Voltage Controlled Crystal Oscillators

QUIKXO™ MERCURY QUICK - TURN Oscillators

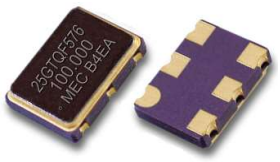
GTQF CMOS waveform | **GPQF** LVPECL Differential | **GDQF** LVDS Differential

2.5 V 3.3 V | Min. 10 MHz | Max. 1.5 GHz

Features

Quick - turn Clock Oscillators | **1.2 pS Phase Jitter (typical)**

The GTQF, GPQF and GDQF 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 forvolume production. The perfect solution to replace traditional XO's & VCXO's that use a more expensive, highfrequency, fundamental crystal and a noisy PLL multiplier circuit



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

Model	GTQF	GPQF	GDQF
Output Logic	**CMOS / TTL**	**LVPECL**	**LVDS**
Supply Voltage V_{DD} (code)	+ 2.5 V_{DD} ± 5% (voltage code " 25 ") + 3.3 V_{DD} ± 5% (voltage code " 3 ")	+ 2.5 V_{DD} ± 5% (voltage code " 25 ") + 3.3 V_{DD} ± 5% (voltage code " 3 ")	+ 2.5 V_{DD} ± 5% (voltage code " 25 ") + 3.3 V_{DD} ± 5% (voltage code " 3 ")
Available Frequency Range	10 ~ 250 MHz	10 ~ 1.5 GMHz	10 ~ 1.5 GMHz
Load	15 pF	Differential	Differential
Output Logic " High " , " 1 "	90 % V_{DD}	V_{DD} - 1.03 (min.) , V_{DD} - 0.6 (max.)	1.4 V Typical , 1.6 V max.
Output Logic " Low " , " 0 "	10 % V_{DD}	V_{DD} - 1.85 (min.) , V_{DD} - 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_{DD} = + 3.3V) All values are typical and over the operating temperatures.	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 : 50 mA ; 750 MHz : 64 mA 250 MHz : 55 Ma ; 1 GHz : 68 mA 500 MHz : 60 mA ; 1.35 GHz : 72 mA	100 MHz : 25 mA ; 750 MHz : 39 mA 250 MHz : 30 mA ; 1 GHz : 43 mA 500 MHz : 35 mA ; 1.35 GHz : 47mA
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 (1) 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	E	

SSB Phase Noise [dBc / Hz (typical)]	Offset / Freq.	77.76 MHz	122.88 MHz	125 MHz	156.25 MHz	212.5 MHz	491.52 MHz	622.08 MHz	1,000 MHz	1,250 MHz
	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	-118	-119
		-152	-148	-148	-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

Control Voltage Function on Pad 1

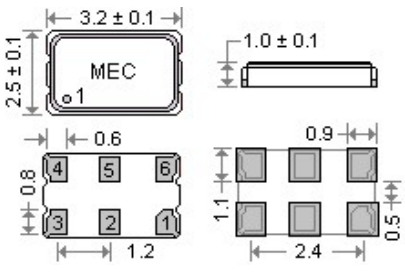
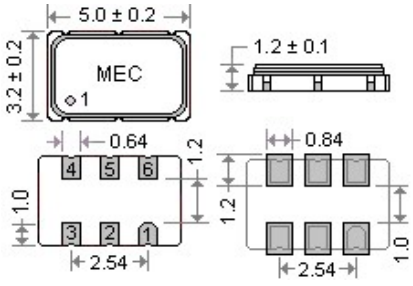
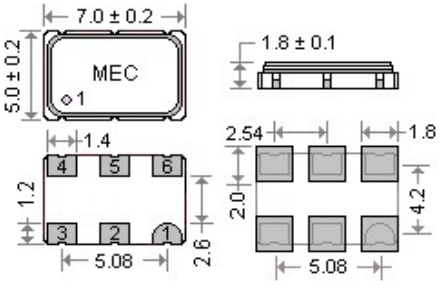
Supply Voltage (V_{DD})	V_{DD} = +2.5 V ; Vcon Center = +1.25V	V_{DD} = +3.3 V ; Vcon Center = +1.65V
Vcontrol Range	+ 0.2V ~ +2.3V	+ 0.3V ~ +3.0V
Frequency Pulling Range	± 30 ppm (min.)	± 30 ppm (min.)
	Up to ± 200 ppm (min.) is also available. Please contact Mercury.	
Absolute Voltage	2.8 V max. for 2.5V V_{DD}; 4.0 V max. for 3.3V V_{DD}	

Linearity	± 5% typical. ±10% (max.)	Input Impedance	1 MΩ typical
Transfer Function	Positive Transfer	Bandwidth	10 KHz min. Measured at -3 dB

Output Enable Function

OE Control on Pad 2	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 nS. Max. / 50 nS. Max.
Integrated Phase Jitter	1.2 pS typical (12 KHz to 20 MHz) ; < 100 fS (1.875 KHz to 20 MHz)

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

G_QF326	G_QF536	G_QF576
		

Pad Connections

Pad 1 : Control Voltage ; Pad 2 : OE: High Enable ; Pad 3 : Ground ; Pad 4 : [CMOS : Output , LVPECL or LVDS : Differential] ;
Pad 5 : [CMOS : NC , LVPECL or LVDS : Complementary] ; Pad 6 : Supply Voltage

Voltage Controlled Crystal Oscillators

QUIKXO™ MERCURY QUICK - TURN Oscillators

GTQF	GPQF	GDQF	2.5 V	3.3 V	Min.	Max.
CMOS waveform	**LVPECL** Differential	**LVDS** Differential			10 MHz	1.5 GHz

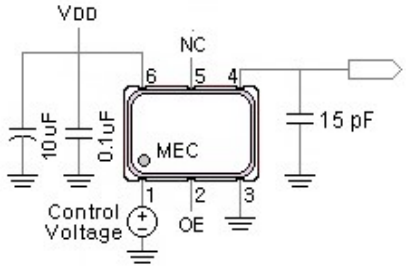
Part Number Format and Example

Example : 3GPQN576 - E - 100N - 622.080

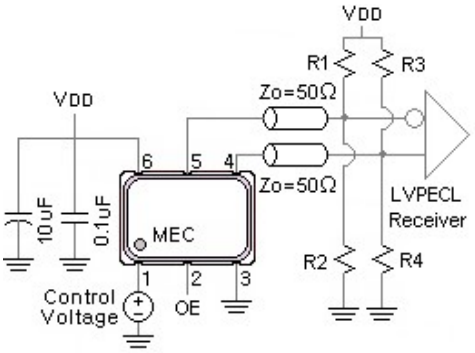
3	GPQF	576	-	E	-	100N	-	622.08
Supply Voltage " **3** " for 3.3V " **25** " for 2.5V	GTQF : CMOS GPQF : LVPECL GDQF : LVDS	Package Size " 576 " : 7 x 5 mm " 536 " : 5 x 3.2 mm " 326 " : 3.2 x 2.5 mm		Frequency Stability Code " **E** ": ± 50 ppm over -40 to +85°C. Other frequency stabilities are available.		±100 ppm (min.) frequency pulling range.		Frequency (MHz)

Test Circuits and Output Waveforms

T T L / CMOS Test Circuit

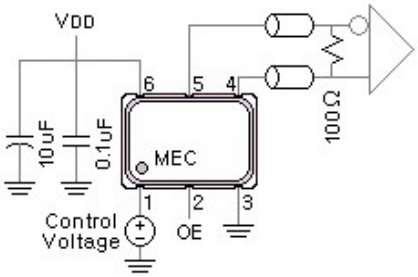


LVPECL Test Circuit

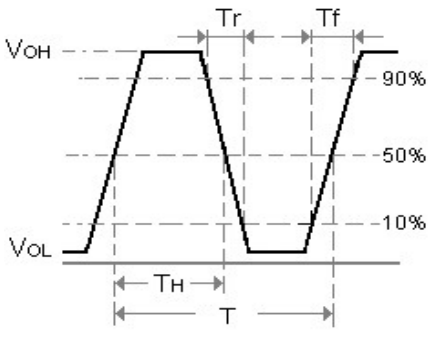


VDD = 3.3 V : R1 = R3 = 127Ω ; R2 = R4 = 82.5Ω
VDD = 2.5 V : R1 = R3 = 250Ω ; R2 = R4 = 62.5Ω

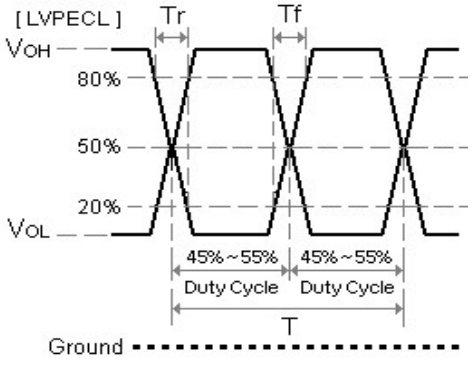
LVDS Test Circuit



T T L / CMOS Output Wave Form



LVPECL Output Wave Form



LVDS Output Wave Form