

- Ultra-miniature SMD package 2.0 x 1.6 x 0.8mm
- Stability from $\pm 0.5\text{ppm}$ over -20° to $+70^\circ\text{C}$
- Supply Voltage 1.8V, 2.5V or 3.0Volts
- Miniature, lightweight and compact
- Ideal for portable devices such as GPS and handsets



SPECIFICATION

Product Series	TCXO = M21S , VCTCXO - VM21S		
Output Wave Form:	Clipped Sine Wave		
Supply Voltage	1.8V $\pm 5\%$ (1.71V ~ 1.89V)	2.5V $\pm 5\%$ (2.37V ~ 2.62V)	3.0V $\pm 5\%$ (2.85V ~ 3.15V)
Frequency Range:	13.0MHz to 52.0MHz		
Initial Calibration Tolerance:	$\pm 2\text{ppm}$ maximum, $+25^\circ\text{C}$, 1 hour after reflow		
Frequency Stability	From $\pm 0.5\text{ppm}$ to $\pm 2.5\text{ppm}$ over operating temperature range. Referenced to frequency reading at 25°C .		
vs Temperature:	See table below for availability		
vs Ageing:	$\pm 1.0\text{ppm}$ maximum, first year at 25°C		
vs Voltage Change:	$\pm 0.3\text{ppm}$ maximum for a $\pm 5\%$ voltage change		
vs Load Change:	$\pm 0.2\text{ppm}$ maximum for a $\pm 10\%$ load change		
vs Reflow:	$\pm 1.0\text{ppm}$ maximum for 1 reflow and measured after 24 hours		
Output Load (CL):	10k Ω /10pF typical		
Frequency Deviation Range (VCTCXO):	Pulling $\pm 8.0\text{ppm}$ (Pad 1 = Vcontrol = $+0.9\text{V} \pm 0.8\text{V}$)		
Current Consumption:	2mA max.		
Startup Time:	5ms max. (to reach 90% amplitude and at $25^\circ\text{C} \pm 2^\circ\text{C}$)		
Output Format:	DC block, AC couple		
Packaging:	8.0mm tape; 4.0mm pitch; 180mm reel; 1000 pieces (code P1) or 3000 pieces (code P3) per reel. Cut tape for <1k pieces.		

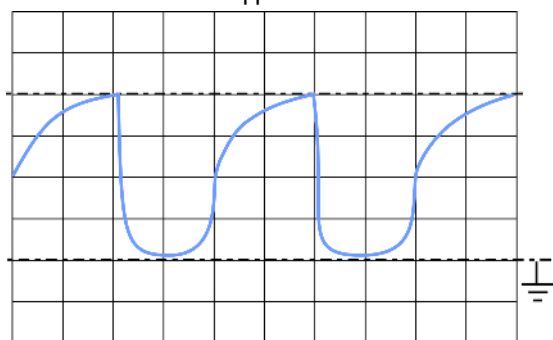
AVAILABLE FREQUENCY STABILITY vs OPERATING TEMPERATURE RANGE

Frequency Stability (ppm)		± 0.5	± 1.0	± 1.5	± 2.0	± 2.5
Temperature Range ($^\circ\text{C}$)	0 ~ +50	✓	✓	✓	✓	✓
	-10 ~ +60	✓	✓	✓	✓	✓
	-20 ~ +70	✓	✓	✓	✓	✓
	-30 ~ +75	ASK	✓	✓	✓	STD
	-40 ~ +85	ASK	ASK	✓	✓	✓

✓ = available, STD = standard, ASK = call Technical Sales

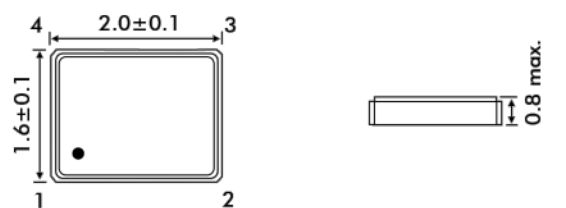
OUTPUT WAVEFORM

Waveform at Pin 3 - Clipped Sine Wave

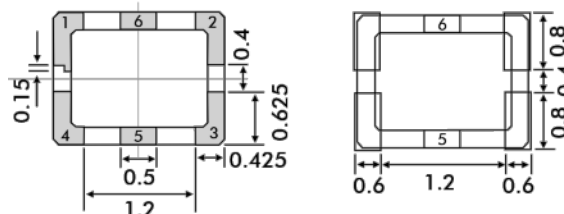


Before AC-coupling capacitor

EM21S - OUTLINES AND DIMENSIONS



Suggested Pad Layout



Pad Connections

- 1 TCXO = Ground
VCTCXO = Voltage Control
- 2 Ground
- 3 Output
- 4 Supply Voltage
- 5, 6 No connection

ENVIRONMENTAL PERFORMANCE SPECIFICATION

1. Temperature Test			
Temperature Cycling Test			
Conditions:	Steps of cycle:	(1) At -55°, 30 minutes	(3) At +85°C, 30 minutes
		(2) At +25°C, 10~15 minutes	(4) At +25°C, 10~15 minutes
	Number of steps:	x3	
Results:	Performance of tested products must remain within specifications.		
Thermal Shock Test			
	Temperature T(H)+125°C, T(L)-55°C		Duration of cycle x3
Results:	Exposure time at temperature extremes = 5 minutes		
	Performance of tested products must remain within specifications.		
Low Temperature Test			
Conditions:	Temperature -20°±2°C		Duration of test 96 hours
Results:	There should be no stain on surface of products.		
	Frequency and waveform of tested products must remain within specifications.		
2. Ageing Test			
Conditions:	Temperature +85°±2°C		Duration of test 96 hours
Results:	Deviation of frequency must be less than ±3ppm.		(±0.0003%)
3. Salt Spray Test			
Conditions:	Temperature: +35°±2°C		Duration of test 48 hours
	NaCl 5%		
Results:	There should be no stain on surface of products.		
4. Humidity Test			
Conditions:	Temperature: +40°±2°C	Relative Humidity 90-95%	Duration of test 96 hours
Results:	Insulation resistance must be 500M Ohm/100 VDC minimum		
	Resistance and wavefor must remain within specification/		
5. Fine Leak Test			
Conditions:	Helium		
Results:	Less than 2 x 10 ⁻⁸ ATM cc/s		

PART NUMBERING PROCEDURE

Example: **VEM21S 18 - 48.000 - 2.0/ -30+85**

Series Description
TCXO = EM21S
VTCXO = VEM21S

Supply Voltage
18 = 1.8 VDC
25 = 2.5 VDC
30 = 3.0 VDC

Frequency (MHz)

Stability over OTR (±ppm)
(See table for available stability)

Operating Temperature Range (OTR) (°C)
0° ~ 50°C to -40° ~ +85°C
Lower and upper limits.