

# EB52E8E3V-12.800M

[Click part number to visit Part Number Details page](#)

## REGULATORY COMPLIANCE (Data Sheet downloaded on Oct 23, 2016)


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## ITEM DESCRIPTION

Temperature Compensated Quartz Crystal Clock Oscillators TCXO (TCVCXO) LVC MOS (CMOS) 3.3Vdc 10 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD) 12.800MHz  $\pm 1.0$ ppm Maximum -40°C to +85°C

## ELECTRICAL SPECIFICATIONS

|                                       |                                                                                                                                                       |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                     | 12.800MHz                                                                                                                                             |
| Frequency Tolerance                   | $\pm 1.0$ ppm Maximum (Measured at 25°C $\pm 2^\circ\text{C}$ , at Vdd=3.3Vdc and Vc=1.65Vdc)                                                         |
| Frequency Stability                   | $\pm 1.0$ ppm Maximum (Inclusive of Operating Temperature Range. Measured at Vdd=3.3Vdc and Vc=1.65Vdc)                                               |
| Frequency Stability vs. Input Voltage | $\pm 0.3$ ppm Maximum ( $\pm 5\%$ )                                                                                                                   |
| Frequency Stability vs. Load          | $\pm 0.3$ ppm Maximum ( $\pm 10\%$ )                                                                                                                  |
| Frequency Stability vs. Aging         | $\pm 1$ ppm/year Maximum (at 25°C)                                                                                                                    |
| Operating Temperature Range           | -40°C to +85°C                                                                                                                                        |
| Supply Voltage                        | 3.3Vdc $\pm 5\%$                                                                                                                                      |
| Input Current                         | 10mA Maximum                                                                                                                                          |
| Output Voltage Logic High (Voh)       | 90% of Vdd Minimum (IOH = -4mA)                                                                                                                       |
| Output Voltage Logic Low (Vol)        | 10% of Vdd Maximum (IOL = +4mA)                                                                                                                       |
| Rise/Fall Time                        | 5nSec Maximum (Measured at 20% to 80% of Waveform)                                                                                                    |
| Duty Cycle                            | 50 $\pm 5\%$ (Measured at 50% of Waveform)                                                                                                            |
| Load Drive Capability                 | 15pF Maximum                                                                                                                                          |
| Output Logic Type                     | CMOS                                                                                                                                                  |
| Control Voltage                       | 1.65Vdc $\pm 1.65$ Vdc                                                                                                                                |
| Control Voltage Range                 | 0.0Vdc to Vdd                                                                                                                                         |
| Frequency Deviation                   | $\pm 5$ ppm Minimum                                                                                                                                   |
| Linearity                             | 5% Maximum                                                                                                                                            |
| Transfer Function                     | Positive Transfer Characteristic                                                                                                                      |
| Input Impedance                       | 100kOhms Minimum                                                                                                                                      |
| Phase Noise                           | -80dBc/Hz at 10Hz Offset, -115dBc/Hz at 100Hz Offset, -135dBc/Hz at 1kHz Offset, and -145dBc/Hz at $\geq 10$ kHz Offset (Typical Values at 12.800MHz) |
| Tri-State Input Voltage (Vih and Vil) | +0.9Vdd Minimum to Enable Output; +0.1Vdd Maximum to Disable Output (High Impedance); No Connect to Enable Output                                     |
| RMS Phase Jitter                      | 1pSec Maximum (Fj = 12kHz to 20MHz)                                                                                                                   |
| Start Up Time                         | 10mSec Maximum                                                                                                                                        |
| Storage Temperature Range             | -40°C to +125°C                                                                                                                                       |

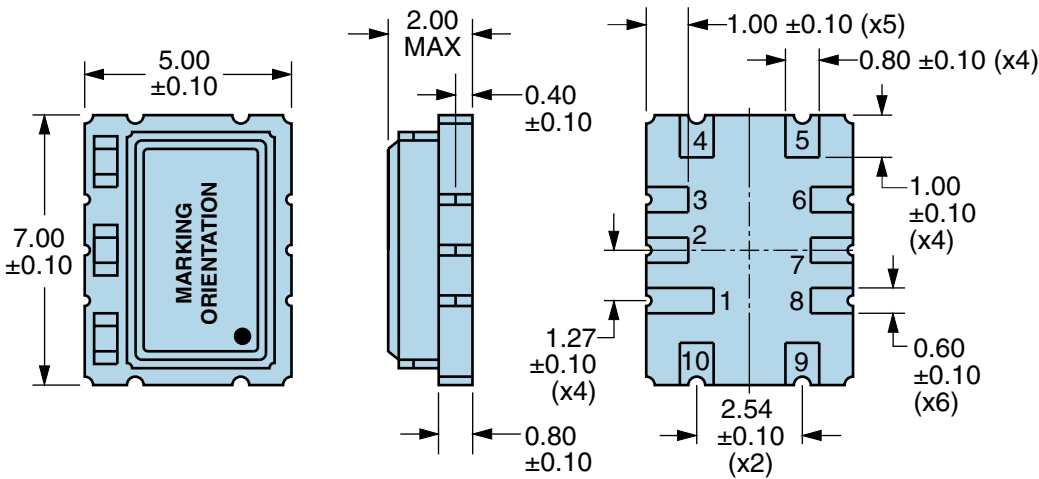
## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                              |                                      |
|------------------------------|--------------------------------------|
| Fine Leak Test               | MIL-STD-883, Method 1014 Condition A |
| Gross Leak Test              | MIL-STD-883, Method 1014 Condition C |
| Mechanical Shock             | MIL-STD-202, Method 213 Condition C  |
| Resistance to Soldering Heat | MIL-STD-202, Method 210              |
| Resistance to Solvents       | MIL-STD-202, Method 215              |
| Solderability                | MIL-STD-883, Method 2003             |
| Temperature Cycling          | MIL-STD-883, Method 1010             |
| Vibration                    | MIL-STD-883, Method 2007 Condition A |

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[Click part number to visit Part Number Details page](#)

MECHANICAL DIMENSIONS (all dimensions in millimeters)

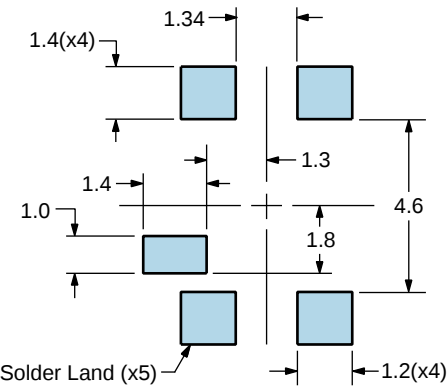


| PIN | CONNECTION      |
|-----|-----------------|
| 1   | Do Not Connect  |
| 2   | Do Not Connect  |
| 3   | Do Not Connect  |
| 4   | Ground          |
| 5   | Output          |
| 6   | Do Not Connect  |
| 7   | Do Not Connect  |
| 8   | Tri-State       |
| 9   | Supply Voltage  |
| 10  | Voltage Control |

| LINE | MARKING                                                                                                        |
|------|----------------------------------------------------------------------------------------------------------------|
| 1    | <b>EXX.XXX</b><br><i>E=Ecliptek Designator<br/>XX.XXX=Nominal<br/>Frequency in MHz</i>                         |
| 2    | <b>XXYYZ</b><br><i>XX=Ecliptek Manufacturing<br/>Code<br/>Y=Last Digit of the Year<br/>ZZ=Week of the Year</i> |

Suggested Solder Pad Layout

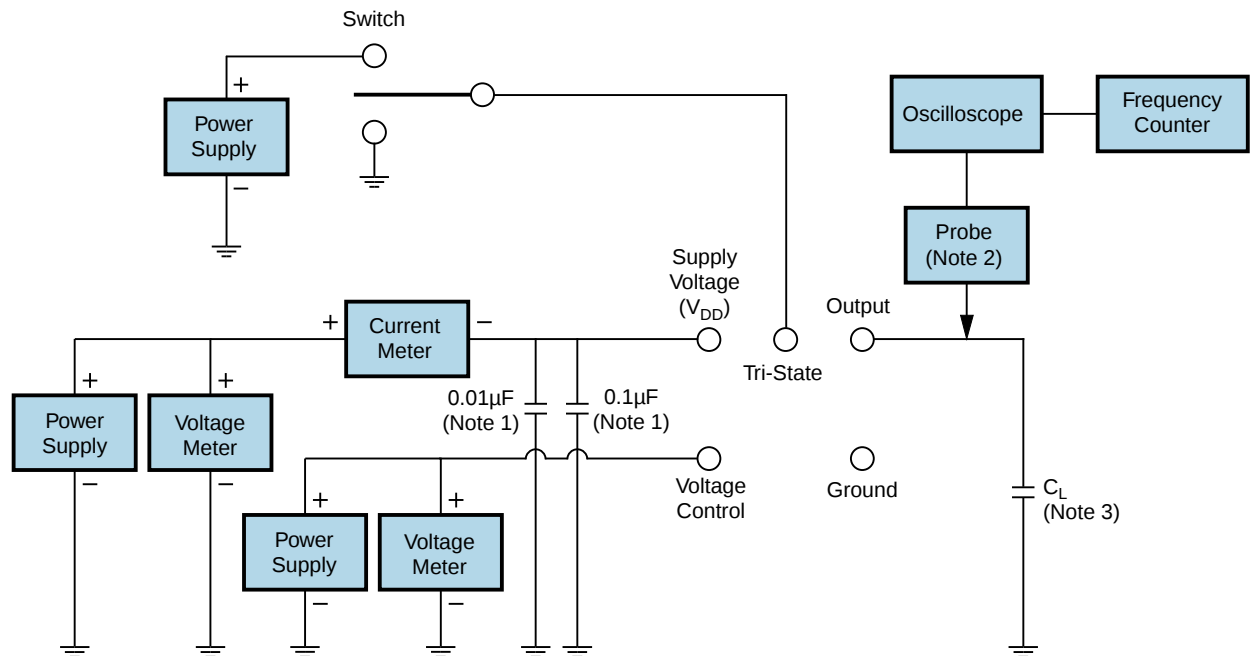
All Dimensions in Millimeters



All Tolerances are ±0.1

OUTPUT WAVEFORM & TIMING DIAGRAM



**EB52E8E3V-12.800M**
[Click part number to visit Part Number Details page](#)
**Test Circuit for CMOS Output**

Note 1: An external  $0.1\mu\text{F}$  low frequency tantalum bypass capacitor in parallel with a  $0.01\mu\text{F}$  high frequency ceramic bypass capacitor close to the package ground and  $V_{DD}$  pin is required.

Note 2: A low capacitance ( $<12\text{pF}$ ), 10X attenuation factor, high impedance ( $>10\text{Mohms}$ ), and high bandwidth ( $>300\text{MHz}$ ) passive probe is recommended.

Note 3: Capacitance value  $C_L$  includes sum of all probe and fixture capacitance.

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[Click part number to visit Part Number Details page](#)

## Recommended Solder Reflow Methods



## Low Temperature Infrared/Convection 230°C

|                                                     |                    |
|-----------------------------------------------------|--------------------|
| T <sub>S</sub> MAX to T <sub>L</sub> (Ramp-up Rate) | 5°C/Second Maximum |
|-----------------------------------------------------|--------------------|

### Preheat

|                                            |                 |
|--------------------------------------------|-----------------|
| - Temperature Minimum (T <sub>S</sub> MIN) | N/A             |
| - Temperature Typical (T <sub>S</sub> TYP) | 150°C           |
| - Temperature Maximum (T <sub>S</sub> MAX) | N/A             |
| - Time (t <sub>S</sub> MIN)                | 30 - 60 Seconds |

|                                                  |                    |
|--------------------------------------------------|--------------------|
| Ramp-up Rate (T <sub>L</sub> to T <sub>P</sub> ) | 5°C/Second Maximum |
|--------------------------------------------------|--------------------|

### Time Maintained Above:

|                                 |                     |
|---------------------------------|---------------------|
| - Temperature (T <sub>L</sub> ) | 150°C               |
| - Time (t <sub>L</sub> )        | 200 Seconds Maximum |

|                                    |               |
|------------------------------------|---------------|
| Peak Temperature (T <sub>P</sub> ) | 230°C Maximum |
|------------------------------------|---------------|

|                                                 |                       |
|-------------------------------------------------|-----------------------|
| Target Peak Temperature (T <sub>P</sub> Target) | 230°C Maximum 2 Times |
|-------------------------------------------------|-----------------------|

|                                                  |                            |
|--------------------------------------------------|----------------------------|
| Time within 5°C of actual peak (t <sub>P</sub> ) | 10 Seconds Maximum 2 Times |
|--------------------------------------------------|----------------------------|

|                |                    |
|----------------|--------------------|
| Ramp-down Rate | 5°C/Second Maximum |
|----------------|--------------------|

|                                   |     |
|-----------------------------------|-----|
| Time 25°C to Peak Temperature (t) | N/A |
|-----------------------------------|-----|

|                            |         |
|----------------------------|---------|
| Moisture Sensitivity Level | Level 1 |
|----------------------------|---------|

|                  |                                                   |
|------------------|---------------------------------------------------|
| Additional Notes | Temperatures shown are applied to body of device. |
|------------------|---------------------------------------------------|

## Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperatures listed are applied to body of device.)

## High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures listed are applied to body of device.)