

ECN/PCN No.: 4154

For Manufacturer			
Product Description: PLASTIC SMD MEMS OSCILLATOR	Abrakon Part Number / Part Series: EMS13	<input type="checkbox"/> Documentation only <input type="checkbox"/> ECN <input checked="" type="checkbox"/> EOL	<input checked="" type="checkbox"/> Series <input type="checkbox"/> Part Number
Affected Revision: E	New Revision: EOL	Application:	<input type="checkbox"/> Safety <input checked="" type="checkbox"/> Non-Safety
Prior to Change: Active			
After Change: EOL			
Cause/Reason for Change: Discontinuation of manufacturing capability.			
Change Plan			
Effective Date: 2/7/2022	Additional Remarks: N/A		
Change Declaration: N/A			
Issued Date: 2/7/2022	Issued By: <i>Brooke Cushman</i> <i>Product Engineer</i>	Issued Department: Engineering	
Approval: <i>Thomas Culhane</i> Engineering Director	Approval: <i>Reuben Quintanilla</i> Quality Director	Approval: <i>Ying Huang</i> Purchasing Director	
For Abracon EOL only			
Last Time Buy (if applicable): 5/7/2022	Alternate Part Number / Part Series: ASSVP		
Additional Approval:	Additional Approval:	Additional Approval:	
Customer Approval (If Applicable)			
Qualification Status: <div style="text-align: center;"> <input type="checkbox"/> Approved <input type="checkbox"/> Not accepted </div> <i>Note: It is considered approved if there is no feedback from the customer 1 month after ECN/PCN is released.</i>			
Customer Part Number:		Customer Project:	
Company Name:	Company Representative:	Representative Signature:	
Customer Remarks:			

REGULATORY COMPLIANCE



ITEM DESCRIPTION

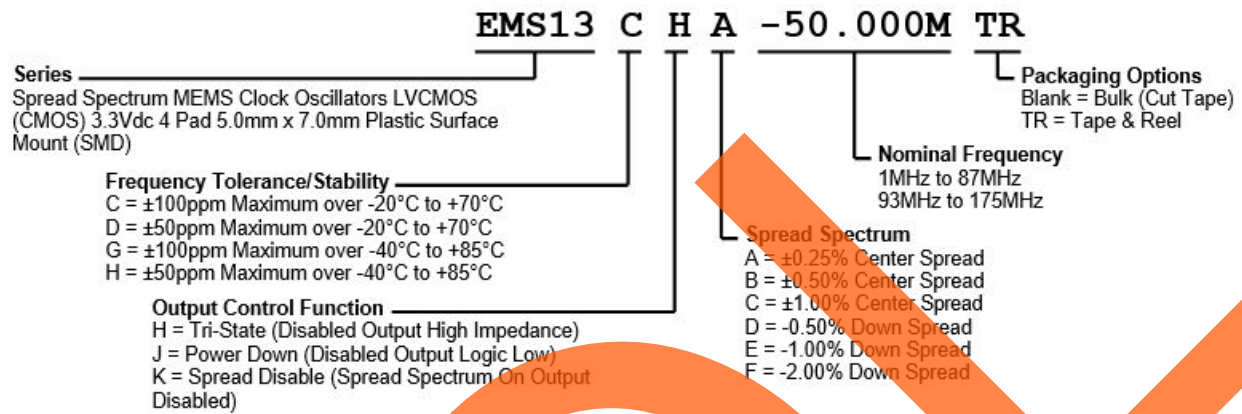
Spread Spectrum MEMS Clock Oscillators LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Plastic Surface Mount (SMD)

ELECTRICAL SPECIFICATIONS

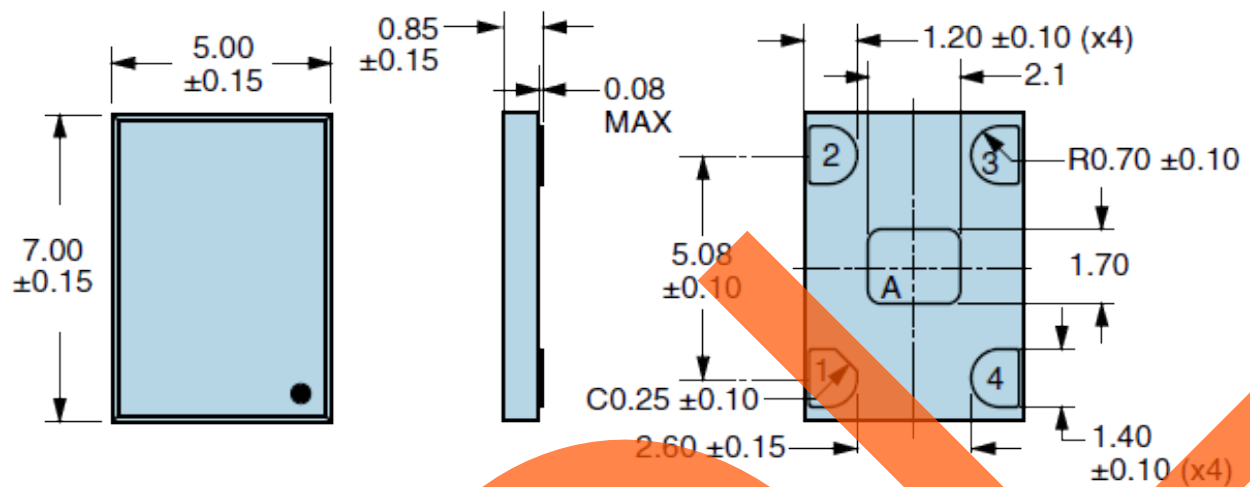
Nominal Frequency	1MHz to 175MHz
Frequency Tolerance/Stability	Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, 260°C Reflow, Shock, and Vibration ±100ppm Maximum over -20°C to +70°C ±50ppm Maximum over -20°C to +70°C ±100ppm Maximum over -40°C to +85°C ±50ppm Maximum over -40°C to +85°C
Aging at 25°C	±1ppm Maximum First Year
Supply Voltage	3.3Vdc ±10%
Maximum Supply Voltage	-0.5Vdc to +3.65Vdc
Input Current	Unloaded; Nominal Vdd 30mA Maximum over Nominal Frequency of 1MHz to 25MHz 40mA Maximum over Nominal Frequency of 25.000001MHz to 175MHz
Output Voltage Logic High (V _{OH})	I _{OH} =-8mA 90% of Vdd Minimum
Output Voltage Logic Low (V _{OL})	I _{OL} =+8mA 10% of Vdd Maximum
Rise/Fall Time	Measured from 20% to 80% of waveform 2nSec Maximum
Duty Cycle	Measured at 50% of waveform 50 ±5(%) over Nominal Frequency of 1MHz to 75MHz 50 ±10(%) over Nominal Frequency of 75.000001MHz to 175MHz
Load Drive Capability	15pF Maximum
Output Logic Type	CMOS
Output Control Function	Tri-State (Disabled Output - High Impedance) Power Down (Disabled Output - Logic Low) Spread Disable (Spread Spectrum On Output - Disabled)
Power Down Input Voltage (V _{IH} and V _{IL})	70% of Vdd Minimum or No Connection to Enable Output, 30% of Vdd Maximum to Disable Output (Disabled Output - Logic Low)
Tri-State Input Voltage (V _{IH} and V _{IL})	70% of Vdd Minimum or No Connection to Enable Output, 30% of Vdd Maximum to Disable Output (Disabled Output - High Impedance)
Standby Current	Pad 1=Ground 50µA Maximum (Disabled Output - Logic Low)
Disable Current	Pad 1=Ground 20mA Maximum (Disabled Output - High Impedance)
Spread Spectrum Input Voltage (V _{IH} and V _{IL})	70% of Vdd Minimum or No Connection to Enable Spread Spectrum-On Output, 30% of Vdd Maximum to Disable Spread Spectrum-On Output
Spread Spectrum	±0.25% Center Spread (Not available with Output Spread Disable Function) ±0.50% Center Spread (Not available with Output Spread Disable Function) ±1.00% Center Spread (Not available with Output Spread Disable Function) -0.50% Down Spread -1.00% Down Spread -2.00% Down Spread
Modulation Frequency	30kHz Minimum, 32kHz Typical, 35kHz Maximum
Period Jitter	Cycle to Cycle; Spread Spectrum-On; Fo=133.333M, Vdd=3.3Vdc 30pSec Maximum
Start Up Time	10mSec Maximum

Storage Temperature Range	-55°C to +125°C
---------------------------	-----------------

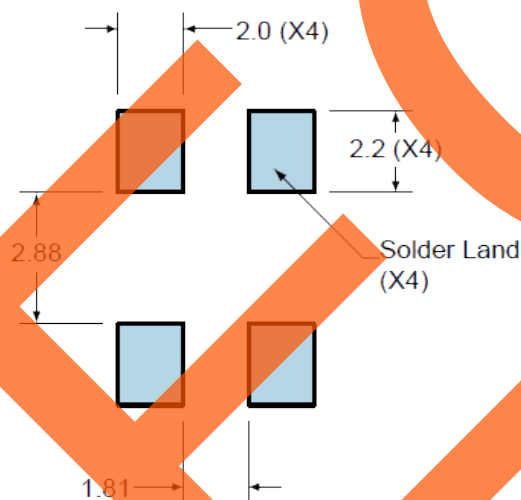
PART NUMBERING GUIDE



MECHANICAL DIMENSIONS



SUGGESTED SOLDER PAD LAYOUT

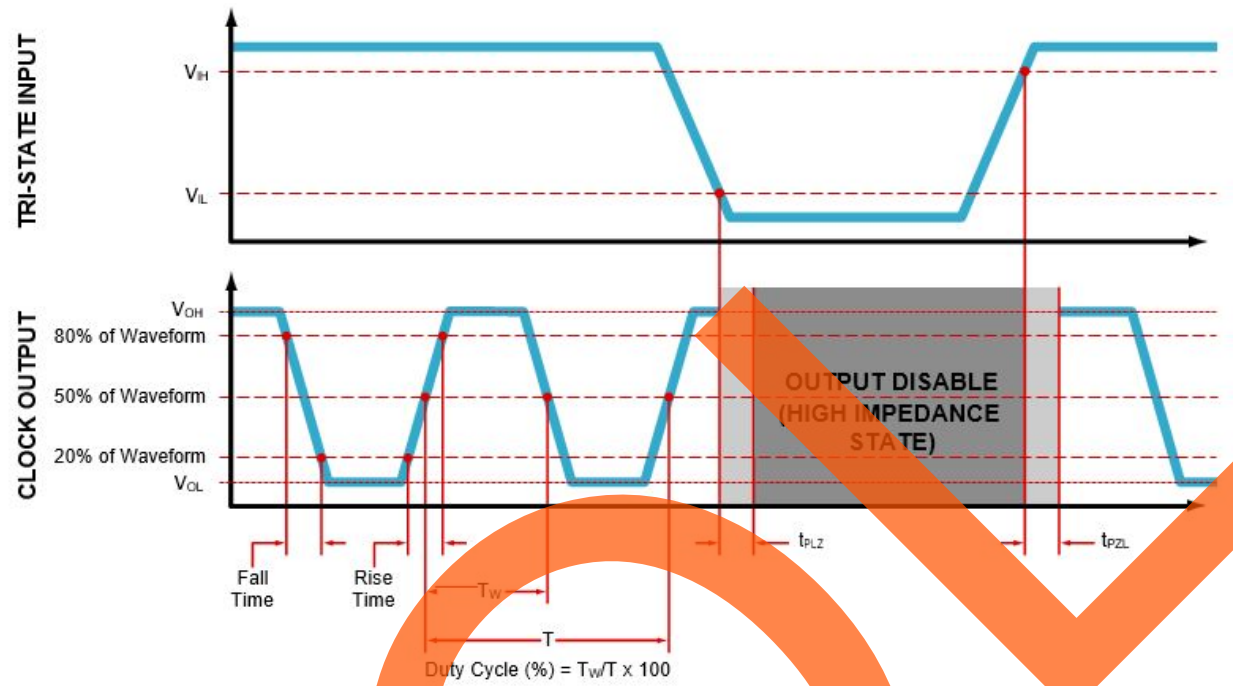


PIN	CONNECTION
1	Power Down (Logic Low) Or Spread Disable (Disabled) Or Tri-State (High Impedance)
2	Ground
3	Output
4	Supply Voltage

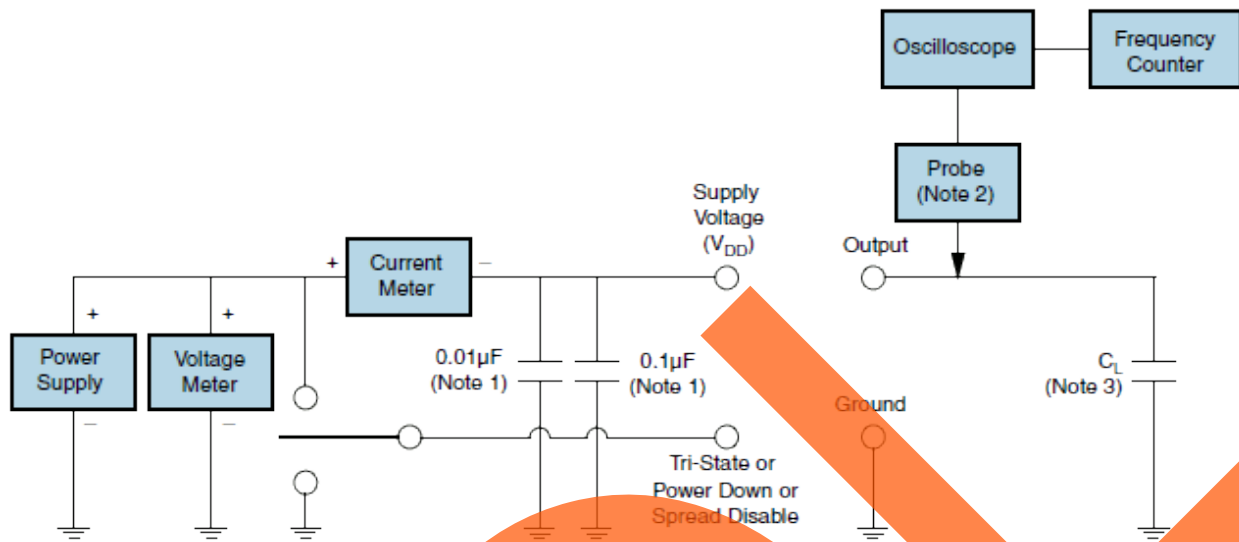
All Tolerances are ± 0.1

All Dimensions in Millimeters

OUTPUT WAVEFORM & TIMING DIAGRAM



TEST CIRCUIT FOR CMOS OUTPUT



Note 1: An external 0.01 μF ceramic bypass capacitor in parallel with a 0.1 μF high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

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

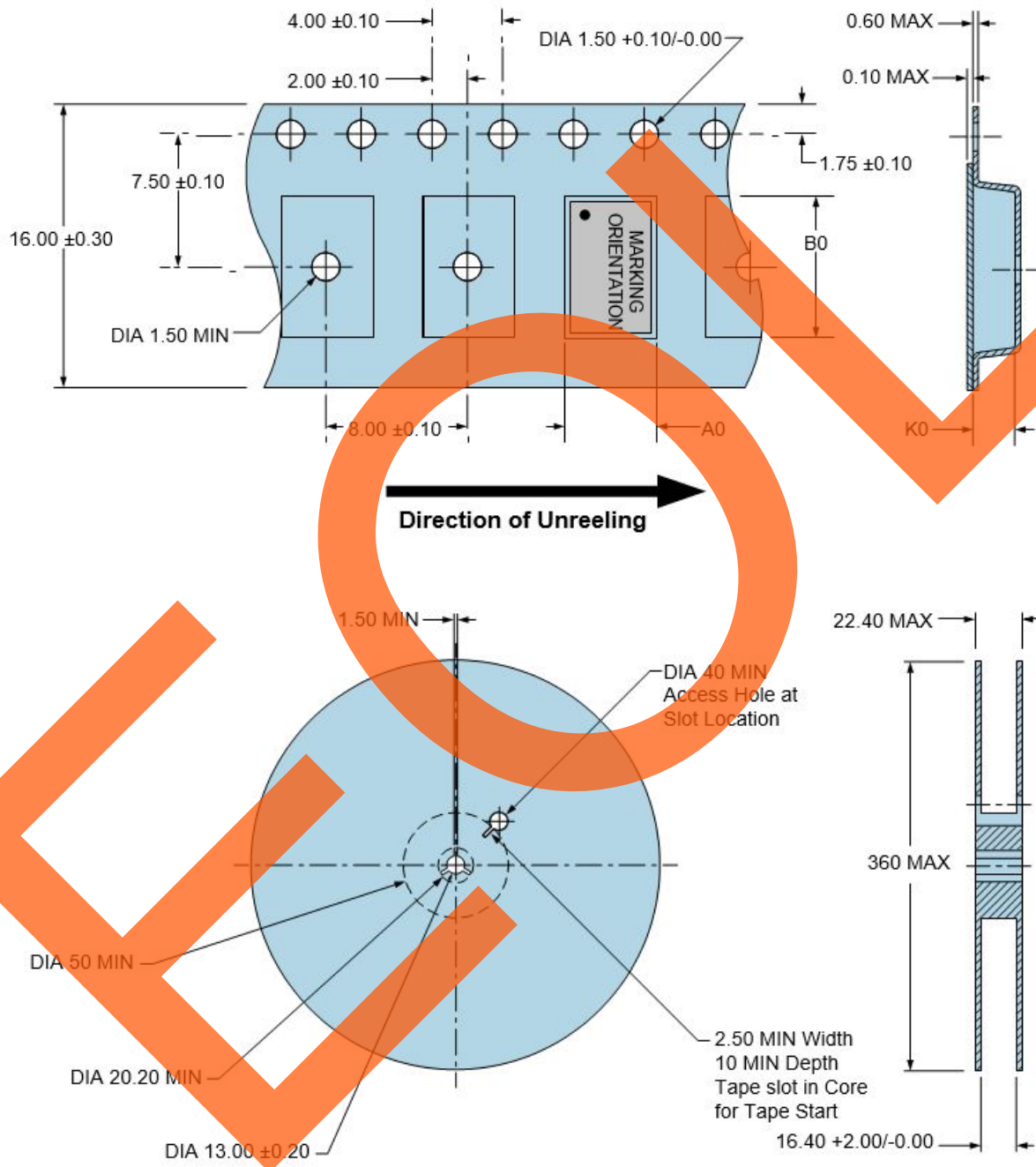
Note 3: Capacitance value (C_L) includes sum of all probe and fixture capacitance.

TAPE & REEL DIMENSIONS

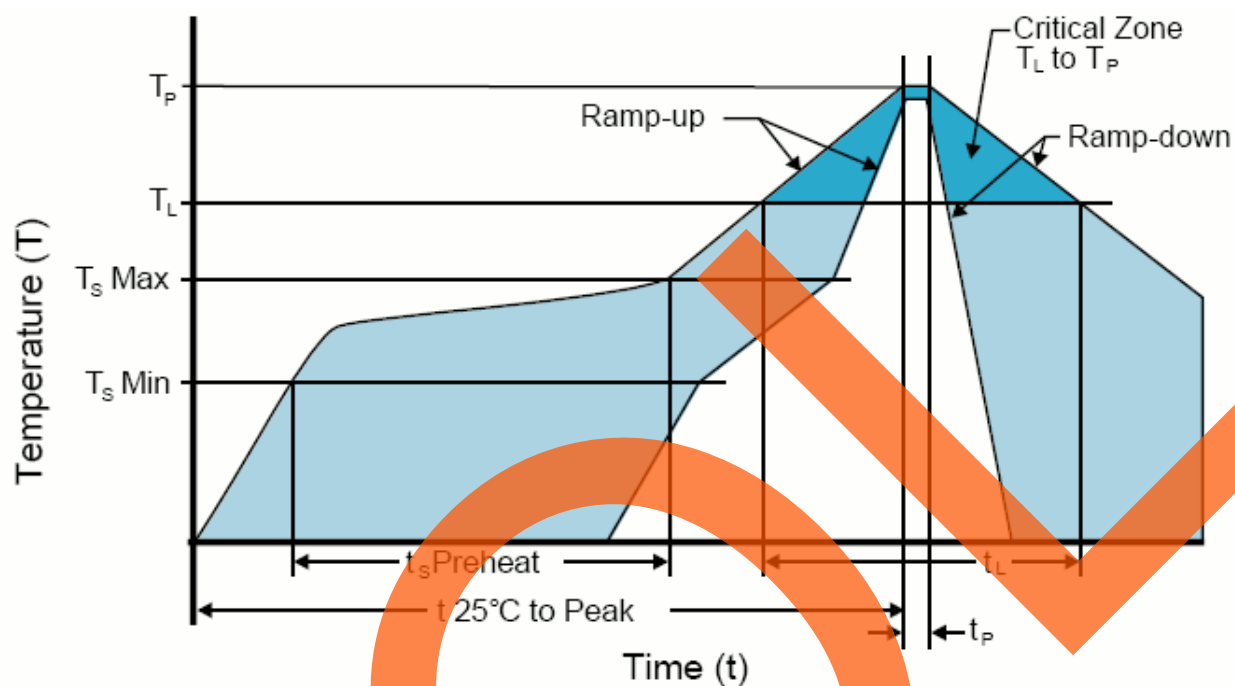
Quantity per Reel: 1,000 Units

All Dimensions in Millimeters

Compliant to EIA-481



RECOMMENDED SOLDER REFLOW METHOD



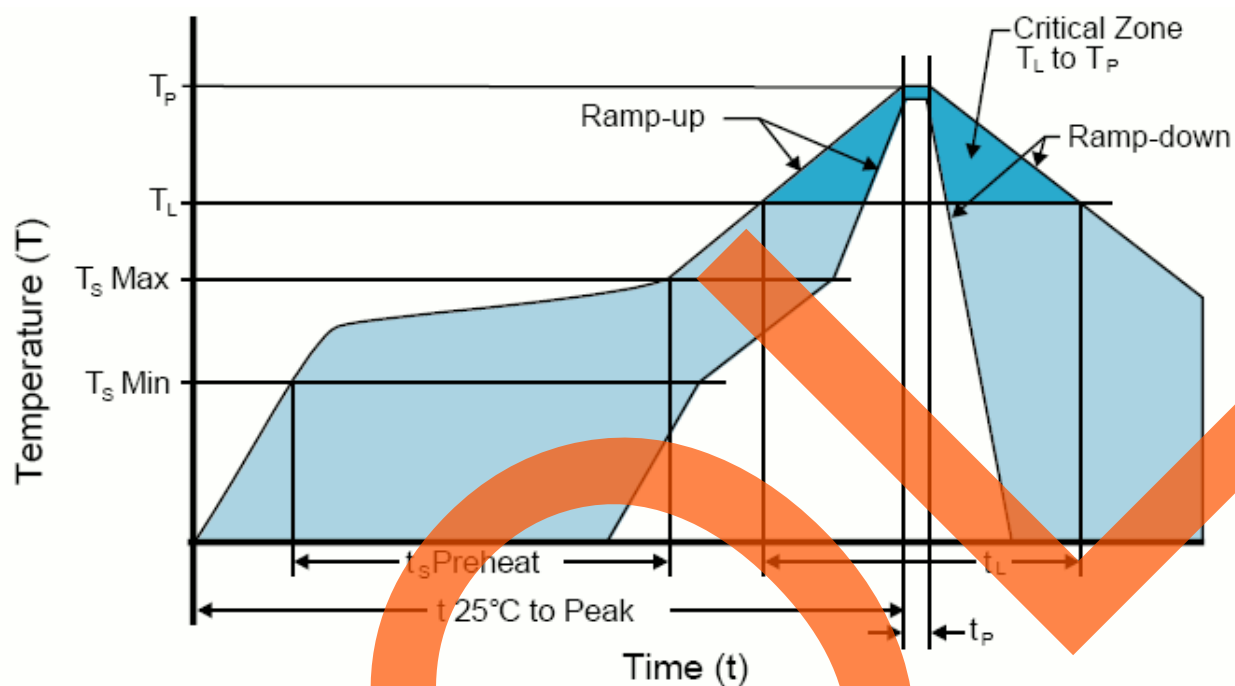
HIGH TEMPERATURE INFRARED/CONVECTION

T_S MAX to T_L (Ramp-up Rate)	3°C/Second Maximum
Preheat	
- Temperature Minimum (T _S MIN)	150°C
- Temperature Typical (T _S TYP)	175°C
- Temperature Maximum (T _S MAX)	200°C
- Time (t _s)	60 - 180 Seconds
Ramp-up Rate (T_L to T_P)	3°C/Second Maximum
Time Maintained Above:	
- Temperature (T _L)	217°C
- Time (t _L)	60 - 150 Seconds
Peak Temperature (T_P)	260°C Maximum for 10 Seconds Maximum
Target Peak Temperature (T_P Target)	250°C +0/-5°C
Time within 5°C of actual peak (t_p)	20 - 40 Seconds
Ramp-down Rate	6°C/Second Maximum
Time 25°C to Peak Temperature (t)	8 Minutes Maximum
Moisture Sensitivity Level	Level 1
Additional Notes	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 _s MAX to T _L (Ramp-up Rate)	5°C/Second Maximum
Preheat	
- Temperature Minimum (T _s MIN)	N/A
- Temperature Typical (T _s TYP)	150°C
- Temperature Maximum (T _s MAX)	N/A
- Time (t _s)	60 - 120 Seconds
Ramp-up Rate (T _L to T _P)	5°C/Second Maximum
Time Maintained Above:	
- Temperature (T _L)	150°C
- Time (t _L)	200 Seconds Maximum
Peak Temperature (T _P)	240°C Maximum
Target Peak Temperature (T _P Target)	240°C Maximum 2 Times / 230°C Maximum 1 Time
Time within 5°C of actual peak (t _P)	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.)