

## REGULATORY COMPLIANCE



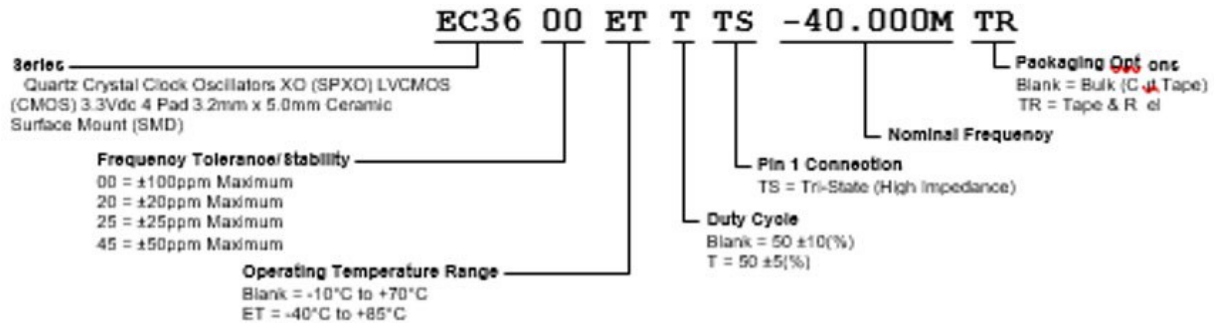
## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 4 Pad 3.2mm x 5.0mm Ceramic Surface Mount (SMD)

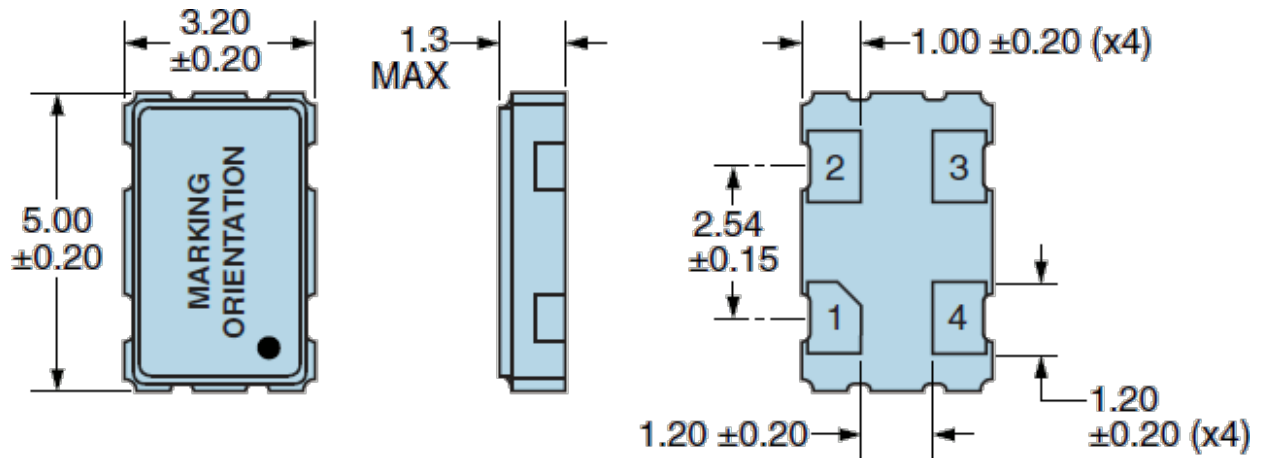
## ELECTRICAL SPECIFICATIONS

|  |   |
|--|---|
| <b>Nominal Frequency</b>   | 1MHz to 170MHz  |
| <b>Frequency Tolerance/Stability</b>                               | 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<br>±100ppm Maximum<br>±20ppm Maximum<br>±25ppm Maximum<br>±50ppm Maximum  |
| <b>Operating Temperature Range</b>                                 | -10°C to +70°C<br>-40°C to +85°C  |
| <b>Supply Voltage</b>  | 3.3Vdc ±10%   |
| <b>Input Current</b>   | 8mA Maximum over Nominal Frequency of 1MHz to 9.999999MHz<br>10mA Maximum over Nominal Frequency of 10MHz to 34.999999MHz<br>25mA Maximum over Nominal Frequency of 35MHz to 49.999999MHz<br>35mA Maximum over Nominal Frequency of 50MHz to 70MHz<br>40mA Maximum over Nominal Frequency of 70.000001MHz to 125MHz<br>50mA Maximum over Nominal Frequency of 125.000001MHz to 170MHz |
| <b>Output Voltage Logic High (V<sub>OH</sub>)</b>                  | IOH = -4mA<br>90% of Vdd Minimum  |
| <b>Output Voltage Logic Low (V<sub>OL</sub>)</b>                   | IOL = +4mA<br>10% of Vdd Maximum  |
| <b>Rise/Fall Time</b>  | Measured at 20% to 80% of waveform<br>6nSec Maximum over Nominal Frequency of 1MHz to 39.999999MHz<br>4nSec Maximum over Nominal Frequency of 40MHz to 79.999999MHz<br>3nSec Maximum over Nominal Frequency of 80MHz to 100MHz<br>2nSec Maximum over Nominal Frequency of 100.000001MHz to 170MHz   |
| <b>Duty Cycle</b>  | Measured at 50% of waveform<br>50 ±10(%)<br>50 ±5(%)  |
| <b>Load Drive Capability</b>                                       | 15pF Maximum  |
| <b>Output Logic Type</b>   | CMOS  |
| <b>Pin 1 Connection</b>  | Tri-State (High Impedance)  |
| <b>Tri-State Input Voltage (V<sub>IH</sub> and V<sub>IL</sub>)</b> | 90% of Vdd Minimum or No Connect to Enable Output,<br>10% of Vdd Maximum to Disable Output (High Impedance)   |
| <b>Standby Current</b>   | Disabled Output: High Impedance<br>10µA Maximum   |
| <b>RMS Phase Jitter</b>  | 12kHz to 20MHz offset frequency<br>1pSec Maximum  |
| <b>Start Up Time</b>   | 10mSec Maximum  |
| <b>Storage Temperature Range</b>                                   | -55°C to +125°C   |

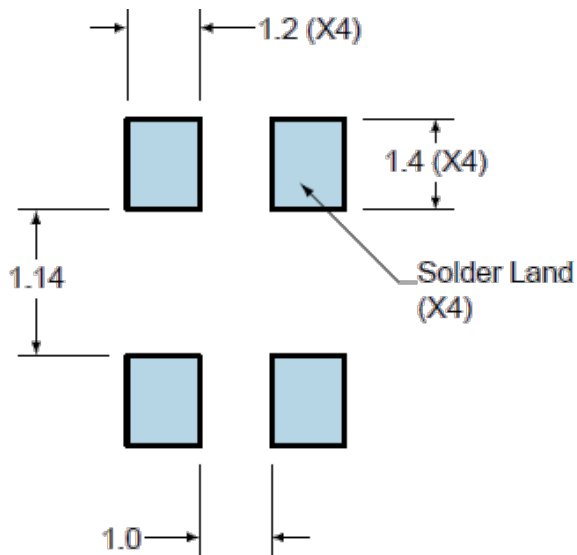
**PART NUMBERING GUIDE**



**MECHANICAL DIMENSIONS**



**SUGGESTED SOLDER PAD LAYOUT**

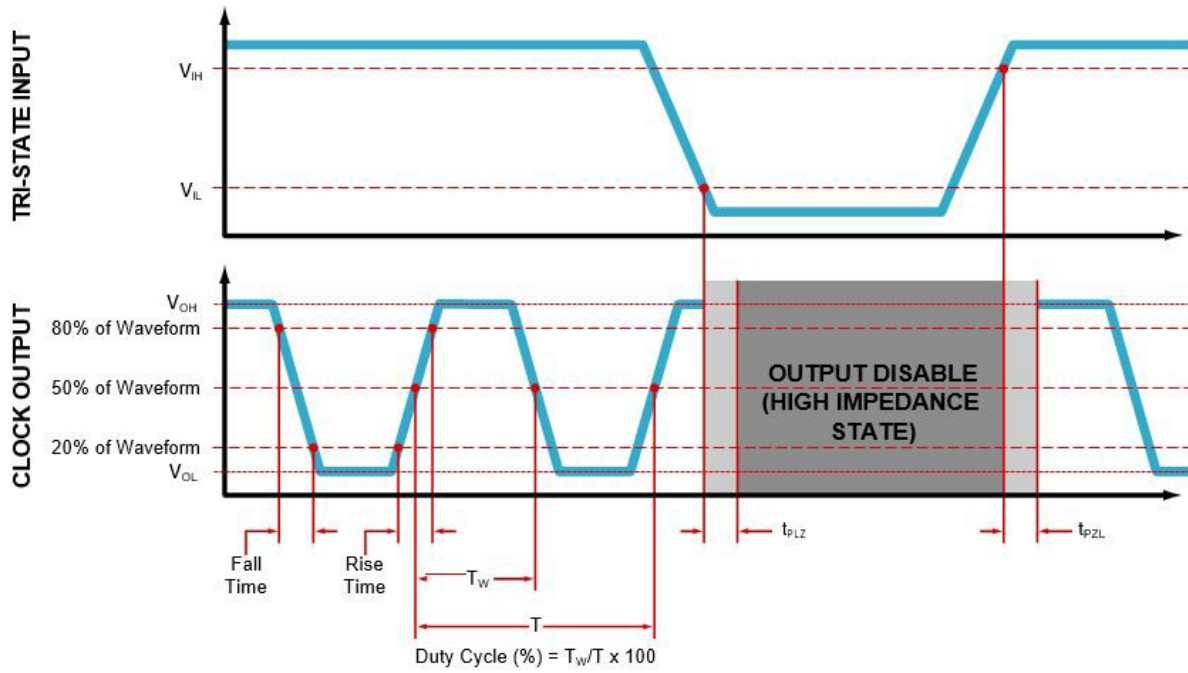


| PIN | CONNECTION     |
|-----|----------------|
| 1   | Tri-State      |
| 2   | Ground         |
| 3   | Output         |
| 4   | Supply Voltage |

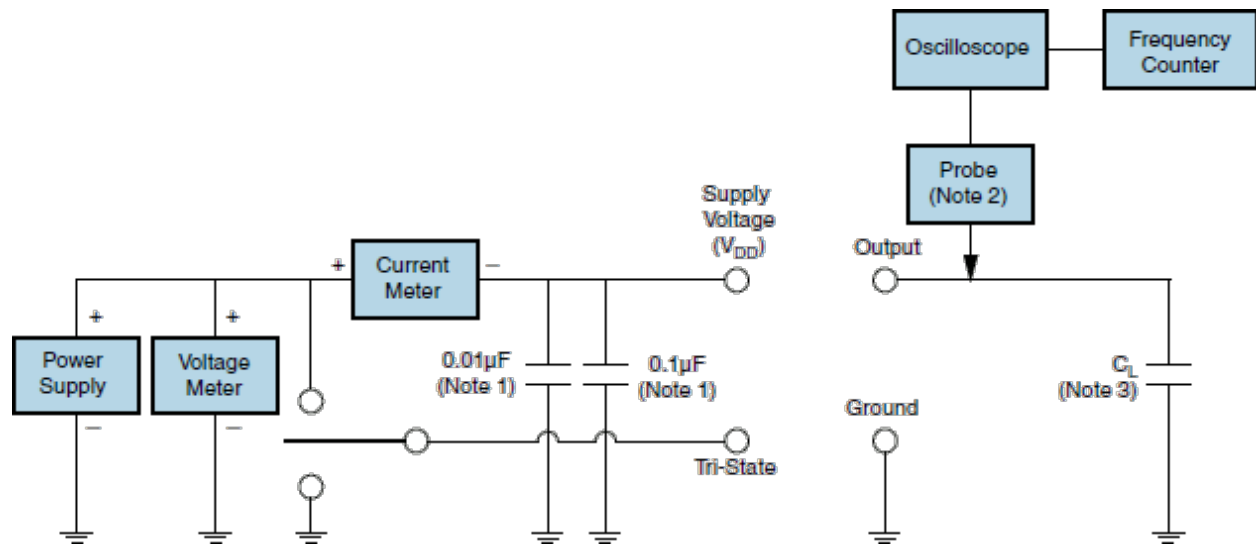
All Tolerances are  $\pm 0.1$

**All Dimensions in Millimeters**

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT



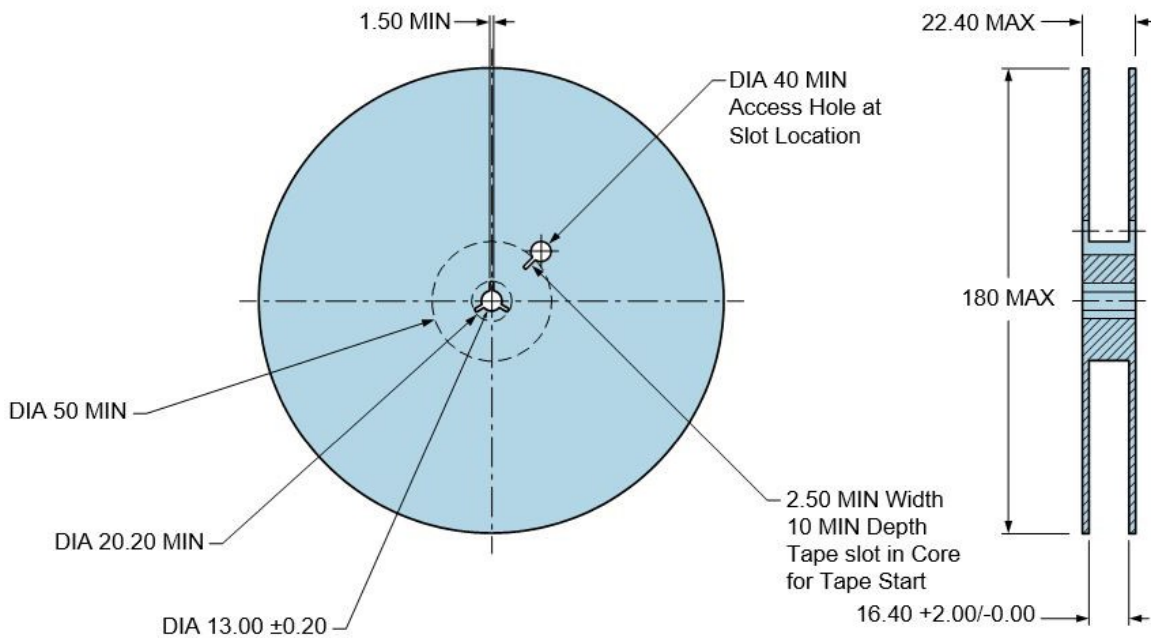
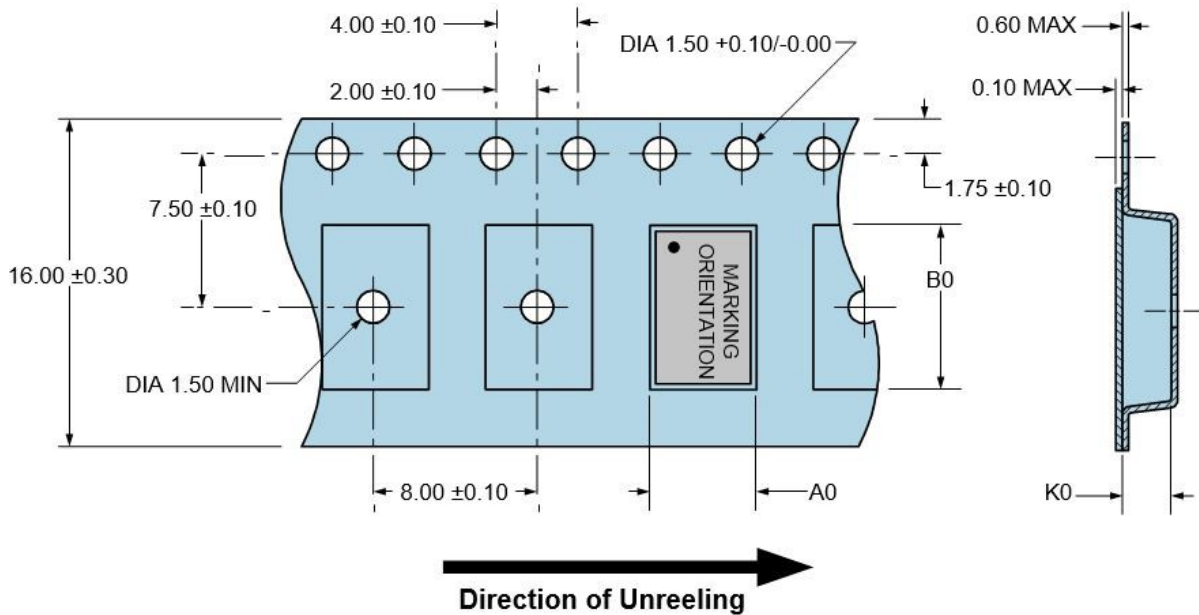
- Note 1:** An external 0.1µF low frequency tantalum bypass capacitor in parallel with a 0.01µF high frequency ceramic bypass Capacitor close to the package ground and supply voltage pin is required.
- Note 2:** A low input capacitance (<12pF), 10X Attenuation Factor, High Impedance (>10Mohms), and High bandwidth (>300MHz) Passive probe is recommended.
- Note 3:** Capacitance value (CL) includes sum of all probe and fixture capacitance. See applicable specification sheet for 'Load Drive Capability'.

**TAPE & REEL DIMENSIONS**

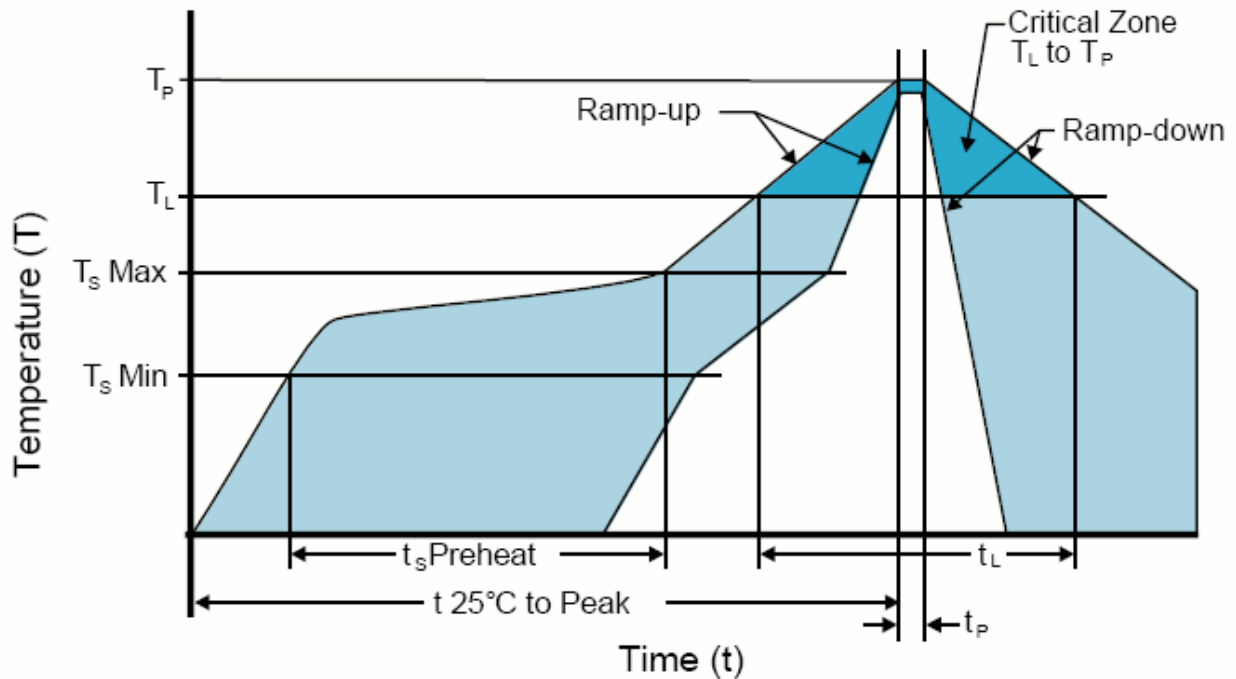
Quantity per Reel: 1000 Units

All Dimensions in Millimeters

Compliant to EIA-481



RECOMMENDED SOLDER REFLOW METHOD



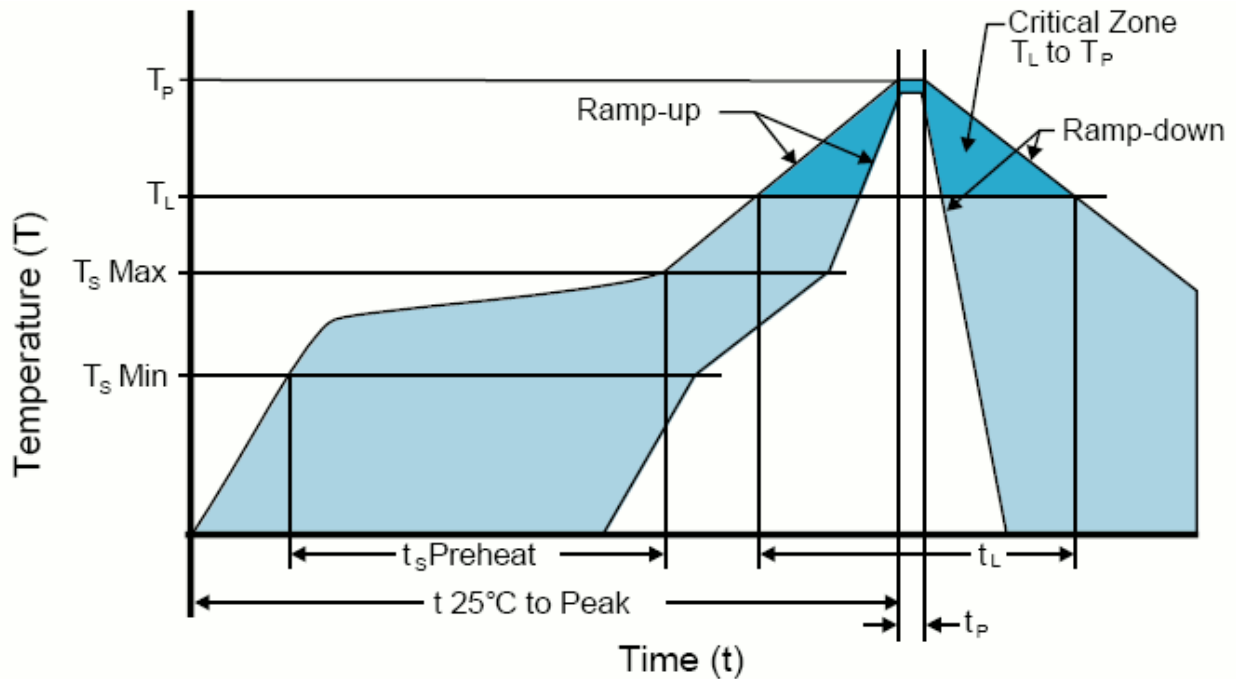
**HIGH TEMPERATURE INFRARED/CONVECTION**

|   |   |
|---|---|
| T <sub>S</sub> MAX to T <sub>L</sub> (Ramp-up Rate)   | 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> )                              | 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   |
| <b>Additional Notes</b>                               | 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.)

RECOMMENDED SOLDER REFLOW METHOD



| LOW TEMPERATURE INFRARED/CONVECTION                 |  |
|---|--|
| T <sub>s</sub> MAX to T <sub>L</sub> (Ramp-up Rate) | 5°C/Second Maximum                                     |
| <b>Preheat</b>                                      |  |
| - Temperature Minimum (T <sub>s</sub> MIN)          | N/A  |
| - Temperature Typical (T <sub>s</sub> TYP)          | 150°C  |
| - Temperature Maximum(T <sub>s</sub> MAX)           | N/A  |
| - Time (t <sub>s</sub> )                            | 60 - 120 Seconds                                       |
| Ramp-up Rate (T <sub>L</sub> to T <sub>P</sub> )    | 5°C/Second Maximum                                     |
| <b>Time Maintained Above:</b>                       |  |
| - Temperature (T <sub>L</sub> )                     | 150°C  |
| - Time (t <sub>L</sub> )                            | 200 Seconds Maximum                                    |
| Peak Temperature (T <sub>P</sub> )                  | 240°C Maximum  |
| Target Peak Temperature (T <sub>P</sub> Target)     | 240°C Maximum 2 Times / 230°C Maximum 1 Time           |
| Time within 5°C of actual peak (t <sub>p</sub> )    | 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.)