# EB15E2C2H-9.000M TR

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Ecliptek

## REGULATORY COMPLIANCE (Data Sheet downloaded on Dec 2, 2017)

Lead Free COMPLIANT | EU RoHS 2011/65 + 2015/863 COMPLIANT | China RoHS COMPLIANT | REACH 174 SVHC COMPLIANT

Click badges to download compliance docs

Regulatory Compliance standards are subject to updates by governing bodies. Click the badges to download the latest compliance docs for this part number directly from Ecliptek.

DRC CONFLICT FREE

## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 2.5Vdc 4 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD) 9.000MHz ±100ppm over -20°C to +70°C

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Nominal Frequency** | 9.000MHz |
| **Frequency Tolerance/Stability** | ±100ppm Maximum over -20°C to +70°C (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°C, Shock, and Vibration) |
| **Supply Voltage** | 2.5Vdc ±5% |
| **Input Current** | 3mA 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** | 5nSec 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)** | 80% of Vdd Minimum or No Connect to Enable Output, 20% of Vdd Maximum to Disable Output (High Impedance) |
| **Standby Current** | 10µA Maximum (Disabled Output: High Impedance) |
| **RMS Phase Jitter** | 1pSec Maximum (Fj = 12kHz to 20MHz) |
| **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: 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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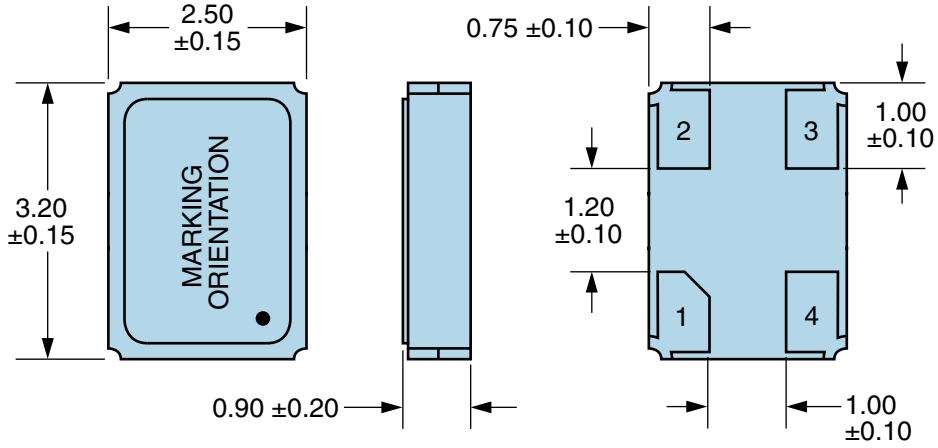
## MECHANICAL DIMENSIONS (all dimensions in millimeters)

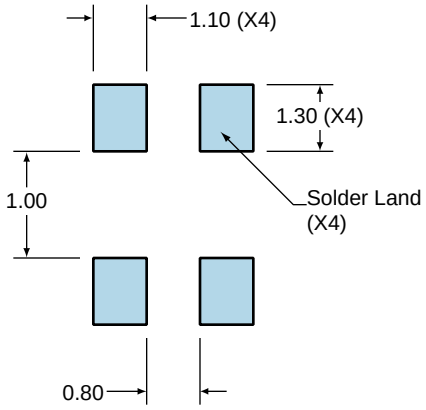



| PIN | CONNECTION |
|---|---|
| 1 | Tri-State |
| 2 | Case/Ground |
| 3 | Output |
| 4 | Supply Voltage |

| LINE | MARKING |
|---|---|
| 1 | **E9.00**<br>*E=Ecliptek Designator* |
| 2 | **XXXXX**<br>*XXXXX=Ecliptek Manufacturing Identifier* |

## Suggested Solder Pad Layout

All Dimensions in Millimeters




All Tolerances are ±0.1



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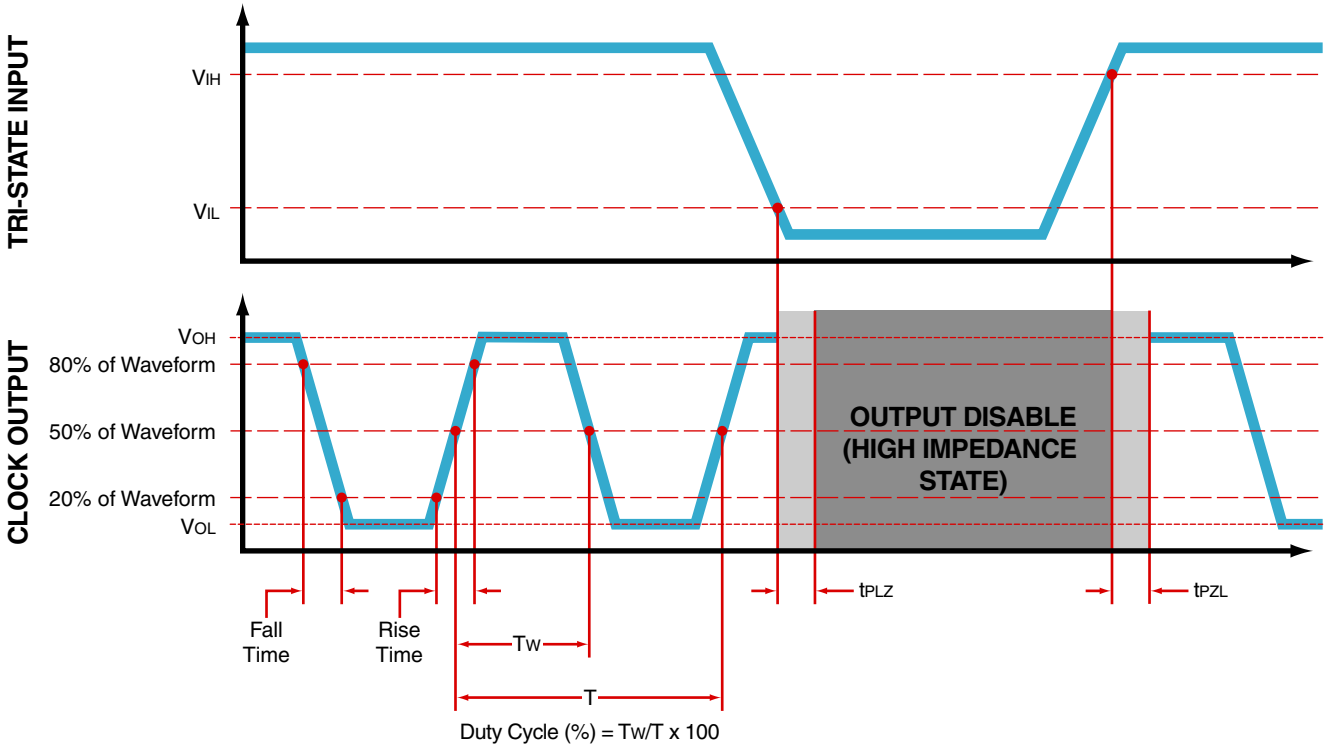
## OUTPUT WAVEFORM & TIMING DIAGRAM



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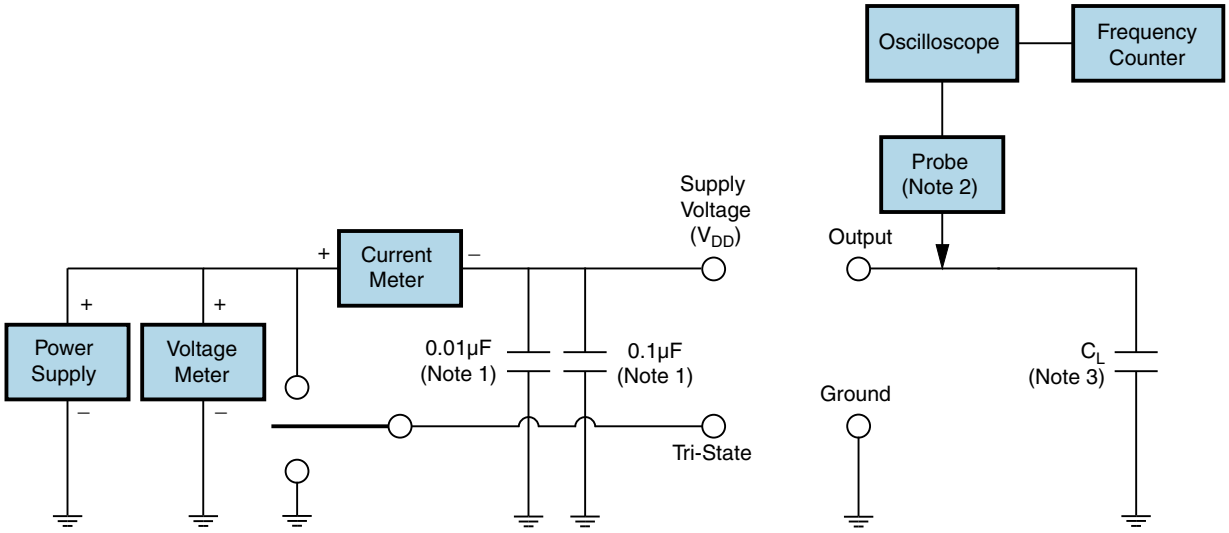
## Test Circuit for CMOS Output




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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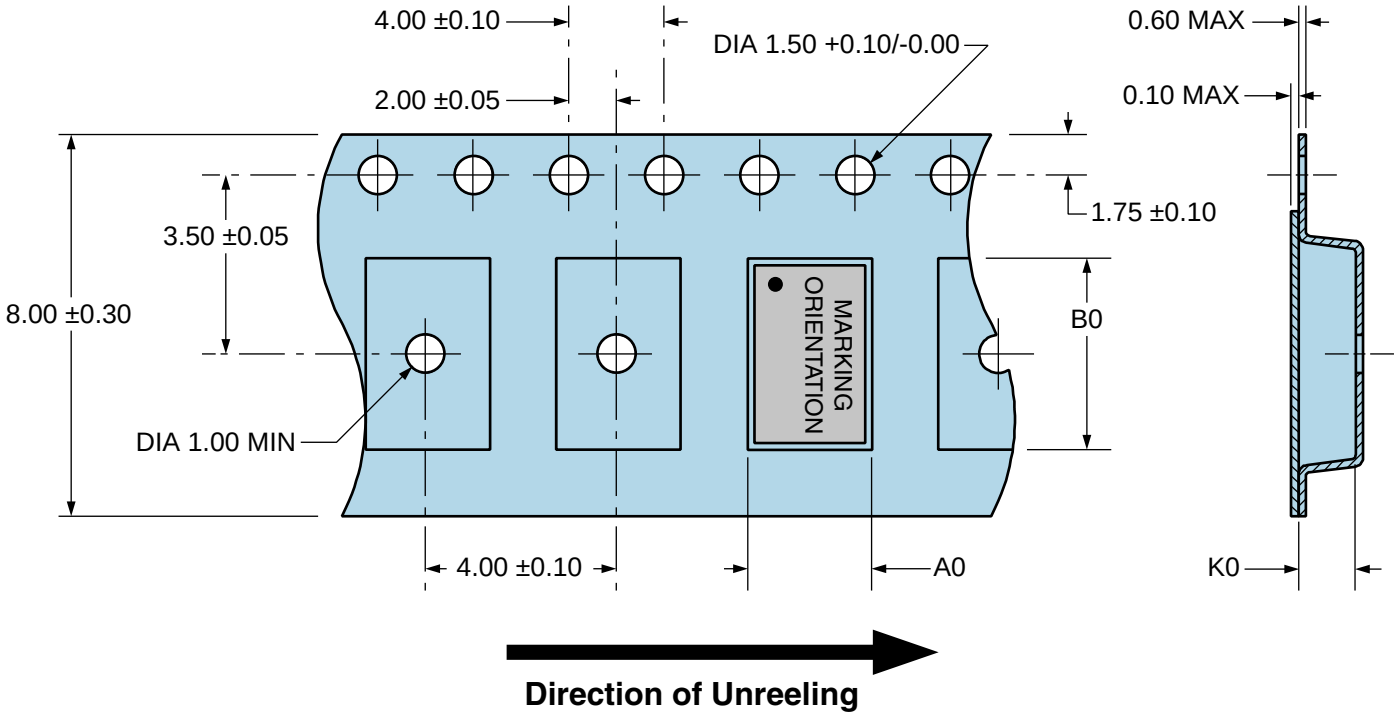
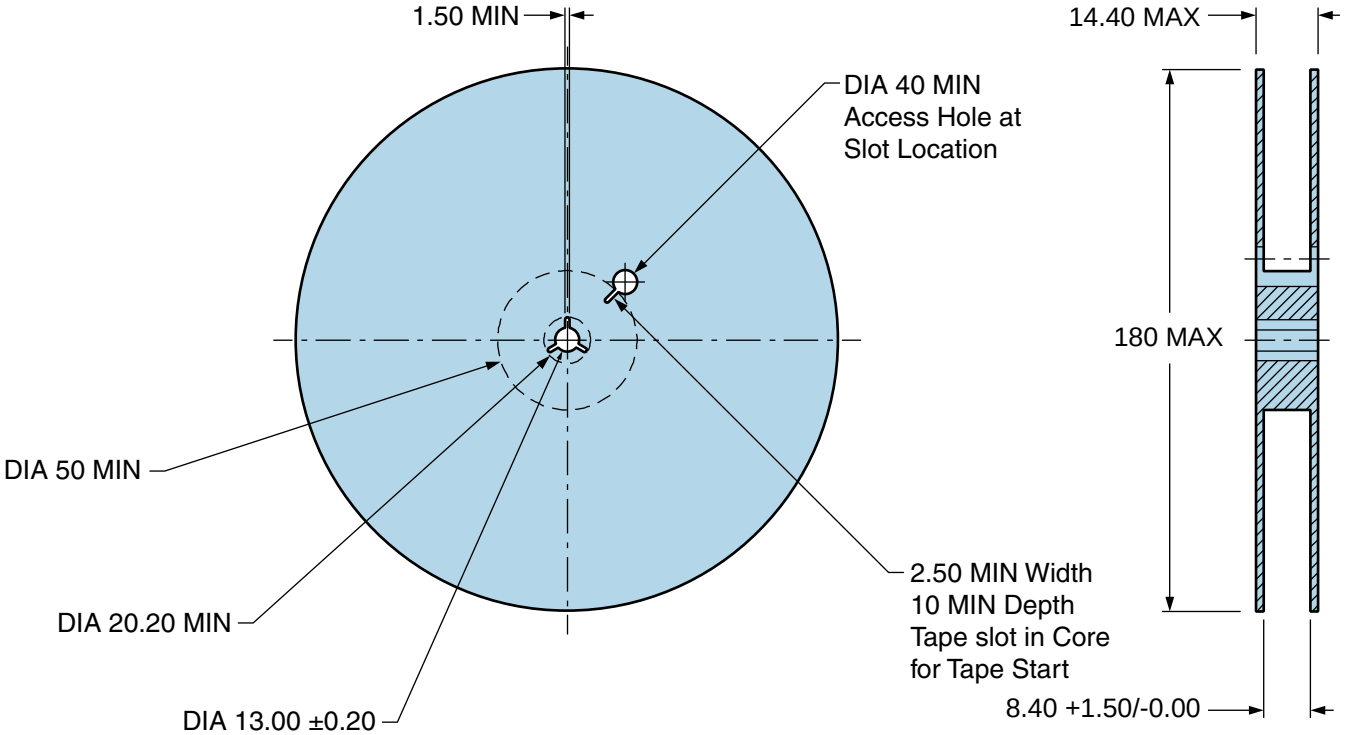
## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



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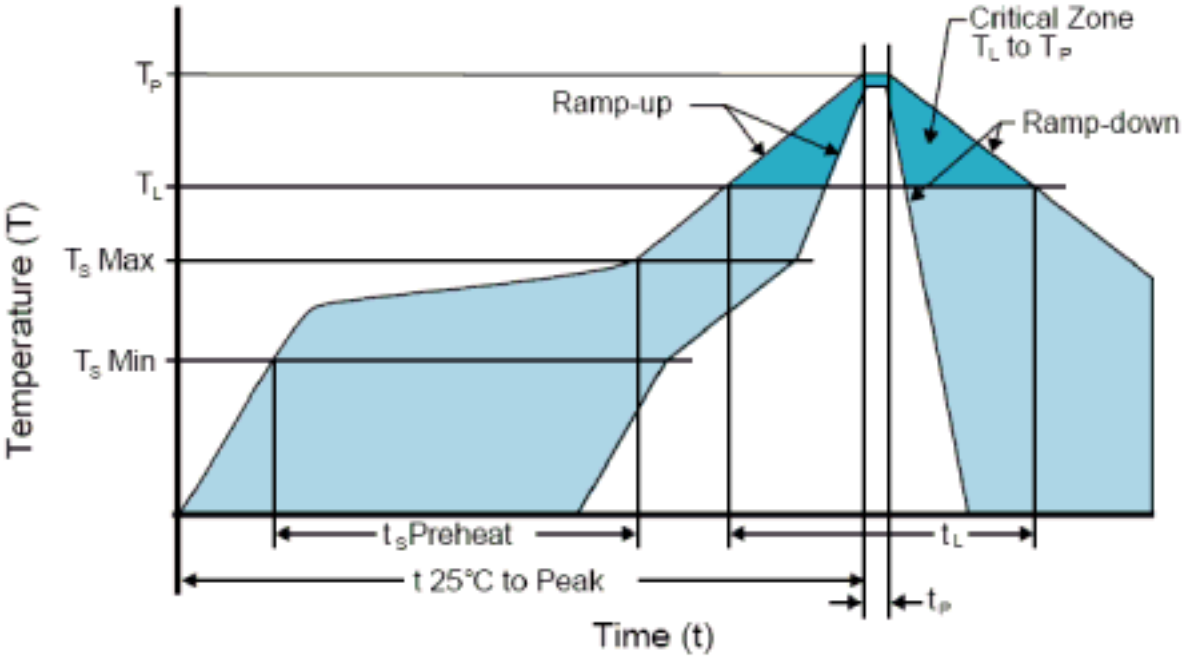
## Recommended Solder Reflow Methods




## High Temperature Infrared/Convection

| | |
|---|---|
| **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 |



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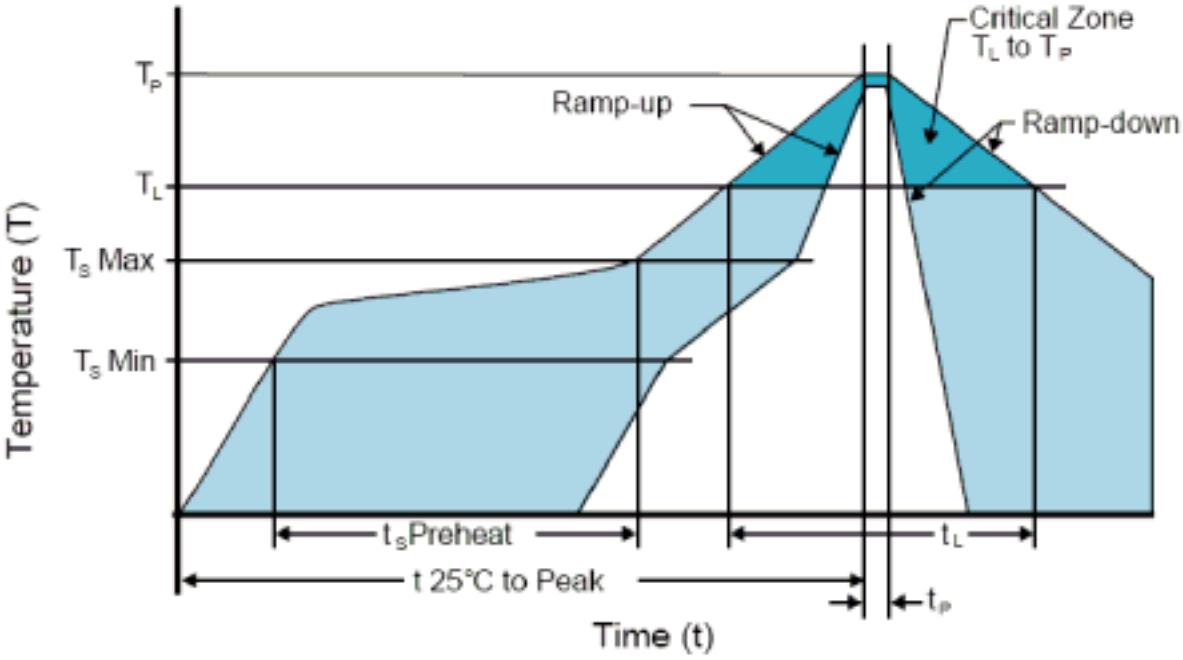


## Low Temperature Infrared/Convection 240°C

| | |
|---|---|
| **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)** | 60 - 120 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)** | 240°C Maximum |
| **Target Peak Temperature (TP Target)** | 240°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 |

## 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.



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