

# EB13E2E2H-8.000M TR [Click part number to visit Part Number Details page](#)

## REGULATORY COMPLIANCE (Data Sheet downloaded on Dec 4, 2018)



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## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 4 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD) 8.000MHz  $\pm 25$ ppm over -20°C to +70°C

## ELECTRICAL SPECIFICATIONS

|                                       |  |
|---------------------------------------|--|
| Nominal Frequency                     | 8.000MHz   |
| Frequency Tolerance/Stability         | $\pm 25$ ppm Maximum over -20°C to +70°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration) |
| Supply Voltage                        | 3.3Vdc $\pm 5\%$   |
| Input Current                         | 3mA 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   |
| Pin 1 Connection                      | Tri-State (High Impedance)   |
| Tri-State Input Voltage (Vih and Vil) | 80% of Vdd Minimum or No Connect to Enable Output, 20% of Vdd Maximum to Disable Output (High Impedance)   |
| Standby Current                       | 10 $\mu$ A Maximum (Disabled Output: High Impedance)   |
| RMS Phase Jitter                      | 1pSec Maximum (Fj = 12kHz to 20MHz)  |
| Start Up Time                         | 10mSec Maximum   |
| Storage Temperature Range             | -55°C to +125°C  |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                              |   |
|------------------------------|---|
| ESD Susceptibility           | MIL-STD-883, Method 3015, Class 1, HBM: 1500V |
| Fine Leak Test               | MIL-STD-883, Method 1014, Condition A         |
| Flammability                 | UL94-V0                                       |
| Gross Leak Test              | MIL-STD-883, Method 1014, Condition C         |
| Mechanical Shock             | MIL-STD-883, Method 2002, Condition B         |
| Moisture Resistance          | MIL-STD-883, Method 1004                      |
| Moisture Sensitivity         | J-STD-020, MSL 1                              |
| Resistance to Soldering Heat | MIL-STD-202, Method 210, Condition K          |
| Resistance to Solvents       | MIL-STD-202, Method 215                       |
| Solderability                | MIL-STD-883, Method 2003                      |
| Temperature Cycling          | MIL-STD-883, Method 1010, Condition B         |
| Vibration                    | MIL-STD-883, Method 2007, Condition A         |

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### MECHANICAL DIMENSIONS (all dimensions in millimeters)



| PIN | CONNECTION     |
|-----|----------------|
| 1   | Tri-State      |
| 2   | Case/Ground    |
| 3   | Output         |
| 4   | Supply Voltage |

| LINE | MARKING   |
|------|---|
| 1    | <b>E8.00</b><br>E=Ecliptek Designator                   |
| 2    | <b>XXXXX</b><br>XXXXX=Ecliptek Manufacturing Identifier |

### Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are  $\pm 0.1$

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## OUTPUT WAVEFORM & TIMING DIAGRAM



**EB13E2E2H-8.000M TR** [Click part number to visit Part Number Details page](#)
**Test Circuit for CMOS Output**


Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

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

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

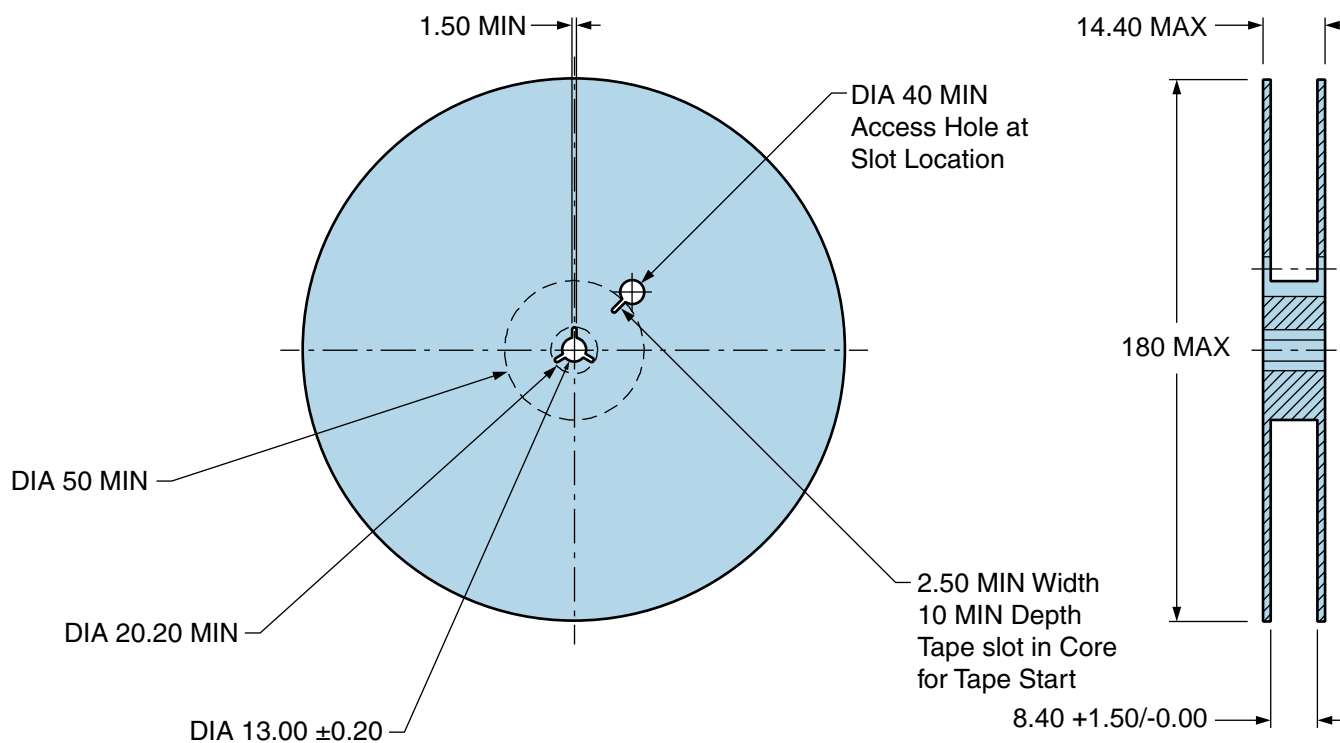
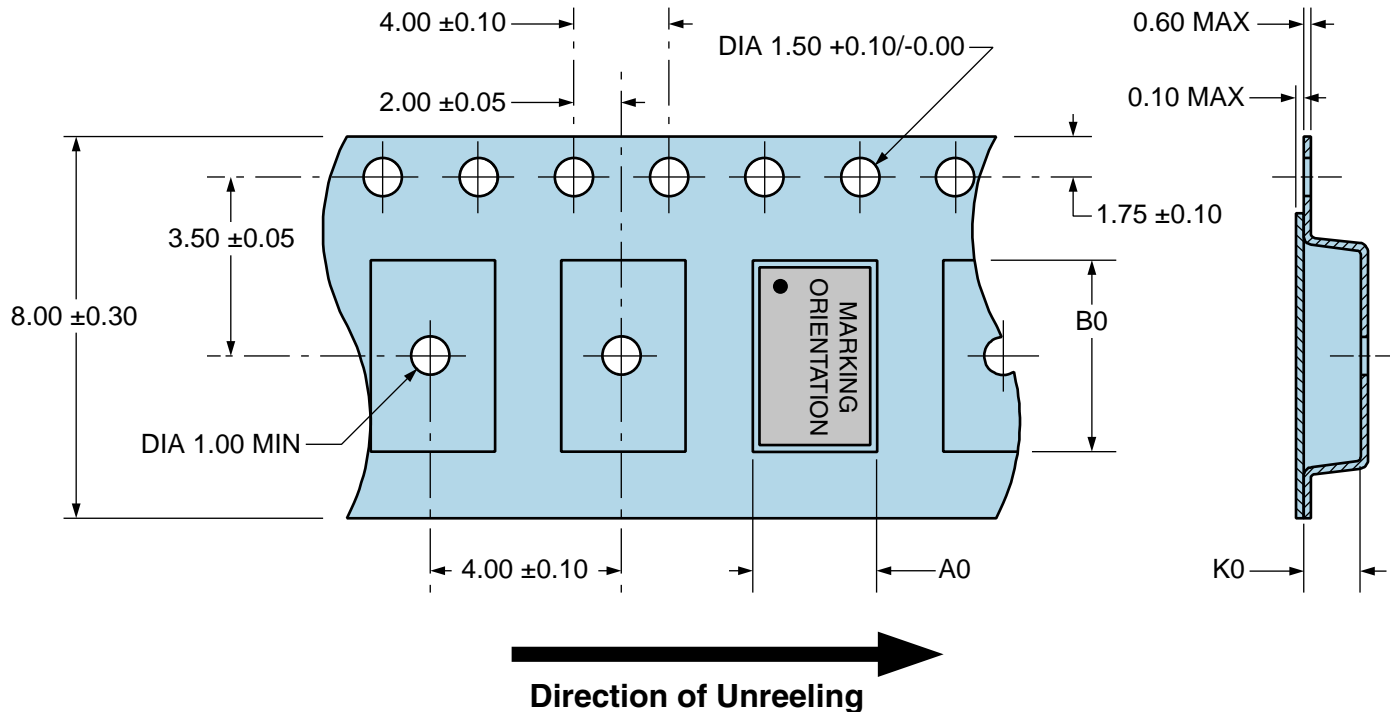
# EB13E2E2H-8.000M TR

## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



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## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|                                    |                    |
|------------------------------------|--------------------|
| <b>Ts MAX to TL (Ramp-up Rate)</b> | 3°C/Second Maximum |
|------------------------------------|--------------------|

#### Preheat

|                                |                  |
|--------------------------------|------------------|
| - Temperature Minimum (Ts MIN) | 150°C            |
| - Temperature Typical (Ts TYP) | 175°C            |
| - Temperature Maximum (Ts MAX) | 200°C            |
| - Time (ts MIN)                | 60 - 180 Seconds |

|                                |                    |
|--------------------------------|--------------------|
| <b>Ramp-up Rate (TL to TP)</b> | 3°C/Second Maximum |
|--------------------------------|--------------------|

#### Time Maintained Above:

|                    |                  |
|--------------------|------------------|
| - Temperature (TL) | 217°C            |
| - Time (tL)        | 60 - 150 Seconds |

|                              |                                      |
|------------------------------|--------------------------------------|
| <b>Peak Temperature (TP)</b> | 260°C Maximum for 10 Seconds Maximum |
|------------------------------|--------------------------------------|

|  |               |
|--|---------------|
| <b>Target Peak Temperature (TP Target)</b> | 250°C +0/-5°C |
|--|---------------|

|  |                 |
|--|-----------------|
| <b>Time within 5°C of actual peak (tp)</b> | 20 - 40 Seconds |
|--|-----------------|

|                       |                    |
|-----------------------|--------------------|
| <b>Ramp-down Rate</b> | 6°C/Second Maximum |
|-----------------------|--------------------|

|  |                   |
|--|-------------------|
| <b>Time 25°C to Peak Temperature (t)</b> | 8 Minutes Maximum |
|--|-------------------|

|                                   |         |
|-----------------------------------|---------|
| <b>Moisture Sensitivity Level</b> | Level 1 |
|-----------------------------------|---------|

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## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

|  |  |
|--|--|
| Ts MAX to Tl (Ramp-up Rate)                | 5°C/Second Maximum                                     |
| <b>Preheat</b>                             |  |
| - Temperature Minimum (Ts MIN)             | N/A  |
| - Temperature Typical (Ts TYP)             | 150°C  |
| - Temperature Maximum (Ts MAX)             | N/A  |
| - Time (ts MIN)                            | 60 - 120 Seconds                                       |
| <b>Ramp-up Rate (Tl to Tp)</b>             | 5°C/Second Maximum                                     |
| <b>Time Maintained Above:</b>              |  |
| - Temperature (Tl)                         | 150°C  |
| - Time (tL)                                | 200 Seconds Maximum                                    |
| <b>Peak Temperature (Tp)</b>               | 240°C Maximum  |
| <b>Target Peak Temperature (Tp Target)</b> | 240°C Maximum 2 Times / 230°C Maximum 1 Time           |
| <b>Time within 5°C of actual peak (tp)</b> | 10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time |
| <b>Ramp-down Rate</b>                      | 5°C/Second Maximum                                     |
| <b>Time 25°C to Peak Temperature (t)</b>   | N/A  |
| <b>Moisture Sensitivity Level</b>          | Level 1  |

### Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum.

### High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum.

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