

ECN/PCN No.: **4476**

For Manufacturer		
<b>Product Description:</b> Ceramic SMD Crystal Oscillator	<b>Abracon Part Number / Part Series:</b> EP16E7 Series	<input type="checkbox"/> Documentation only <input checked="" type="checkbox"/> Series <input checked="" type="checkbox"/> ECN <input type="checkbox"/> Part Number <input checked="" type="checkbox"/> EOL
<b>Affected Revision:</b> Rev. G 12/11/2012	<b>New Revision:</b> EOL	<b>Application:</b> <input type="checkbox"/> Safety <input checked="" type="checkbox"/> Non-Safety
<b>Prior to Change:</b> ACTIVE		
<b>After Change:</b> EOL		
<b>Cause/Reason for Change:</b> Discontinuation of manufacturing capability		
Change Plan		
<b>Effective Date:</b> 11/15/2022	<b>Additional Remarks:</b> N/A	
<b>Change Declaration:</b> N/A		
<b>Issued Date:</b> 11/15/22	<b>Issued By:</b> Conor Healey	<b>Issued Department:</b> Engineering
<b>Approval:</b> Thomas Culhane Engineering Director	<b>Approval:</b> Reuben Quintanilla Quality Director	<b>Approval:</b> Ying Huang Purchasing Director
For Abracon EOL only		
<b>Last Time Buy (if applicable):</b> None	<b>Alternate Part Number / Part Series:</b> ASEDV, ASE3, AP3S	
<b>Additional Approval:</b>	<b>Additional Approval:</b>	<b>Additional Approval:</b>
Customer Approval (If Applicable)		
<b>Qualification Status:</b> <input type="checkbox"/> Approved <input type="checkbox"/> Not accepted <i>Note: It is considered approved if there is no feedback from the customer 1 month after ECN/PCN is released.</i>		
<b>Customer Part Number:</b>	<b>Customer Project:</b>	
<b>Company Name:</b>	<b>Company Representative:</b>	<b>Representative Signature:</b>
<b>Customer Remarks:</b>		

**REGULATORY COMPLIANCE**

				
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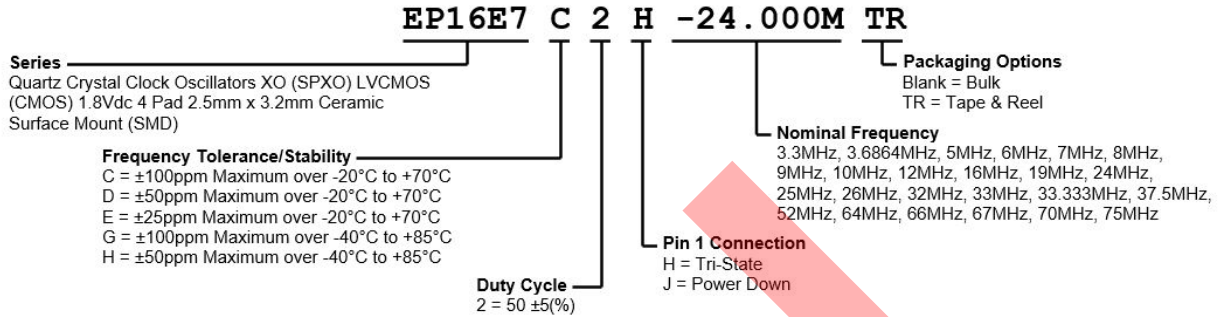
**ITEM DESCRIPTION**

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 1.8Vdc 4 pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD)

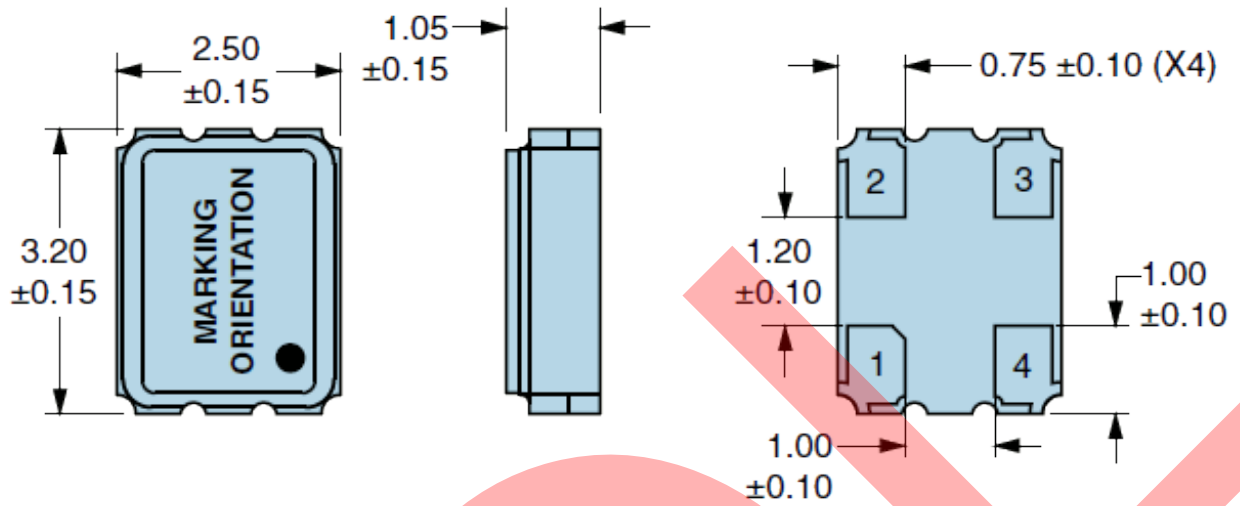
**ELECTRICAL SPECIFICATIONS**

<b>Nominal Frequency</b>	3.3MHz to 75MHz
<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°, 260°C Reflow, Shock, and Vibration ±100ppm Maximum over -20°C to +70°C ±50ppm Maximum over -20°C to +70°C ±25ppm Maximum over -20°C to +70°C ±100ppm Maximum over -40°C to +85°C ±50ppm Maximum over -40°C to +85°C
<b>Aging at 25°C</b>	±5ppm/year Maximum
<b>Supply Voltage</b>	1.8Vdc ±5%
<b>Input Current</b>	8mA Maximum over Nominal Frequency of 3.3MHz to 25MHz 9mA Maximum over Nominal Frequency of 25.000001MHz to 50MHz 12mA Maximum over Nominal Frequency of 50.000001MHz to 75MHz
<b>Output Voltage Logic High (V<sub>OH</sub>)</b>	I <sub>OH</sub> = -8mA 90% of V <sub>dd</sub> Minimum
<b>Output Voltage Logic Low (V<sub>OL</sub>)</b>	I <sub>OL</sub> = +8mA 10% of V <sub>dd</sub> Maximum
<b>Rise/Fall Time</b>	Measured at 20% to 80% of waveform 6nSec Maximum over Nominal Frequency of 3.3MHz to 50MHz 4nSec Maximum over Nominal Frequency of 50.000001MHz to 75MHz
<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>Pin 1 Connection</b>	Tri-State Power Down
<b>Pin 1 Input Voltage (V<sub>IH</sub> and V<sub>IL</sub>)</b>	90% of V <sub>dd</sub> Minimum or No Connect to Enable Output, 10% of V <sub>dd</sub> Maximum to Disable Output
<b>Standby Current</b>	30µA Maximum (Pin 1 = Ground, Power Down)
<b>Disable Current</b>	4mA Maximum (Pin 1 = Ground, Tri-State)
<b>Absolute Clock Jitter</b>	350pSec Maximum over Nominal Frequency of 3.3MHz to 24.999999MHz 200pSec Maximum over Nominal Frequency of 25MHz to 75MHz
<b>Start Up Time</b>	10mSec Maximum
<b>Storage Temperature Range</b>	-55°C to 125°C

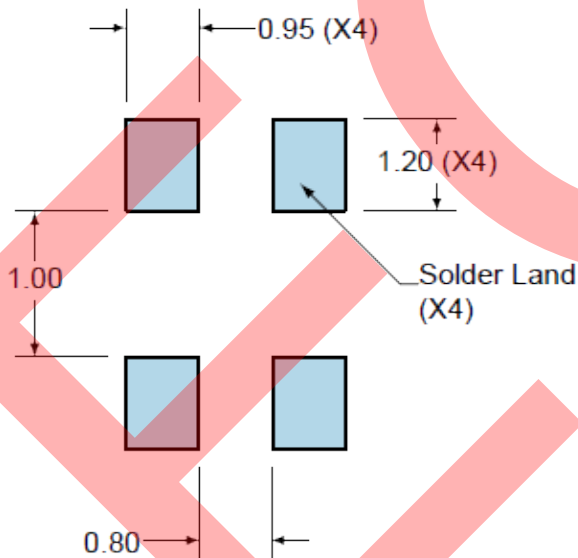
**PART NUMBERING GUIDE**



**MECHANICAL DIMENSIONS**



**SUGGESTED SOLDER PAD LAYOUT**

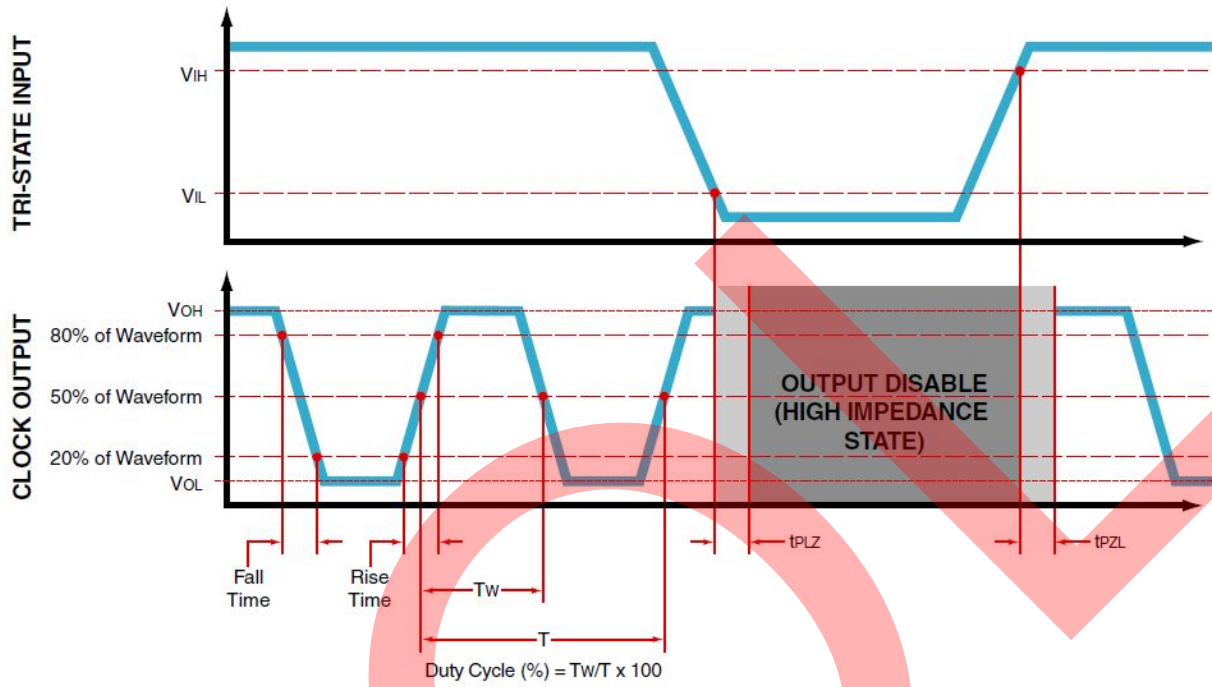


PIN	CONNECTION
1	Power Down Or Tri-State
2	Ground
3	Output
4	Supply Voltage

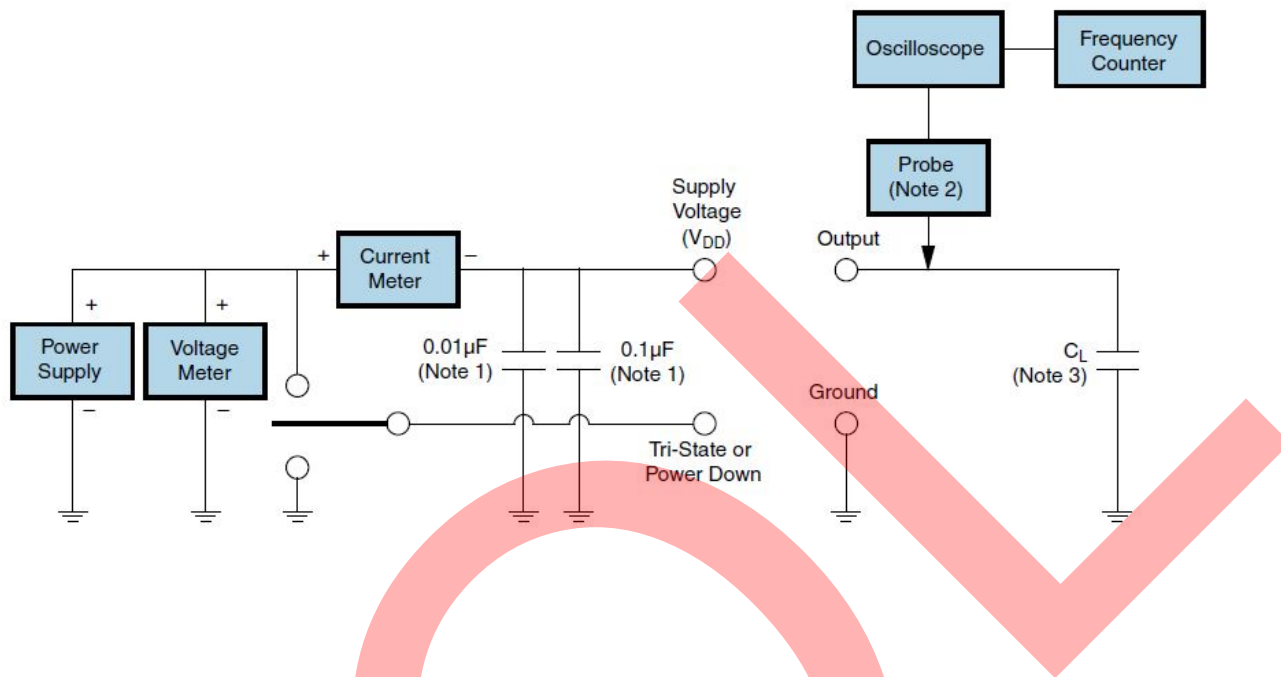
All Tolerances are  $\pm 0.1$

**All Dimensions in Millimeters**

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT



**Note 1:** An external 0.01µF 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.

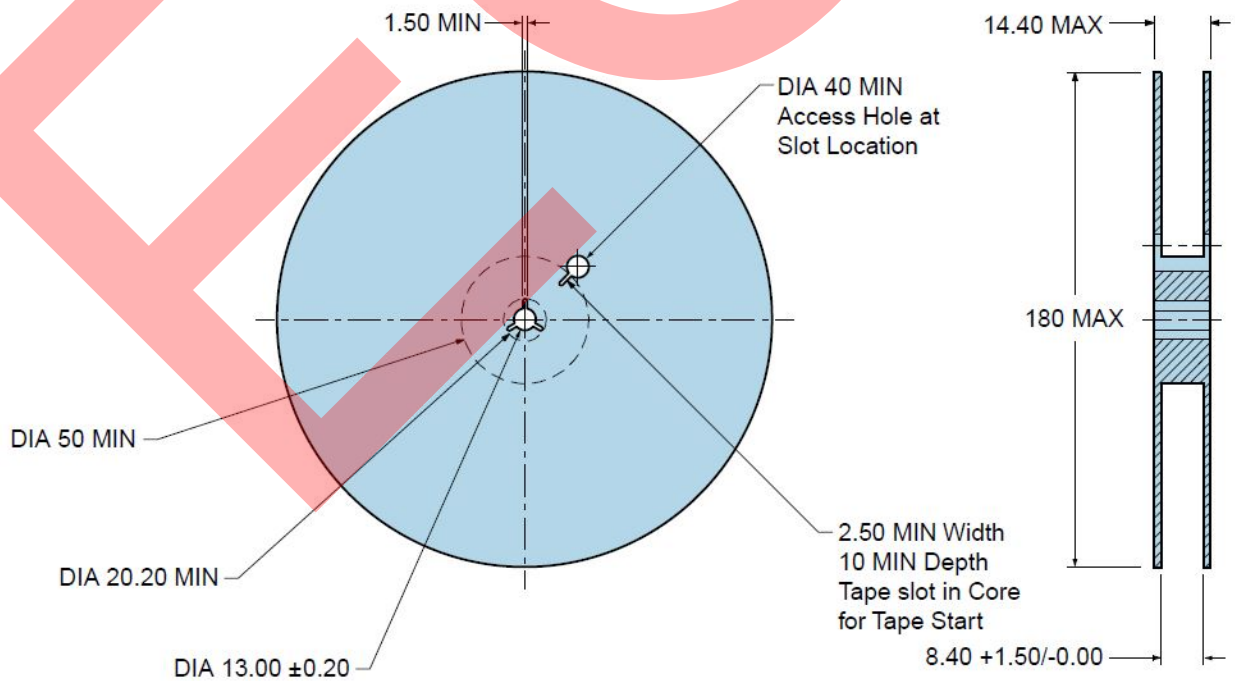
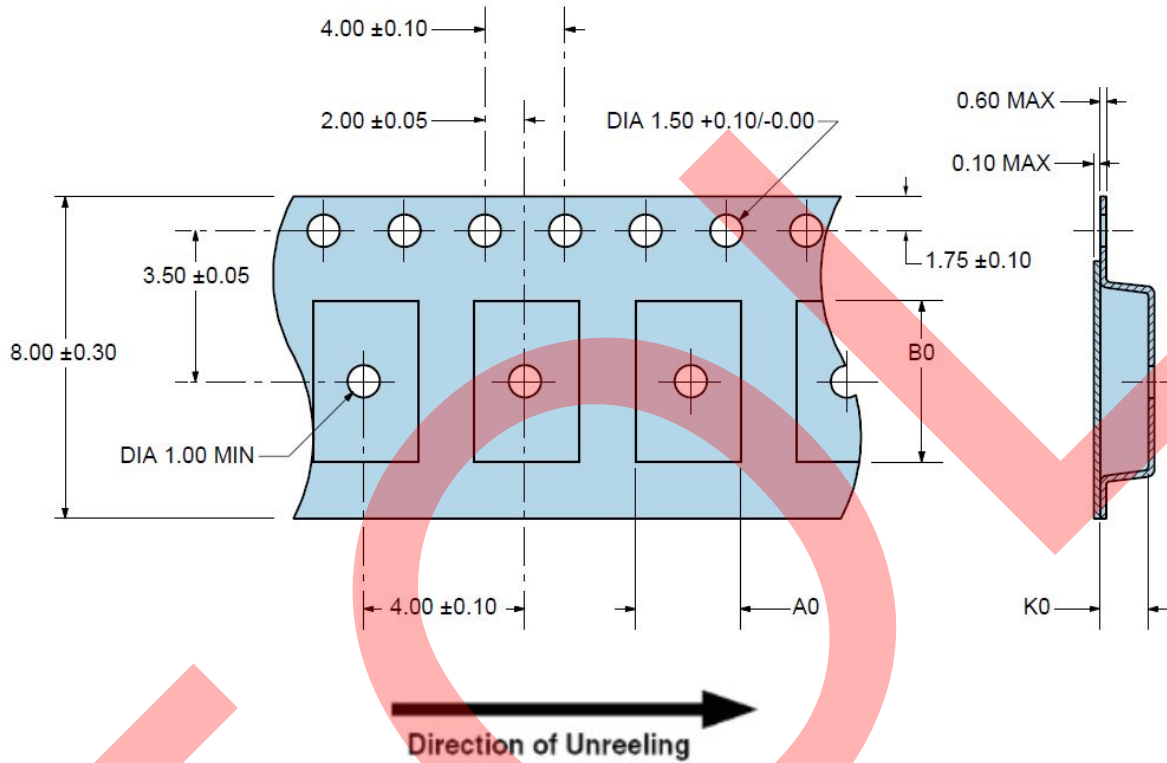
**Note 3:** Capacitance value  $C_L$  includes sum of all probe and fixture capacitance. See applicable specification sheet for 'Load Drive Capability'.

**TAPE & REEL DIMENSIONS**

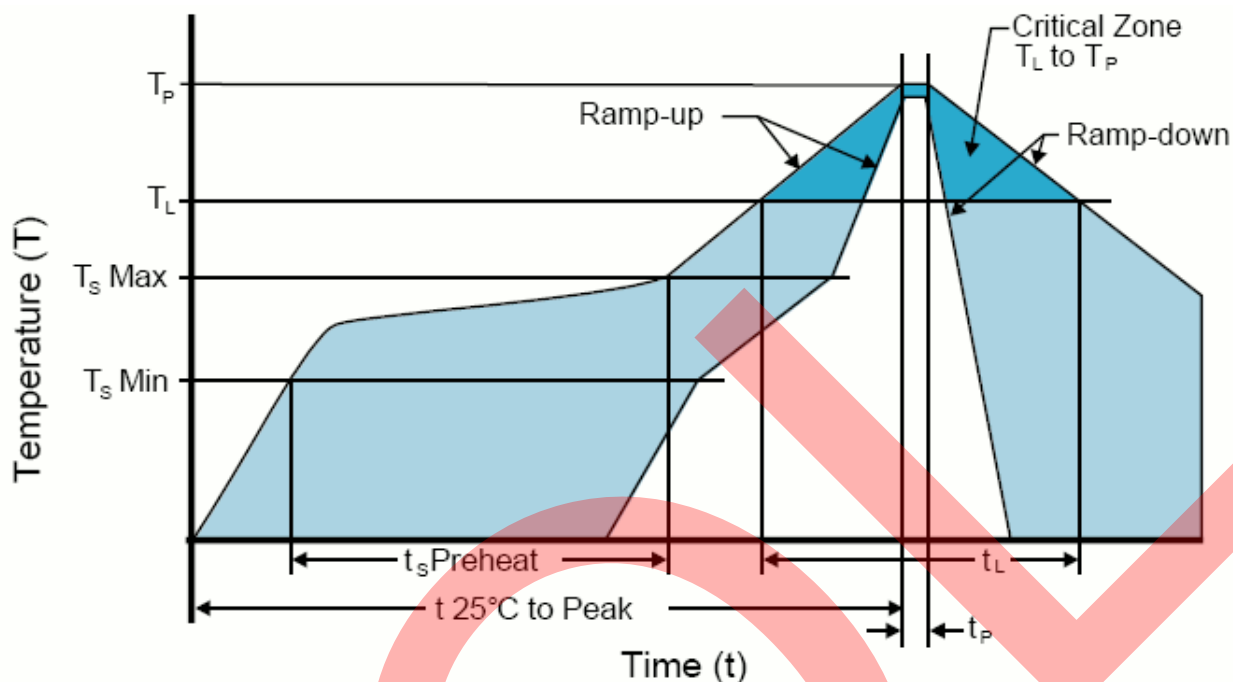
Quantity per Reel: 1,000 Units

All Dimensions in Millimeters

Compliant to EIA-481



RECOMMENDED SOLDER REFLOW METHOD



**HIGH TEMPERATURE INFRARED/CONVECTION**

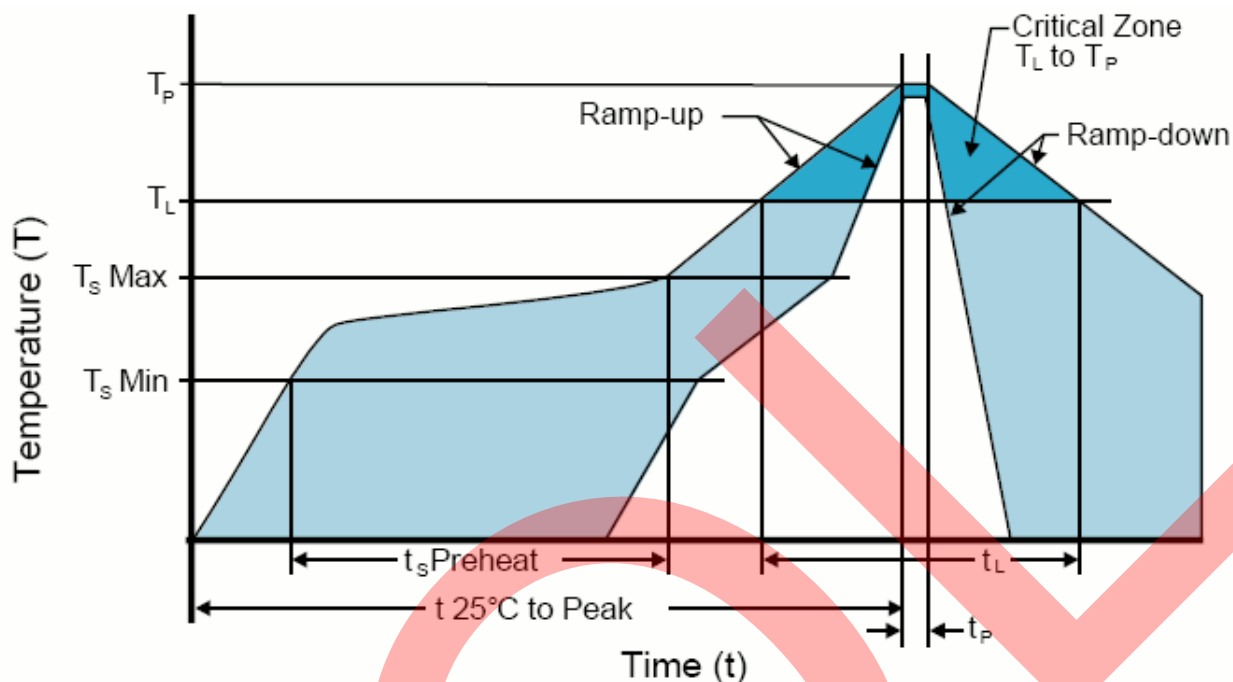
<b><math>T_S \text{ MAX}</math> to <math>T_L</math> (Ramp-up Rate)</b>	3°C/Second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_S \text{ MIN}$ )	150°C
- Temperature Typical ( $T_S \text{ TYP}$ )	175°C
- Temperature Maximum ( $T_S \text{ MAX}$ )	200°C
- Time ( $t_s \text{ MIN}$ )	60 - 180 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	3°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 - 150 Seconds
<b>Peak Temperature (<math>T_P</math>)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (<math>T_P \text{ Target}</math>)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (<math>t_p</math>)</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
<b>Ramp-up Rate (T<sub>L</sub> to T<sub>P</sub>)</b>	5°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature (T <sub>L</sub> )	150°C
- Time (t <sub>L</sub> )	200 Seconds Maximum
<b>Peak Temperature (T<sub>P</sub>)</b>	240°C Maximum
<b>Target Peak Temperature (T<sub>P</sub> Target)</b>	240°C Maximum 2 Times / 230°C Maximum 1 Time
<b>Time within 5°C of actual peak (t<sub>P</sub>)</b>	10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time
<b>Ramp-down Rate</b>	5°C/Second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	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.)