# Engineering/Process Change Notice

**ECN/PCN No.: 4133**

| For Manufacturer | | | |
|---|---|---|---|
| **Product Description:** PLASTIC SMD MEMS OSCILLATOR | **Abracon Part Number / Part Series:** EMRA13 | ☐ Documentation only<br>☐ ECN<br>☒ EOL | ☒ Series<br>☐ Part Number |
| **Affected Revision:** C | **New Revision:** EOL | **Application:** | ☐ Safety<br>☒ Non-Safety |
| **Prior to Change:**<br>Active<br>https://abracon.com/datasheets/Ecliptek/EMRA13.pdf | | | |
| **After Change:**<br>EOL | | | |
| **Cause/Reason for Change:**<br>Discontinuation of manufacturing capability. | | | |

| Change Plan | | |
|---|---|---|
| **Effective Date:** 2/7/2022 | **Additional Remarks:** N/A | |
| **Change Declaration:**<br>N/A | | |
| **Issued Date:** 2/7/2022 | **Issued By:** *Brooke Cushman*<br>*Product Engineer* | **Issued Department:** Engineering |
| **Approval:** *Thomas Culhane*<br>Engineering Director | **Approval:** *Reuben Quintanilla*<br>Quality Director | **Approval:** *Ying Huang*<br>Purchasing Director |

| For Abracon EOL only | | |
|---|---|---|
| **Last Time Buy (if applicable):** 5/7/2022 | **Alternate Part Number / Part Series:** ASVDV (7.0x5.0mm) | |
| **Additional Approval:** | **Additional Approval:** | **Additional Approval:** |

| Customer Approval (If Applicable) | | |
|---|---|---|
| **Qualification Status:**<br>☐ Approved ☐ Not accepted<br>*Note: It is considered approved if there is no feedback from the customer 1 month after ECN/PCN is released.* | | |
| **Customer Part Number:** | **Customer Project:** | |
| **Company Name:** | **Company Representative:** | **Representative Signature:** |
| **Customer Remarks:** | | |



ABRACON Ecliptek FOX ILSI MMD OSCILENT

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## REGULATORY COMPLIANCE

Lead Free COMPLIANT | EU RoHS 2011/65 + 2015/863 COMPLIANT | China RoHS COMPLIANT | REACH SVHC COMPLIANT | DRC CONFLICT FREE

## ITEM DESCRIPTION

MEMS Clock Oscillators LVCMOS (CMOS) 3.3Vdc 4 Pad 5.0mm x 7.0mm Plastic Surface Mount (SMD)

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Nominal Frequency** | 1MHz to 137MHz |
| **Frequency Tolerance/Stability** | Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, and Output Load Change<br>±100ppm Maximum over 0°C to +70°C<br>±50ppm Maximum over 0°C to +70°C<br>±25ppm Maximum over 0°C to +70°C<br>±20ppm Maximum over 0°C to +70°C<br>±100ppm Maximum over -20°C to +70°C<br>±50ppm Maximum over -20°C to +70°C<br>±25ppm Maximum over -20°C to +70°C<br>±20ppm Maximum over -20°C to +70°C<br>±100ppm Maximum over -40°C to +85°C<br>±50ppm Maximum over -40°C to +85°C<br>±25ppm Maximum over -40°C to +85°C<br>±20ppm Maximum over -40°C to +85°C<br>±100ppm Maximum over -40°C to +105°C<br>±50ppm Maximum over -40°C to +105°C<br>±25ppm Maximum over -40°C to +105°C<br>±20ppm Maximum over -40°C to +105°C<br>±100ppm Maximum over -40°C to +125°C<br>±50ppm Maximum over -40°C to +125°C<br>±25ppm Maximum over -40°C to +125°C<br>±20ppm Maximum over -40°C to +125°C<br>±100ppm Maximum over -55°C to +125°C<br>50ppm Maximum over -55°C to +125°C<br>±25ppm Maximum over -55°C to +125°C |
| **Aging at 25°C** | ±1.5ppm Maximum First Year |
| **Supply Voltage** | 3.3Vdc ±10% |
| **Input Current** | 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 137MHz |
| **Output Voltage Logic High ($V_{Oh}$)** | IOH = -4mA<br>90% of Vdd Minimum |
| **Output Voltage Logic Low ($V_{Ol}$)** | IOL = +4mA<br>10% of Vdd Maximum |
| **Rise/Fall Time** | Measured from 20% to 80% of waveform<br>1.2nSec Typical, 3nSec Maximum |
| **Duty Cycle** | Measured at 50% of waveform<br>50 ±10(%)<br>50 ±5(%) |
| **Load Drive Capability** | 15pF Maximum |
| **Output Logic Type** | CMOS |
| **Output Control Function** | Tri-State (Disabled Output: High Impedance)<br>Power Down (Disabled Output: Logic Low) |
| **Output Control Input Voltage Logic High (Vih)** | 70% of Vdd Minimum or No Connect to Enable Output |

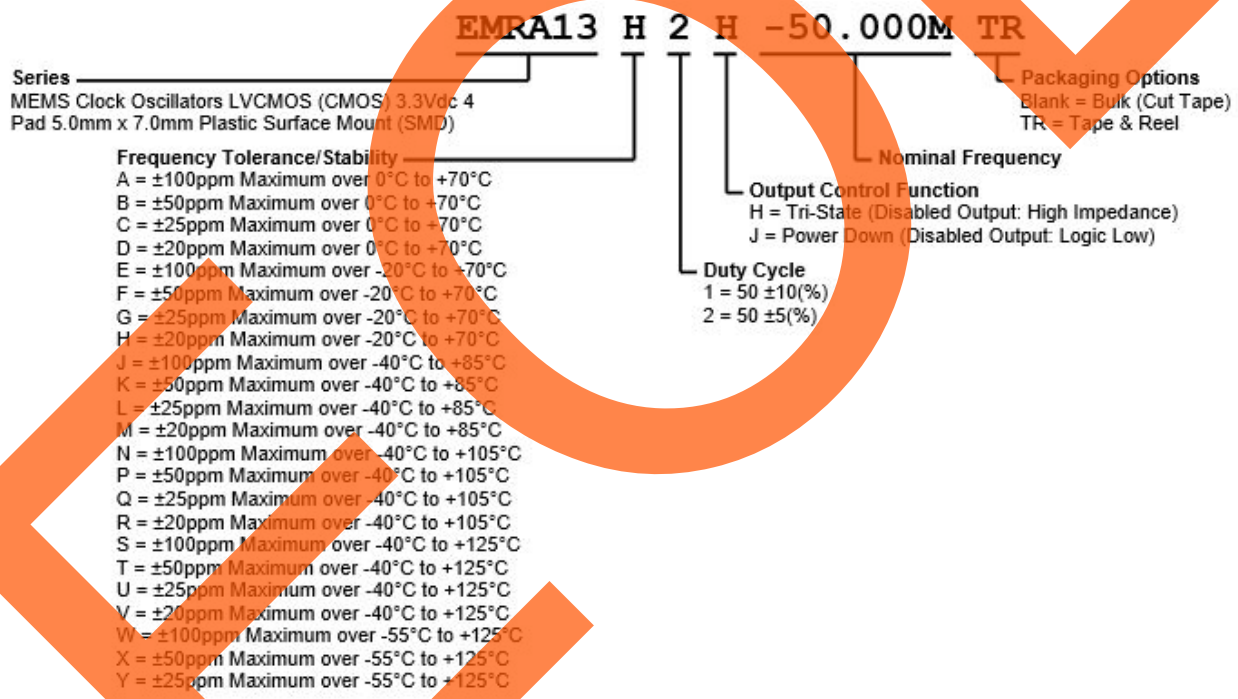
EOL



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| | |
|---|---|
| **Output Control Input Voltage Logic Low (Vil)** | 30% of Vdd Maximum to Disable Output |
| **Power Down Output Enable Time** | 5mSec Maximum (Disabled Output: Logic Low) |
| **Tri-State Output Enable Time** | 150nSec Maximum (Disabled Output: High Impedance) |
| **Power Down Output Disable Time** | 150nSec Maximum (Disabled Output: Logic Low) |
| **Tri-State Output Disable Time** | 150nSec Maximum (Disabled Output: High Impedance) |
| **Standby Current** | 10µA Maximum (Disabled Output: Logic Low) |
| **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 |

## PART NUMBERING GUIDE

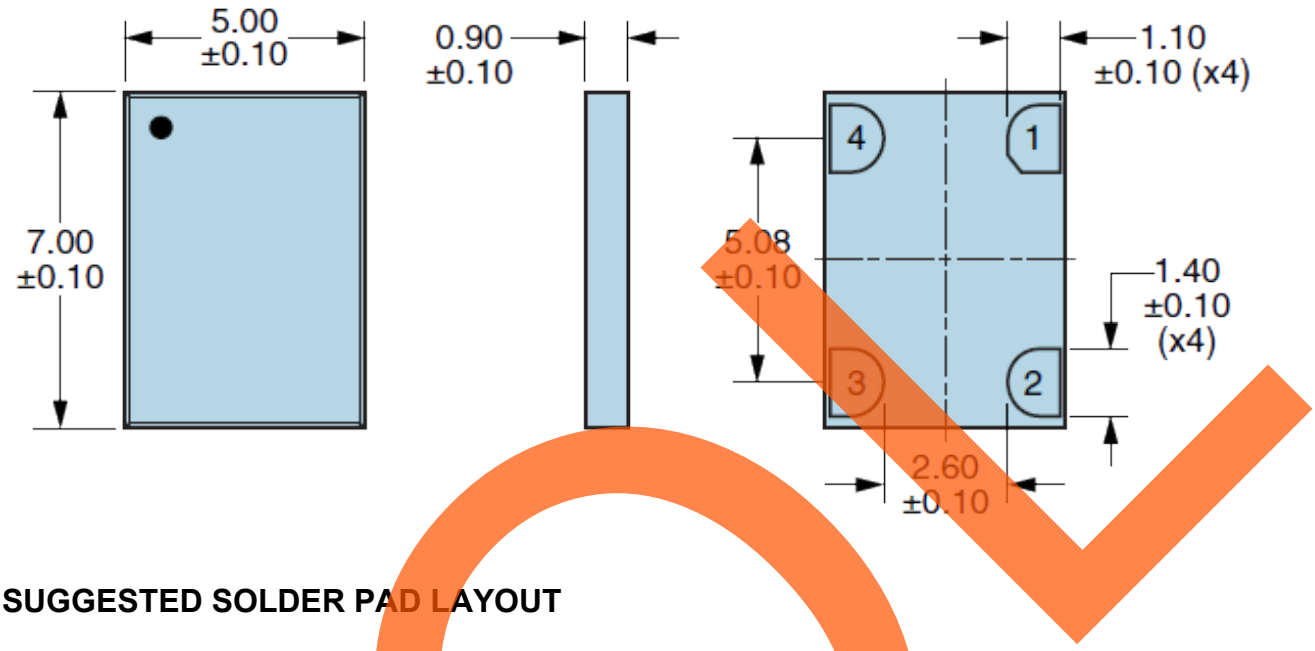



NOT RECOMMENDED FOR NEW DESIGN

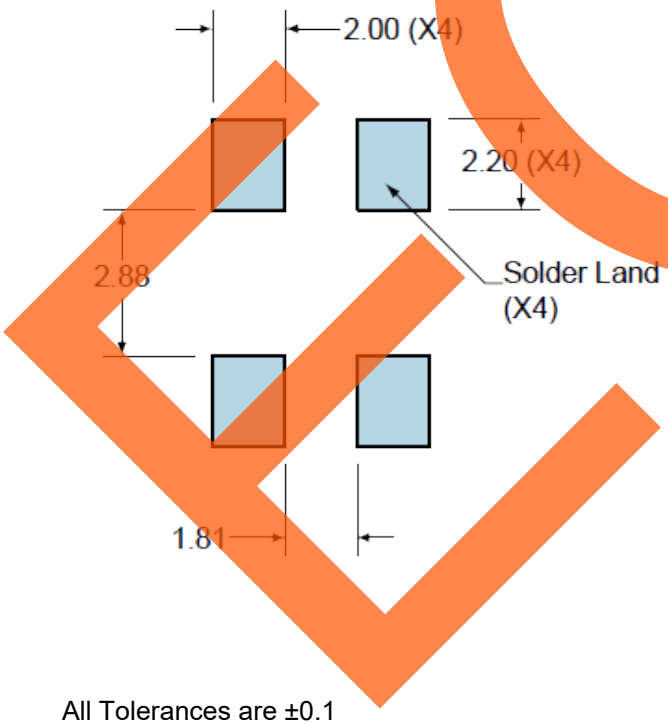


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## MECHANICAL DIMENSIONS




## SUGGESTED SOLDER PAD LAYOUT




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

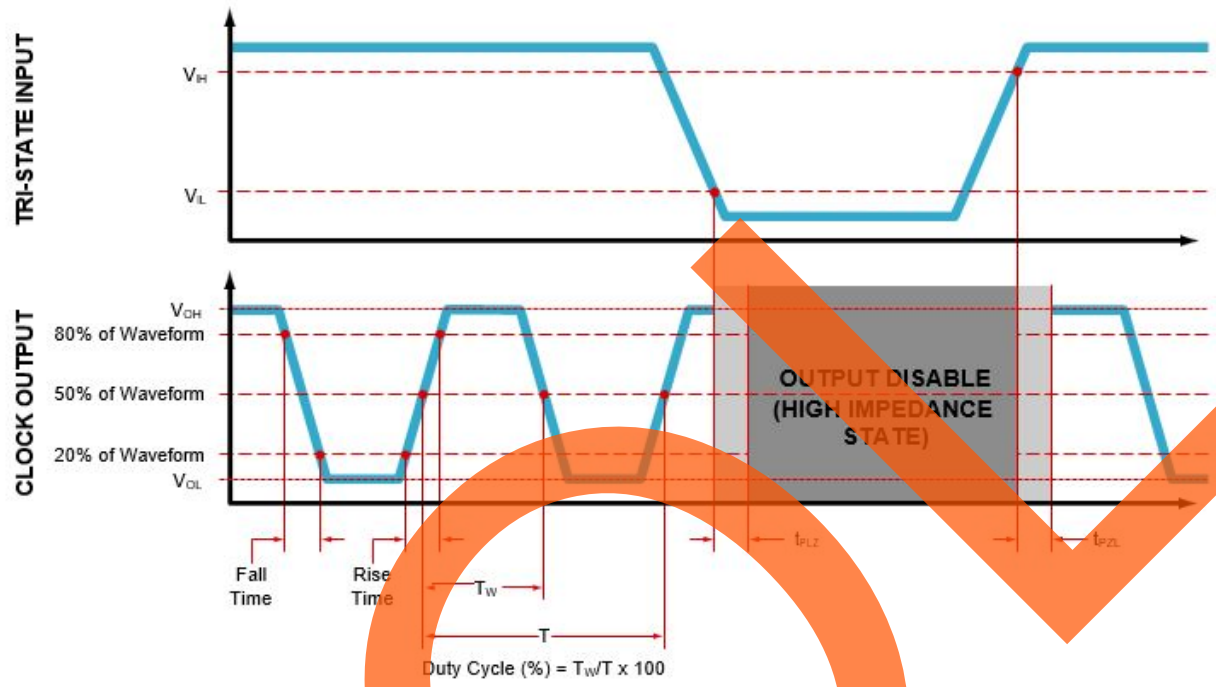
All Tolerances are ±0.1

**All Dimensions in Millimeters**



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## OUTPUT WAVEFORM & TIMING DIAGRAM

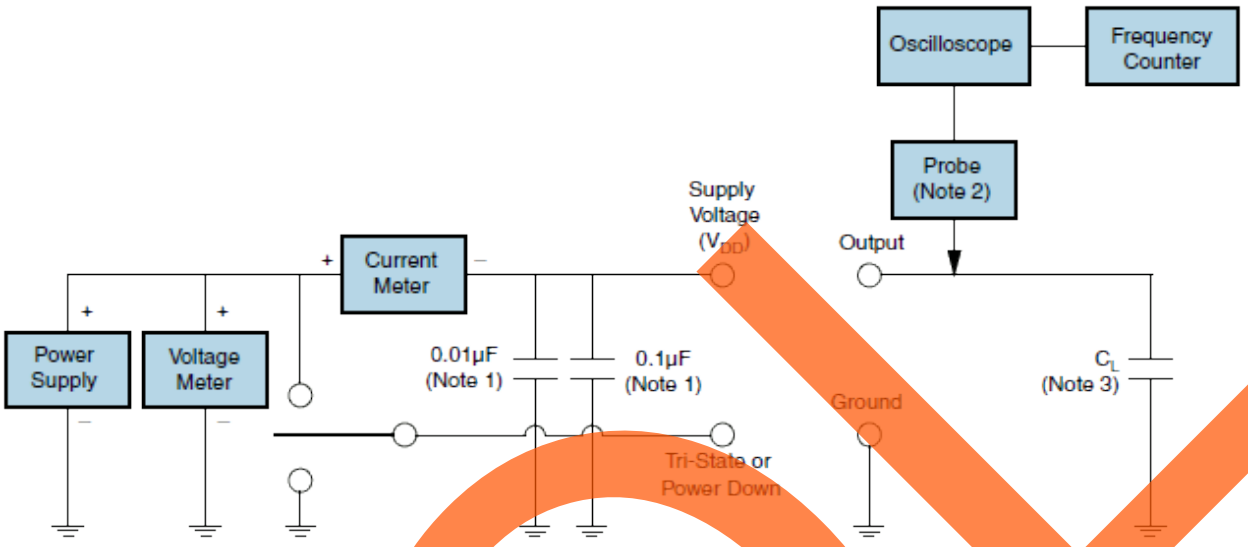



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## TEST CIRCUIT FOR CMOS OUTPUT




**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 Attentuation Factor, High Impedance (>10Mohms), and High bandwidth (>300MHz) Passive probe is recommended.
**Note 3:** Capacitance value CL includes sum of all probe and fixture capacitance. See applicable specification sheet for â€˜Load Drive Capabilityâ€™.

EOL



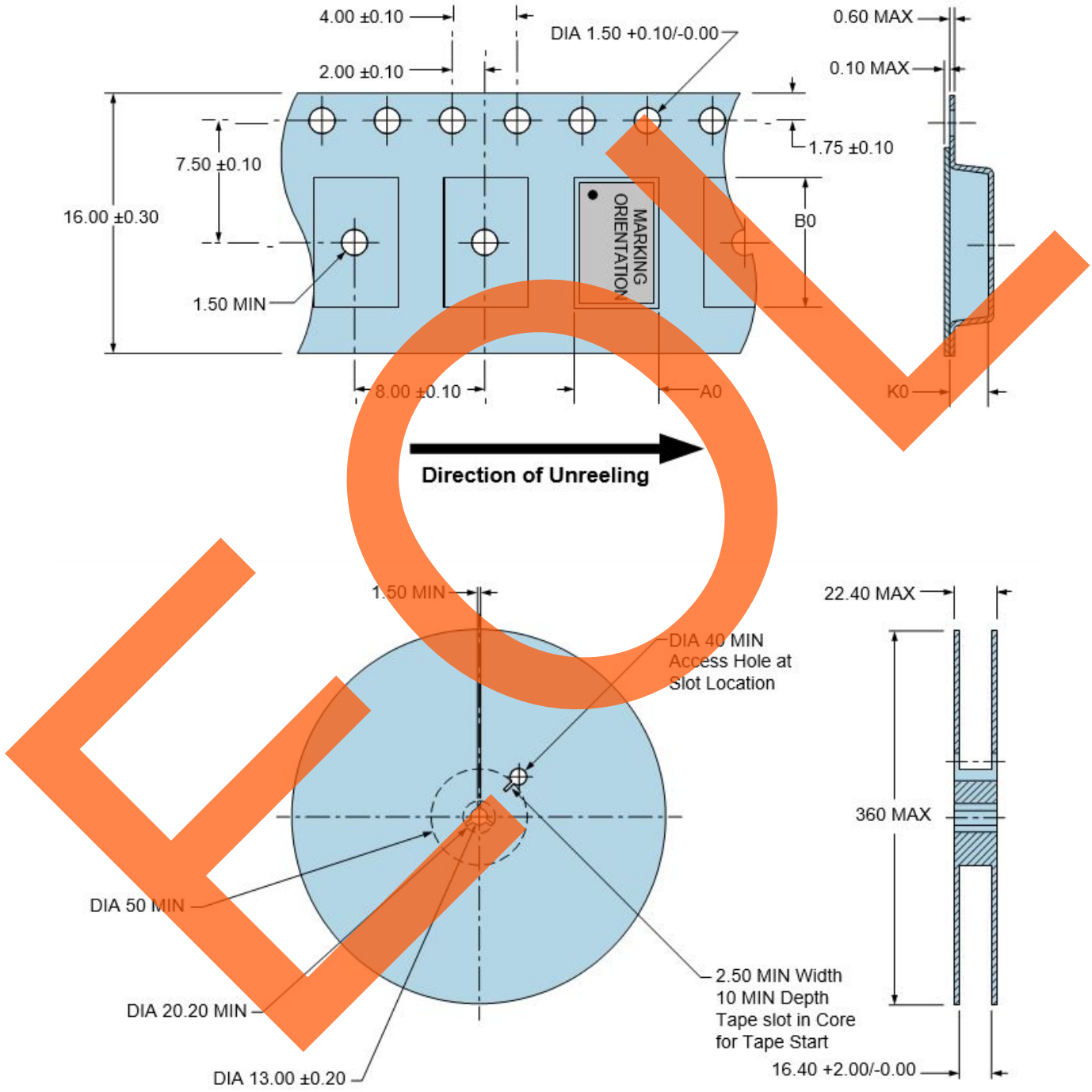
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## TAPE & REEL DIMENSIONS

Quantity per Reel: 1000 Units

All Dimensions in Millimeters

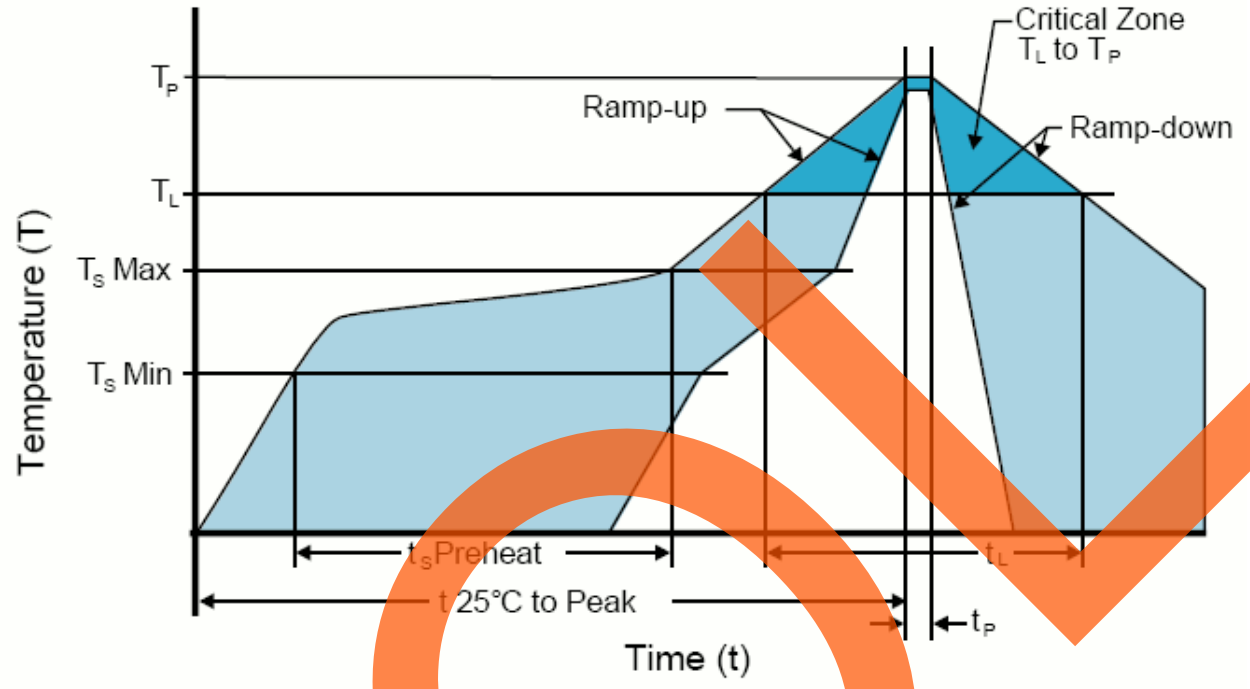
Compliant to EIA-481






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## RECOMMENDED SOLDER REFLOW METHOD




| HIGH TEMPERATURE INFRARED/CONVECTION | |
|---|---|
| $T_S$ MAX to $T_L$ (Ramp-up Rate) | 3°C/Second Maximum |
| **Preheat**<br>- Temperature Minimum ($T_S$ MIN)<br>- Temperature Typical ($T_S$ TYP)<br>- Temperature Maximum($T_S$ MAX)<br>- Time ($t_S$) | <br>150°C<br>175°C<br>200°C<br>60 - 180 Seconds |
| Ramp-up Rate ($T_L$ to $T_P$) | 3°C/Second Maximum |
| **Time Maintained Above:**<br>- Temperature ($T_L$)<br>- Time ($t_L$) | <br>217°C<br>60 - 150 Seconds |
| Peak Temperature ($T_P$) | 260°C Maximum for 10 Seconds Maximum |
| Target Peak Temperature($T_P$ Target) | 250°C +0/-5°C |
| Time within 5°C of actual peak ($t_p$) | 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 | Temperatures shown are applied to body of device. |

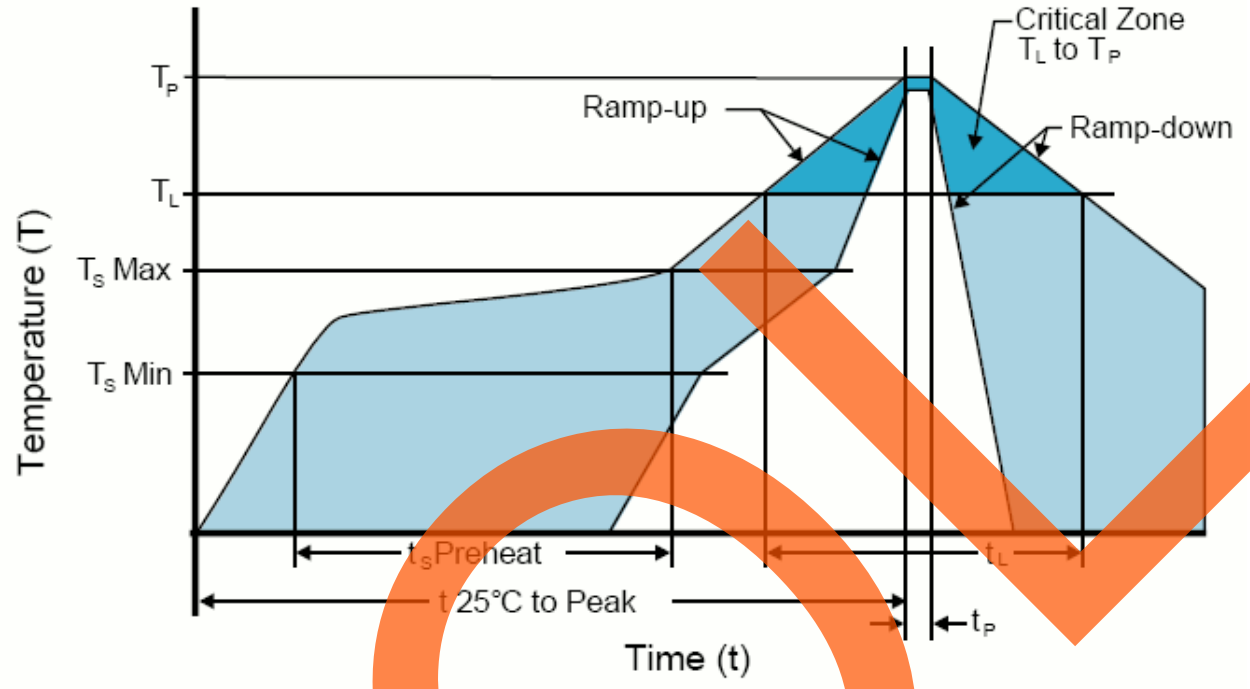
### High Temperature Manual Soldering

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



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## RECOMMENDED SOLDER REFLOW METHOD




| LOW TEMPERATURE INFRARED/CONVECTION | |
|---|---|
| **$T_S$ MAX to $T_L$ (Ramp-up Rate)** | 5°C/Second Maximum |
| **Preheat**<br>**- Temperature Minimum ($T_s$ MIN)**<br>**- Temperature Typical ($T_s$ TYP)**<br>**- Temperature Maximum($T_s$ MAX)**<br>**- Time ($t_s$)** | <br>N/A<br>150°C<br>N/A<br>60 - 120 Seconds |
| **Ramp-up Rate ($T_L$ to $T_P$)** | 5°C/Second Maximum |
| **Time Maintained Above:**<br>**- Temperature ($T_L$)**<br>**- Time ($t_L$)** | <br>150°C<br>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 |
| **Additional Notes** | 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.)



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