

## 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

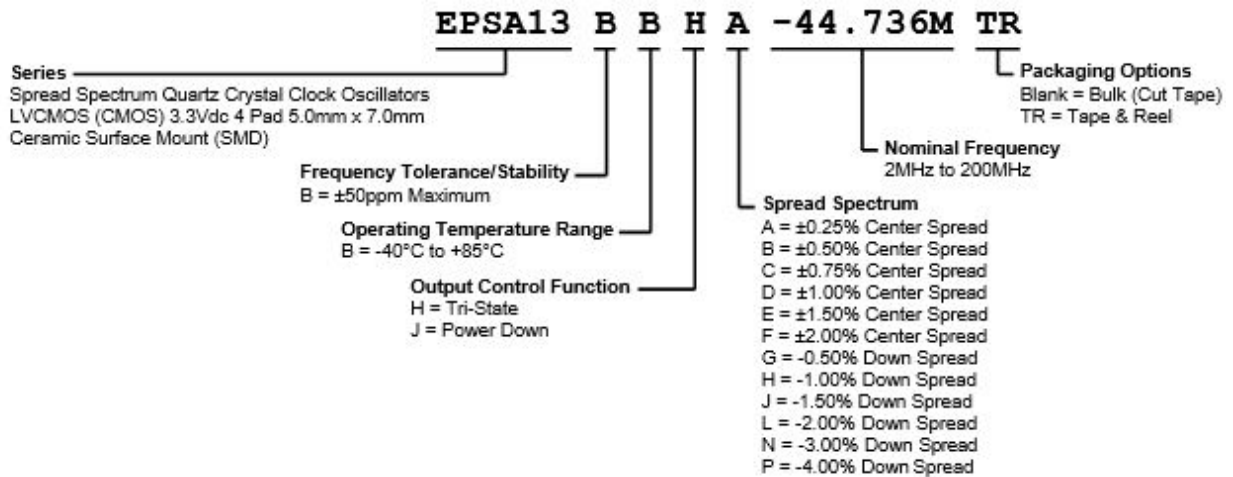
Spread Spectrum Quartz Crystal Clock Oscillators LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Ceramic Surface Mount (SMD)

## ELECTRICAL SPECIFICATIONS

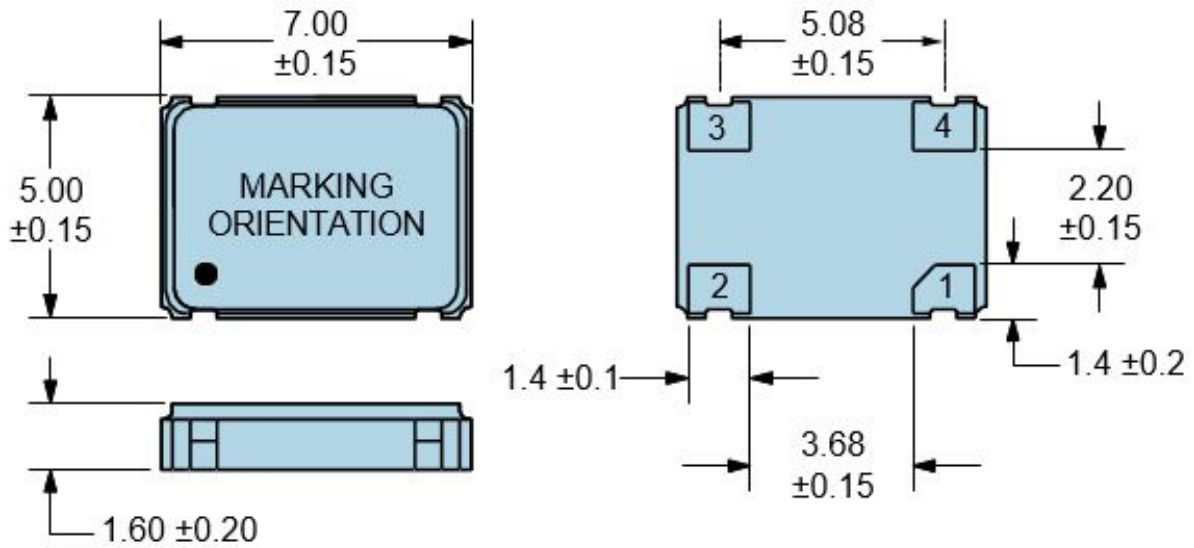
<b>Nominal Frequency</b>	2MHz to 200MHz
<b>Frequency Tolerance/Stability</b>	Inclusive of all conditions: Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration. ±50ppm Maximum
<b>Operating Temperature Range</b>	-40°C to +85°C
<b>Supply Voltage</b>	3.3Vdc ±10%
<b>Maximum Supply Voltage</b>	-0.5Vdc to +4.2Vdc
<b>Input Current</b>	15mA Maximum over Nominal Frequency of 2MHz to 25MHz 23mA Maximum over Nominal Frequency of 25.000001MHz to 50MHz 27mA Maximum over Nominal Frequency of 50.000001MHz to 100MHz 30mA Maximum over Nominal Frequency of 100.000001MHz to 166MHz 40mA Maximum over Nominal Frequency of 166.000001MHz to 200MHz
<b>Output Voltage Logic High (Voh)</b>	90% of Vdd Minimum (IOH=-8mA)
<b>Output Voltage Logic Low (Vol)</b>	10% of Vdd Maximum (IOL=+8mA)
<b>Rise/Fall Time</b>	Measured at 10% to 90% of Waveform 3nSec Maximum
<b>Duty Cycle</b>	Measured at 50% of waveform 50 ±5 (%)
<b>Load Drive Capability</b>	15pF Maximum
<b>Output Logic Type</b>	CMOS
<b>Output Control Function</b>	Tri-State (Disabled Output: High Impedance) Power Down (Disabled Output: High Impedance)
<b>Power Down Input Voltage (Vih and Vil)</b>	70% of Vdd Minimum or No Connection to Enable Output, 30% of Vdd Maximum to Disable Output
<b>Tri-State Input Voltage (Vih and Vil)</b>	70% of Vdd Minimum or No Connection to Enable Output, 30% of Vdd Maximum to Disable Output
<b>Power Down Output Disable Time</b>	100nSec Maximum
<b>Power Down Output Enable Time</b>	3mSec Maximum
<b>Standby Current</b>	Unloaded; Pad 1=Ground 10µA Maximum
<b>Tri-State Output Disable Time</b>	100nSec Maximum
<b>Tri-State Output Enable Time</b>	100nSec Maximum
<b>Disable Current</b>	Unloaded; Pad 1=Ground 20mA Maximum

<b>Spread Spectrum</b>	±0.25% Center Spread ±0.50% Center Spread ±0.75% Center Spread ±1.00% Center Spread ±1.50% Center Spread ±2.00% Center Spread -0.50% Down Spread -1.00% Down Spread -1.50% Down Spread -2.00% Down Spread -3.00% Down Spread -4.00% Down Spread
<b>Modulation Frequency</b>	30kHz Minimum, 32kHz Typical, 45kHz Maximum
<b>Period Jitter</b>	Cycle to Cycle; Spread Spectrum-On 100pSec Maximum
<b>Start Up Time</b>	10mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

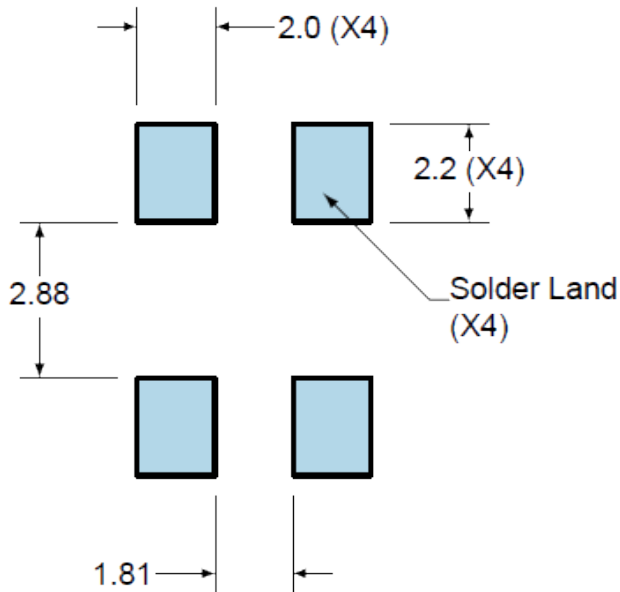
## PART NUMBERING GUIDE



**MECHANICAL DIMENSIONS**



**SUGGESTED SOLDER PAD LAYOUT**

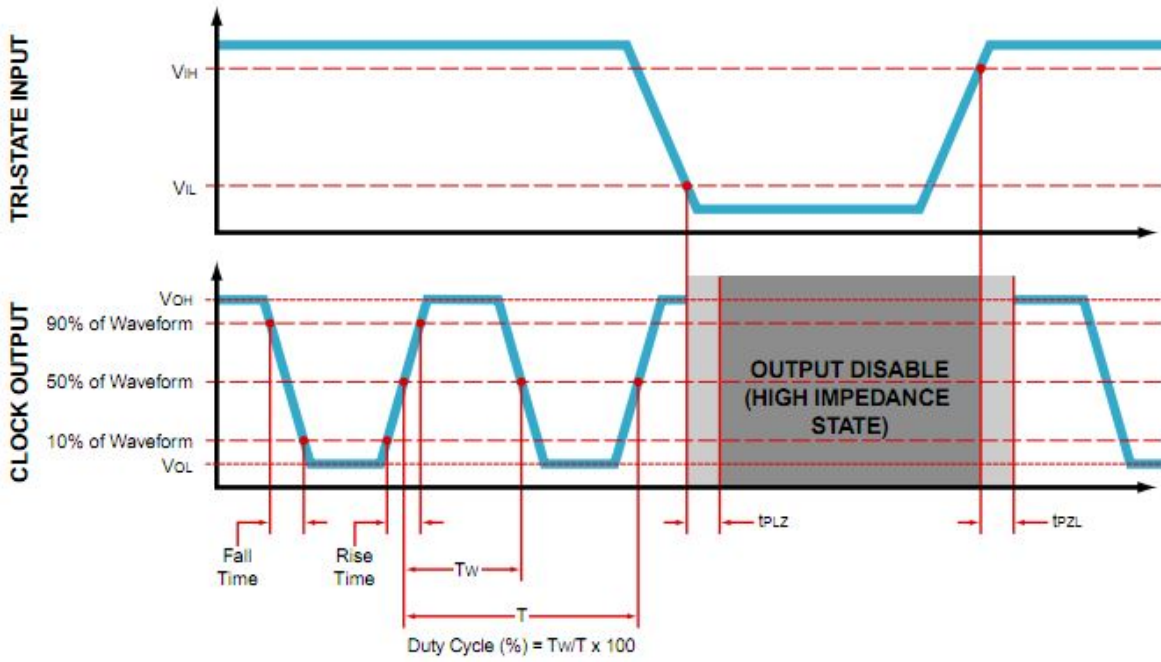


PIN	CONNECTION
1	Power Down Or Tri-State
2	Case/Ground
3	Output
4	Supply Voltage

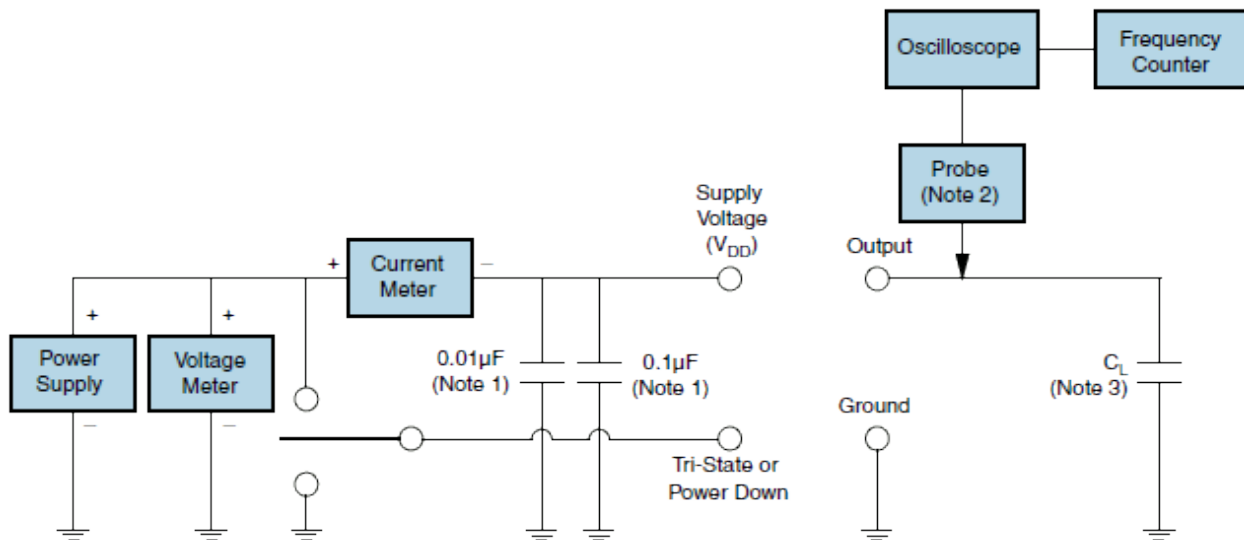
All Tolerances are ±0.1

**All Dimensions in Millimeters**

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT



**Note 1:** An external  $0.01\mu\text{F}$  ceramic bypass capacitor in parallel with a  $0.1\mu\text{F}$  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 ( $<12\text{pF}$ ), 10X Attenuation Factor, High Impedance ( $>10\text{Mohms}$ ), and High bandwidth ( $>300\text{MHz}$ ) passive probe is recommended.

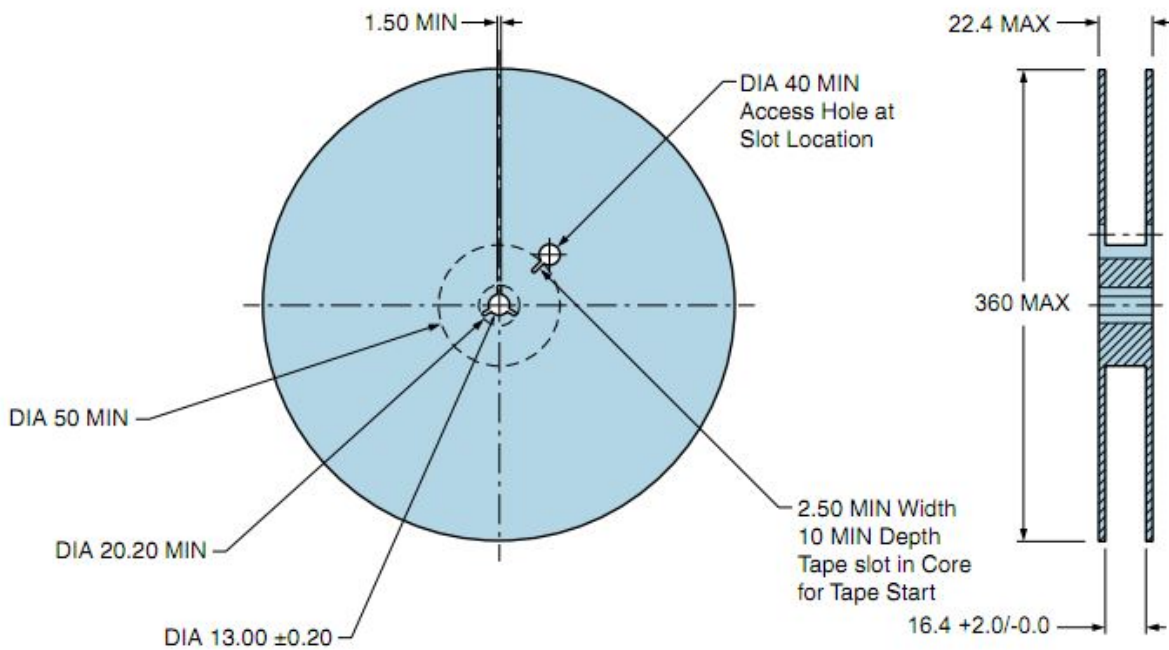
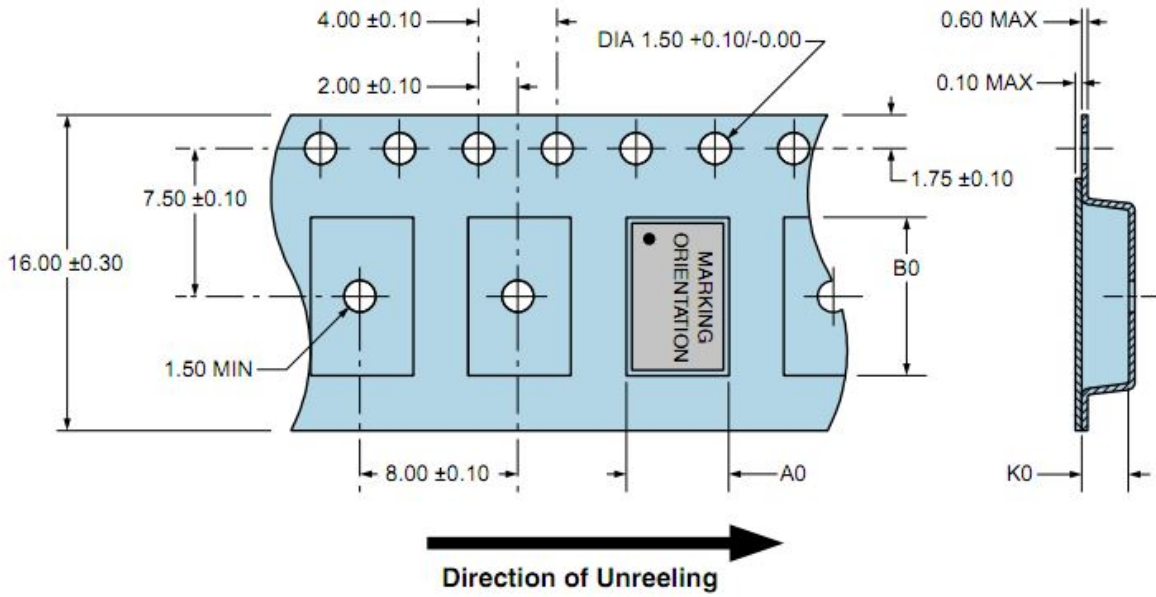
**Note 3:** Capacitance value  $C_L$  includes sum of all probe and fixture capacitance. See applicable specification sheet For 'Load Drive Capability'.

**TAPE & REEL DIMENSIONS**

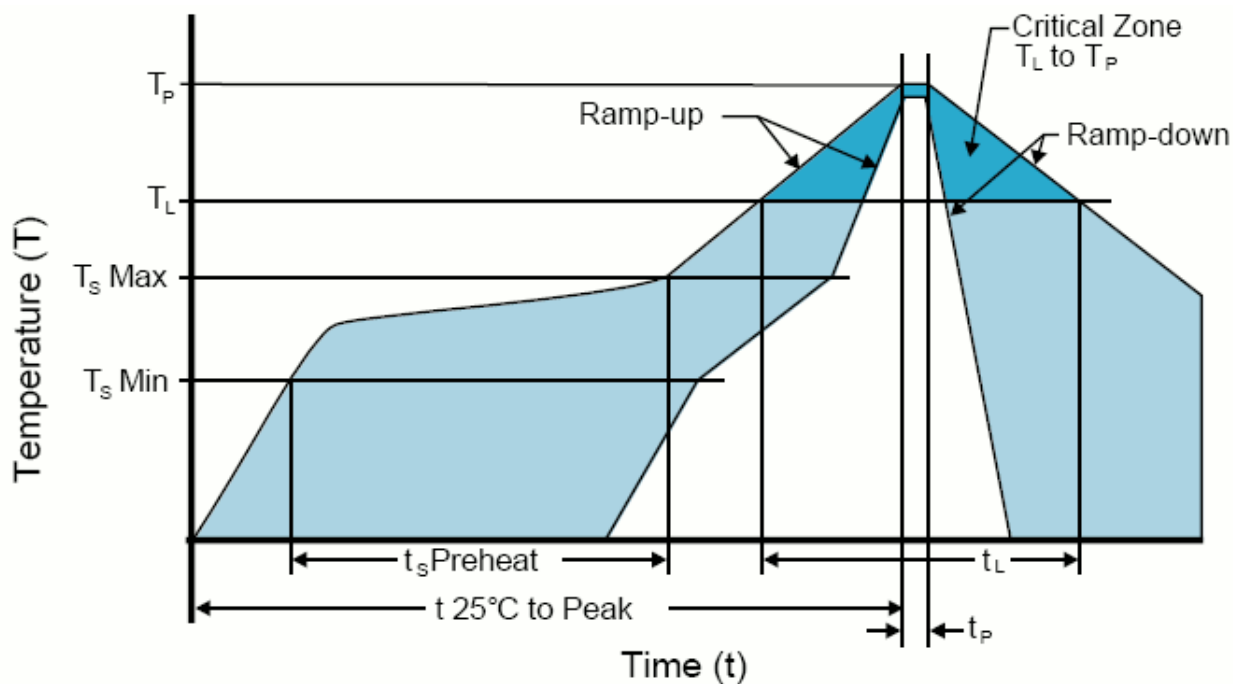
Quantity per Reel: 1000 Units

All Dimensions in Millimeters

Compliant to EIA-481



RECOMMENDED SOLDER REFLOW METHOD



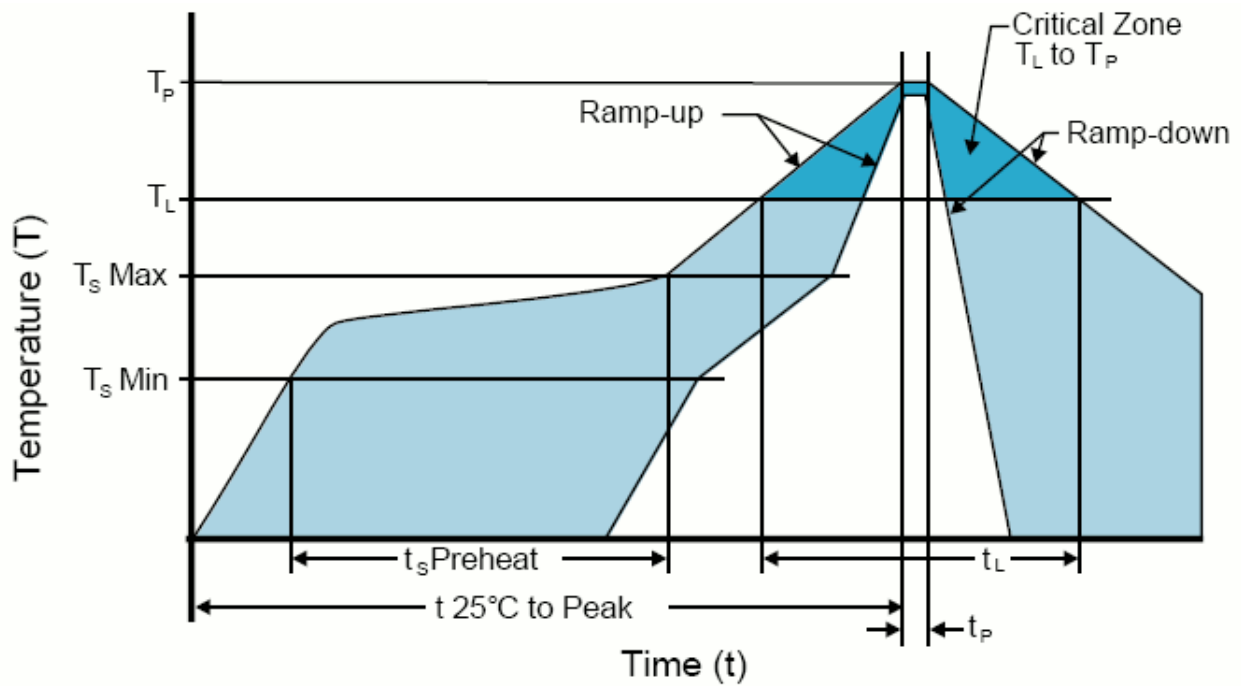
**HIGH TEMPERATURE INFRARED/CONVECTION**

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> MIN)	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> MIN)	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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