General Specifications for 32.768 kHz (at+25℃ and specified input voltage)

Frequency		32.768 KHz		
Output Wave Form		Square wave. Wave form code is "**T**"		
Initial Calibration Tolerance		Models with mechanical trimmer: Adjustable to the nominal frequency Models without mechanical trimmer: ±3 ppm at +25°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, over specified 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 ±5 ppm stability for -40°C to +85°C		
Mechanical Frequency Tuning		±3 ppm min. (from built-in trimming capacitor)		
Start-Up Time. (reach 90% amplitude and at+25°C±2°C)		2 m. sec. Typical, 3 m. sec. max.		
Input Voltage Range (V_{DD})		Logic	+3.0 V (voltage code is "**3**")	+5.0 V (voltage code is "**5**")
Output Voltage Level	Logic High "**1**"	TTL	2.4V min.	2.4V min.
		HCMOS	90% V_{DD} min.	90% V_{DD} min.
	Logic Low "**0**"	TTL	0.4V max.	0.4V max.
		HCMOS	10% V_{DD} max.	10% V_{DD} max.
Rise Time and Fall Time		TTL	10 nano. sec. max. from 0.5 V to 2.4V	
		HCMOS	10 nano. sec. max. 20%↔80% of waveform	
Duty Cycle (Symmetry)		TTL	50%±10% measured at +1.4V D.C.	
		HCMOS	50%±10% measured at 50% V_{DD}	
Start-up Time		10 m. sec. max.		
Enable / Disable Option		Output Enable. Tri-states output when low. Internal pull-up. Note: Available in certain models only and TCXO products only.		
Current Consumption			22 mA typical.	45 mA typical.
VCTCXO only	Electrical Frequency Tuning (from voltage control pin)		±5~±12 ppm for +1.5 V±1.5V	±6~±12 ppm for +2.5 V±2.0 V
	Slope Polarity	**Positive:** Increasing control voltage increases output frequency.		
	Linearity	10 % max.		
Output Load		15 pF		
Output Format		AC block, DC coupled		
Storage Temperature		-40°C to +85°C		

Note : TCXO products ordered without mechanical and electrical frequency tuning should have a frequency tolerance of ±3 ppm max. (at +25°C) and the frequency stability over temperature will be from that measured value.

Contacts:
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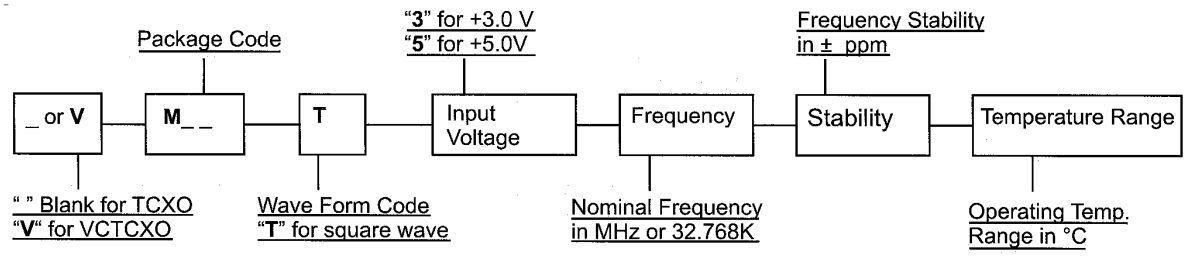
TELCONA AG,Sales Office: Lésigny, France Tel.++33-1-60 34 28 28 Fax ++33-1-60 34 28 29

Part Number Format and Examples:

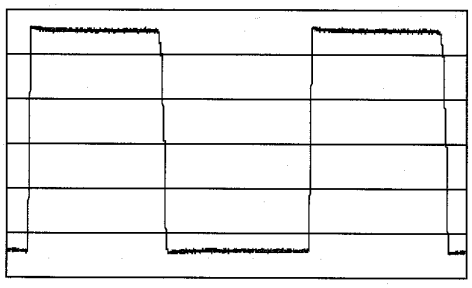


M44T5-12.800-1.0/-20+70 represents 12.800 MHz TCXO in M44 package with stability of ±1 ppm from -20°C to +70°C, TTL/CMOS square wave output, +5.0V input voltage.

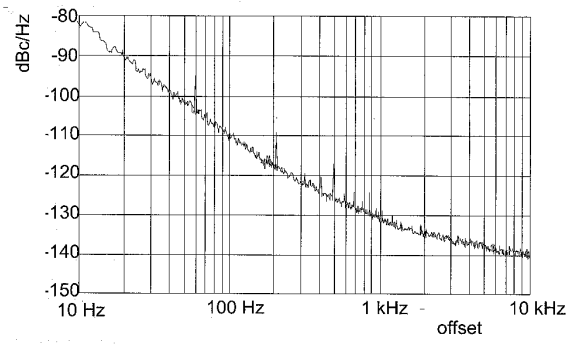
VM14T3-13.000-2.5/-30+75 represents 13.0 MHz VCTCXO in M14 package with stability of ±2.5 ppm from −30°C to +75°C, TTL/CMOS square wave output, +3.0 V input voltage.

VM57T3-32.768K-1/-20+70 represents 32.768 kHz VCTCXO in M57 package with stability of ±1 ppm from −20°C to +70°C, TTL/CMOS square wave output, +3.0 V input voltage.

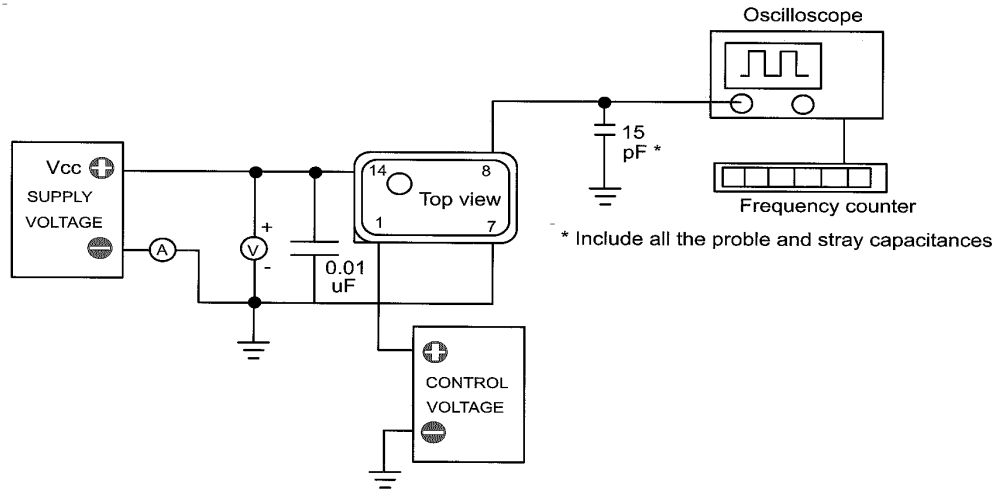
Output Wave Form



Phase Noise M38T5-10.000



TTL / CMOS Square Wave TCXO (VCTCXO) Test Circuit:



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TELCONA AG,Sales Office: Sinsheim, Germany Tel.++49-7261-655 388 Fax.++49-7261-655 389
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Product Summary:

SINE

Output Wave Form: Sine Wave					
TCXO	VCTCXO	Available Frequency Range	Package size (mm), L x W x seated height		Package size (inches), L x W x seated height
Thru-Hole Types					
M38E	VM38E	9.6 ~ 170 MHz	4 pin DIP	11.7 x 18.4 x 7.3	[0.460 x 0.724 x 0.287]
M39E	VM39E	9.6 ~ 170 MHz	4 pin DIP	11.7 x 18.3 x 4.7	[0.460 x 0.724 x 0.185]
M14E	VM14E	9.6 ~ 170 MHz	4 pin DIP. Hermetically sealed.	12.8 x 20.2 x 8.3	[0.504 x 0.795 x 0.327]
M15E	VM15E	9.6 ~ 170 MHz	4 pin DIP. With trimmer.	12.8 x 20.2 x 8.3	[0.504 x 0.795 x 0.327]
M8E	VM8E	10.0 ~ 26 MHz	4 pin DIP. Half size. Hermetically sealed.	12.8 x 12.8 x 8.3	[0.504 x 0.504 x 0.327]
M19E	VM19E	9.6 ~ 26 MHz	5 pin DIP	19.8 x 19.8 x 10.0	[0.780 x 0.780 x 0.394]
Gull Wing Surface Mount Types					
M55E	VM55E	9.6 ~ 170 MHz	4 pin gull wing	11.7 x 21.3 x 6.6	[0.460 x 0.839 x 0.260]
M47E	VM19E	9.6 ~ 170 MHz	4 pin gull wing	11.7 x 21.3 x 4.7	[0.460 x 0.839 x 0.185]
M24E	VM24E	9.6 ~ 170 MHz	4 pin gull wing. Hermetically sealed.	12.8 x 20.2 x 9.3	[0.504 x 0.795 x 0.366]
M25E	VM25E	9.6 ~ 170 MHz	4 pin gull wing. With trimmer.	12.8 x 20.2 x 9.3	[0.504 x 0.795 x 0.366]
M28E	VM28E	10.0 ~ 26 MHz	4 pin gull wing. Half size. Hermetically sealed.	12.8 x 12.8 x 9.3	[0.504 x 0.504 x 0.366]
Leadless Surface Mount Types					
M62E	VM62E	10.0 ~ 26 MHz	6 pad FR4 base. 2.5 mm H	9.6 x 11.4 x 2.5	[0.378 x 0.449 x 0.098]
M42E	VM42E	10.0 ~ 26 MHz	4 pad FR4 base. 2.5mm H	9.6 x 11.4 x 2.5	[0.378 x 0.449 x 0.098]
M64E	VM64E	9.6 ~ 26 MHz	6 pad FR4 base. 4.7 mm H	9.6 x 11.4 x 4.7	[0.378 x 0.449 x 0.185]
M44E	VM44E	9.6 ~ 26 MHz	4 pad FR4 base. 4.7 mm H	9.6 x 11.4 x 4.7	[0.378 x 0.449 x 0.185]

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

Frequency Range		9.6 MHz ~ 26.0 MHz, up to 170 MHz for full size 4 pin and 5 pin packages	
Output Wave From		**True Sine** wave. Wave form code is "**E**"	
Initial Calibration Tolerance		Models with mechanical trimmer: Adjustable to the nominal frequency Models without mechanical trimmer: ±3 ppm at +25°C	
Standard Frequencies (partial list)		9.6, 10.0, 12.8, 13.0, 14.4, 15.36, 16.384, 19.2, 19.440, 19.68 MHz	
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, or ±10 ppm over specified 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 -40°C to +85°C (not available on all frequency stability listed above)	
Mechanical Frequency Tuning		±3 ppm min. (from built-in trimming capacitor)	
Start-Up Time. (reach 90% amplitude and at+25°C±2°C)		2 m. sec. Typical, 3 m. sec. max.	
Input Voltage Range (must specify when ordering; +3.0V and +5.0V are standards)		All other models: +2.7 V D.C. min.; +5.5 V D.C. max.	
		+3.0V (voltage code is "**3**")	+5.0V (voltage code is "**5**")
Output Voltage Level		0.8 V p-p min.	1.0 V p-p min.
Current Consumption		9.6~13 MHz: 1.3 mA max. 13.1~20 MHz: 1.5 mA max. 20.1~26 MHz: 2.0 mA max.	9.6~13 MHz: 2.0 mA max. 13.1~20 MHz: 2.2 mA max. 20.1~26 MHz: 2.5 mA max.
VCTCXO only	Electrical Frequency Tuning (from voltage control pin)	±5~±12 ppm for +1.5 V±1.0 V (up to ±100 ppm is also available for some of the packages)	±6~±12 ppm for +2.5 V ±2.0 V (up to ±100 ppm is also available for some of the packages)
	Slope Polarity	**Positive:** Increasing control voltage increases output frequency.	
	Linearity	10 % max.	
Output Load		10 K Ω // 15 pF	
Harmonics Distortion		-25 dB typ.	
Output Format		DC block, AC coupled	
Storage Temperature		-40°C to +85°C	

Note 1: Depends on specific frequency, operating temperature range and package style, specifications may vary from model to model. Please contact Mercury if spec. sheets of a particular model is required.

Note 2: TCXO products ordered without mechanical and electrical frequency tuning should have a frequency tolerance of ±3 ppm (at +25°C) and the frequency stability over temperature will be from that measured value.

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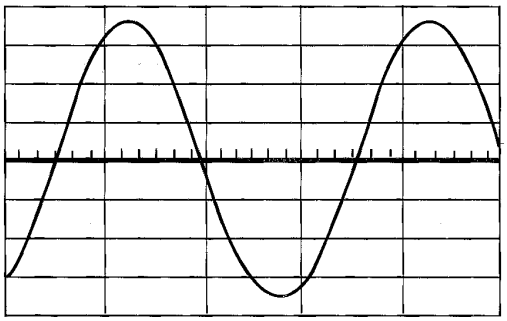
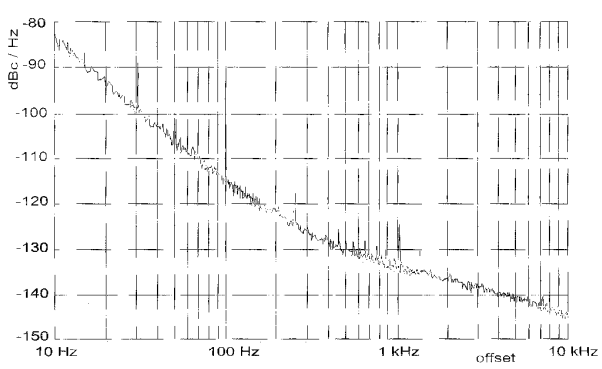
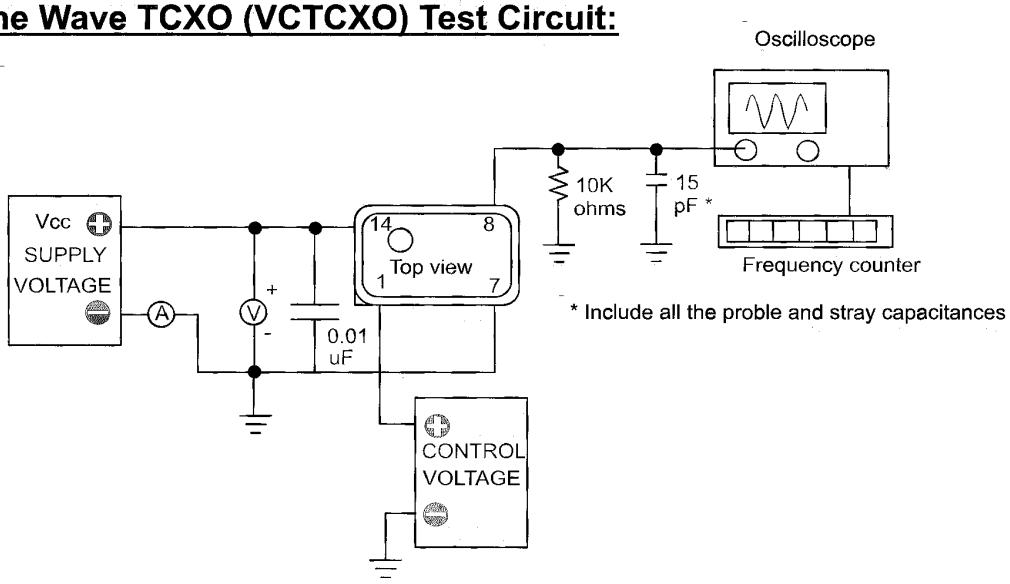
Typical Wave Form: True Sine wave



Typical Phase Noise: VM44E3-19.200

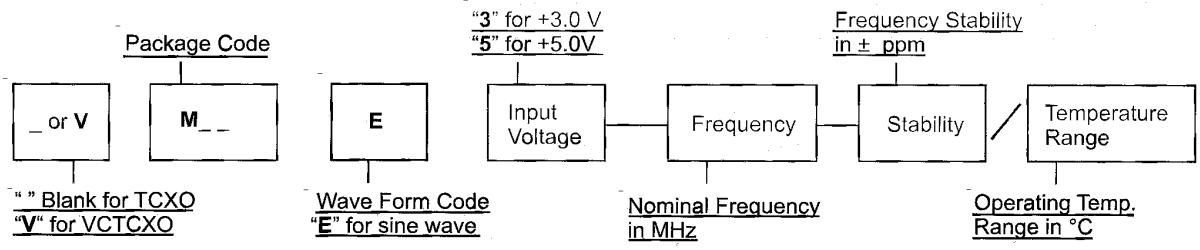


True Sine Wave TCXO (VCTCXO) Test Circuit:



* Include all the proble and stray capacitances

Part Number Format and Examples:



M14E5-19.440-1.0/0+70 represents 19.440 MHz TCXO in M14 package with stability of ±1 ppm from 0°C to +70°C, sine wave output, +5.0V input voltage.

VM44E3-13.000-2.5/-30+75 represents 13.0 MHz VCTCXO in M44 package with stability of ±2.5 ppm from-30°C to +75°C, sine wave output, +3.0 V input voltage.

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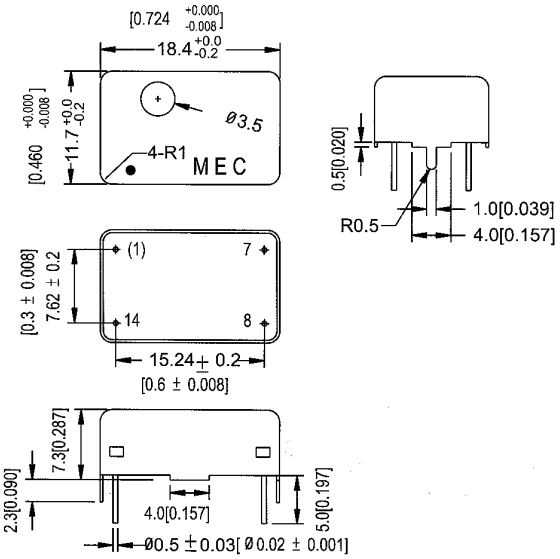
Package M38,VM38

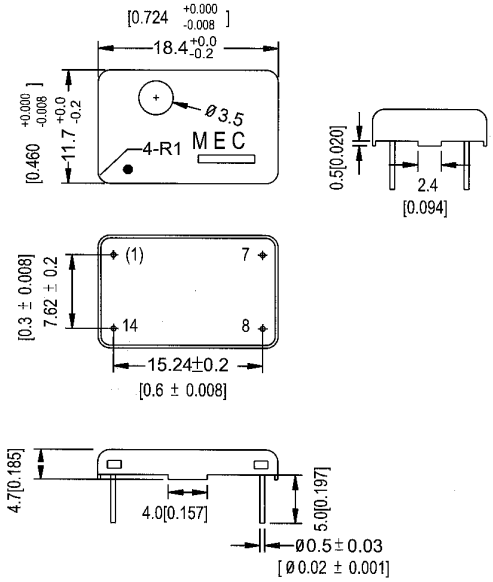


Pin Connections

Pin 1: Voltage Control for VCTCXO; No physical pin 1 for TCXO
Pin 7: Ground
Pin 8: Output
Pin 14: Supply Voltage

Package M39,VM39

Unit : mm [inches]

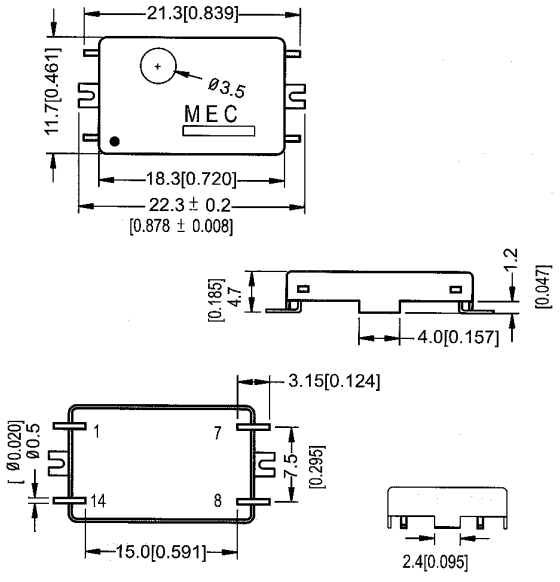


Pin Connections

Pin 1: Voltage Control for VCTCXO; No physical pin 1 for TCXO
Pin 7: Ground
Pin 8: Output
Pin 14: Supply Voltage

TCXO;VCTCXO

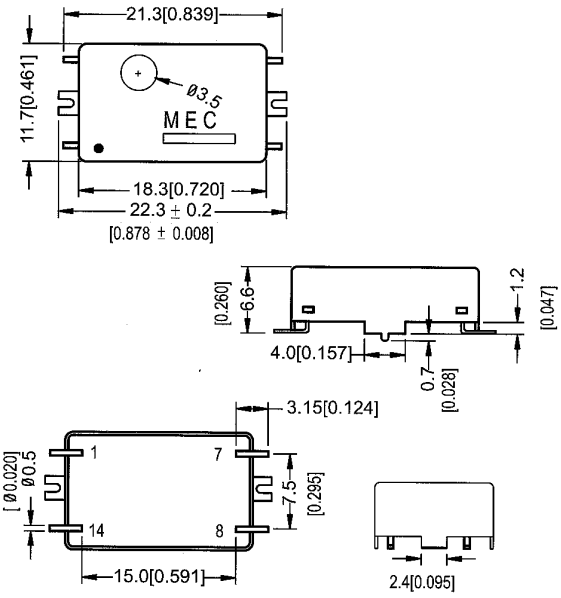
Package: M47,VM47



Pin Connections

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

Package: M55,VM55



Pin Connections

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

Contacts:

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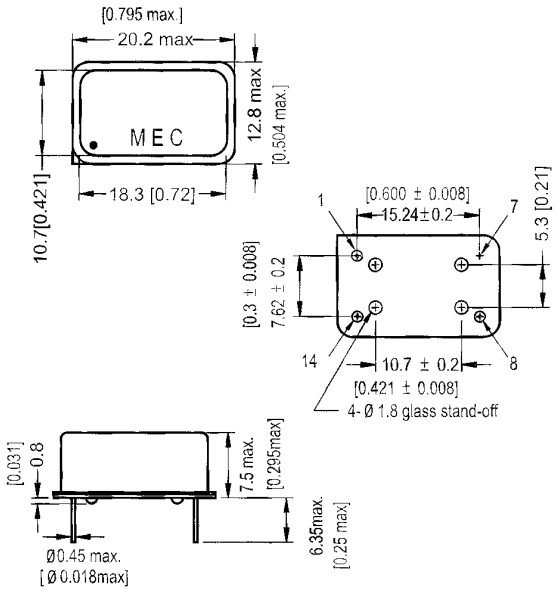
Package : M14 ,VM14

Hermetically Seales DIP
No Trimmer Access

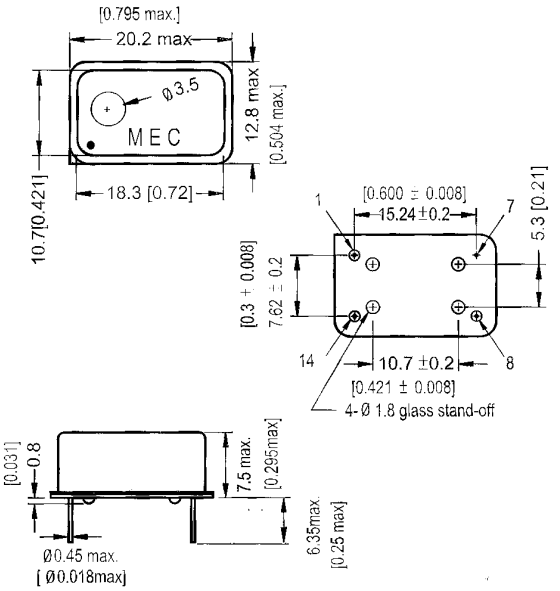


Pin Connections Square corner denotes pin 1

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

Package : M15 ,VM15

Unit : mm [inches]



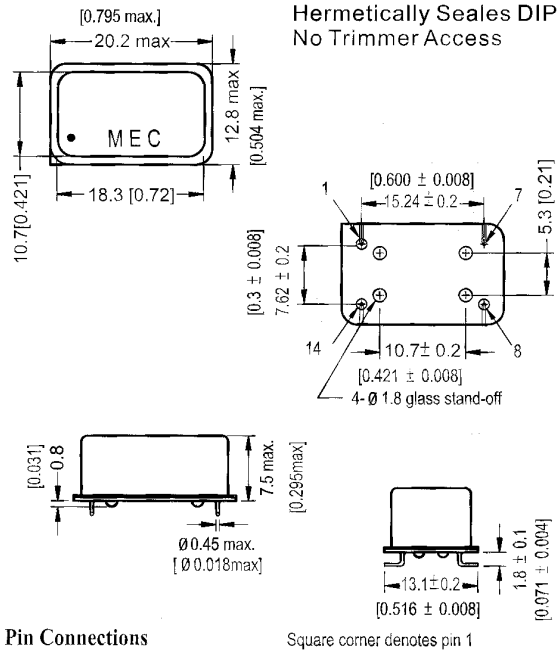
Pin Connections Square corner denotes pin 1

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

TCXO;VCTCXO

Package : M24 ,VM24

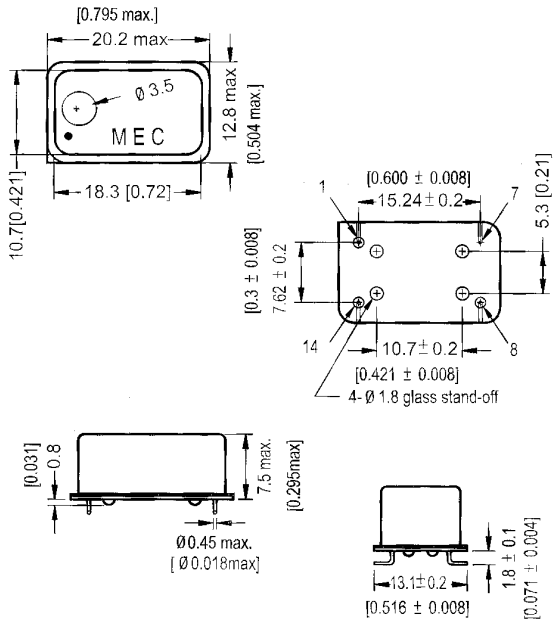
Hermetically Seales DIP
No Trimmer Access



Pin Connections Square corner denotes pin 1

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

Package : M25 ,VM25



Pin Connections Square corner denotes pin 1

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

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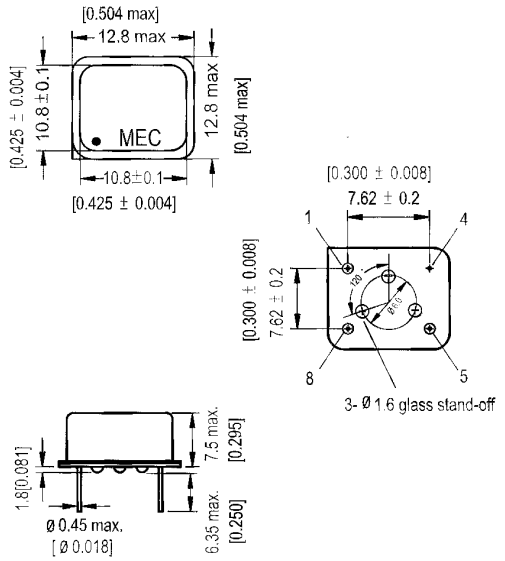
Package : M8,VM8

Hermetically Sealed DIP
No trimmer Access



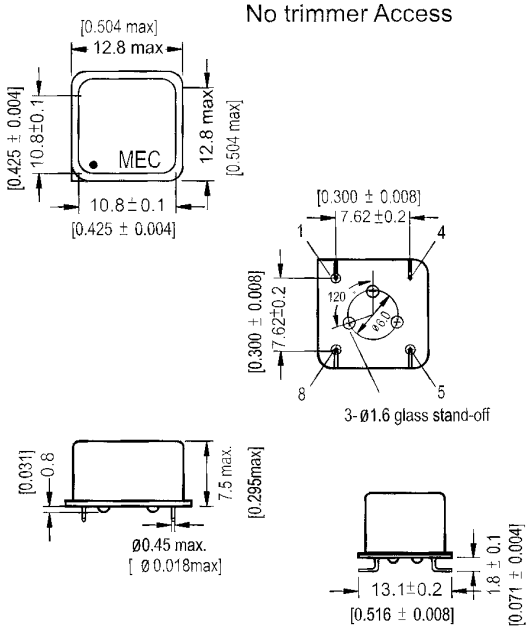
Pin Connections

Square corner denotes pin 1

Pin 1: Voltage Control for VCTCXO or No Connection for TCXO
Pin 4: Ground
Pin 5: Output
Pin 8: Supply Voltage

Package : M28,VM28

Hermetically Sealed DIP
No trimmer Access



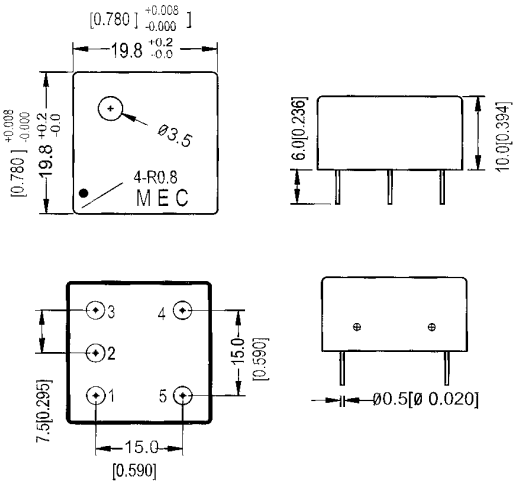
Pin Connections

Square corner denotes pin 1

Pin 1: Voltage Control for VCTCXO or No Connection for TCXO
Pin 4: Ground
Pin 5: Output
Pin 8: Supply Voltage

TCXO ; VCTCXO

Package: M19,VM19



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

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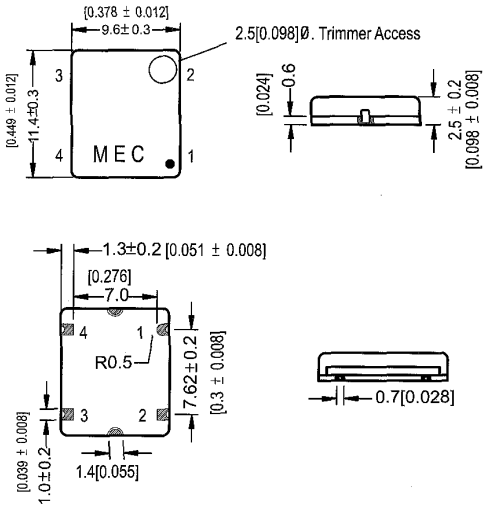
Package : M42,VM42

"42" represents 4 pads and 2.5 mm overall height

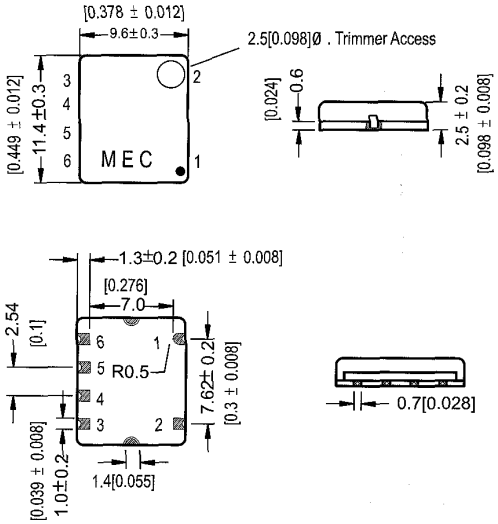


Pad Connections

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

Package : M62,VM62

"62" represents 6 pads and 2.5 mm overall height



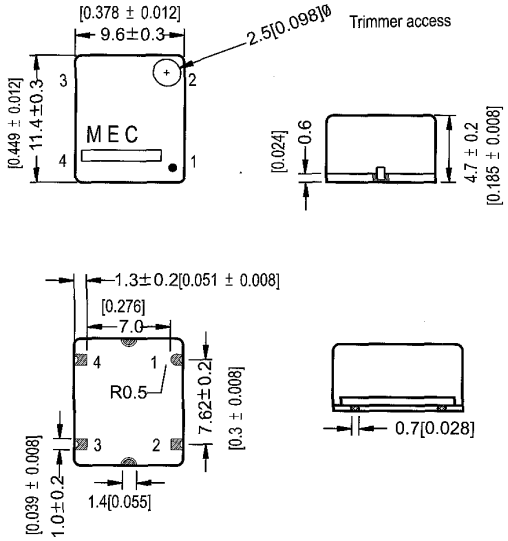
Pad Connections

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

TCXO ; VCTCXO

Package: M44, VM44

"44" represents 4 pads and 4.7 mm overall height

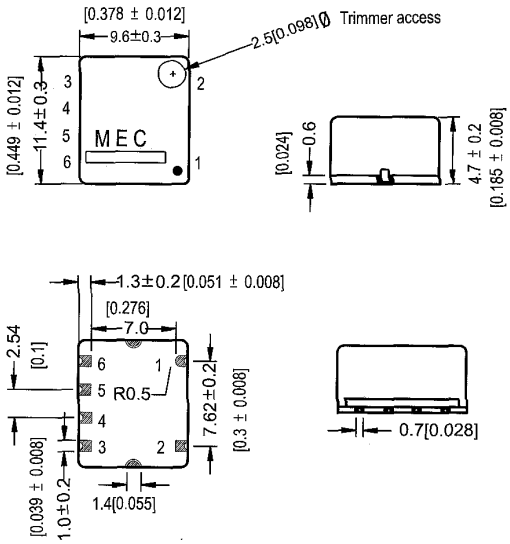


Pad Connections:

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

Package: M64, VM64

"64" represents 6 pads and 4.7 mm overall height



Pad Connections:

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

Contacts:

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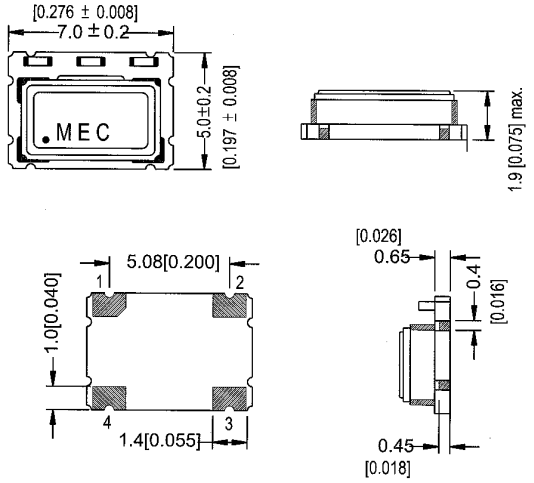
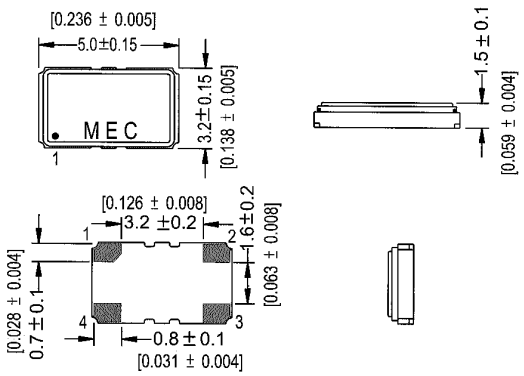
Package: M57S,VM57S



Pad Connections

Pad 1: Ground for TCXO; Voltage Control for VCTCXO
Pad 2: Ground
Pad 3: Output
Pad 4: Supply Voltage

Package: M53,VM53

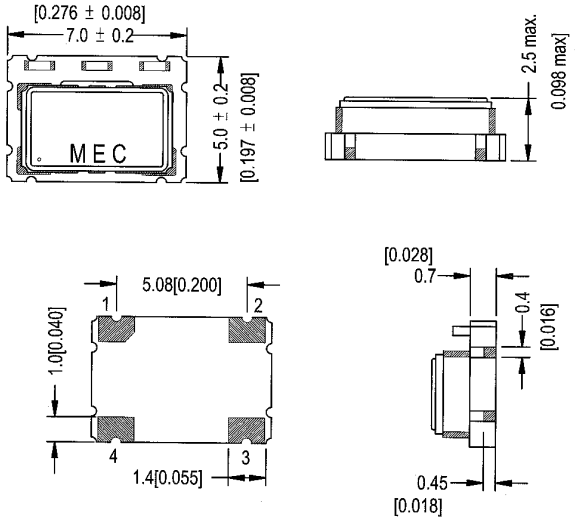


Pad Connections

Pad 1: Ground for TCXO; Voltage Control for VCTCXO
Pad 2: Ground
Pad 3: Output
Pad 4: Supply Voltage

TCXO;VCTCXO

Package: M57T, VM57T



Pad Connections:

Pad 1: Ground for TCXO; Voltage Control for VCTCXO
Pad 2: Ground
Pad 3: Output
Pad 4: Supply Voltage

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