

# Crystal Oscillators [ Quick - turn Clock Oscillators , 10 ~ 1500 MHz ]



**HTQF**  
CMOS waveform

**HPQF**  
LVPECL Differential

**HDQF**  
LVDS Differential

2.5 V 3.3 V

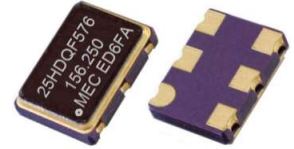
Min.  
10 MHz

Max.  
1.5 GHz

## Features

**1.0 pS Phase Jitter ( typical )**

The HTQF, HPQF and HDQF Series are members of Mercury's Q-Family Quick-Turn crystal oscillators that can be delivered within days. With low current consumption ( 54 mA for LVPECL 622.080 MHz at 3.3V ) and an integrated phase jitter performance of 1.0 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. The perfect solution to replace traditional XO's & VCXO's that use a more expensive, high-frequency, fundamental crystal and a noisy PLL multiplier circuit



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

Model	HTQF	HPQF	HDQF							
<b>Output Logic</b>	<b>LVC MOS / LV TTL</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.							
Current with Output Disable	16 mA typical	16 mA typical	16 mA typical							
Current Consumption ( V <sub>DD</sub> = + 3.3V ) <small>All values are typical and over the operating temperatures.</small>	10 MHz : 17 mA ; 150 MHz : 28 mA 50 MHz : 20 mA ; 200 MHz : 33 mA 100 MHz : 24 mA ; 250 MHz : 37 mA	100 MHz : 48 mA ; 750 MHz : 59 mA 250 MHz : 50 mA ; 1 GHz : 62 mA 500 MHz : 55 mA ; 1.35 GHz : 68 mA	100 MHz : 18 mA ; 750 MHz : 24 mA 250 MHz : 20 mA ; 1 GHz : 26 mA 500 MHz : 22 mA ; 1.35 GHz : 28 mA							
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							
Duty Cycle	50 % ± 5%									
Start-up Time	10 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									
Frequency Stability Codes	Frequency Stability over Operating Temperature Range	± 25 ppm	± 50 ppm	± 100 ppm	If non-standard , please enter the desired stability after the " C " or " I " represents . For example : " C20 " ± 20 ppm over -10°C to +70°C ; " I30 " ± 30 ppm over -40°C to +85°C					
	Commercial ( -10°C to +70°C )	A	B	C						
	Industrial ( -40°C to +85°C )	D	E	F						
SSB Phase Noise [ dBc / Hz ( typical ) ]	Offset	<b>77.76</b>	<b>122.88</b>	<b>125</b>	<b>156.25</b>	<b>212.5</b>	<b>491.52</b>	<b>622.08</b>	<b>1000</b>	<b>1250</b>
	10 Hz	-57	-68	-63	-55	-62	-61	-48	-52	-42
	100 Hz	-94	-99	-94	-85	-93	-86	-85	-82	-81
	1 KHz	-114	-113	-113	-109	-105	-100	-101	-93	-93
	10 KHz	-123	-119	-118	-116	-113	-105	-102	-97	-96
	100 KHz	-124	-120	-119	-118	-115	-105	-103	-97	-97
	1 MHz	-144	-140	-137	-139	-135	-126	-124	-116	-119
10 MHz	-152	-148	-146	-146	-143	-137	-133	-127	-129	
Phase Jitter ( 12KHz ~ 20 MHz, RMS ) unit : pS.	0.9	0.8	1.1	0.9	1.0	1.1	1.2	1.5	1.1	
<b>Output Enable Function</b>										
OE Control on Pad 1	70% of V <sub>DD</sub> ( min. ) to enable output. ( Open connection prohibit. ) 30% of V <sub>DD</sub> ( max. ) to disable output.									
Output Enable Time / Disable Time	200 nS. Max. / 50 nS. Max.									
Integrated Phase Jitter	1.0 pS typical ( 12 KHz to 20 MHz ) ; < 100 fS ( 1.875 KHz to 20 MHz )									

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

H_QF326	H_QF536	H_QF576
Pad Connections		
<b>Pad 1</b> : OE - High Enable ; <b>Pad 2</b> : No connection ; <b>Pad 3</b> : Ground ; <b>Pad 4</b> : [ CMOS : Output , LVPECL or LVDS : Differential ] ; <b>Pad 5</b> : [ CMOS : NC , LVPECL or LVDS : Complementary ] ; <b>Pad 6</b> : Supply Voltage		

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

■ Taiwan : Tel (886)-2-2406-2779 / sales-tw@mercury-crystal.com
■ U.S.A: Tel: (1)-909-466-0427 / sales-us@mercury-crystal.com
■ China: Tel: (86)-512-5763-8100 / sales-cn@mecxtal.com