

## Voltage Controlled Crystal Oscillators

CMOS output

VCXO " G "

CMOS

Thru-Hole

SMD

1.8 V

3.3 V

Min.

Max.

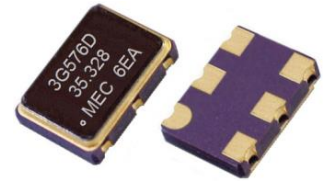
1.25 MHz

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.

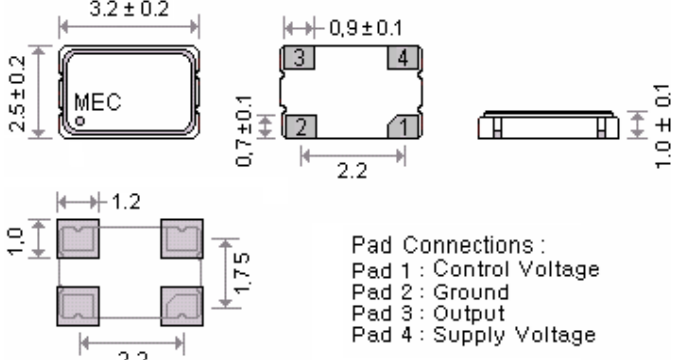
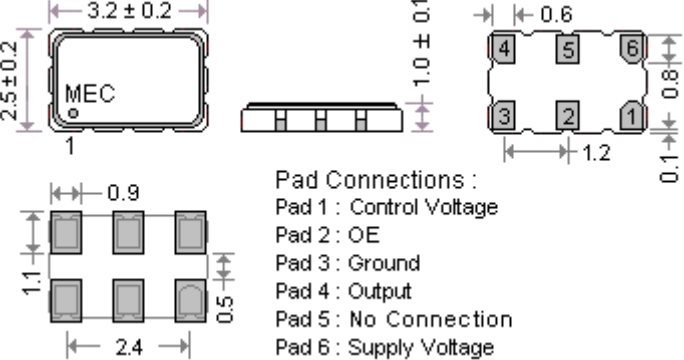
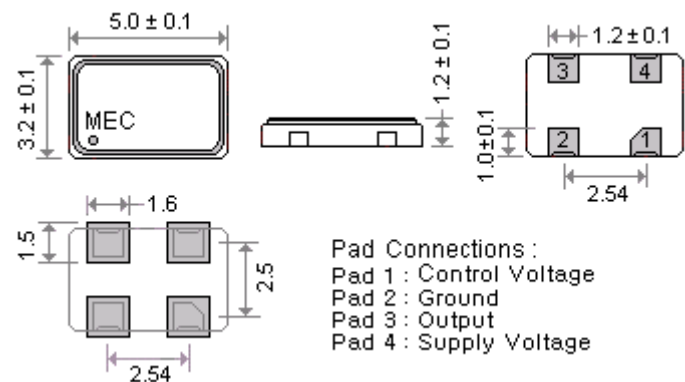
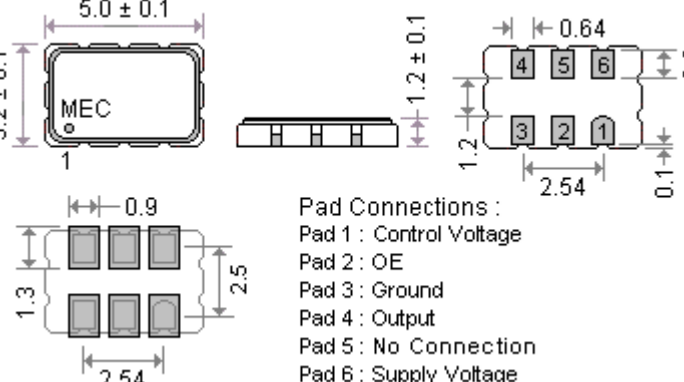
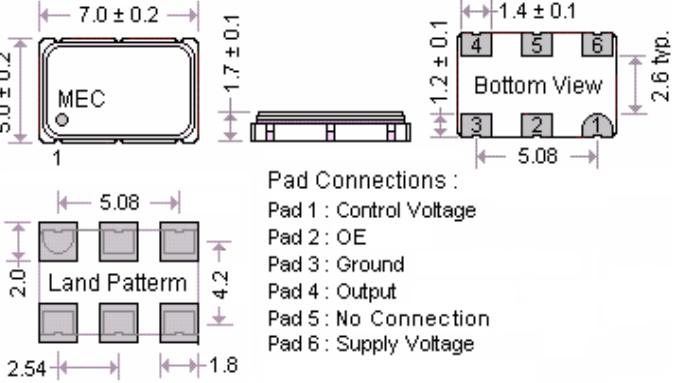
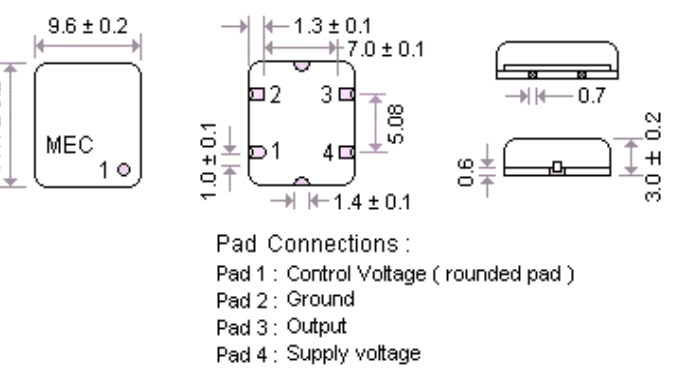
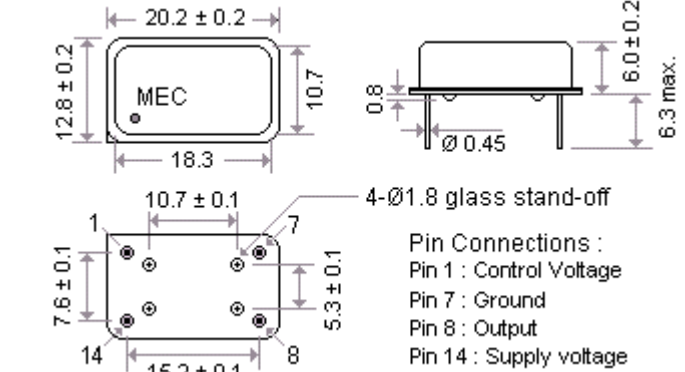
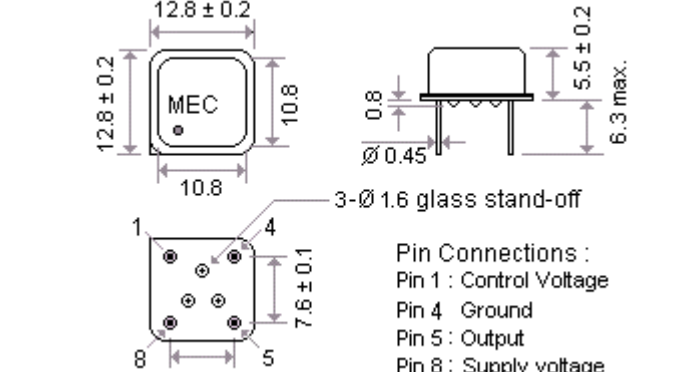
Applications include (PLL) phase lock loop, SONET / ATM, set-top boxes, MPEG, audio-video modulations, video game consoles and HDTV sets, ONET, 10GbE, Fibre Channel, wireless repeaters, transponders, HDTV, FPGAs, data acquisition.



General Specifications of "G" series, [ TA = +25°C, V<sub>DD</sub> = at specified voltage, Load : 15 pF ]

Model	" G " series					
Output Wave Form	CMOS					
Type	SMD Type			Thru - Hole Type		
Pads / Pins	4 pads		6 pads		4 pins	
Models ( Dimensions ), Unit : mm	<b>G324</b> ( 3.2 * 2.5 * 1.0 )	<b>G534</b> ( 5.0 * 3.2 * 1.2 )	<b>G326</b> ( 3.2 * 2.5 * 1.0 )	<b>G536</b> ( 5.0 * 3.2 * 1.2 )	<b>G14</b> ( 20.2 * 12.8 * 6.0 )	
	<b>G42</b> ( 11.4 * 9.6 * 2.5 )	<b>G43</b> ( 11.4 * 9.6 * 3.0 )	<b>G576</b> ( 7.0 * 5.0 * 1.7 )	<b>G8</b> ( 12.8 * 12.8 * 5.5 )		
Input Voltage ( V <sub>DD</sub> )	V <sub>DD</sub> = +1.8V $\pm$ 5%		V <sub>DD</sub> = +2.5V $\pm$ 5%		V <sub>DD</sub> = +3.3V $\pm$ 5%	
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 <sub>c</sub> = 0.9V $\pm$ 0.15V		with V <sub>c</sub> = 1.25V $\pm$ 0.2V		with V <sub>c</sub> = 1.65V $\pm$ 0.2V	
Output Logic High " 1 "	1.62 V ( min. )		2.25 V ( min. )		2.97 V ( min. )	
Output Logic Low " 0 "	0.183 V ( max. )		0.25 V ( max. )		0.33 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 <sub>DC</sub>		1.25 V <sub>DC</sub>		1.65 V <sub>DC</sub>	
Control Voltage Range	0.0V to 1.8V		0.25 V to 2.25 V		0.3V to 3.0V	
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 )	6 n sec.( max. ) ; 4 n sec.( typical ) . 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 )					
Integrated Phase Jitter	1.0 ps max. ( 12 KHz to 20 MHz ) .					
Phase Noise [ typical of 27.0 MHz ] [ at 3.3V ]	10 Hz	100 Hz	1k Hz	10K Hz	100K Hz	1 MHz
	-40 dBc/Hz	-104 dBc/Hz	-132 dBc/Hz	-147 dBc/Hz	-152 dBc/Hz	-150 dBc/Hz
Start-up Time ( Ts )	10 m sec. ( max. )					
Current Consumption	10 ~ 45 mA ( Frequency dependent ) . For 27 MHz: 10 mA typical at +3.3 V <sub>DD</sub> and 20 mA typical at 5.0 V <sub>DD</sub> .					
Linearity	6% typical ; 10% max.					
Modulation Bandwidth	10 KHz min. Measured at -3 dB					
Input Impedance	5 M $\Omega$ typical					
Slope Polarity ( Transfer Function )	Monotonic and Positive : Increasing control voltage always increases output frequency ,					
Aging	$\pm$ 3 ppm per year ( max. )					
Output Enable / Disable Function	Enable	When 70% min. of V <sub>DD</sub> to Enable Output. ; Enable time : 2 ms max.				
	Disable	When 30% max. of V <sub>DD</sub> to Disable Output. ; Disable time : 100 ns max.				

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

[ G324 ]	[ G326 ]
 <p>Top View: <math>3.2 \pm 0.2</math> (width), <math>2.5 \pm 0.2</math> (height), MEC, 1, 2, 3, 4</p> <p>Side View: <math>0.7 \pm 0.1</math> (height), <math>2.2</math> (width), <math>1.0 \pm 0.1</math> (height)</p> <p>Pad Connections:            Pad 1 : Control Voltage            Pad 2 : Ground            Pad 3 : Output            Pad 4 : Supply Voltage</p> <p>Pad Layout: <math>1.2</math> (width), <math>1.75</math> (height), <math>2.2</math> (width), <math>1.0</math> (height)</p>	 <p>Top View: <math>3.2 \pm 0.2</math> (width), <math>2.5 \pm 0.2</math> (height), MEC, 1, 2, 3, 4, 5, 6</p> <p>Side View: <math>1.0 \pm 0.1</math> (height), <math>1.2</math> (width), <math>0.1</math> (height)</p> <p>Pad Connections:            Pad 1 : Control Voltage            Pad 2 : OE            Pad 3 : Ground            Pad 4 : Output            Pad 5 : No Connection            Pad 6 : Supply Voltage</p> <p>Pad Layout: <math>0.9</math> (width), <math>1.1</math> (height), <math>2.4</math> (width), <math>0.5</math> (height)</p>
[ G534 ]	[ G536 ]
 <p>Top View: <math>5.0 \pm 0.1</math> (width), <math>3.2 \pm 0.1</math> (height), MEC, 1, 2, 3, 4</p> <p>Side View: <math>1.2 \pm 0.1</math> (height), <math>1.0 \pm 0.1</math> (height), <math>2.54</math> (width)</p> <p>Pad Connections:            Pad 1 : Control Voltage            Pad 2 : Ground            Pad 3 : Output            Pad 4 : Supply Voltage</p> <p>Pad Layout: <math>1.6</math> (width), <math>2.5</math> (height), <math>2.54</math> (width), <math>1.5</math> (height)</p>	 <p>Top View: <math>5.0 \pm 0.1</math> (width), <math>3.2 \pm 0.1</math> (height), MEC, 1, 2, 3, 4, 5, 6</p> <p>Side View: <math>1.2 \pm 0.1</math> (height), <math>1.2</math> (width), <math>0.1</math> (height)</p> <p>Pad Connections:            Pad 1 : Control Voltage            Pad 2 : OE            Pad 3 : Ground            Pad 4 : Output            Pad 5 : No Connection            Pad 6 : Supply Voltage</p> <p>Pad Layout: <math>0.9</math> (width), <math>1.3</math> (height), <math>2.54</math> (width), <math>2.5</math> (height)</p>
[ G576 ]	[ G43 ]
 <p>Top View: <math>7.0 \pm 0.2</math> (width), <math>5.0 \pm 0.2</math> (height), MEC, 1, 2, 3, 4, 5, 6</p> <p>Side View: <math>1.7 \pm 0.1</math> (height), <math>2.6</math> typ. (height), <math>1.4 \pm 0.1</math> (width), <math>1.2 \pm 0.1</math> (height), <math>5.08</math> (width)</p> <p>Bottom View: 1, 2, 3, 4, 5, 6</p> <p>Pad Connections:            Pad 1 : Control Voltage            Pad 2 : OE            Pad 3 : Ground            Pad 4 : Output            Pad 5 : No Connection            Pad 6 : Supply Voltage</p> <p>Land Pattern: <math>5.08</math> (width), <math>4.2</math> (height), <math>2.54</math> (width), <math>1.8</math> (height)</p>	 <p>Top View: <math>9.6 \pm 0.2</math> (width), <math>11.4 \pm 0.2</math> (height), MEC, 1, 2, 3, 4</p> <p>Side View: <math>1.3 \pm 0.1</math> (width), <math>7.0 \pm 0.1</math> (width), <math>5.08</math> (width), <math>1.4 \pm 0.1</math> (width), <math>1.0 \pm 0.1</math> (height), <math>0.7</math> (width), <math>3.0 \pm 0.2</math> (height), <math>0.6</math> (height)</p> <p>Pad Connections:            Pad 1 : Control Voltage ( rounded pad )            Pad 2 : Ground            Pad 3 : Output            Pad 4 : Supply voltage</p>
[ G14 ]	[ G8 ]
 <p>Top View: <math>20.2 \pm 0.2</math> (width), <math>12.8 \pm 0.2</math> (height), MEC, 1, 7, 8, 14</p> <p>Side View: <math>0.8</math> (height), <math>6.0 \pm 0.2</math> (height), <math>6.3</math> max. (height), <math>\varnothing 0.45</math> (diameter)</p> <p>Pin Connections:            Pin 1 : Control Voltage            Pin 7 : Ground            Pin 8 : Output            Pin 14 : Supply voltage</p> <p>Stand-off: 4-<math>\varnothing 1.8</math> glass stand-off</p> <p>Pin Layout: <math>10.7 \pm 0.1</math> (width), <math>7.6 \pm 0.1</math> (height), <math>15.2 \pm 0.1</math> (width), <math>5.3 \pm 0.1</math> (height)</p>	 <p>Top View: <math>12.8 \pm 0.2</math> (width), <math>12.8 \pm 0.2</math> (height), MEC, 1, 4, 5, 8</p> <p>Side View: <math>0.8</math> (height), <math>5.5 \pm 0.2</math> (height), <math>6.3</math> max. (height), <math>\varnothing 0.45</math> (diameter)</p> <p>Pin Connections:            Pin 1 : Control Voltage            Pin 4 : Ground            Pin 5 : Output            Pin 8 : Supply voltage</p> <p>Stand-off: 3-<math>\varnothing 1.6</math> glass stand-off</p> <p>Pin Layout: <math>10.8</math> (width), <math>10.8</math> (height), <math>7.6 \pm 0.1</math> (width), <math>7.6 \pm 0.1</math> (height)</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 ( typical ) , 27.000 MHz ]

[ 1 ]	Supply voltage , " 18 " for +1.8V ; " 25 " for +2.5V ; " 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
	Pulling Range Code	" M " stands for maximum ; " N " stands for minimum ; " T " stands for typical ( tolerance is ± 20% )
[ 6 ]	Center Frequency in MHz	

