

**ECN/PCN No.: 4125**

| For Manufacturer   |   |  |  |
|--|---|--|--|
| <b>Product Description:</b><br>PLASTIC SMD MEMS OSCILLATOR   | <b>Abracon Part Number / Part Series:</b><br>EMK23                | <input type="checkbox"/> Documentation only<br><input type="checkbox"/> ECN<br><input checked="" type="checkbox"/> EOL | <input checked="" type="checkbox"/> Series<br><input type="checkbox"/> Part Number |
| <b>Affected Revision:</b><br>K   | <b>New Revision:</b><br>EOL                                       | <b>Application:</b>  | <input type="checkbox"/> Safety<br><input checked="" type="checkbox"/> Non-Safety  |
| <b>Prior to Change:</b><br>Active<br><a href="https://abracon.com/datasheets/Ecliptek/EMK23.pdf">https://abracon.com/datasheets/Ecliptek/EMK23.pdf</a>   |   |  |  |
| <b>After Change:</b><br>EOL  |   |  |  |
| <b>Cause/Reason for Change:</b><br>Discontinuation of manufacturing capability.  |   |  |  |
| Change Plan  |   |  |  |
| <b>Effective Date:</b><br>2/7/2022   | <b>Additional Remarks:</b><br>N/A                                 |  |  |
| <b>Change Declaration:</b><br>N/A  |   |  |  |
| <b>Issued Date:</b><br>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><br>5/7/2022  | <b>Alternate Part Number / Part Series:</b><br>ASFLDV (5.0x3.2mm) |  |  |
| <b>Additional Approval:</b>  | <b>Additional Approval:</b>                                       | <b>Additional Approval:</b>  |  |
| Customer Approval (If Applicable)  |   |  |  |
| <b>Qualification Status:</b><br><input type="checkbox"/> Approved <input type="checkbox"/> Not accepted<br><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><br>COMPLIANT |  <b>EU RoHS</b><br>2011/65 +<br>2015/863<br>COMPLIANT |  <b>China RoHS</b><br>COMPLIANT |  <b>REACH</b><br>SVHC<br>COMPLIANT |  <b>DRC</b><br>CONFLICT<br>FREE |
|--|--|--|---|--|

## ITEM DESCRIPTION

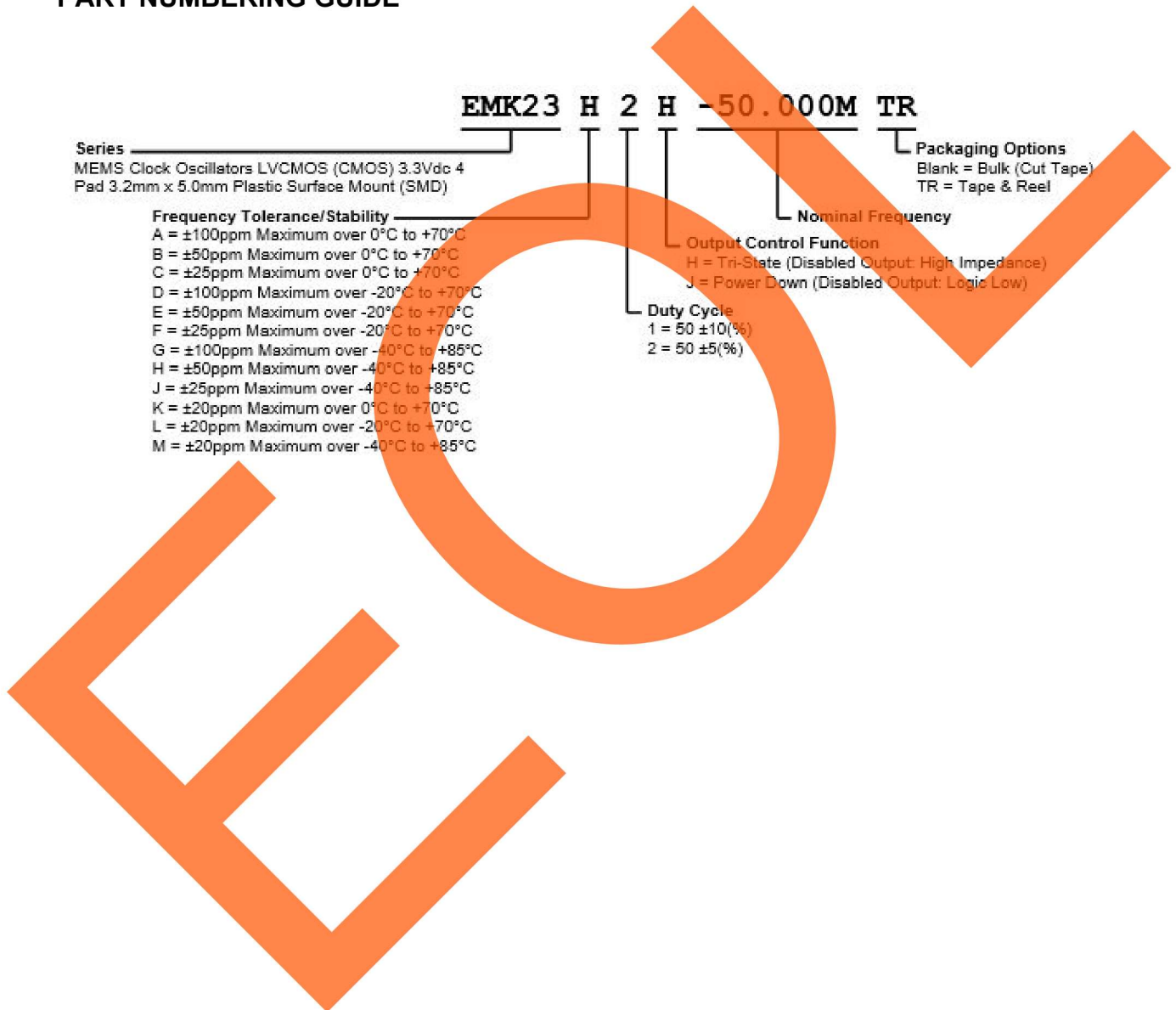
MEMS Clock Oscillators LVCMOS (CMOS) 3.3Vdc 4 Pad 3.2mm x 5.0mm Plastic Surface Mount (SMD)

## ELECTRICAL SPECIFICATIONS

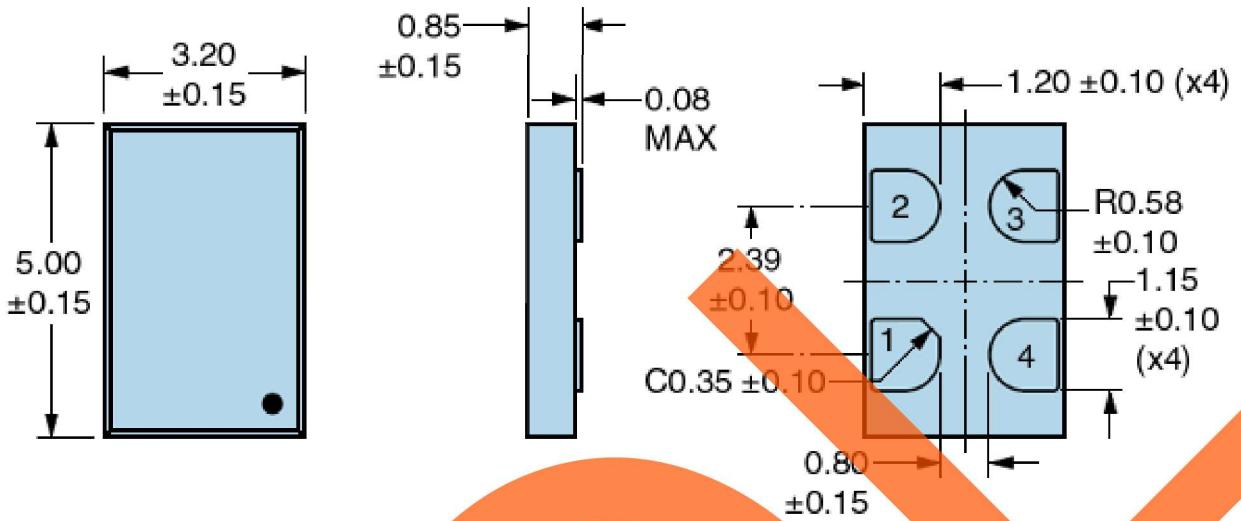
|  |  |
|--|--|
| <b>Nominal Frequency</b>   | 1MHz to 125MHz   |
| <b>Frequency Tolerance/Stability</b>                                 | Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, and Output Load Change<br>$\pm 100\text{ppm}$ Maximum over 0°C to +70°C<br>$\pm 50\text{ppm}$ Maximum over 0°C to +70°C<br>$\pm 25\text{ppm}$ Maximum over 0°C to +70°C<br>$\pm 20\text{ppm}$ Maximum over 0°C to +70°C<br>$\pm 100\text{ppm}$ Maximum over -20°C to +70°C<br>$\pm 50\text{ppm}$ Maximum over -20°C to +70°C<br>$\pm 25\text{ppm}$ Maximum over -20°C to +70°C<br>$\pm 20\text{ppm}$ Maximum over -20°C to +70°C<br>$\pm 100\text{ppm}$ Maximum over -40°C to +85°C<br>$\pm 50\text{ppm}$ Maximum over -40°C to +85°C<br>$\pm 25\text{ppm}$ Maximum over -40°C to +85°C<br>$\pm 20\text{ppm}$ Maximum over -40°C to +85°C |
| <b>Aging at 25°C</b>   | $\pm 1.5\text{ppm}$ Maximum First Year   |
| <b>Supply Voltage</b>  | 3.3Vdc $\pm 10\%$  |
| <b>Input Current</b>   | No Load<br>5mA Maximum over Nominal Frequency of 1MHz to 20MHz<br>6mA Maximum over Nominal Frequency of 20.000001MHz to 50MHz<br>7mA Maximum over Nominal Frequency of 50.000001MHz to 80MHz<br>9mA Maximum over Nominal Frequency of 80.000001MHz to 125MHz   |
| <b>Output Voltage Logic High (<math>V_{OH}</math>)</b>               | $I_{OH} = -4\text{mA}$<br>90% of $V_{DD}$ Minimum  |
| <b>Output Voltage Logic Low (<math>V_{OL}</math>)</b>                | $I_{OL} = +4\text{mA}$<br>10% of $V_{DD}$ Maximum  |
| <b>Rise/Fall Time</b>  | Measured from 20% to 80% of waveform<br>1.2nSec Typical, 3nSec Maximum   |
| <b>Duty Cycle</b>  | Measured at 50% of waveform<br>50 $\pm 10\%$<br>50 $\pm 5\%$   |
| <b>Load Drive Capability</b>   | 15pF Maximum   |
| <b>Output Logic Type</b>   | CMOS   |
| <b>Output Control Function</b>                                       | Tri-State (Disabled Output: High Impedance)<br>Power Down (Disabled Output: Logic Low)   |
| <b>Output Control Input Voltage Logic High (<math>V_{IH}</math>)</b> | 70% of $V_{DD}$ Minimum or No Connect to Enable Output   |
| <b>Output Control Input Voltage Logic Low (<math>V_{IL}</math>)</b>  | 30% of $V_{DD}$ Maximum to Disable Output  |
| <b>Power Down Output Enable Time</b>                                 | 5mSec Maximum (Disabled Output: Logic Low)   |
| <b>Tri-State Output Enable Time</b>                                  | 150nSec Maximum (Disabled Output: High Impedance)  |
| <b>Power Down Output Disable Time</b>                                | 150nSec Maximum (Disabled Output: Logic Low)   |
| <b>Tri-State Output Disable Time</b>                                 | 150nSec Maximum (Disabled Output: High Impedance)  |
| <b>Standby Current</b>   | 10 $\mu\text{A}$ Maximum (Disabled Output: Logic Low)  |
| <b>Period Jitter (RMS)</b>   | 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                |

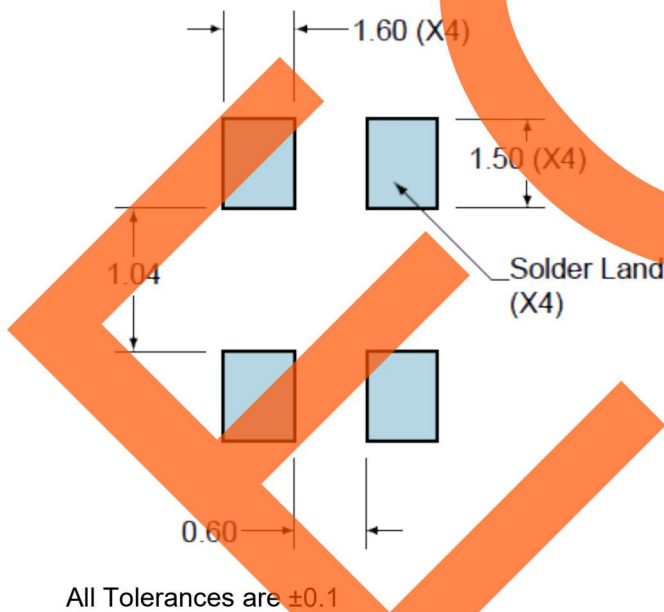
## PART NUMBERING GUIDE



MECHANICAL DIMENSIONS



SUGGESTED SOLDER PAD LAYOUT

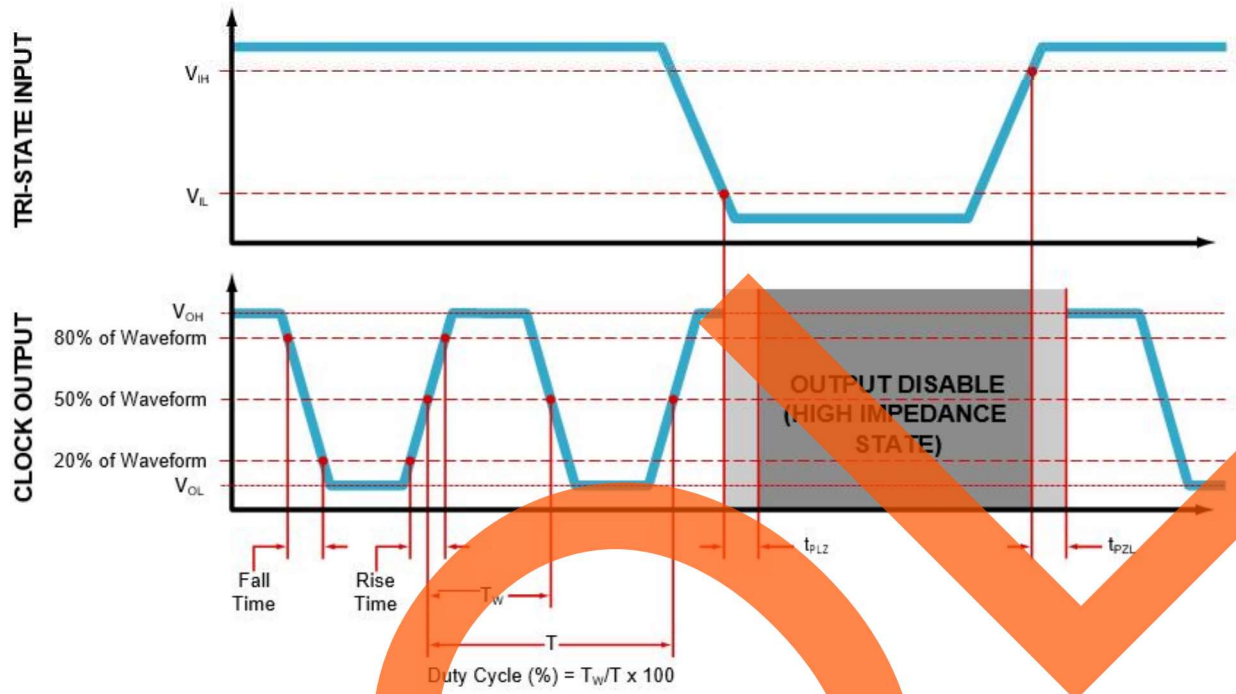


| PIN | CONNECTION              |
|-----|-------------------------|
| 1   | Power Down or Tri-State |
| 2   | Ground                  |
| 3   | Output                  |
| 4   | Supply Voltage          |

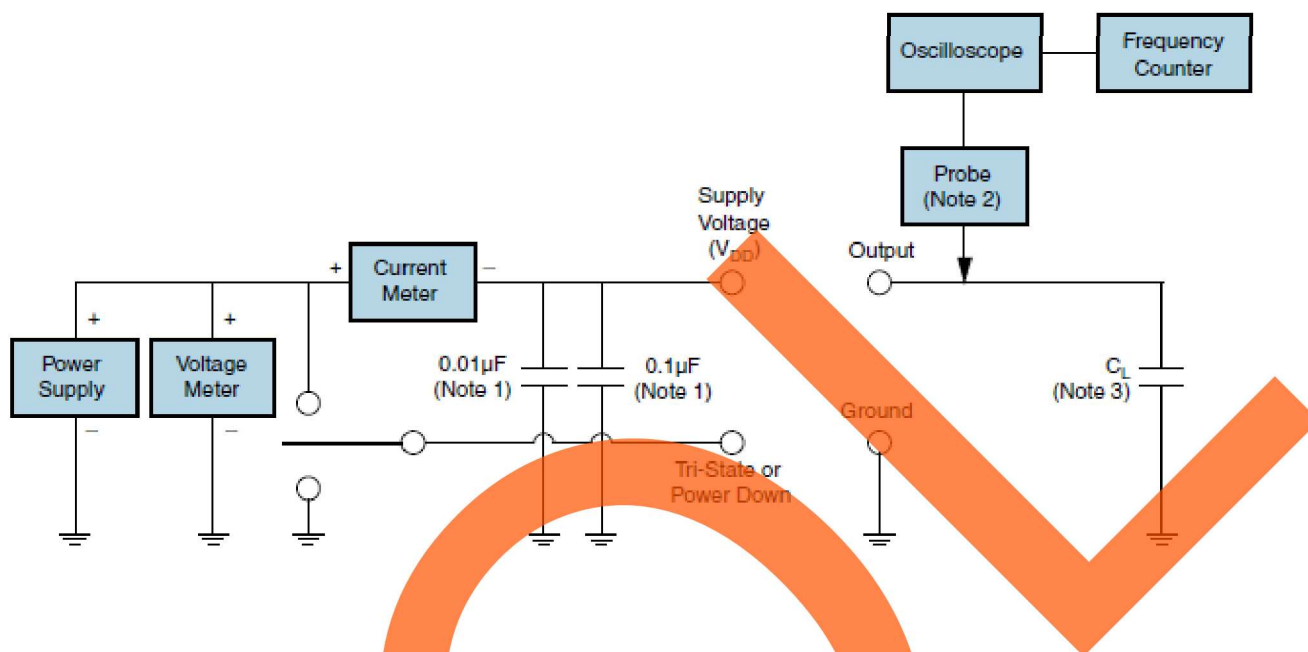
All Tolerances are ±0.1

All Dimensions in Millimeters

### OUTPUT WAVEFORM & TIMING DIAGRAM



## 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

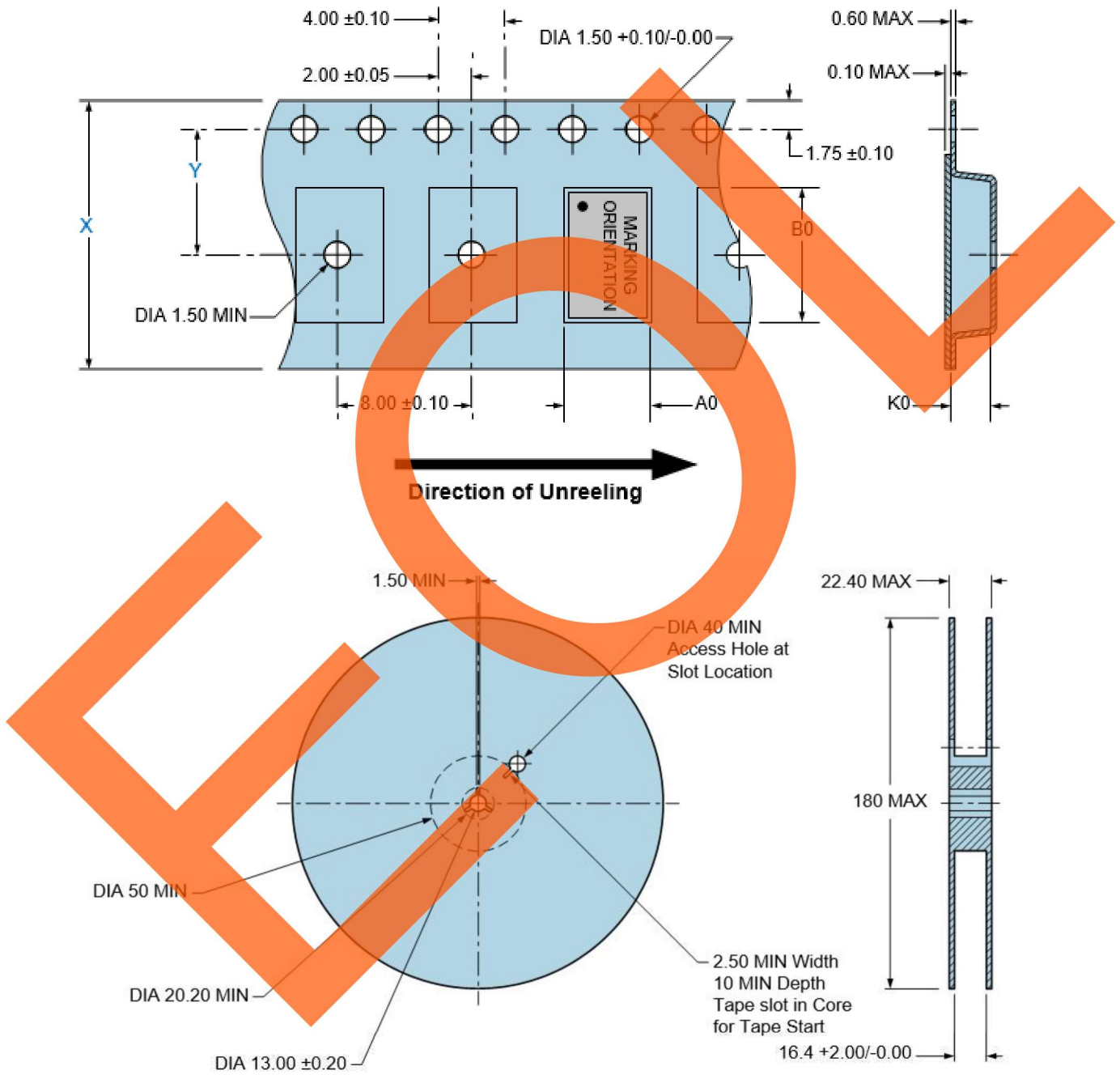
Quantity per Reel: 1,000 Units

All Dimensions in Millimeters

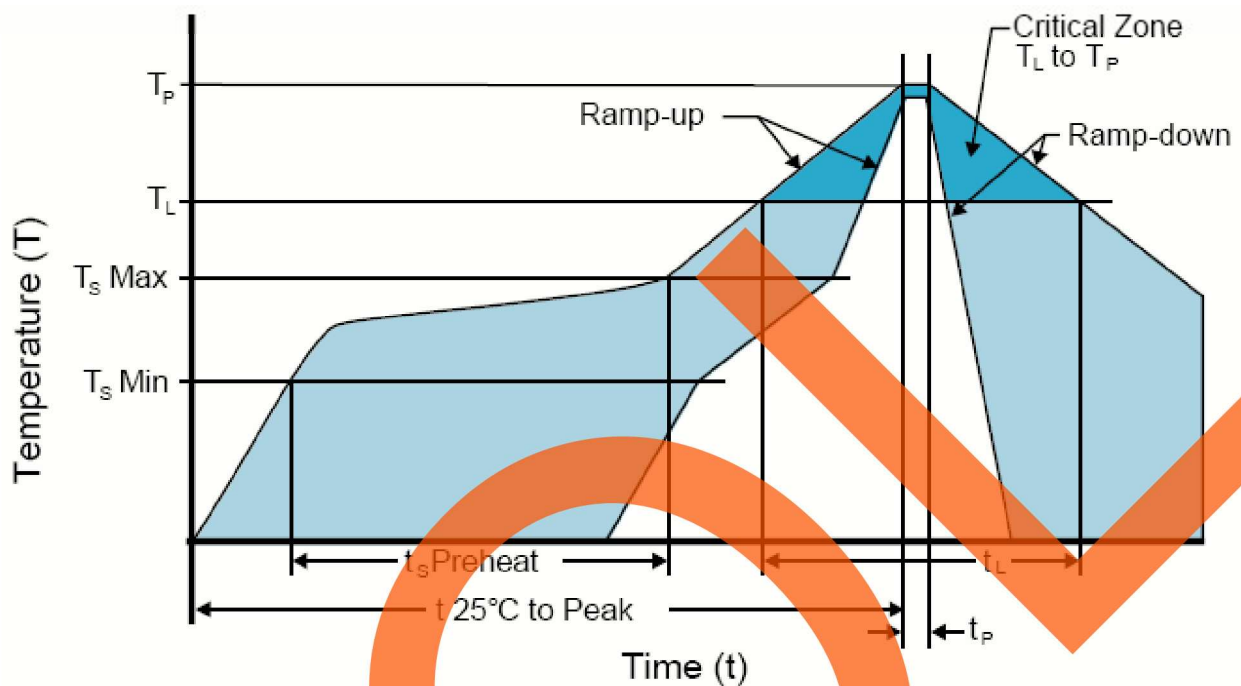
Compliant to EIA-481

X = 16.00±0.30 or 12.00±0.30

Y = 7.5±0.05 or 5.5±0.05



RECOMMENDED SOLDER REFLOW METHOD



**HIGH TEMPERATURE INFRARED/CONVECTION**

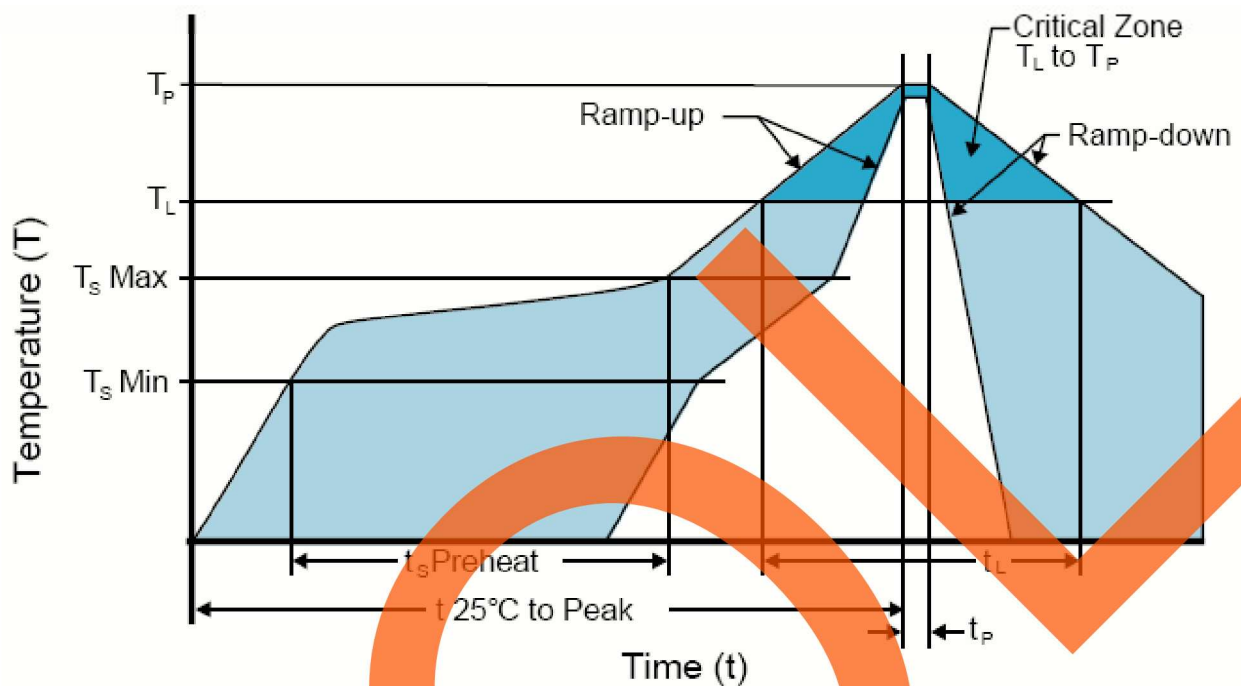
|   |   |
|---|---|
| T <sub>S</sub> MAX to T <sub>L</sub> (Ramp-up Rate)   | 3°C/Second Maximum                                |
| <b>Preheat</b>  |   |
| - Temperature Minimum (T <sub>S</sub> MIN)            | 150°C   |
| - Temperature Typical (T <sub>S</sub> TYP)            | 175°C   |
| - Temperature 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**

|  |  |
|--|--|
| <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 ( $t_s$ )   | 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 2 Times / 230°C Maximum 1 Time           |
| <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  |
| <b>Additional Notes</b>  | 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.)