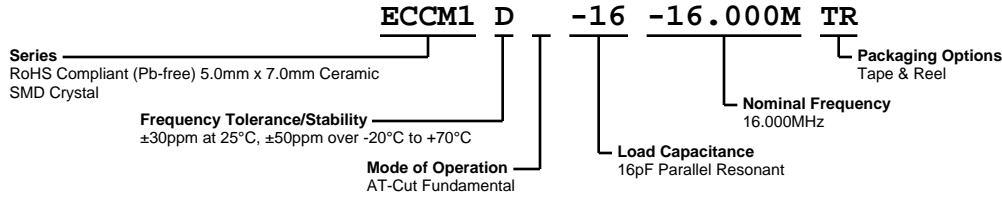


# ECCM1D-16-16.000M TR



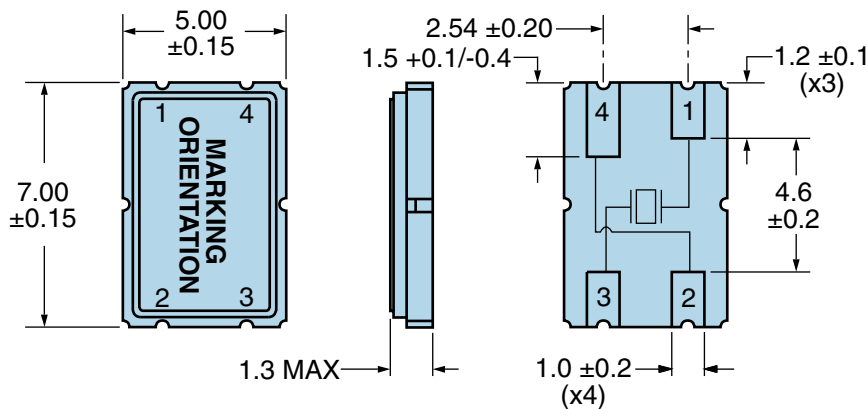
## ELECTRICAL SPECIFICATIONS

|                               |  |
|-------------------------------|--|
| Nominal Frequency             | 16.000MHz  |
| Frequency Tolerance/Stability | $\pm 30\text{ppm}$ at 25°C, $\pm 50\text{ppm}$ over -20°C to +70°C |
| Aging at 25°C                 | $\pm 3\text{ppm}/\text{year}$ Maximum                              |
| Load Capacitance              | 16pF Parallel Resonant   |
| Shunt Capacitance (C0)        | 7pF Maximum  |
| Equivalent Series Resistance  | 30 Ohms Maximum  |
| Mode of Operation             | AT-Cut Fundamental   |
| Drive Level                   | 50µWatts Maximum, 50µWatts Correlation                             |
| Spurious Response             | -3dB Minimum (Measured from Fo to Fo +5000ppm)                     |
| Storage Temperature Range     | -40°C to +85°C   |
| Insulation Resistance         | 500 Megaohms Minimum (Measured at 100Vdc)                          |

## 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         |

## MECHANICAL DIMENSIONS (all dimensions in millimeters)



Note: Chamfer not shown.

| PIN | CONNECTION   |
|-----|--------------|
| 1   | Crystal      |
| 2   | Cover/Ground |
| 3   | Crystal      |
| 4   | Cover/Ground |

| LINE | MARKING   |
|------|---|
| 1    | <b>E16.00</b><br>E=Ecliptek Designator                  |
| 2    | <b>XXXXX</b><br>XXXXX=Ecliptek Manufacturing Identifier |

# ECCM1D-16-16.000M TR

## Suggested Solder Pad Layout

All Dimensions in Millimeters

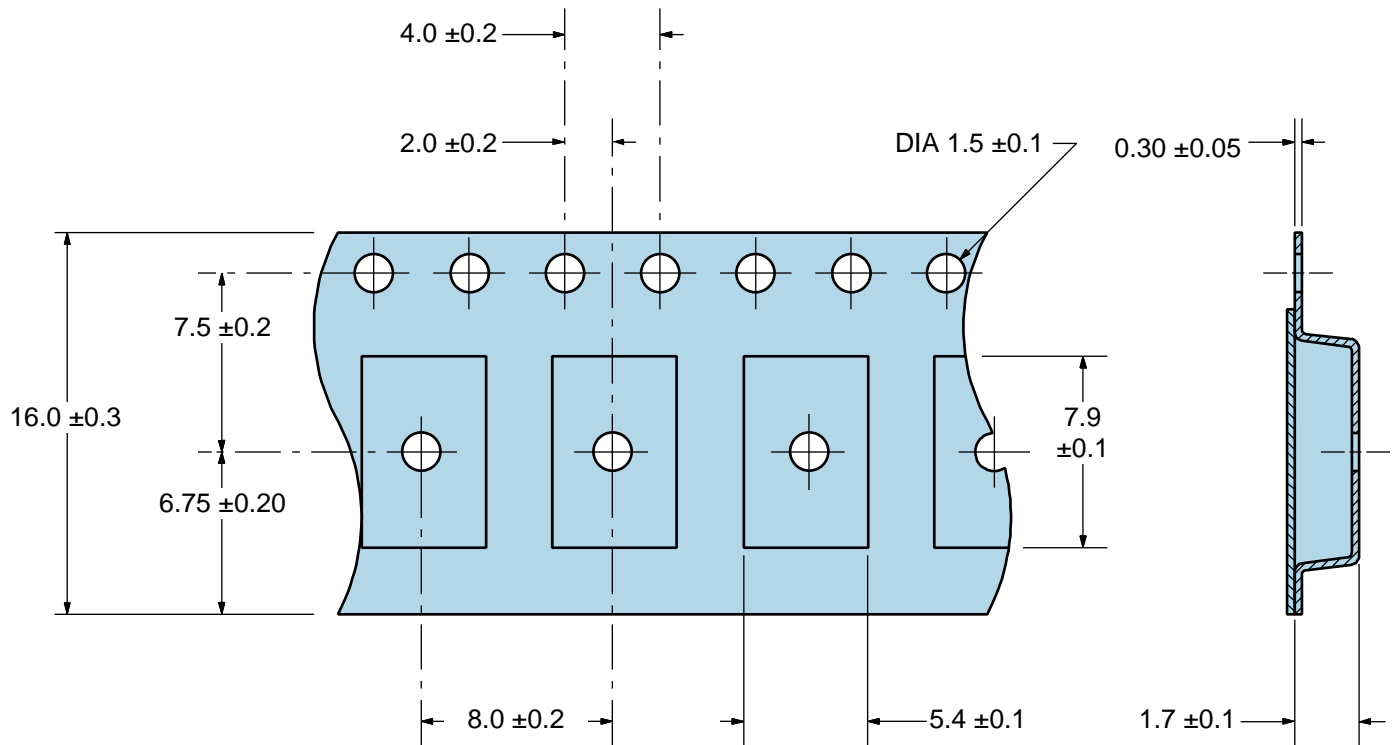


All Tolerances are  $\pm 0.1$

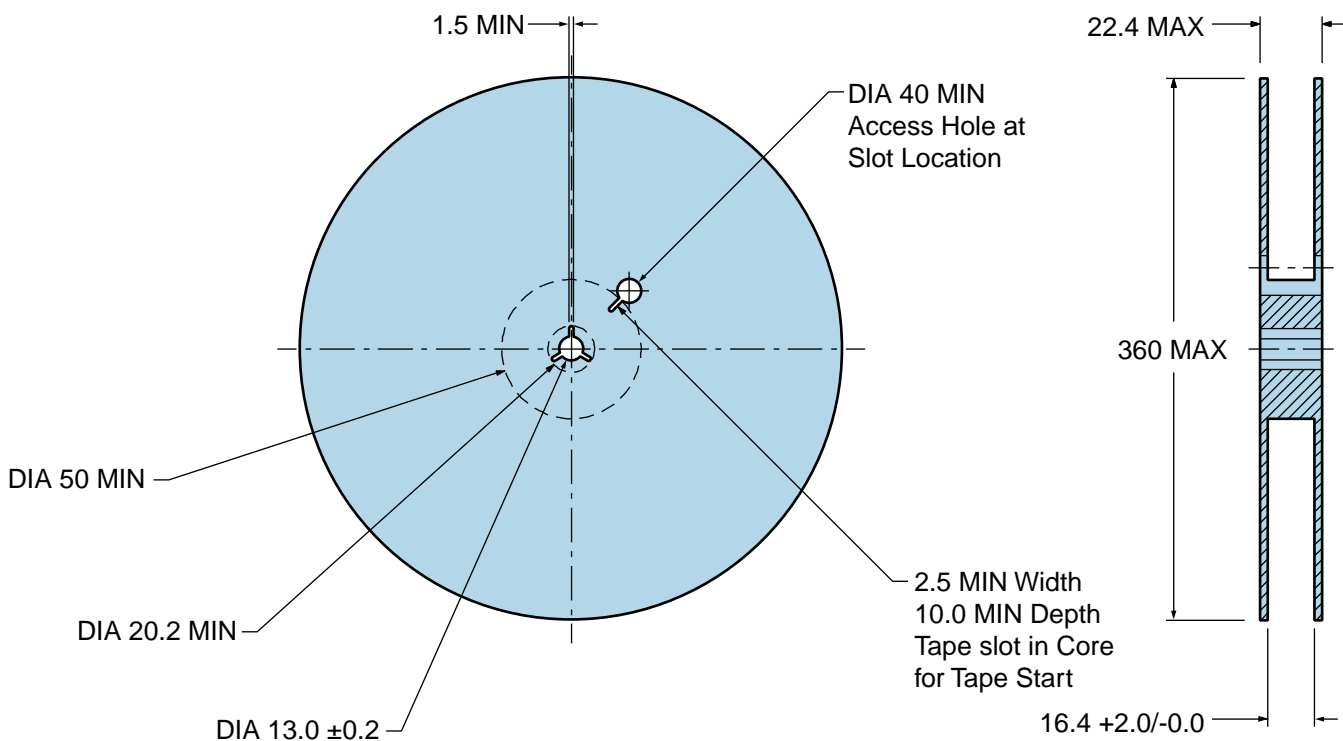
# ECCM1D-16-16.000M TR

## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units



\*Compliant to EIA 481A



## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|  |                                      |
|--|--------------------------------------|
| <b>T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)</b> | 3°C/second Maximum                   |
| <b>Preheat</b>   |                                      |
| - Temperature Minimum (T <sub>s</sub> MIN)               | 150°C                                |
| - Temperature Typical (T <sub>s</sub> TYP)               | 175°C                                |
| - Temperature Maximum (T <sub>s</sub> MAX)               | 200°C                                |
| - Time (t <sub>s</sub> MIN)                              | 60 - 180 Seconds                     |
| <b>Ramp-up Rate (T<sub>L</sub> to T<sub>p</sub>)</b>     | 3°C/second Maximum                   |
| <b>Time Maintained Above:</b>                            |                                      |
| - Temperature (T <sub>L</sub> )                          | 217°C                                |
| - Time (t <sub>L</sub> )                                 | 60 - 150 Seconds                     |
| <b>Peak Temperature (T<sub>p</sub>)</b>                  | 260°C Maximum for 10 Seconds Maximum |
| <b>Target Peak Temperature (T<sub>p</sub> Target)</b>    | 250°C +0/-5°C                        |
| <b>Time within 5°C of actual peak (t<sub>p</sub>)</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                              |

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

|  |  |
|--|--|
| <b><math>T_S</math> MAX to <math>T_L</math> (Ramp-up Rate)</b> | 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 1 Time / 230°C Maximum 2 Times           |
| <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  |

### 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.