

# EB13K7G2H-32.768K TR



## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD) 32.768KHz  $\pm 100$ ppm over -40°C to +85°C

## ELECTRICAL SPECIFICATIONS

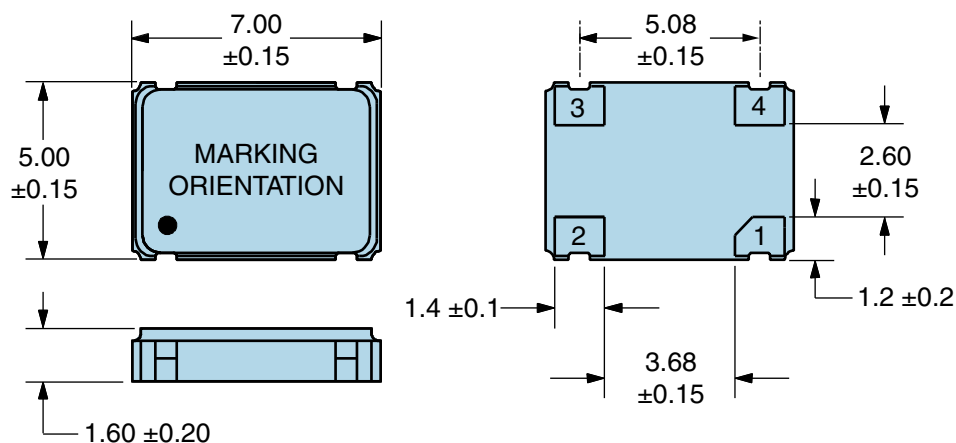
|                                       |                                                                                                                                                                                                                                                             |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                     | 32.768KHz                                                                                                                                                                                                                                                   |
| Frequency Tolerance/Stability         | $\pm 100$ ppm Maximum over -40°C to +85°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) |
| Aging at 25°C                         | $\pm 5$ ppm/year Maximum                                                                                                                                                                                                                                    |
| Supply Voltage                        | 3.3Vdc $\pm 5\%$                                                                                                                                                                                                                                            |
| Input Current                         | 1mA Maximum                                                                                                                                                                                                                                                 |
| Output Voltage Logic High (Voh)       | 90% of Vdd Minimum (IOH= -2mA)                                                                                                                                                                                                                              |
| Output Voltage Logic Low (Vol)        | 10% of Vdd Maximum (IOL= +2mA)                                                                                                                                                                                                                              |
| Rise/Fall Time                        | 0.5 $\mu$ Sec Maximum (Measured at 20% to 80% of waveform)                                                                                                                                                                                                  |
| Duty Cycle                            | 50 $\pm 5$ (%) (Measured at 50% of waveform)                                                                                                                                                                                                                |
| Load Drive Capability                 | 15pF Maximum                                                                                                                                                                                                                                                |
| Output Logic Type                     | CMOS                                                                                                                                                                                                                                                        |
| Logic Control / Additional Output     | Tri-State                                                                                                                                                                                                                                                   |
| 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)                                                                                                                                                                                                        |
| 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)

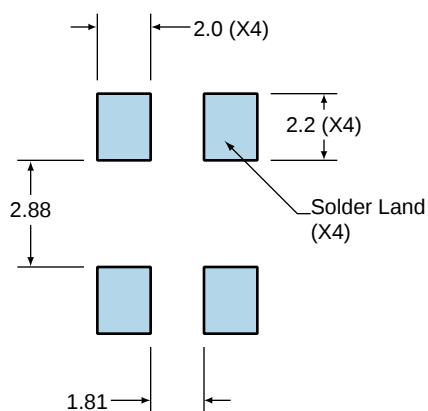


| PIN | CONNECTION     |
|-----|----------------|
| 1   | Tri-State      |
| 2   | Case/Ground    |
| 3   | Output         |
| 4   | Supply Voltage |

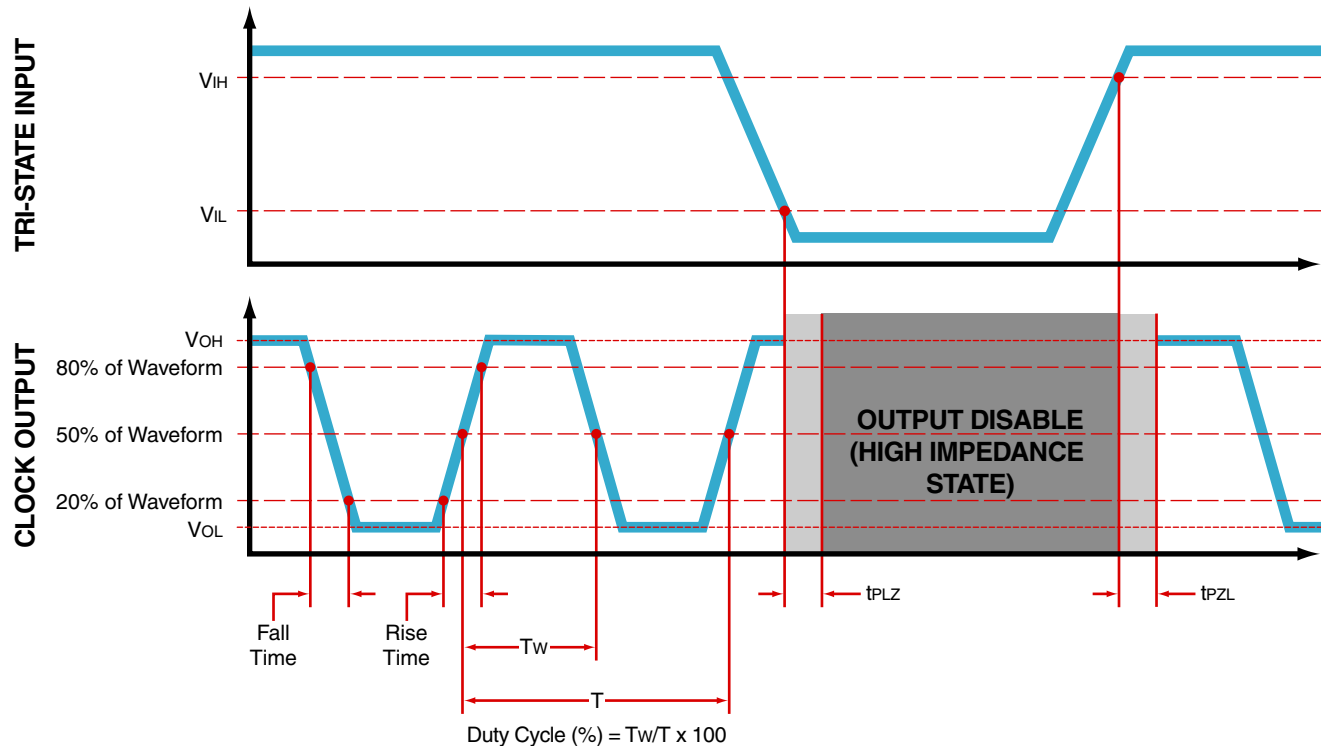
| LINE | MARKING                                                      |
|------|--------------------------------------------------------------|
| 1    | <b>ECLIPTEK</b>                                              |
| 2    | <b>32.768K</b>                                               |
| 3    | <b>XXXXXX</b><br>XXXXXX=Ecliptek<br>Manufacturing Identifier |

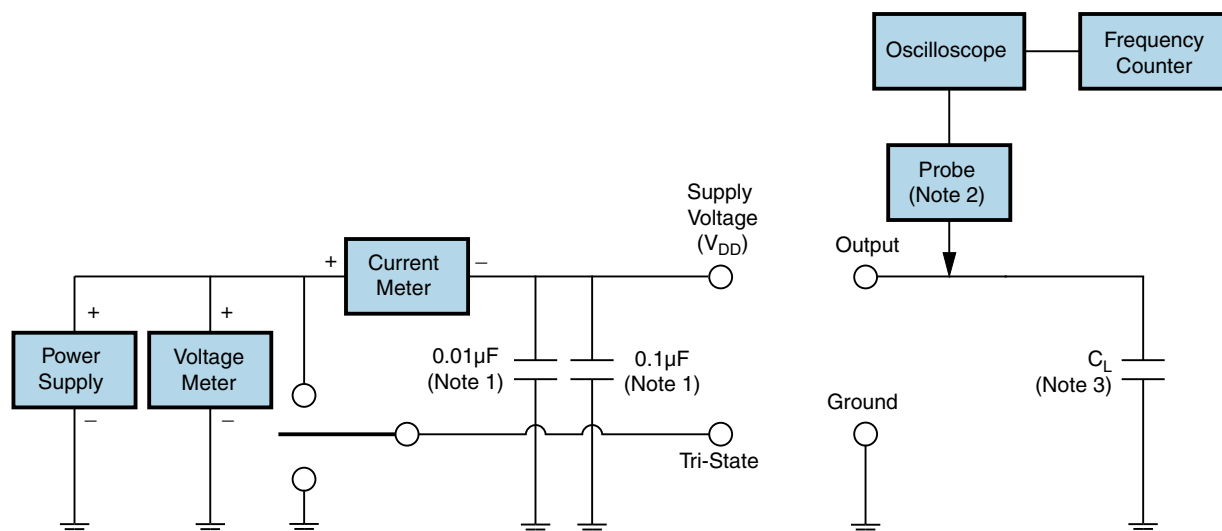
## Suggested Solder Pad Layout

All Dimensions in Millimeters



All Tolerances are ±0.1

**EB13K7G2H-32.768K TR****OUTPUT WAVEFORM & TIMING DIAGRAM**

**EB13K7G2H-32.768K TR** **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<sub>L</sub> includes sum of all probe and fixture capacitance.

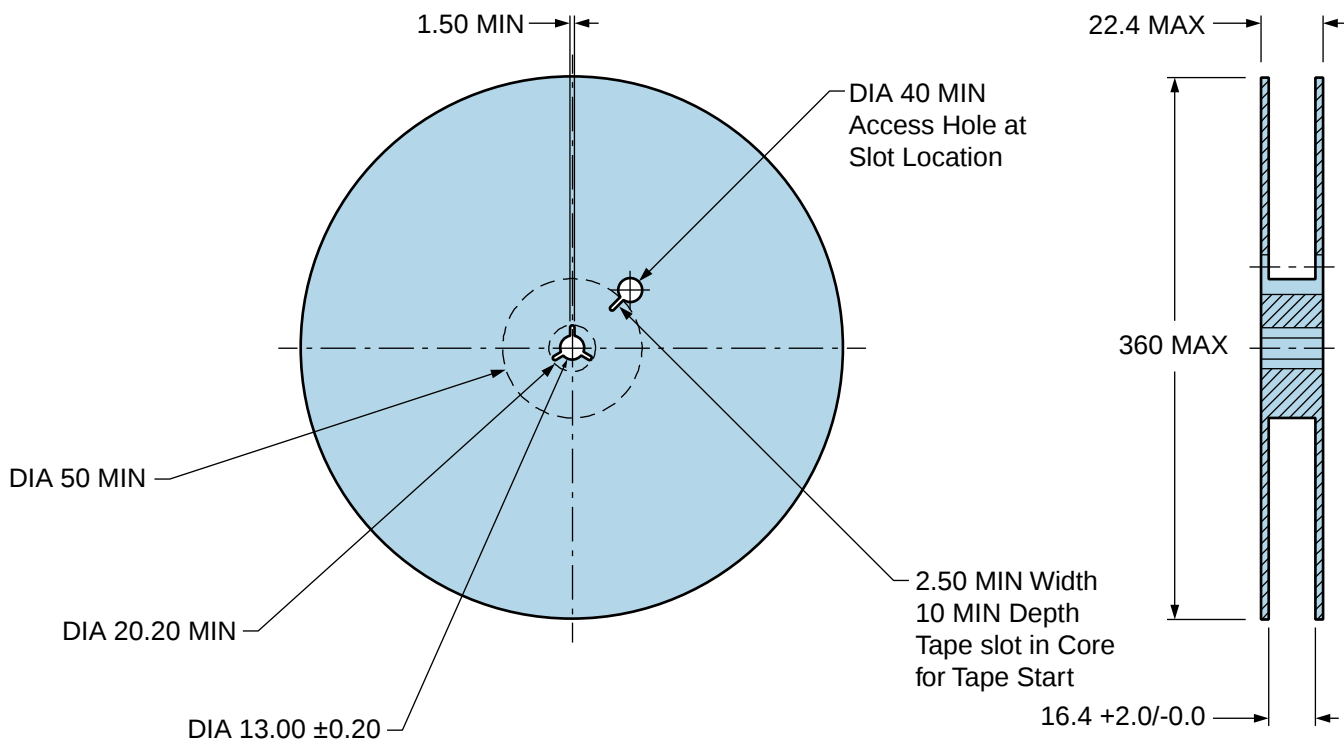
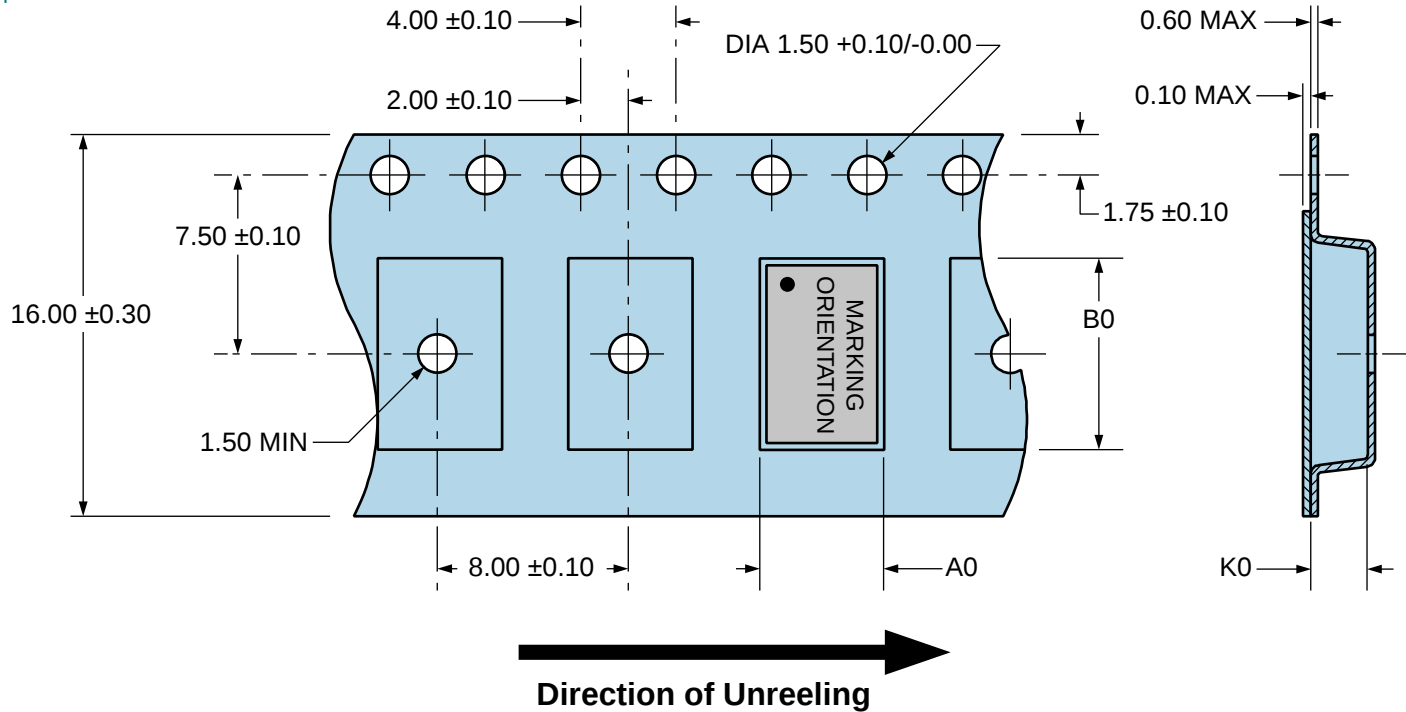
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## Tape & Reel Dimensions

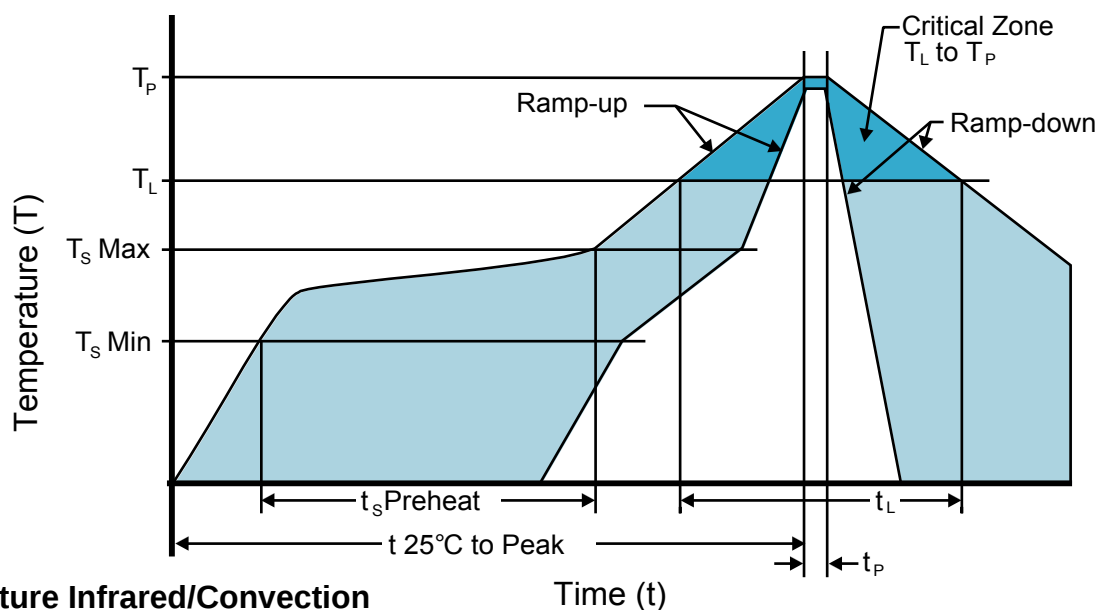
Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



## 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

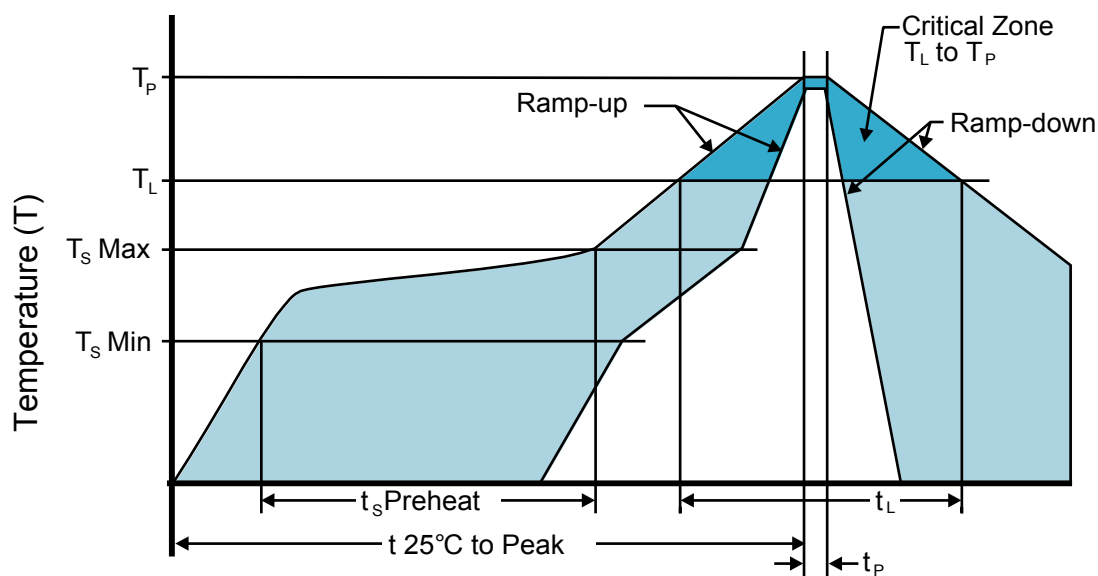
**Ramp-down Rate** 6°C/Second Maximum

**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.

## 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 2 Times / 230°C Maximum 1 Time

**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

**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.)