

- Highly stable CMOS TCXO with ultra-low supply current
- Industry-standard SMD package
- Consumes less than 4mA at 20.0MHz with 3.3V supply
- Low phase noise
- RoHS compliant



### DESCRIPTION

EM64K TCXOs and VCTCXOs are packaged in a 11.4 x 9.6 x 4.7mm ceramic SMD package. The part offers the stability of a TCXO and the design convenience of HCMOS output with ultra-low current consumption.

### SPECIFICATION

|                                |                                                                                                   |        |
|--------------------------------|---------------------------------------------------------------------------------------------------|--------|
| Product Code                   | TCXO:                                                                                             | EM64K  |
|                                | VCTCXO:                                                                                           | VEM64K |
| Frequency Range:               | 12.8MHz to 26.0MHz                                                                                |        |
| Output Waveform:               | HCMOS                                                                                             |        |
| Initial Calibration Tolerance: | $\pm 2.0\text{ppm}$ at $+25^\circ\pm 2^\circ\text{C}$                                             |        |
| Standard Frequencies:          | 12.8, 13.0, 14.4, 15.36, 16.0, 16.384, 16.8, 19.2, 19.44, 19.68, 20.0 and 26.0MHz (Partial list.) |        |
| Operating Temperature Range:   | See table                                                                                         |        |
| Frequency Stability            | See table                                                                                         |        |
| vs. Temperature                | $\pm 1.0\text{ ppm max. first year}$                                                              |        |
| vs. Ageing:                    | $\pm 1.0\text{ ppm max. } \pm 10\% \text{ change}$                                                |        |
| vs. Voltage Change:            | $\pm 0.3\text{ ppm max. } \pm 10\% \text{ change}$                                                |        |
| vs. Load Change:               | $\pm 1.0\text{ppm max. for one reflow}$                                                           |        |
| vs. Reflow (SMD type):         | (Measured after 24 hours)                                                                         |        |
| Supply Voltage:                | +2.8, 3.0 or 3.3 Volts                                                                            |        |
| Current Consumption:           | See table                                                                                         |        |
| Output Logic Levels:           | See table                                                                                         |        |
| Rise and Fall Times:           | 4ns typical with 15pF load                                                                        |        |
| Duty Cycle:                    | 50% $\pm$ 5%                                                                                      |        |
| Start-up Time:                 | 5ms typical, 10ms max.                                                                            |        |
| Output Load:                   | 15pF                                                                                              |        |
| Fanout (drive capability):     | 12mA typical, 17mA max. (at TTL level)                                                            |        |
| RMS Period Jitter:             | 3ps max. (1 Sigma, 1000 samples; capacitive coupling between Vdd and Ground).                     |        |
| RoHS Status:                   | RoHS compliant and pB free                                                                        |        |
| Packaging:                     | 16mm tape, 8mm pitch                                                                              |        |
|                                | 1000 pieces per reel.                                                                             |        |

### CURRENT CONSUMPTION

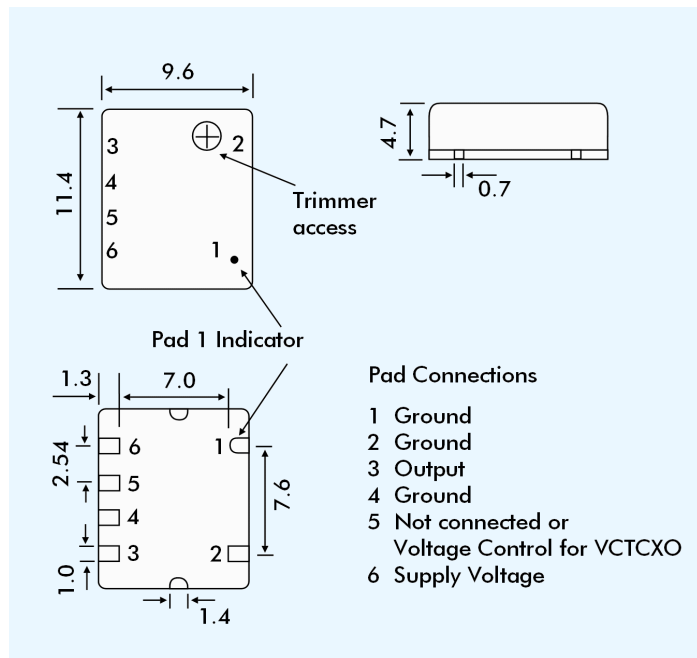
| Frequency | Input Voltage |            |            |
|-----------|---------------|------------|------------|
|           | +2.8V         | +3.0V      | +3.3V      |
| 12.800MHz | 2.3mA typ.    | 2.4mA typ. | 2.6mA typ. |
| 13.000MHz | 2.5mA typ.    | 2.6mA typ. | 2.8mA typ. |
| 14.400MHz | 2.6mA typ.    | 2.8mA typ. | 3.1mA typ. |
| 16.384MHz | 2.8mA typ.    | 3.0mA typ. | 3.2mA typ. |
| 19.200MHz | 3.2mA typ.    | 3.3mA typ. | 3.6mA typ. |
| 19.440MHz | 3.2mA typ.    | 3.4mA typ. | 3.7mA typ. |
| 20.000MHz | 3.2mA typ.    | 3.4mA typ. | 3.7mA typ. |
| 26.000MHz | 3.6mA typ.    | 3.8mA typ. | 4.1mA typ. |

### FREQUENCY STABILITY OVER TEMPERATURE

| Stability (ppm)  |           | $\pm 1.0$ | $\pm 2.0$ | $\pm 2.5$ | $\pm 3.0$ | $\pm 4.0$ | $\pm 5.0$ |
|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Temp. Range (°C) | 0 ~ +50   | ✓         | ✓         | ✓         | ✓         | ✓         | ✓         |
|                  | -10 ~ +60 | ASK       | ✓         | ✓         | ✓         | ✓         | ✓         |
|                  | -20 ~ +70 | X         | ✓         | ✓         | ✓         | ✓         | ✓         |
|                  | -30 ~ +75 | X         | ✓         | ✓         | ✓         | ✓         | ✓         |
|                  | -40 ~ +85 | X         | X         | X         | ASK       | ASK       | ✓         |

✓ = available, x = not available, ASK = call Technical Sales

### OUTLINES AND DIMENSIONS



### VEM64K VOLTAGE CONTROL SPECIFICATION

|                  |                                                                    |
|------------------|--------------------------------------------------------------------|
| Control Voltage: | $\pm 5$ to $\pm 12\text{ppm}$ for $+1.5 \pm 1.5$ Volts             |
| Slope Polarity:  | Positive (increase of control voltage increases output frequency.) |
| Linearity:       | 6% typical, 10% maximum                                            |

### SSB PHASE NOISE at 25°C

| Offset                                | 100Hz | 1kHz | 10kHz | 100kHz | 1MHz |
|---------------------------------------|-------|------|-------|--------|------|
| Part = VEM64K30 at 13.000MHz (dBc/Hz) | -80   | -110 | -130  | -135   | -142 |

### PART NUMBER FORMAT

Example:

**EM64K33-20.000-2.5/-30+75**

Series Description

TCXO = EM64K

VCTCXO = VEM64K

Supply Voltage

28=2.8V, 30=3.0V, 33=3.3VDC

Frequency (MHz)

Stability over OTR ( $\pm$ ppm)

Operating Temperature Range (OTR)

Lower and upper limits (°C)