

**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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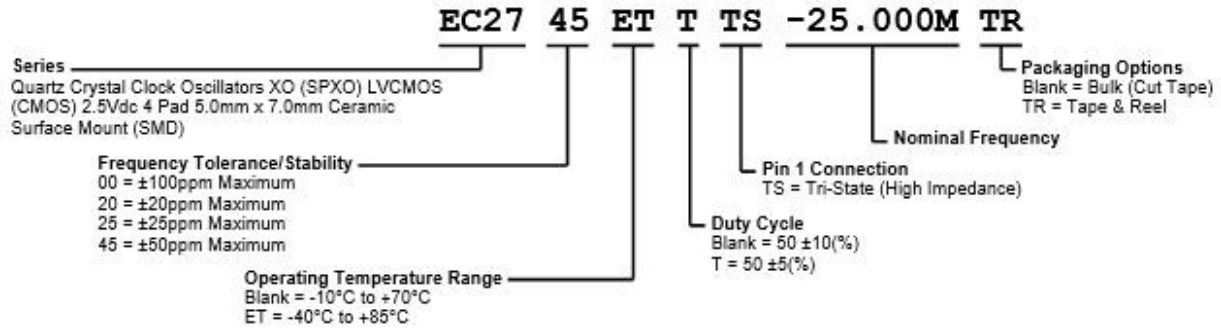
**ITEM DESCRIPTION**

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 2.5Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

**ELECTRICAL SPECIFICATIONS**

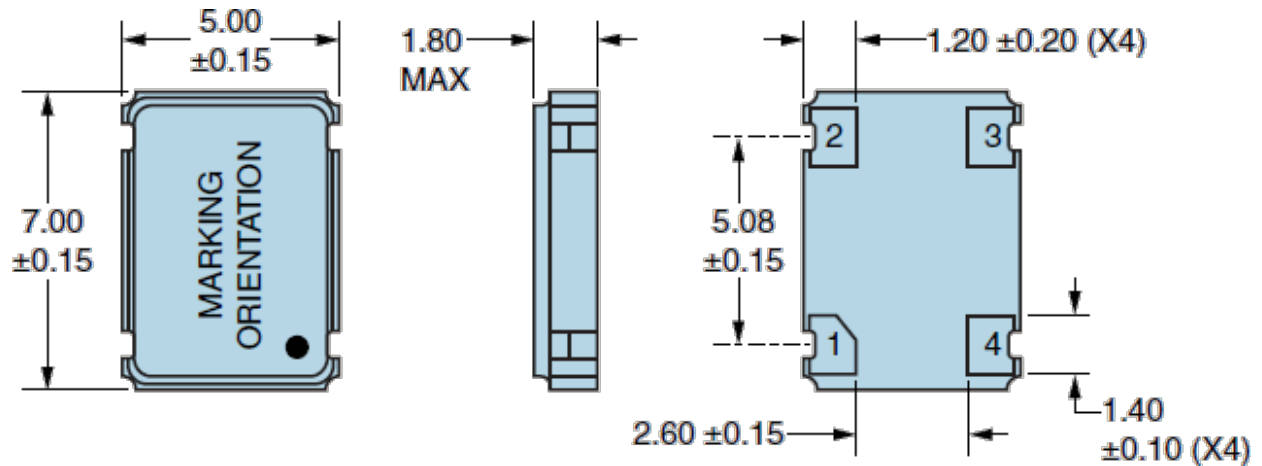
<b>Nominal Frequency</b>	1.544MHz to 200MHz
<b>Frequency Tolerance/Stability</b>	Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration ±100ppm Maximum ±20ppm Maximum ±25ppm Maximum ±50ppm 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>	2.5Vdc ±5%
<b>Input Current</b>	3mA Maximum over Nominal Frequency of 1.544MHz to 9.999999MHz 4mA Maximum over Nominal Frequency of 10MHz to 19.999999MHz 5mA Maximum over Nominal Frequency of 20MHz to 39.999999MHz 6mA Maximum over Nominal Frequency of 40MHz to 50MHz 10mA Maximum over Nominal Frequency of 50.000001MHz to 69.999999MHz 15mA Maximum over Nominal Frequency of 70MHz to 110MHz 35mA Maximum over Nominal Frequency of 110.000001MHz to 125MHz 45mA Maximum over Nominal Frequency of 125.000001MHz to 155MHz 58mA Maximum over Nominal Frequency of 155.000001MHz to 200MHz
<b>Output Voltage Logic High (VOH)</b>	IOH = -4mA 90% of Vdd Minimum
<b>Output Voltage Logic Low (VOL)</b>	IOL = +4mA 10% of Vdd Maximum
<b>Rise/Fall Time</b>	Measured at 20% to 80% of waveform 6nSec Maximum over Nominal Frequency of 1.544MHz to 24MHz 4nSec Maximum over Nominal Frequency of 24.000001MHz to 50MHz 3nSec Maximum over Nominal Frequency of 50.000001MHz to 110MHz 2nSec Maximum over Nominal Frequency of 110.000001MHz to 200MHz
<b>Duty Cycle</b>	Measured at 50% of waveform 50 ±10(%) 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>Output Control Input Voltage Logic High (Vih)</b>	90% of Vdd Minimum or No Connect to Enable Output.
<b>Output Control Input Voltage Logic Low (Vil)</b>	10% 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**

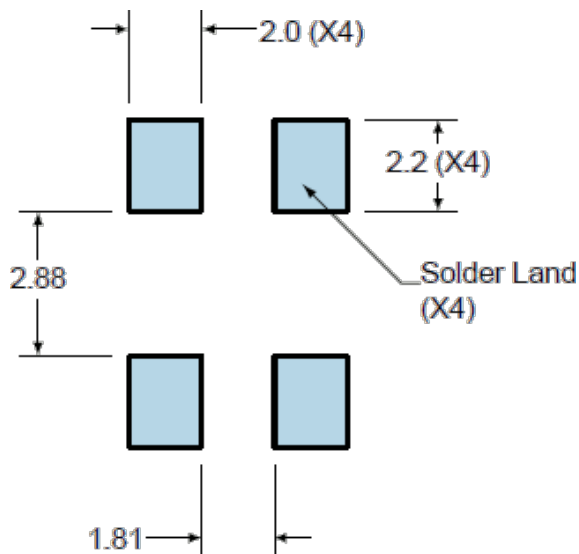


# EC27 Series

## MECHANICAL DIMENSIONS



## SUGGESTED SOLDER PAD LAYOUT



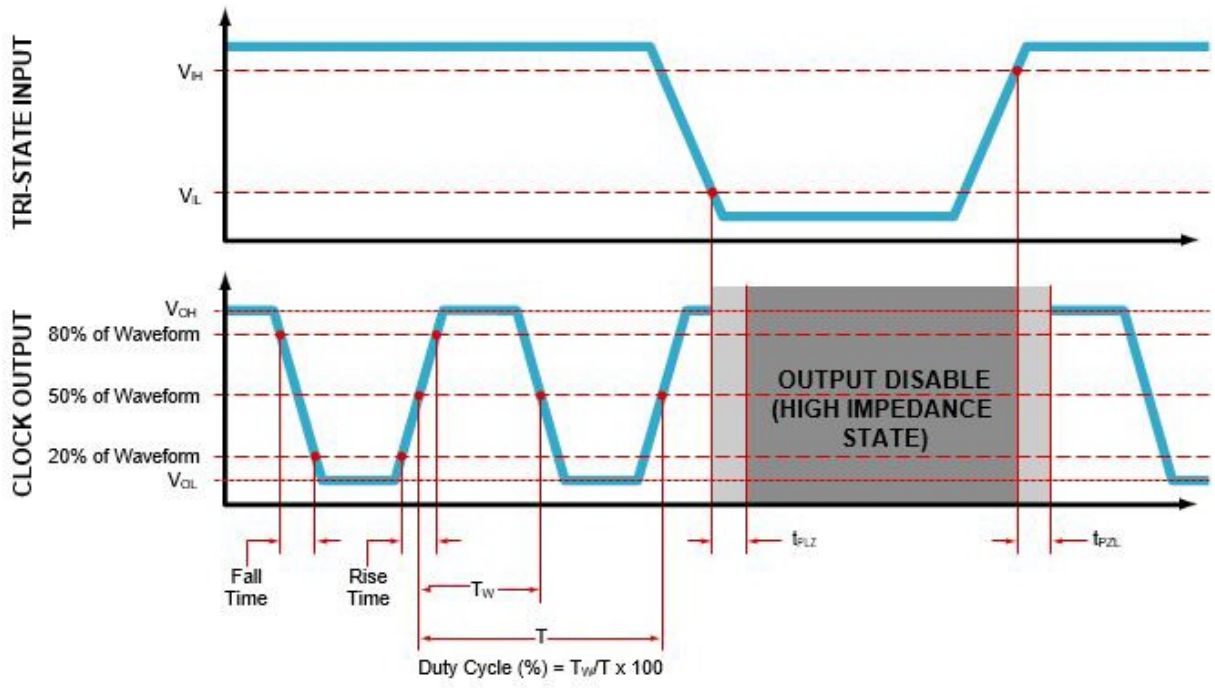
PIN	CONNECTION
1	Tri-State
2	Case/Ground
3	Output
4	Supply Voltage

All Tolerances are  $\pm 0.1$

**All Dimensions in Millimeters**

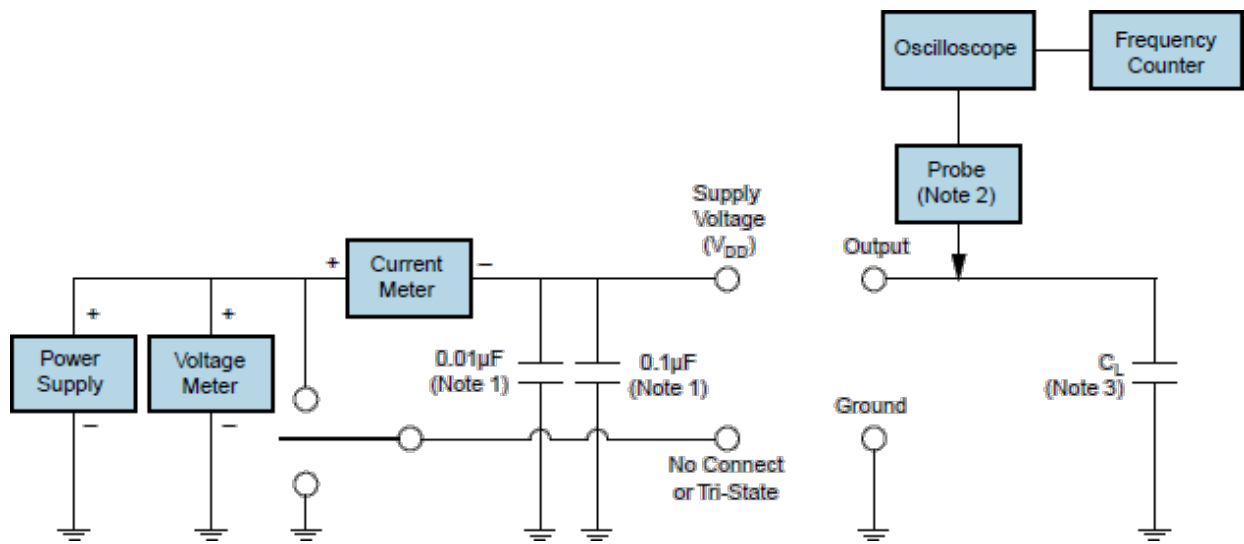
# EC27 Series

## OUTPUT WAVEFORM & TIMING DIAGRAM



## EC27 Series

### TEST CIRCUIT FOR CMOS OUTPUT



**Note 1:** An external  $0.1\mu\text{F}$  low frequency tantalum bypass capacitor in parallel with a  $0.01\mu\text{F}$  high frequency ceramic bypass Capacitor close to the package ground pin is required.

**Note 2:** A low input capacitance ( $<12\text{pF}$ ), 10X Attenuation Factor, High Impedance ( $>10\text{Mohms}$ ), and High bandwidth ( $>300\text{MHz}$ ) 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'.

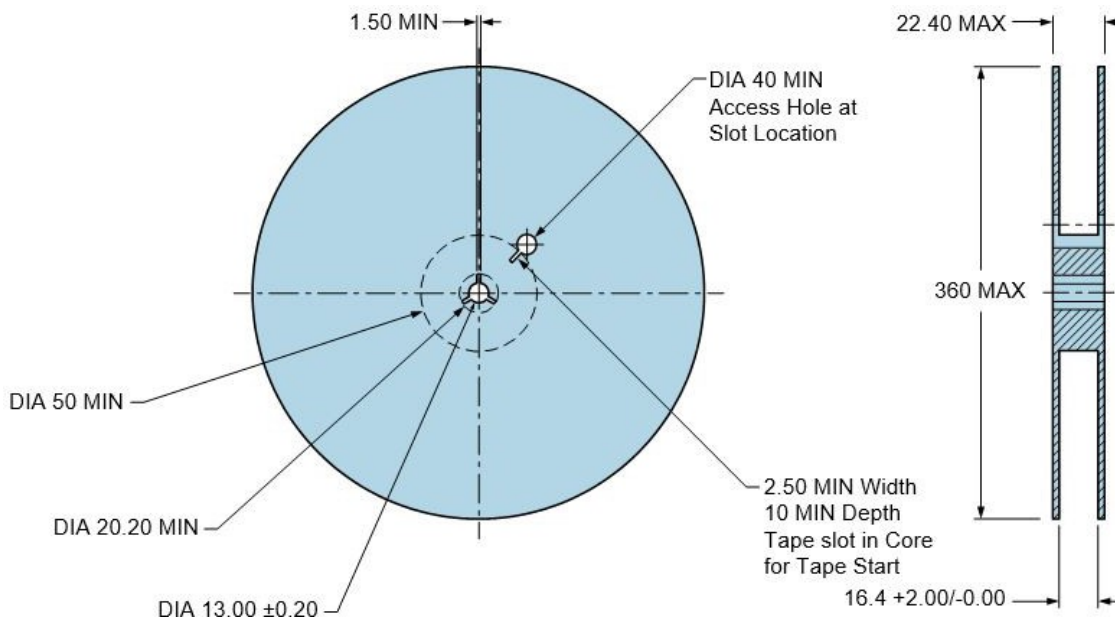
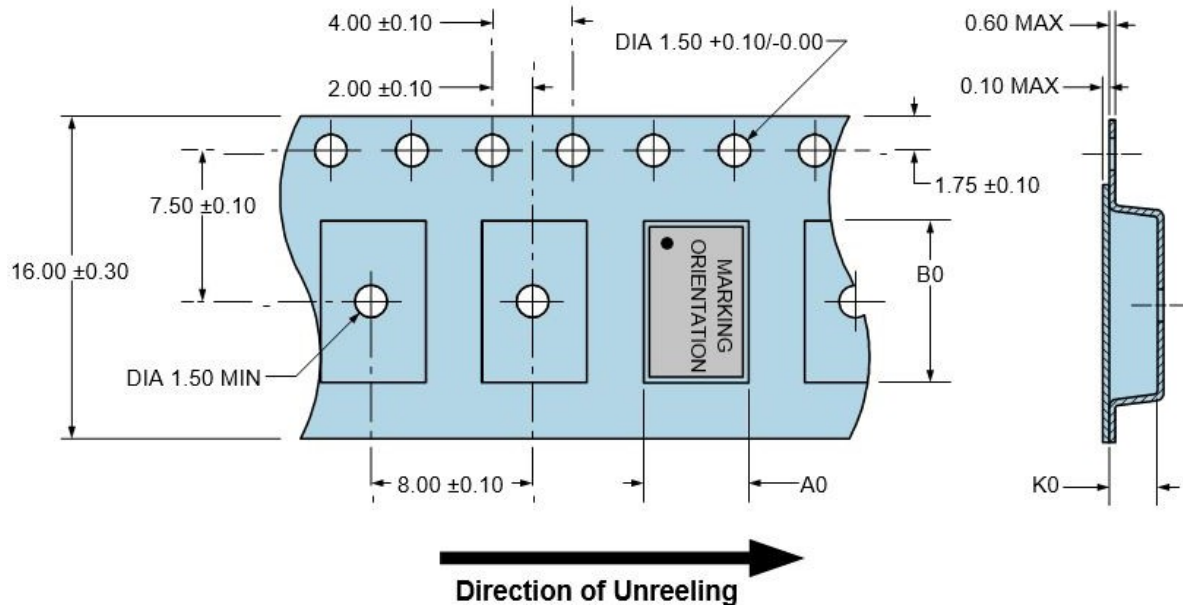
# EC27 Series

## TAPE & REEL DIMENSIONS

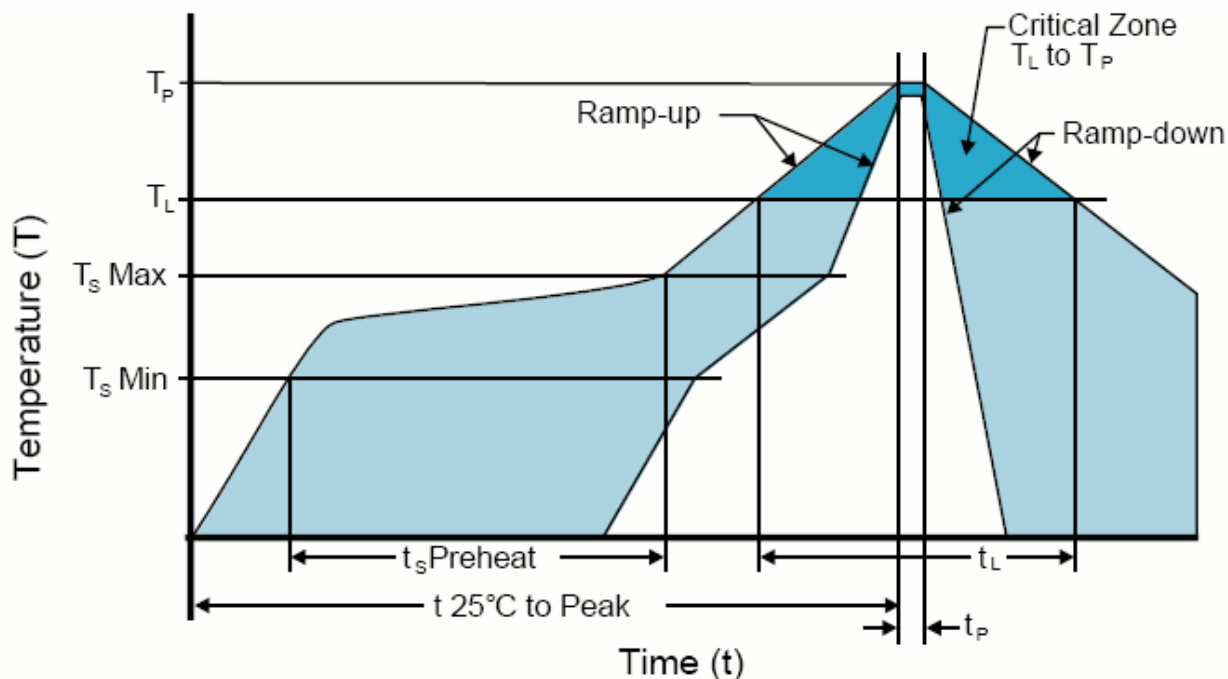
Quantity per Reel: 1,000 Units

All Dimensions in Millimeters

Compliant to EIA-481



**RECOMMENDED SOLDER REFLOW METHOD**

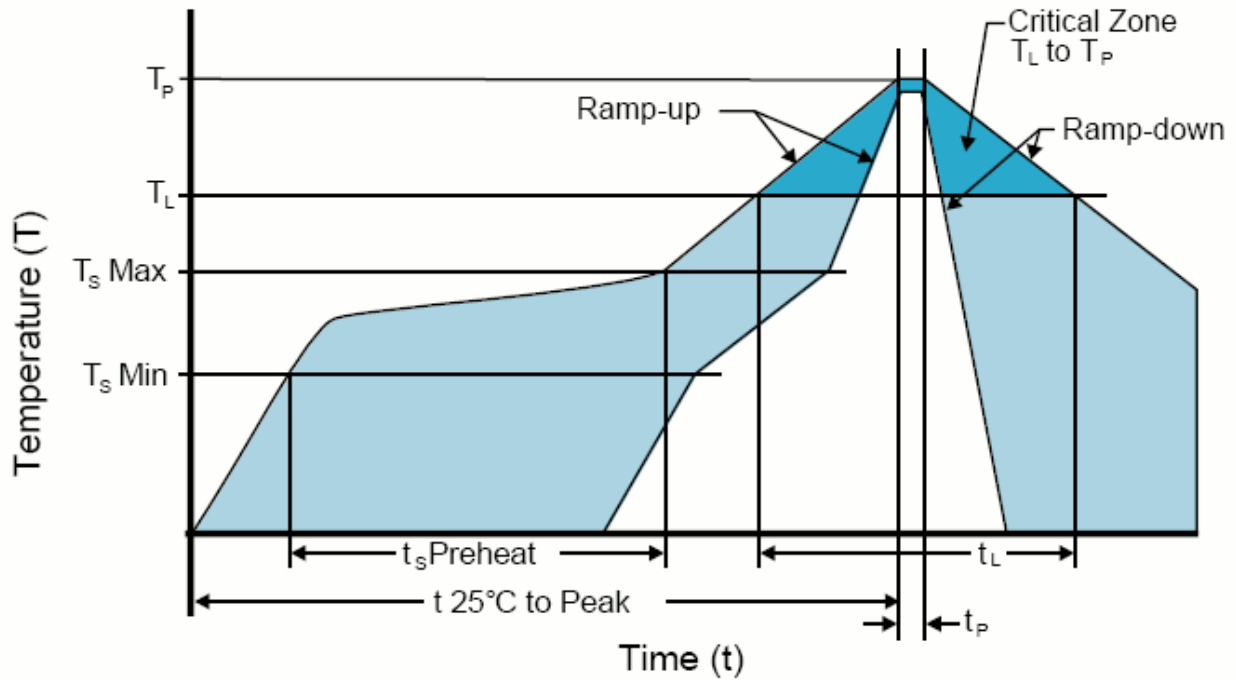


HIGH TEMPERATURE INFRARED/CONVECTION	
<b>T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)</b>	3°C/Second Maximum
<b>Preheat</b>	
- Temperature Minimum (T <sub>s</sub> MIN)	150°C
- Temperature Typical (T <sub>s</sub> TYP)	175°C
- Temperature Maximum (T <sub>s</sub> MAX)	200°C
- Time (t <sub>s</sub> )	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.)