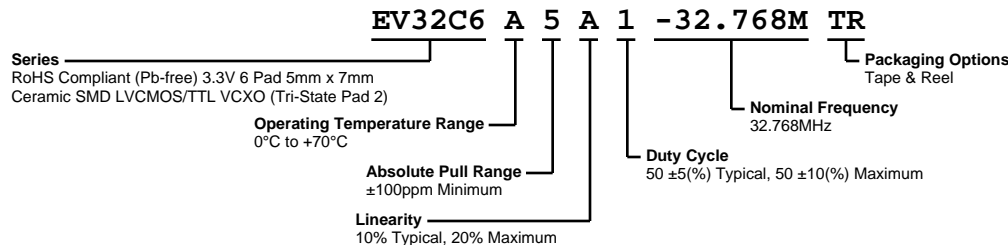


# EV32C6A5A1-32.768M TR



## ELECTRICAL SPECIFICATIONS

|                                       |   |
|---------------------------------------|---|
| Nominal Frequency                     | 32.768MHz   |
| Frequency Tolerance/Stability         | ±50ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, Shock, and Vibration.)                                       |
| Aging at 25°C                         | ±2ppm/first year Typical, ±10ppm/10 years Maximum   |
| Operating Temperature Range           | 0°C to +70°C  |
| Supply Voltage                        | 3.3Vdc ±10%   |
| Input Current                         | 15mA Maximum  |
| Output Voltage Logic High (Voh)       | 90% of Vdd Minimum (IOH = -4mA)   |
| Output Voltage Logic Low (Vol)        | 10% of Vdd Minimum (IOL = +4mA)   |
| Rise/Fall Time                        | 5nSec Maximum (Measured at 20% to 80% of Waveform)  |
| Duty Cycle                            | 50 ±5(%) Typical, 50 ±10(%) Maximum (Measured at 50% of Waveform)   |
| Load Drive Capability                 | 15pF LVCMOS Load Maximum  |
| Output Logic Type                     | CMOS  |
| Absolute Pull Range                   | ±100ppm Minimum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, Shock, Vibration, and Aging over the Control Voltage (Vc).) |
| Control Voltage                       | 0.3Vdc to 3.0Vdc (Test Condition for Absolute Pull Range)   |
| Control Voltage Range                 | 0.0Vdc to Vdd   |
| Linearity                             | 10% Typical, 20% Maximum  |
| Transfer Function                     | Positive Transfer Characteristic  |
| Modulation Bandwidth                  | 10kHz Minimum (Measured at -3dB, Vc = 1.65Vdc)  |
| Input Impedance                       | 50kOhms Minimum   |
| Input Leakage Current                 | 10µA Maximum  |
| Phase Noise                           | -70dBc/Hz at offset of 10Hz, -100dBc/Hz at offset of 100Hz, -130dBc/Hz at offset of 1kHz, -147dBc/Hz at offset of 10kHz, -152dBc/Hz at offset of 100kHz, and -155dBc/Hz at offset of 1MHz (Typical values at Fo = 27MHz)                      |
| Tri-State Input Voltage (Vih and Vil) | +0.9Vdd Minimum to Enable Output; +0.1Vdd Maximum to Disable Output (High Impedance); No Connect to Enable Output.  |
| RMS Phase Jitter                      | 1pSec Maximum (Fj = 12kHz to 20MHz)   |
| Start Up Time                         | 10mSec Maximum  |
| Storage Temperature Range             | -55°C to +125°C   |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

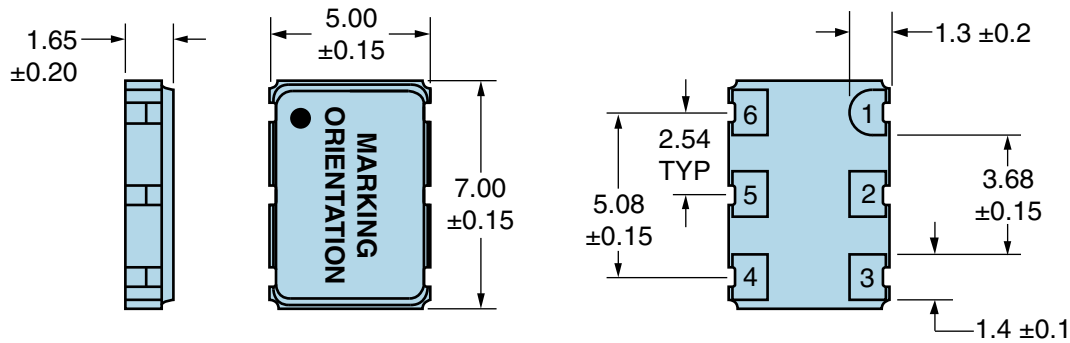
|                              |   |
|------------------------------|---|
| ESD Susceptibility           | MIL-STD-883, Method 3015, Class 1, HBM: 1500V |
| Fine Leak Test               | MIL-STD-883, Method 1014, Condition A         |
| Flammability                 | UL94-V0                                       |
| Gross Leak Test              | MIL-STD-883, Method 1014, Condition C         |
| Mechanical Shock             | MIL-STD-883, Method 2002, Condition B         |
| Moisture Resistance          | MIL-STD-883, Method 1004                      |
| Moisture Sensitivity         | 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                      |

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## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

|                     |                                       |
|---------------------|---------------------------------------|
| Temperature Cycling | MIL-STD-883, Method 1010, Condition B |
| Vibration           | MIL-STD-883, Method 2007, Condition A |

### MECHANICAL DIMENSIONS (all dimensions in millimeters)

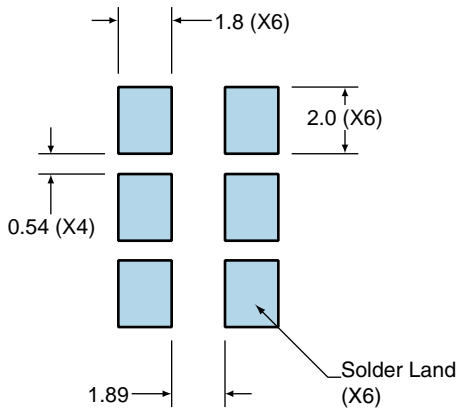


| PIN | CONNECTION      |
|-----|-----------------|
| 1   | Control Voltage |
| 2   | Tri-State       |
| 3   | Case Ground     |
| 4   | Output          |
| 5   | No Connect      |
| 6   | Supply Voltage  |

| LINE | MARKING   |
|------|---|
| 1    | <b>ECLIPTEK</b>   |
| 2    | <b>32.768M</b>  |
| 3    | <b>XXYZZ</b><br>XX=Ecliptek Manufacturing Code<br>Y=Last Digit of Year<br>ZZ=Week of Year |

### Suggested Solder Pad Layout

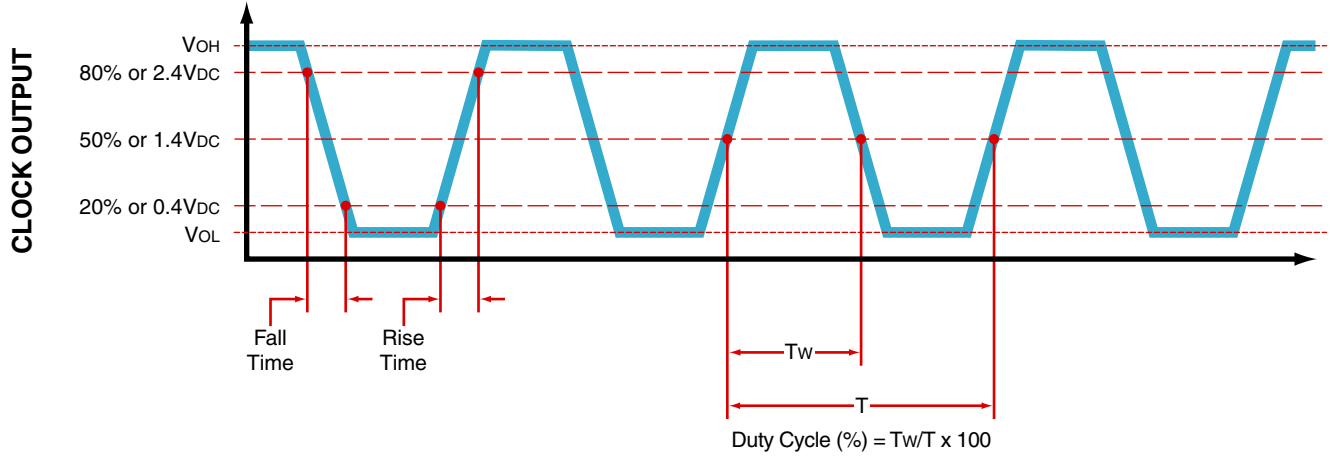
All Dimensions in Millimeters



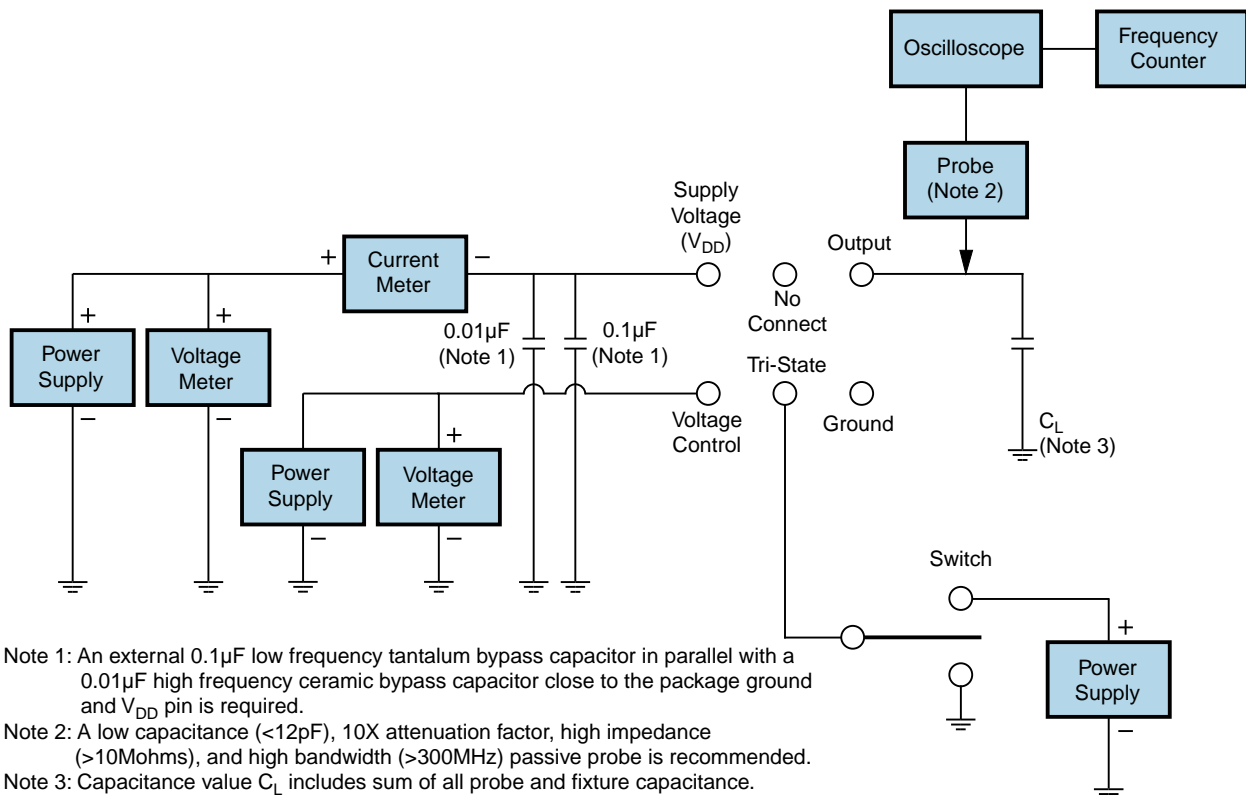
All Tolerances are ±0.1

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## OUTPUT WAVEFORM



## Test Circuit for CMOS Output

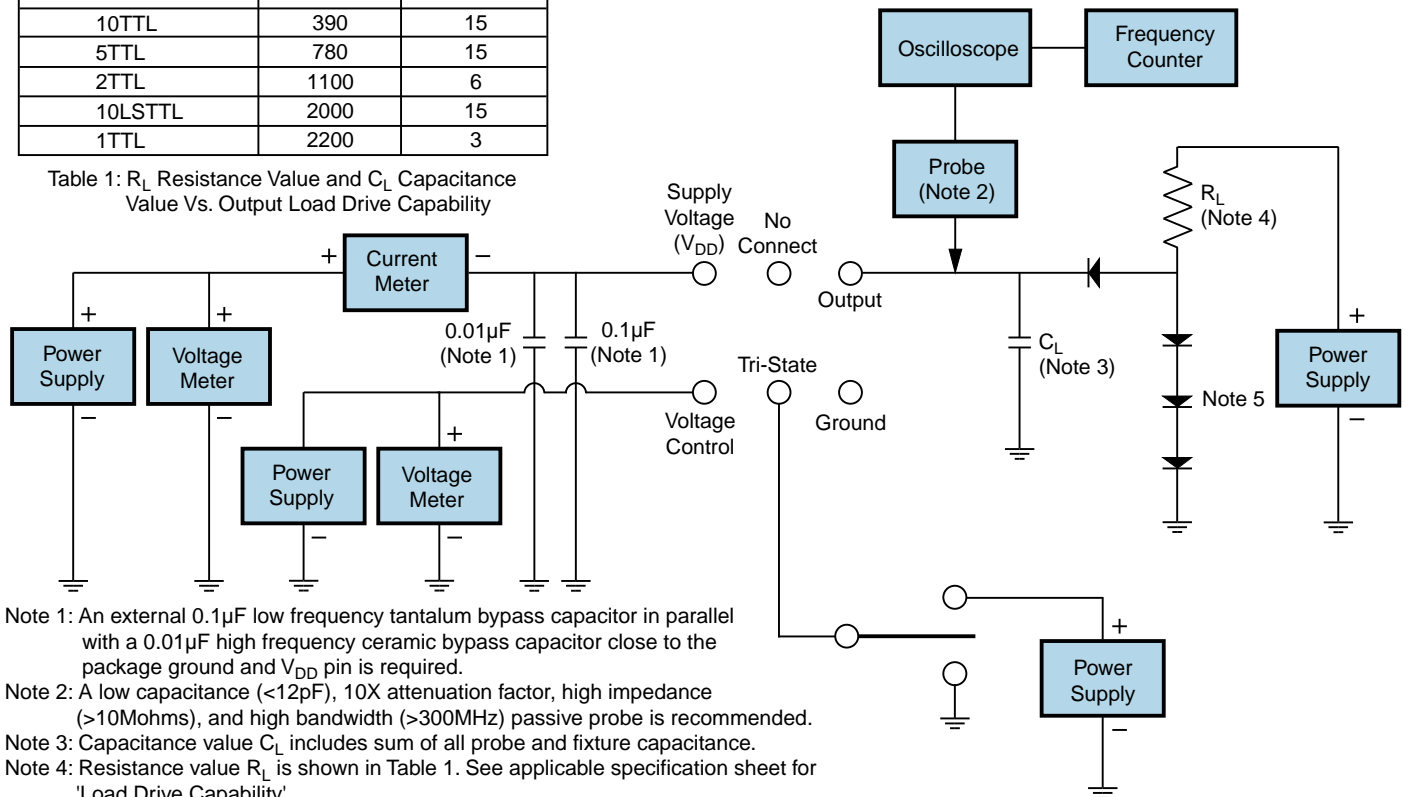


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## Test Circuit for TTL Output

| Output Load Drive Capability | R <sub>L</sub> Value (Ohms) | C <sub>L</sub> Value (pF) |
|------------------------------|-----------------------------|---------------------------|
| 10TTL                        | 390                         | 15                        |
| 5TTL                         | 780                         | 15                        |
| 2TTL                         | 1100                        | 6                         |
| 10LSTTL                      | 2000                        | 15                        |
| 1TTL                         | 2200                        | 3                         |

Table 1: R<sub>L</sub> Resistance Value and C<sub>L</sub> Capacitance Value Vs. Output Load Drive Capability



Note 1: An external 0.1µF low frequency tantalum bypass capacitor in parallel with a 0.01µF high frequency ceramic bypass capacitor close to the package ground and V<sub>DD</sub> 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.

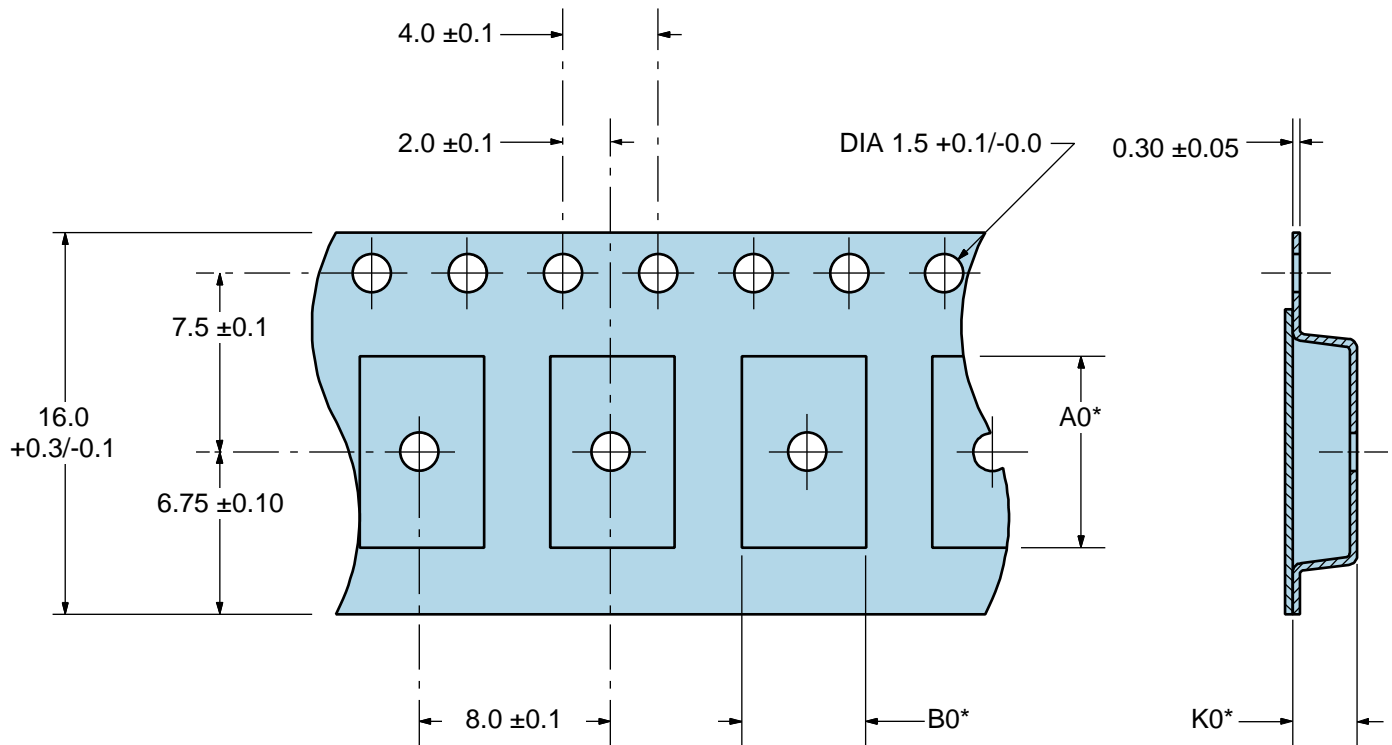
Note 4: Resistance value R<sub>L</sub> is shown in Table 1. See applicable specification sheet for 'Load Drive Capability'.

Note 5: All diodes are MMBD7000, MMBD914, or equivalent.

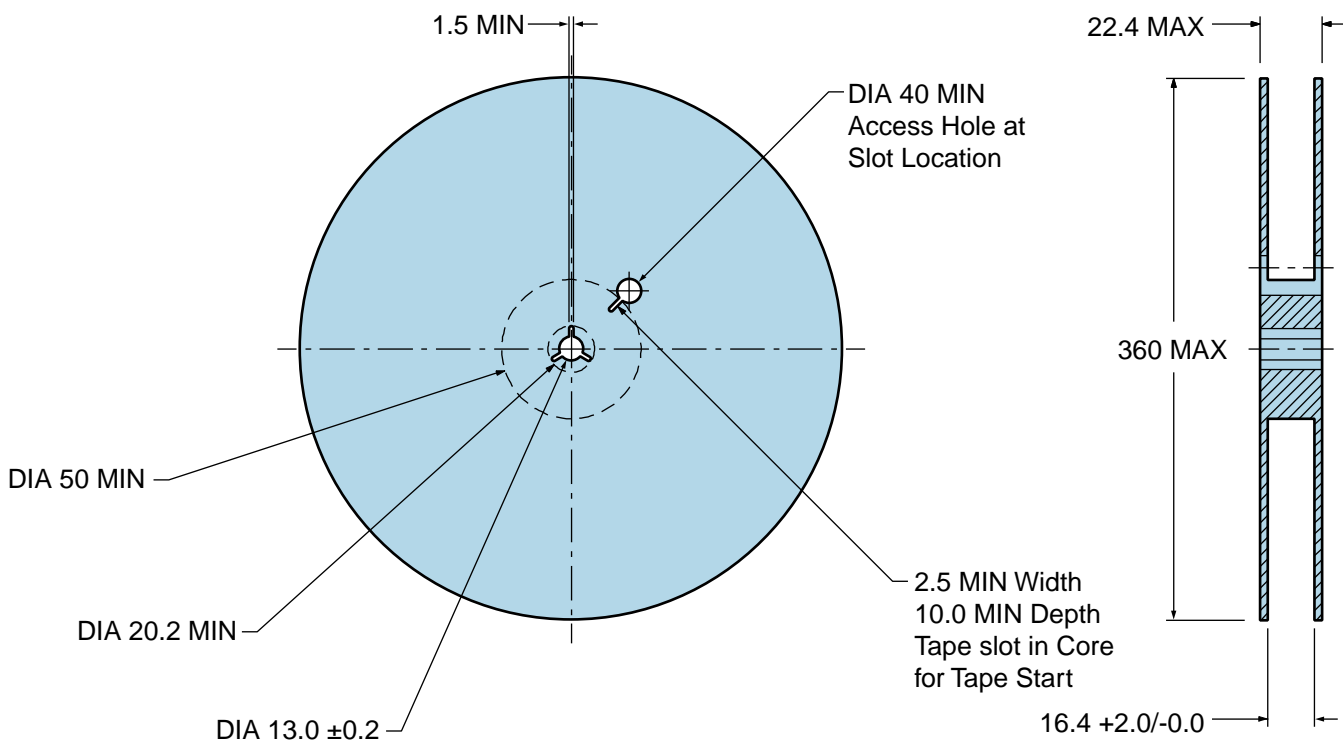
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## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units



\*Compliant to EIA 481A



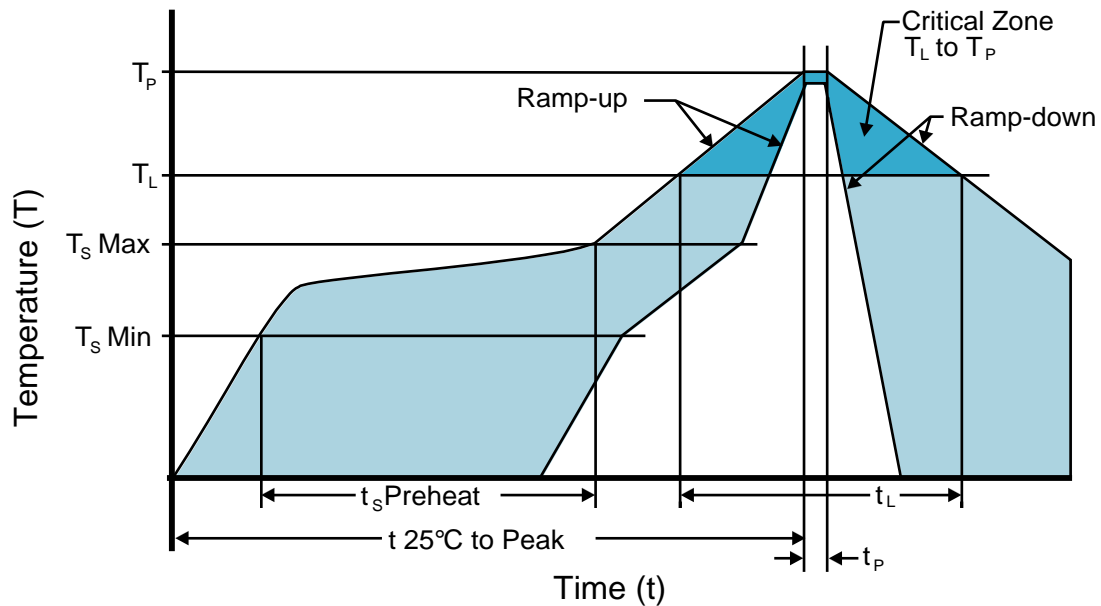
## Recommended Solder Reflow Methods



### High Temperature Infrared/Convection

|  |                                      |
|--|--------------------------------------|
| <b>T<sub>s</sub> MAX to T<sub>L</sub> (Ramp-up Rate)</b> | 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> MIN)                              | 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                              |

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 240°C

|  |  |
|--|--|
| <b><math>T_s</math> MAX to <math>T_L</math> (Ramp-up Rate)</b> | 5°C/second Maximum                                     |
| <b>Preheat</b>   |  |
| - 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                                       |
| <b>Ramp-up Rate (<math>T_L</math> to <math>T_p</math>)</b>     | 5°C/second Maximum                                     |
| <b>Time Maintained Above:</b>                                  |  |
| - Temperature ( $T_L$ )  | 150°C  |
| - Time ( $t_L$ )   | 200 Seconds Maximum                                    |
| <b>Peak Temperature (<math>T_p</math>)</b>                     | 240°C Maximum  |
| <b>Target Peak Temperature (<math>T_p</math> Target)</b>       | 240°C Maximum 1 Time / 230°C Maximum 2 Times           |
| <b>Time within 5°C of actual peak (<math>t_p</math>)</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.