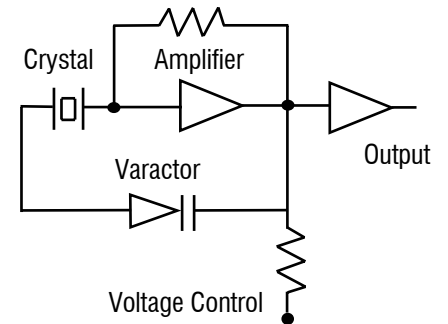




**What is a VCXO ?**

Unlike regular clock oscillator which has fixed output frequency, the output frequency of a **VCXO** (also known as “**frequency modulator**”) 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. Varactor, a voltage variable capacitance tuning diode, is used to achieve this purpose.



Applications of VCXO include (PLL) phase lock loop, SONET/ATM, set-top boxes, MPEG , audio-video modulations, video game consoles and HDTV sets.

**Product Summary:**

Package Code	Frequency Range	Assembly Technique	Package Size (mm) [inches]
<b>Thru-Hole Types</b>			
<b>G14</b>	500 kHz ~ 170 MHz	4 pin DIL full size	12.8 x 20.2 x 5.88H [0.504 x 0.795 x 0.231]
<b>G8</b>	500 kHz ~ 170 MHz	4 pin DIL half size	12.8 x 12.8 x 5.88H [0.504 x 0.504 x 0.231]
<b>Surface Mount Types – Gull Wing</b>			
<b>G24</b>	500 kHz ~ 170 MHz	Gull wing version of G14	12.8 x 20.2 x 7.6H [0.504 x 0.795 x 0.300]
<b>G18</b>	500 kHz ~ 170 MHz	Gull wing version of G8	12.8 x 12.8 x 7.6H [0.504 x 0.504 x 0.300]
<b>Surface Mount Types – Leadless</b>			
<b>G61</b>	500 kHz ~ 170 MHz	6 pad FR4 Leadless	9.6 x 11.4 x 1.85H [0.378 x 0.449 x 0.073]
<b>G62</b>	500 kHz ~ 170 MHz	6 pad FR4 Leadless	9.6 x 11.4 x 2.5H [0.378 x 0.449 x 0.098]
<b>G42</b>	500 kHz ~ 170 MHz	4 pad FR4 Leadless	9.6 x 11.4 x 2.5H [0.378 x 0.449 x 0.098]
<b>G64</b>	500 kHz ~ 170 MHz	6 pad FR4 Leadless	9.6 x 11.4 x 4.7H [0.378 x 0.449 x 0.185]
<b>G44</b>	500 kHz ~ 170 MHz	4 pad FR4 Leadless	9.6 x 11.4 x 4.7H [0.378 x 0.449 x 0.185]
<b>G57</b>	2 MHz ~ 60 MHz	4 pad Ceramic Leadless	5.0 x 7.0 x 1.7H [0.197 x 0.275 x 0.067]
<b>G576</b>	2 MHz ~ 60 MHz	6 pad Ceramic Leadless	5.0 x 7.0 x 1.7H [0.197 x 0.275 x 0.067]
<b>G575</b>	500 KHz ~ 170 MHz	6 pad Leadless	5.0 x 7.5 x 2.65H [0.197 x 0.295 x 0.104]

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

Taiwan: TEL (886)-2-2695-7099, FAX (886)-2-2695-7473, e-mail: [sales-tw@mercury-crystal.com](mailto:sales-tw@mercury-crystal.com)

U.S.A.: TEL (1)-909-466-0427, FAX (1)-909-466-0762, e-mail: [sales-us@mercury-crystal.com](mailto:sales-us@mercury-crystal.com)

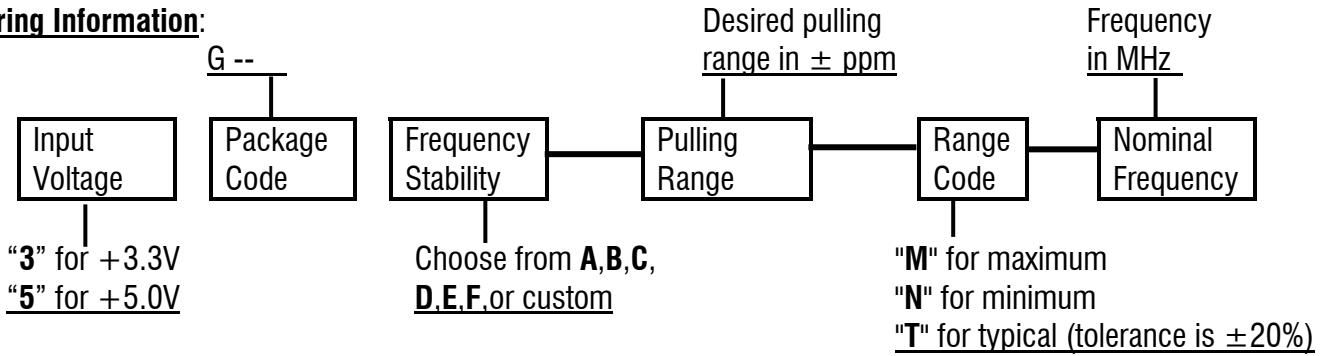
**"G" series General Specifications** $T_A = +25^\circ\text{C}$ ,  $V_{DD} =$  At specified voltage,  $C_L = 15\text{ pF}$ 

		3.3 V System	5.0 V System
Input Voltage ( $V_{DD}$ )		$V_{DD} = +3.3\text{ V D.C. } \pm 5\%$ Control Voltage Center ( $V_c$ ) = +1.65 V Voltage code is "3"	$V_{DD} = +5.0\text{ V D.C. } \pm 5\%$ Control Voltage Center ( $V_c$ ) = +2.5 V Voltage code is "5"
Initial Frequency Accuracy (at +25°C)		To tune to the nominal frequency with $V_c = 1.65\text{ V} \pm 0.2\text{ V}$	To tune to the nominal frequency with $V_c = 2.5\text{ V} \pm 0.2\text{ V}$
Frequency Range	Commercial temperature (0°C to +70°C)	500 kHz ~ 100 MHz	500 kHz ~ 156 MHz
	Industrial temperature (-40°C to +85°C)	500 kHz ~ 90 MHz	500 kHz ~ 140 MHz
Output Voltage HIGH "1"	TTL	2.4 V min.	2.4 V min.
	CMOS	2.97 min.	$V_{CC} - 0.5$ min.
Output Voltage LOW "0"	TTL	0.4 V max.	0.4 V max.
	CMOS	0.33 max.	0.5 V max.
Frequency Pulling Range		From $\pm 30$ ppm to $\pm 150$ ppm Control Voltage Range: 0.3 V to 3.0 V	From $\pm 80$ ppm to $\pm 200$ ppm Control Voltage Range: 0.5 V to 4.5 V
Frequency Stability <sup>(1)</sup> Commercial temp. range (code "C")		<p>"A": <math>\pm 25</math> ppm over 0°C to +70°C      "B": <math>\pm 50</math> ppm over 0°C to +70°C            "C": <math>\pm 100</math> ppm over 0°C to +70°C            For non-standard please give desired frequency stability after the "C".            For example "C20" is <math>\pm 20</math> ppm over 0 to +70°C</p>	
Frequency Stability <sup>(1)</sup> Industrial temp. range (code "I")		<p>"D": <math>\pm 25</math> ppm over -40°C to +85° (not available on all packages)            "E": <math>\pm 50</math> ppm over -40°C to +85°C      "F": <math>\pm 100</math> ppm over -40°C to +85°C            For non-standard please give desired frequency stability after the "I".            For example "I20" is <math>\pm 20</math> ppm over -40 to +85°C</p>	
Output Load	TTL	5 ~ 10 TTL gates	
	CMOS	15 ~ 50 pF	
Rise Time ( $T_r$ ) and Fall Time ( $T_f$ )	TTL	5 n Sec. max; 2 n Sec. typical. Measured between 0.4V to 2.4V ( $R_L = 390\ \Omega$ ; $C_L = 15\text{ pF}$ )	
	CMOS	5 n Sec. max; 2 n Sec. typical. Measured between 10% to 90% $V_{DD}$ ( $C_L = 15\text{ pF}$ )	
Duty Cycle	TTL	40% min. 60% max. (measured at +1.4 V)	
	CMOS	40% min. 60% max. (measured at 50% $V_{DD}$ )	
Start-up Time ( $T_s$ )		10 m Sec. max. 5 m Sec. typical	
Linearity		10% max.; 6% typical	
Slope Polarity (Transfer Function)		<b>Monotonic and Positive:</b> Increasing control voltage always increases output frequency. Negative slope is also available.	
Current Consumption		15 ~ 45 mA (frequency dependent)	
Modulation Bandwidth ( $\pm 3$ dB)		10 kHz min.	
Input Impedance		10 k $\Omega$ at 10 kHz min.	
Storage Temperature		-40°C to +85°C	
Aging		$\pm 5$ ppm per year max.	
Jitter, one sigma, 155.520 MHz, +5 V		25 ps typical, 28 ps max.	

<sup>(1)</sup>Inclusive of 25°C tolerance, operating temperature range,  $\pm 10\%$  input voltage variation, load change, aging, shock and vibration.



**Ordering Information:**

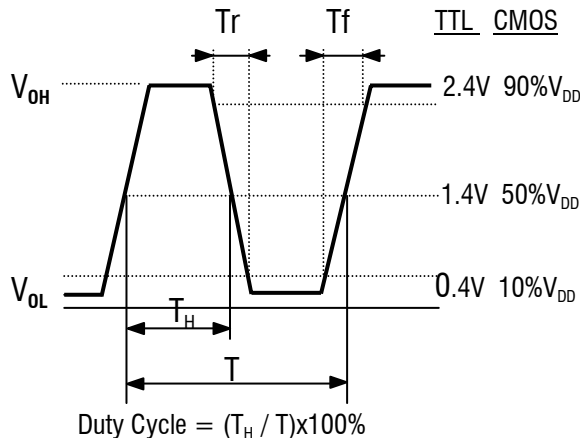


**Part Number Examples:**

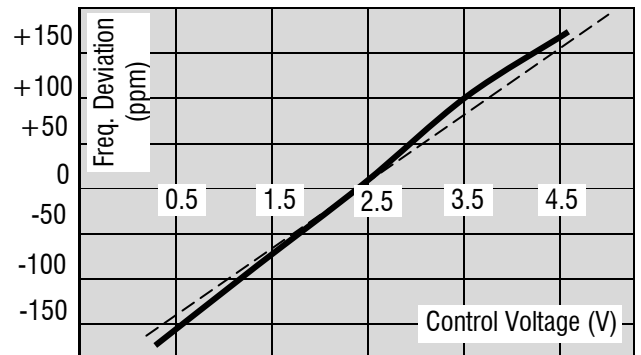
**3G44B-120T-54.000**

represents 54.0 MHz VCXO in G44 package, frequency stability is  $\pm 50$  ppm from 0°C to +70°C, pullability is  $\pm 120$  ppm typical, +3.3 V.

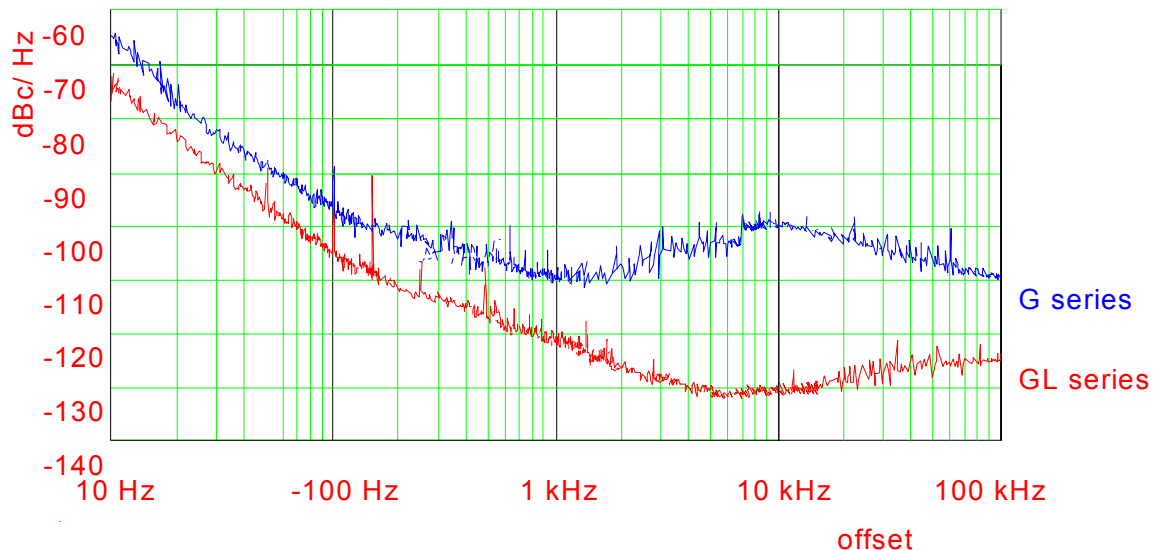
**Output Waveform:**



**Transfer Function:** Typical response of 5G14C-150N-27.000 (at +25°C, positive transfer)

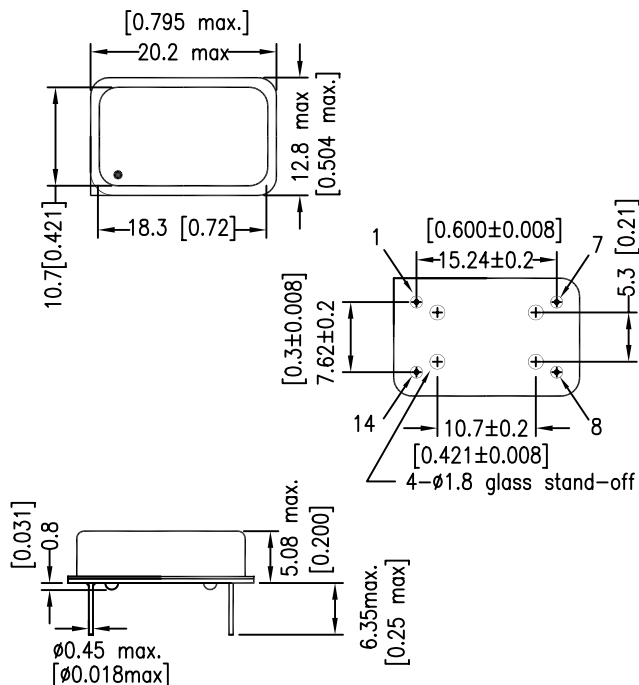


**SSB Phase Noise:** 155.520 MHz at +3.3V



**Package: G14**

**Unit: mm [inches]**

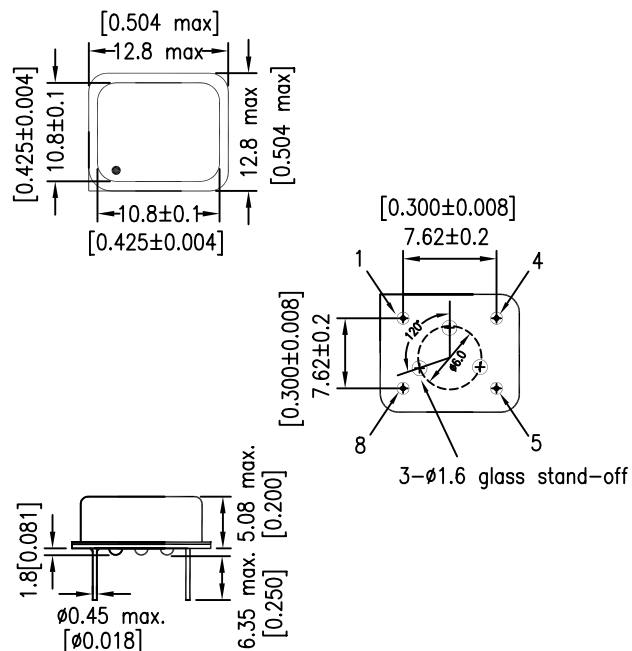


**Pin Connections**

Square corner denotes pin 1

- Pin 1: Voltage Control
- Pin 7: Ground
- Pin 8: Output
- Pin 14: Supply Voltage

**Package: G8**



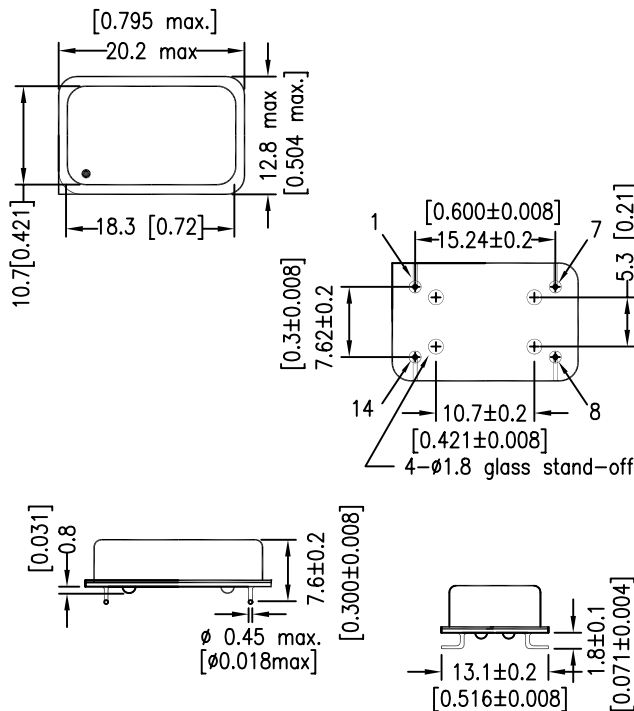
**Pin Connections**

Square corner denotes pin 1

- Pin 1: Voltage Control
- Pin 4: Ground
- Pin 5: Output
- Pin 8: Supply Voltage

**V C X 0**  
**TTL,HCMOS**

**Package: G24**

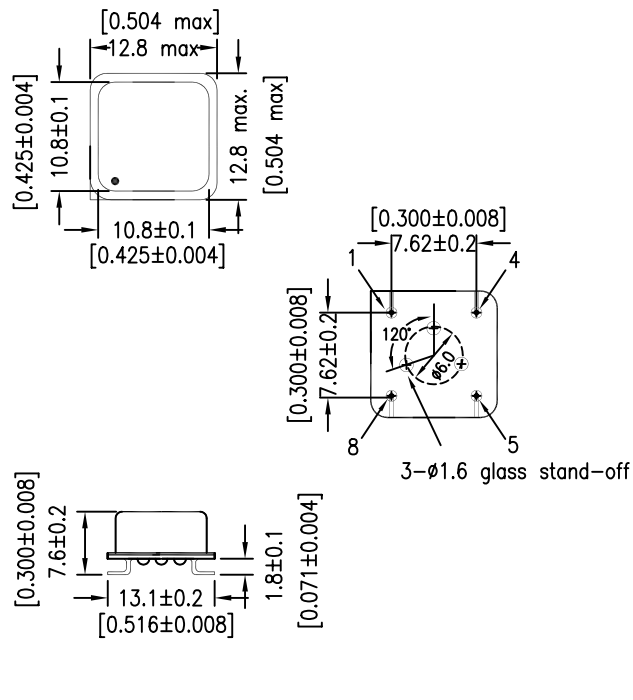


**Pin Connections**

Square corner denotes pin 1

- Pin 1: Voltage Control
- Pin 7: Ground
- Pin 8: Output
- Pin 14: Supply Voltage

**Package: G18**



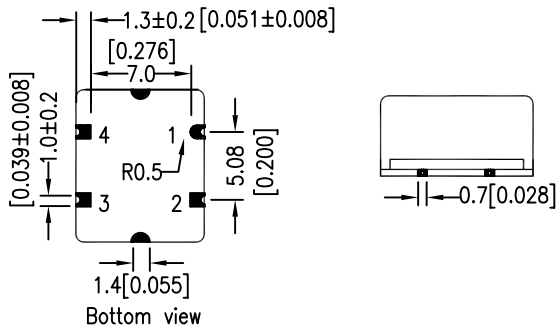
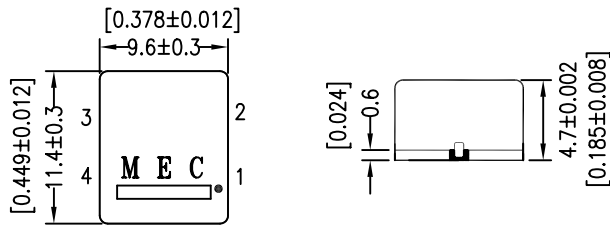
**Pin Connections**

Square corner denotes pin 1

- Pin 1: Voltage Control
- Pin 4: Ground
- Pin 5: Output
- Pin 8: Supply Voltage

**Package: G44**

"44" represents 4 pads and 4.7 mm overall height

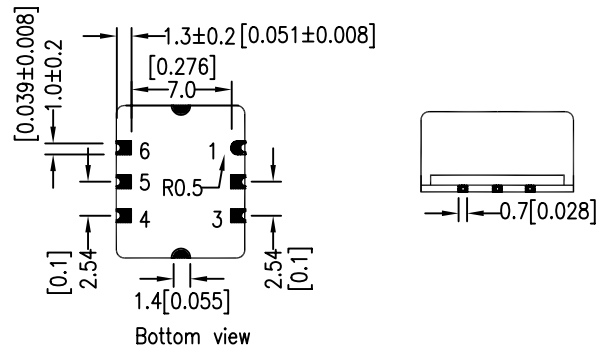
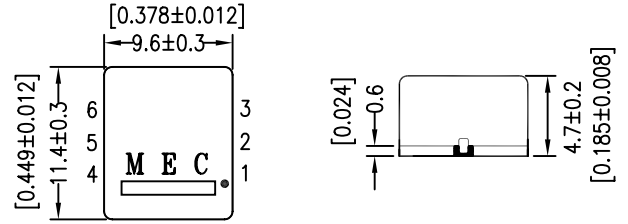


**Pad Connections:**

- Pad 1: Voltage Control (rounded pad)
- Pad 2: Ground
- Pad 3: Output
- Pad 4: Supply Voltage

**Package: G64**

"64" represents 6 pads and 4.7 mm overall height



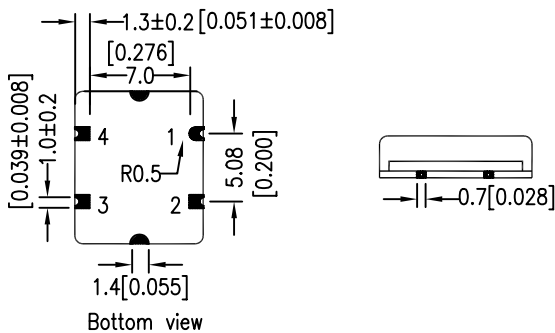
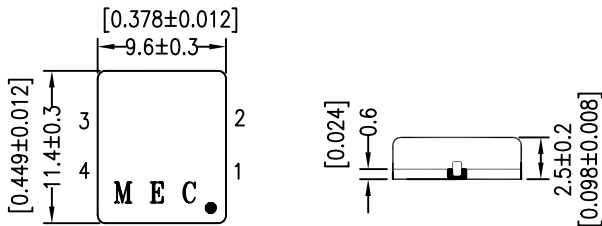
**Pad Connections:**

- Pad 1: Voltage Control (rounded pad)
- Pad 2: Tri-State
- Pad 3: Ground
- Pad 4: Output
- Pad 5: No Connection
- Pad 6: Supply Voltage

V C X 0  
TTL,HCMOS

**Package: G42**

"42" represents 4 pads and 2.5 mm overall height

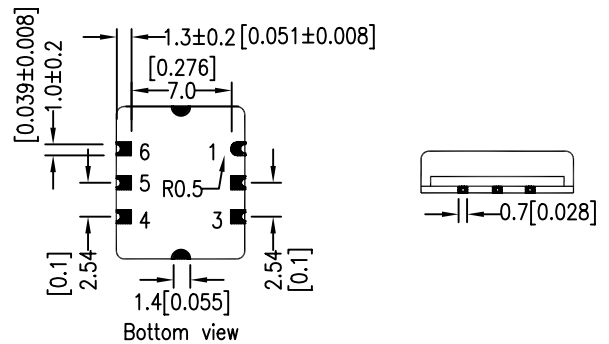
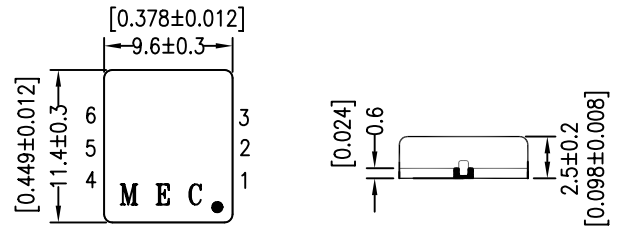


**Pad Connections:**

- Pad 1: Voltage Control (rounded pad)
- Pad 2: Ground
- Pad 3: Output
- Pad 4: Supply Voltage

**Package: G62**

"62" represents 6 pads and 2.5 mm overall height

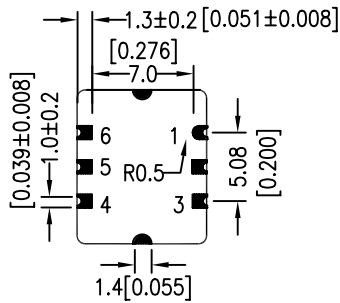
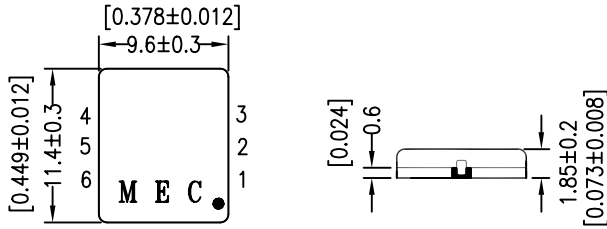


**Pad Connections:**

- Pad 1: Voltage Control (rounded pad)
- Pad 2: Tri-State
- Pad 3: Ground
- Pad 4: Output
- Pad 5: No Connection
- Pad 6: Supply Voltage

**Package: G61**

"61" represents 6 pads and 1.85 mm overall height



Bottom view

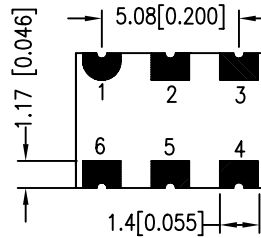
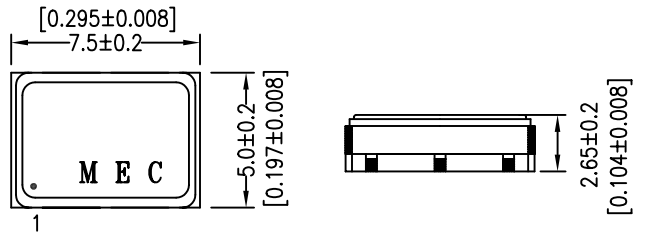
Rounded pad is pad No. 1

**Pad Connections:**

- Pad 1: Voltage Control
- Pad 2: Tri-State
- Pad 3: Ground
- Pad 4: Output
- Pad 5: No connection
- Pad 6: Supply Voltage

**Package: G575**

Unit: mm [inches]



Bottom view

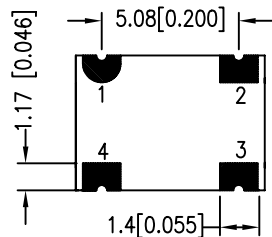
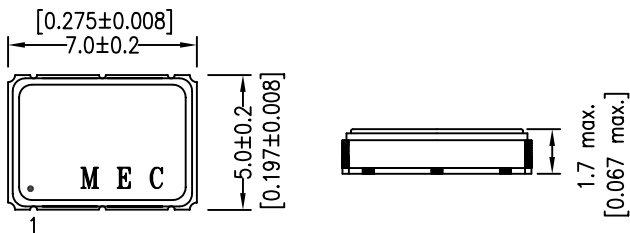
Rounded pad is pad No. 1

**Pad Connections:**

- Pad 1: Voltage Control
- Pad 2: Tri-State
- Pad 3: Ground
- Pad 4: Output
- Pad 5: No connection
- Pad 6: Supply Voltage

V C X O  
TTL, HCMOS

**Package: G57 4 Pads**



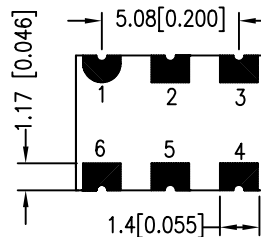
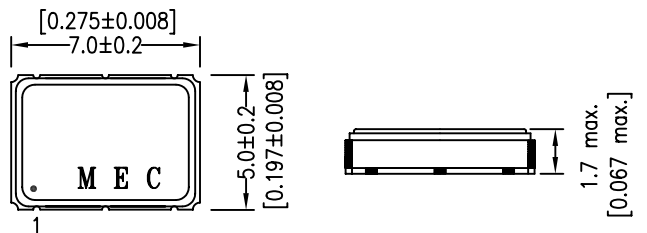
Bottom view

Rounded pad is pad No. 1

**Pad Connections:**

- Pad 1: Voltage Control
- Pad 2: Ground
- Pad 3: Output
- Pad 4: Supply Voltage

**Package: G576 6 pads**



Bottom view

Rounded pad is pad No. 1

**Pad Connections:**

- Pad 1: Voltage Control
- Pad 2: Tri-State
- Pad 3: Ground
- Pad 4: Output
- Pad 5: No connection
- Pad 6: Supply Voltage