

**ECN/PCN No.: 4158**

For Manufacturer			
<b>Product Description:</b> PLASTIC SMD MEMS OSCILLATOR	<b>Abracon Part Number / Part Series:</b> EMS41	<input type="checkbox"/> Documentation only <input type="checkbox"/> ECN <input checked="" type="checkbox"/> EOL	<input checked="" type="checkbox"/> Series <input type="checkbox"/> Part Number
<b>Affected Revision:</b> E	<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> 2/7/2022	<b>Additional Remarks:</b> N/A		
<b>Change Declaration:</b> N/A			
<b>Issued Date:</b> 2/7/2022	<b>Issued By:</b>	<b>Issued Department:</b>	
<b>Approval:</b>	<b>Approval:</b>	<b>Approval:</b>	
For Abracon EOL only			
<b>Last Time Buy (if applicable):</b> 5/7/2022	<b>Alternate Part Number / Part Series:</b> none		
<b>Additional Approval:</b>	<b>Additional Approval:</b>	<b>Additional Approval:</b>	
Customer Approval (If Applicable)			
<b>Qualification Status:</b> <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>			
<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

 <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>
---	---	---	---	---

## ITEM DESCRIPTION

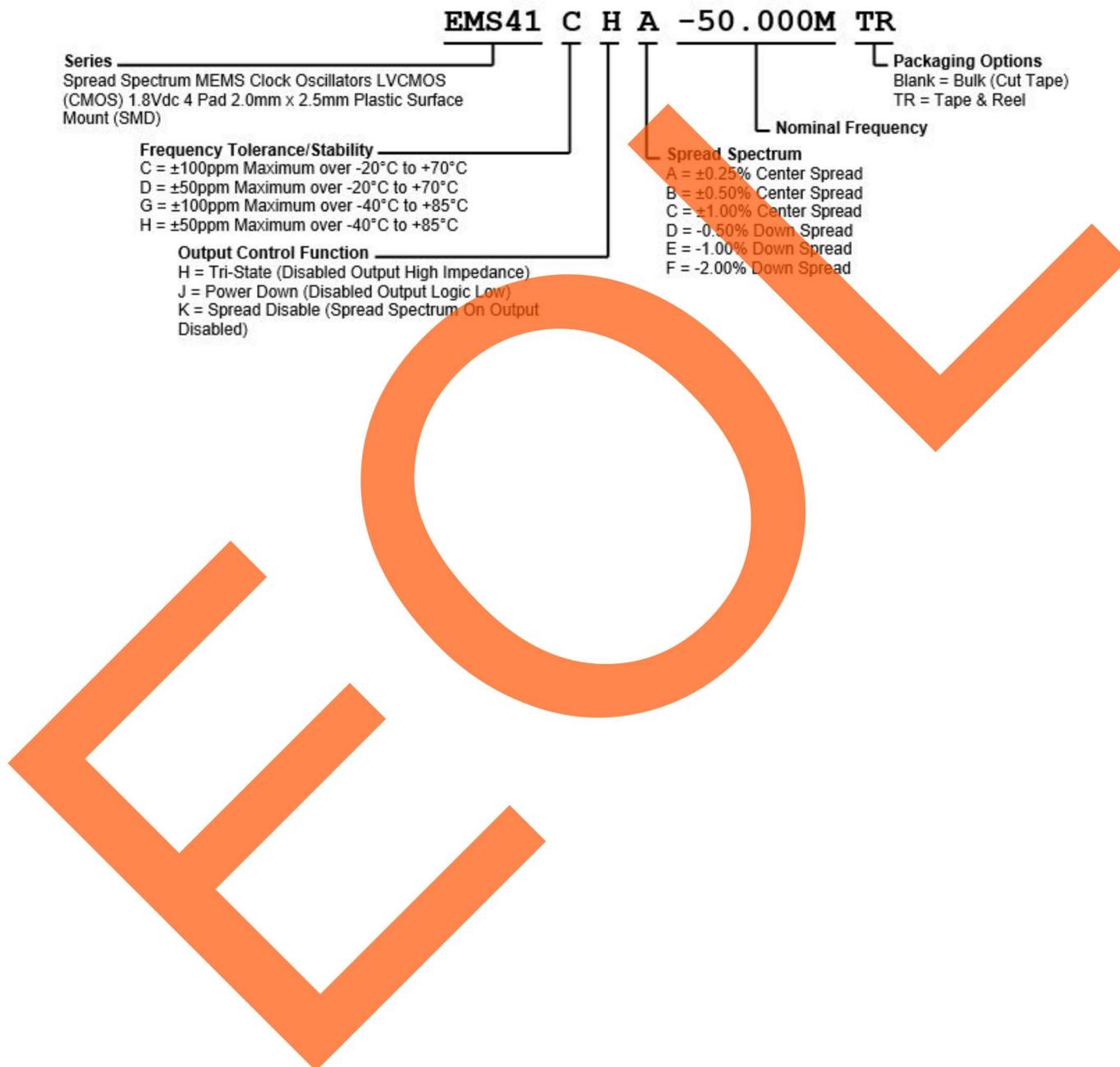
Spread Spectrum MEMS Clock Oscillators LVCMOS (CMOS) 1.8Vdc 4 Pad 2.0mm x 2.5mm Plastic Surface Mount (SMD)

## ELECTRICAL SPECIFICATIONS

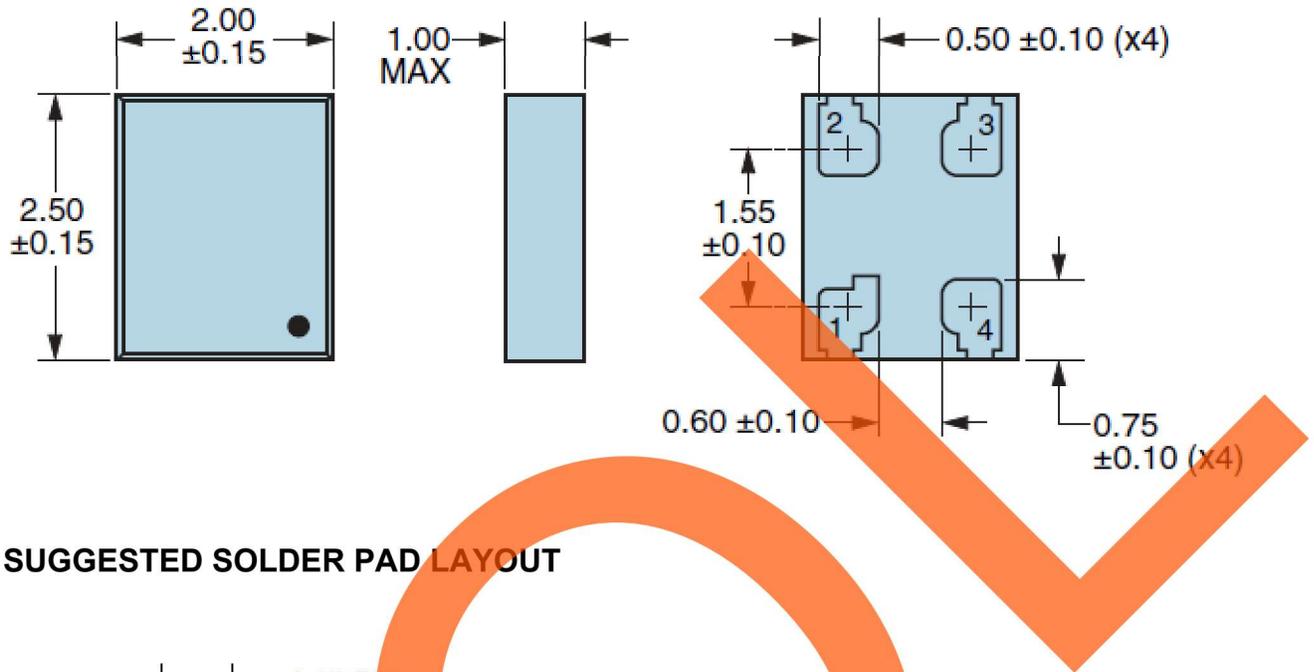
<b>Nominal Frequency</b>	1MHz to 175MHz
<b>Frequency Tolerance/Stability</b>	Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, 260°C Reflow, Shock, and Vibration ±100ppm 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
<b>Aging at 25°C</b>	±1ppm Maximum First Year
<b>Supply Voltage</b>	1.8Vdc ±5%
<b>Maximum Supply Voltage</b>	-0.5Vdc to +1.98Vdc
<b>Input Current</b>	Unloaded; Nominal Vdd 25mA Maximum over Nominal Frequency of 1MHz to 25MHz 35mA Maximum over Nominal Frequency of 25.000001MHz to 175MHz
<b>Output Voltage Logic High (V<sub>OH</sub>)</b>	I <sub>OH</sub> =-8mA 90% of Vdd Minimum
<b>Output Voltage Logic Low (V<sub>OL</sub>)</b>	I <sub>OL</sub> =+8mA 10% of Vdd Maximum
<b>Rise/Fall Time</b>	Measured from 20% to 80% of waveform 2nSec Maximum
<b>Duty Cycle</b>	Measured at 50% of waveform 50 ±5(%) over Nominal Frequency of 1MHz to 75MHz 50 ±10(%) over Nominal Frequency of 75.000001MHz to 175MHz
<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 Logic Low) Spread Disable (Spread Spectrum On Output Disabled)
<b>Power Down Input Voltage (V<sub>IH</sub> and V<sub>IL</sub>)</b>	70% of Vdd Minimum or No Connection to Enable Output, 30% of Vdd Maximum to Disable Output (Disabled Output Logic Low)
<b>Tri-State Input Voltage (V<sub>IH</sub> and V<sub>IL</sub>)</b>	70% of Vdd Minimum or No Connection to Enable Output, 30% of Vdd Maximum to Disable Output (Disabled Output High Impedance)
<b>Disable Current</b>	Pad 1=Ground 20mA Maximum (Disabled Output: Logic Low)
<b>Standby Current</b>	Pad 1=Ground 50µA Maximum (Disabled Output: High Impedance)
<b>Spread Spectrum Input Voltage (V<sub>IH</sub> and V<sub>IL</sub>)</b>	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 On Output Disabled)
<b>Spread Spectrum</b>	±0.25% Center Spread (Not available with Output Control Function of Spread Disable) ±0.50% Center Spread (Not available with Output Control Function of Spread Disable) ±1.00% Center Spread (Not available with Output Control Function of Spread Disable) -0.50% Down Spread -1.00% Down Spread -2.00% Down Spread
<b>Modulation Frequency</b>	30kHz Minimum, 32kHz Typical, 35kHz Maximum
<b>Period Jitter</b>	Cycle to Cycle; Spread Spectrum-On; Fo=133.333M, Vdd=1.8Vdc 90pSec Maximum
<b>Start Up Time</b>	10mSec Maximum

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

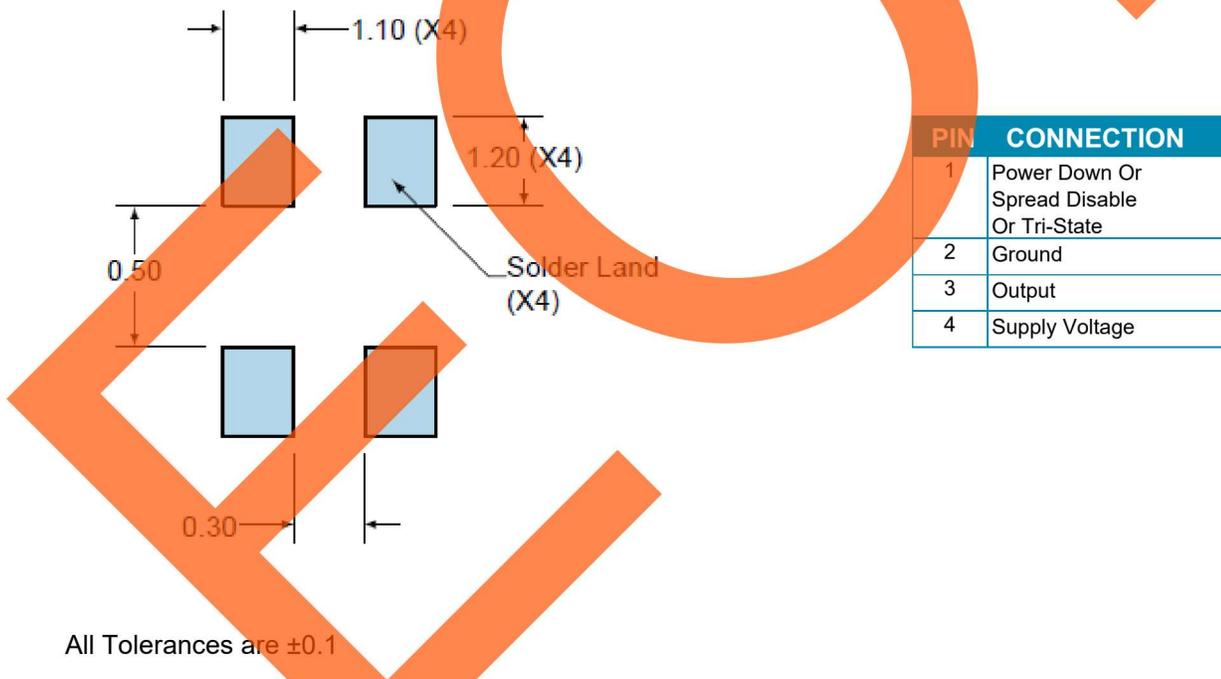
## PART NUMBERING GUIDE



MECHANICAL DIMENSIONS



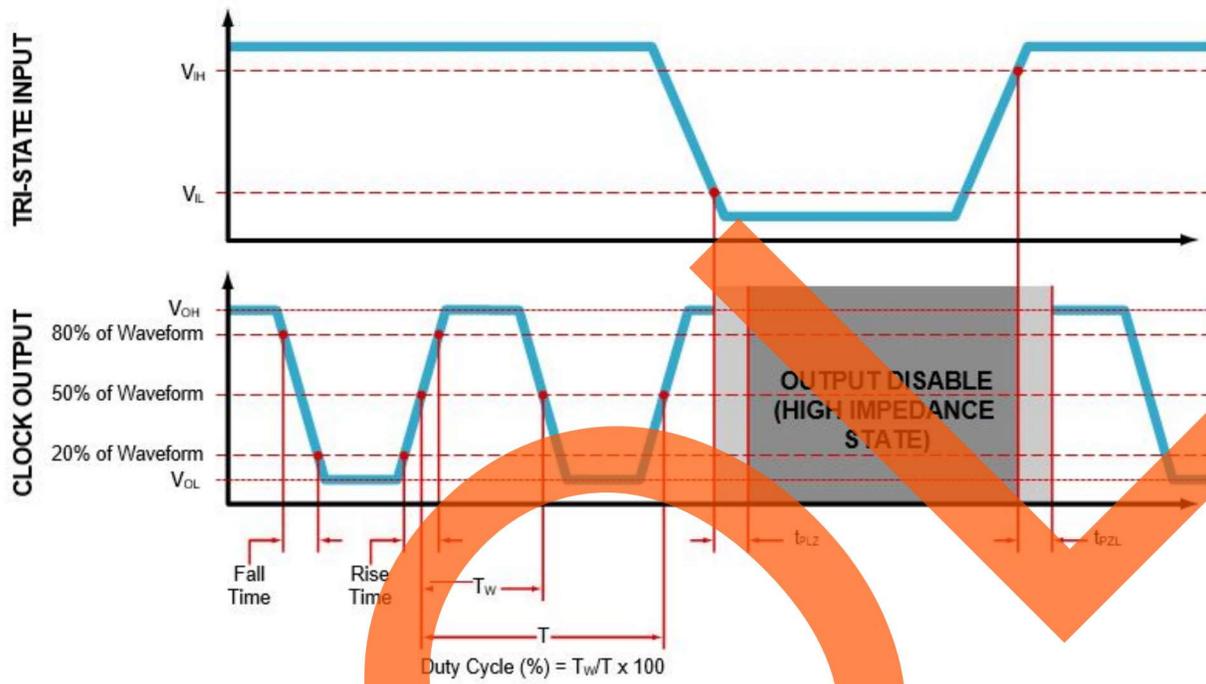
SUGGESTED SOLDER PAD LAYOUT



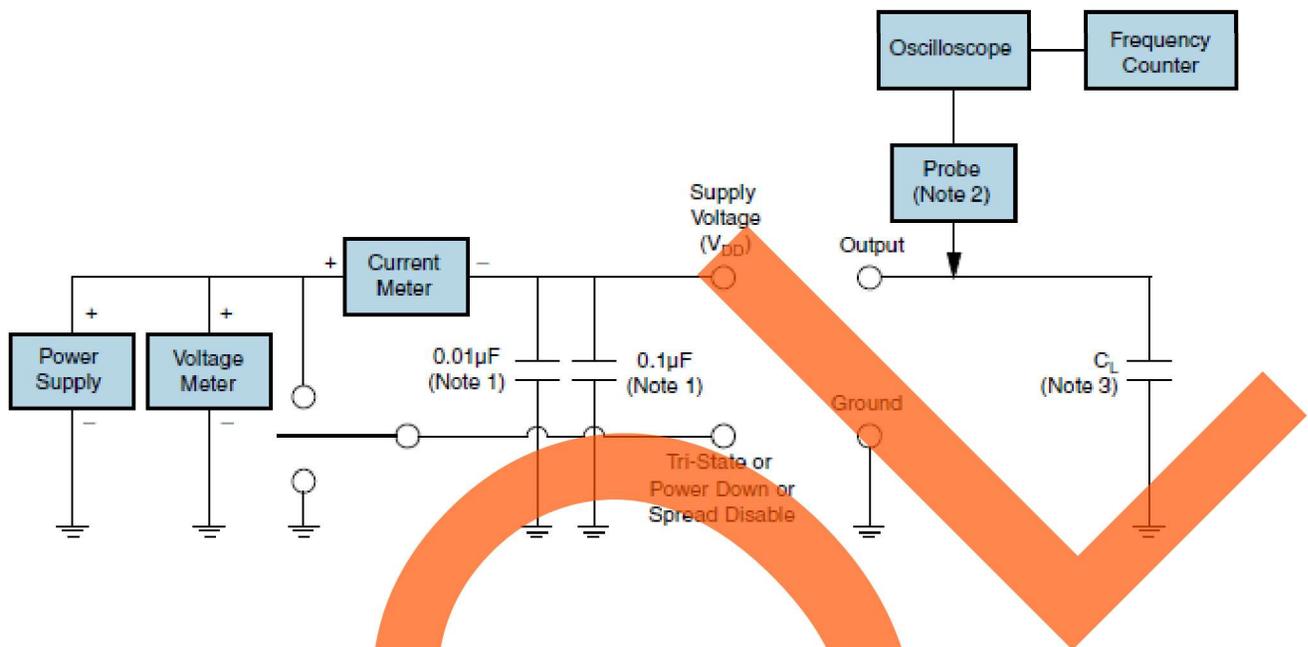
All Tolerances are ±0.1

All Dimensions in Millimeters

OUTPUT WAVEFORM & TIMING DIAGRAM



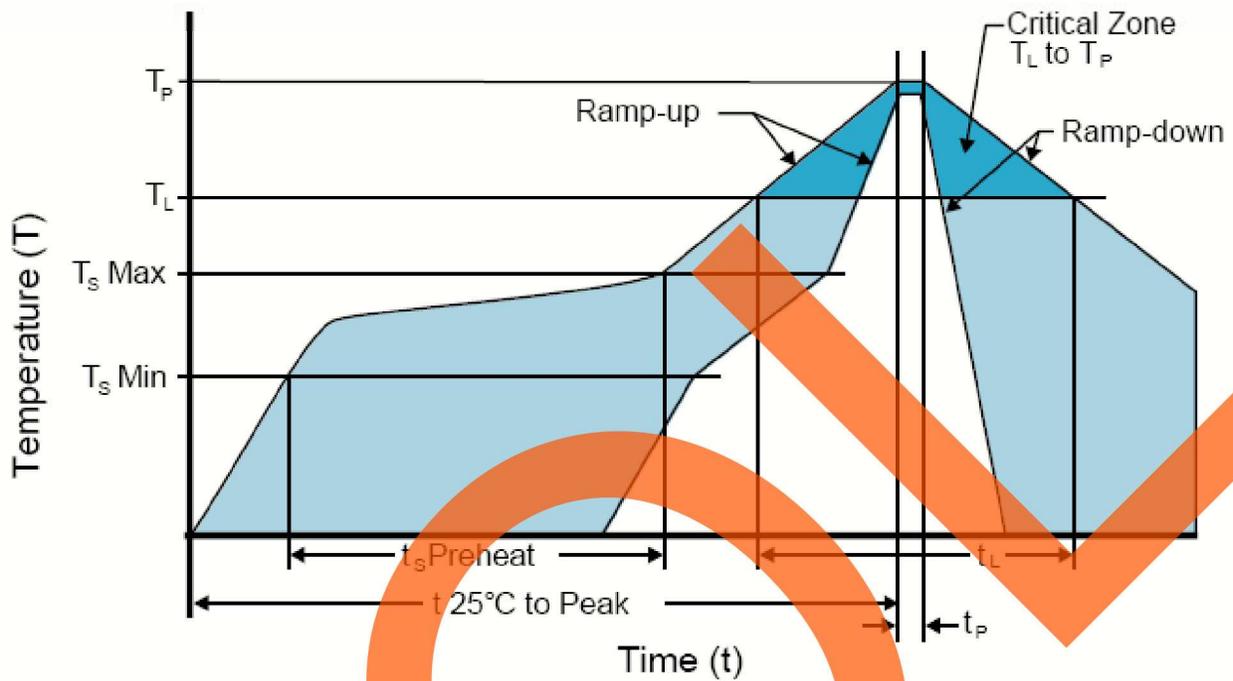
TEST CIRCUIT FOR CMOS OUTPUT



- 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 capacitance (<12pF), 10X Attenuation Factor, High Impedance (>10Mohms), and High bandwidth (>300MHz) Passive probe is recommended.
- Note 3:** Capacitance value (C<sub>L</sub>) includes sum of all probe and fixture capacitance.



RECOMMENDED SOLDER REFLOW METHOD



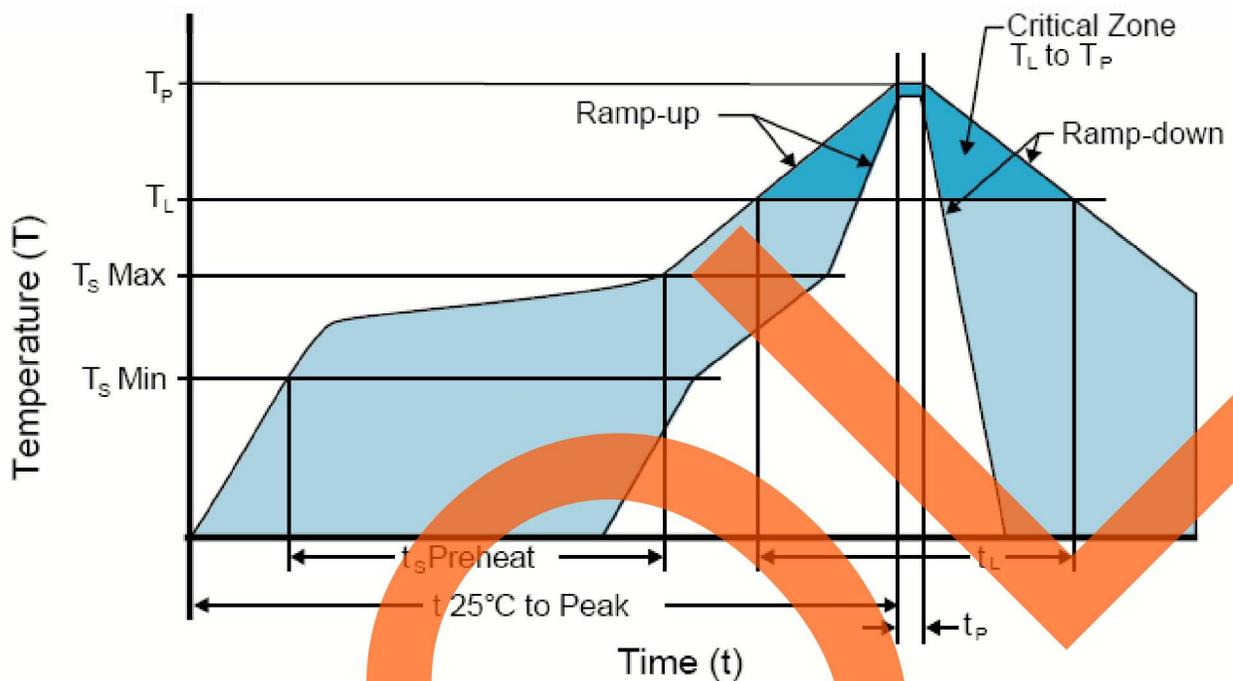
**HIGH TEMPERATURE INFRARED/CONVECTION**

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
Preheat	
- 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
Time Maintained Above:	
- 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.)