

# ECCM9LA12-20.000M TR



## ITEM DESCRIPTION

Quartz Crystal Resonator 3.2mm x 5.0mm x 1.0mm 4 Pad Ceramic Surface Mount (SMD) 20.000MHz  $\pm 15$ ppm at 25°C,  $\pm 20$ ppm over -20°C to +70°C 12pF Parallel Resonant

## ELECTRICAL SPECIFICATIONS

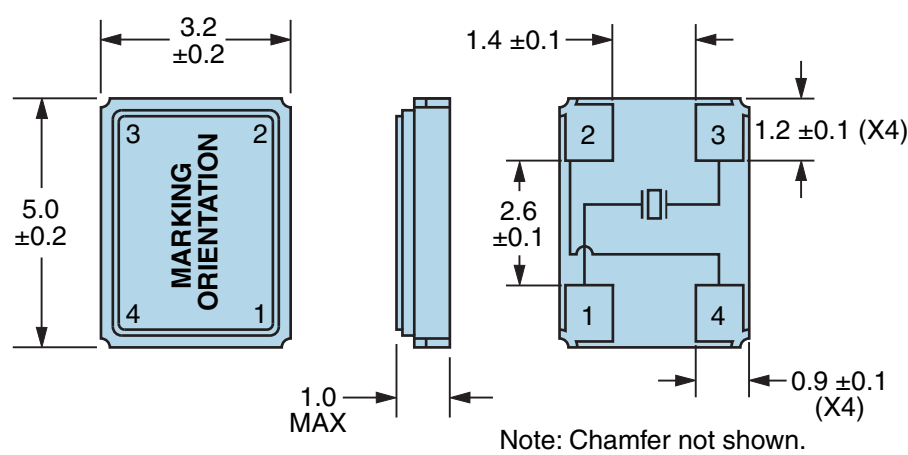
|                               |                                                        |
|-------------------------------|--------------------------------------------------------|
| Nominal Frequency             | 20.000MHz                                              |
| Frequency Tolerance/Stability | $\pm 15$ ppm at 25°C, $\pm 20$ ppm over -20°C to +70°C |
| Aging at 25°C                 | $\pm 3$ ppm/Year Maximum                               |
| Load Capacitance              | 12pF Parallel Resonant                                 |
| Shunt Capacitance             | 7pF Maximum                                            |
| Equivalent Series Resistance  | 50 Ohms Maximum                                        |
| Mode of Operation             | AT-Cut Fundamental                                     |
| Drive Level                   | 100 $\mu$ Watts Maximum                                |
| Spurious Response             | -3dB Minimum (Measured from Fo to Fo+5000ppm)          |
| Storage Temperature Range     | -40°C to +125°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         |

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MECHANICAL DIMENSIONS (all dimensions in millimeters)

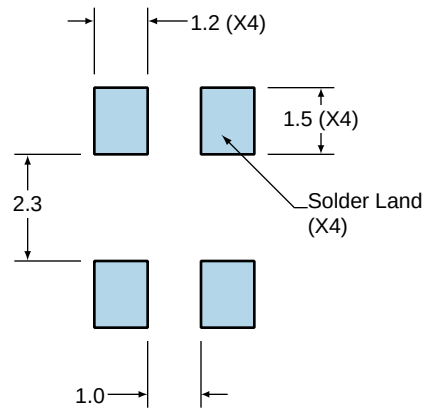


| PIN | CONNECTION   |
|-----|--------------|
| 1   | Crystal      |
| 2   | Cover/Ground |
| 3   | Crystal      |
| 4   | Cover/Ground |

| LINE | MARKING                                                              |
|------|----------------------------------------------------------------------|
| 1    | <b>E20.00</b><br><i>E=Ecliptek Designator</i>                        |
| 2    | <b>XXXXXX</b><br><i>XXXXXX=Ecliptek<br/>Manufacturing Identifier</i> |

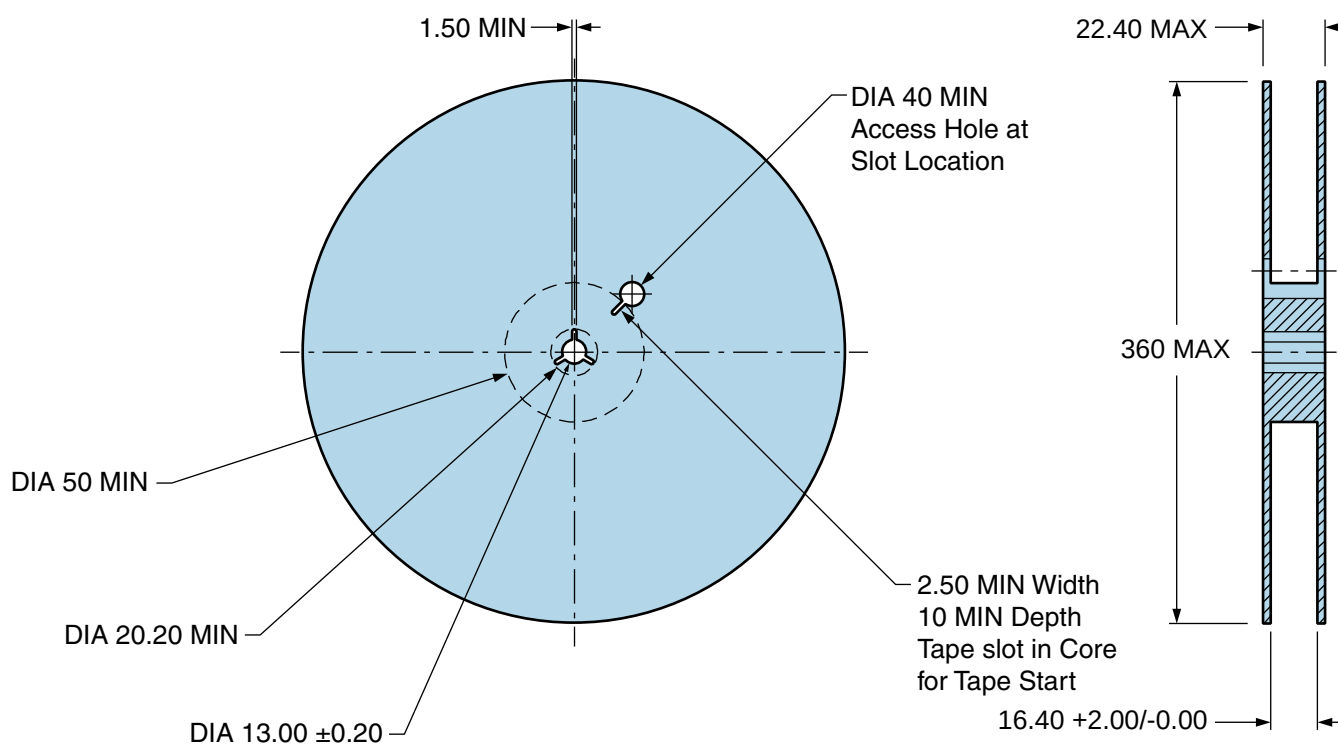
Suggested Solder Pad Layout

All Dimensions in Millimeters



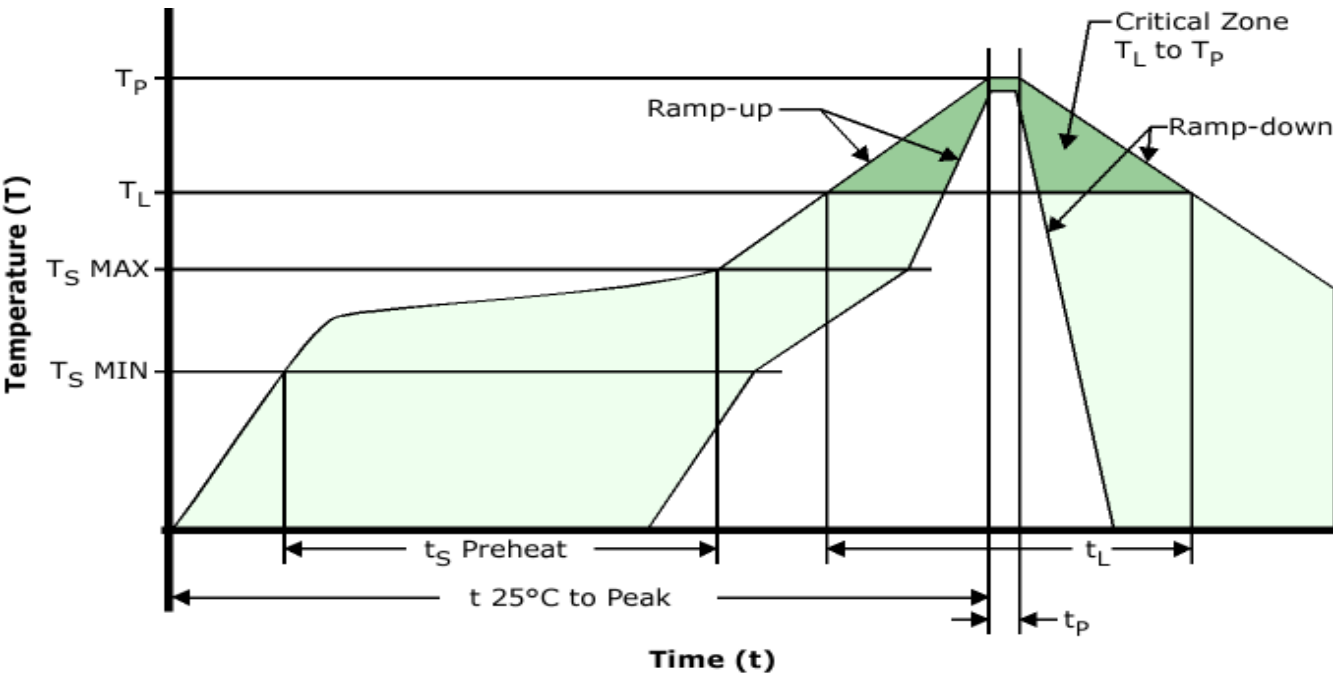
All Tolerances are ±0.1

Compliant to EIA-481



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Recommended Solder Reflow Methods

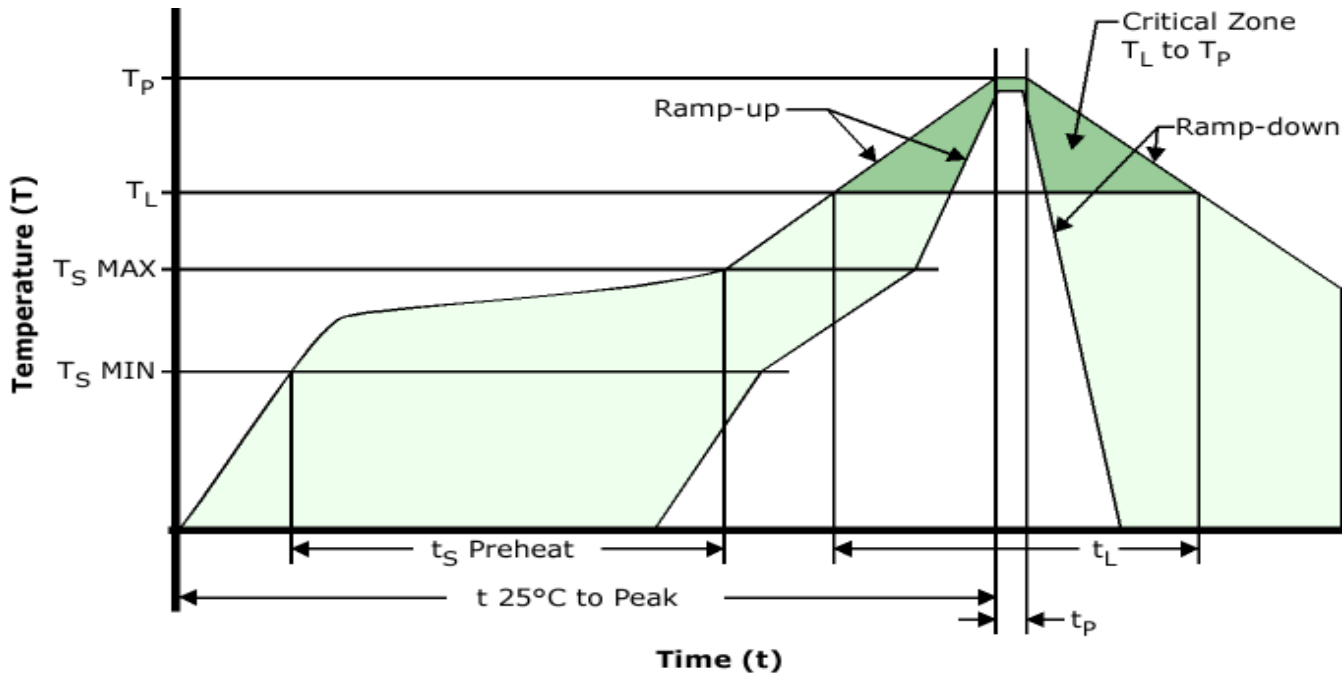


High Temperature Infrared/Convection

|                                     |                                                   |
|-------------------------------------|---------------------------------------------------|
| Ts MAX to Tl (Ramp-up Rate)         | 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                                  |
| Ramp-up Rate (Tl to Tp)             | 3°C/Second Maximum                                |
| Time Maintained Above:              |                                                   |
| - Temperature (Tl)                  | 217°C                                             |
| - Time (tL)                         | 60 - 150 Seconds                                  |
| Peak Temperature (Tp)               | 260°C Maximum for 10 Seconds Maximum              |
| Target Peak Temperature (Tp Target) | 250°C +0/-5°C                                     |
| Time within 5°C of actual peak (tp) | 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                                           |
| Additional Notes                    | Temperatures shown are applied to body of device. |

# ECCM9LA12-20.000M TR

## Recommended Solder Reflow Methods



## Low Temperature Infrared/Convection 245°C

|                             |                    |
|-----------------------------|--------------------|
| Ts MAX to Tl (Ramp-up Rate) | 5°C/Second Maximum |
|-----------------------------|--------------------|

### Preheat

|                                |                 |
|--------------------------------|-----------------|
| - Temperature Minimum (Ts MIN) | N/A             |
| - Temperature Typical (Ts TYP) | 150°C           |
| - Temperature Maximum (Ts MAX) | N/A             |
| - Time (ts MIN)                | 30 - 60 Seconds |

|                         |                    |
|-------------------------|--------------------|
| Ramp-up Rate (Tl to Tp) | 5°C/Second Maximum |
|-------------------------|--------------------|

### Time Maintained Above:

|                    |                     |
|--------------------|---------------------|
| - Temperature (Tl) | 150°C               |
| - Time (tL)        | 200 Seconds Maximum |

|                       |               |
|-----------------------|---------------|
| Peak Temperature (Tp) | 245°C Maximum |
|-----------------------|---------------|

|                                     |                                              |
|-------------------------------------|----------------------------------------------|
| Target Peak Temperature (Tp Target) | 245°C Maximum 2 Times / 230°C Maximum 1 Time |
|-------------------------------------|----------------------------------------------|

|                                     |                                                        |
|-------------------------------------|--------------------------------------------------------|
| Time within 5°C of actual peak (tp) | 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 |
|----------------------------|---------|

|                  |                                                   |
|------------------|---------------------------------------------------|
| Additional Notes | 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.)