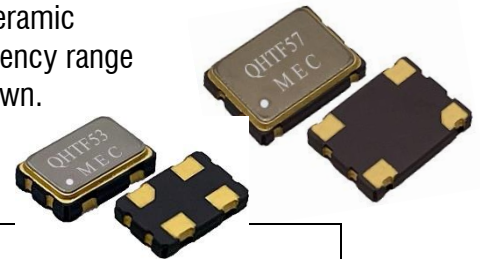




QHTF is one of the Mercury QuikXO family quick-turn CMOS output clock oscillators. QuikXO™ products, either standard or custom frequencies are built-to-order and shipped from Taiwan in 10 days. QHTF is available in five different hermetically sealed ceramic leadless SMD packages, three supply Voltages, and a 1.0 MHz to 200 MHz frequency range (up to 125 MHz for 1.8V). Pin 1 can be either Tri-State High Enable or Power Down.


General Specifications: at Ta= +25°C

Product Series	QHTF Series							
Output Logic Type	LVCMOS (Output Logic Code: "T")							
HTF Series Models	QHTF21	QHTF22	QHTF32	QHTF53	QHTF57			
Package Dimensions (mm)	2.0x1.6x0.8	2.5x2.0x0.8	3.2x2.5x1.0	5.0x3.2x1.2	7.0x5.0x1.3			
Supply Voltage (V _{DD})	+1.8 V ±5%		+2.5 V ±10%		+3.3 V ±10%			
	Voltage Code: "18"		Voltage Code: "25"		Voltage Code: "3"			
Frequency Range	1.0 ~ 125.0 MHz		1.0 ~ 200.0 MHz		1.0 ~ 200.0 MHz			
Current Consumption	20 mA typical 30 mA max.		28 mA typical 35 mA max.		30 mA typical 40 mA max.			
Rise / Fall Time (Tr; Tf) 10% ↔ 90% waveform. 15 pF load.	2.0 n. sec. typical 5.0 n. sec. max.		1.4 n. sec. typical 3.0 n. sec. max.		1.1 n. sec. typical 3.0 n. sec. max.			
Frequency Stability	±50 ppm over -40 to +85°C operating temperature range							
Aging at Ta= +25°C	±3 ppm (max.) the first year; ±2 ppm (max.) per year thereafter							
Output Load	15 pF typical							
Output Drive Strength	8 mA typical							
Output High Voltage; V _{OH}	V _{DD} - 0.4 V min.							
Output Low Voltage; V _{OL}	0.4V max.							
Duty Cycle	1.0~150.0 MHz: 50% ±5%. 150.01~200.0 MHz: 50% ±10%. At V _{DD} /2.							
Start-up Time	4.5 m. sec. typical; 10 m. sec. max.							
Pin 1 Options	Pin 1 Options	High Enable. Option code: OE			Power Down. Option code: PD			
	Output Enable / Disable	70% of V _{DD} (min.) to Enable; 30% of V _{DD} (max.) to Disable						
	Output Enable Time	10 n. sec. max.			4.5 m. sec. typical. 10 m. sec. max.			
	Output Disable Current	18 mA typical; 22 mA max.			300 μA typical; 400 μA max.			
Integrated Phase Jitter, RMS, 12 kHz to 20 MHz	3.3 V: 1.0 p. sec. typical; 2.5 V: 1.1 p. sec. typical; 1.8 V: 1.5 p. sec. typical							
Single Sideband Phase Noise (dBc / Hz; typical)	Offset	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz
	dBc / Hz	-61	-89	-110	-119	-119	-142	-149





Absolute Maximum Rating:

Positive Supply Voltage (V_{DD})	-0.5 V ~ 7 V w.r.t. ground
Input Pin Voltage (V_{in})	-0.5 V to V _{DD} +0.5 V
Output Pin Voltage (V_{out})	-0.5 V to V _{DD} +0.5 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

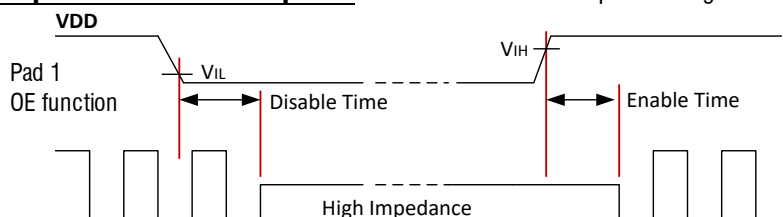
Green Requirement	RoHS compliant, Pb (lead) free per EU Directive 2002/95/EC 6/6 (2002/95/EC) and WEEE (2002/96/EC). Free of halide, cadmium, hexavalent chromium, lead, mercury, PBBs, and PBDEs.
Moisture Sensitivity Level	Level 1 per IPC/JEDEC J-STD-020D.1
Storage temperature range	-55 to +125°C
Humidity	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: 18QHTF57-25.000-PD Example 2: 25QHTF53-100.000-OE Example 3: 3QHTF32-200.000-PD

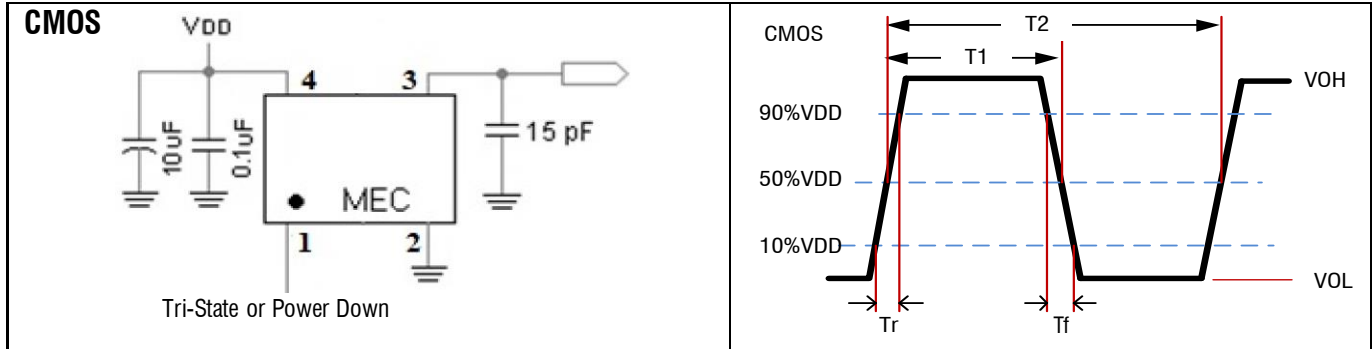
18	QHTF	57	-	25.000	-	PD
25		53		100.000		OE
3		32		200.000		PD
Voltage Code "18" for 1.8V "25" for 2.5V "3" for 3.3V	HTF Series	Package Code "57": 7.0x5.0x1.3 mm "53": 5.0x3.2x1.2 mm "32": 3.2x2.5x1.0 mm "22": 2.5x2.0x0.8 mm "21": 2.0x1.6x0.8 mm	a dash	The nominal Frequency in MHz. 3 places or more after the decimal point	a dash	Pin 1 option: "PD": Power Down "OE": Output Enable

Output OE Function on pad 1 Note: Do not leave this pad floating. If "no connection" is desired, please contact Mercury.



Test Circuits and Output Waveforms

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



Package Dimensions and Recommended Solder Pad Layout Unit: (mm)

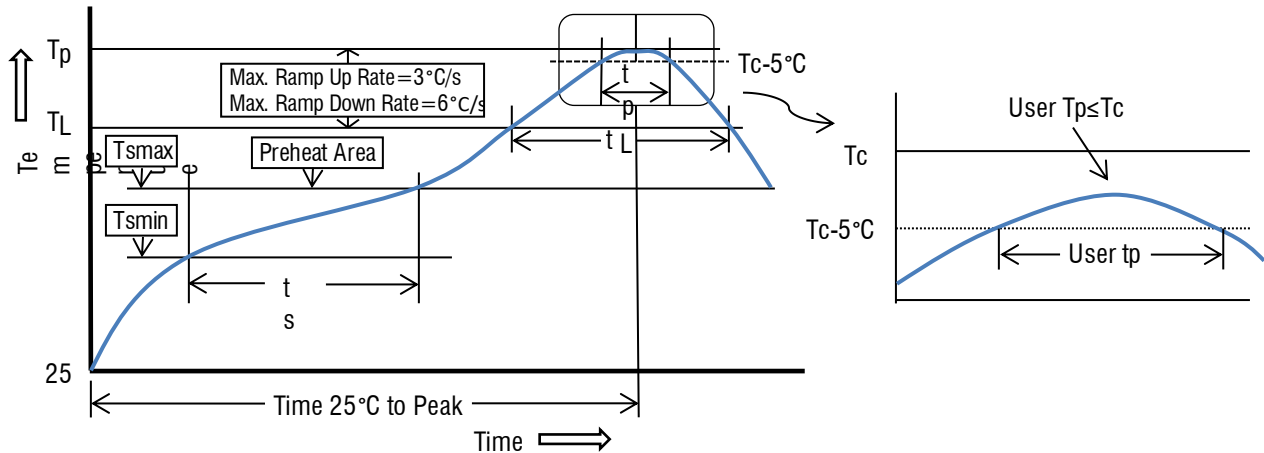
<p>QHTF21</p> <p>Top View: 2.0 ± 0.1, 1.6 ± 0.1, 1</p> <p>Bottom View: 0.6 ± 0.1, 0.5 ± 0.1, 0.7, 0.5, 2, 3, 4, 1</p> <p>Land Pattern: 0.8, 0.9, 1.0, 1.4</p> <p>Side View: 0.8 ± 0.1</p> <p>Pad Connections: Pad1: OE or PD Pad3: Output Pad2: Ground Pad4: Supply Voltage</p>	<p>QHTF22</p> <p>Top View: 2.5 ± 0.2, 2.0 ± 0.2, MEC</p> <p>Bottom View: 0.7 ± 0.1, 0.6 ± 0.1, 1.2, 1.6, 2, 3, 4, 1</p> <p>Land Pattern: 1.0, 0.9, 1.2, 1.6</p> <p>Side View: 0.8 ± 0.1</p> <p>Pad Connections: Pad1: OE or PD Pad3: Output Pad2: Ground Pad4: Supply Voltage</p>
<p>QHTF32</p> <p>Top View: 3.2 ± 0.2, 2.5 ± 0.2, MEC</p> <p>Bottom View: 0.9 ± 0.1, 0.7 ± 0.1, 1.6, 2.2, 2, 3, 4, 1</p> <p>Land Pattern: 1.2, 1.0, 1.6, 2.2</p> <p>Side View: 1.0 ± 0.1</p> <p>Pad Connections: Pad1: OE or PD Pad3: Output Pad2: Ground Pad4: Supply Voltage</p>	<p>QHTF53</p> <p>Top View: 5.0 ± 0.1, 3.2 ± 0.1, MEC</p> <p>Bottom View: 1.2 ± 0.1, 1.0 ± 0.1, 2.2, 2.54, 2, 3, 4, 1</p> <p>Land Pattern: 1.6, 1.5, 2.5, 2.54</p> <p>Side View: 1.2 ± 0.1</p> <p>Pad Connections: Pad1: OE or PD Pad3: Output Pad2: Ground Pad4: Supply Voltage</p>
<p>QHTF57</p> <p>Top View: 7.0 ± 0.2, 5.0 ± 0.2, MEC</p> <p>Bottom View: 1.4 ± 0.1, 1.2 ± 0.1, 3.7, 5.08, 2, 3, 4, 1</p> <p>Land Pattern: 2.0, 1.8, 4.2, 5.08</p> <p>Side View: 1.3 ± 0.2</p> <p>Pad Connections: Pad1: OE or PD Pad3: Output Pad2: Ground Pad4: Supply Voltage</p>	<ul style="list-style-type: none"> ◆ To minimize EMI, a 10 to 100 Ω series resistor is recommended at the output signal. ◆ To improve noise immunity: Do not float pin 1. Connect it to V_{DD}, if Tri-state or power down is not used.

Equivalent Products:

QHTF and **HTF** (click for HTF info.) are equivalent product series. They are manufactured at different Mercury facilities using identical designs, raw materials, and production processes. Once either one is approved, Mercury recommends including both the **QHTF** and the **HTF** part numbers of your referenced part on your BOM to take advantage of the **QuikXO** short lead-times and the low-cost high-volume production offerings. Examples:

QHTF	HTF
A QuikXO, quick turn, Mercury eCommerce product. For engineering, low to medium volume. The COO is U.S.A.	High volume, low cost, regular production lead time. The COO is Taiwan.
Ex. 18QHTF57-25.000-PD (quick-turn) is equivalent to 18HTF57-ET-25.000-PD (regular lead time)	
Ex. 25QHTF53-100.000-OE (quick-turn) is equivalent to 25HTF53-ET-100.000-OE (regular lead time)	
Ex. 3QHTF32-200.000-PD (quick-turn) is equivalent to 3HTF32-ET-200.000-PD (regular lead time)	

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



Profile Feature	Sn-Pb Eutectic Assembly	Pb-free Assembly
Preheat/Soak		
- Temperature min. (T_s min.)	100°C	150°C
- Temperature max. (T_s max.)	150°C	200°C
- Time (t_s) (T_s min. to T_s max.)	60 to 120 seconds	60 to 180 seconds
Ramp-up rate (T_L to T_p)	3°C / sec. max.	3°C / sec. max.
Liquidous temperature (T_L)	183°C	217°C
Time (t_L) maintained above T_L	60 to 150 seconds	60 to 150 seconds
Peak package body temperature (T_p)	235°C	260°C
Time (T_p) within 5°C of the classification temperature T_c	10 to 30 seconds	20 to 40 seconds
Ramp-down rate (T_p to T_L)	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.