Voltage Controlled Crystal Oscillators

GTQF — **CMOS** waveform

GPQF — **PECL** Differential

GDQF — **LVDS** Differential

2.5 V **3.3 V**

Min. **10 MHz**

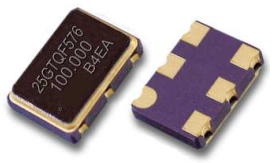
Max. **1,500 MHz**

Features

Quick - turn Clock Oscillators

1.2 pS Phase Jitter (typical)

The GTQF, GPQF and GDQF Series are members of Matel's Q-Family Quick-Turn crystal oscillators that can be delivered within days. With low current consumption (44 mA for PECL 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

Model	GTQF	GPQF	GDQF
Output Logic	**CMOS**	**PECL**	**LVDS**
Supply Voltage V_{DD} (code)	+ 2.5 V ± 5% (voltage code " 25 ")	+ 2.5 V ± 5% (voltage code " 25 ")	+ 2.5 V ± 5% (voltage code " 25 ")
	+ 3.3 V ± 5% (voltage code " 3 ")	+ 3.3 V ± 5% (voltage code " 3 ")	+ 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 VDD - 2V or Thevenin equivalent	100 Ω between OUT and OUTN
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 with Output Disable	16 mA (typ.)	16 mA (typ.)	16 mA (typ.)
Current Consumption (V_{DD} = + 3.3V)	10 ~ 50 MHz : 30 mA	10 ~ 250 MHz : 50 mA	10 ~ 250 MHz : 30 mA
	51 ~ 150 MHz : 38 mA	251 ~ 750 MHz : 55 mA	251 ~ 750 MHz : 34 mA
	151 ~ 250 MHz : 48 mA	751 ~ 1,500 MHz : 60 mA	751 ~ 1,500 MHz : 40 mA
Rise Time / Fall Time	1.5 nsec. (Typ.) , 3.0 nsec. (max.) Tr / Tf : 10% ↔ 90% waveform	0.2 nsec. (Typ.) , 0.5 nsec. (max.) Tr / Tf : 20% ↔ 80% waveform	0.2 nsec. (Typ.) , 0.4 nsec. (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 ; " 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*	

RMS Jitter [12 kHz ~ 20 MHz]	1.2 psec (typ.)							
Phase Noise [dBc / Hz (typ.)]	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	10 MHz
	156.250 MHz	-55	-85	-109	-116	-118	-139	-146
	491.52 MHz	-61	-86	-100	-105	-105	-126	-137

Control Voltage Function on Pad 1

Supply Voltage	V_{DD} = +2.5 V ; Vcon Center = +1.25V	V_{DD} = +3.3 V ; Vcon Center = +1.65V
Vcontrol Range	+ 0.25V ~ +2.25V	+ 0.3V ~ +3.0V
Frequency Pulling Range	± 80 ppm (min.)	± 80 ppm (min.)
	Up to ± 200 ppm (min.) is also available. Please contact Mercury.	
Linearity	± 5% (typ.) ±10% (max.)	
Transfer Function	Positive Transfer	
Input Impedance	1 MΩ (typ.)	
Bandwidth	10 KHz (min.) Measured at -3 dB	

Output Enable Function on Pad 2

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 nsec. (max.) / 50 nsec.(max.)

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GTQF — **CMOS** waveform

GPQF — **PECL** Differential

GDQF — **LVDS** Differential

2.5 V / 3.3 V

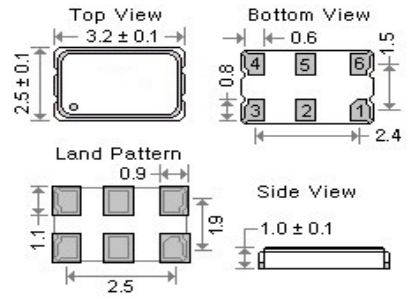
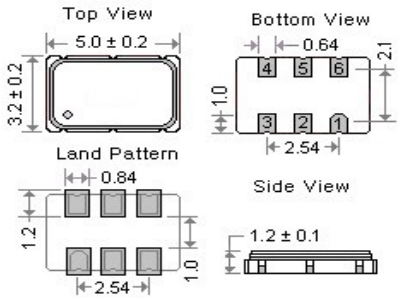
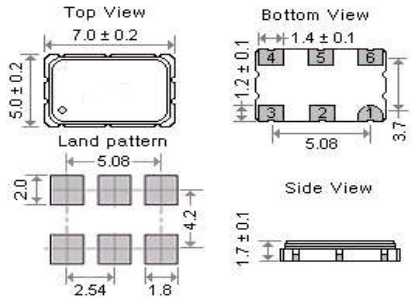
Min.	Max.
10 MHz	1,500 MHz

Part Number Format and Example

Example : 3GPQF576 - E - 100N - 622.080

3	GPQF	576	-	E	-	100N	-	622.080
Supply Voltage " **3** " for 3.3V " **25** " for 2.5V	GTQF : CMOS GPQF : PECL GDQF : LVDS	Package Size " **576** " : 7.0 * 5.0 mm " **536** " : 5.0 * 3.2 mm " **326** " : 3.2 * 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)

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

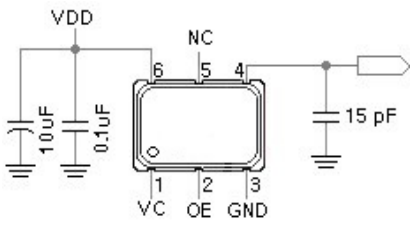
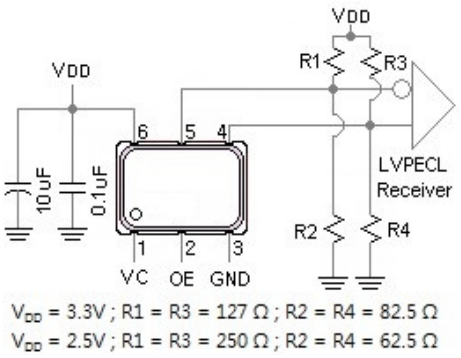
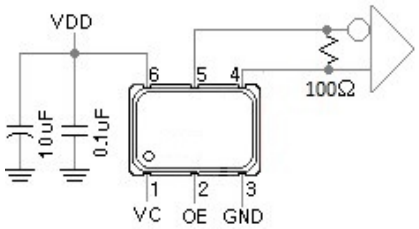
G_QF326	G_QF536	G_QF576
		

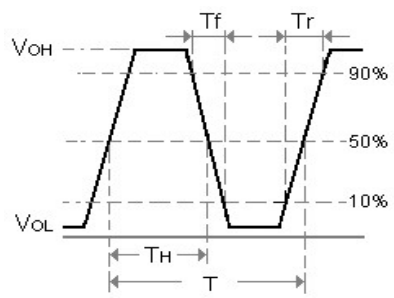
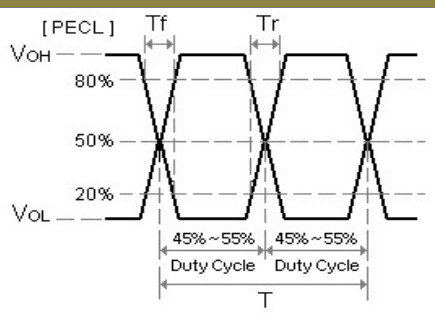
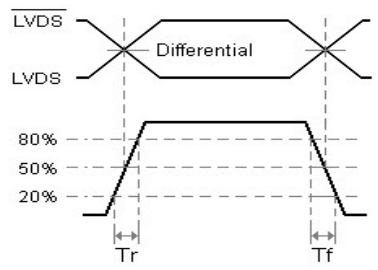
Pad Connections :

Pad 1 : VCXO ; **Pad 2 :** OE: High Enable ; **Pad 3 :** Ground

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

Test Circuits and Output Waveforms

CMOS Test Circuit	PECL Test Circuit	LVDS Test Circuit
		

CMOS Output Waveform	PECL Output Waveform	LVDS Output Waveform
		

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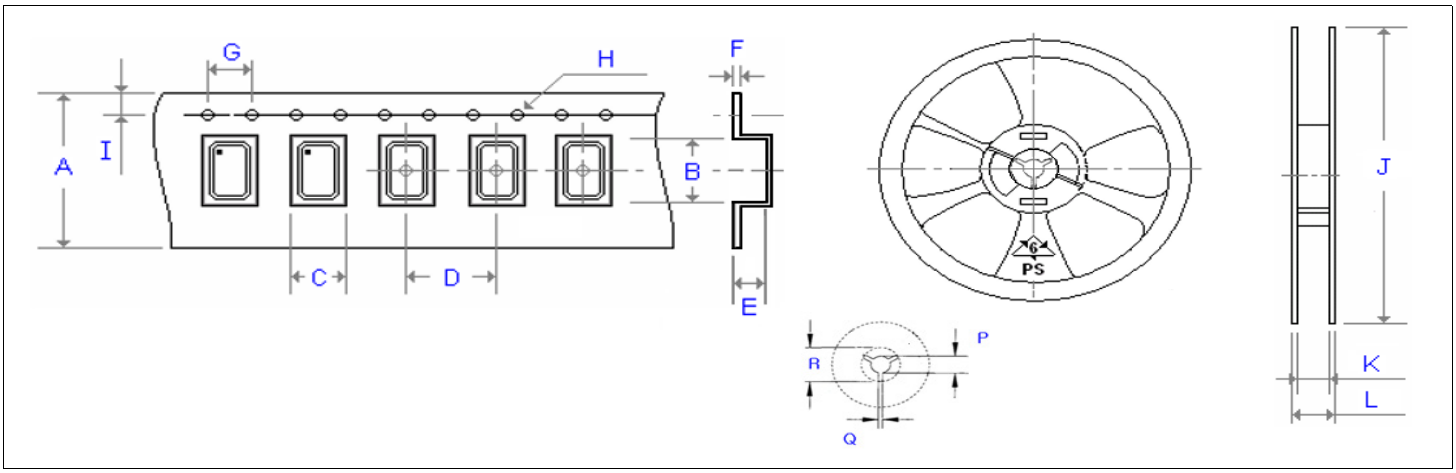
Emboss Taping and Reel Specifications

[VCXO]	[(VC)TCXO]



Carrier Type Dimensions (unit : mm) ±0.3mm

	A	B	C	D	E	F	G	H	I	pcs / reel
G_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
G_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
G_534	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
G_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	Ø 1.50	1.75	1000
G_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	Ø 1.50	1.75	500
G_63	24.00	11.80	10.00	16.00	5.00	0.30	4.00	Ø 1.50	1.75	500
G_JF538	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
G_JF578	16.00	7.30	5.30	8.00	1.90	0.32	4.00	Ø 1.50	1.75	1000
(V)M21	8.00	2.30	1.90	4.00	0.90	0.25	4.00	Ø 1.50	1.75	3000
ME21	8.00	2.30	1.50	4.00	1.35	0.25	4.00	Ø 1.50	1.75	3000
(V)M22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
(V)M_32	8.00	3.71	2.80	4.00	1.75	0.25	4.00	Ø 1.50	1.75	3000
(V)MQ_326	12.00	3.60	2.90	4.00	1.70	0.30	4.00	Ø 1.50	1.75	3000
(V)M_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
(V)M_57(2)	16.00	7.40	5.50	8.00	2.80	0.35	4.00	Ø 1.50	1.75	500
(V)M_43 (63)	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
G_226	180.00	8.40	11.40	13.00	2.50	20.20	3000
G_326	180.00	9.00	12.00	13.00	2.50	20.20	3000
G_534	180.00	13.00	16.00	13.00	2.50	20.20	1000
G_576	180.00	17.20	19.30	13.00	2.50	20.20	1000
G_43	330.00	24.50	29.10	13.00	2.50	20.20	500
G_63	330.00	24.50	29.10	13.00	2.50	20.20	500
G_JF538	180.00	13.00	16.000	13.00	2.50	20.20	1000
G_JF578	180.00	17.20	19.300	13.00	2.50	20.20	1000
(V)M21	180.00	8.40	11.40	13.00	2.50	20.20	3000
ME21	180.00	9.00	12.00	13.00	2.50	20.20	3000
(V)M22	180.00	8.40	11.40	13.00	2.50	20.20	3000
(V)M_32	180.00	9.00	11.40	13.00	2.50	20.20	3000
(V)MQ_326	180.00	13.00	16.00	13.00	2.50	20.20	3000
(V)M_53	180.00	13.00	16.00	13.00	2.50	20.20	1000
(V)M_57(2)	180.00	17.20	19.30	13.00	2.50	20.20	500
(V)M_43 (63)	330.00	24.50	29.10	13.00	2.50	20.20	500

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