

## REGULATORY COMPLIANCE

 <b>Lead Free</b> COMPLIANT	 <b>EU RoHS</b> 2011/65 + 2015/863 COMPLIANT	 <b>China RoHS</b> COMPLIANT	 <b>REACH</b> <b>SVHC</b> COMPLIANT	 <b>DRC</b> <b>CONFLICT</b> <b>FREE</b>
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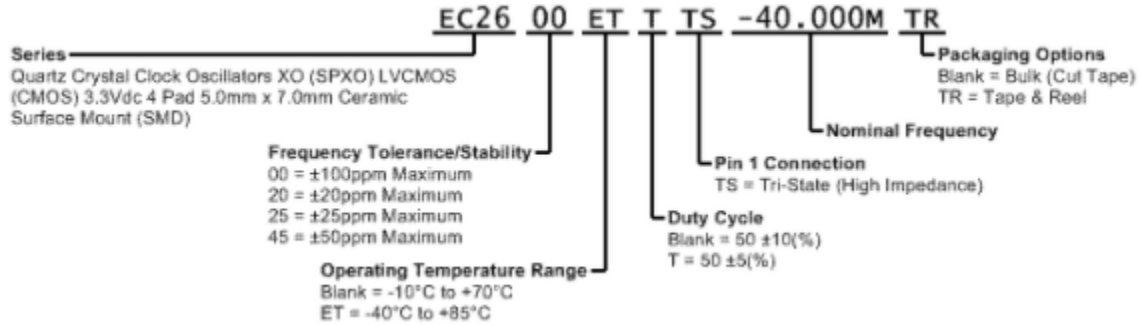
## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

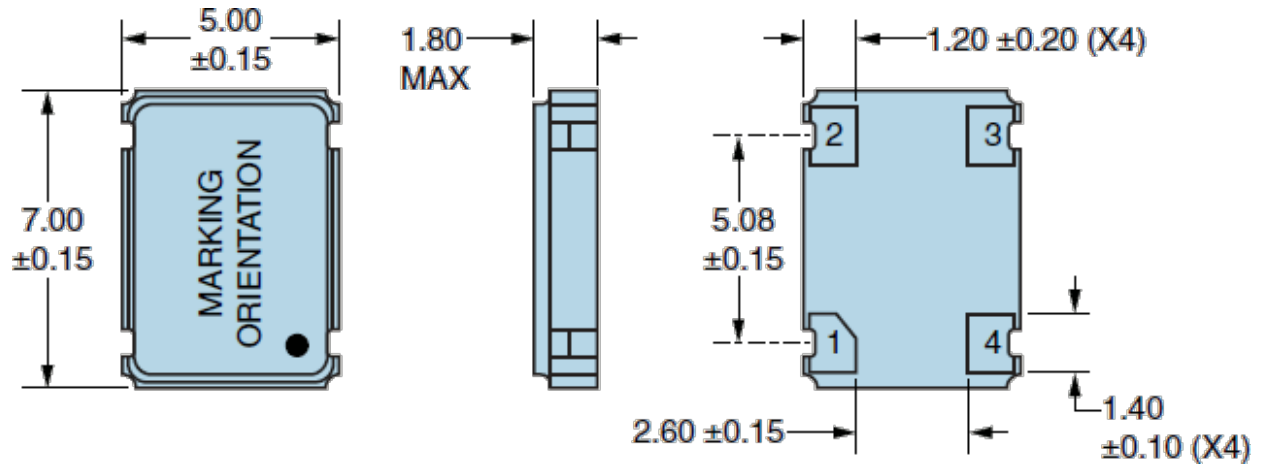
## ELECTRICAL SPECIFICATIONS

<b>Nominal Frequency</b>	1.544MHz to 200MHz
<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 ±100ppm Maximum ±50ppm Maximum ±20ppm Maximum ±25ppm Maximum
<b>Aging at 25°C</b>	±5ppm/year Maximum
<b>Operating Temperature Range</b>	-10°C to +70°C -40°C to +85°C
<b>Supply Voltage</b>	3.3Vdc ±10%
<b>Input Current</b>	10mA Maximum over Nominal Frequency of 1.544MHz to 32MHz 18mA Maximum over Nominal Frequency of 32MHz to 50MHz 20mA Maximum over Nominal Frequency of 50.000001MHz to 70MHz 40mA Maximum over Nominal Frequency of 70.000001MHz to 125MHz 60mA Maximum over Nominal Frequency of 125.000001MHz to 200MHz
<b>Output Voltage Logic High (VOH)</b>	IOH = -8mA 90% of Vdd Minimum
<b>Output Voltage Logic Low (VOL)</b>	IOL = +8mA 10% of Vdd Maximum
<b>Rise/Fall Time</b>	Measured at 20% to 80% of waveform 5nSec Maximum (w/15pF Load), 7nSec Maximum (w/30pF Load) over Nominal Frequency of 1.544MHz to 35MHz 3nSec Maximum over Nominal Frequency of 35.000001MHz to 165MHz 2nSec Maximum over Nominal Frequency of 165.000001MHz to 200MHz
<b>Duty Cycle</b>	Measured at 50% of waveform 50 ±10(%) 50 ±5(%)
<b>Load Drive Capability</b>	30pF Maximum over Nominal Frequency of 1.544MHz to 35MHz 15pF Maximum over Nominal Frequency of 35.0000001MHz to 200MHz
<b>Output Logic Type</b>	CMOS
<b>Pin 1 Connection</b>	Tri-State (High Impedance)
<b>Output Control Input Voltage Logic High (Vih)</b>	70% of Vdd Minimum or No Connect to Enable Output.
<b>Output Control Input Voltage Logic Low (Vil)</b>	30% of Vdd Maximum to Disable Output (High Impedance)
<b>Standby Current</b>	Disabled Output, High Impedance 10µA Maximum
<b>RMS Phase Jitter</b>	12kHz to 20MHz offset frequency 1pSec Maximum
<b>Start Up Time</b>	10mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

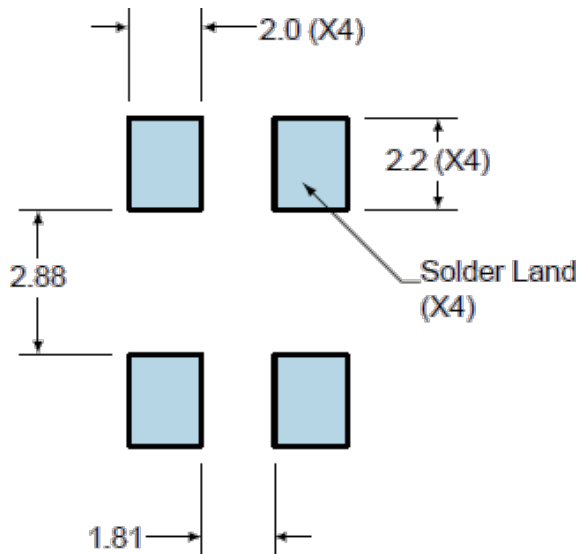
**PART NUMBERING GUIDE**



**MECHANICAL DIMENSIONS**



**SUGGESTED SOLDER PAD LAYOUT**

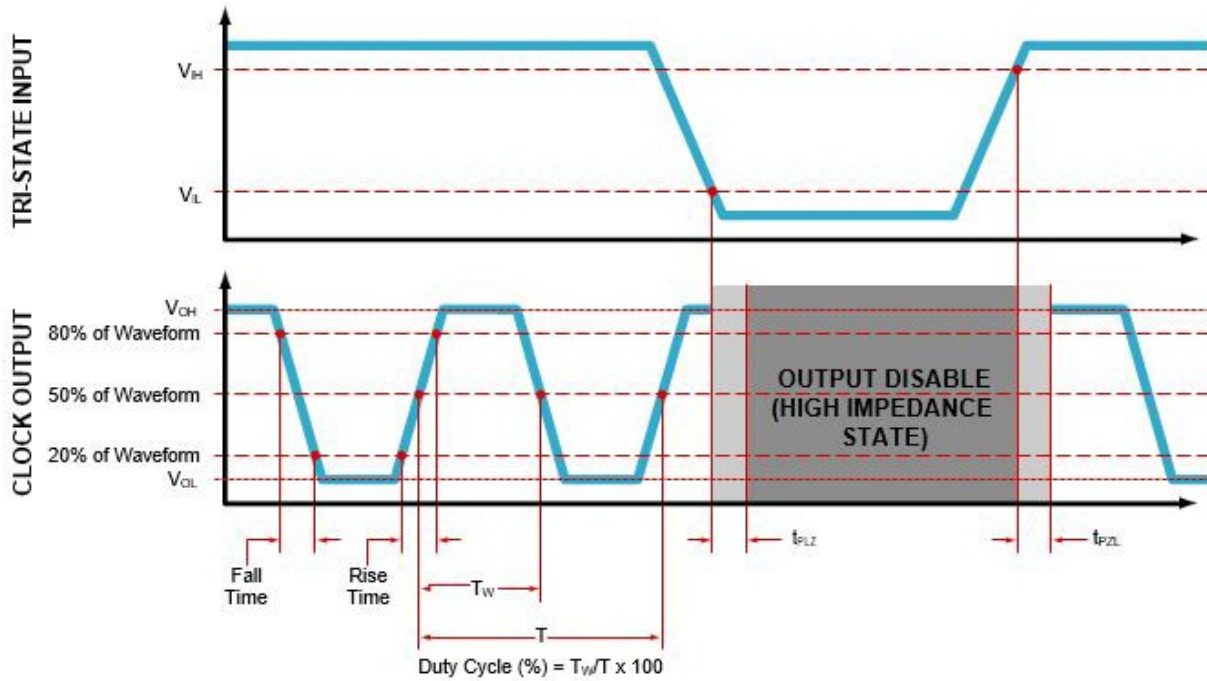


PIN	CONNECTION
1	Tri-State
2	Case/Ground
3	Output
4	Supply Voltage

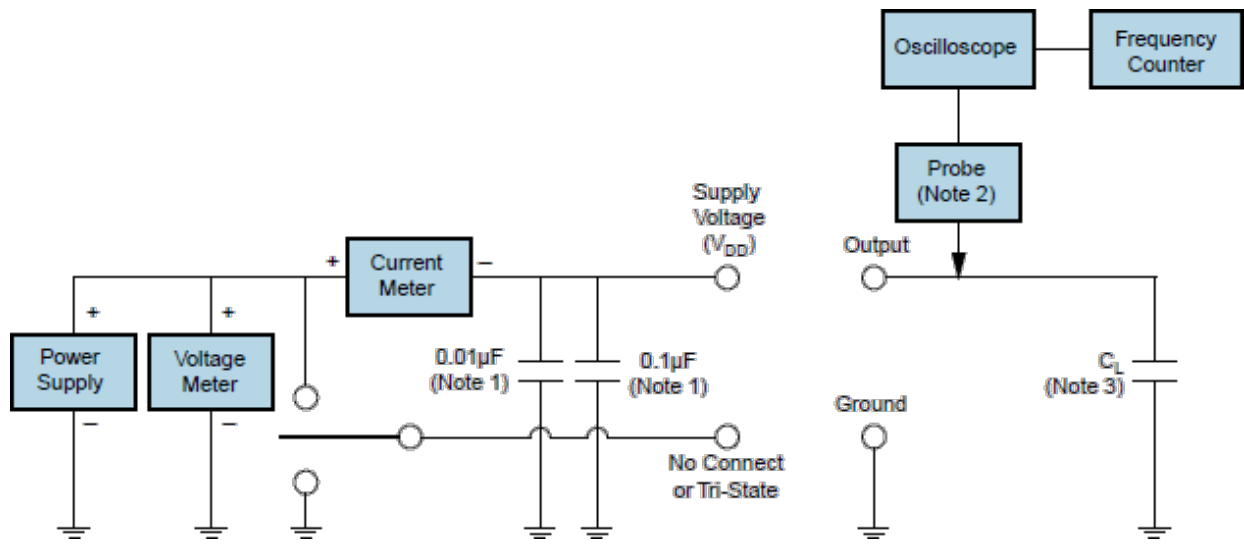
All Tolerances are  $\pm 0.1$

**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 pin is required.

**Note 2:** A low input capacitance (<12pF), 10X Attenuation Factor, High Impedance (>10Mohms), and High bandwidth (>300MHz) Passive probe is recommended.

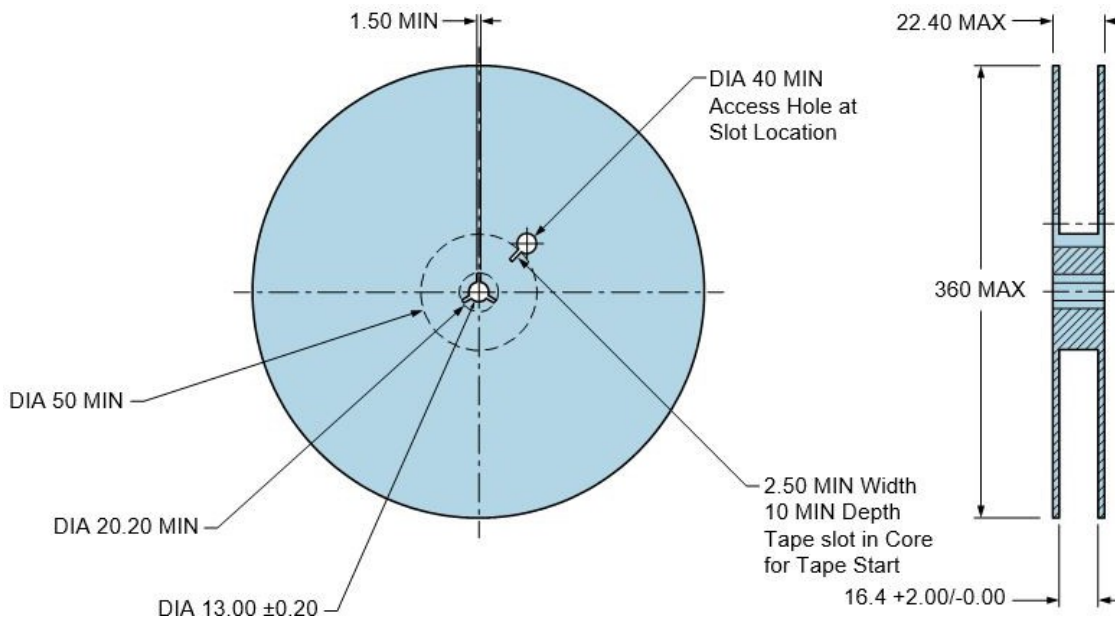
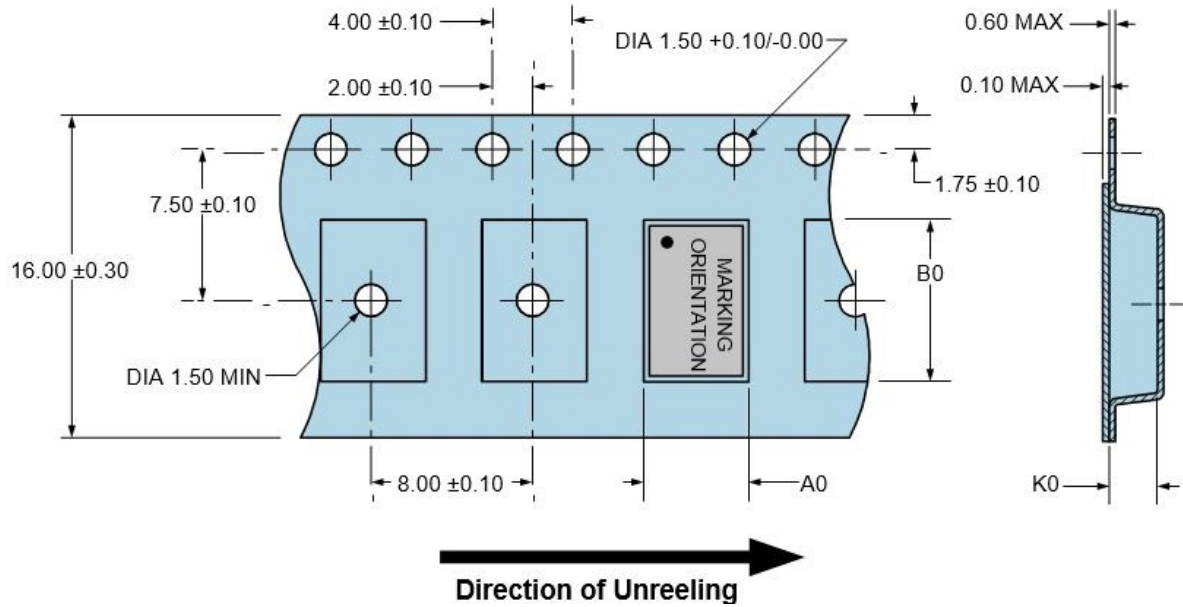
**Note 3:** Capacitance value ( $C_L$ ) includes sum of all probe and fixture capacitance. See applicable specification sheet for 'Load Drive Capability'.

**TAPE & REEL DIMENSIONS**

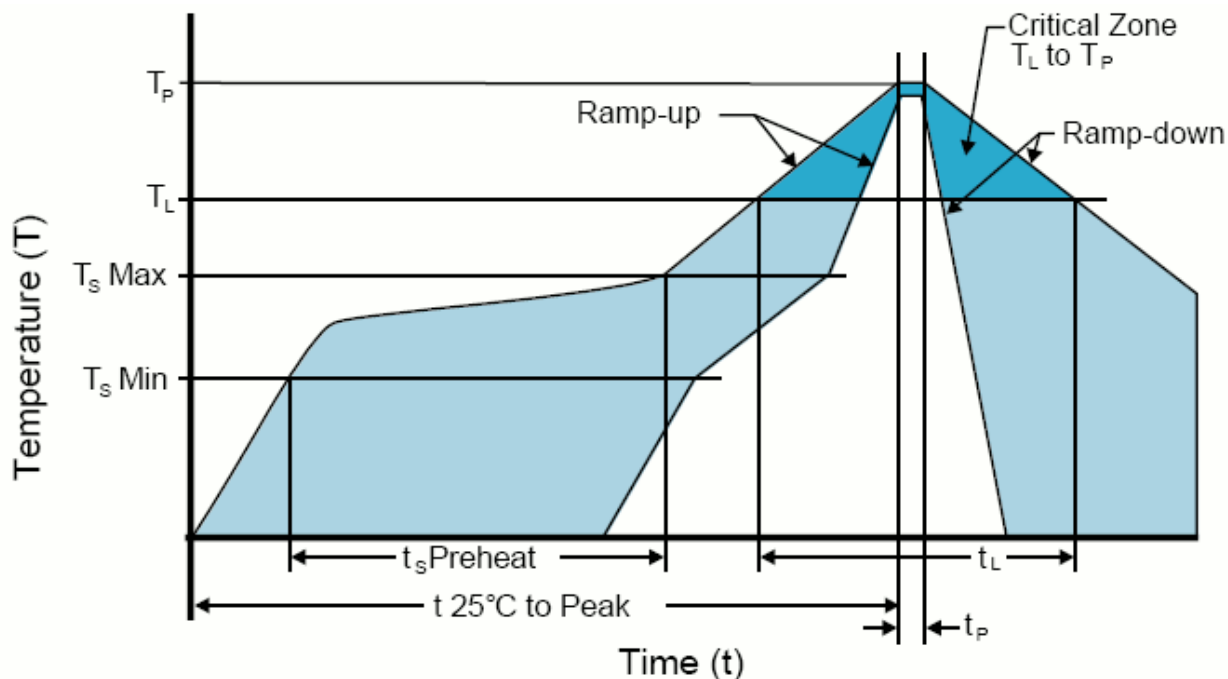
Quantity per Reel: 1,000 Units

All Dimensions in Millimeters

Compliant to EIA-481



**RECOMMENDED SOLDER REFLOW METHOD**



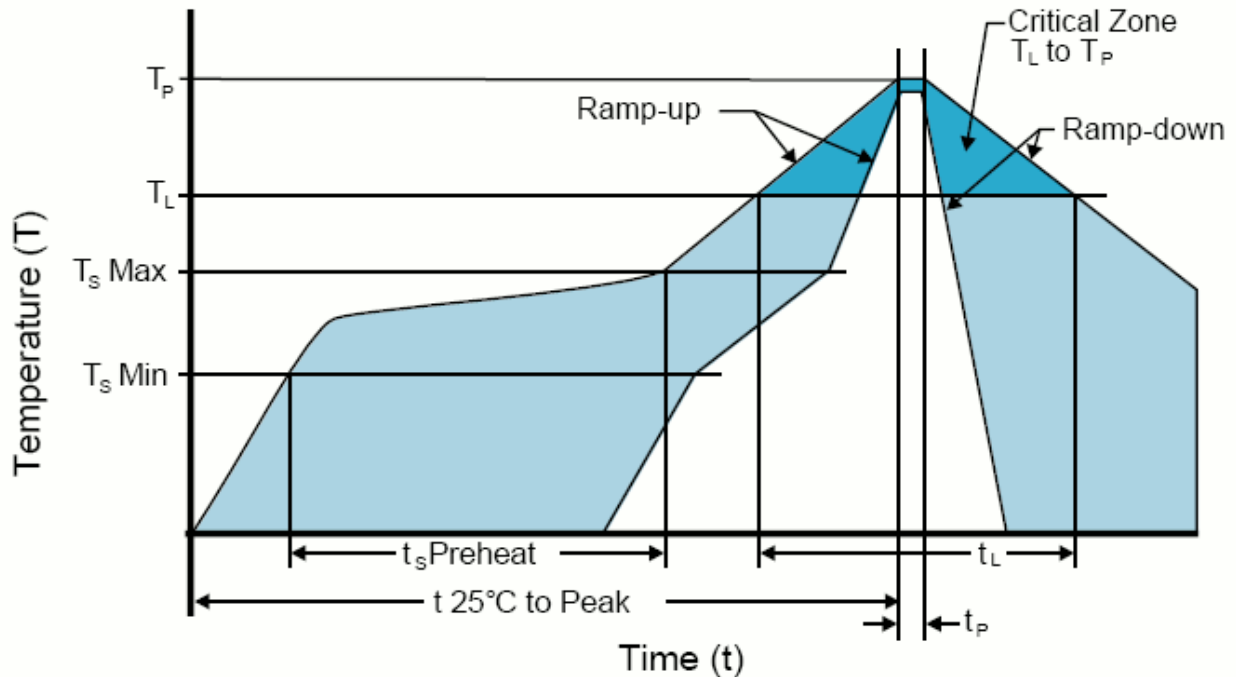
**HIGH TEMPERATURE INFRARED/CONVECTION**

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