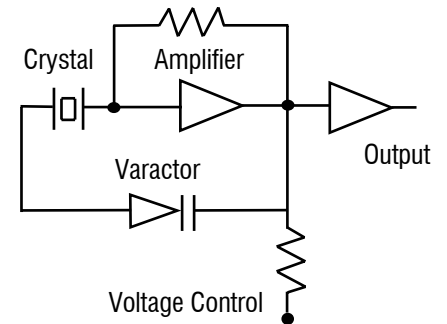




**What is a VCXO ?**

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>GL14</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>GL8</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>GL24</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>GL18</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>GL61</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>GL62</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>GL42</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>GL64</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>GL44</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>GL575</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)**

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 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)



**“GL” series (low phase noise version of G series) General Specifications**

$T_A = +25^\circ\text{C}$ ,  $V_{DD} =$  At specified voltage,  $CL = 15\text{ pF}$

	<b>3.3 V System</b>	<b>5.0 V System</b>
<b>Input Voltage (<math>V_{DD}</math>)</b>	$V_{DD} = +3.3\text{ V D.C. } \pm 5\%$ 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”
<b>Initial Frequency Accuracy (at +25°C)</b>	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 $V_c = 2.5\text{ V} \pm 0.2\text{ V}$
<b>Frequency Range</b>	10 MHz ~ 170 MHz	
<b>Output Voltage HIGH “1”</b>	2.4 min.	$V_{cc} - 0.4\text{ min.}$
<b>Output Voltage LOW “0”</b>	0.4 max.	0.4 V max.
<b>Frequency Pulling Range</b>	From $\pm 30\text{ ppm}$ to $\pm 150\text{ ppm}$ Control Voltage Range: 0.3 V to 3.0 V	From $\pm 80\text{ ppm}$ to $\pm 200\text{ ppm}$ Control Voltage Range: 0.5 V to 4.5 V
<b>Frequency Stability<sup>(1)</sup></b> Commercial temp. range (code “C”)	<b>“A”</b> : $\pm 25\text{ ppm}$ over $0^\circ\text{C}$ to $+70^\circ\text{C}$ <b>“B”</b> : $\pm 50\text{ ppm}$ over $0^\circ\text{C}$ to $+70^\circ\text{C}$ <b>“C”</b> : $\pm 100\text{ ppm}$ over $0^\circ\text{C}$ to $+70^\circ\text{C}$ For non-standard please give desired frequency stability after the “C”. For example “C20” is $\pm 20\text{ ppm}$ over 0 to $+70^\circ\text{C}$	
<b>Frequency Stability<sup>(1)</sup></b> Industrial temp. range (code “I”)	<b>“D”</b> : $\pm 25\text{ ppm}$ over $-40^\circ\text{C}$ to $+85^\circ$ (not available on all packages) <b>“E”</b> : $\pm 50\text{ ppm}$ over $-40^\circ\text{C}$ to $+85^\circ\text{C}$ <b>“F”</b> : $\pm 100\text{ ppm}$ over $-40^\circ\text{C}$ to $+85^\circ\text{C}$ For non-standard please give desired frequency stability after the “I”. For example “I20” is $\pm 20\text{ ppm}$ over -40 to $+85^\circ\text{C}$	
<b>Output Load</b>	15 ~ 50 pF	
<b>Rise Time (<math>T_r</math>) and Fall Time (<math>T_f</math>)</b>	5 n Sec. max; 3 n sec. typical. Measured between 0.8 V to 2.0 V, ( $CL = 15\text{ pF}$ )	
<b>Duty Cycle</b>	40% min. 60 % max. (measured at 50% $V_{DD}$ )	
<b>Start-up Time (<math>T_s</math>)</b>	10 m Sec. max. 5 m Sec. typical	
<b>Linearity</b>	10% max.; 6% typical	
<b>Slope Polarity (Transfer Function)</b>	<b>Monotonic and Positive:</b> Increasing control voltage always increases output frequency. Negative slope is also available.	
<b>Current Consumption</b>	15 ~ 45 mA (frequency dependent)	
<b>Modulation Bandwidth (<math>\pm 3\text{ dB}</math>)</b>	10 kHz min.	
<b>Input Impedance</b>	10 $k\Omega$ at 10 kHz min.	
<b>Storage Temperature</b>	$-40^\circ\text{C}$ to $+85^\circ\text{C}$	
<b>Aging</b>	$\pm 5\text{ ppm}$ per year max.	
<b>Jitter, 1 sigma, 155.520 MHz, +3.3 V</b>	20 ps typical, 25 ps max.	

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

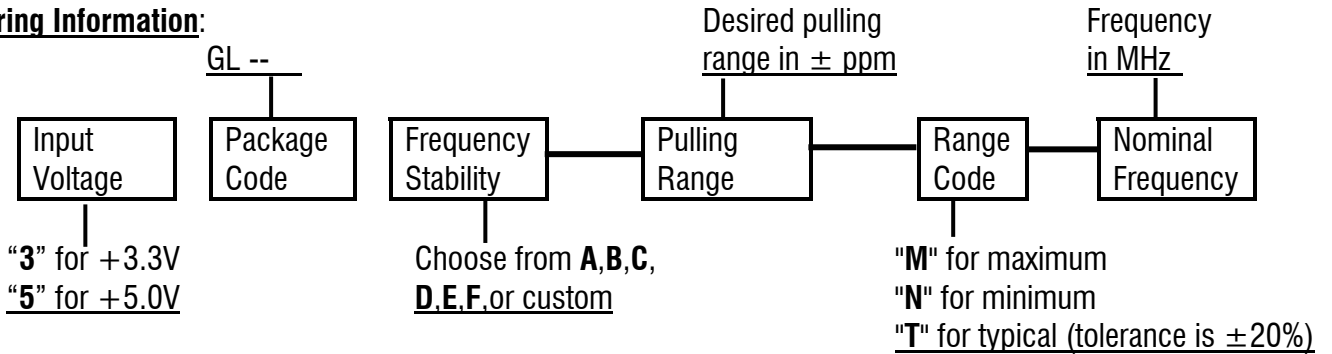
**VCXO "GL" series**  
**Low Phase Noise**

**Logic: TTL / HCMOS**  
**Wave Form: Square**



**MERCURY**  
Since 1973

**Ordering Information:**

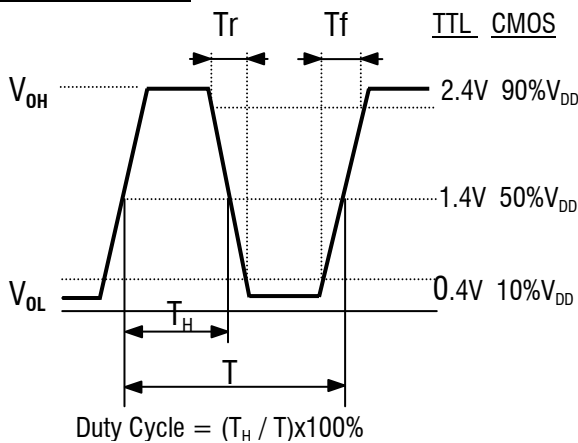


**Part Number Examples:**

**3GL44B-120T-54.000**

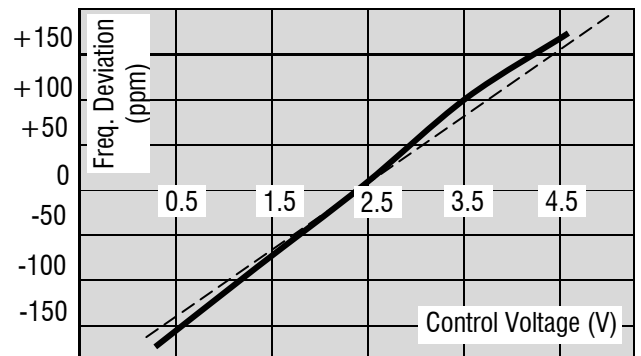
represents 54.0 MHz VCXO in GL44 package, frequency stability is  $\pm 50$  ppm from 0°C to +70°C, pullability is  $\pm 120$  ppm typical, +3.3 V. Low phase noise version.

**Output Waveform:**



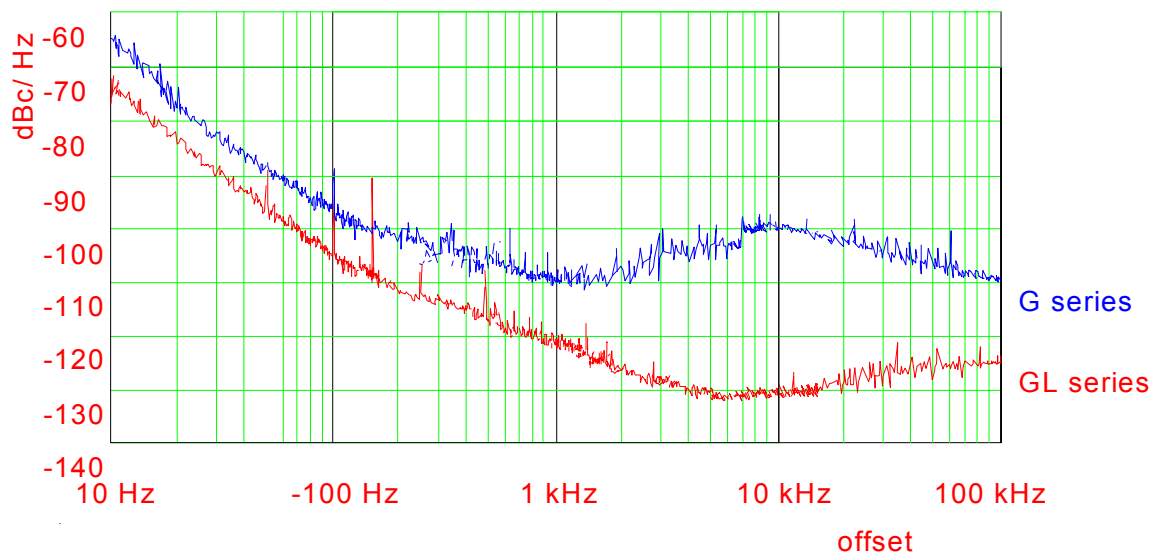
**Transfer Function:**

Typical response of 5GL14C-150N-54.000 (at +25°C, positive transfer)



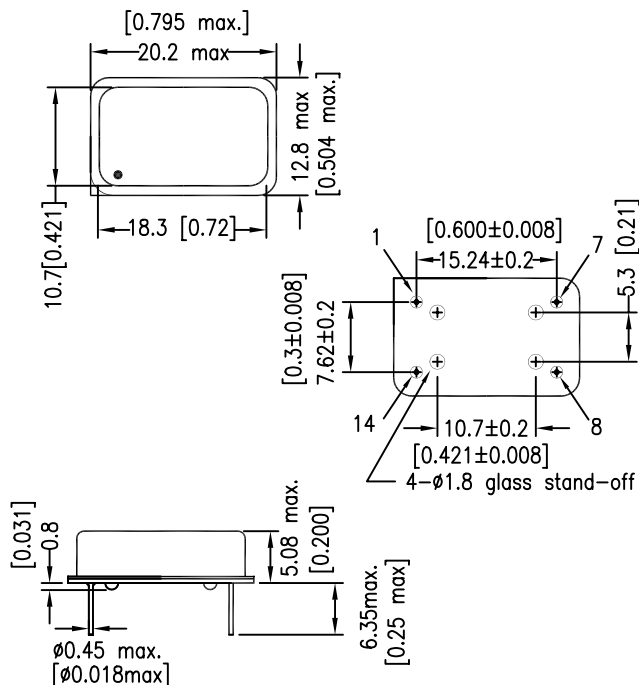
" - - - - " : Theoretical 0% non-linearity

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



**Package: GL14**

**Unit: mm [inches]**

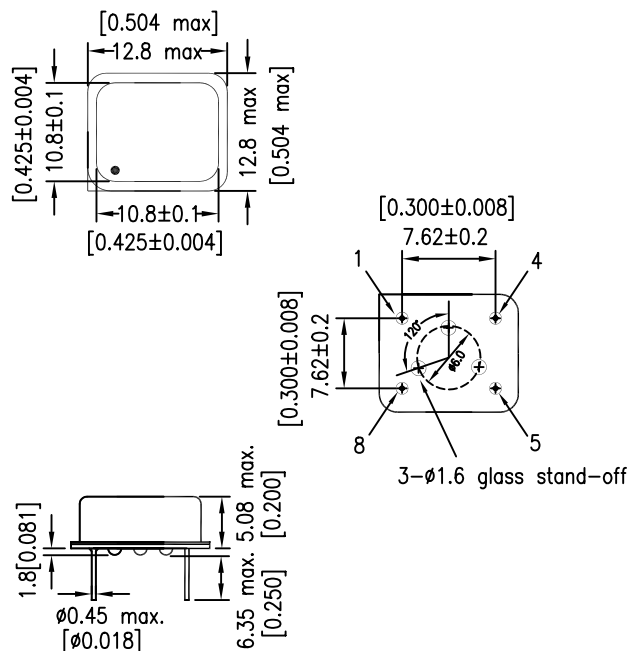


**Pin Connections**

Square corner denotes pin 1

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

**Package: GL8**



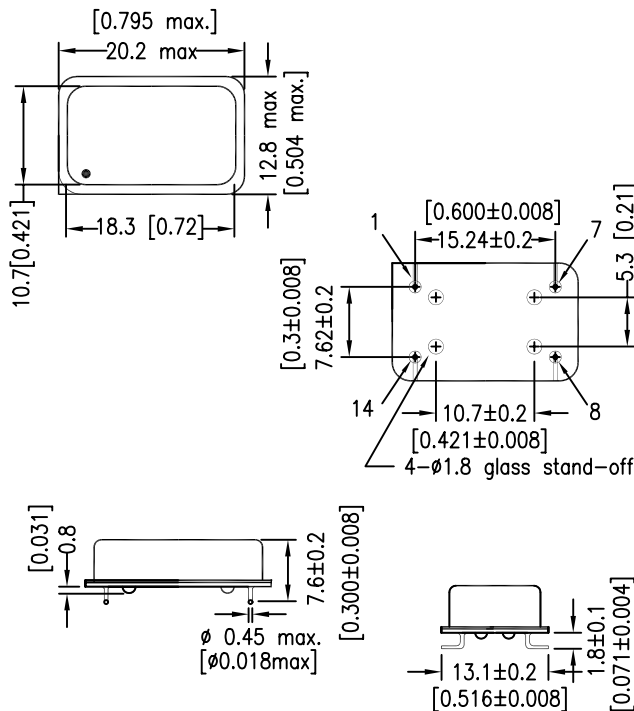
**Pin Connections**

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: GL24**

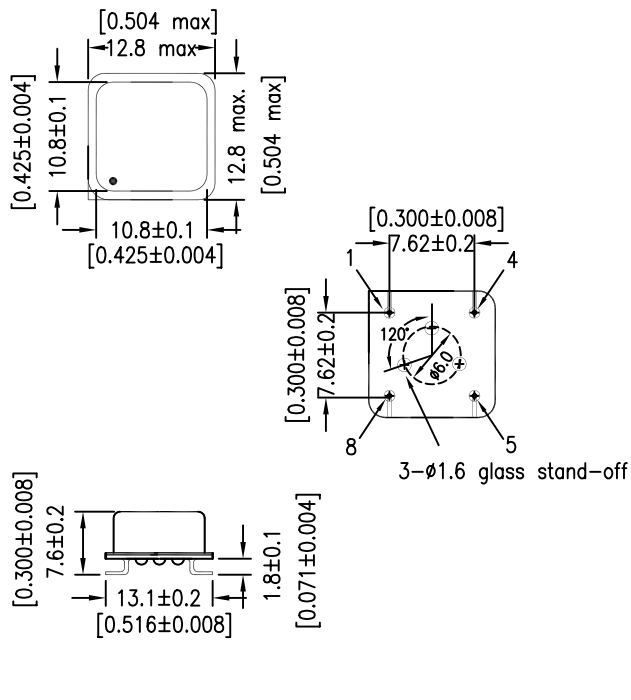


**Pin Connections**

Square corner denotes pin 1

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

**Package: GL18**



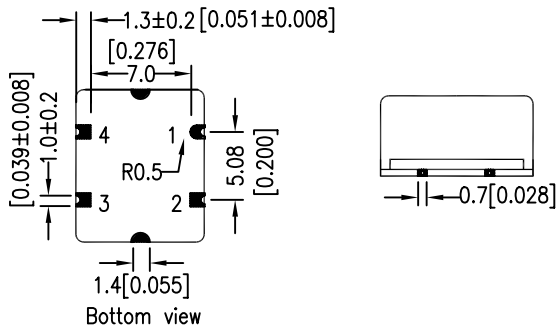
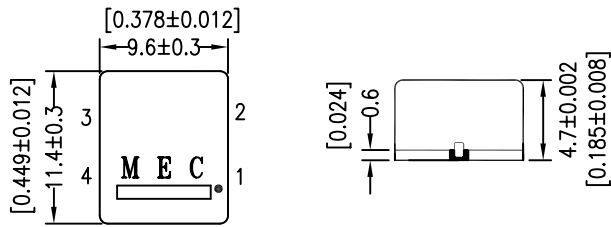
**Pin Connections**

Square corner denotes pin 1

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

**Package: GL44**

"44" represents 4 pads and 4.7 mm overall height

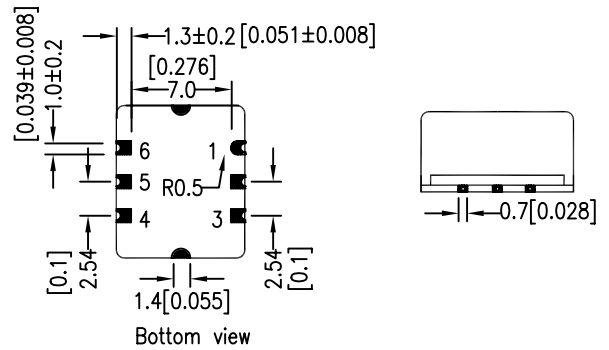
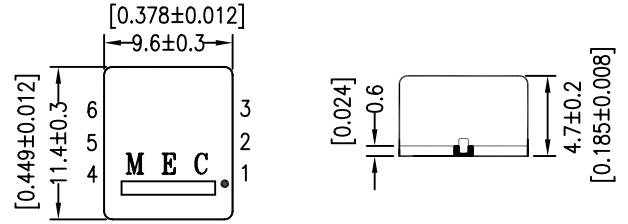


**Pad Connections:**

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

**Package: GL64**

"64" represents 6 pads and 4.7 mm overall height



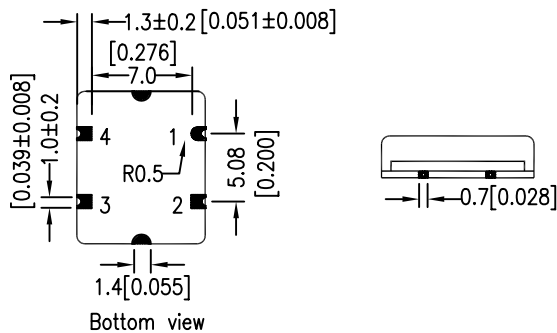
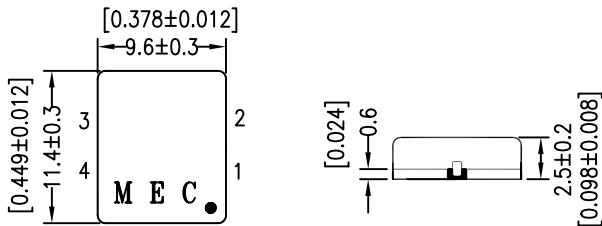
**Pad Connections:**

- 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 O  
TTL,HCMOS

**Package: GL42**

"42" represents 4 pads and 2.5 mm overall height

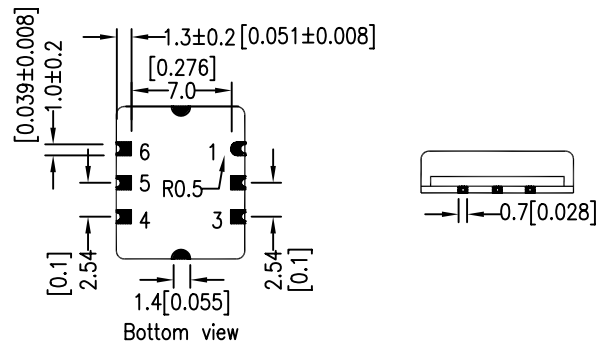
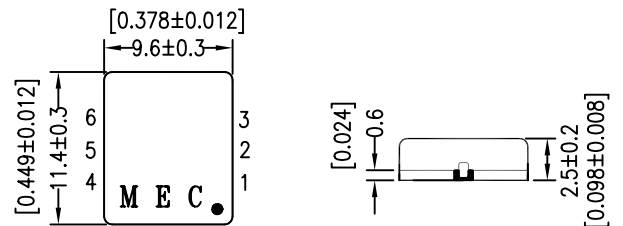


**Pad Connections:**

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

**Package: GL62**

"62" represents 6 pads and 2.5 mm overall height

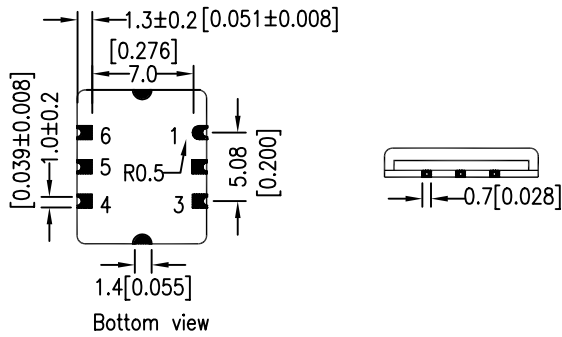
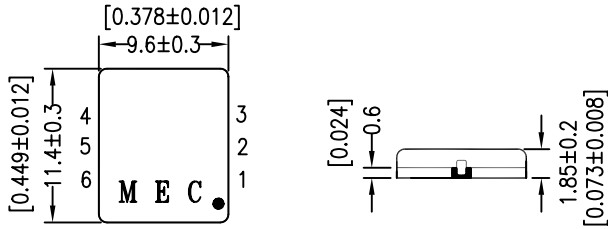


**Pad Connections:**

- 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: GL61**

"61" represents 6 pads and 1.85 mm overall height



Bottom view

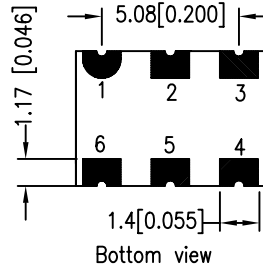
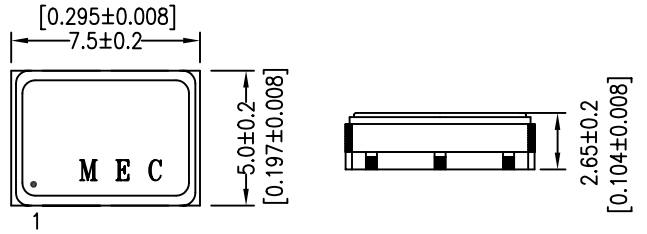
Rounded pad is pad No. 1

**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: GL575**

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 0  
TTL, HCMOS