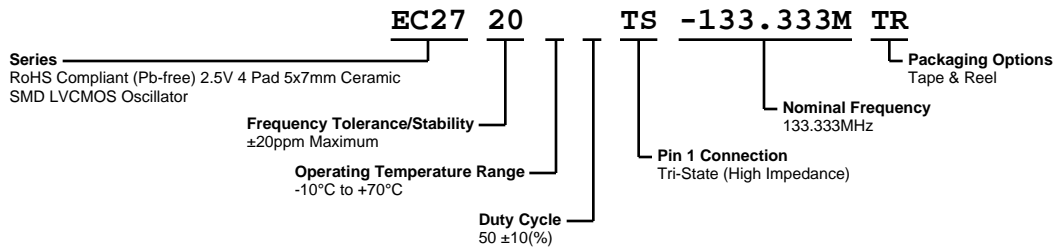


# EC2720TS-133.333M TR



## ELECTRICAL SPECIFICATIONS

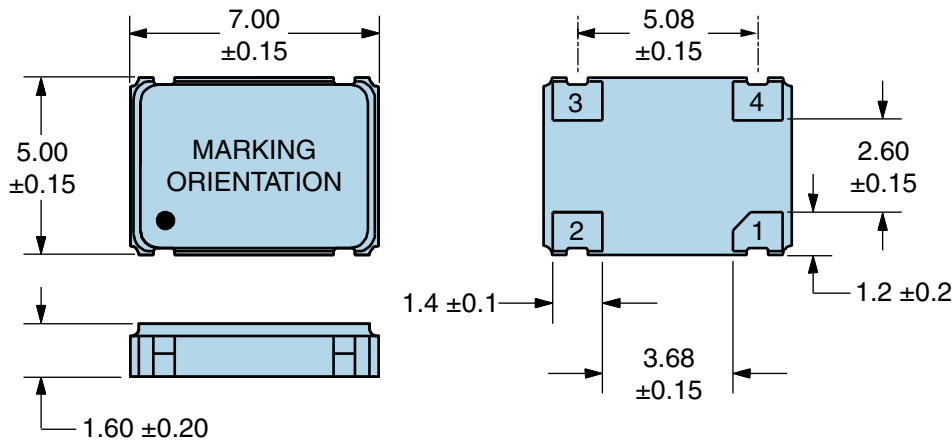
|                                       |  |
|---------------------------------------|--|
| Nominal Frequency                     | 133.333MHz   |
| Frequency Tolerance/Stability         | $\pm 20$ ppm Maximum (Inclusive of all conditions: Calibration Tolerance at $25^{\circ}\text{C}$ , Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at $25^{\circ}\text{C}$ , Shock, and Vibration) |
| Aging at $25^{\circ}\text{C}$         | $\pm 5$ ppm/year Maximum   |
| Operating Temperature Range           | $-10^{\circ}\text{C}$ to $+70^{\circ}\text{C}$   |
| Supply Voltage                        | 2.5Vdc $\pm 5\%$   |
| Input Current                         | 45mA 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                        | 2nSec Maximum (Measured at 20% to 80% of waveform)   |
| Duty Cycle                            | $50 \pm 10(\%)$ (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                       | 10 $\mu$ A Maximum (Disabled Output, High Impedance)   |
| RMS Phase Jitter                      | 1pSec Maximum (12kHz to 20MHz offset frequency)  |
| Start Up Time                         | 10mSec Maximum   |
| Storage Temperature Range             | $-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$  |

## 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   | Ground/Case Ground |
| 3   | Output             |
| 4   | Supply Voltage     |

| LINE | MARKING   |
|------|---|
| 1    | <b>ECLIPTEK</b>   |
| 2    | <b>133.33M</b>  |
| 3    | <b>XXYYZ</b><br>XX=Ecliptek Manufacturing Code<br>Y=Last Digit of the Year<br>ZZ=Week of the Year |

## Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are  $\pm 0.1$

# EC2720TS-133.333M TR

## OUTPUT WAVEFORM & TIMING DIAGRAM



### Test Circuit for CMOS Output



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

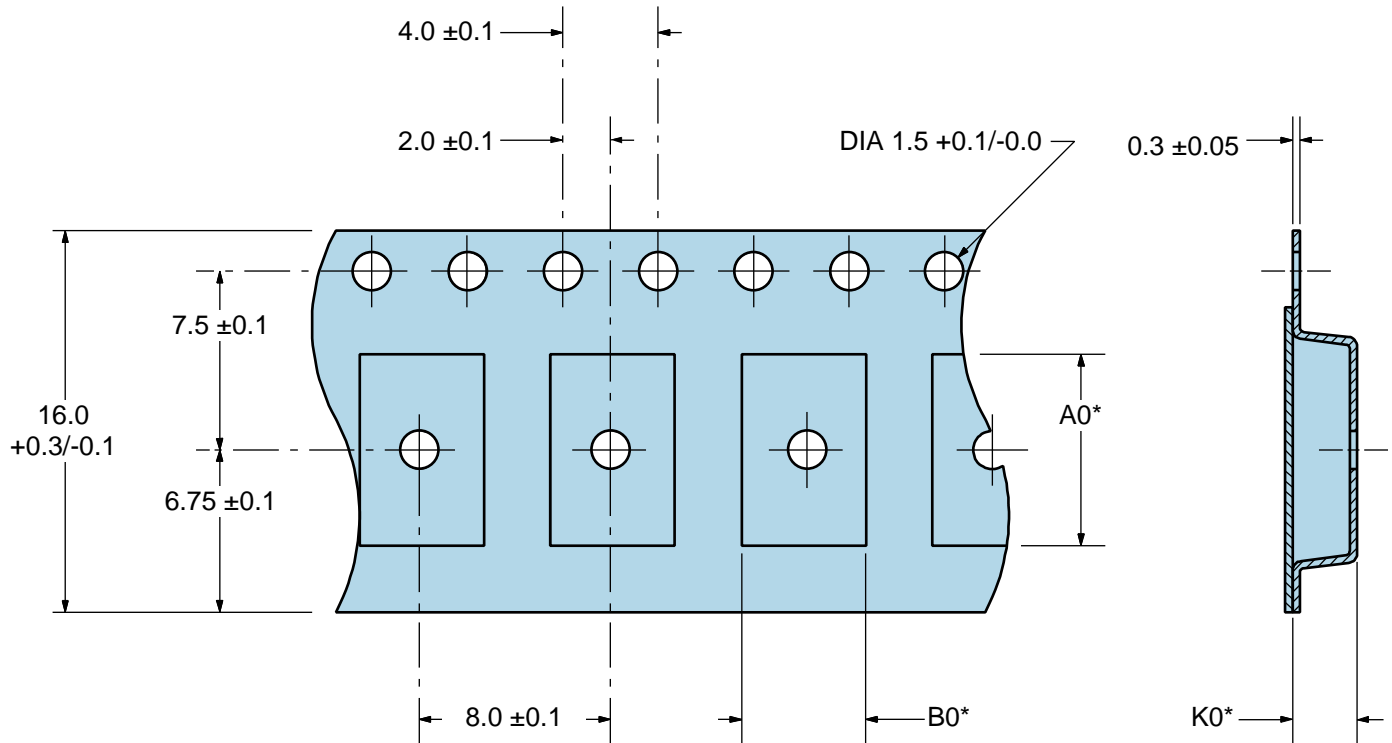
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.

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

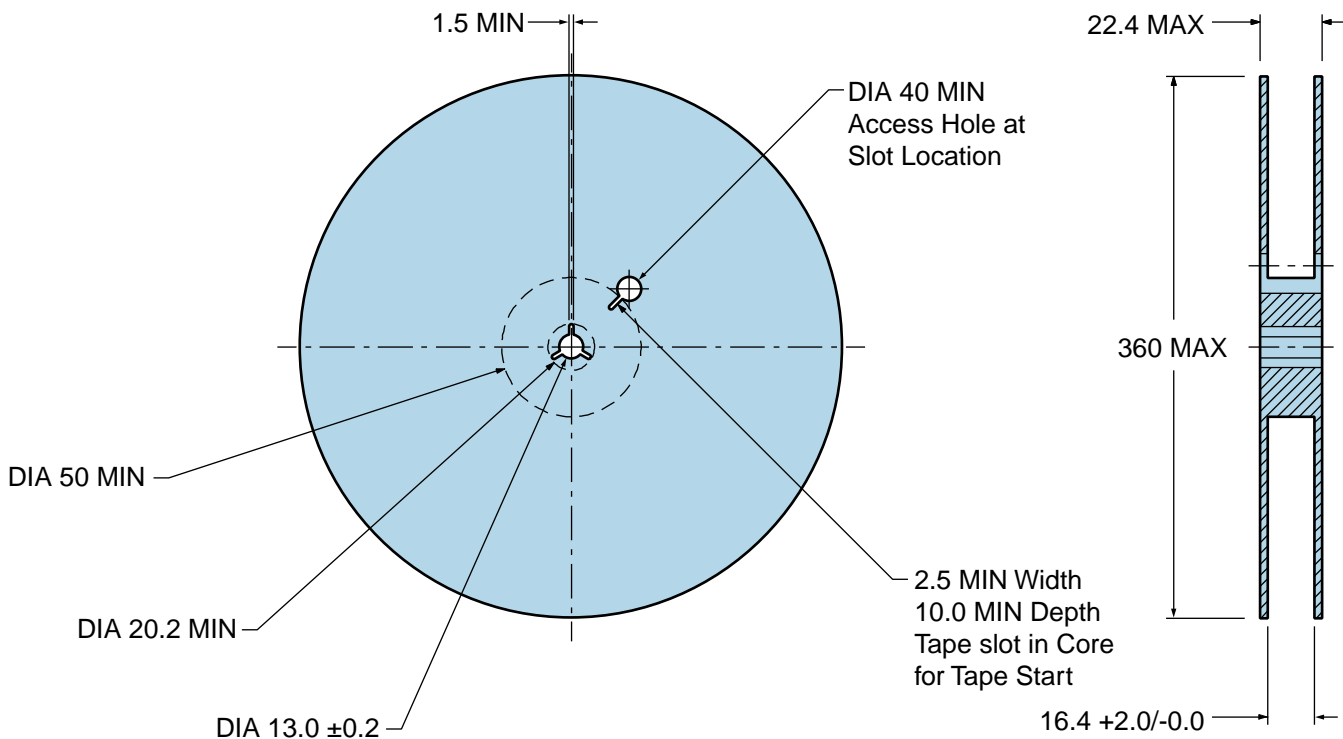
# EC2720TS-133.333M TR

## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units



\*Compliant to EIA 481A



## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|  |   |
|--|---|
| <b><math>T_S</math> MAX to <math>T_L</math> (Ramp-up Rate)</b> | 3°C/second Maximum                                |
| <b>Preheat</b>   |   |
| - Temperature Minimum ( $T_S$ MIN)                             | 150°C   |
| - Temperature Typical ( $T_S$ TYP)                             | 175°C   |
| - Temperature Maximum ( $T_S$ MAX)                             | 200°C   |
| - Time ( $t_s$ 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</math> Target)</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. |

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

|  |  |
|--|--|
| <b>T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)</b> | 5°C/second Maximum                                     |
| <b>Preheat</b>   |  |
| - 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)                              | 60 - 120 Seconds                                       |
| <b>Ramp-up Rate (T<sub>L</sub> to T<sub>p</sub>)</b>     | 5°C/second Maximum                                     |
| <b>Time Maintained Above:</b>                            |  |
| - Temperature (T <sub>L</sub> )                          | 150°C  |
| - Time (t <sub>L</sub> )                                 | 200 Seconds Maximum                                    |
| <b>Peak Temperature (T<sub>p</sub>)</b>                  | 240°C Maximum  |
| <b>Target Peak Temperature (T<sub>p</sub> Target)</b>    | 240°C Maximum 1 Time / 230°C Maximum 2 Times           |
| <b>Time within 5°C of actual peak (t<sub>p</sub>)</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.)