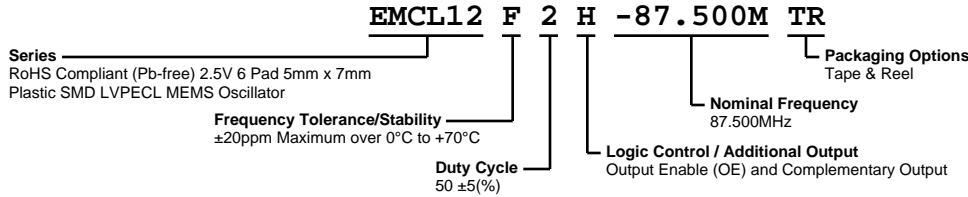


# EMCL12F2H-87.500M TR



**ECLIPTEK**  
CORPORATION



## ELECTRICAL SPECIFICATIONS

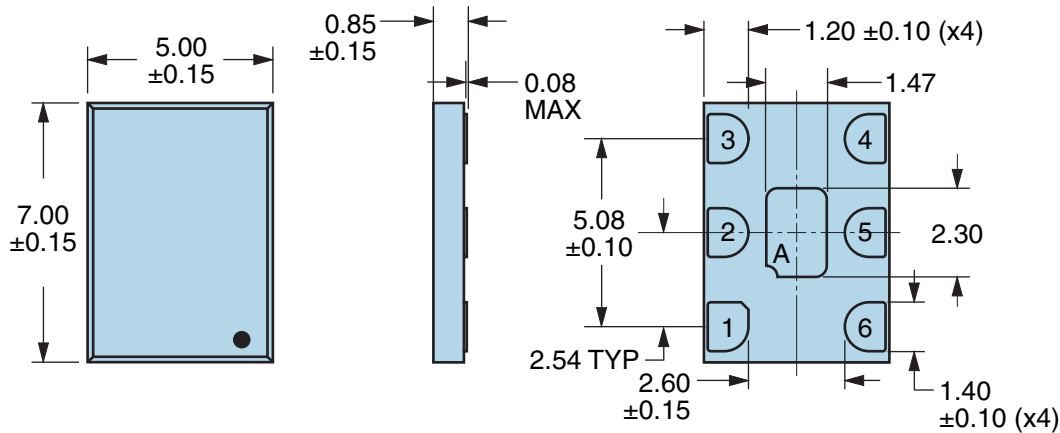
<b>Nominal Frequency</b>	87.500MHz
<b>Frequency Tolerance/Stability</b>	±20ppm Maximum over 0°C to +70°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, 1st Year Aging at 25°C, Reflow, Shock, and Vibration)
<b>Aging at 25°C</b>	±1ppm First Year Maximum
<b>Supply Voltage</b>	+2.5Vdc ±0.125Vdc
<b>Input Current</b>	75mA Maximum (Excluding Load Termination Current)
<b>Output Voltage Logic High (Voh)</b>	1.55Vdc Typical, Vcc-1.025Vdc Minimum
<b>Output Voltage Logic Low (Vol)</b>	0.80Vdc Typical, Vcc-1.62Vdc Maximum
<b>Rise/Fall Time</b>	150pSec Typical, 300pSec Maximum (Measured over 20% to 80% of waveform)
<b>Duty Cycle</b>	50 ±5(%) (Measured at 50% of waveform)
<b>Load Drive Capability</b>	50 Ohms into Vcc-2.0Vdc
<b>Output Logic Type</b>	LVPECL
<b>Logic Control / Additional Output</b>	Output Enable (OE) and Complementary Output
<b>Output Control Input Voltage</b>	Vih of 70% of Vcc Minimum or No Connect to Enable Output and Complementary Output, Vil of 30% of Vcc Maximum to Disable Output and Complementary Output (High Impedance)
<b>Output Enable Current</b>	70mA Maximum (OE) Without Load
<b>Period Jitter (Deterministic)</b>	0.2pSec Typical
<b>Period Jitter (Random)</b>	2.0pSec Typical
<b>Period Jitter (RMS)</b>	1.5pSec Typical, 3.0pSec Maximum
<b>Period Jitter (pk-pk)</b>	20pSec Typical, 25pSec Maximum
<b>RMS Phase Jitter (Fj = 637kHz to 10MHz; Random)</b>	1.7pSec Typical
<b>RMS Phase Jitter (Fj = 1MHz to 20MHz; Random)</b>	1.4pSec Typical
<b>RMS Phase Jitter (Fj = 1.875MHz to 20MHz; Random)</b>	1.1pSec Typical
<b>Start Up Time</b>	10mSec Maximum
<b>Storage Temperature Range</b>	-55°C to +125°C

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

<b>ESD Susceptibility</b>	MIL-STD-883, Method 3015, Class 2, HBM 2000V
<b>Flammability</b>	UL94-V0
<b>Mechanical Shock</b>	MIL-STD-883, Method 2002, Condition G, 30,000G
<b>Moisture Resistance</b>	MIL-STD-883, Method 1004
<b>Moisture Sensitivity Level</b>	J-STD-020, MSL 1
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210, Condition K
<b>Resistance to Solvents</b>	MIL-STD-202, Method 215
<b>Solderability</b>	MIL-STD-883, Method 2003 (Six I/O Pads on bottom of package only)
<b>Temperature Cycling</b>	MIL-STD-883, Method 1010, Condition B
<b>Thermal Shock</b>	MIL-STD-883, Method 1011, Condition B
<b>Vibration</b>	MIL-STD-883, Method 2007, Condition A, 20G

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## MECHANICAL DIMENSIONS (all dimensions in millimeters)



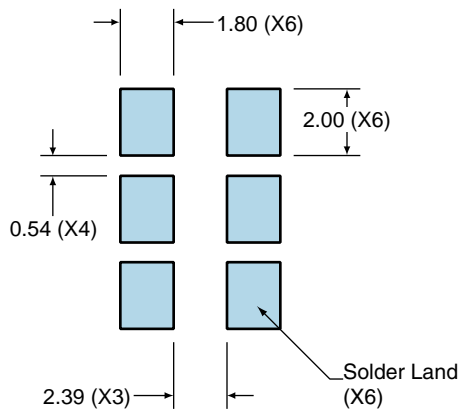
PIN	CONNECTION
1	Output Enable (OE)
2	No Connect
3	Case Ground
4	Output
5	Complementary Output
6	Supply Voltage

LINE	MARKING
1	<b>XXXX or XXXXX</b> XXXX or XXXXX=Ecliptek Manufacturing Lot Code

Note A: Center paddle is connected internally to oscillator ground (Pad 3).

## Suggested Solder Pad Layout

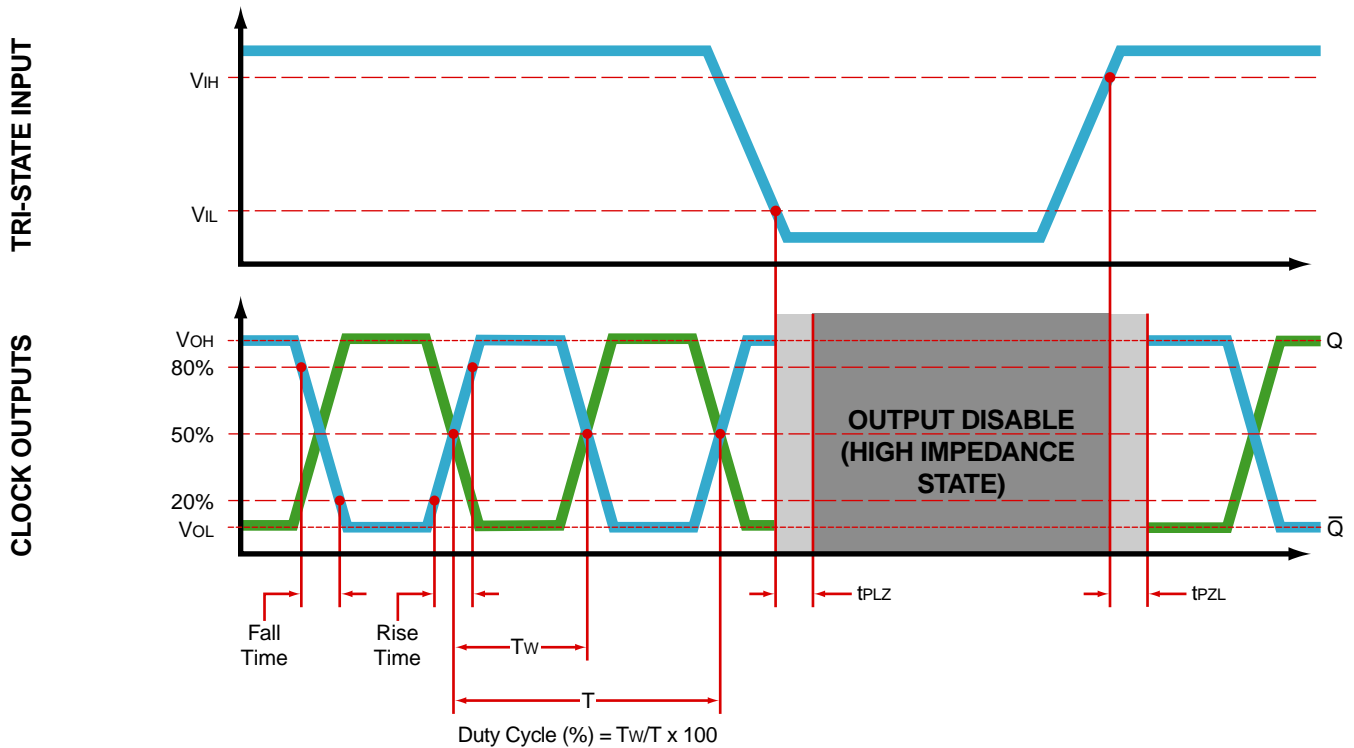
All Dimensions in Millimeters



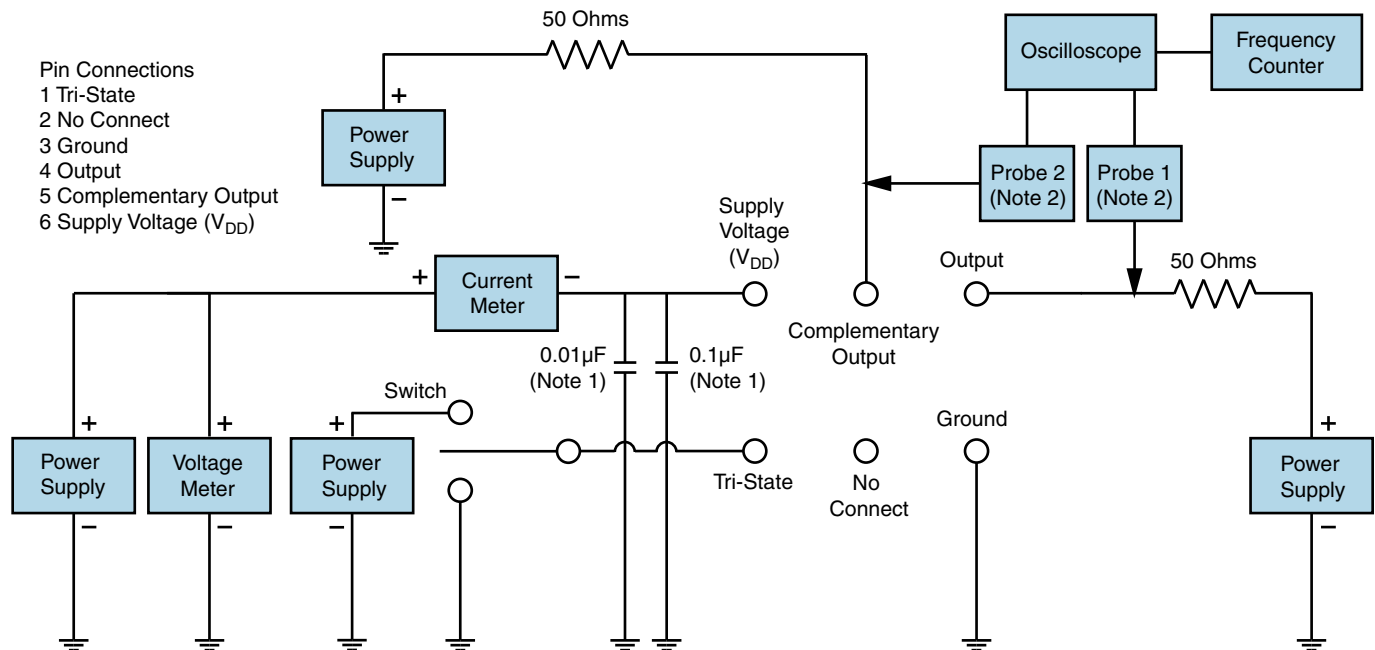
All Tolerances are  $\pm 0.1$

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## OUTPUT WAVEFORM & TIMING DIAGRAM



## Test Circuit for Tri-State and Complementary 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.

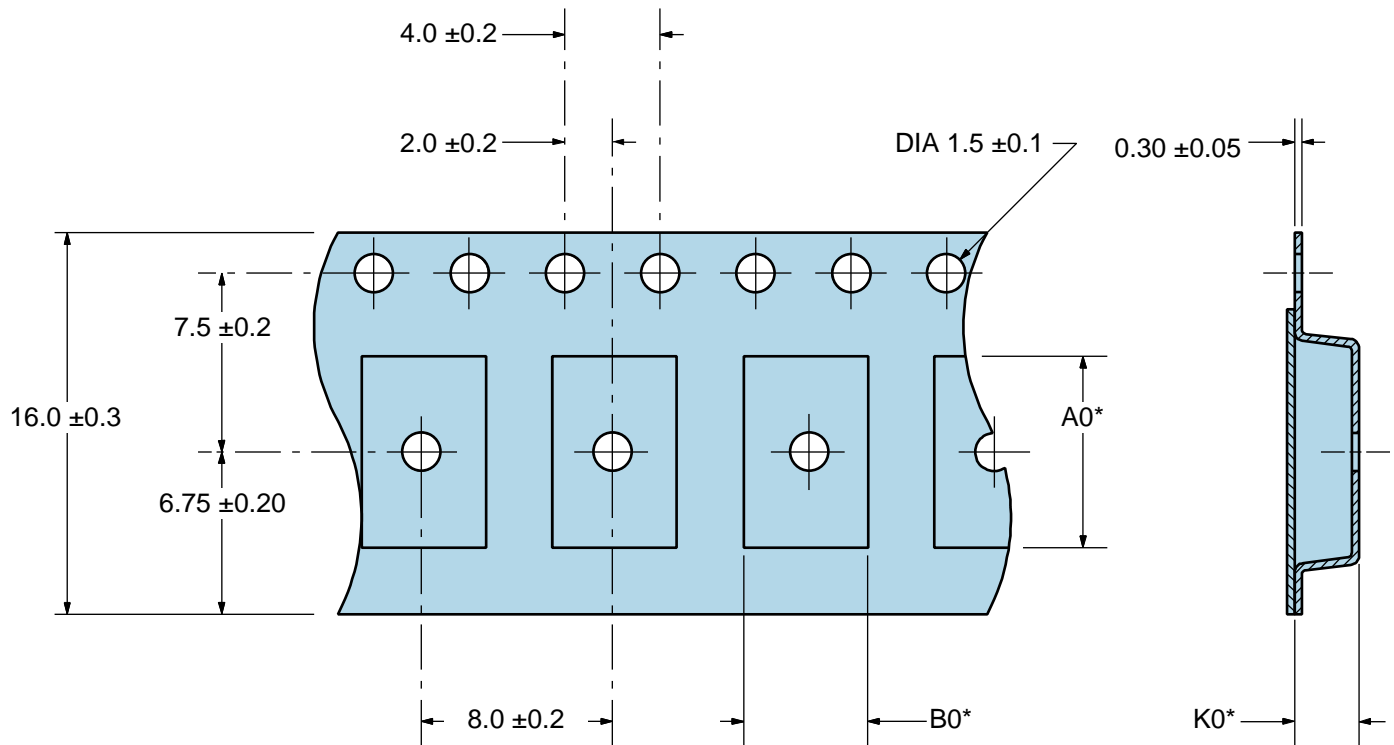
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>500MHz) passive probe is recommended.

Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.

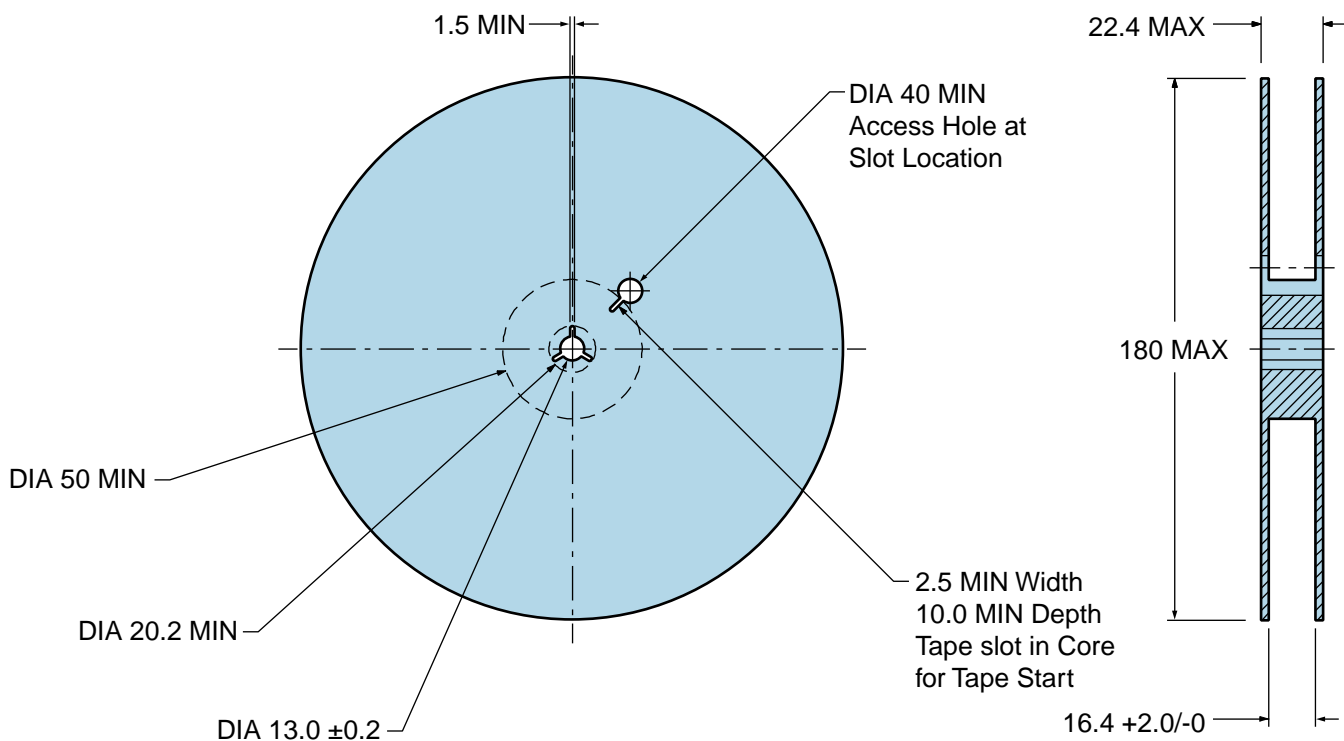
# EMCL12F2H-87.500M TR

## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

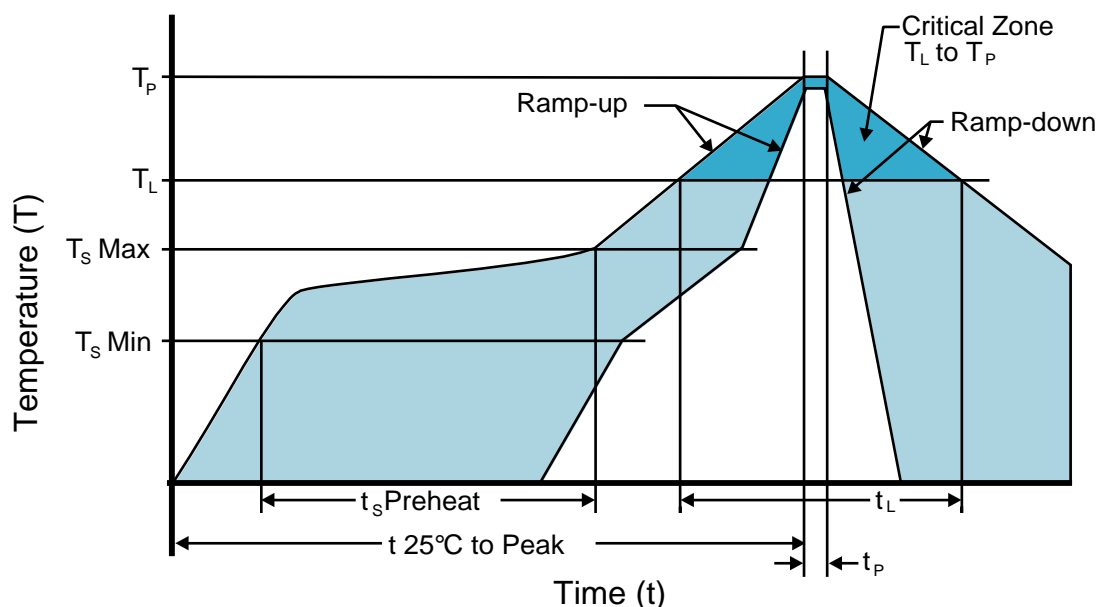


\*Compliant to EIA 481A



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## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

**T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)** 3°C/second Maximum

#### Preheat

- 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

**Ramp-up Rate (T<sub>L</sub> to T<sub>p</sub>)** 3°C/second Maximum

#### Time Maintained Above:

- Temperature (T<sub>L</sub>) 217°C
- Time (t<sub>L</sub>) 60 - 150 Seconds

**Peak Temperature (T<sub>p</sub>)** 260°C Maximum for 10 Seconds Maximum

**Target Peak Temperature (T<sub>p</sub> Target)** 250°C +0/-5°C

**Time within 5°C of actual peak (t<sub>p</sub>)** 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

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

<b>T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)</b>	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 1 Time / 230°C Maximum 2 Times
<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

### Low Temperature Manual Soldering

185°C Maximum for 10 seconds Maximum, 2 times Maximum.

### High Temperature Manual Soldering

260°C Maximum for 5 seconds Maximum, 2 times Maximum.