

Voltage Controlled Crystal Oscillators

CMOS output

VCXO " G "

CMOS

Thru-Hole

SMD

1.8 V

3.3 V

Min.

Max.

2.5 V

5.0 V

1.25 MHz

50.0 MHz

Unlike regular clock oscillators that have a fixed output frequency, the output frequency of VCXOs (also known as " frequency modulators ") can be tuned $\pm 50 \sim \pm 200$ ppm up or down from the nominal frequency, by varying the control voltage on the voltage control pin. A varactor and a voltage variable capacitance tuning diode, is used to achieve this function.

Applications include (PLL) phase lock loop, SONET / ATM, set -top boxes, MPEG, audio -video modulations, video game consoles and HDTV sets, ONET, 10GbE, Fibre Channel, wireless repeaters, transponders, HDTV, FPGAs, data acquisition.



General Specifications of " G " series , [TA = +25°C , V_{DD}= at specified voltage , Load : 15 pF]

Model	" G " series						
Output Waveform	CMOS						
Type	SMD Type					Thru - Hole Type	
Pads / Pins	4 pads		6 pads			4 pins	
Models (Dimensions) , Unit : mm	G534 (5.0 * 3.2 * 1.2)		G226 (2.5 * 2.0 * 1.0)		G576 (7.0 * 5.0 * 1.7)		G14 (20.2 * 12.8 * 6.0)
	G43 (11.4 * 9.6 * 3.0)		G326 (3.2 * 2.5 * 1.0)		G63 (11.4 * 9.6 * 3.0)		G8 (12.8 * 12.8 * 5.5)
Supply Voltage (V _{DD})	+1.8V \pm 5%		+3.3V \pm 10%			+5.0V \pm 10%	
Frequency Range	16.0 MHz ~ 50.0 MHz		1.25 MHz ~ 50.0 MHz			1.25 MHz ~ 50.0 MHz	
Initial Freq. Accuracy (at 25 °C)	with V _c = 0.9V		with V _c = 1.65V			with V _c = 2.5V	
Output Logic High " 1 "	1.62 V (min.)		2.97 V (min.)			4.5 V (min.)	
Output Logic Low " 0 "	0.18 V (max.)		0.33 V (max.)			0.5 V (max.)	
Frequency Deviation Range	Standard : \pm 80 ppm (min.)		Standard : \pm 80 ppm (min.)			Standard : \pm 80 ppm (min.) ; \pm 200 ppm (min.) available	
Control Voltage Center	0.9 V _{DC}		1.65 V _{DC}			2.5 V _{DC}	
Control Voltage Range	0.0V to 1.8V		0.3V to 3.0V			0.5V to 4.5V	
Frequency Stability Codes	Frequency Stability over Operating Temperature Range		\pm 25 ppm	\pm 50 ppm	\pm 100 ppm	If non-standard please enter the desired stability after the " C " or " I " For example : " C20 " : \pm 20 ppm over -10°C to +70°C ; " I30 " : \pm 30 ppm over -40°C to +85°C	
	Commercial " C " (-10°C to +70°C)		A	B	C		
	Industrial " I " (-40°C to +85°C)		D	E	F		
Output Load	15 pF						
Rise Time (Tr) / Fall Time (Tf)	4 nsec.(typ.) ; 6 nsec.(max.) Measured between 10% to 90% of wave form (CL=15pF)						
Duty Cycle	50% \pm 10% (standard) , 50% \pm 5% (optional, add " - S " as suffix to part number)						
RMS Jitter (12 KHz to 20 MHz)	1.0 psec (max.)						
Phase Noise	Offset	10 Hz	100 Hz	1k Hz	10K Hz	100K Hz	1 MHz
[27MHz , 3.3V]	dBc/Hz (typ.)	-40 dBc/Hz	-104 dBc/Hz	-132 dBc/Hz	-147 dBc/Hz	-152 dBc/Hz	-150 dBc/Hz
Start-up Time	10 msec. (max.)						
Current Consumption	10 ~ 45 mA (Frequency dependent) . For 27 MHz: 10 mA (typ.) at +3.3 V _{DD} and 20 mA (typ.) at 5.0 V _{DD} .						
Linearity	6% (typ.) ; 10% (max.)						
Modulation Bandwidth	10 KHz (min.) Measured at -3 dB						
Input Impedance	5 M Ω (typ.)						
Slope Polarity (Transfer Function)	Monotonic and Positive : Increasing control voltage always increases output frequency ,						
Storage Temperature	-55°C to + 125°C						
Aging at Ta = +25°C	\pm 3 ppm per year (max.)						
Output Enable / Disable Function	Enable	When 70% (min.) of V _{DD} to Enable Output. ; Enable time : 2 msec (max.)					
	Disable	When 30% (max.) of V _{DD} to Disable Output. ; Disable time : 100 nsec (max.)					

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

[G226]	[G326]	[G534]
<p>Top View 2.5 ± 0.1 2.0 ± 0.1 MEC</p> <p>Bottom View 0.85 0.6 0.6 ± 0.1 1.0 ± 0.1</p> <p>Land Pattern 0.6 0.6 ± 0.1</p> <p>Side View 1.0 ± 0.1</p> <p>Pad Connections : Pad 1 : Control Voltage Pad 4 : Output Pad 2 : OE Pad 5 : No Connection Pad 3 : Ground Pad 6 : Supply Voltage</p>	<p>Top View 3.2 ± 0.1 2.5 ± 0.1 MEC</p> <p>Bottom View 1.2 0.6 0.6 ± 0.1 1.0 ± 0.1</p> <p>Land Pattern 0.9 2.4 0.5 ± 0.1</p> <p>Side View 1.0 ± 0.1</p> <p>Pad Connections : Pad 1 : Control Voltage Pad 4 : Output Pad 2 : OE Pad 5 : No Connection Pad 3 : Ground Pad 6 : Supply Voltage</p>	<p>Top View 5.0 ± 0.1 3.2 ± 0.1 MEC</p> <p>Bottom View 1.2 ± 0.1 2.54 1.0 ± 0.1 1.2 ± 0.1</p> <p>Land Pattern 1.6 2.54 1.5</p> <p>Side View 1.2 ± 0.1</p> <p>Pad Connections : Pad 1 : Control Voltage Pad 3 : Output Pad 2 : Ground Pad 4 : Supply Voltage</p>
<p>Top View 5.0 ± 0.1 3.2 ± 0.1 MEC</p> <p>Bottom View 2.54 2.1 0.9 0.64 ± 0.1 1.2 ± 0.1</p> <p>Land Pattern 0.9 2.54 1.3</p> <p>Side View 1.2 ± 0.1</p> <p>Pad Connections : Pad 1 : Control Voltage Pad 4 : Output Pad 2 : OE Pad 5 : No Connection Pad 3 : Ground Pad 6 : Supply Voltage</p>	<p>Top View 7.0 ± 0.2 5.0 ± 0.2 MEC</p> <p>Bottom View 1.4 ± 0.1 5.08 1.2 ± 0.1 3.7 1.7 ± 0.1</p> <p>Land pattern 5.08 2.54 4.2</p> <p>Side View 1.7 ± 0.1</p> <p>Pad Connections : Pad 1 : Control Voltage Pad 4 : Output Pad 2 : OE Pad 5 : No Connection Pad 3 : Ground Pad 6 : Supply Voltage</p>	
<p>Top View 12.8 ± 0.2 10.8 MEC</p> <p>Side View 5.5 ± 0.2 6.3 max. 0.8 Ø 0.45</p> <p>Bottom View 7.6 ± 0.1 7.6 ± 0.1 3-Ø 1.6 glass stand-off</p> <p>Pin Connections : Pin 1 : Control Voltage Pin 4 : Ground Pin 5 : Output Pin 8 : Supply voltage</p>	<p>Top View 20.2 ± 0.2 18.3 MEC</p> <p>Side View 6.0 ± 0.2 6.3 max. 0.8 Ø 0.45</p> <p>Bottom View 10.7 ± 0.1 15.2 ± 0.1 4-Ø 1.8 glass stand-off</p> <p>Pin Connections : Pin 1 : Control Voltage Pin 7 : Ground Pin 8 : Output Pin 14 : Supply voltage</p>	
<p>Top View 9.6 ± 0.2 11.4 ± 0.2 MEC</p> <p>Bottom View 1.3 ± 0.1 7.0 ± 0.1 1.0 ± 0.1 1.4 ± 0.1 5.08</p> <p>Side View 0.7 3.0 ± 0.2 0.6</p> <p>Pad Connections : Pad 1 : Control Voltage Pad 4 : Output Pad 2 : OE Pad 5 : No Connection Pad 3 : Ground Pad 6 : Supply Voltage</p>	<p>Top View 9.6 ± 0.2 11.4 ± 0.2 MEC</p> <p>Bottom View 1.4 ± 0.1 7.0 ± 0.1 1.0 ± 0.1 1.3 ± 0.1 5.08</p> <p>Side View 0.7 3.0 ± 0.2 0.6</p> <p>Pad Connections : Pad 1 : Control Voltage (rounded pad) Pad 2 : Ground Pad 3 : Output Pad 4 : Supply voltage</p>	

Part Number Format and Examples

[1]	[2]	[3]	[4]	[5]	[6]
Supply Voltage	Holder Type	Frequency Stability	Pulling Range	Range Code	Center Frequency

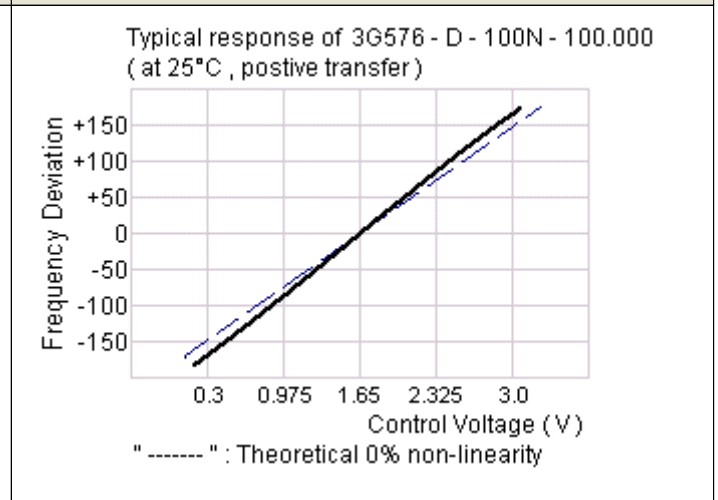
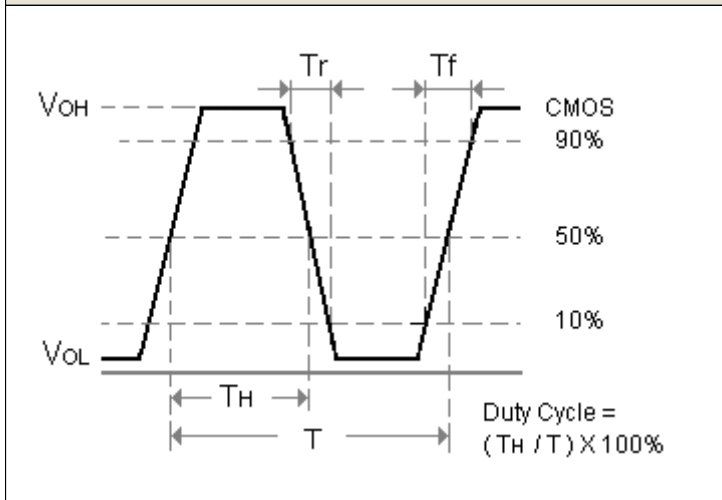
Examples	(1)	5	G14	-	B	-	100	N	-	35.328
	(2)	3	G576	-	D	-	80	T	-	27.000

Ex (1) : **5G14 - B - 100N - 35.328** [+5.0V , full size 4 pin Dip type , ±50ppm (-10°C to 70°C) , pulling : ±100 ppm (min.) , 35.328 MHz]

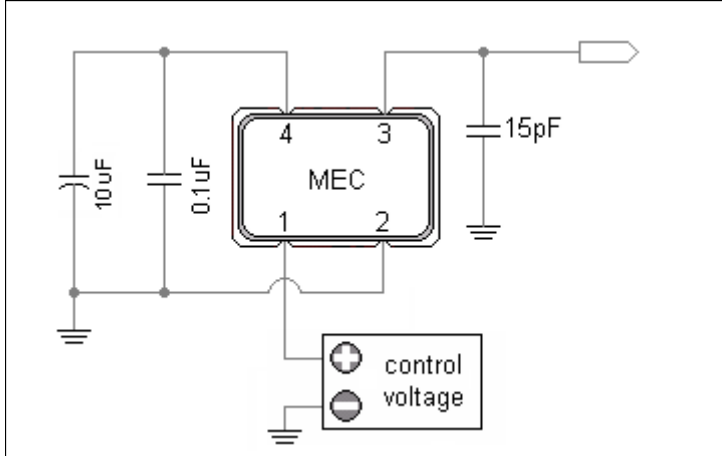
Ex (1) : **3G576 - D - 80T - 27.000** [+3.3V , G576 type , ±25ppm (-40°C to 85°C) , pulling : ±80 ppm (typ.) , 27.000 MHz]

[1]	Supply voltage , " 18 " for +1.8V ; " 3 " for +3.3V ; " 5 " for +5.0V	
[2]	Holder Type	
[3]	-10°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm ; If non-standard please enter the desired stability after " C " ,for example " C15 " : represents ±15ppm over -10 to +70°C
	-40°C ~ 85 °C	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm ; If non-standard please enter the desired stability after " I " ,for example " I20 " : represents ±20ppm over -40 to +85°C
[4]	Frequency Pulling Range	3.3V From ±30ppm ~ ±150ppm , control Voltage range : 0.3V ~ 3.0 ; control voltage center : ± 1.65 V
		5.0V From ±70ppm ~ ±200ppm , control Voltage range : 0.5V ~ 4.5V ; control voltage center : ± 2.5 V
[5]	Pulling Range Code	" M " stands for maximum ; " N " stands for minimum ; " T " stands for typical (tolerance is ± 20%)
[6]	Center Frequency in MHz	

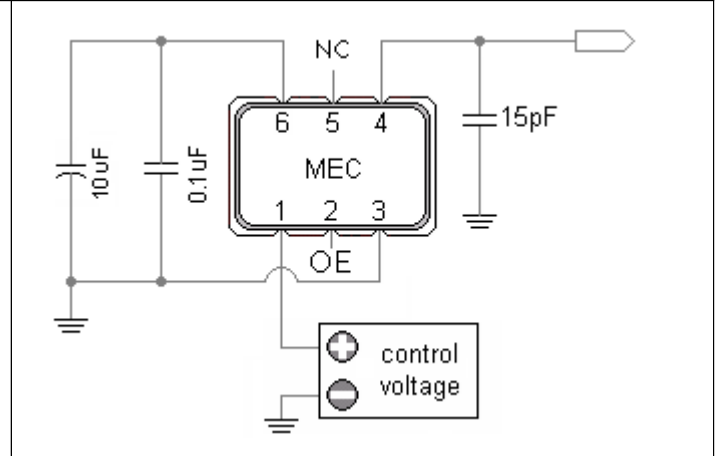
CMOS Output Waveform	Transfer Function
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[4 pads] CMOS Square Wave Test Circuit



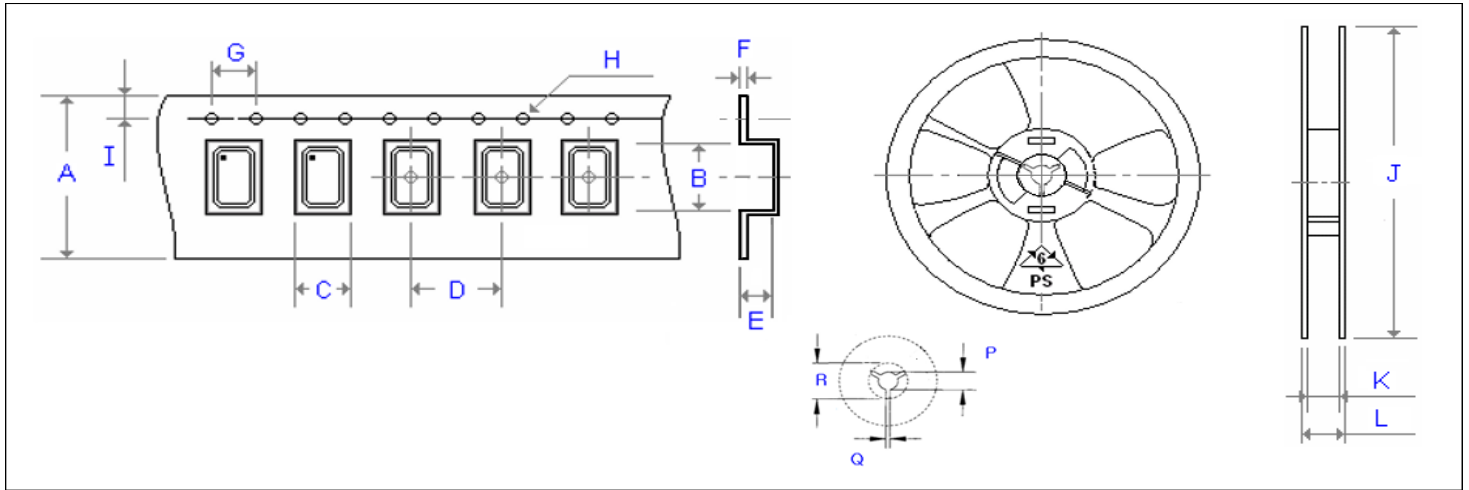
[6 pads] CMOS Square Wave Test Circuit



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	∅ 1.50	1.75	3000
G_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
G_534	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
G_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
G_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	∅ 1.50	1.75	500
G_63	24.00	11.80	10.00	16.00	5.00	0.30	4.00	∅ 1.50	1.75	500
G_JF538	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
G_JF578	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
(V)M21	8.00	2.30	1.90	4.00	0.90	0.25	4.00	∅ 1.50	1.75	3000
(V)ME21	8.00	2.30	1.50	4.00	1.35	0.25	4.00	∅ 1.50	1.75	3000
(V)M22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
(V)M_32	8.00	3.71	2.80	4.00	1.75	0.25	4.00	∅ 1.50	1.75	3000
(V)MQ_326	12.00	3.60	2.90	4.00	1.70	0.30	4.00	∅ 1.50	1.75	3000
(V)M_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
(V)M_57(2)	16.00	7.40	5.50	8.00	2.80	0.35	4.00	∅ 1.50	1.75	500
(V)M_43 (63)	24.00	11.80	10.00	16.00	5.00	0.30	4.00	∅ 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	16.00	13.00	2.50	20.20	1000
G_JF578	180.00	17.20	19.30	13.00	2.50	20.20	1000
(V)M21	180.00	8.40	11.40	13.00	2.50	20.20	3000
(V)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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