(MAX). 1X.
<b>Vibration</b>	MIL-STD-883F:2007.3, 20G, 20 to 2000 Hz
<b>Shock</b>	MIL-STD-883F:2002.4, 1500G for 0.5mS , 3cycles
<b>Resistance to Solvent</b>	MIL-STD-202, method 215
<b>Temperature Cycling</b>	MIL-STD-883F-1010.8 Condition B
<b>Pad Surface Finish</b>	Gold (0.3 um to 1.0 um) over nickel (1.27 um to 8.89 um)

### Part Number Format and Examples:

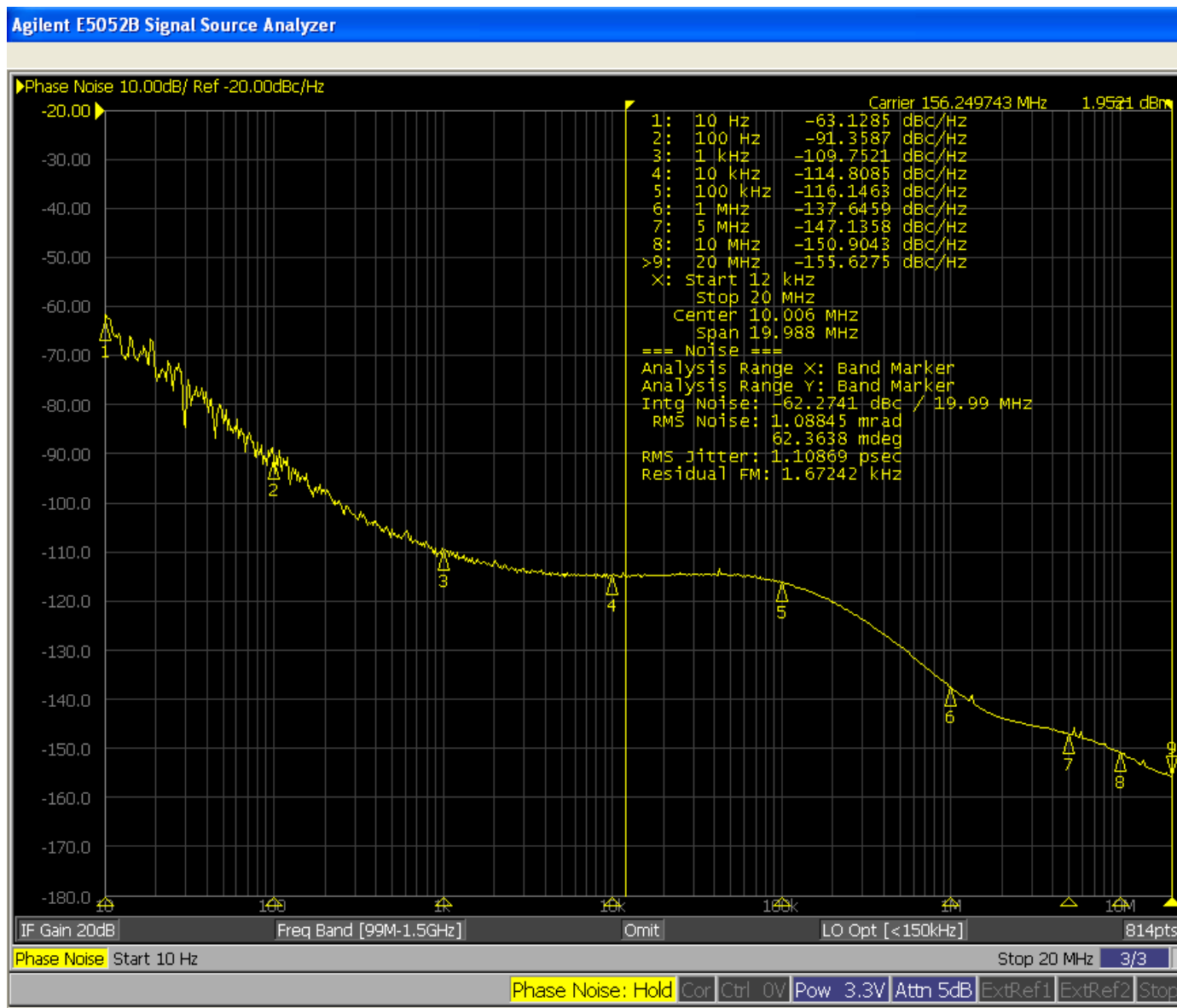
Example 1: QVMQF576D33-2.0A-622.080; Example 2: QMQF576P25-2.5B-148.500;  
Example 3: QMQF576P33-xxxx-155.520

QVMQF	576	D	33	-	2.0A	-	622.080
QMQF	576	P	25	-	2.5B	-	148.500
QMQF	576	P	33	-	xxxxx	-	155.520
Product Series "QMQF": TCXO "QVMQF": VCTCXO	Package Code "576": 3.2x2.5 mm 6-pad SMD	Output Logic "P": LVPECL "D": LVDS	Supply Voltage "33" for 3.3V "25" for 2.5V	-	"2.5B": The freq. stability is $\pm 2.5$ ppm over -30 to +85°C "2.0A": The freq. stability is $\pm 2.0$ ppm over -40 to +85°C "xxxxx": Custom frequency stability. A control number assigned by Mercury.	-	The nominal Frequency in MHz. 3 places or more after the decimal.

**Output OE Function on pad 2** Note: Do not leave this pad floating. If “no-connection” is desired, please contact Mercury.

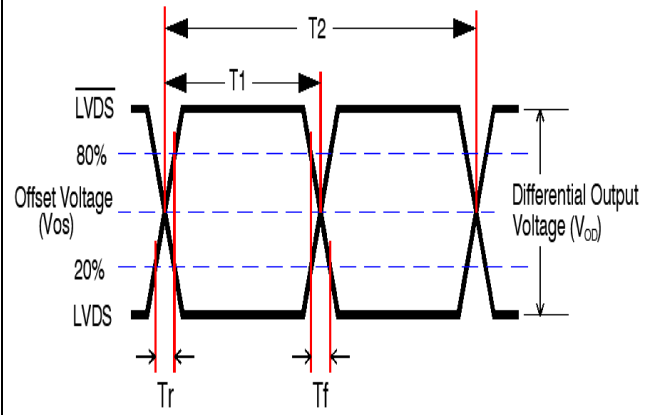
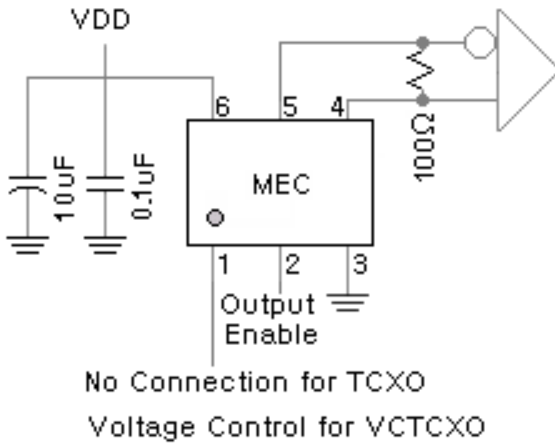


**Phase Noise Plot of QMQF576P33-156.250 MHz, V<sub>DD</sub>= +3.3V, LVPECL**

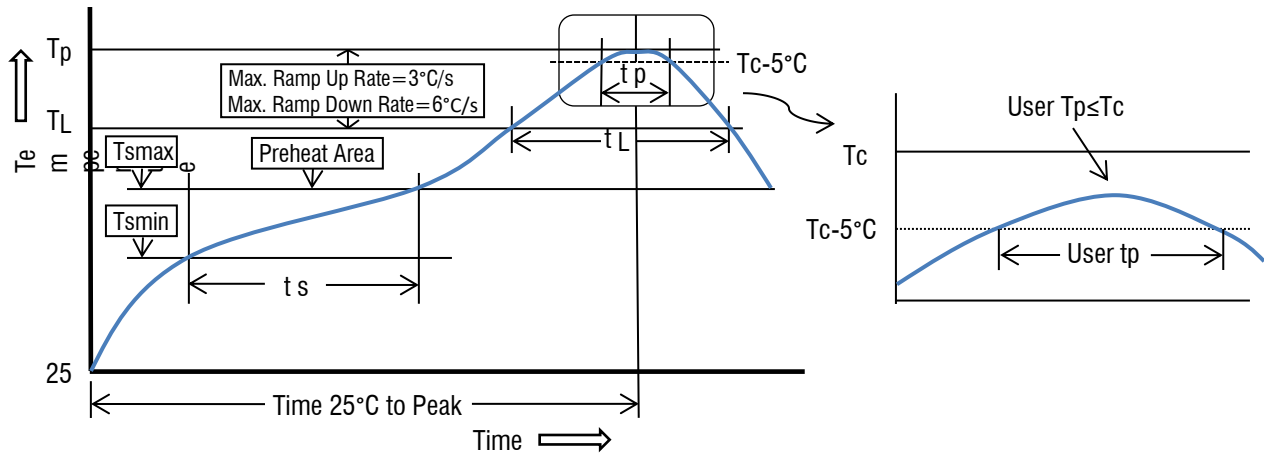




**LVDS**



**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.