

Frequency Switchable Crystal Oscillators [10 ~ 1,500 MHz]



HC_QF
CMOS / Differential

Q family
F series

Frequency Switchable

SMD

2.5 V

3.3 V

Min.
10 MHz

Max.
1,500 MHz

Features

Mercury's Q-Family crystal oscillators that can be delivered in days
Low current consumption (44 mA for PECL 622.080 MHz at 3.3V) and an integrated phase jitter performance of 1.5 pS RMS. Gaining its precision frequency control market position by providing engineers with *next-day* samples for prototypes.



General specifications , at Ta = + 25°C

Model	HCTQF		HCPQF		HCDQF
Output Logic	CMOS		PECL		LVDS
Supply Voltage V _{DD} (code)	+ 2.5 V ± 5% (voltage code " 25 ") + 3.3 V ± 5% (voltage code " 3 ")		+ 2.5 V ± 5% (voltage code " 25 ") + 3.3 V ± 5% (voltage code " 3 ")		+ 2.5 V ± 5% (voltage code " 25 ") + 3.3 V ± 5% (voltage code " 3 ")
Available Frequency Range	10 ~ 250 MHz		10 ~ 1,500 MHz		10 ~ 1,500 MHz
Output Load	15 pF		50 Ω into V _{CC} - 2V or Thevenin equivalent		100 Ω
Output Logic " High " , " 1 "	90 % V _{DD}		V _{DD} - 1.03 (min.) , V _{DD} - 0.6 (max.)		1.4 V (Typ.) , 1.6 V (max.)
Output Logic " Low " , " 0 "	10 % V _{DD}		V _{DD} - 1.85 (min.) , V _{DD} - 1.6 (max.)		1.1 V (Typ.) , 0.9 V (min.)
Current Consumption (V _{DD} = + 2.5 V)	10 ~ 150 MHz : 30 mA (max.)		10 ~ 750 MHz : 50 mA (max.)		10 ~ 750 MHz : 32 mA (max.)
	151 ~ 250 MHz : 40 mA (max.)		751 ~ 1,500 MHz : 55 mA (max.)		751 ~ 1,500 MHz : 35 mA (max.)
Current with Output Disabie	18 mA (Typ.)		18 mA (Typ.)		18 mA (Typ.)
Current Consumption (V _{DD} = + 3.3 V)	10 ~ 150 MHz : 38 mA (max.)		10 ~ 750 MHz : 55 mA (max.)		10 ~ 750 MHz : 34 mA (max.)
	151 ~ 250 MHz : 48 mA (max.)		751 ~ 1,500 MHz : 60 mA (max.)		751 ~ 1,500 MHz : 40 mA (max.)
Rise Time / Fall Time	10.0 nsec. (max.) Tr / Tf : 10% → 90% waveform		0.5 nsec. (max.) Tr / Tf : 20% → 80% waveform		0.4 nsec. (max.) Tr / Tf : 20% → 80% waveform
	RMS Jitter [12 kHz ~ 20 MHz]		1.5 psec. (typ.)		
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	
Duty Cycle	50 % ± 5%				
Start-up Time	10 msec. (max.)				
Aging at Ta = +25°C	± 5 ppm (max.) for first year				
Storage Temperature	-55°C to + 150°C				
Output Enable Function on Pad 1					
Output Enable / Disable Function	70% of V _{DD} (min.) to enable output. (Open connection prohibit.)				
	30% of V _{DD} (max.) to disable output				
Output Enable Time / Disable Time	200 nsec. (max.) / 50 nsec. (max.)				
Frequency Selection Function on Pad 2					
Frequency Selection (FSEL)	When FSEL = 0 (0 V or GND) , Output frequency is Freq.1 (f 1)				Default FSEL pin has internal pull-up resistor
	When FSEL = 1 (V _{DD}) , Output frequency is Freq.2 (f 2)				
FSEL on Pad 2	70% of V _{DD} (min.) For FSEL = 1 , Output frequency is Freq.2 (f 2)				
	30% of V _{DD} (max.) For FSEL = 0 , Output frequency is Freq.1 (f 1)				
	Frequency switching time : 60 us (typ.)				

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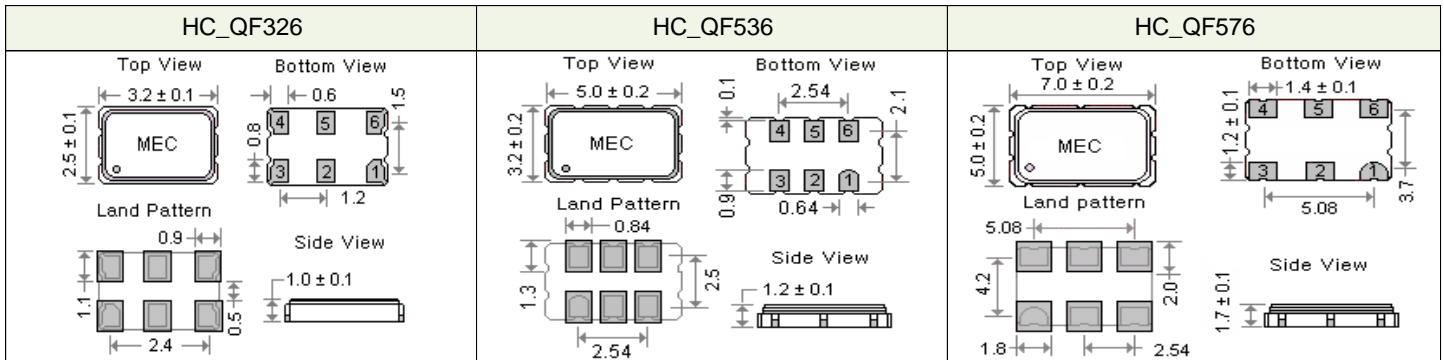
Max.
1,500
MHz

Part Number Format and Example

Example : 3HCTQF576 - E - 30.000 / 120.000

3	HCTQF	576	-	E	-	30.000	/	120.000
Supply Voltage "3" for 3.3V "25" for 2.5V	HCTQF : CMOS HCPQF : PECL HCDQF : LVDS	Package Size "576": 7 x 5 mm "536": 5 x 3.2 mm "326": 3 x 2.5 mm	-	Frequency Stability Code "E": ±50 ppm over -40 to +85°C. Other frequency stabilities are available.	-	Custom Frequency 1 FSEL = 0 (MHz)	/	Custom Frequency 2 FSEL = 1 (MHz)

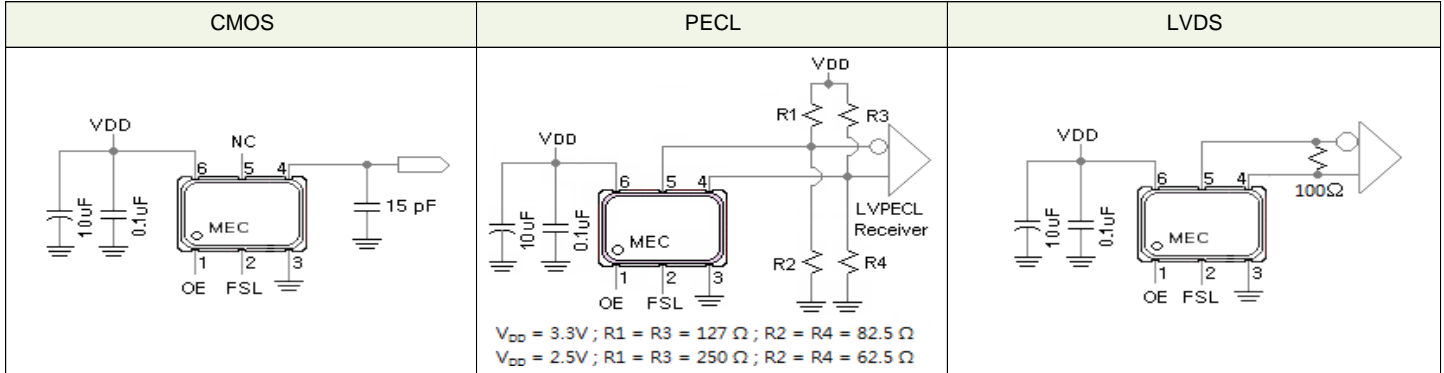
Outline Dimensions (Unit : mm) , Suggested pad Layout for SMDs , Test Circuits



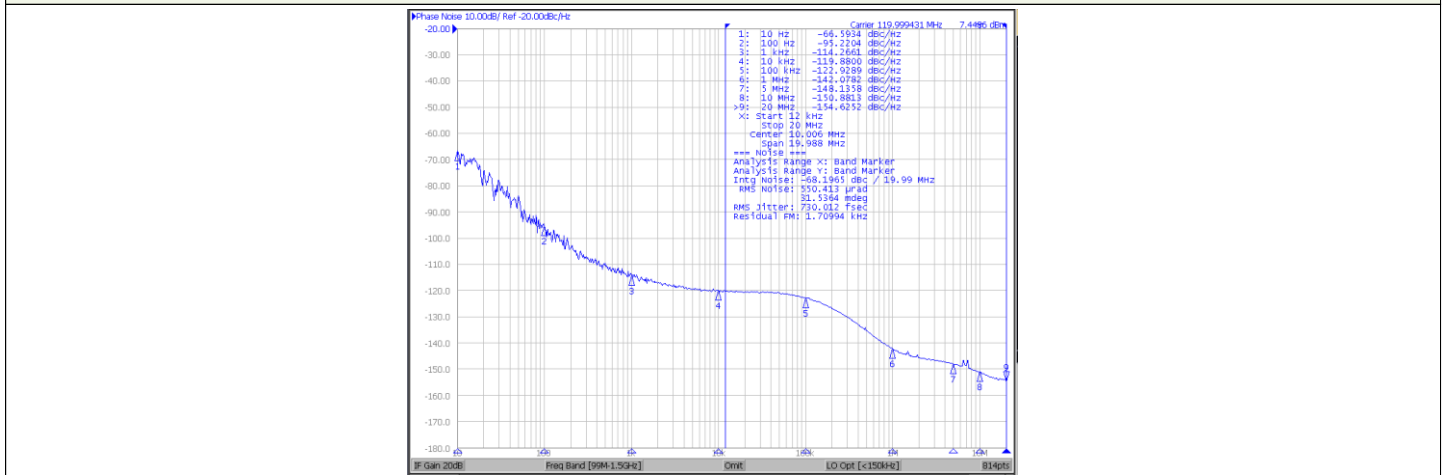
Pad Connections

Pad 1 : OE ; **Pad 2 :** Frequency Selection [FSEL = 0 (f 1) , FSEL = 1 (f 2)] ; **Pad 3 :** Ground

Pad 4 : [CMOS : Output , PECL or LVDS : Differential] ; **Pad 5 :** [CMOS : NC , PECL or LVDS : Complementary] ; **Pad 6 :** Supply Voltage

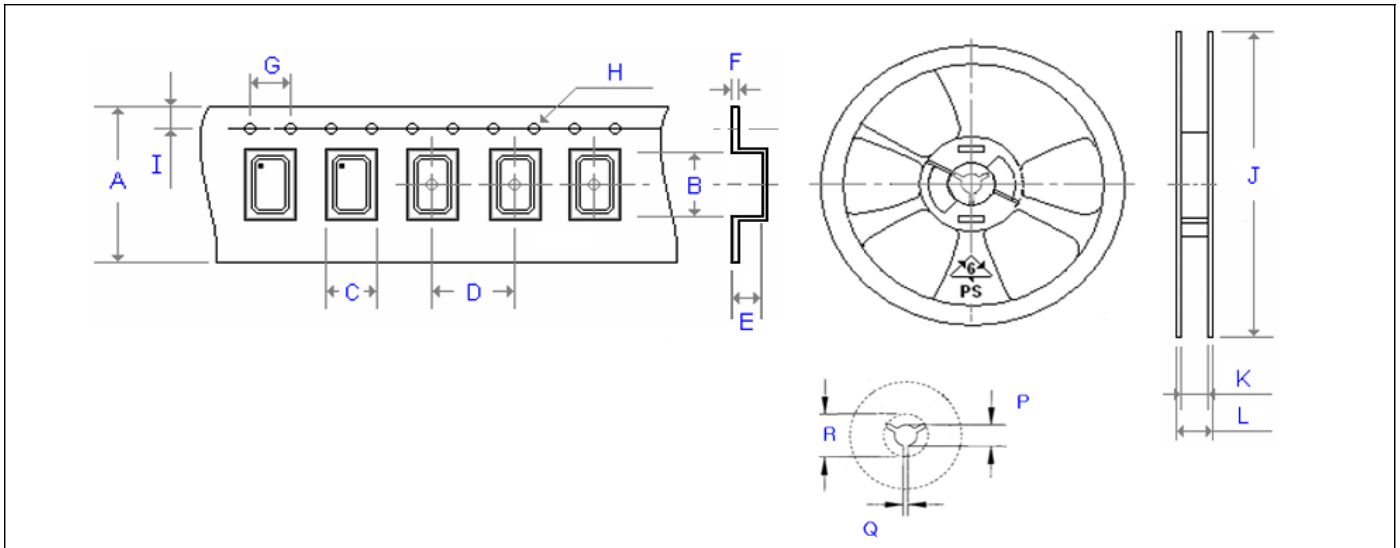


Phase Noise and Phase Jitter Data 3HCTQF576-E-30.000/120.000 (typical) , $V_{DD}=+3.3V$, FSEL=1 (3.3V)



Emboss Taping and Reel Specifications

[Crystal Oscillator Units]



Carrier Type Dimensions (unit : mm) ±0.3mm

	A	B	C	D	E	F	G	H	I	pcs / reel
H21	8.00	2.30	1.90	4.00	0.90	0.25	4.00	Ø 1.50	1.75	3000
H_22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
H_32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
H_57	16.00	7.30	5.30	8.00	1.90	0.32	4.00	Ø 1.50	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.32	4.00	Ø 1.50	1.75	1000
H_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
H_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
H_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	Ø 1.50	1.75	1000
H_328	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	Ø 1.50	1.75	1000
H_578	16.00	7.30	5.30	8.00	1.90	0.32	4.00	Ø 1.50	1.75	1000
H_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	Ø 1.50	1.75	500

Reel Dimensions (unit : mm) ±2mm

	J	K	L	P	Q	R	pcs / reel
H21	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_22	180.00	8.40	11.40	13.00	2.50	20.20	3000
H_32	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_53	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_57	180.00	17.20	19.30	13.00	2.50	20.20	1000
SWO	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_226	180.00	8.40	11.40	13.00	2.50	20.20	3000
H_326	180.00	9.00	12.00	13.00	2.50	20.20	3000
H_536	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_576	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_328	180.00	8.00	12.00	13.00	2.50	20.20	3000
H_538	180.00	13.00	16.00	13.00	2.50	20.20	1000
H_578	180.00	17.20	19.30	13.00	2.50	20.20	1000
H_43	330.00	24.50	29.10	13.00	2.50	20.20	500