

V C X O
“GP” series (non-PLL based PECL)

Logic: PECL square wave



“GP” series VCXOs use fundamental mode (inverted mesa) crystal to achieve wide frequency deviation, stable and clean signals. No multiplier no overtone no phase lock loop technique is used. Jitter is as low as 1ps for the 155.520 MHz for SONET/SDH applications. The inherent advantage of differential PECL signal transmission provides improved noise immunity and makes the system less susceptible to ground noise.

PRODUCT SUMMARY:

Package Code	Frequency Range	Assembly Technique	Package Size (mm) [inches]. H: Seated height.
PECL			
Thru-Hole Types			
4 PIN MODELS			
GP14	19.440 ~ 250 MHz	4 pin DIL full size. Hermetically sealed. Can height = 7.5 mm. Sealed crystal inside.	12.8 x 20.2 x 8.3H [0.504 x 0.795 x 0.327]
GP8 In development	19.440 ~250 MHz	Half size 4 pin DIP. Hermetically sealed.	12.8 x 12.8 x 5.88H [0.504 x 0.504 x 0.231]
5 PIN MODELS			
GP514	19.440 ~250 MHz	5 pin DIL full size. Hermetically sealed. Can height = 7.5 mm. Sealed crystal inside.	12.8 x 20.2 x 8.3H [0.504 x 0.795 x 0.327]
6 PIN MODELS			
GP614	19.440 ~250 MHz	6 pin DIL full size. Hermetically sealed. Can height = 7.5 mm. Sealed crystal inside.	12.8 x 20.2 x 8.3H [0.504 x 0.795 x 0.327]
Surface Mount Types – Gull Wing			
4 PIN MODELS			
GP24	19.440 ~250 MHz	4 pin DIL full size. Hermetically sealed. Can height = 7.5 mm. Sealed crystal inside.	12.8 x 20.2 x 9.3H [0.504 x 0.795 x 0.366]
GP18 In development	19.440 ~250 MHz	Half size DIP. Hermetically sealed.	12.8 x 12.8 x 7.6H [0.504 x 0.504 x 0.300]
5 PIN MODELS			
GP524	19.440 ~250 MHz	5 pin DIL full size. Hermetically sealed. Can height = 7.5 mm. Sealed crystal inside.	12.8 x 20.2 x 9.3H [0.504 x 0.795 x 0.366]
6 PIN MODELS			
GP624	19.440 ~250 MHz	6 pin DIL full size. Hermetically sealed. Can height = 7.5 mm. Sealed crystal inside.	12.8 x 20.2 x 9.3H [0.504 x 0.795 x 0.366]
Surface Mount Types – Leadless			
GP62	19.440 ~250 MHz	6 pad Leadless.	9.6 x 11.4 x 2.5H [0.378 x 0.449 x 0.098]
GP64	19.440 ~250 MHz	6 pad Leadless.	9.6 x 11.4 x 4.7H [0.378 x 0.449 x 0.185]
GP575 In development	19.440 ~250 MHz	6 pad Leadless.	5 x 7.5 x 2.65H [0.197 x 0.295 x 0.104]

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General Specification for "GP" series (low jitter)

$T_A = +25^\circ\text{C}$, Inclusive of 25°C calibration tolerance, operating temperature range, input voltage variation, load change, aging, shock and vibration.

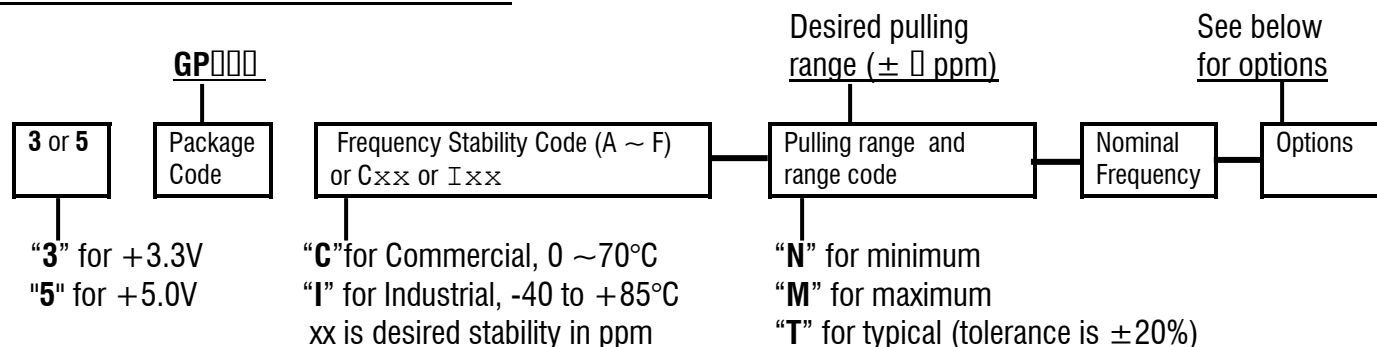
Output Wave Form		P E C L 100K compatible square wave	GP series
Frequency Range		Non-PLL based, fundamental mode (inverted mesa) crystal used	
Standard Frequencies		19.440 ~ 250 MHz	
Frequency Stability ⁽¹⁾ Commercial temp. range (code "C")		"A": ± 25 ppm over 0°C to $+70^\circ\text{C}$ "B": ± 50 ppm over 0°C to $+70^\circ\text{C}$ "C": ± 100 ppm over 0°C to $+70^\circ\text{C}$ For non-standard please give desired frequency stability after the "C". For example "C20" is ± 20 ppm over 0 to $+70^\circ\text{C}$	
Frequency Stability ⁽¹⁾ Industrial temp. range (code "I")		"D": ± 25 ppm over -40°C to $+85^\circ$ (not available on all packages) "E": ± 50 ppm over -40°C to $+85^\circ\text{C}$ "F": ± 100 ppm over -40°C to $+85^\circ\text{C}$ For non-standard please give desired frequency stability after the "I". For example "I20" is ± 20 ppm over -40 to $+85^\circ\text{C}$	
Frequency Stability		vs Supply voltage $\pm 5\%$ change: ± 3 ppm max. vs Load $\pm 10\%$ change: ± 2 ppm max.	
Input Voltage Vcc		+3.3 V $\pm 5\%$ (LVPECL)	+5.0 V $\pm 5\%$ (PECL)
Control Voltage Center		+1.65 V D.C.	+2.5 V D.C.
Control Voltage Range (Vc)		+0.3 V to +3.0 V	+0.5 V to +4.5 V D.C.
Initial Frequency Accuracy (at $+25^\circ\text{C}$)		To tune to the nominal frequency with Vc = +1.65 V D.C. ± 0.2 V	To tune to the nominal frequency with Vc = +2.5 V D.C. ± 0.2 V
Output Voltage HIGH "1", V_{OH}		2.25 V min.	3.95 V min. 4.05 typical 4.15 V max
Output Voltage LOW "0", V_{OL}		1.65 V max.	3.15 min; 3.25 typical; 3.35 V max.
Frequency Deviation Range		± 80 ppm typical Wider pulling range available.	± 100 ppm typical. Wider pulling range available.
Current Consumption (measured with terminating resistors)		58 mA typical at 155.520 MHz 54 mA typical at 77.760 MHz	85 mA typical at 155.520 MHz 73 mA typical at 77.760 MHz
Load		50 ohms into Vcc-2V or Thevenin equivalent. (terminating resistors required on all outputs)	
Rise Time (Tr) and Fall Time (Tf)		1.5 nano sec. max (20% \leftrightarrow 80% Vcc)	
Duty Cycle at 50% output swing		50 $\pm 2\%$ typical; 50% $\pm 5\%$ max. both outputs	
Jitter	155.520 MHz, 5V as example	Over 1 Hz to 1 MHz band width: 20 pico seconds RMS max. Over 10 Hz to 1 MHz band width: 1.8 pico seconds RMS max. Over 100 Hz to 1 MHz band width: 0.2 pico seconds RMS max. Over 12 kHz to 20 MHz band width: 1 pico seconds RMS max. Over 10 Hz to 20 MHz band width: 5 pico seconds RMS max.	
SSB Phase Noise	155.520 MHz, 5V as example	-50 dBc at 10 Hz offset, -80 dBc at 100 Hz offset, -110 dBc at 1 kHz offset, -135 dBc at 10 kHz offset, -145 dBc at 100 kHz offset, -145 dBc at 1 MHz offset	
Linearity		$\pm 10\%$ max.	
Slope Polarity (Transfer Function)		Monotonic and Positive: Increasing control voltage always increases output frequency. (Higher frequency when control voltage towards more positive voltage)	
Start-up Time		10 m sec. max.	
Input Impedance		Greater than 10 k Ω	
Frequency Response		10 KHz min	
3 dB Modulation Band Width		10 kHz min.	
Aging		± 2 ppm / year max.	
Storage Temperature		-55°C to $+100^\circ\text{C}$	
Tri-state option		PECL output is disabled and complimentary output remains high when Tri-state pin is "HIGH". Both PECL and complimentary PECL outputs are high when Tri-state pin is "LOW".	

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PART NUMBER FORMAT AND EXAMPLES:



5GP14A-80N-125.0 represents +5.0 V, non- PLL based PECL VCXO 125.0 MHz in 4 pin DIP full size package, frequency stability is ±25 ppm over 0 to +70°C, pulling range is ±80 ppm minimum.

3GP614C20-80T-155.520-3T

represents +3.3V non-PLL based PECL VCXO 155.520 MHz in 6 pin full size DIL package, frequency stability is ±20 ppm over 0 to +70°C, pulling range is ±80 ppm typical, with Tri-state option on pin 3.

MODELS WITH OPTIONS

4 pin thru-hole (GP14) and gull wing (GP24) models

Part number suffix	Pin 1	Pin 7	Pin 8	Pin 14
No suffix, no options	Voltage control	Case ground	PECL Output	Supply Voltage

5 pin thru-hole (GP514) and gull wing (GP524) models

				Option	
Part number suffix	Pin 1	Pin 7	Pin 8	Pin 9	Pin 14
- 9C	Voltage control	Case ground	PECL Output	Complimentary PECL Output	Supply Voltage
- 9T	Voltage control	Case ground	PECL Output	Tri-State	Supply Voltage

6 pad leadless SMD (GP62, GP64)

Suffix	Pad 1	Pad 2	Pad 3	Pad 4	Pad 5	Pad 6
No suffix, no option	Voltage control	Tri-state	Case ground	PECL Output	Complimentary PECL output	Supply Voltage

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"GP" series (non-PLL based PECL)

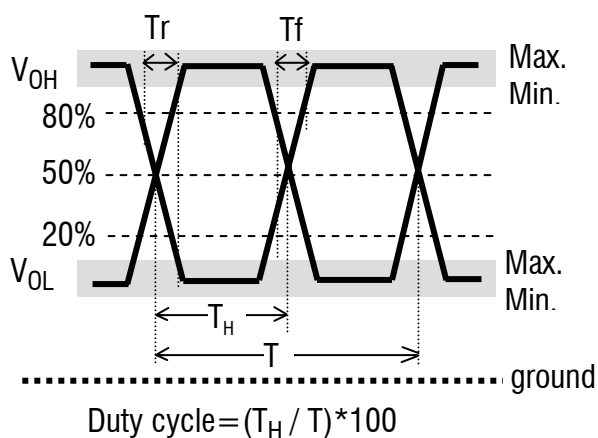
Logic: PECL square wave



6 pin thru-hole (GP614) and gull wing (GP624) models

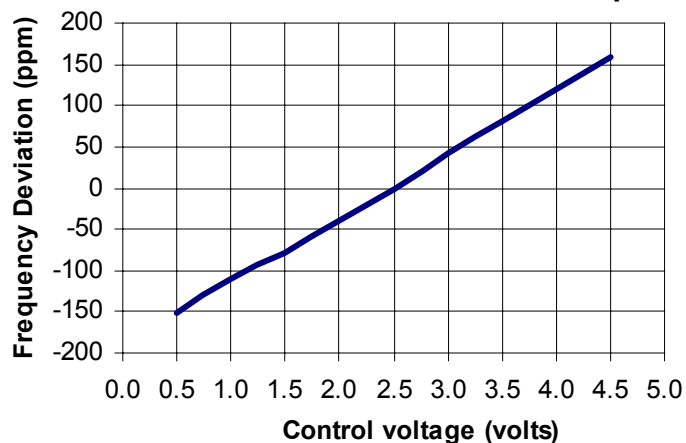
Suffix	Pin 1	Option Pin 3	Pin 7	Pin 8	Pin 12	Pin 14
- 3N	Voltage control	No connection	Case ground	PECL Output	Complimentary PECL output	Supply Voltage
- 3T	Voltage control	Tri-State	Case ground	PECL Output	Complimentary PECL output	Supply Voltage

OUTPUT WAVEFORMS:



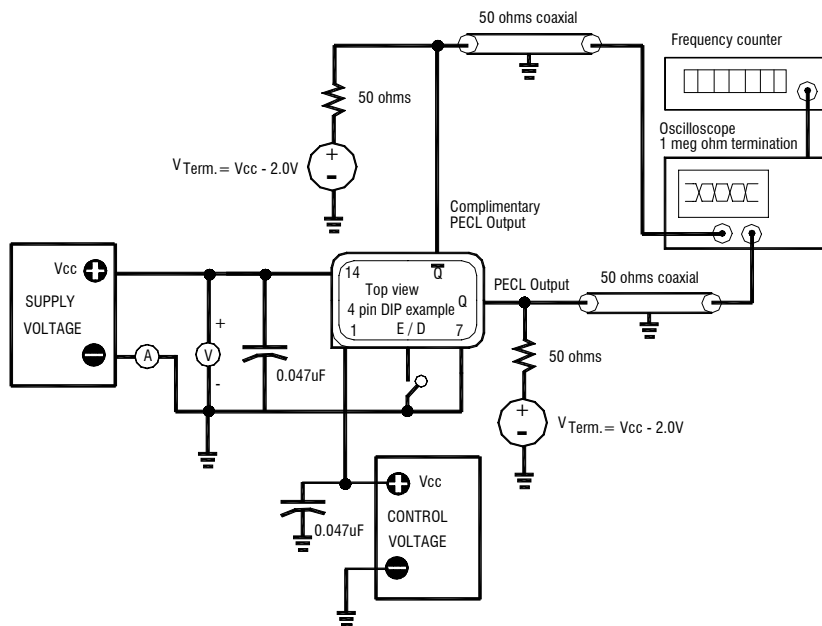
OUTPUT PERFORMANCE: Typical response of

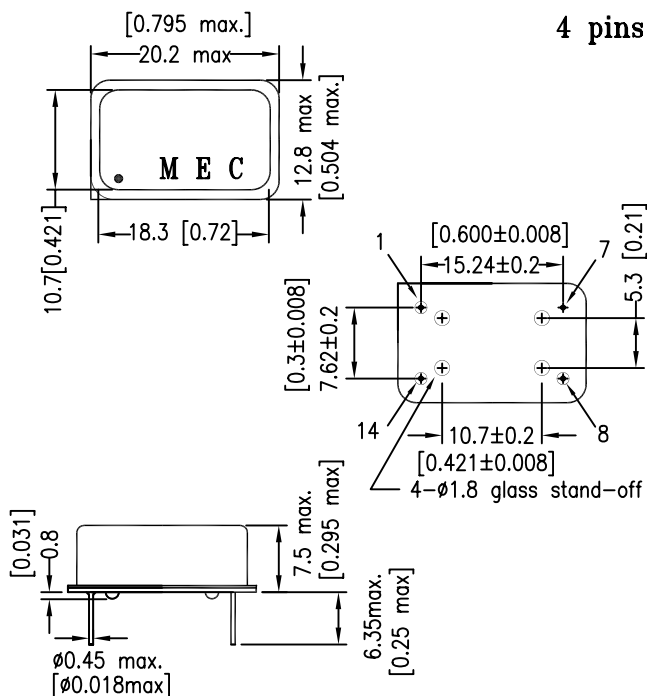
5GP150T-155.520 Positive slope



TEST CIRCUIT

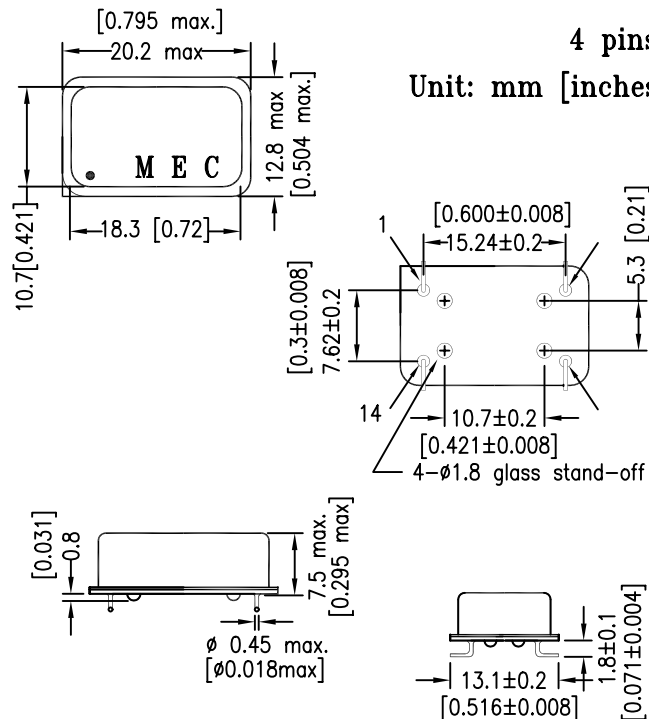
Apply to all models and options. Both PECL and complimentary PECL outputs shown.



Package: GP14**4 pins****Pin Connections**

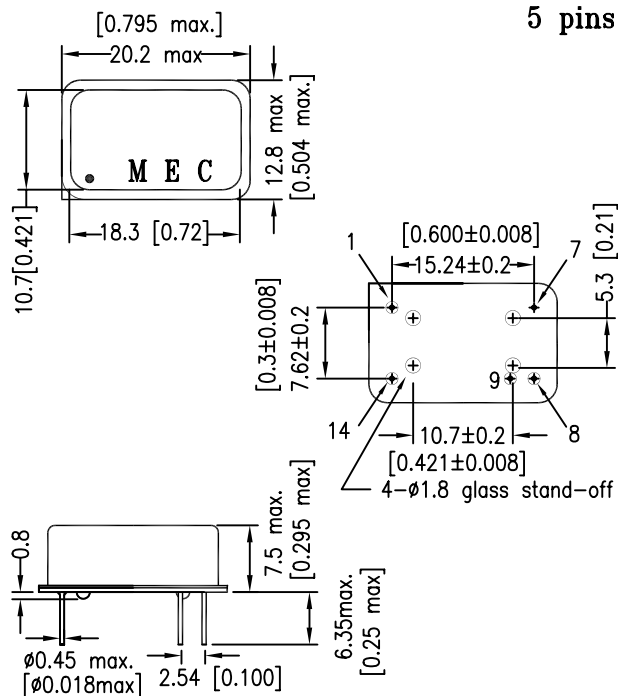
Pin 1: Voltage Control
 Pin 7: Ground
 Pin 8: Output
 Pin 14: Vcc

Square corner is pin No. 1

Package: GP24**4 pins****Unit: mm [inches]****Pin Connections**

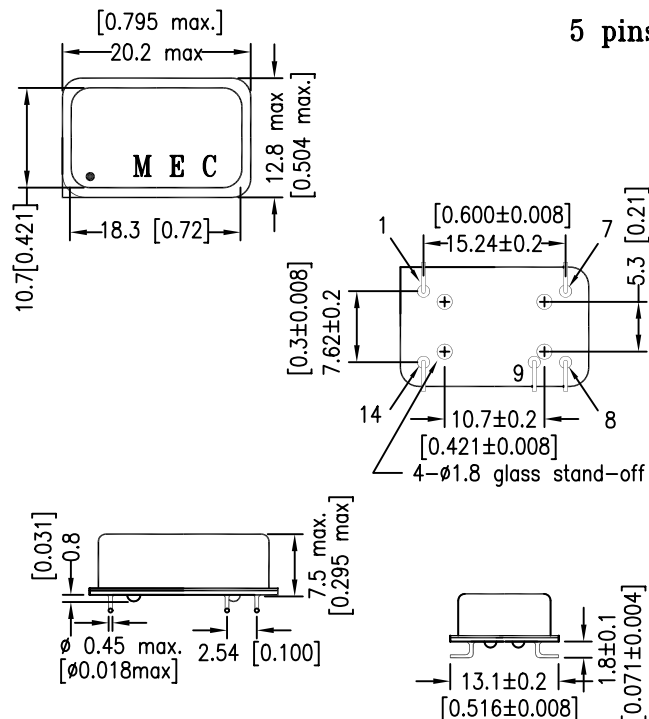
Pin 1: Voltage Control
 Pin 7: Ground
 Pin 8: Output
 Pin 14: Vcc

Square corner is pin No. 1

**V C X O
PECL****Package: GP514****5 pins****Pin Connections**

Pin 1: Voltage Control
 Pin 7: Ground
 Pin 8: Output
 Pin 14: Vcc

Square corner is pin No. 1
 Pin 9: Complimentary output or Tri-State function

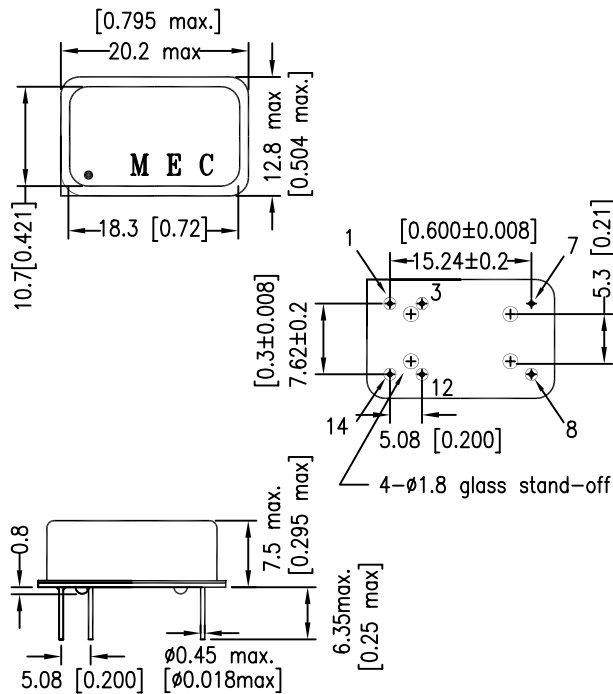
Package: GP524**5 pins****Pin Connections**

Pin 1: Voltage Control
 Pin 7: Ground
 Pin 8: Output
 Pin 14: Vcc

Square corner is pin No. 1
 Pin 9: Complimentary output or Tri-State function

Package: GP614

6 pins



Square corner is pin No. 1

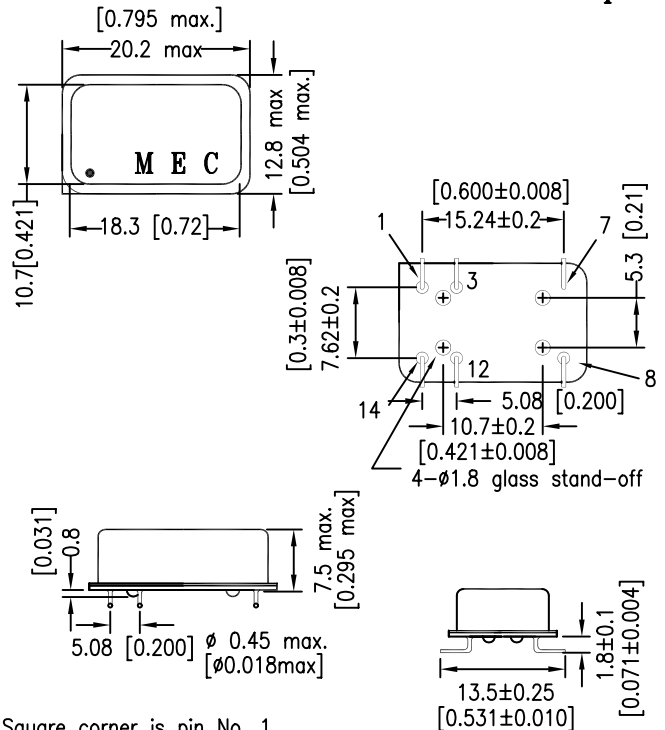
Pin Connections

Pin 1: Voltage Control
Pin 7: Ground
Pin 8: Output
Pin 14: Vcc

Pin 3: No connection or Tri-State
Pin 12: Complimentary Output

Package: GP624

6 pins



Square corner is pin No. 1

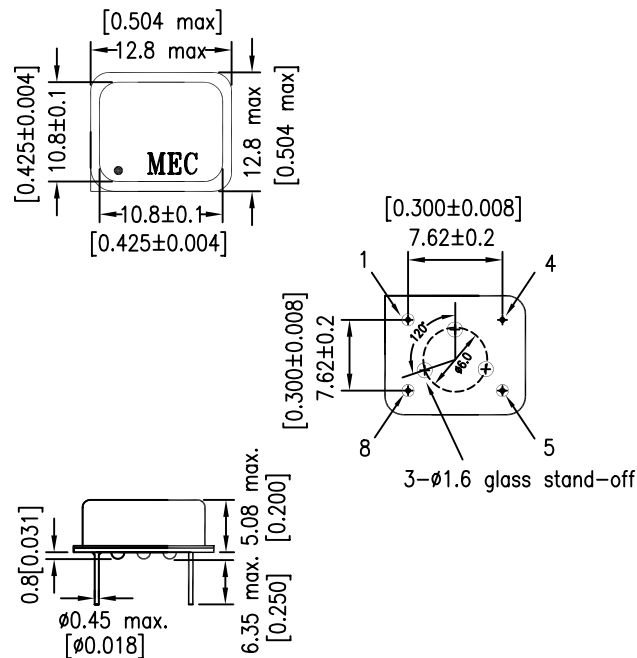
Pin Connections

Pin 1: Voltage Control
Pin 7: Ground
Pin 8: Output
Pin 14: Vcc

Pin 3: No connection or Tri-State
Pin 12: Complimentary Output

V C X O
PECL

Package: GP8

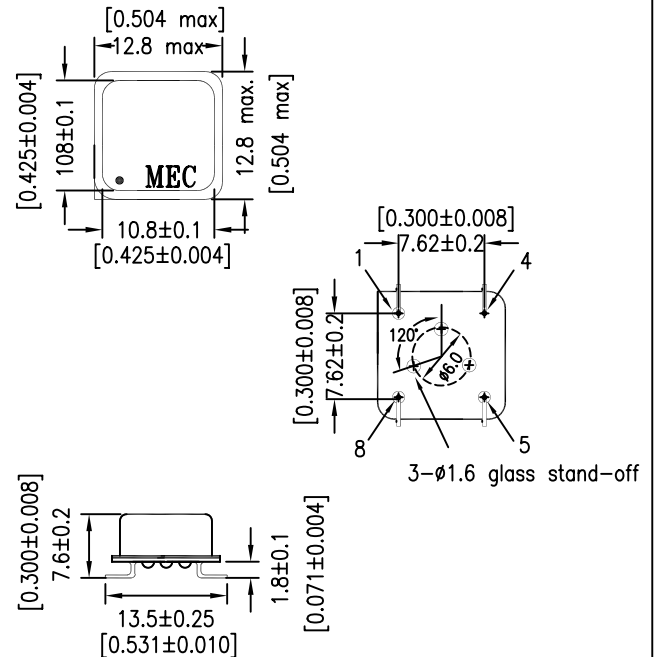


Pin Connections

Pin 1: Voltage Control
Pin 4: Ground
Pin 5: Output
Pin 8: Vcc

Square corner is pin No.1

Package: GP18



Pin Connections

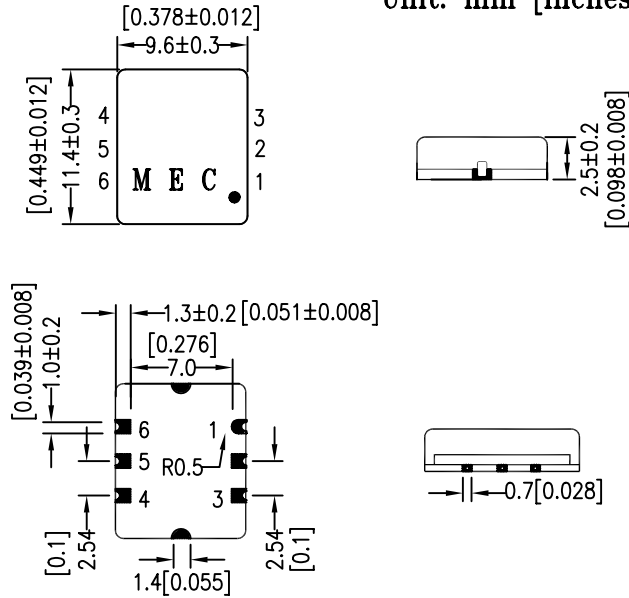
Pin 1: Voltage Control
Pin 4: Ground
Pin 5: Output
Pin 8: Vcc

Square corner is pin No. 1

Package: GP62

"62" represents 6 pads and 2.5 mm overall height

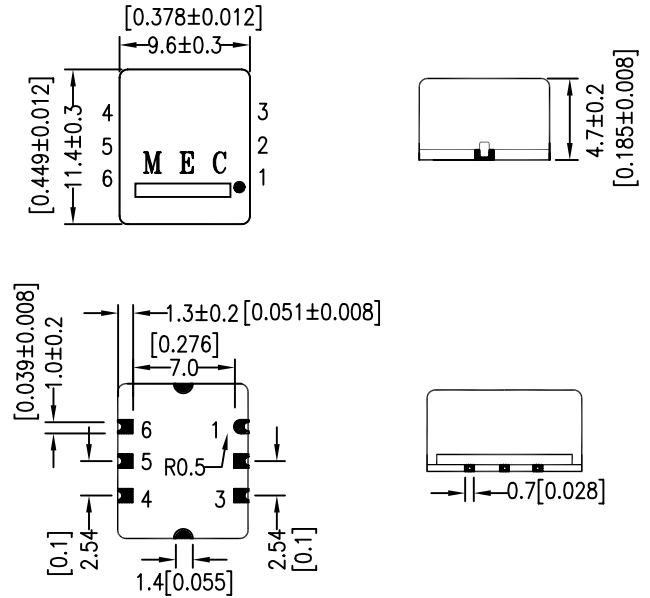
Unit: mm [inches]

**Pad Connections:**

- Pad 1: Voltage Control (rounded pad)
- Pad 2: Tri-State
- Pad 3: Ground
- Pad 4: Output
- Pad 5: Complimentary Output
- Pad 6: Vcc

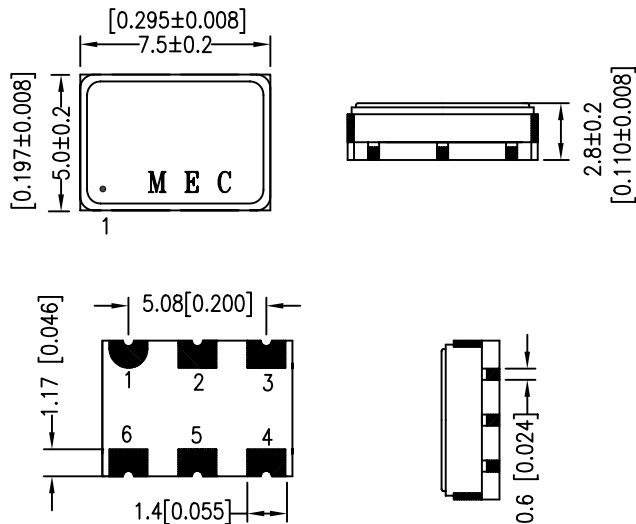
Package: GP64

"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: Complimentary Output
- Pad 6: Vcc

V C X O
PECL

Package: GP575

Rounded pad is pad No. 1

Pad Connections:

- Pad 1: Voltage Control
- Pad 2: Tri-State
- Pad 3: Ground
- Pad 4: Output
- Pad 5: Complimentary Output
- Pad 6: Vcc