

EMRA56M2H-100.000M TR

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REGULATORY COMPLIANCE (Data Sheet downloaded on Jan 9, 2020)


[Click badges to download compliance docs](#)

Regulatory Compliance standards are subject to updates by governing bodies. Click the badges to download the latest compliance docs for this part number directly from Ecliptek.



ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 2.25Vdc to 3.63Vdc 4 Pad 1.6mm x 2.0mm Plastic Surface Mount (SMD)
100.000MHz ± 20 ppm over -40°C to +85°C

ELECTRICAL SPECIFICATIONS

| | |
|--|--|
| Nominal Frequency | 100.000MHz |
| Frequency Tolerance/Stability | ± 20 ppm Maximum over -40°C to +85°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, and First Year Aging at 25°C) |
| Aging at 25°C | ± 1.5 ppm Maximum First Year |
| Supply Voltage | 2.25Vdc to 3.63Vdc |
| Input Current | 9mA Maximum (No Load) |
| Output Voltage Logic High (Voh) | 90% of Vdd Minimum (IOH = -4mA) |
| Output Voltage Logic Low (Vol) | 10% of Vdd Maximum (IOL = +4mA) |
| Rise/Fall Time | 1.2nSec Typical, 3nSec Maximum (Measured from 20% to 80% of waveform) |
| Duty Cycle | 50 ± 5 (%) (Measured at 50% of waveform) |
| Load Drive Capability | 15pF Maximum |
| Output Logic Type | CMOS |
| Output Control Function | Tri-State (Disabled Output: High Impedance) |
| Output Control Input Voltage Logic High (Vih) | 70% of Vdd Minimum or No Connect to Enable Output |
| Output Control Input Voltage Logic Low (Vil) | 30% of Vdd Maximum to Disable Output |
| Tri-State Output Enable Time | 150nSec Maximum |
| Tri-State Output Disable Time | 150nSec Maximum |
| Period Jitter (RMS) | 2pSec Typical, 4pSec Maximum |
| RMS Phase Jitter (Fj = 900kHz to 7.5MHz; Random) | 0.5pSec Typical, 1pSec Maximum |
| RMS Phase Jitter (Fj = 12kHz to 20MHz; Random) | 1.5pSec Typical, 3pSec Maximum |
| Start Up Time | 5mSec Maximum |
| Storage Temperature Range | -65°C to +150°C |

ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

| | |
|----------------------|--|
| ESD Susceptibility | JESD22-A114, HBM, 2000V |
| Flammability | UL94-V0 |
| Mechanical Shock | MIL-STD-883, Method 2002, Condition E, 10,000G |
| Moisture Sensitivity | J-STD-020, MSL 1 |
| Solderability | MIL-STD-883, Method 2003 (Four I/O Pads on bottom of package only) |
| Temperature Cycling | JESD22-A104, Condition B |
| Vibration | MIL-STD-883, Method 2007, Condition A, 20G |

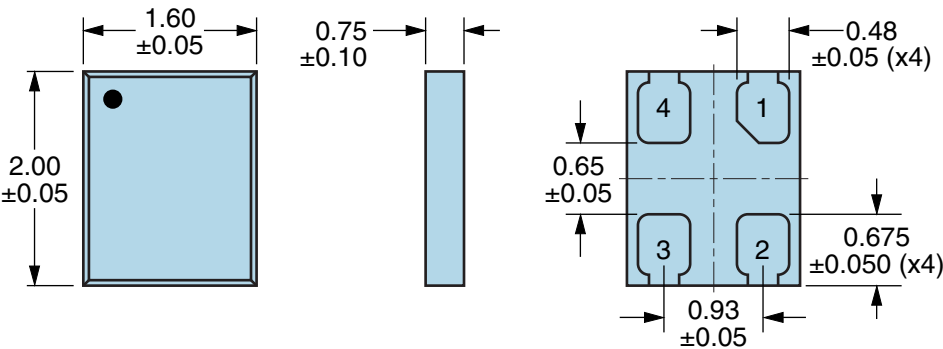
EMRA56M2H-100.000M TR

[Click part number to visit Part Number Details page](#)

MECHANICAL DIMENSIONS (all dimensions in millimeters)

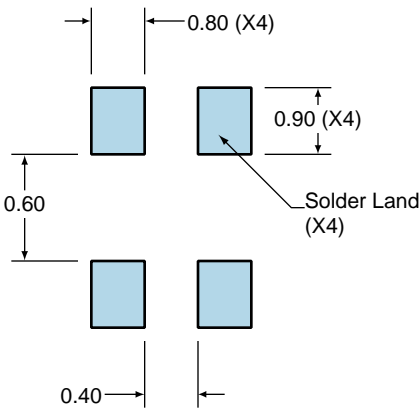
| PIN | CONNECTION |
|-----|----------------------------|
| 1 | Tri-State (High Impedance) |
| 2 | Ground |
| 3 | Output |
| 4 | Supply Voltage |

| LINE | MARKING |
|------|---|
| 1 | Ecliptek Manufacturing Identifier |
| 2 | Ecliptek Manufacturing Identifier (continued) |



Suggested Solder Pad Layout

All Dimensions in Millimeters

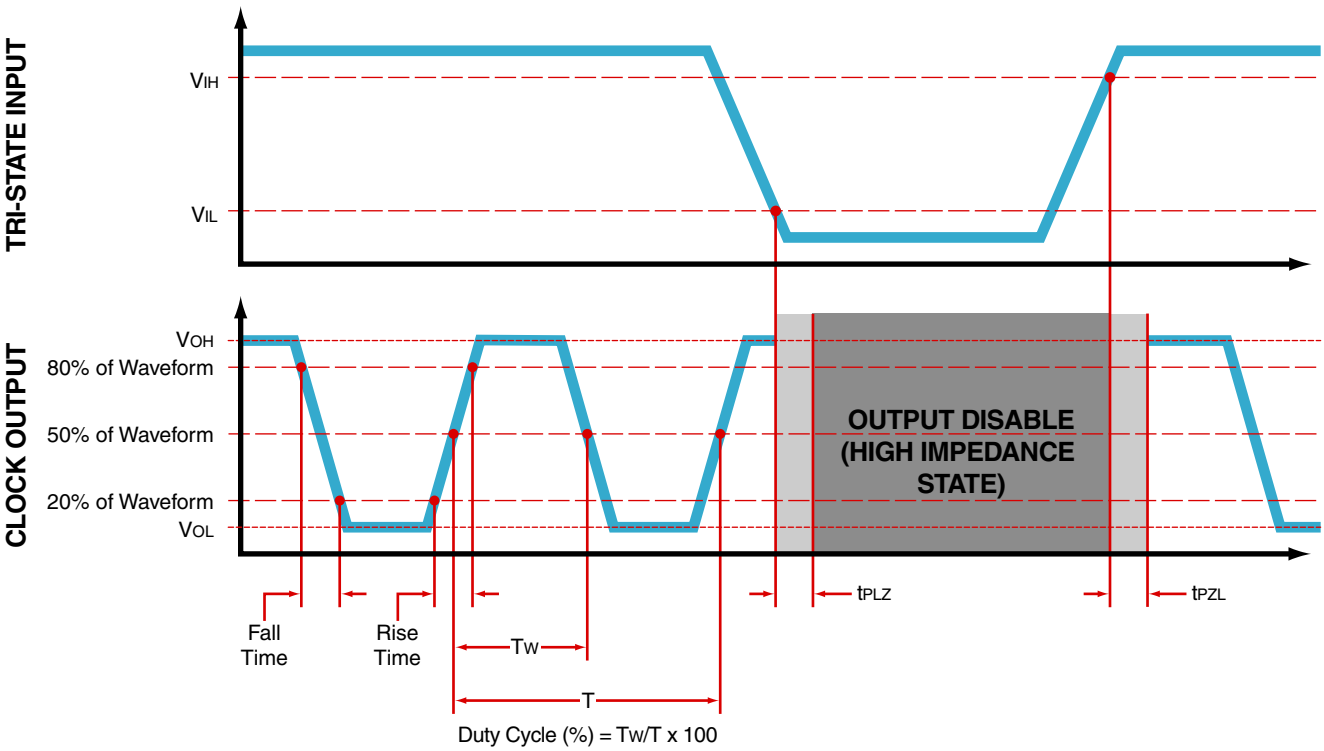


All Tolerances are ±0.1

EMRA56M2H-100.000M TR

[Click part number to visit Part Number Details page](#)

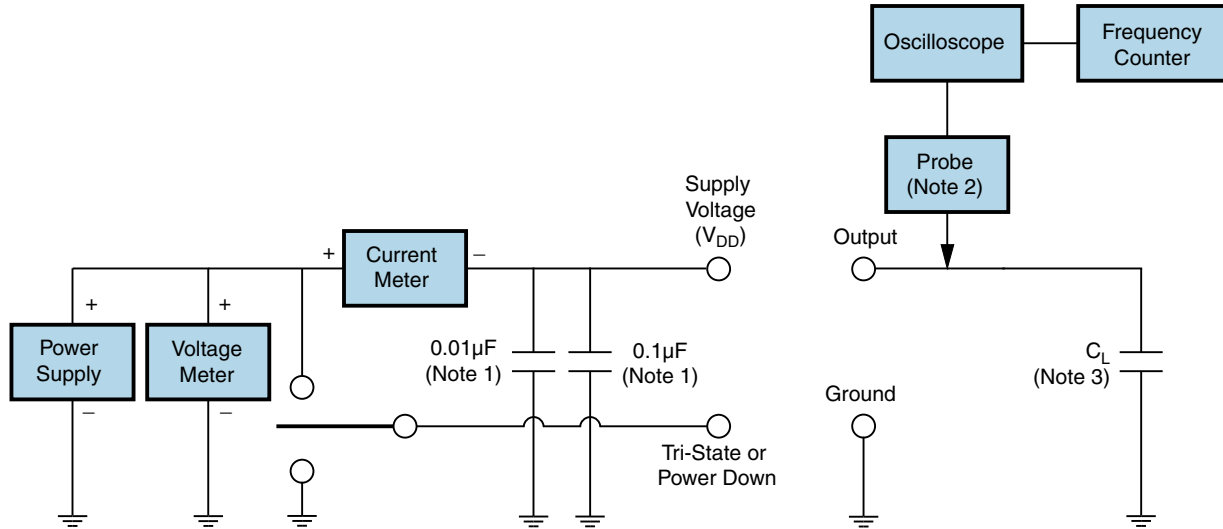
OUTPUT WAVEFORM & TIMING DIAGRAM



EMRA56M2H-100.000M TR

[Click part number to visit Part Number Details page](#)

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.

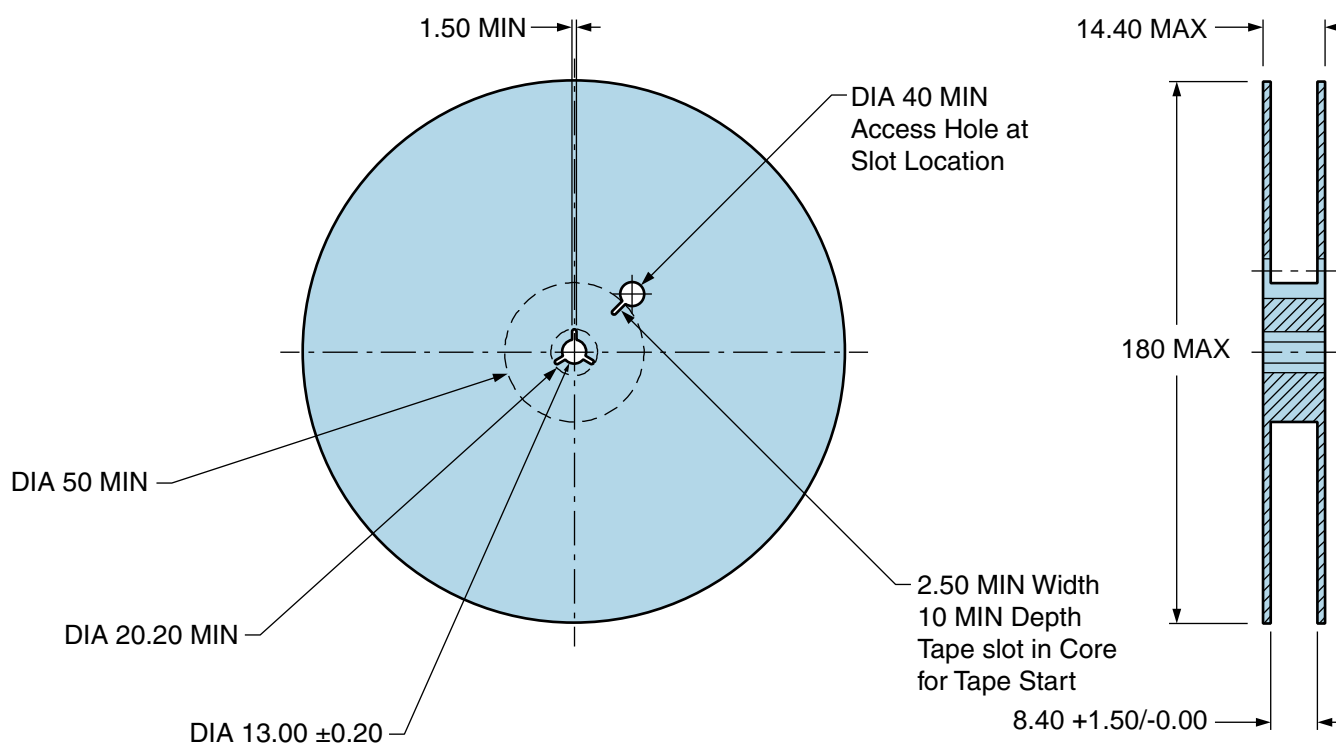
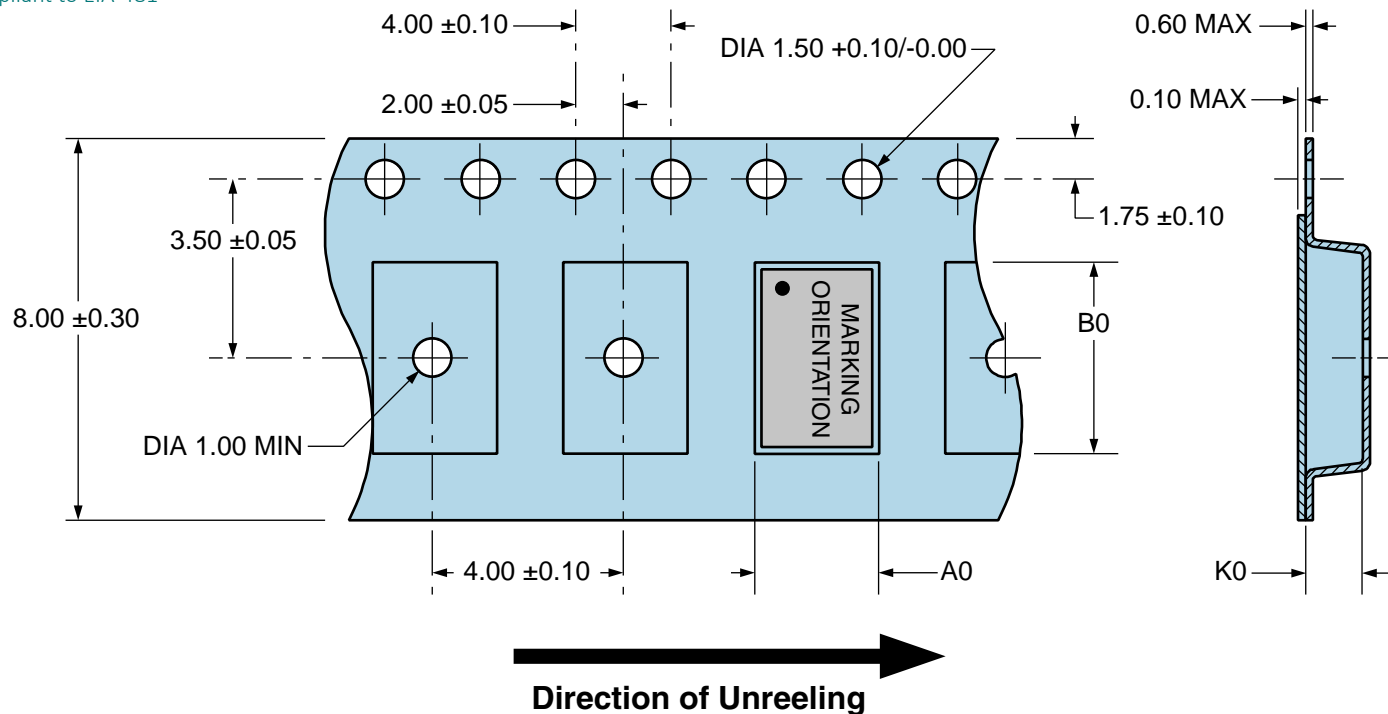
Note 3: Capacitance value C_L includes sum of all probe and fixture capacitance. See applicable specification sheet for 'Load Drive Capability'.

Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

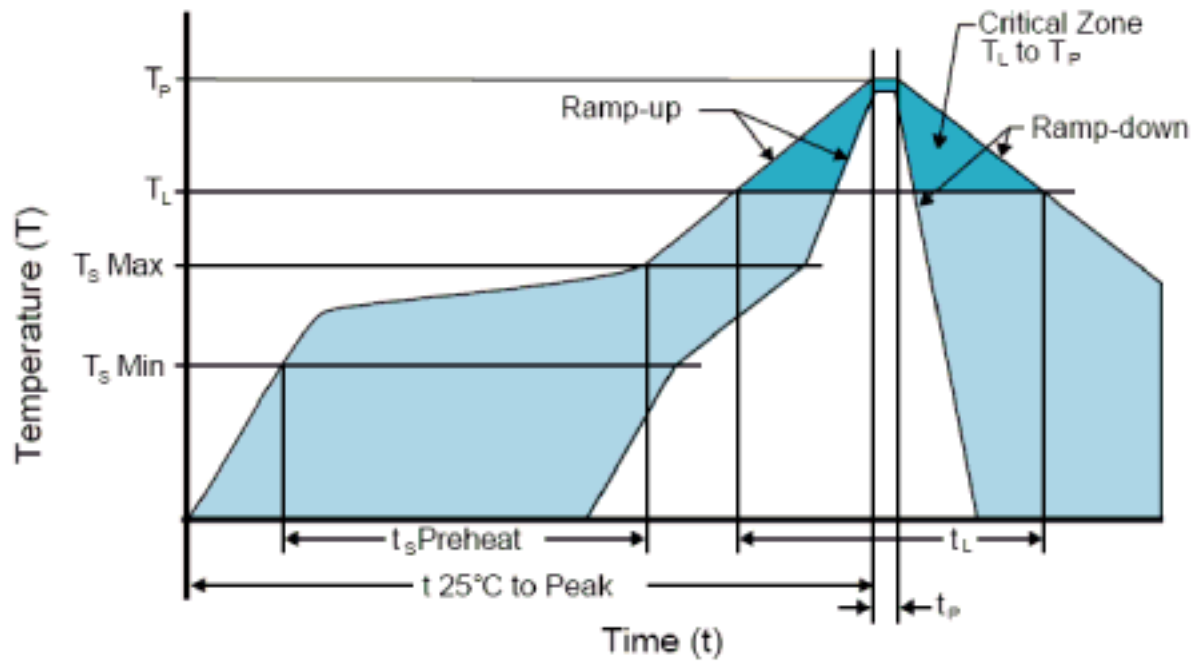
Compliant to EIA-481



EMRA56M2H-100.000M TR

[Click part number to visit Part Number Details page](#)

Recommended Solder Reflow Methods



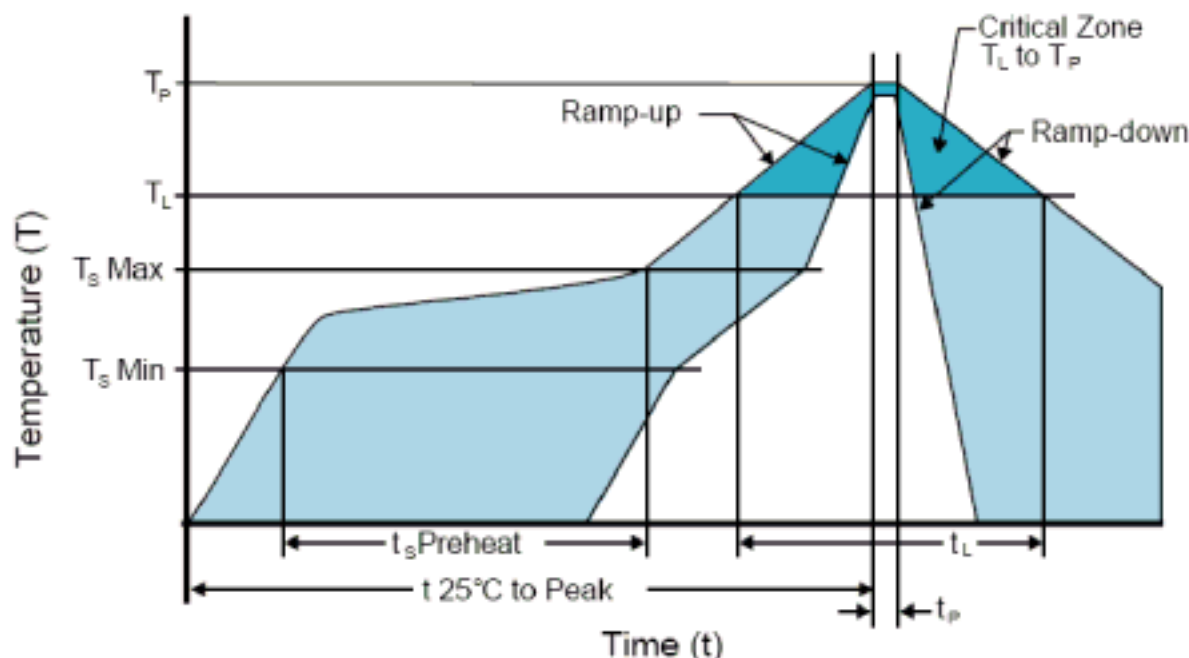
High Temperature Infrared/Convection

| | |
|-------------------------------------|--|
| Ts MAX to TL (Ramp-up Rate) | 3°C/Second Maximum |
| Preheat | |
| - Temperature Minimum (Ts MIN) | 150°C |
| - Temperature Typical (Ts TYP) | 175°C |
| - Temperature Maximum (Ts MAX) | 200°C |
| - Time (ts MIN) | 60 - 180 Seconds |
| Ramp-up Rate (TL to TP) | 3°C/Second Maximum |
| Time Maintained Above: | |
| - Temperature (TL) | 217°C |
| - Time (tL) | 60 - 150 Seconds |
| Peak Temperature (TP) | 260°C Maximum for 10 Seconds Maximum |
| Target Peak Temperature (TP Target) | 250°C +0/-5°C |
| Time within 5°C of actual peak (tp) | 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 | Temperature shown are applied to body of device. |

EMRA56M2H-100.000M TR

[Click part number to visit Part Number Details page](#)

Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

| | |
|-----------------------------|--------------------|
| TS MAX to TL (Ramp-up Rate) | 5°C/Second Maximum |
|-----------------------------|--------------------|

Preheat

| | |
|--------------------------------|------------------|
| - Temperature Minimum (TS MIN) | N/A |
| - Temperature Typical (TS TYP) | 150°C |
| - Temperature Maximum (TS MAX) | N/A |
| - Time (ts MIN) | 60 - 120 Seconds |

| | |
|-------------------------|--------------------|
| Ramp-up Rate (TL to TP) | 5°C/Second Maximum |
|-------------------------|--------------------|

Time Maintained Above:

| | |
|--------------------|---------------------|
| - Temperature (TL) | 150°C |
| - Time (tL) | 200 Seconds Maximum |

| | |
|-----------------------|---------------|
| Peak Temperature (TP) | 240°C Maximum |
|-----------------------|---------------|

| | |
|-------------------------------------|--|
| Target Peak Temperature (TP Target) | 240°C Maximum 2 Times / 230°C Maximum 1 Time |
|-------------------------------------|--|

| | |
|-------------------------------------|--|
| Time within 5°C of actual peak (tP) | 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 | Temperature shown are applied to body of device. |
|------------------|--|

Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperature shown are applied to body of device.)

High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperature shown are applied to body of device.)