

# EH4620TTS-110.000M TR [Click part number to visit Part Number Details page](#)

## REGULATORY COMPLIANCE (Data Sheet downloaded on Jan 2, 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) 110.000MHz ±20ppm 0°C to +70°C

## ELECTRICAL SPECIFICATIONS

|                                       |   |
|---------------------------------------|---|
| Nominal Frequency                     | 110.000MHz  |
| Frequency Tolerance/Stability         | ±20ppm Maximum (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°, 260°C Reflow, Shock, and Vibration) |
| Aging at 25°C                         | ±5ppm/Year Maximum  |
| Operating Temperature Range           | 0°C to +70°C  |
| Supply Voltage                        | 3.3Vdc ±5%  |
| Input Current                         | 13mA Maximum (No Load)  |
| Output Voltage Logic High (Voh)       | 90% of Vdd Minimum (IOH = -8mA)   |
| Output Voltage Logic Low (Vol)        | 10% of Vdd Maximum (IOL = +8mA)   |
| Rise/Fall Time                        | 2nSec Maximum (Measured at 20% to 80% of waveform)  |
| Duty Cycle                            | 50 ±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) | 90% of Vdd Minimum or No Connect to Enable Output, 10% of Vdd Maximum to Disable Output (High Impedance)  |
| Standby Current                       | 10µA Maximum (Pin 1 = Ground)   |
| RMS Phase Jitter                      | 20pSec Typical, 30pSec Maximum (Fj = 12kHz to 20MHz)  |
| Period Jitter (RMS)                   | 10pSec Typical  |
| Period Jitter (pk-pk)                 | 60pSec Typical, 100pSec Maximum   |
| 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: 1500Vdc |
| 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>E110.00</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



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## 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.

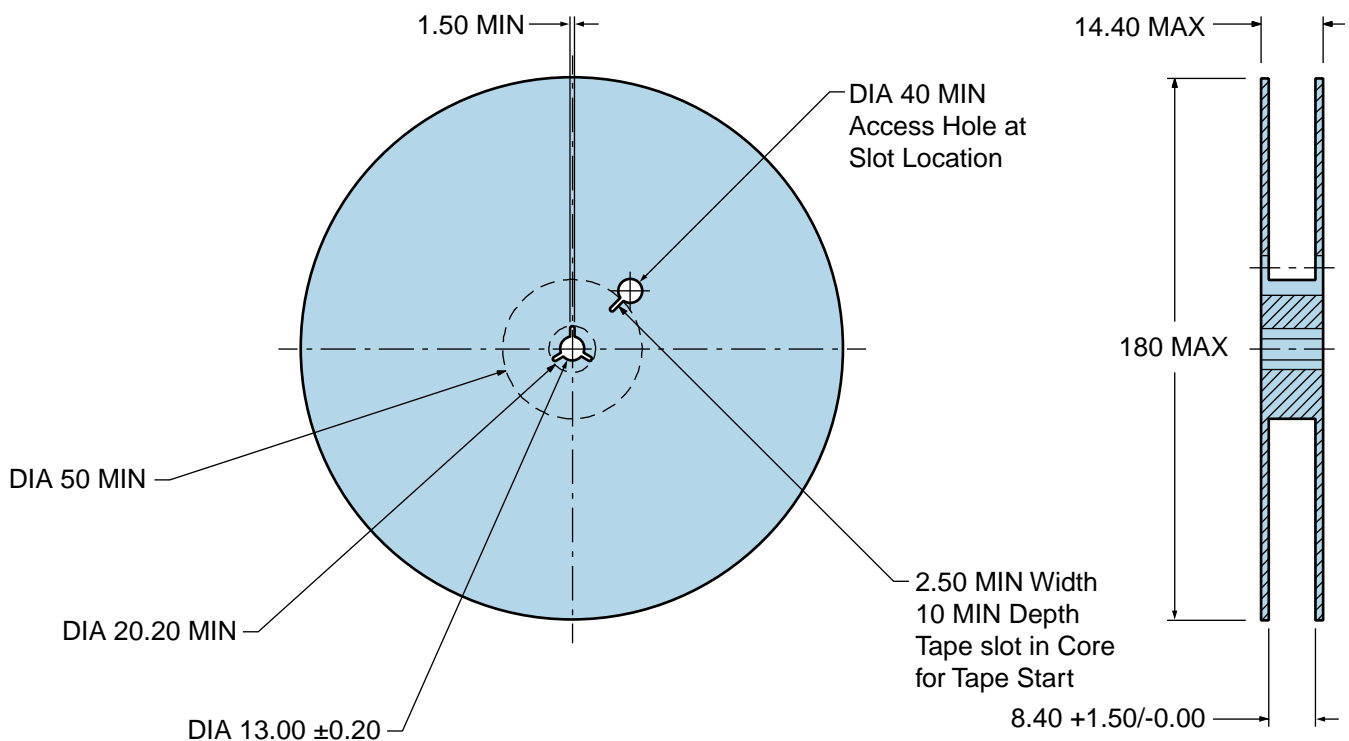
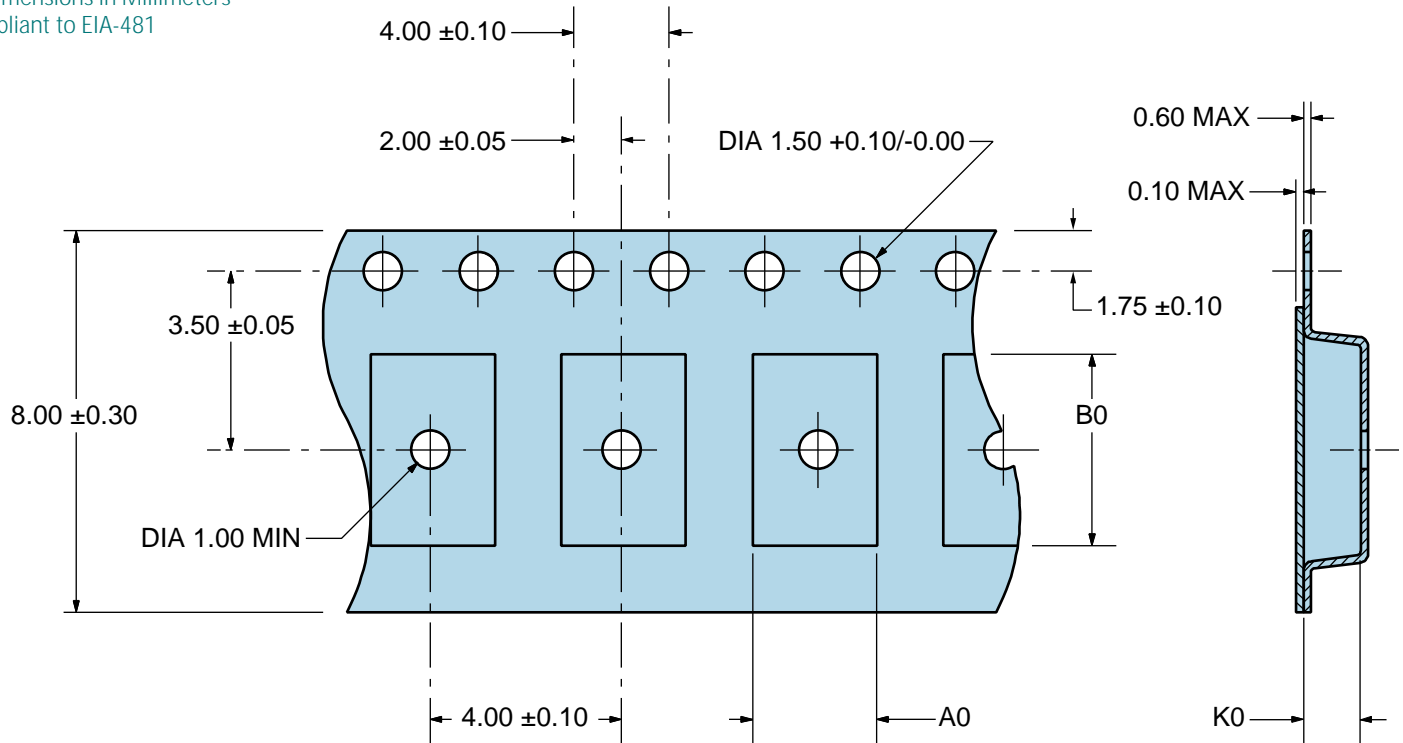
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## Tape & Reel Dimensions

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><math>T_s \text{ MAX}</math> to <math>T_L</math> (Ramp-up Rate)</b> | 3°C/Second Maximum                                |
| <b>Preheat</b>   |   |
| - Temperature Minimum ( $T_s \text{ MIN}$ )                            | 150°C   |
| - Temperature Typical ( $T_s \text{ TYP}$ )                            | 175°C   |
| - Temperature Maximum ( $T_s \text{ MAX}$ )                            | 200°C   |
| - Time ( $t_s \text{ MIN}$ )   | 60 - 180 Seconds                                  |
| <b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>             | 3°C/Second Maximum                                |
| <b>Time Maintained Above:</b>  |   |
| - Temperature ( $T_L$ )  | 217°C   |
| - Time ( $t_L$ )   | 60 - 150 Seconds                                  |
| <b>Peak Temperature (<math>T_P</math>)</b>                             | 260°C Maximum for 10 Seconds Maximum              |
| <b>Target Peak Temperature (<math>T_P \text{ Target}</math>)</b>       | 250°C +0/-5°C                                     |
| <b>Time within 5°C of actual peak (<math>t_p</math>)</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   |
| <b>Additional Notes</b>  | Temperatures shown are applied to body of device. |

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## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

|  |  |
|--|--|
| $T_s$ MAX to $T_L$ (Ramp-up Rate)                          | 5°C/Second Maximum                                     |
| <b>Preheat</b>   |  |
| - Temperature Minimum ( $T_s$ MIN)                         | N/A  |
| - Temperature Typical ( $T_s$ TYP)                         | 150°C  |
| - Temperature Maximum ( $T_s$ MAX)                         | N/A  |
| - Time ( $t_s$ MIN)  | 60 - 120 Seconds                                       |
| <b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b> | 5°C/Second Maximum                                     |
| <b>Time Maintained Above:</b>                              |  |
| - Temperature ( $T_L$ )                                    | 150°C  |
| - Time ( $t_L$ )   | 200 Seconds Maximum                                    |
| <b>Peak Temperature (<math>T_P</math>)</b>                 | 240°C Maximum  |
| <b>Target Peak Temperature (<math>T_P</math> Target)</b>   | 240°C Maximum 2 Times / 230°C Maximum 1 Time           |
| <b>Time within 5°C of actual peak (<math>t_p</math>)</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  |
| <b>Additional Notes</b>                                    | Temperatures shown are applied to body of device.      |

### Low Temperature Manual Soldering

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

### High Temperature Manual Soldering

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