

## REGULATORY COMPLIANCE

				
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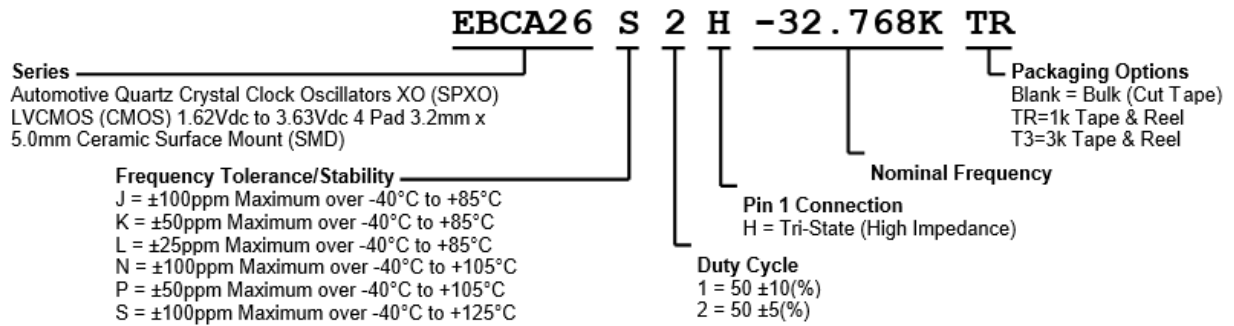
## ITEM DESCRIPTION

Automotive Grade Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 1.62Vdc to 3.63Vdc 4 Pad 3.2mm x 5.0mm Ceramic Surface Mount (SMD)

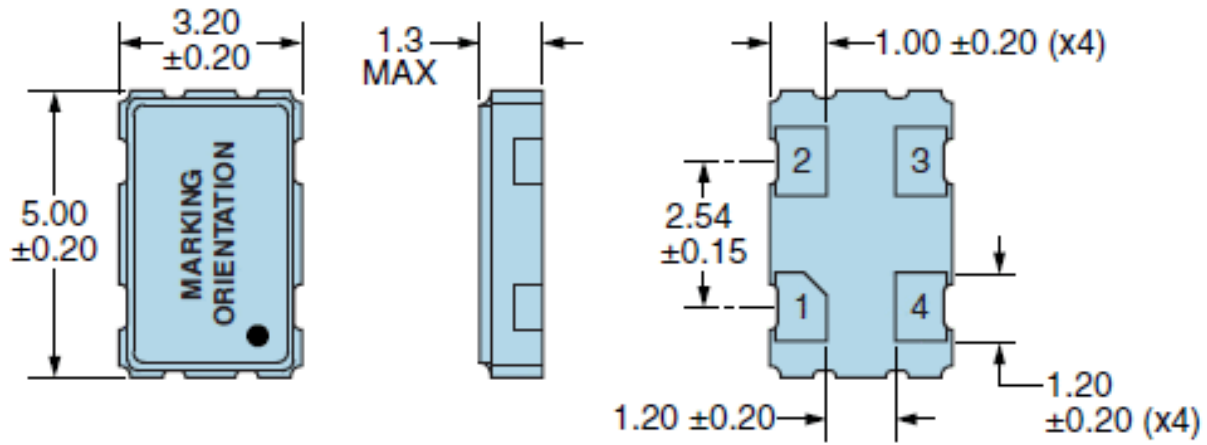
## ELECTRICAL SPECIFICATIONS

<b>Nominal Frequency</b>	32.768kHz
<b>Frequency Tolerance/Stability</b>	Inclusive of all conditions: Calibration Tolerance (at 25°C), Frequency Stability over the Operating Temperature Range, Supply Voltage Change (±5%), Output Load Change (±5%), and First Year Aging at 25°C ±100ppm Maximum over -40°C to +85°C ±50ppm Maximum over -40°C to +85°C ±25ppm Maximum over -40°C to +85°C ±100ppm Maximum over -40°C to +105°C ±50ppm Maximum over -40°C to +105°C ±100ppm Maximum over -40°C to +125°C
<b>Aging at 25°C</b>	±3ppm/year Maximum
<b>Supply Voltage</b>	1.62Vdc to 3.63Vdc
<b>Input Current</b>	Unloaded, Vdd = 3.3Vdc 50µA Typical, 100µA Maximum
<b>Output Voltage Logic High (V<sub>OH</sub>)</b>	I <sub>OH</sub> = -1mA 90% of Vdd Minimum
<b>Output Voltage Logic Low (V<sub>OL</sub>)</b>	I <sub>OL</sub> = +1mA 10% of Vdd Maximum
<b>Rise/Fall Time</b>	Measured at 10% to 90% of Waveform 15nSec Maximum
<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 (V<sub>IH</sub>)</b>	70% of Vdd Minimum or No Connect to Enable Output
<b>Output Control Input Voltage Logic Low (V<sub>IL</sub>)</b>	30% of Vdd Maximum to Disable Output (High Impedance)
<b>Standby Current</b>	Disable Output: High Impedance 1µA Typical, 3µA Maximum
<b>Start Up Time</b>	2mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

## PART NUMBERING GUIDE



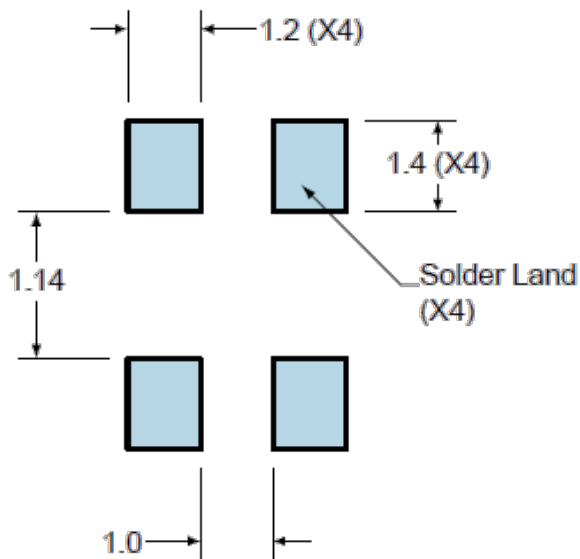
**MECHANICAL DIMENSIONS**



**Seam Sealed**

**Terminal Plating Thickness:** Gold (0.3 to 1.0µm) over Nickel (1.27 to 8.89µm).

**SUGGESTED SOLDER PAD LAYOUT**

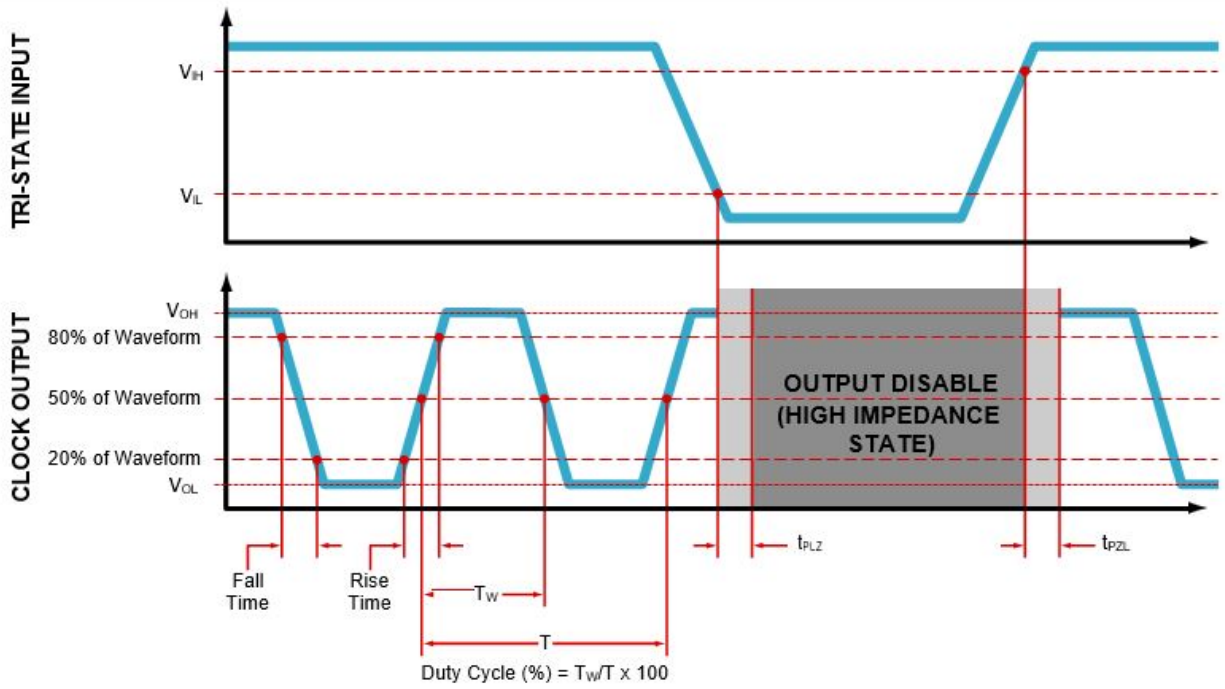


PIN	CONNECTION
1	Tri-State
2	Case/Ground
3	Output
4	Supply Voltage

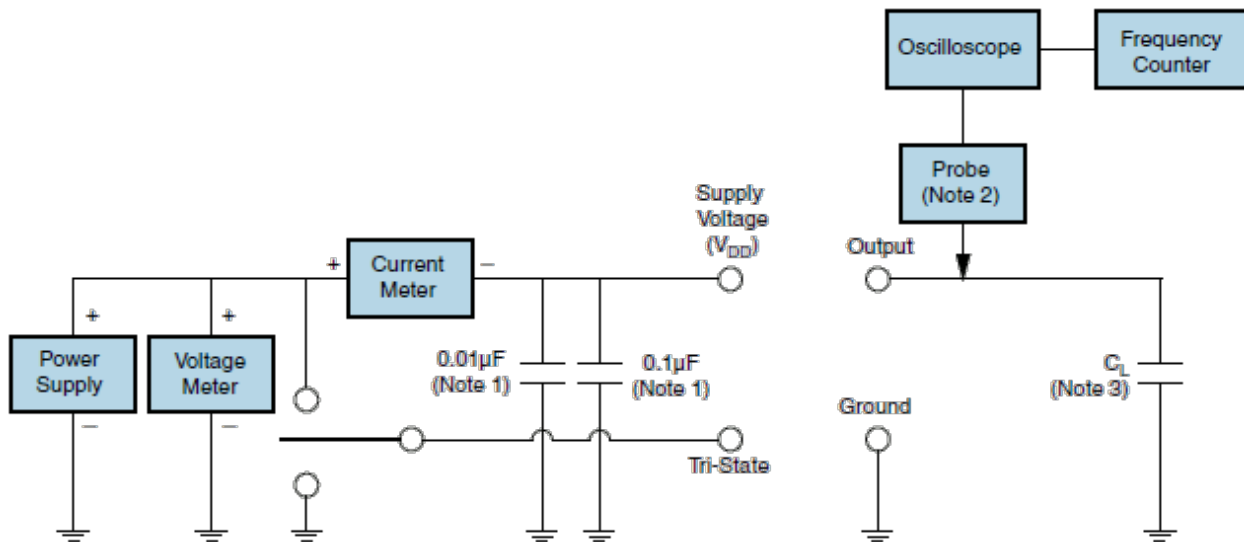
All Tolerances are ±0.1

**All Dimensions in Millimeters**

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT



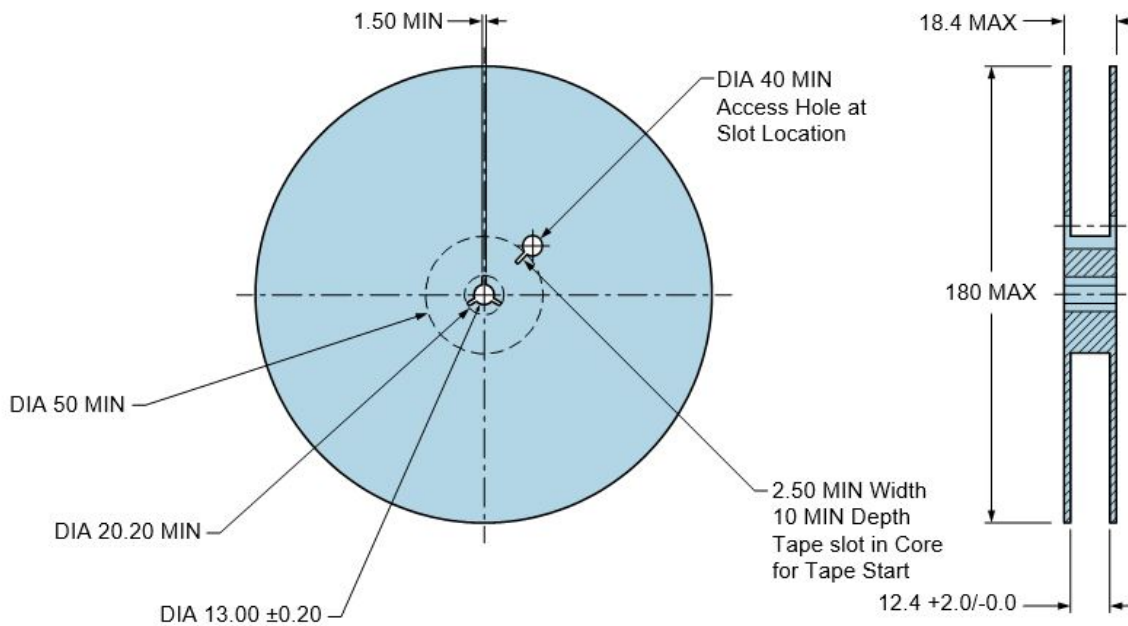
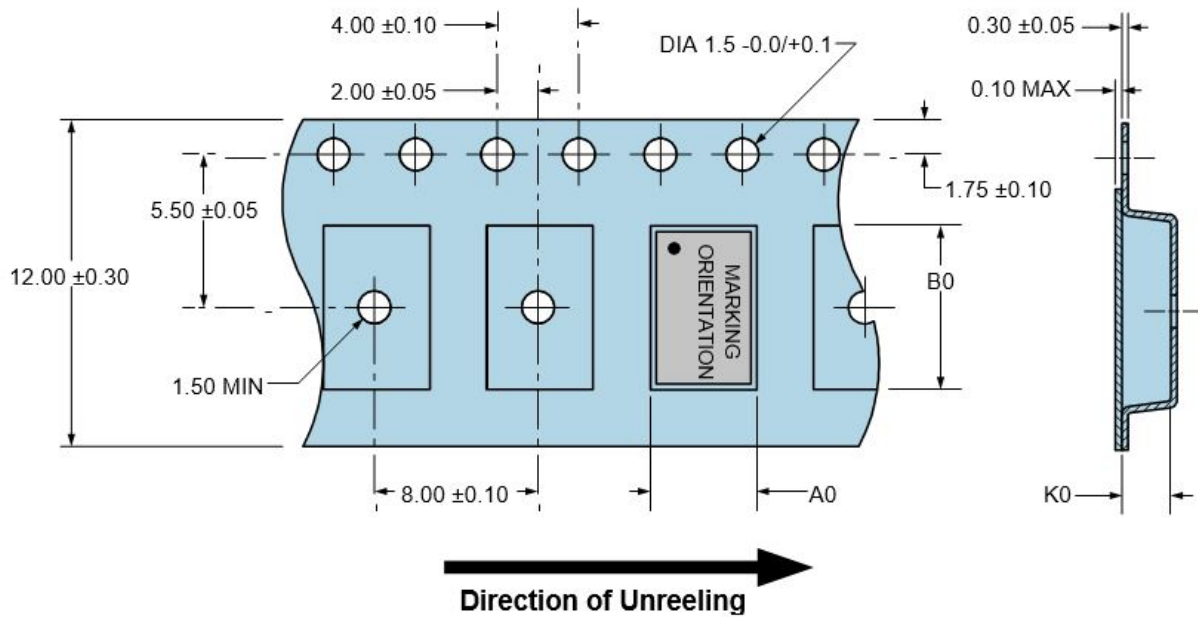
- Note 1:** An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less Than 2mm) to the package ground and supply voltage pin is required.
- Note 2:** A low input capacitance (<12pF), 10X Attenuation Factor, High Impedance (>10Mohms), and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

## TAPE & REEL DIMENSIONS

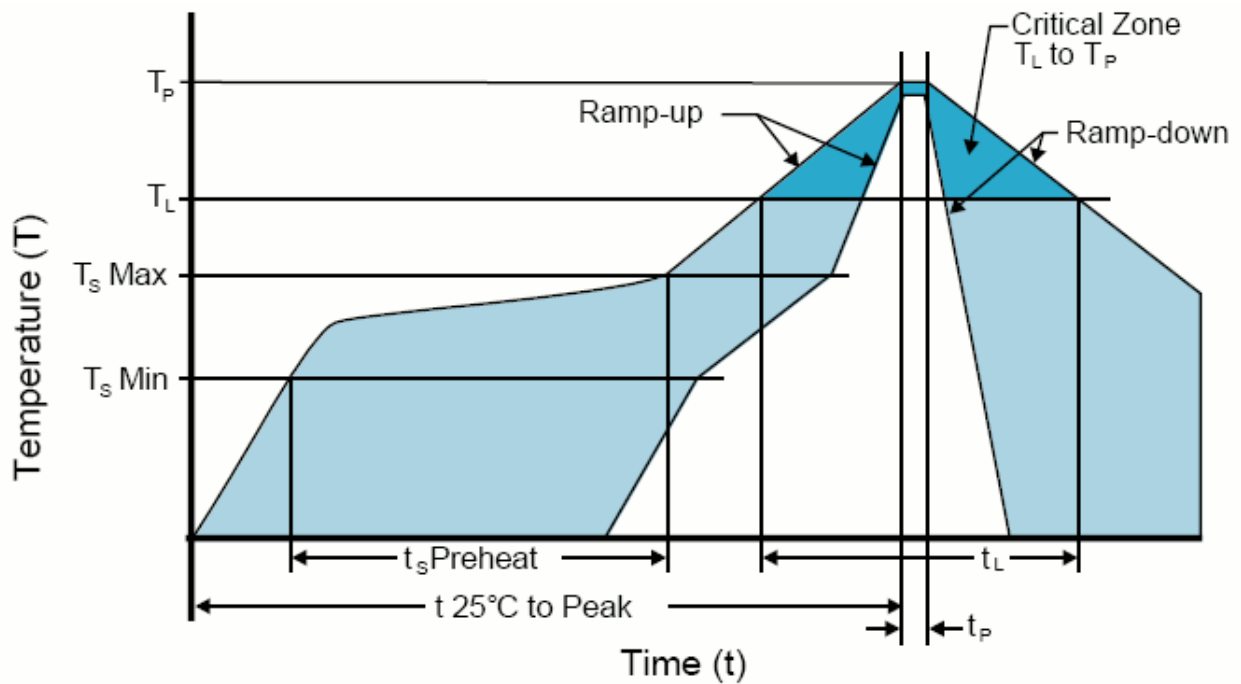
Quantity per Reel: TR=1000 Units or T3=3000 Units

All Dimensions in Millimeters

Compliant to EIA-481



RECOMMENDED SOLDER REFLOW METHOD



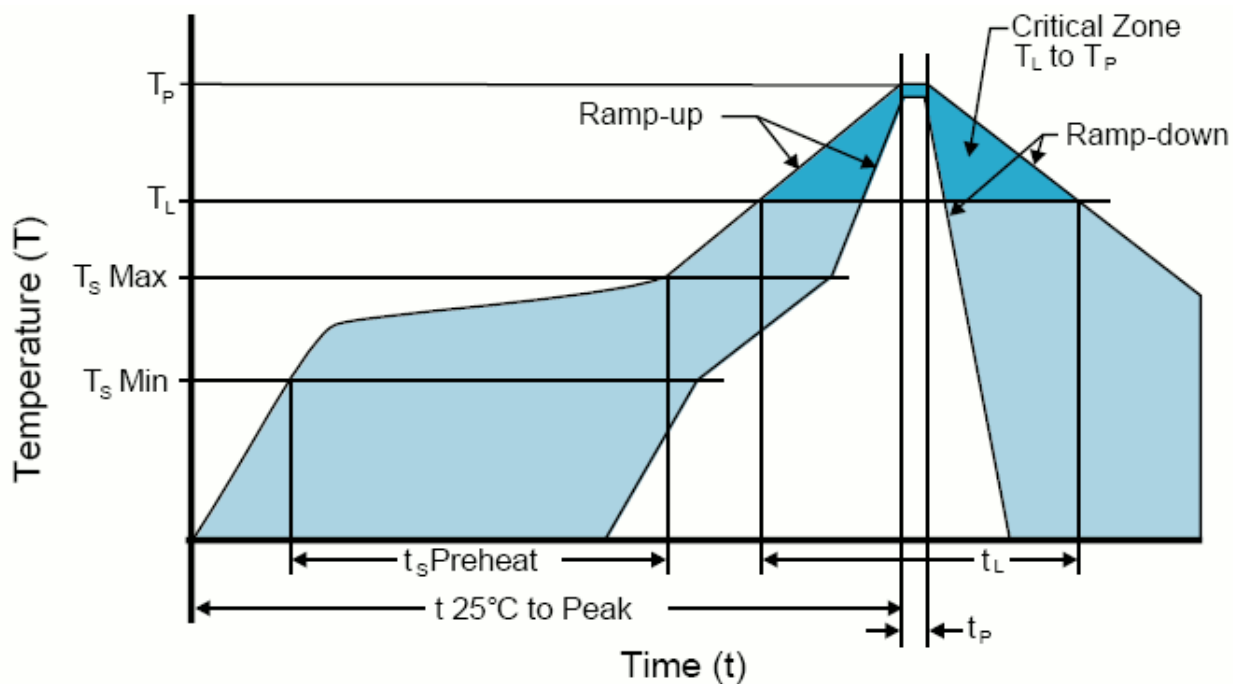
**HIGH TEMPERATURE INFRARED/CONVECTION**

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.)



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