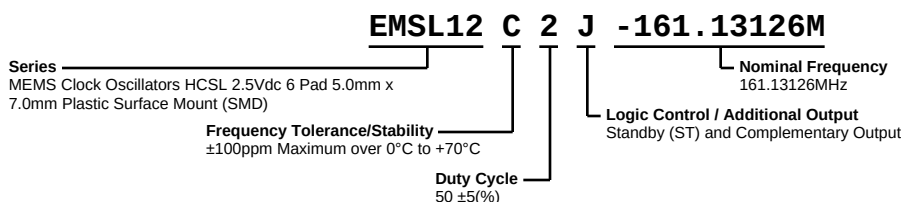


# EMSL12C2J-161.13126M



## ELECTRICAL SPECIFICATIONS

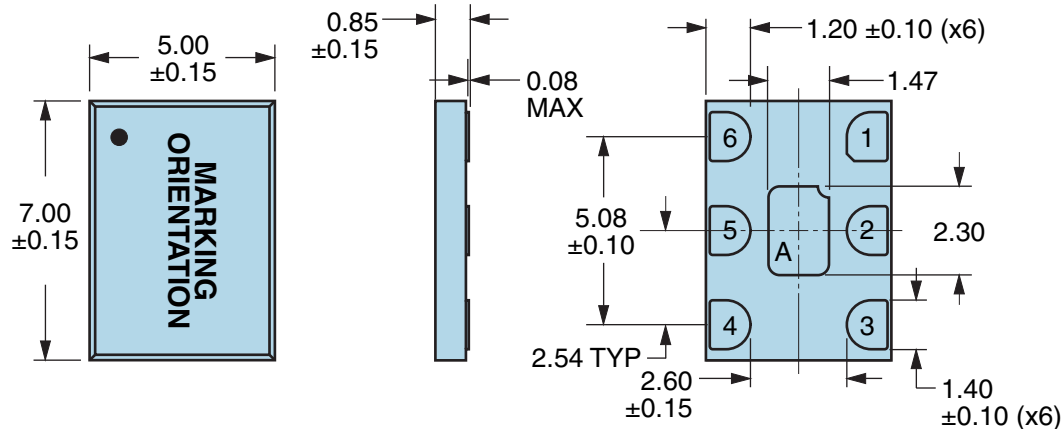
|                                                   |                                                                                                                                                                                                                                                                   |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal Frequency                                 | 161.13126MHz                                                                                                                                                                                                                                                      |
| Frequency Tolerance/Stability                     | $\pm 100$ ppm 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, First Year Aging at 25°C, Reflow, Shock, and Vibration) |
| Aging at 25°C                                     | $\pm 1$ ppm First Year Maximum                                                                                                                                                                                                                                    |
| Supply Voltage                                    | +2.5Vdc $\pm 0.125$ Vdc                                                                                                                                                                                                                                           |
| Input Current                                     | 65mA Maximum (Excluding Load Termination Current)                                                                                                                                                                                                                 |
| Output Voltage Logic High (Voh)                   | 600mVdc Minimum, 750mVdc Typical, 950mVdc Maximum                                                                                                                                                                                                                 |
| Output Voltage Logic Low (Vol)                    | 0mVdc Minimum, 25mVdc Typical, 50mVdc Maximum                                                                                                                                                                                                                     |
| Rise/Fall Time                                    | 300pSec Typical, 350pSec Maximum (Measured over 20% to 80% of waveform)                                                                                                                                                                                           |
| Duty Cycle                                        | 50 $\pm 5$ (%) (Measured at 50% of waveform)                                                                                                                                                                                                                      |
| Output Swing (VOpp)                               | 600mVdc Minimum, 750mVdc Typical, 950mVdc Maximum                                                                                                                                                                                                                 |
| Load Drive Capability                             | 50 Ohms to Ground (Output and Complementary Output)                                                                                                                                                                                                               |
| Output Logic Type                                 | HCSL                                                                                                                                                                                                                                                              |
| Logic Control / Additional Output                 | Standby (ST) and Complementary Output                                                                                                                                                                                                                             |
| Output Control Input Voltage                      | Vih of 70% of Vdd Minimum or No Connect to Enable Output and Complementary Output, Vil of 30% of Vdd Maximum to Disable Output and Complementary Output (High Impedance)                                                                                          |
| Standby Current                                   | 30 $\mu$ A Maximum (Without Load)                                                                                                                                                                                                                                 |
| Period Jitter (Deterministic)                     | 0.2pSec Typical                                                                                                                                                                                                                                                   |
| Period Jitter (Random)                            | 2.0pSec Typical                                                                                                                                                                                                                                                   |
| Period Jitter (RMS)                               | 1.5pSec Typical, 3.0pSec Maximum                                                                                                                                                                                                                                  |
| Period Jitter (pk-pk)                             | 20pSec Typical, 25pSec Maximum                                                                                                                                                                                                                                    |
| Period Jitter (Cycle to Cycle)                    | 10pSec Typical                                                                                                                                                                                                                                                    |
| RMS Phase Jitter (Fj = 637kHz to 10MHz; Random)   | 1.6pSec Typical                                                                                                                                                                                                                                                   |
| RMS Phase Jitter (Fj = 1.5MHz to 22MHz; Random)   | 0.4pSec Typical                                                                                                                                                                                                                                                   |
| RMS Phase Jitter (Fj = 1.875MHz to 20MHz; Random) | 0.4pSec Typical                                                                                                                                                                                                                                                   |
| Start Up Time                                     | 10mSec Maximum                                                                                                                                                                                                                                                    |
| Storage Temperature Range                         | -55°C to +125°C                                                                                                                                                                                                                                                   |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

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

# EMSL12C2J-161.13126M

## MECHANICAL DIMENSIONS (all dimensions in millimeters)

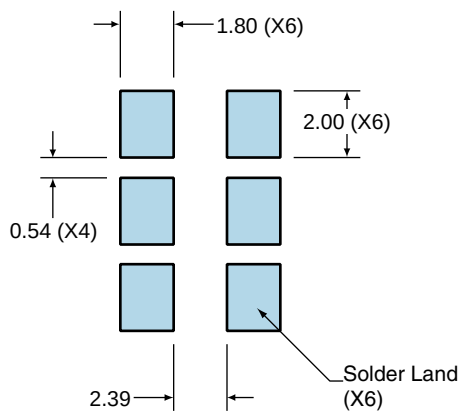


| PIN | CONNECTION           |
|-----|----------------------|
| 1   | Standby (ST)         |
| 2   | No Connect           |
| 3   | Case Ground          |
| 4   | Output               |
| 5   | Complementary Output |
| 6   | Supply Voltage       |

| LINE | MARKING                                                             |
|------|---------------------------------------------------------------------|
| 1    | XXXX or XXXXX<br>XXXX or XXXXX=Ecliptek<br>Manufacturing Identifier |

## Suggested Solder Pad Layout

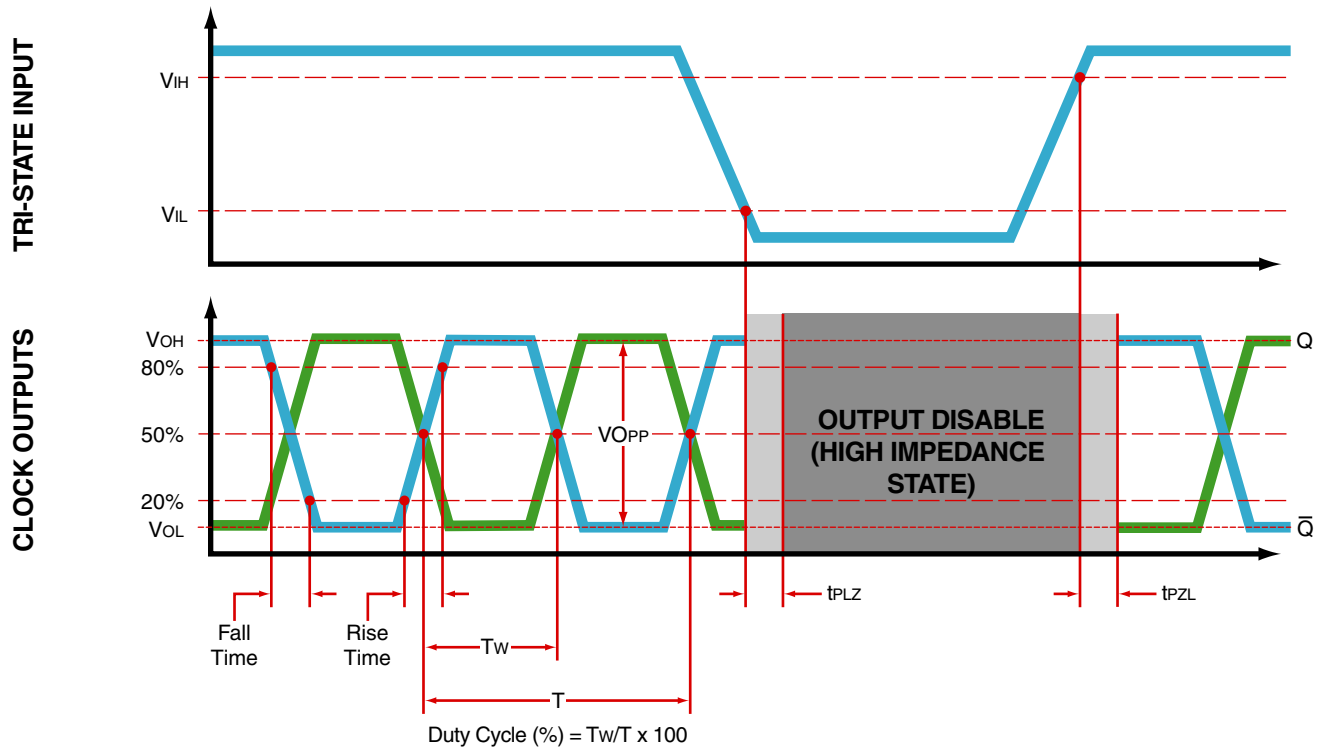
All Dimensions in Millimeters



All Tolerances are ±0.1

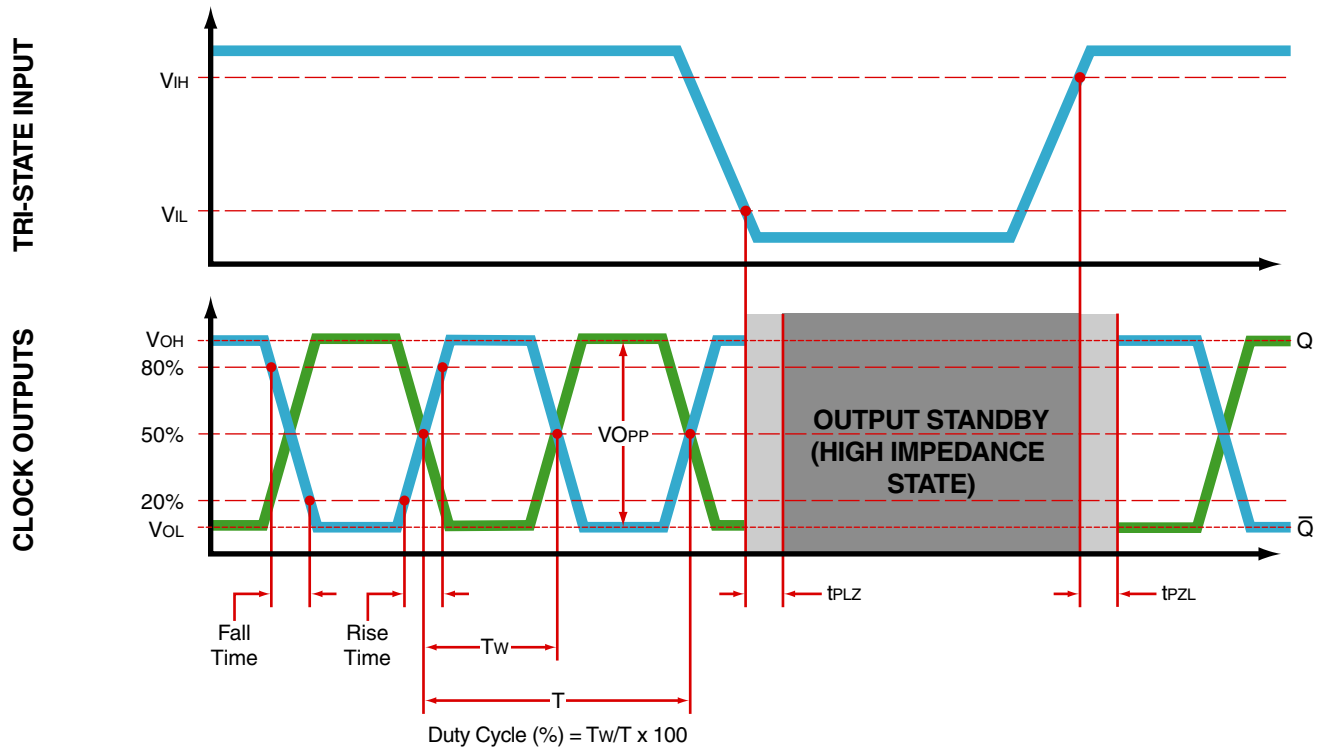
# EMSL12C2J-161.13126M

## OUTPUT WAVEFORM & TIMING DIAGRAM



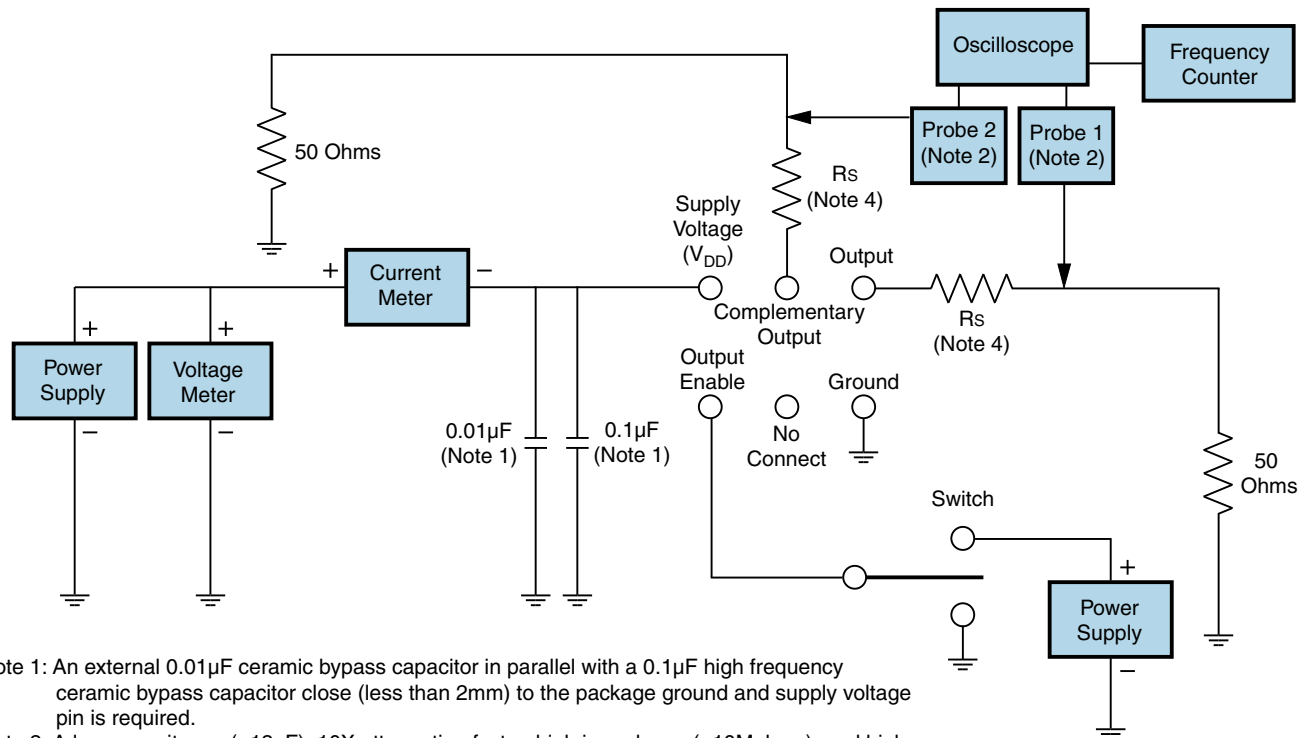
# EMSL12C2J-161.13126M

## OUTPUT WAVEFORM & TIMING DIAGRAM



# EMSL12C2J-161.13126M

## Test Circuit for Output Enable and Complementary 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 capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>500MHz) passive probe is recommended.

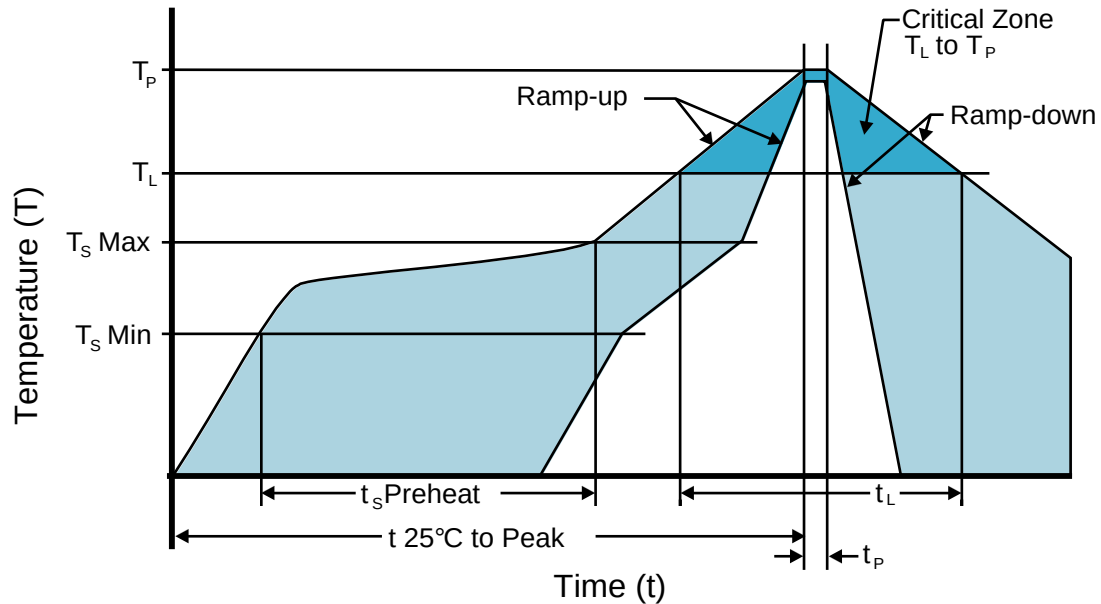
Note 3: Test circuit PCB traces need to be designed for a characteristic line impedance of 50 ohms.

Note 4: A 10 ohm to 33 ohm series resistor is required to limit overshoot.  $R_s$  value is circuit layout dependant.

Figure 2 is a detailed circuit diagram for measuring the output impedance of a device. The circuit includes a Power Supply, Voltage Meter, Current Meter, and Oscilloscope. The device under test is connected to a 50 Ohms load. The circuit is configured to measure the output voltage and current, and the output impedance is calculated from these measurements. The diagram shows the connection of the device to the measurement instruments and the power supply, including the use of a switch and a 50 Ohms load.

Note 4: A 10 ohm to 33 ohm series resistor is required to limit overshoot. Rs value is circuit layout dependant.

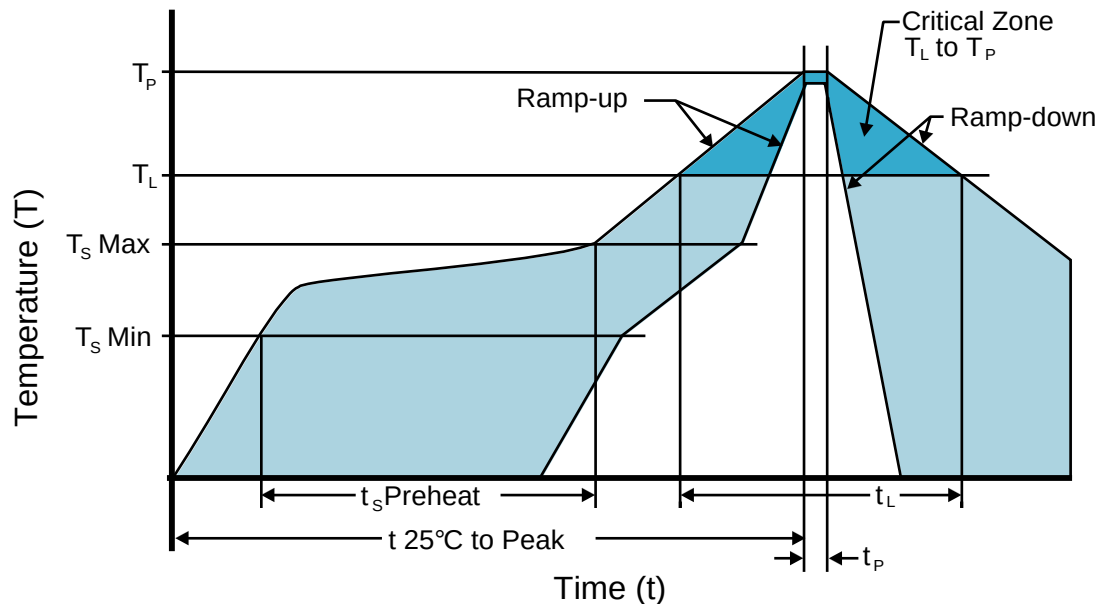
## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|                                                                  |                                      |
|------------------------------------------------------------------|--------------------------------------|
| <b><math>T_s \text{ MAX to } 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                              |

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

**$T_S$  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 ( $t_s$  MIN) 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

### 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.