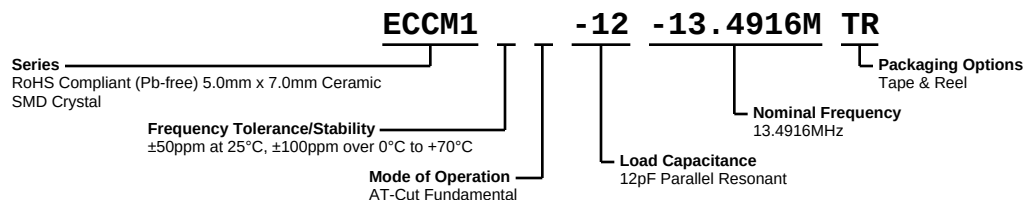


# ECCM1-12-13.4916M TR



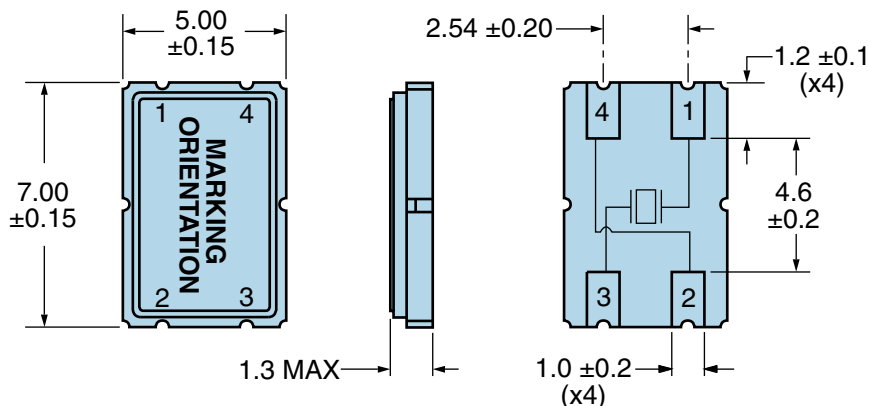
## ELECTRICAL SPECIFICATIONS

|                               |                                                |
|-------------------------------|------------------------------------------------|
| Nominal Frequency             | 13.4916MHz                                     |
| Frequency Tolerance/Stability | ±50ppm at 25°C, ±100ppm over 0°C to +70°C      |
| Aging at 25°C                 | ±3ppm/year Maximum                             |
| Load Capacitance              | 12pF Parallel Resonant                         |
| Shunt Capacitance (C0)        | 7pF Maximum                                    |
| Equivalent Series Resistance  | 50 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 and index mark not shown.

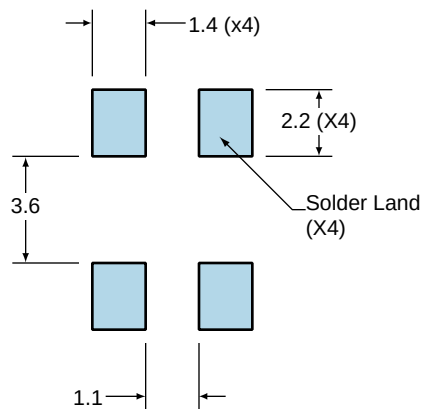
| PIN | CONNECTION   |
|-----|--------------|
| 1   | Crystal      |
| 2   | Cover/Ground |
| 3   | Crystal      |
| 4   | Cover/Ground |

| LINE | MARKING                                                 |
|------|---------------------------------------------------------|
| 1    | <b>E13.49</b><br>E=Ecliptek Designator                  |
| 2    | <b>XXXXX</b><br>XXXXX=Ecliptek Manufacturing Identifier |

# ECCM1-12-13.4916M TR

## Suggested Solder Pad Layout

All Dimensions in Millimeters

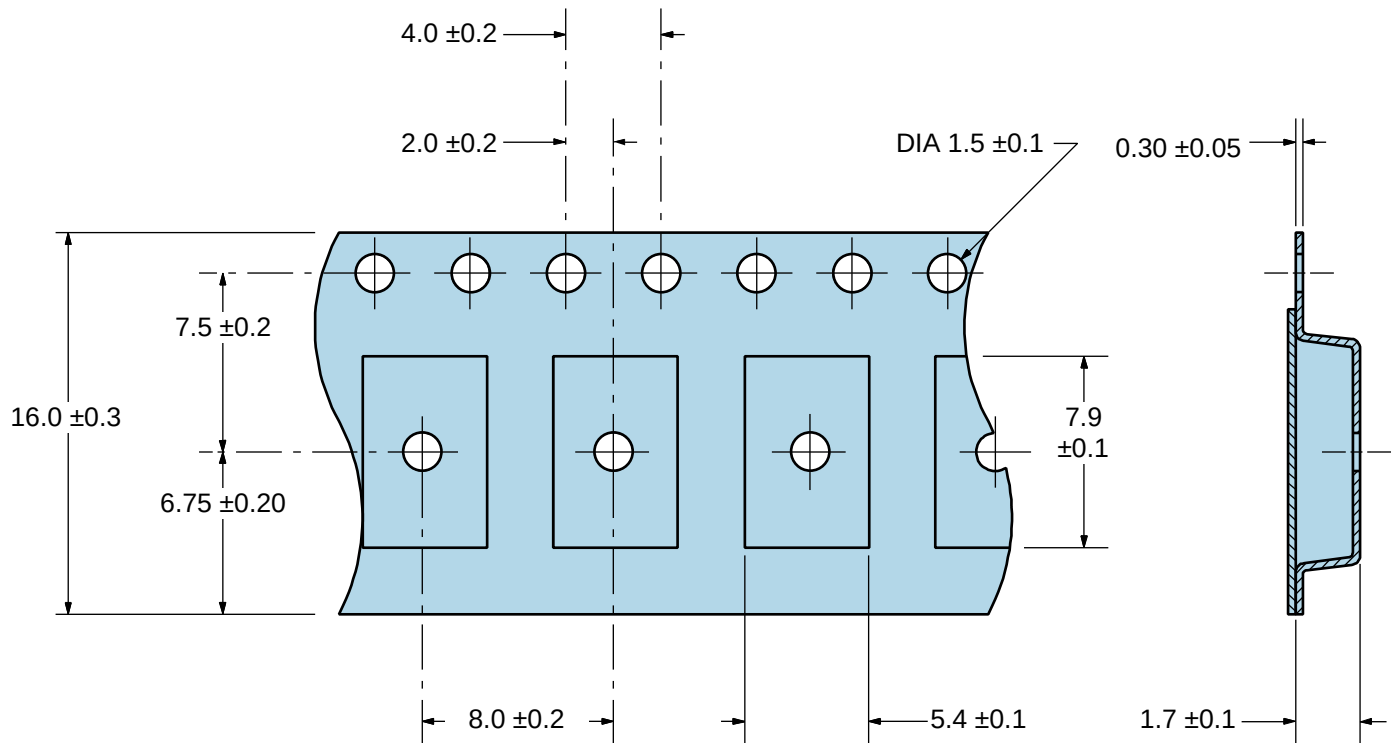


All Tolerances are  $\pm 0.1$

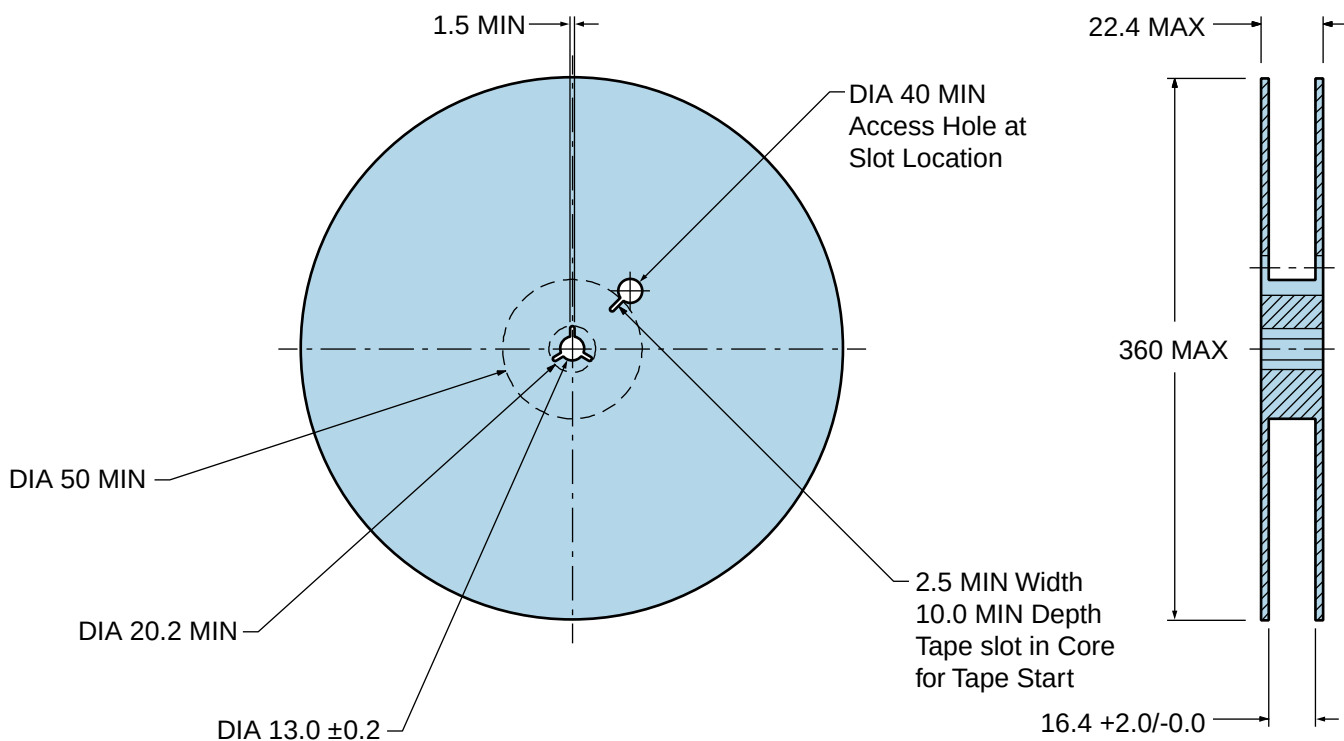
# ECCM1-12-13.4916M TR

## Tape & Reel Dimensions

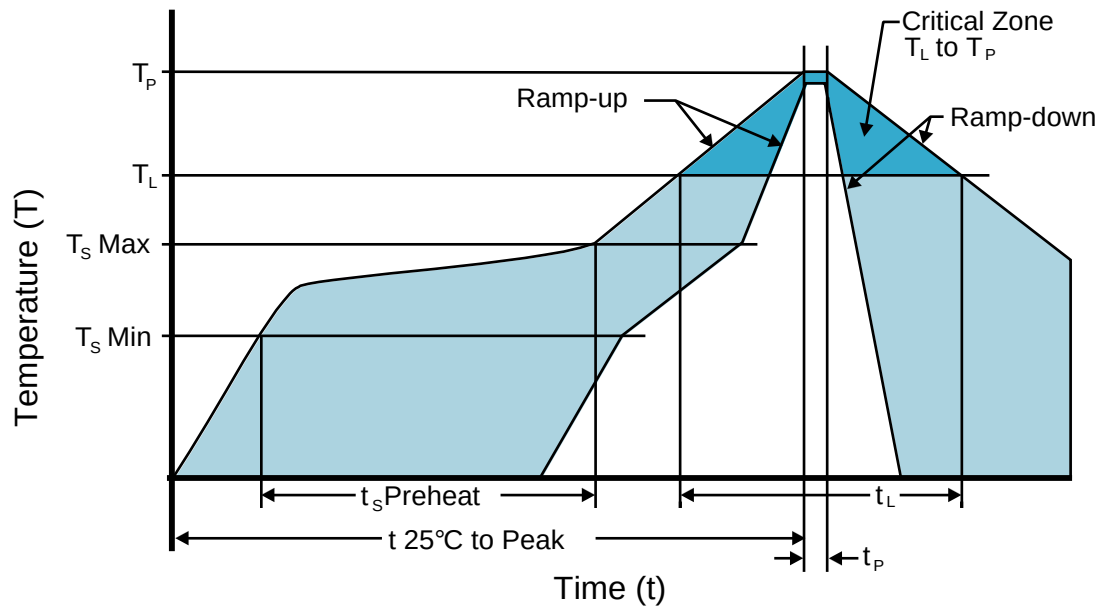
Quantity Per Reel: 1,000 units



\*Compliant to EIA 481A



## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|                                   |                    |
|-----------------------------------|--------------------|
| $T_s$ MAX to $T_L$ (Ramp-up Rate) | 3°C/second Maximum |
|-----------------------------------|--------------------|

#### Preheat

|                                    |                  |
|------------------------------------|------------------|
| - 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 |

|                                 |                    |
|---------------------------------|--------------------|
| Ramp-up Rate ( $T_L$ to $T_P$ ) | 3°C/second Maximum |
|---------------------------------|--------------------|

#### Time Maintained Above:

|                         |                  |
|-------------------------|------------------|
| - Temperature ( $T_L$ ) | 217°C            |
| - Time ( $t_L$ )        | 60 - 150 Seconds |

|                            |                                      |
|----------------------------|--------------------------------------|
| Peak Temperature ( $T_P$ ) | 260°C Maximum for 10 Seconds Maximum |
|----------------------------|--------------------------------------|

|                                         |               |
|-----------------------------------------|---------------|
| Target Peak Temperature ( $T_P$ Target) | 250°C +0/-5°C |
|-----------------------------------------|---------------|

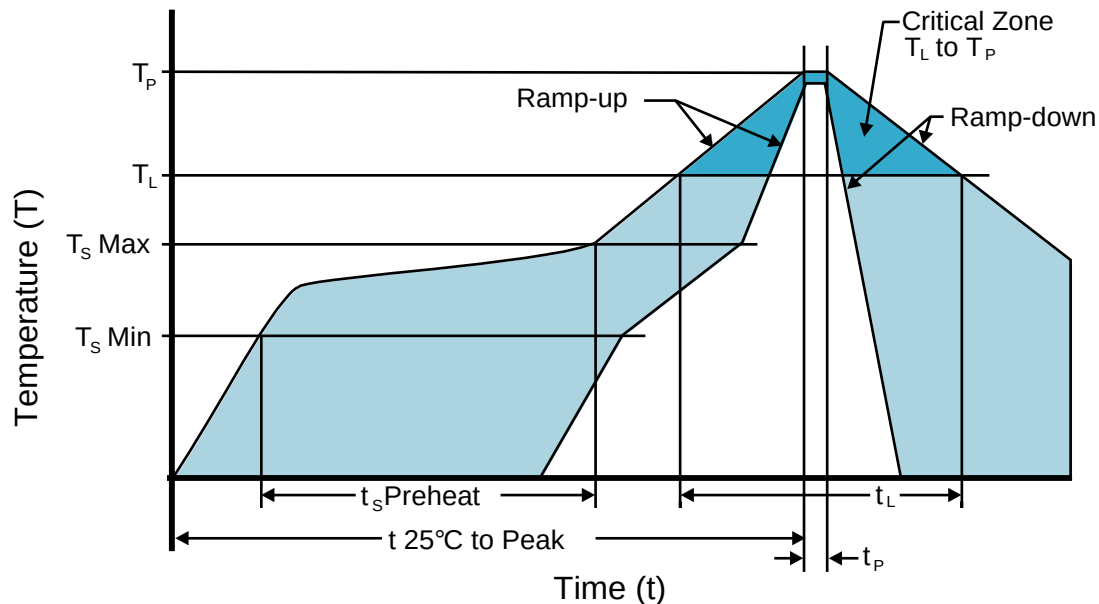
|                                          |                 |
|------------------------------------------|-----------------|
| Time within 5°C of actual peak ( $t_p$ ) | 20 - 40 seconds |
|------------------------------------------|-----------------|

|                |                    |
|----------------|--------------------|
| Ramp-down Rate | 6°C/second Maximum |
|----------------|--------------------|

|                                   |                   |
|-----------------------------------|-------------------|
| Time 25°C to Peak Temperature (t) | 8 minutes Maximum |
|-----------------------------------|-------------------|

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

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

$T_s$  MAX to  $T_L$  (Ramp-up Rate) 5°C/second Maximum

#### Preheat

- 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

Ramp-up Rate ( $T_L$  to  $T_p$ ) 5°C/second Maximum

#### Time Maintained Above:

- Temperature ( $T_L$ ) 150°C  
 - Time ( $t_L$ ) 200 Seconds Maximum

Peak Temperature ( $T_p$ ) 240°C Maximum

Target Peak Temperature ( $T_p$  Target) 240°C Maximum 1 Time / 230°C Maximum 2 Times

Time within 5°C of actual peak ( $t_p$ ) 10 seconds Maximum 2 Times / 80 seconds Maximum 1 Time

Ramp-down Rate 5°C/second Maximum

Time 25°C to Peak Temperature (t) N/A

Moisture Sensitivity Level 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.