

# Switchable output Crystal Oscillators [ 10 ~ 1,500 MHz ]

<b>GCTQF</b> CMOS waveform	<b>GCPQF</b> PECL Differential	<b>GCDQF</b> LVDS Differential	<b>Q</b> family <b>F</b> series	<b>Frequency</b> <b>Switchable</b>	SMD	2.5 V 3.3 V	Min. 10 MHz	Max. 1,500 MHz
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## Features

## Switchable output Oscillators

1.5 pS Phase Jitter ( typical )

Mercury's Q-Family crystal oscillators delivered in days. Low current consumption (44 mA for LVPECL 622.080 MHz at 3.3V ) & 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 and low cost , fast delivery for volume production.



## General specifications , at Ta = + 25°C

Model	GCTQF	GCPQF	GCDQF
Output Logic	CMOS	PECL	LVDS
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 ~ 1,500 MHz	10 ~ 1,500 MHz
Load	15 pF	50 Ω into Vcc - 2V or Thevenin equivalent	100 Ω between output and complimentary output
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 Consumption ( V <sub>DD</sub> : +2.5 V )	100 MHz : 30 mA ; 250 MHz : 40 mA	600 MHz : 45 mA ; 1,500 MHz : 55 mA	600 MHz : 30 mA ; 1,500 MHz : 35 mA
Current with Output Disable	18 mA typical	18 mA typical	18 mA typical
Current Consumption ( V <sub>DD</sub> : +3.3 V )	100 MHz : 35 mA ; 250 MHz : 40 mA	600 MHz : 50 mA ; 1,500 MHz : 60 mA	600 MHz : 35 mA ; 1,500 MHz : 40 mA
Rise Time / Fall Time	10.0 nS. ( max. ) Tr / Tf : 10% ↔ 90% waveform	0.5 nS. ( max. ) Tr / Tf : 20% ↔ 80% waveform	0.4 nS. ( max. ) Tr / Tf : 20% ↔ 80% waveform
Phase Jitter , rms ( typical ) ( 12 KHz to 20 MHz )	100 MHz : 0.8 ps ; 250 MHz : 0.8 ps	< 400 MHz 0.8 ps ; 600 MHz : 1.0 ps 1000 MHz : 1.3 ps ; 1,500MHz : 1.7 ps	< 400 MHz 0.8 ps ; 600 MHz : 0.8 ps 1000 MHz : 1.1 ps ; 1,500MHz : 1.3 ps

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 ; " I20 " ± 20 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%	Aging at Ta = +25°C		± 5 ppm max. for first year at 25°C	
Start-up Time	10 m sec. ( max. )	Storage Temperature		-55°C to + 150°C	

### Control Voltage Function on Pad 1

Supply Voltage ( V <sub>DD</sub> )	V <sub>DD</sub> = +2.5 V ; Vcon Center = +1.25V	V <sub>DD</sub> = +3.3 V ; Vcon Center = +1.65V	
Vcontrol Range	+ 0.2V ~ +2.3V	+ 0.3V ~ +3.0V	
Frequency Pulling Range	± 80 ppm ( min. )	± 80 ppm ( min. )	
Absolute Voltage	2.8 V max. for 2.5V V <sub>DD</sub> ; 4.0 V max. for 3.3V V <sub>DD</sub>		
Linearity	± 5% typical. ±10% ( max. )	Input Impedance	1 MΩ typical
Transfer Function	Positive Transfer	Bandwidth	10 KHz min. Measured at -3 dB

### Frequency Selection Function on Pads

Frequency Selection ( FSEL )	When FSEL = 0 , Output frequency is Freq.1 ( f1 )
	When FSEL = 1 , Output frequency is Freq.2 ( f2 )
	Default FSEL pin has internal pull-up resistor .
FSEL on pad2	70% of V <sub>DD</sub> ( min. ) For FSEL = 1 , Output frequency is Freq.2 ( f2 )
	30% of V <sub>DD</sub> ( max. ) For FSEL = 0 , Output frequency is Freq.1 ( f1 )

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

GC_QF326	GC_QF536	GC_QF576

### Pad Connections

**Pad 1** : Control Voltage ; **Pad 2** : Frequency Selection [ FSEL = 0 ( f1 ) , FSEL =1 ( f2 ) ] ; **Pad 3** : Ground  
**Pad 4** : [ CMOS : Output , PECL or LVDS : Differential ] ; **Pad 5** : [ CMOS : NC , PECL or LVDS : Complementary ] ; **Pad 6** : Supply Voltage

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

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# Switchable output Crystal Oscillators [ 10 ~ 1,500 MHz ]

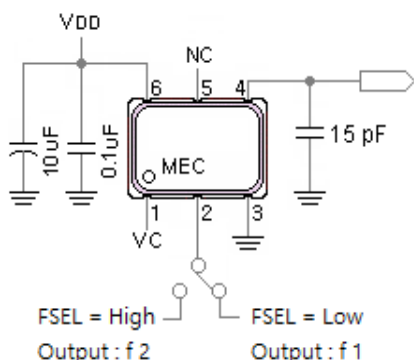
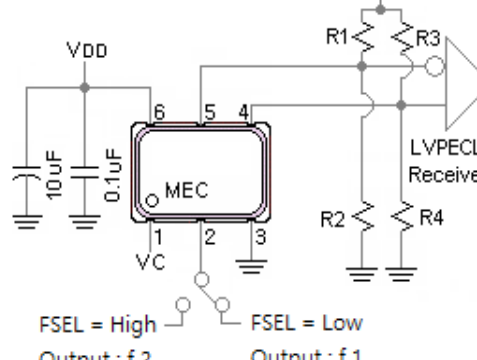
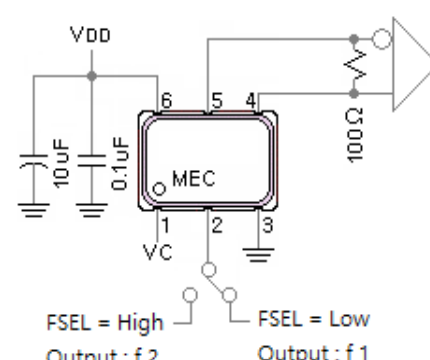
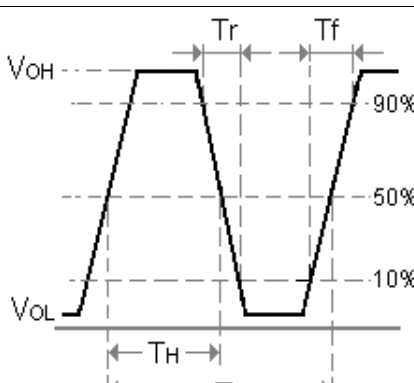
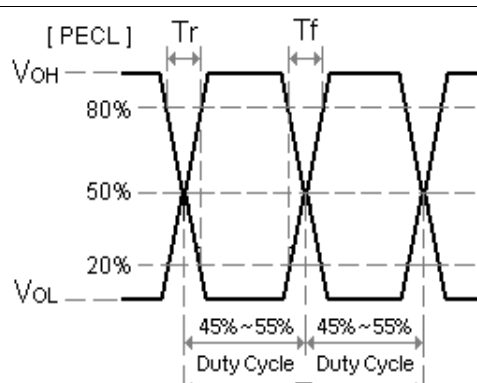
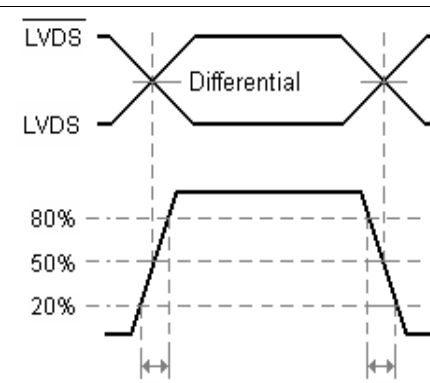
<b>GCTQF</b>	<b>GCPQF</b>	<b>GCDQF</b>	<b>Q</b> family <b>F</b> series	<b>Frequency Switchable</b>	<b>SMD</b>	<b>2.5 V</b> <b>3.3 V</b>	<b>Min. 10 MHz</b>	<b>Max. 1,500 MHz</b>
CMOS waveform	PECL Differential	LVDS Differential						

## Part Number Format and Example

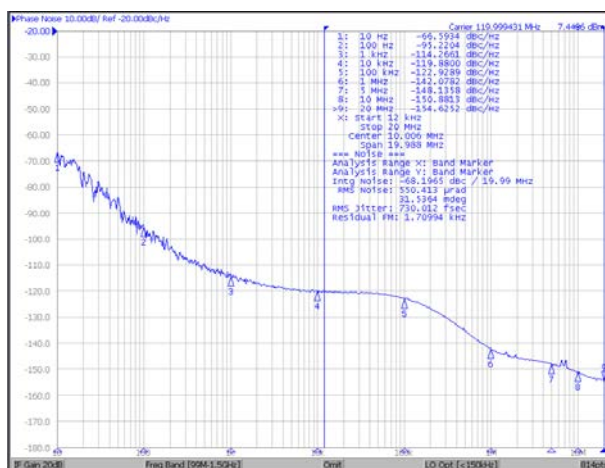
Example : 3GCTQF576 - E - 30.000 / 120.000

3	GCTQN	576	-	E	-	30	/	120
Supply Voltage "3" for 3.3V "25" for 2.5V	GCTQF : CMOS GCPQF : PECL GCDQF : 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)

## Test Circuits and Output Waveforms

CMOS	PECL	LVDS
 <p style="text-align: center;">FSEL = High    FSEL = Low Output : f2      Output : f1</p>	 <p style="text-align: center;">FSEL = High    FSEL = Low Output : f2      Output : f1</p>	 <p style="text-align: center;">FSEL = High    FSEL = Low Output : f2      Output : f1</p>
	 <p style="text-align: center;">45%~55%    45%~55% Duty Cycle    Duty Cycle</p>	 <p style="text-align: center;">Differential</p>

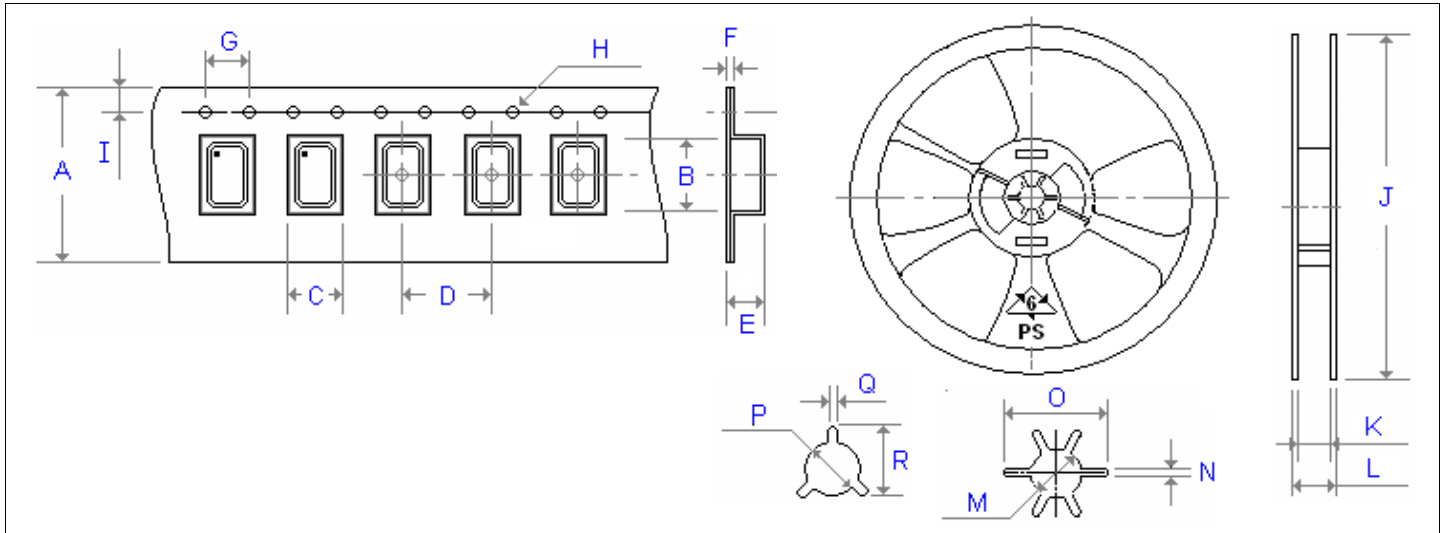
Phase Noise and Phase Jitter Data 3GCTQF576-E-30.000/120.000 (typical) ,  $V_{DD}=3.3V$  , FSEL=1 ( 3.3V )



# Emboss Taping and Reel Specifications

[ VCXO ]

[ ( VC )TCXO ]



Carrier Type Dimensions ( unit : mm )

	A	B	C	D	E	F	G	H	I	pcs / reel
G_324 ( 6 )	8.0	3.4	2.7	4.0	1.4	0.3	4.0	Ø 1.50	1.75	3000
G_534	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
G_576	16.0	7.3	5.3	8.0	1.9	0.3	4.0	Ø 1.55	1.75	1000
G_42	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_43	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_62	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
G_63	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_22	8.0	2.8	2.3	4.0	1.1	0.3	4.0	Ø 1.50	1.75	3000
(V)M_32	8.0	3.4	2.7	4.0	1.4	0.3	4.0	Ø 1.50	1.75	3000
(V)MQ_326	12.0	3.6	2.9	4.0	1.7	0.3	4.0	Ø 1.55	1.75	3000
(V)M_53	12.0	5.3	3.6	8.0	1.4	0.3	4.0	Ø 1.55	1.75	1000
(V)M_57	16.0	7.4	5.5	8.0	2.8	0.4	4.0	Ø 1.50	1.75	500
(V)M_42	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_43	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_62	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500
(V)M_63	24.0	12.4	10.3	16.0	5.0	0.3	4.0	Ø 1.55	1.75	500

Reel Dimensions ( unit : mm )

	J	K	L	P	Q	R	pcs / reel
G_324 ( 6 )	180.0	9.0	12.0	13.2	2.1	-	3000
G_534	180.0	13.0	16.0	13.2	2.5	-	1000
G_576	180.0	17.2	19.3	13.3	2.2	22.0	1000
G_42	330.0	30.0	25.0	13.4	2.5	19.5	500
G_43	330.0	30.0	25.0	13.4	2.5	19.5	500
G_62	330.0	30.0	25.0	13.4	2.5	19.5	500
G_63	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_22	180.0	9.0	12.0	13.2	2.1	-	3000
(V)M_32	180.0	9.0	12.0	13.2	2.1	-	3000
(V)MQ_326	180.0	9.0	12.0	13.2	2.1	-	3000
(V)M_53	180.0	13.0	16.0	13.2	2.5	19.5	1000
(V)M_57	180.0	17.2	19.3	13.3	2.2	22.0	500
(V)M_42	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_43	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_62	330.0	30.0	25.0	13.4	2.5	19.5	500
(V)M_63	330.0	30.0	25.0	13.4	2.5	19.5	500