

ASMT-Mx22 / ASMT-MxE2

Moonstone 3 W High Brightness Power LED Light Source



Data Sheet



Description

The Moonstone 3W High Brightness Power LED Light Source is a high performance energy efficient device which can handle high thermal and high driving current. The exposed pad design has excellent heat transfer from the package to the motherboard.

The Cool White Power LED is available in various color temperature ranging from 4000 K to 10000 K and Warm White Power LED ranging from 2600 K to 4000 K.

The low profile package design is suitable for a wide variety of applications especially where height is a constraint.

The package is compatible with reflow soldering. This will give more freedom and flexibility to the light source designer.

Applications

- Sign backlight
- Safety, exit and emergency sign lightings
- Specialty lighting such as task lighting and reading lights
- Retail display
- Commercial lighting
- Accent or marker lightings, strip or step lightings
- Portable lightings, bicycle head lamp, torch lights.
- Decorative lighting
- Architectural lighting
- Pathway lighting
- Street lighting
- Pedestrian street lighting
- Tunnel lighting

Features

- Available in Cool White & Warm White color
- Energy efficient
- Exposed pad for excellent heat transfer
- Suitable for reflow soldering process
- High current operation
- Long operation life
- Wide viewing angle
- Silicone encapsulation
- Non-ESD sensitive (threshold > 16 kV)
- MSL 4 products

Specifications

- InGaN Technology
- 3.5 V (max) at 350 mA
- 110° viewing angle

Package Dimensions

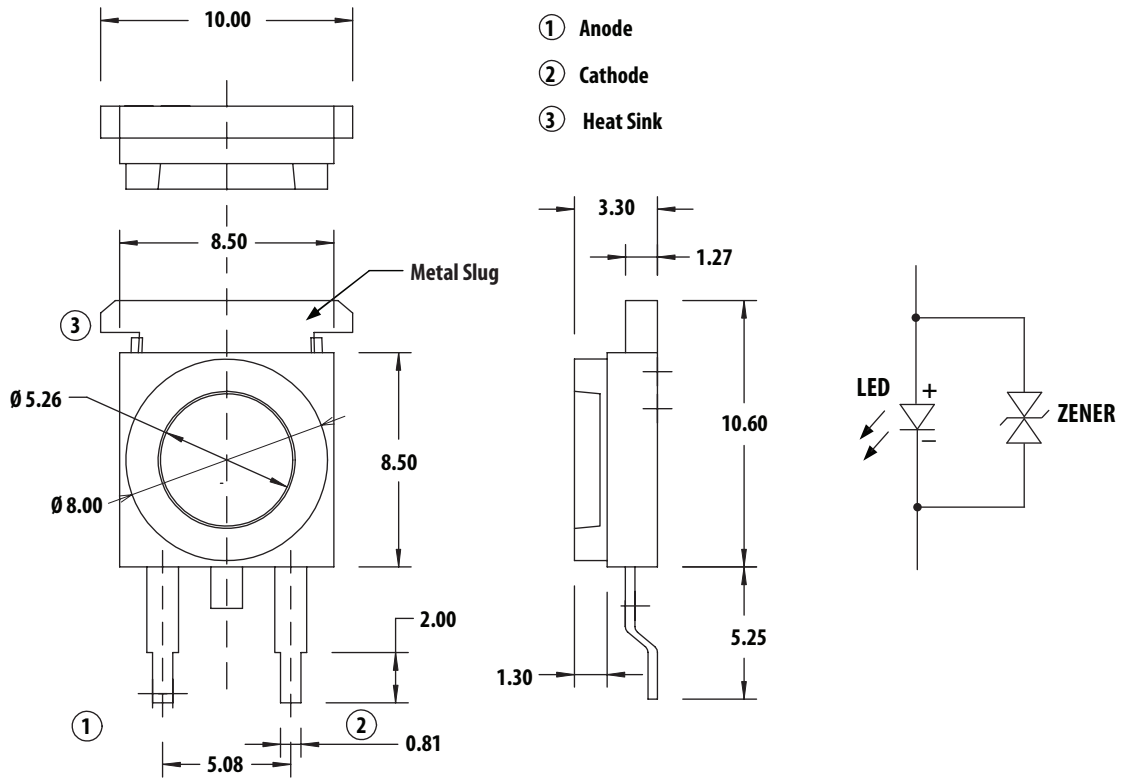
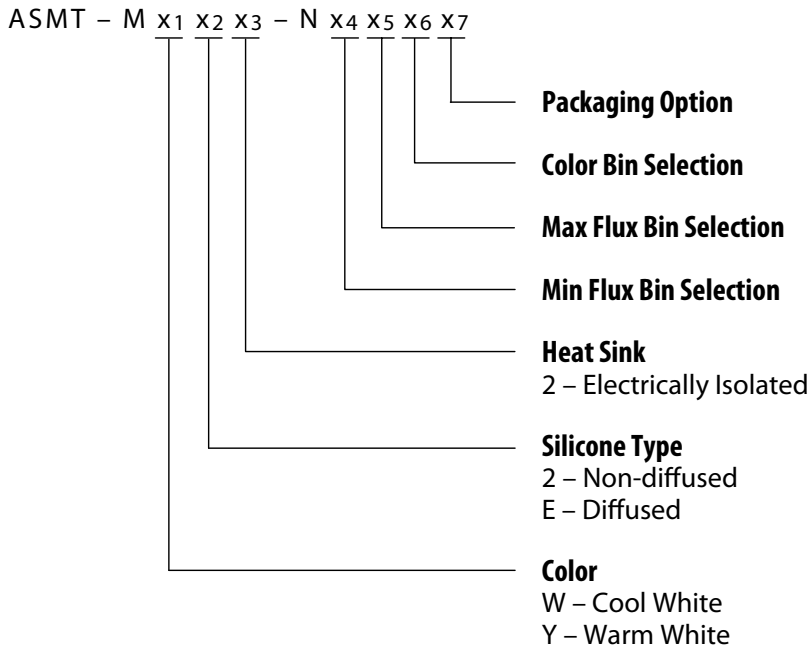


Figure 1. ASMT-Mx22 / ASMT-MxE2 package outline drawing.

Notes:

1. All dimensions are in millimeters.
2. Unless otherwise stated, the tolerance for dimension is ± 0.1 mm.
3. Metal slug is connected to anode for electrically non-isolated option.

Part Numbering System



Note:

1. Please refer to Page 8 for selection details.

Device Selection Guide ($T_J = 25^\circ\text{C}$)

| Part Number | Color | Luminous Flux, Φ_V [1,2] (lm) | | | Test Current (mA) | Die Technology | Electrically Isolated Metal Slug |
|-----------------|---------------------|------------------------------------|------|------|-------------------|----------------|----------------------------------|
| | | Min. | Typ. | Max. | | | |
| ASMT-MW22-NNP00 | Cool White | 110 | 120 | 140 | 350 | InGaN | Yes |
| ASMT-MY22-NMP00 | Warm White | 95 | 100 | 140 | 350 | InGaN | Yes |
| ASMT-MWE2-NNP00 | Cool White Diffused | 110 | 115 | 140 | 350 | InGaN | Yes |
| ASMT-MYE2-NMP00 | Warm White Diffused | 95 | 98 | 140 | 350 | InGaN | Yes |

Notes:

1. Φ_V is the total luminous flux output as measured with an integrating sphere at 25 ms mono pulse condition.
2. Flux tolerance is $\pm 10\%$.

Absolute Maximum Ratings

| Parameter | ASMT-Mx22 / ASMT-MxE2 | Units |
|--|-----------------------|-------|
| DC Forward Current ^[1] | 700 | mA |
| Peak Pulsing Current | 2400 | mA |
| Power Dissipation | 2730 | mW |
| LED Junction Temperature | 125 | °C |
| Operating Metal Slug Temperature Range at 350 mA | -40 to +110 | °C |
| Operating Metal Slug Temperature Range at 700 mA | -40 to +95 | °C |
| Storage Temperature Range | -40 to +120 | °C |
| Soldering Temperature | Refer to Figure 11 | |
| Reverse Voltage ^[2] | Not recommended | |

Note:

1. Derate linearly based on Figure 9.
2. Not designed for reverse bias operation.

Optical Characteristics at 350 mA (T_J = 25° C)

| Part Number | Color | Correlated Color Temperature, CCT (Kelvin) | | Viewing Angle | Luminous Efficiency |
|-----------------|---------------------|--|-------|------------------------------------|---------------------|
| | | Min. | Max. | 2θ _½ ^[1] (°) | (lm/W) |
| ASMT-MW22-NNP00 | Cool White | 4000 | 10000 | Typ. 110 | 107 |
| ASMT-MY22-NMP00 | Warm White | 2600 | 4000 | 110 | 89 |
| ASMT-MWE2-NNP00 | Cool White Diffused | 4000 | 10000 | 110 | 103 |
| ASMT-MYE2-NMP00 | Warm White Diffused | 2600 | 4000 | 110 | 88 |

Notes:

1. θ_½ is the off-axis angle where the luminous intensity is ½ the peak intensity.

Electrical Characteristic at 350 mA ($T_J = 25^\circ\text{C}$)

| Dice Type | Forward Voltage, V_F (Volts) | | | Thermal Resistance, $R_{\theta_{j-ms}}$ ($^\circ\text{C/W}$) [1] | Temperature Coefficient of Forward Voltage ($\text{mV}/^\circ\text{C}$), $\Delta V_F/\Delta T_J$ |
|------------------|--|-------------|-------------|---|---|
| | Min. | Typ. | Max. | Typ. | Typ. |
| InGaN | 2.8 | 3.2 | 3.5 | 10 | -1.5 to -3.5 |

Note:

1. $R_{\theta_{j-ms}}$ is the Thermal Resistance from LED junction to metal slug.

Typical Characteristic at 700 mA ($T_J = 25^\circ\text{C}$)

| Part Number | Color | Luminous Flux, Φ_V (lm) | Forward Voltage, V_F (Volts) |
|--------------------|---------------------|--|--|
| | | Typ. | Typ. |
| ASMT-MW22-NNP00 | Cool White | 205 | 3.6 |
| ASMT-MY22-NMP00 | Warm White | 170 | 3.6 |
| ASMT-MWE2-NNP00 | Cool White Diffused | 196 | 3.6 |
| ASMT-MYE2-NMP00 | Warm White Diffused | 167 | 3.6 |

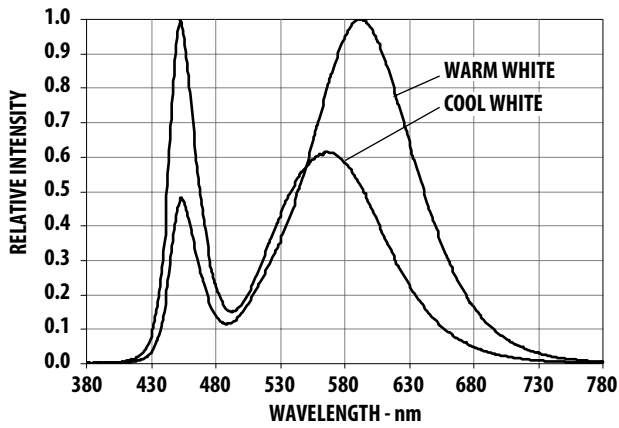


Figure 2. Relative Intensity vs. Wavelength.

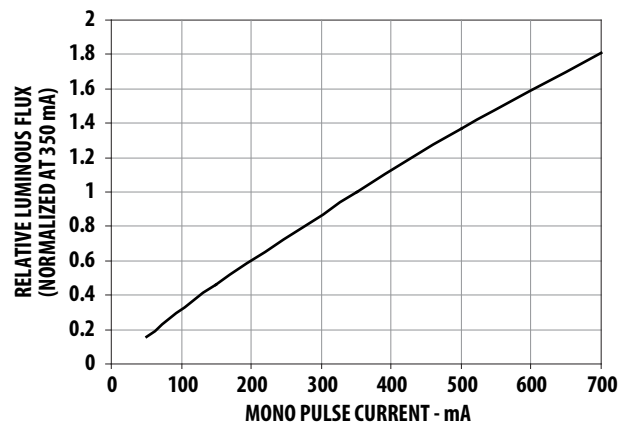


Figure 3. Relative Luminous Flux vs. Forward Current.

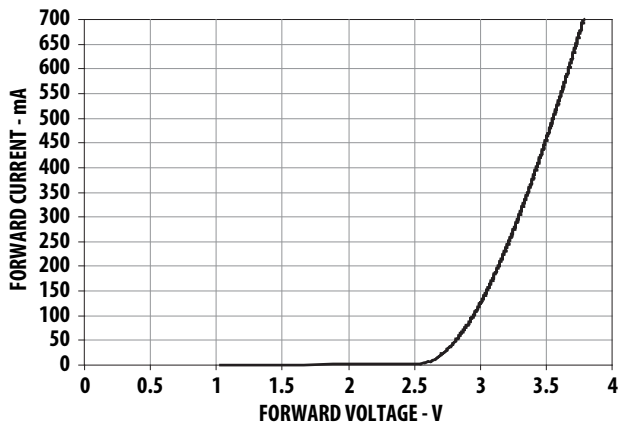


Figure 4. Forward Current vs. Forward Voltage.

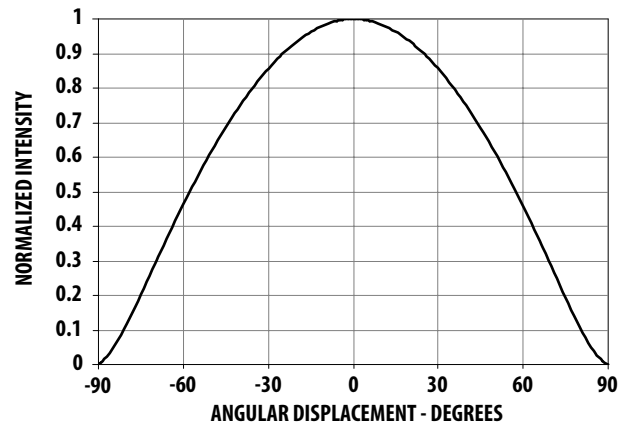


Figure 5. Radiation Pattern.

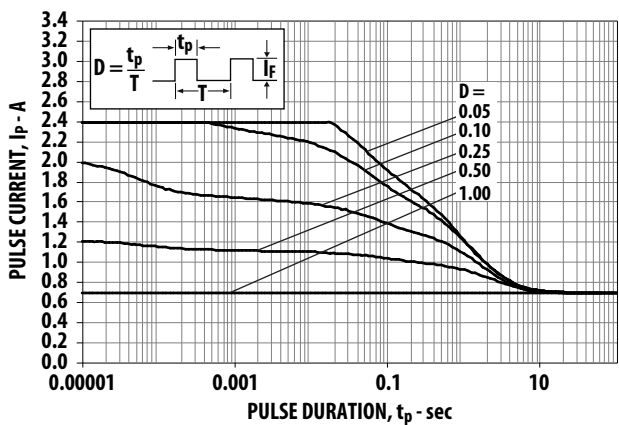


Figure 6. Maximum pulse current vs. pulse duration. Derated based on $T_A = 25^\circ\text{C}$, $R\theta_{J-A} = 30^\circ\text{C/W}$.

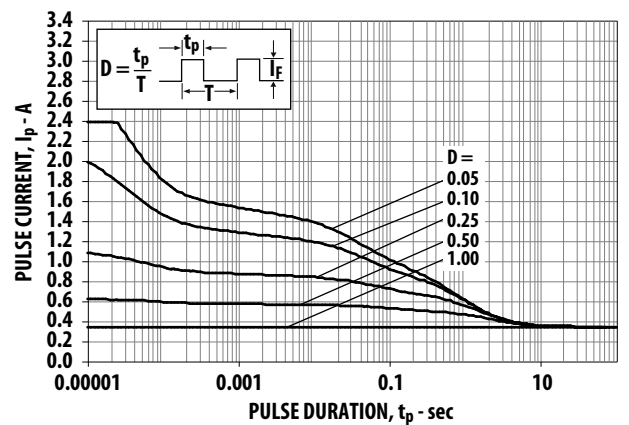


Figure 7. Maximum pulse current vs. pulse duration. Derated based on $T_A = 85^\circ\text{C}$, $R\theta_{J-A} = 30^\circ\text{C/W}$.

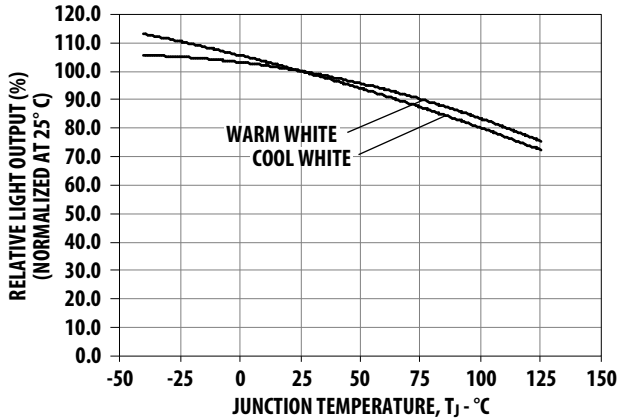


Figure 8. Relative Light Output vs. Junction Temperature.

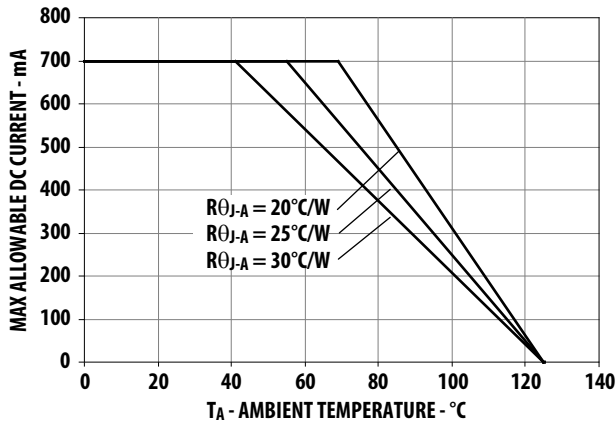


Figure 9. Maximum Forward Current vs. Ambient Temperature. Derated based on T_{JMAX} = 125°C, R_{θJ-A} = 20°C/W, 25°C/W and 30°C/W.

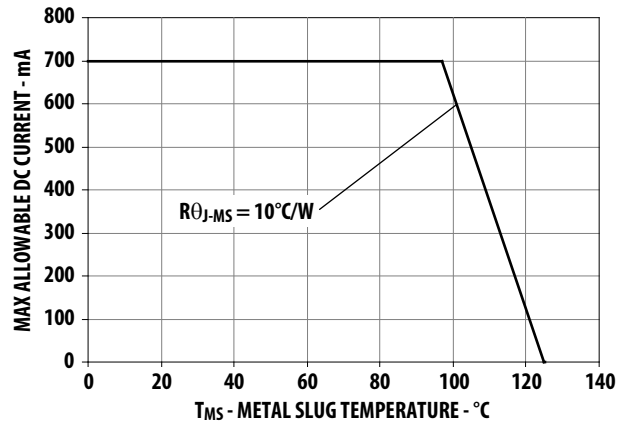


Figure 10. Maximum Forward Current vs. Metal Slug Temperature. Derated based on T_{JMAX} = 125°C, R_{θJ-MS} = 10°C/W.

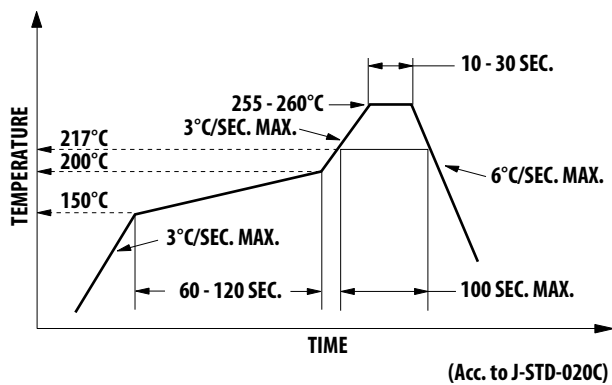


Figure 11. Recommended Reflow Soldering.

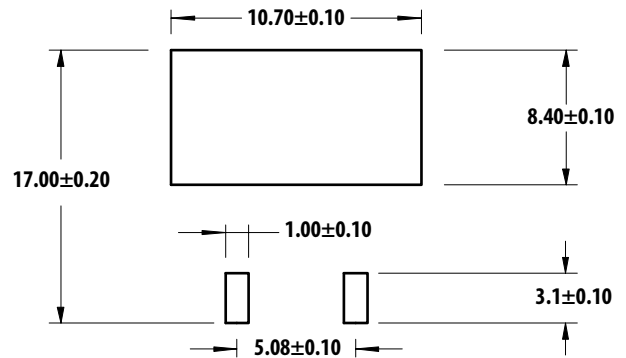


Figure 12. Recommended soldering land pattern.

Note:

For detail information on reflow soldering of Avago surface mount LEDs, do refer to Avago Application Note AN1060 Surface Mounting SMT LED Indicator Components.

Option Selection Details

ASMT – M x₁ x₂ x₃ – N x₄ x₅ x₆ x₇

x₄ – Minimum Flux Bin

x₅ – Maximum Flux Bin

x₆ – Color Bin Selection

x₇ – Packaging Option

Flux Bin Limit [x₄, x₅]

| Bin | Luminous Flux (lm) at I _F = 350mA | |
|-----|--|-------|
| | Min. | Max. |
| K | 56.0 | 73.0 |
| L | 73.0 | 95.0 |
| M | 95.0 | 110.0 |
| N | 110.0 | 125.0 |
| P | 125.0 | 140.0 |

Tolerance for each bin limits is ±10%.

Color Bin Selections [x₃]

Individual reel will contain parts from one color bin selection only.

Cool White

| Selection | Bin ID |
|-----------|--------------------|
| 0 | Full Distribution |
| A | A only |
| B | B only |
| C | C only |
| D | D only |
| E | E only |
| F | F only |
| G | G only |
| H | H only |
| L | A and G only |
| M | B and H only |
| N | A and C only |
| P | B and D only |
| Q | E and C only |
| R | F and D only |
| S | G and H only |
| U | E and F only |
| W | C and D only |
| Z | A and B only |
| 1 | A, B, C and D only |
| 2 | G, H, A and B only |
| 4 | C, D, E and F only |

Warm White

| Selection | Bin ID |
|-----------|--------------------|
| 0 | Full Distribution |
| A | A only |
| B | B only |
| C | C only |
| D | D only |
| E | E only |
| F | F only |
| N | A and C only |
| P | B and D only |
| Q | E and C only |
| R | F and D only |
| U | E and F only |
| W | C and D only |
| Z | A and B only |
| 1 | A, B, C and D only |
| 4 | C, D, E and F only |

Color Bin Limit

| Cool White | Color Limits (Chromaticity Coordinates) | | | | |
|------------|---|-------|-------|-------|-------|
| | | X | Y | X | Y |
| Bin A | X | 0.367 | 0.362 | 0.329 | 0.329 |
| | Y | 0.400 | 0.372 | 0.345 | 0.369 |
| Bin B | X | 0.362 | 0.356 | 0.329 | 0.329 |
| | Y | 0.372 | 0.330 | 0.302 | 0.345 |
| Bin C | X | 0.329 | 0.329 | 0.305 | 0.301 |
| | Y | 0.369 | 0.345 | 0.322 | 0.342 |
| Bin D | X | 0.329 | 0.329 | 0.311 | 0.305 |
| | Y | 0.345 | 0.302 | 0.285 | 0.322 |
| Bin E | X | 0.303 | 0.307 | 0.283 | 0.274 |
| | Y | 0.333 | 0.311 | 0.284 | 0.301 |
| Bin F | X | 0.307 | 0.311 | 0.290 | 0.283 |
| | Y | 0.311 | 0.285 | 0.265 | 0.284 |
| Bin G | X | 0.388 | 0.379 | 0.362 | 0.367 |
| | Y | 0.417 | 0.383 | 0.372 | 0.400 |
| Bin H | X | 0.379 | 0.369 | 0.356 | 0.362 |
| | Y | 0.383 | 0.343 | 0.330 | 0.372 |

Tolerance: ± 0.01

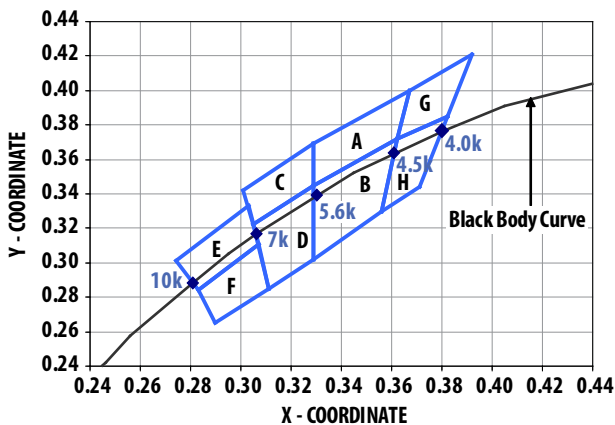


Figure 13. Color bins (Cool White).

Packaging Option [x₇]

| Selection | Option |
|-----------|---------------|
| 0 | Tube |
| 1 | Tape and Reel |

| Warm White | Color Limits (Chromaticity Coordinates) | | | | |
|------------|---|-------|-------|-------|-------|
| | | X | Y | X | Y |
| Bin A | X | 0.452 | 0.488 | 0.470 | 0.438 |
| | Y | 0.434 | 0.447 | 0.414 | 0.403 |
| Bin B | X | 0.438 | 0.470 | 0.452 | 0.424 |
| | Y | 0.403 | 0.414 | 0.384 | 0.376 |
| Bin C | X | 0.407 | 0.418 | 0.452 | 0.438 |
| | Y | 0.393 | 0.422 | 0.434 | 0.403 |
| Bin D | X | 0.395 | 0.407 | 0.438 | 0.424 |
| | Y | 0.362 | 0.393 | 0.403 | 0.376 |
| Bin E | X | 0.381 | 0.387 | 0.418 | 0.407 |
| | Y | 0.377 | 0.404 | 0.422 | 0.393 |
| Bin F | X | 0.373 | 0.381 | 0.407 | 0.395 |
| | Y | 0.349 | 0.377 | 0.393 | 0.362 |

Tolerance: ± 0.01

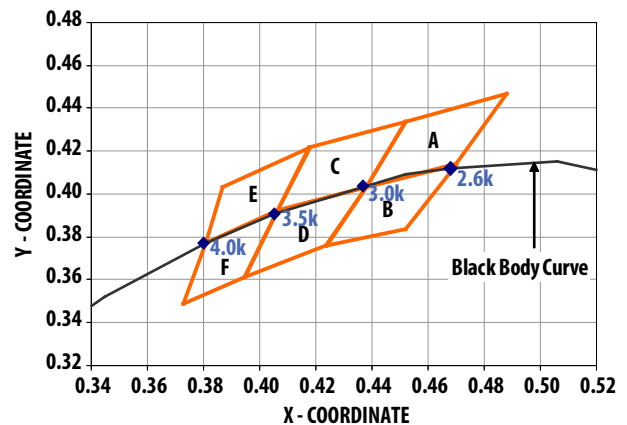


Figure 14. Color bins (Warm White).

Example

ASMT-MW20-NLNZO

ASMT-MW20-Nxxxx – Cool White, Electrically Non-isolated Heat Sink, Non-diffused

- x₄ = L – Minimum Flux Bin L
- x₅ = N – Maximum Flux Bin N
- x₆ = Z – Color Bin A and B only
- x₇ = 0 – Tube Option

Packing Tube – Option 0

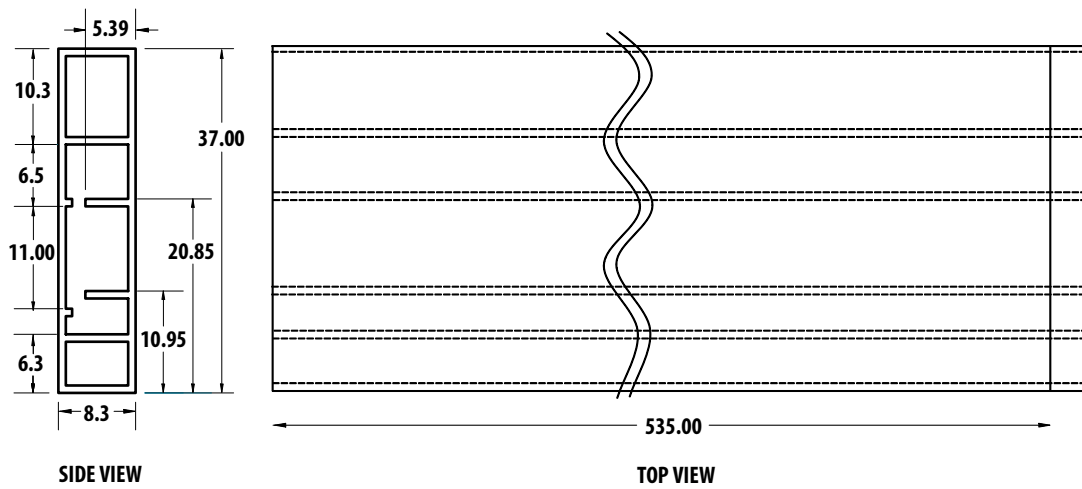


Figure 15. Tube dimensions

Tape & Reel – Option 1

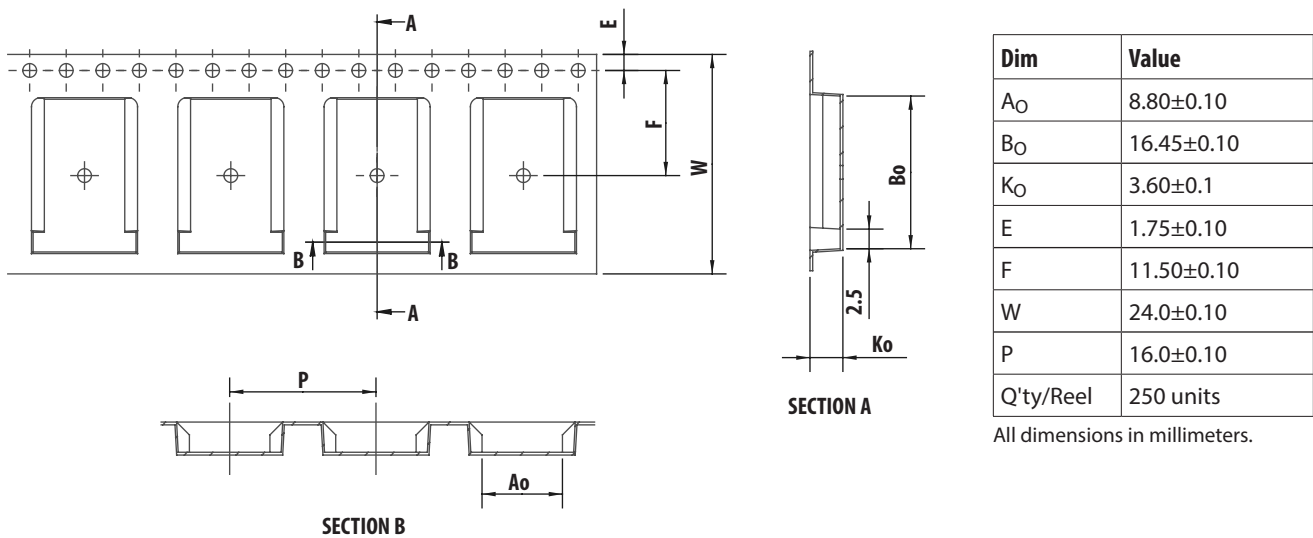


Figure 16. Carrier tape dimensions

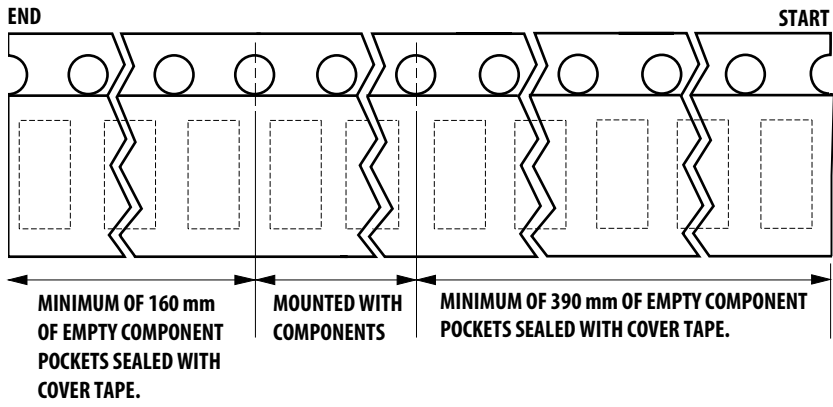


Figure 17. Carrier tape leader and trailer dimensions.

Reel Dimension

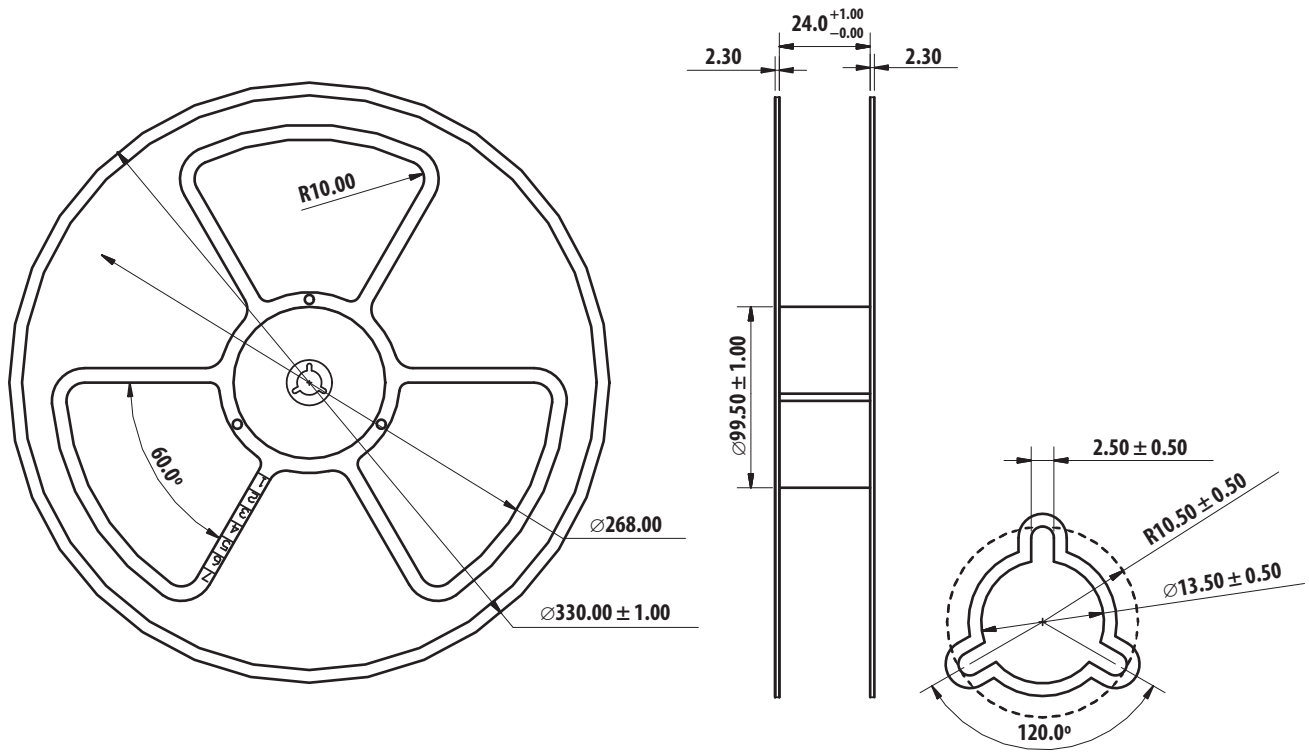


Figure 18. Reel dimensions.

Handling Precaution

The encapsulation material of the product is made of silicone for better reliability of the product. As silicone is a soft material, please do not press on the silicone or poke a sharp object onto the silicone. These might damage the product and cause premature failure. During assembly or handling, the unit should be held on the body only. Please refer to Avago Application Note AN 5288 for detail information.

Moisture Sensitivity

This product is qualified as Moisture Sensitive Level 4 per Jedec J-STD-020. Precautions when handling this moisture sensitive product is important to ensure the reliability of the product. Do refer to Avago Application Note AN5305 Handling of Moisture Sensitive Surface Mount Devices for details.

A. Storage before use

- Unopen moisture barrier bag (MBB) can be stored at < 40°C/90%RH for 12 months. If the actual shelf life has exceeded 12 months and the humidity indicator card (HIC) indicates that baking is not required, then it is safe to reflow the LEDs per the original MSL rating.
- It is not recommended to open the MBB prior to assembly (e.g. for IQC).

B. Control after opening the MBB

- The humidity indicator card (HIC) shall be read immediately upon opening of MBB.
- The LEDs must be kept at < 30°C/60%RH at all time and all high temperature related process including soldering, curing or rework need to be completed within 72 hours.

C. Control for unfinished reel

- For any unused LEDs, they need to be stored in sealed MBB with desiccant or desiccator at < 5%RH.

D. Control of assembly boards

- If the PCB soldered with the LEDs is to be subjected to other high temperature processes, the PCB need to be stored in sealed MBB with desiccant or desiccator at < 5%RH to ensure no LEDs have exceeded their floor life of 72 hours.

E. Baking is required if

- HIC “10%” indicator is not blue and “5%” indicator is pink.
- The LEDs are exposed to condition of > 30°C/60%RH at any time.
- The LEDs floor life exceeded 72 hrs.

Recommended baking condition: 60±5°C for 20 hrs.

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