PRODUCT SELECTION GUIDE

Product Summary:

Output Wave Form: Square Wave					
TCXO	**VCTCXO**	**Available Frequency Range**	**RoHS Compliant Equivalent**		**Package Description**
Thru-Hole Types					
M14E	**VM14E**	9.6 ~ 320 MHz	**M14GE_**	**VM14GE_**	4 pin DIP. Hermetically sealed.
M15E	**VM15E**	9.6 ~ 320 MHz	**M15GE_**	**VM15GE_**	4 pin DIP. With trimmer
M11E	**VM11E**	9.6 ~ 320 MHz	**Please contact Mercury**		25.4x25.4x12.7 solder sealed 4 pin package
M97E	**VM97E**	9.6 ~ 320 MHz			25.8x25.8x13.4 mm solder sealed 4 pin package
M78E	**VM78E**	9.6 ~ 320 MHz			24.1x24.1x7.5 mm solder sealed 4 pin package
M19E	**VM19E**	9.6 ~ 320 MHz			19.8x19.8x10 mm solder sealed 5 pin package
M16E	**VM16E**	9.6 ~ 320 MHz			16 pin double wide DIP. Solder sealed.
M31E	**VM31E**	9.6 ~ 320 MHz			24.1x24.1x9.5 mm solder sealed 5 pin package
M233E	**VM233E**	9.6 ~ 320 MHz			38.1x38.1x16 mm solder sealed 4 pin package
M51E	**VM51E**	9.6 ~ 320 MHz			30x30x10 mm solder sealed 4 pin package
Gull Wing Surface Mount Types					
M24E	**VM24E**	10 ~ 320 MHz	**M24GE_**	**VM24GE_**	4 pin gull wing. Hermetically sealed.
M25E	**VM25E**		**M25GE_**	**VM25GE_**	4 pin gull wing. With trimmer
M44E	**VM44E**	12.8 ~ 320 MHz	**M44GE_**	**VM44GE_**	9.6x11.4x4.7 mm 4 pad leadless FR4 substrate.
M64E	**VM64E**	12.8 ~ 320 MHz	**M64GE_**	**VM64GE_**	9.6x11.4x4.7 mm 6 pad leadless FR4 substrate.

For RoHS equivalent please add “**G**” after the package code. For example: M14GE**.**

Product Options

- No mechanical Trimmer models are available.
- Narrow ((±1 ppm max.) or wide electrical tuning range (±35 ppm max.)
- Hi-Rel (-55℃ to +125℃) VCTCXOs and TCXOs.
- +15V, +12V, +10V or +9V DC supply voltages are available.
- Reference voltage output available on selected models
- External frequency adjustment option is available via external potentiometer or variable capacitor.

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General Specifications (at+25°C and specified input voltage)

Frequency Range			9.6 MHz ~ 320.0 MHz					
Output Load			50 ohms					
Output Wave From			**True Sine Wave**. 50 ohm load. Wave form code is “**E**” For 10KΩ//10 pF load sine wave output, please refer to “**U**” series					
Initial Calibration Tolerance			Models with mechanical trimmer: ≤ ±1 ppm. +25°C ±2°C. Models without mechanical trimmer: ≤±2 ppm at +25°C ±2°C.					
Frequency Stability **vs Temperature** **vs Aging** **vs Voltage Change** **vs Load Change** **vs reflow (SMD models only)**			≤±1 ppm , ±1.5 ppm, ±2.0 ppm, ±2.5 ppm, ±3 ppm, ±5 ppm, ±25 ppm, or ±50 ppm, over operating temperature range. ≤±1.0 ppm max. first year at +25°C ≤±0.3 ppm max. for a ±5% input voltage change ≤±0.3 ppm max. for a ±10% loading condition change ≤±1 ppm max. 1 reflow and measured 24 hours afterwards					
Typical Operating Temperature Range (examples)			0°C to +60°C 0°C to +70°C -10°C to +60°C -20 °C to +70°C -30°C to +60°C -30°C to +75°C -30°C to +85°C -40°C to +85°C -55°C to +125°C or -custom.					
			Customer package and /or pin configurations are welcome.					
Mechanical Frequency Tuning		**Standard**	Mechanical trimmer built-in. ±3 ppm min. tuning					
		Option	No mechanical trimmer built-in (for aqueous washing cycles). To order please add “**1**” after the regular model prefix. For example: M141E15.					
Input Voltage Range			+15.0V, +12.0V, +10.0V, +9.0V; +5.0V; +3.3V,+3.0V V D.C. ±5%					
Output Power (into 50 ohm load)			+3.0 V and +3.3V: +5 dBm (0.4Vrms, 3.2 mW) typical, +13 dBm is available for selected packages. +5.0 V and higher: +13 dBm (1 Vrms, 20 mW) typical.					
Output Power Tolerance			“A”:±1 dBm; “B”: ±2 dBm or “C”: ±3 dBm					
Current Consumption. **(Over operating temperature range. Output level dependent.)**			Current consumption greatly depends on the frequency, supply voltage and output power required. Here are some examples: 20 mA max. for 30 MHz at 5V with +13 dBm output 75 mA max. for 310 MHz at 3.3 V with +13 dBm output					
VCTCXO only	**Control voltage**		+1.5 V±1.0 V or +2.5 V±2.0 V. or custom.					
	Frequency Deviation Range	**Standard**	±10 ppm typical. for +1.5 V±1.0 V					
		Option	Narrow: ±1 ppm max. or custom					
			Wide: ±35 min. or custom					
	Slope Polarity		Positive slope. Positive voltage for positive frequency shift.					
	Linearity		10 % max.					
Start-Up Time.			5 m. sec. typical, 10 m. sec. max. (reach 90% amplitude and at+25°C±2°C)					
Harmonic			- 20 dBc max.					
Spurious			- 60 dBc min.					
SSB Phase Noise VM16E33-310.000 MHz	Offset	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	
	dBc/Hz	-60	-90	-120	-125	-130	-140	
Output Format			DC block, AC coupled					
Vibration			6 G’s rms over 10 to 2000 Hz					
Shock			15G’s 11 ms, 1/2 sine wave, 3 shocks in each plane					
Storage Temperature			-40°C to +85°C or -55°C to +125°C (package dependent)					

Note 1: Some specifications are package dependent. Please refer to the spec. sheet of individual packages once a package is selected.

Note 2: TCXO products ordered without mechanical and electrical frequency tuning should have a frequency tolerance of ±2 ppm (at +25°C) and the frequency stability over temperature will be from that measured value.

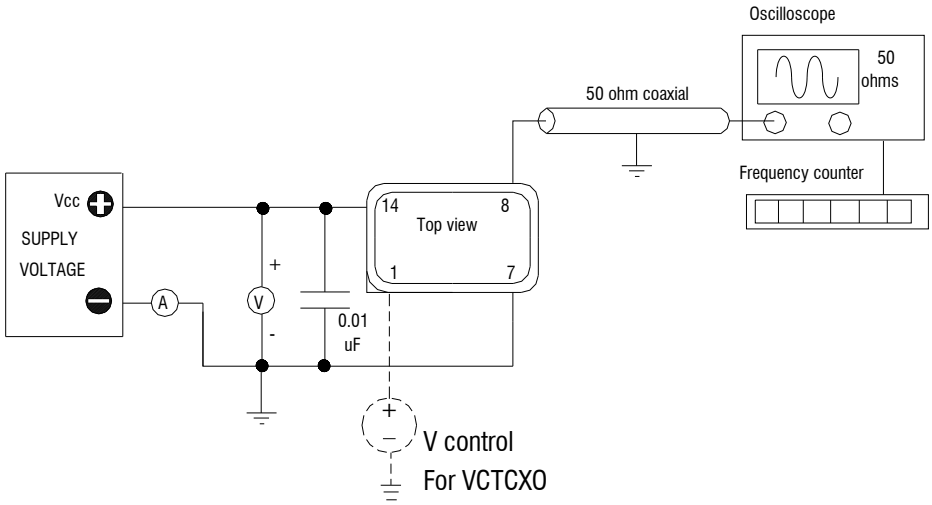
Part Number Format and Examples:

Example of TCXO: M16E15-310.000-1/-40+85-13A;
Example of VCTCXO: VM16E15-310.000-1/-40+85-13A

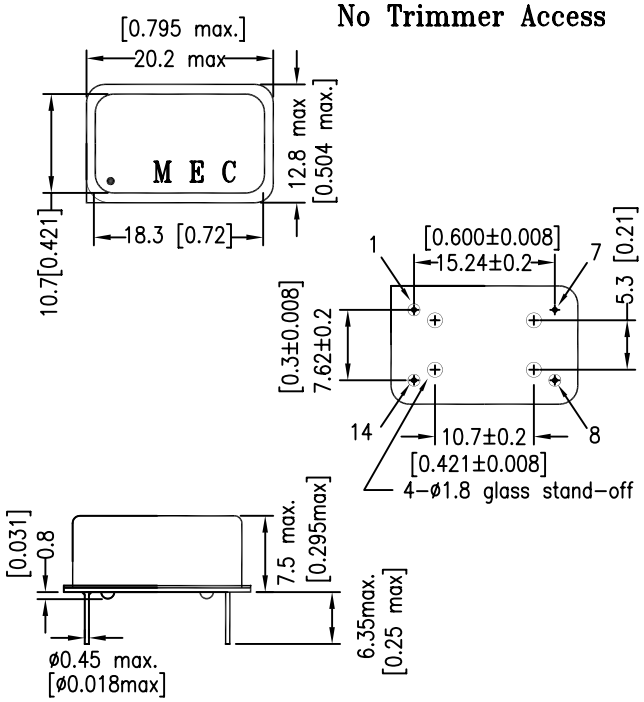
✍	✍		✍		✍		✍		✍		✍: customer to specify	
V	M16	E	15	—	310.000	—	1	/	-40+85	—	13	A
❶	❷	❸	❹		❺		❻		❼		❽	❾

❶: “**V**” for **VCTCXO**; “**blank**” for **TCXO** ❷: Package code ❸: Wave form code “**E**” for sine wave 50 ohm load ❹: Supply voltage code: “**33**” for “+3.3V, “**5**” for +5.0V; “**10**” for +10V; “**15**” for +15.0V ❺:Frequency in MHz ❻: Frequency stability in ±ppm ❼: Operating temperature range in °C. ❽ Output power in dBm (tolerance is ± 1 dBm); ❾ Output power tolerance. “A”:±1 dBm; “B”: ±2 dBm or “C”: ±3 dBm

True Sine Wave 50 ohm load TCXO (VCTCXO) Test Circuit (example of VM14)



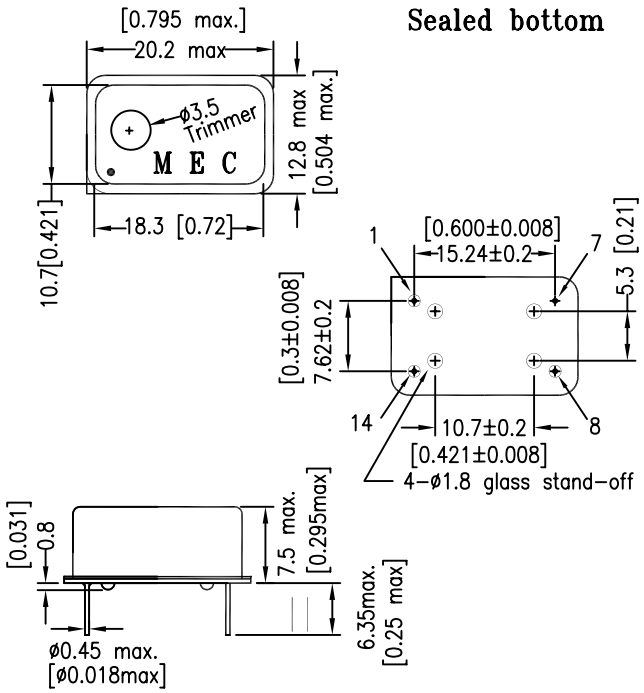
Package: M14E,VM14E Hermetically Sealed DIP
No Trimmer Access



Pin Connections Square corner denotes pin 1

Pin 1: Voltage Control for VCTCXO; No Connection for TCXO
Pin 7: Ground and case
Pin 8: Output
Pin 14: Supply Voltage

Package: M15E,VM15E Unit: mm [inches]
Sealed bottom

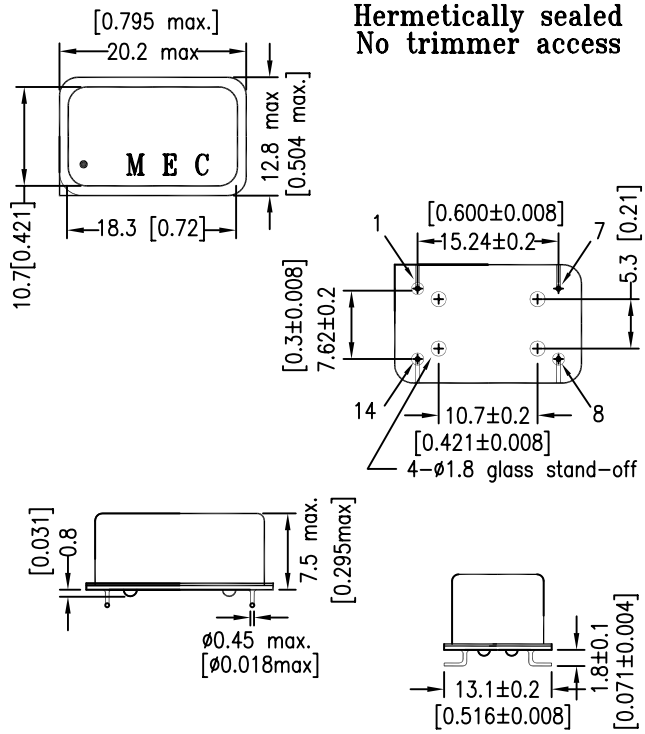


Pin Connections Square corner denotes pin 1

Pin 1: Voltage Control for VCTCXO; No Connection for TCXO
Pin 7: Ground and case
Pin 8: Output
Pin 14: Supply Voltage

TCXO;VCTCXO

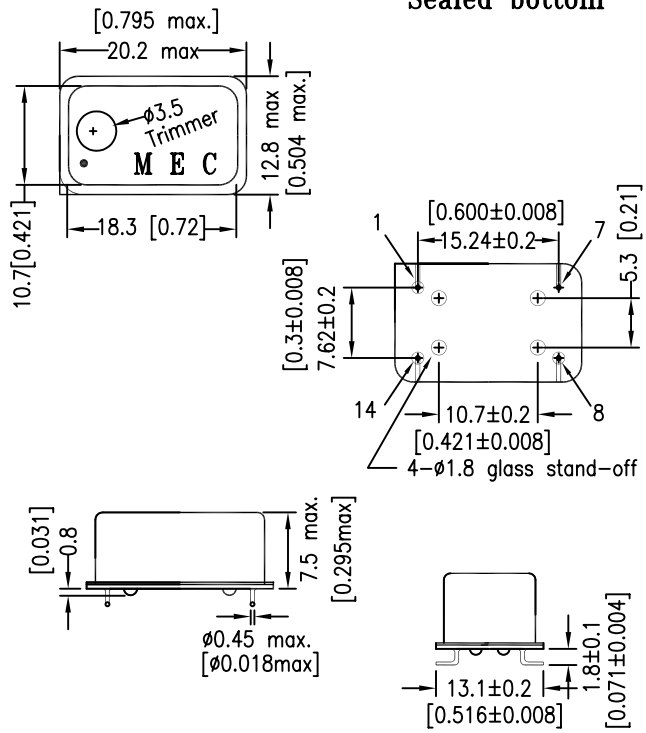
Package: M24E,VM24E Hermetically sealed
No trimmer access



Pin Connections Square corner denotes pin 1

Pin 1: Voltage Control for VCTCXO; No Connection for TCXO
Pin 7: Ground and case
Pin 8: Output
Pin 14: Supply Voltage

Package:M25E,VM25E
Sealed bottom

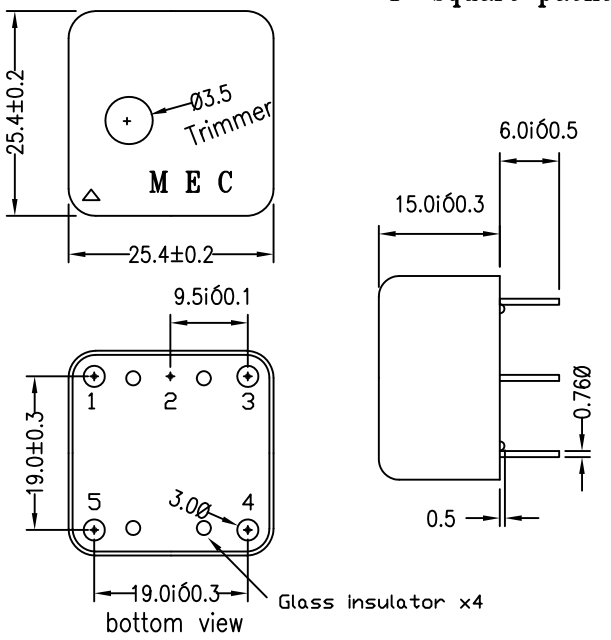


Pin Connections Square corner denotes pin 1

Pin 1: Voltage Control for VCTCXO; No Connection for TCXO
Pin 7: Ground and case
Pin 8: Output
Pin 14: Supply Voltage

Package: M11E,VM11E

Solder Sealed DIP
1" square package

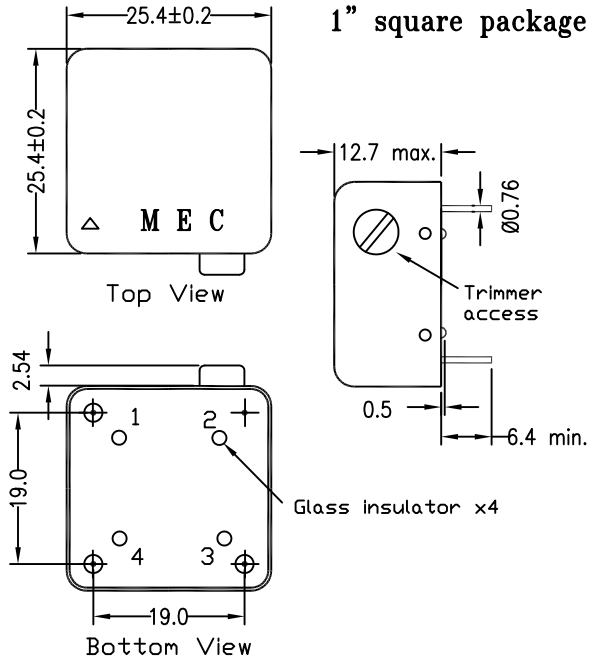


Pin Connections

Pin 1: Output
Pin 2: Ground
Pin 3. Control voltage for VCTCXO; No connection for TCXO
Pin 4: No connection
Pin 5: Supply voltage

Package: M97E, VM97E

Unit: mm
Solder Sealed DIP
1" square package



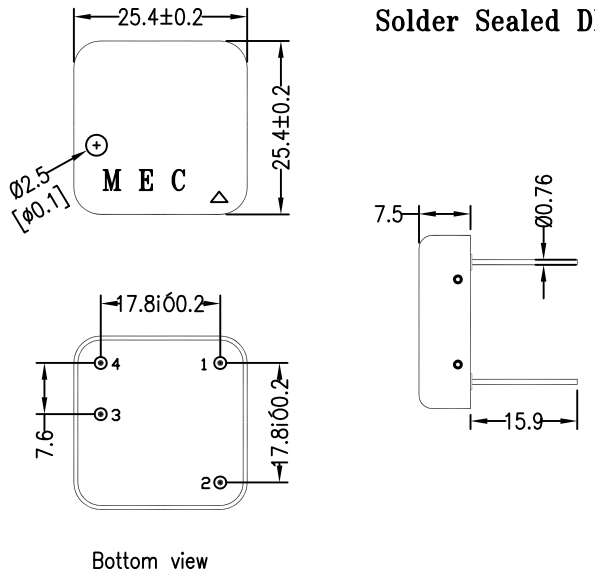
Pin Connections:

Pin 1: Output
Pin 2: Ground
Pin 3: No connection for TCXOs; Voltage Control for VCTCXOs
Pin 4: Suply Voltage

TCXO;VCTCXO

Package: M78E, VM78E

1" square package
Solder Sealed DIP

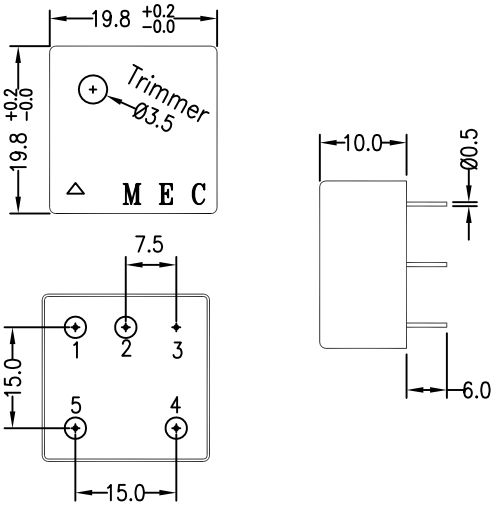


Pin Connections:

Pin 1: Output
Pin 2: No connection for TCXO; Voltage Control for VCTCXO
Pin 3: Ground
Pin 4: Supply Voltage

Package: M19E, VM19E

Solder Sealed DIP



Pin Connections

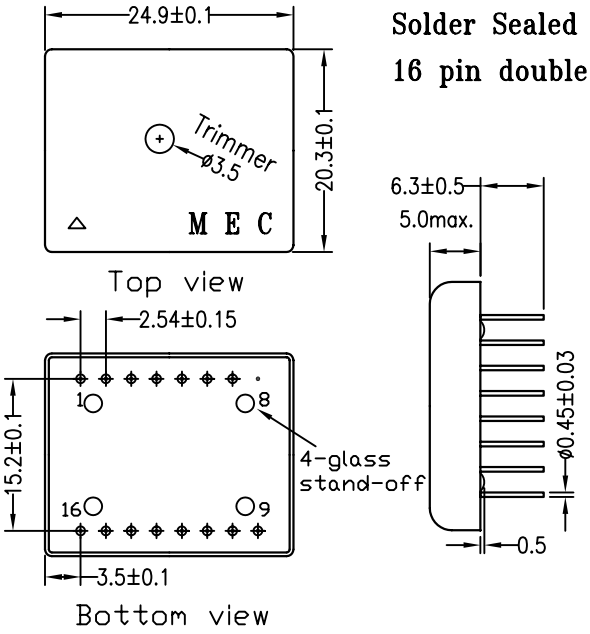
Pin 1: Supply Voltage
Pin 2: Output
Pin 3: Ground
Pin 4: Voltage Control for VCTCXO; No Connection for TCXO
Pin 5: No Connection

Package: M16E,VM16E

Unit: mm

Solder Sealed

16 pin double DIP

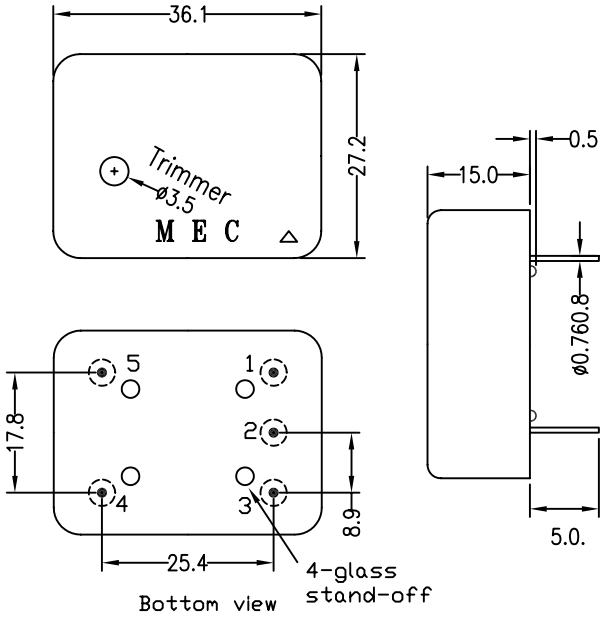


Pin Connections

Pin 1: Voltage control for VCTCXOs; No connection for TCXOs
Pin 5: External potentiometer frequency trimming
Pin 8: Ground
Pin 9: Output
Pin 11: Ground
Pin 16: Supply voltage All other pins are no connections.

Package: M30E, VM30E

Solder Sealed DIP



Pin Connections

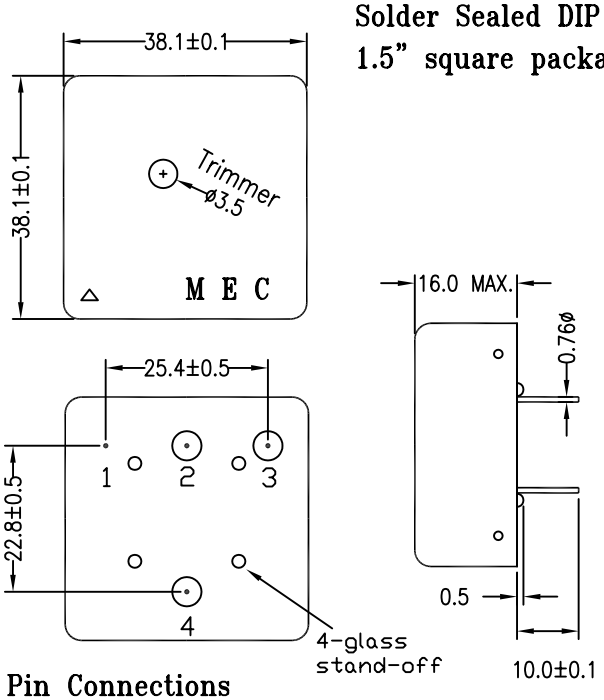
Pin 1: Control voltage for VCTCXOs; No connection for TCXOs
Pin 2: No connection
Pin 3. Supply voltage
Pin 4: Output
Pin 5: Ground

TCXO;VCTCXO

Package: M233E, VM233E

Solder Sealed DIP

1.5" square package



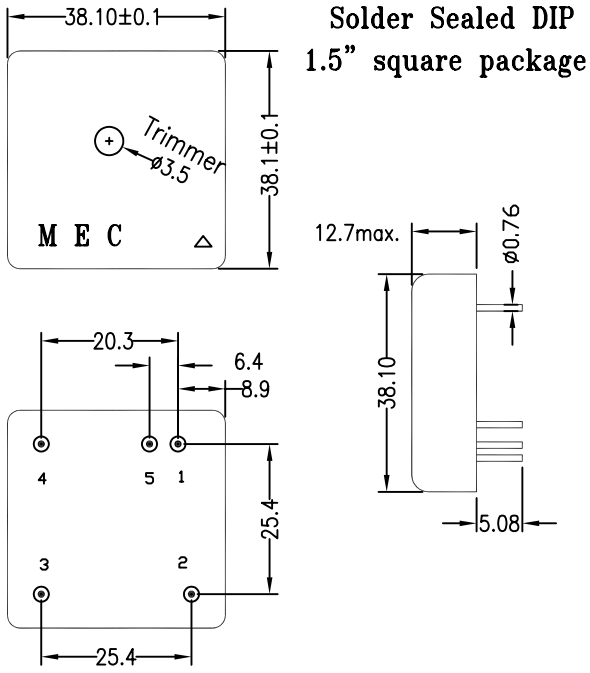
Pin Connections

Pin 1: Ground
Pin 2: Control voltage
Pin 3: Supply voltage
Pin 4: Output

Package: M51E,VM51E

Solder Sealed DIP

1.5" square package



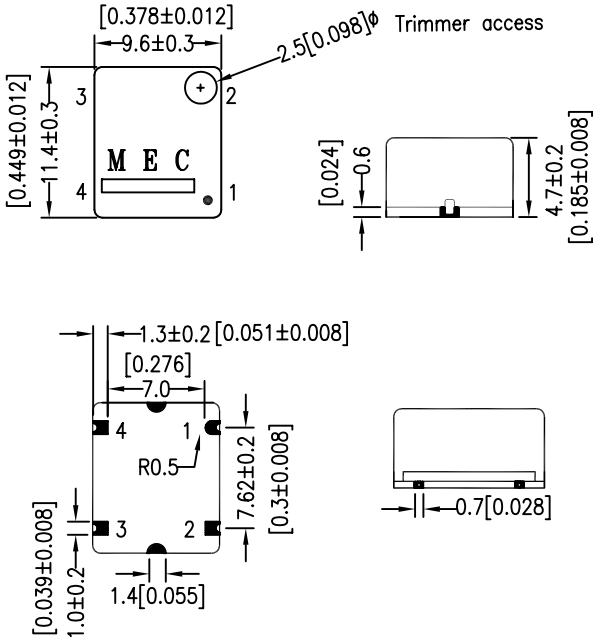
Pin Connections:

Pin 1: Output
Pin 2: Supply voltage
Pin 3: Ground
Pin 4: Voltage control for VCTCXOs; No connection for TCXOs
Pin 5: Ground

Package: M44E,VM44E

FR4 substrate

"44" represents 4 pads and 4.7 mm overall height



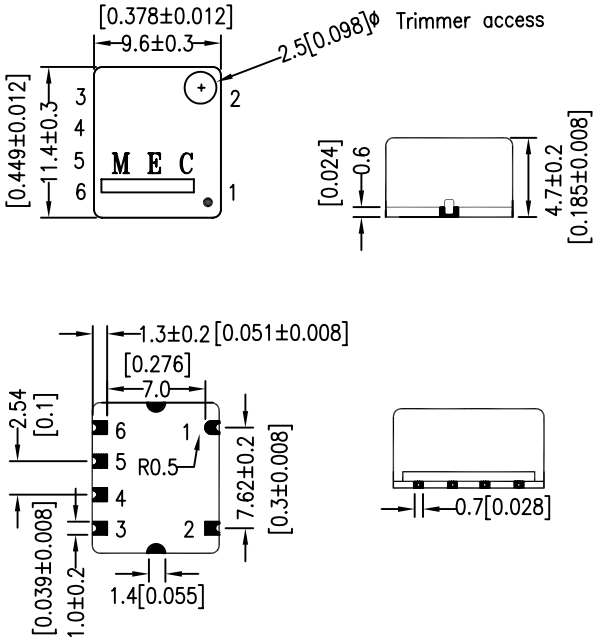
Pad Connections:

Pad 1: Voltage Control for VCTCXO; No Connection for TCXO
Pad 2: Ground and case
Pad 3: Output
Pad 4: Supply Voltage

Package: M64E,VM64E

FR4 substrate

"64" represents 6 pads and 4.7 mm overall height



Pad Connections:

Pad 1,2,4: Ground and case
Pad 3: Output
Pad 5: Voltage Control for VCTCXO; No Connection for TCXO
Pad 6: Supply Voltage

TCXO;VCTCXO