

ASMT-Mxx9

Moonstone™ 1W Power LED Light Source



Data Sheet



Description

Moonstone™ 1W 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.

It is available in various color temperatures ranging from 2600K to 10000K.

The package is compatible with reflow soldering. To facilitate easy pick and place assembly, the LEDs are also available in EIA-compliant tape and reel.

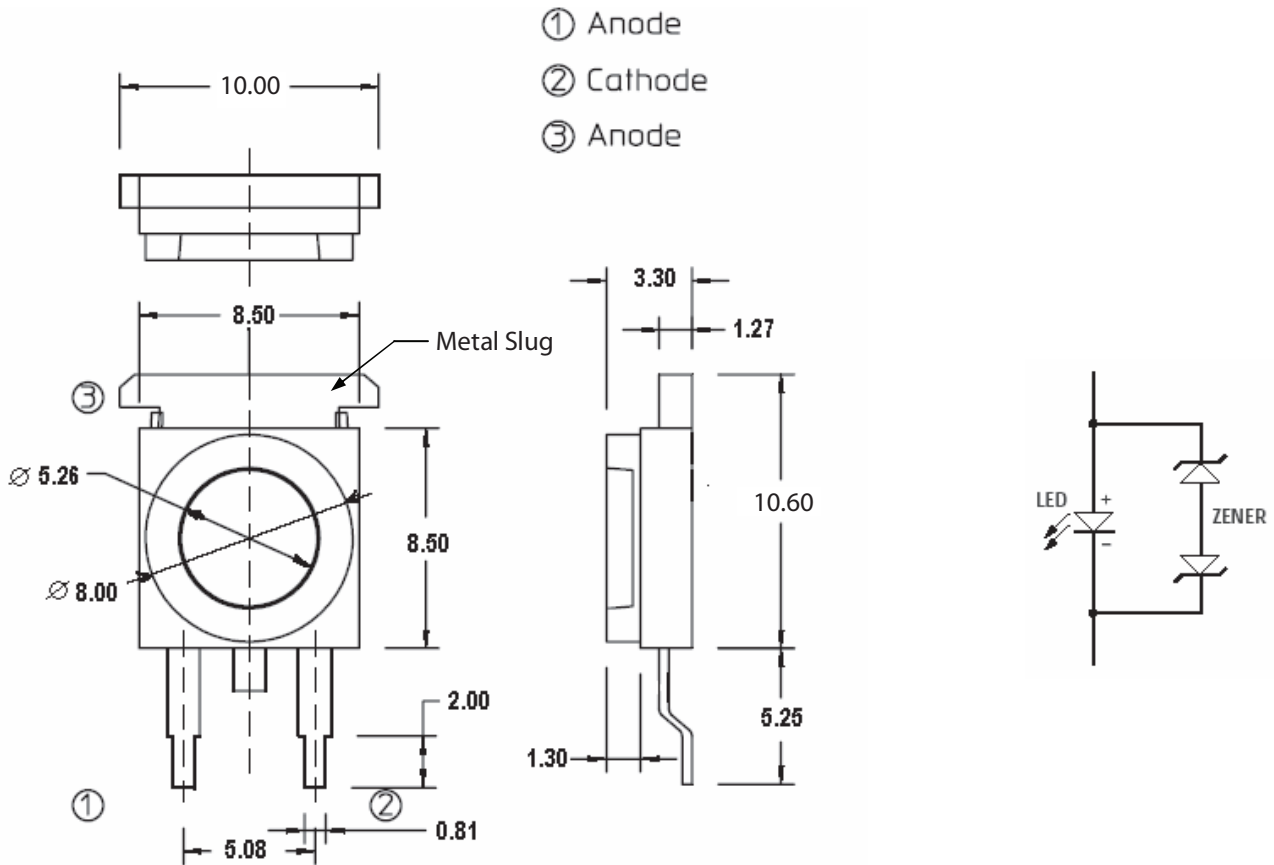
Features

- 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 >16kV)
- MSL 4

Applications

- Portable (flash light, bicycle head light)
- Reading light
- Architectural lighting
- Garden lighting
- Decorative lighting

Package Dimensions



Notes:

1. All dimensions in mm.
2. Tolerance = ± 0.10 mm unless otherwise specified.
3. Terminal finish: Ag plating.

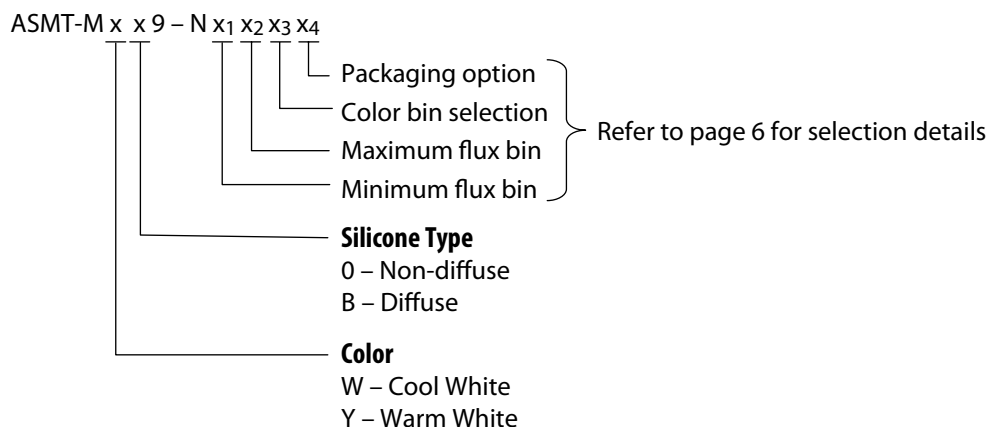
Device Selection Guide ($T_J = 25^\circ\text{C}$)

| Part Number | Color | Luminous Flux, $\Phi_V^{[1,2]}$ (lm) | | | Test Current (mA) | Die Technology |
|-----------------|--------------------|--------------------------------------|------|------|-------------------|----------------|
| | | Min | Typ | Max | | |
| ASMT-MW09-Nxxxx | Cool White | 73.0 | 80.0 | 95.0 | 350 | InGaN |
| ASMT-MY09-Nxxxx | Warm White | 56.0 | 73.0 | 95.0 | 350 | InGaN |
| ASMT-MWB9-Nxxxx | Cool White Diffuse | 56.0 | 73.0 | 95.0 | 350 | InGaN |
| ASMT-MYB9-Nxxxx | Warm White Diffuse | 56.0 | 68.0 | 95.0 | 350 | InGaN |

Notes:

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

Part Numbering System



Absolute Maximum Ratings

| Parameter | ASMT-Mxx9 | Unit |
|-------------------------------------|--------------------|------|
| DC Forward Current ^[1] | 500 | mA |
| Peak Pulsing Current ^[2] | 1000 | mA |
| Power Dissipation | 2100 | mW |
| Reverse Voltage | 5 | V |
| LED Junction Temperature | 125 | °C |
| Operating Ambient Temperature Range | -40 to +85 | °C |
| Storage Temperature Range | -40 to +120 | °C |
| Soldering Temperature | Refer to figure 10 | |

Note:

- Derate linearly based on Figure 8 and 9.
- Pulse condition: duty factor = 10%, Frequency = 1kHz.

Optical Characteristics (T_J = 25°C)

| Part Number | Color | Correlated Color Temperature, CCT (Kelvin) | | Viewing Angle 2θ _½ ^[1] (Degrees) | Luminous Efficiency (lm/W) |
|-----------------|--------------------|--|-------|--|----------------------------|
| | | Min. | Max. | Typ. | Typ. |
| ASMT-MW09-Nxxxx | Cool White | 4000 | 10000 | 120 | 64 |
| ASMT-MY09-Nxxxx | Warm White | 2600 | 4000 | 120 | 58 |
| ASMT-MWB9-Nxxxx | Cool White Diffuse | 4000 | 10000 | 120 | 58 |
| ASMT-MYB9-Nxxxx | Warm White Diffuse | 2600 | 4000 | 120 | 54 |

Notes:

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

Electrical Characteristic (T_J = 25°C)

| Part Number | Forward Voltage, V _F (Volts) @ I _F = 350mA | | | Reverse Voltage, V _R (Volts) | Thermal Resistance, R _{θJ-M5} ^[1] (°C/W) |
|-------------|--|------|------|---|--|
| | Min. | Typ. | Max. | Max. | Typ. |
| ASMT-Mxx9 | 3.2 | 3.6 | 4.0 | 5 | 10 |

Note:

- R_{θJ-M5} is the Thermal Resistance from LED junction to metal slug.

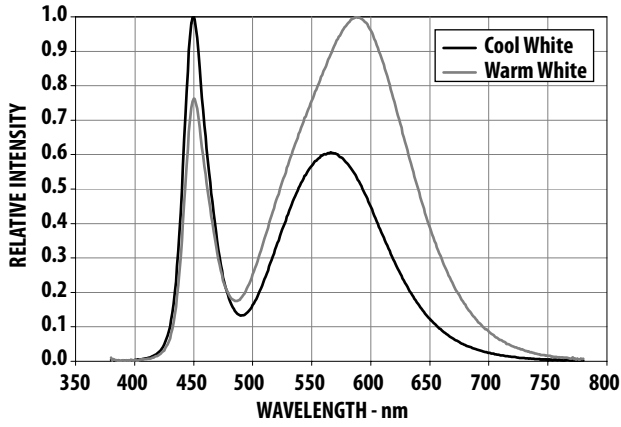


Figure 1. Relative intensity vs. wavelength

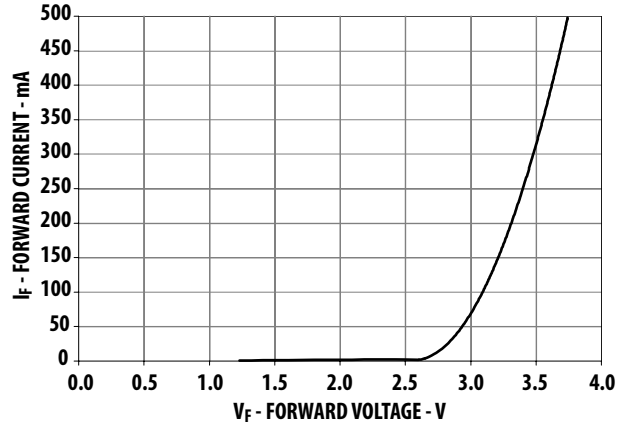


Figure 2. Forward voltage vs. forward current.

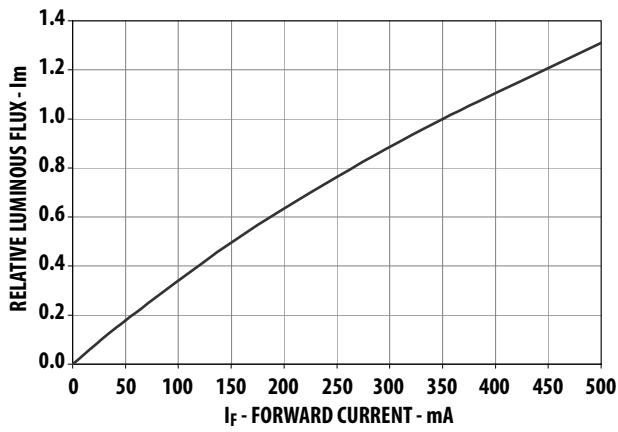


Figure 3. Relative luminous flux vs. forward current.

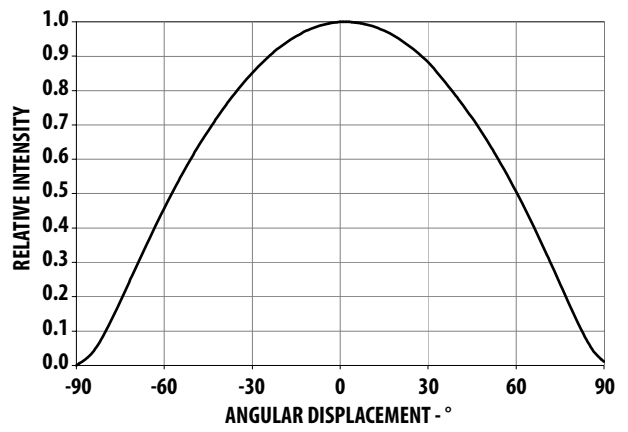


Figure 4. Radiation pattern.

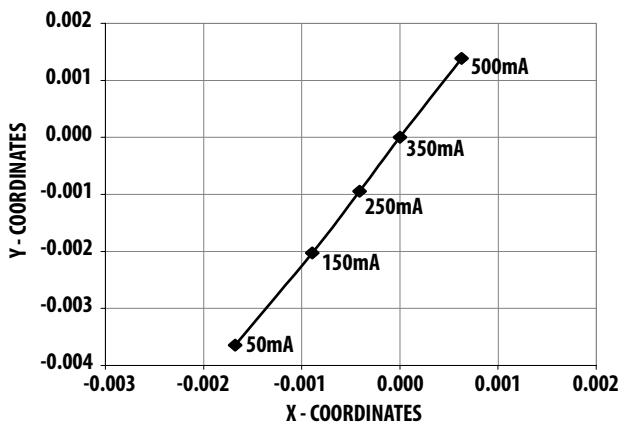


Figure 5a. Chromaticity coordinate shift vs. forward current (Cool White).

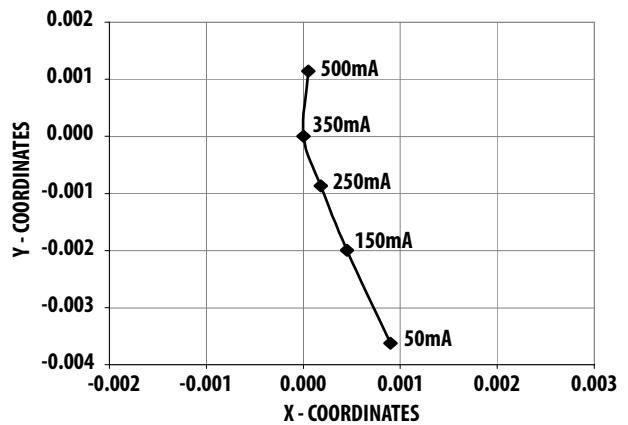


Figure 5b. Chromaticity coordinate shift vs. forward current (Warm White).

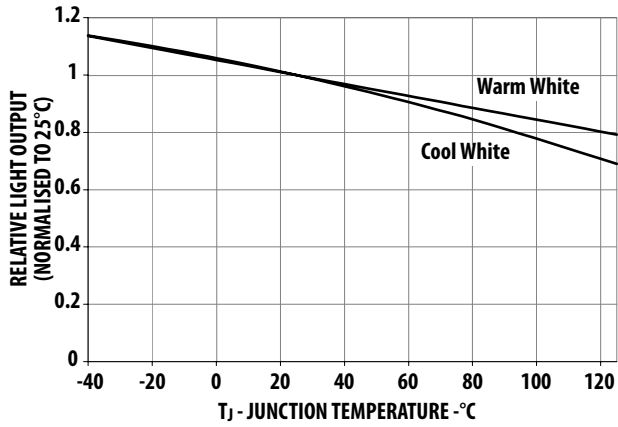


Figure 6. Relative light output vs. junction temperature.

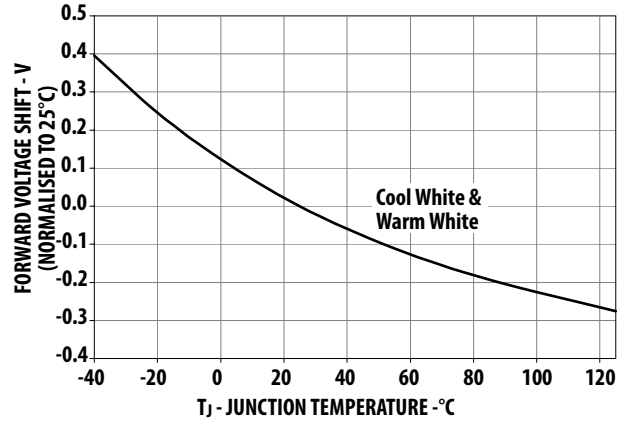


Figure 7. Forward voltage shift vs. junction temperature.

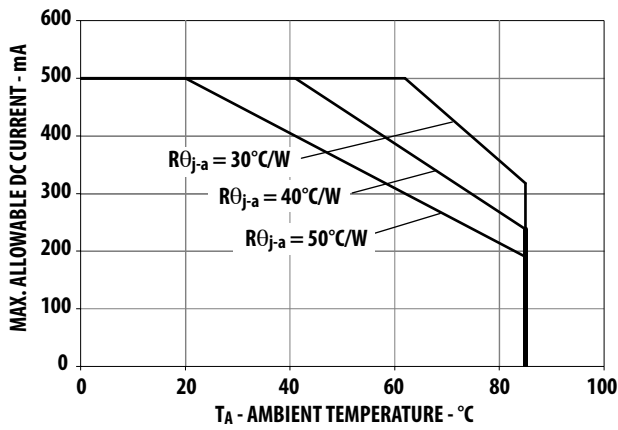


Figure 8. Maximum forward current vs. ambient temperature

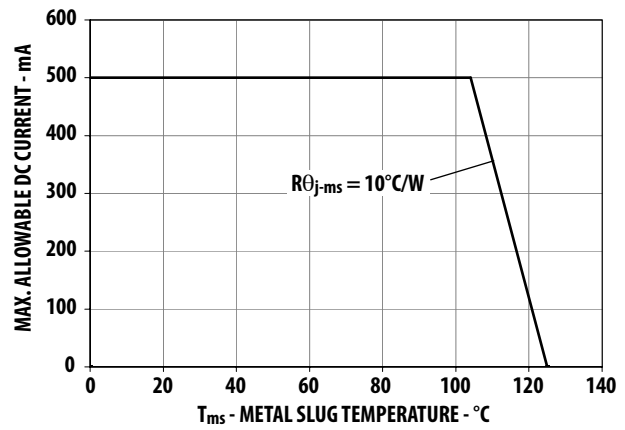


Figure 9. Maximum forward current vs. metal slug temperature

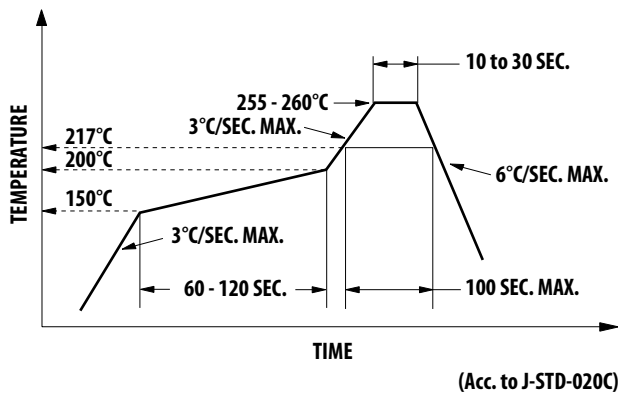


Figure 10. Recommended soldering profile.

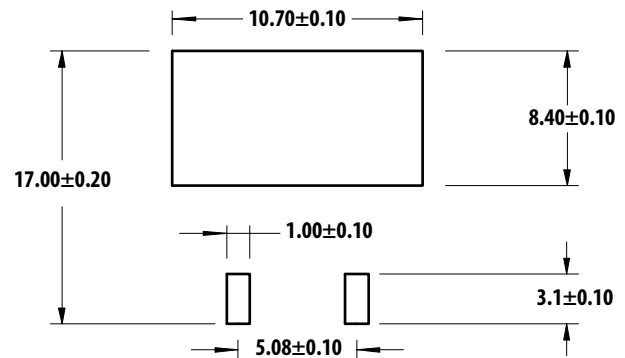


Figure 11. Recommended soldering land pattern.

Option Selection Details

ASMT-Mxx9 – N x₁ x₂ x₃ x₄

x₁ = Minimum flux bin

x₂ = Maximum flux bin

Flux Bin Limit [x₁ x₂]

| Bin | Luminous Flux (lm) @ I _F = 350mA | |
|-----|---|------|
| | Min | Max |
| K | 56.0 | 73.0 |
| L | 73.0 | 95.0 |

Tolerance: ±10%

x₃ = Color bin selection

Individual reel or tube will contain LEDs from one color bin only.

Cool White

| Selection | Bin |
|-----------|--------------------|
| 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 |
|-----------|--------------------|
| 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

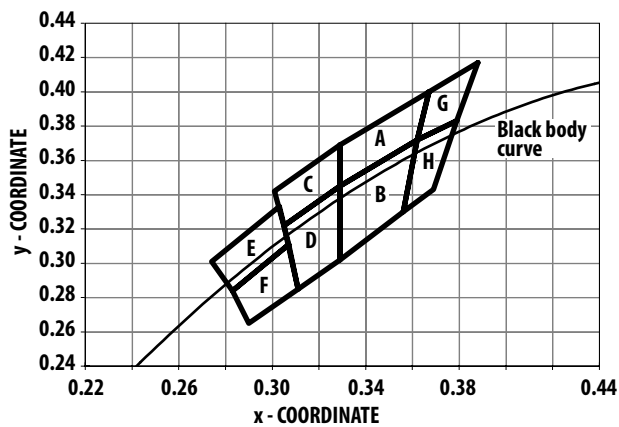


Figure 12a. Color bins (Cool White)

| Warm White | Color Limits (Chromaticity Coordinates) | | | | |
|------------|---|-------|-------|-------|-------|
| | | X | Y | X | Y |
| Bin A | X | 0.497 | 0.458 | 0.441 | 0.477 |
| | Y | 0.447 | 0.434 | 0.403 | 0.414 |
| Bin B | X | 0.477 | 0.441 | 0.428 | 0.459 |
| | Y | 0.414 | 0.403 | 0.376 | 0.384 |
| Bin C | X | 0.458 | 0.429 | 0.415 | 0.441 |
| | Y | 0.434 | 0.425 | 0.393 | 0.403 |
| Bin D | X | 0.441 | 0.415 | 0.405 | 0.428 |
| | Y | 0.403 | 0.393 | 0.368 | 0.376 |
| Bin E | X | 0.429 | 0.387 | 0.381 | 0.415 |
| | Y | 0.425 | 0.404 | 0.377 | 0.393 |
| Bin F | X | 0.415 | 0.381 | 0.373 | 0.405 |
| | Y | 0.393 | 0.377 | 0.349 | 0.368 |

Tolerance: ± 0.01

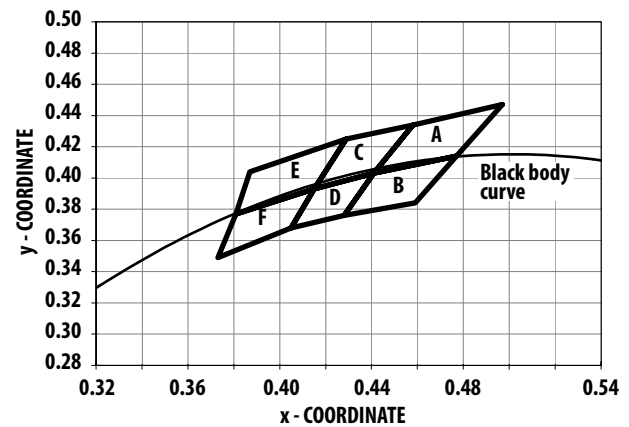


Figure 12b. Color bins (Warm White)

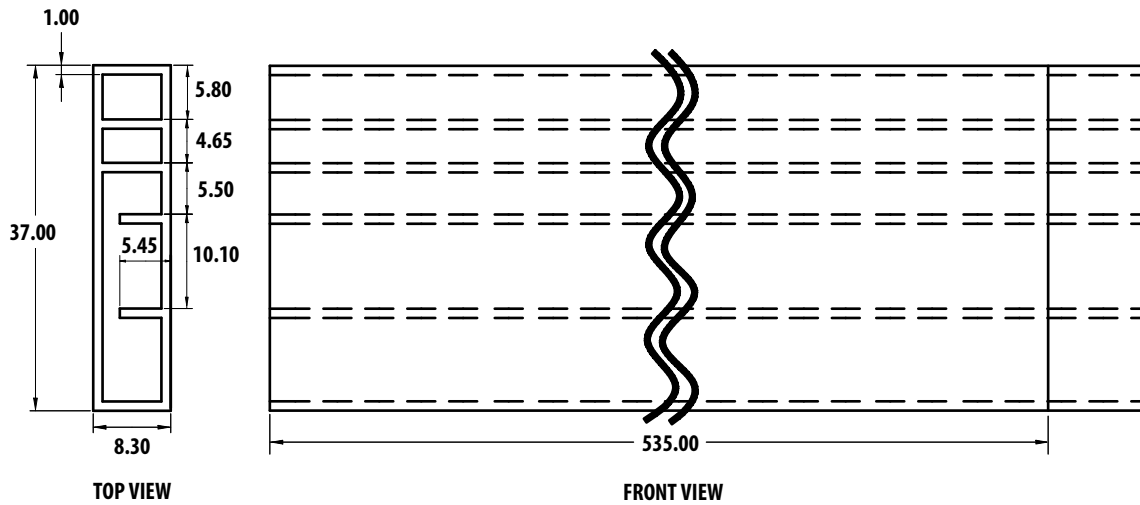
x₄ = Packaging option

| Selection | Option |
|-----------|-------------|
| 0 | Tube |
| 1 | Tape & reel |

Example

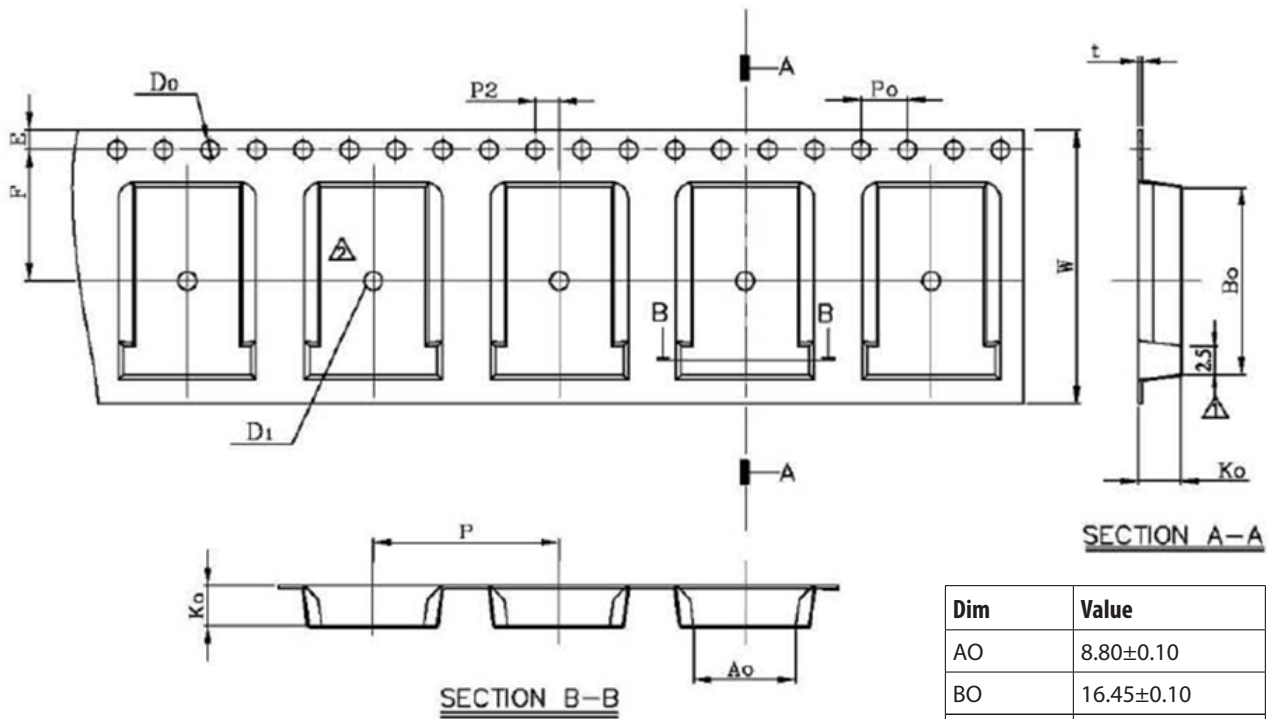
ASMT-MW09-NLLZ1

- ASMT-MW09-Nxxxx – Cool White Non-diffuse
- x₁ = L – Min. flux bin L
- x₂ = L – Max. flux bin L
- x₃ = Z – Color bin A & B only
- x₄ = 1 – Tape & reel option



Quantity per tube = 25 pcs

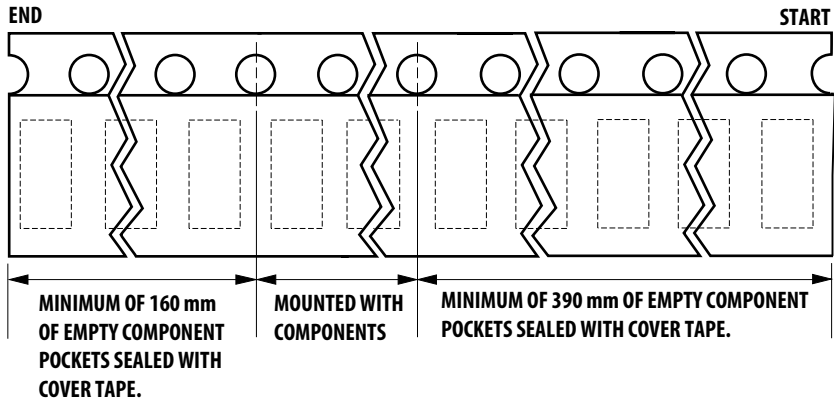
Figure 13. Tube dimensions.



| Dim | Value |
|-----------|------------|
| AO | 8.80±0.10 |
| BO | 16.45±0.10 |
| KO | 3.60±0.1 |
| E | 1.75±0.10 |
| F | 11.50±0.10 |
| W | 24.0±0.10 |
| P | 16.0±0.10 |
| Q'ty/Reel | 250 units |

All dimensions in mm.

Figure 14. Carrier tape dimensions.



*Note: Tape & Reel Packaging only applicable as per this datasheet only.

Figure 15. Carrier tape leader and trailer dimensions.

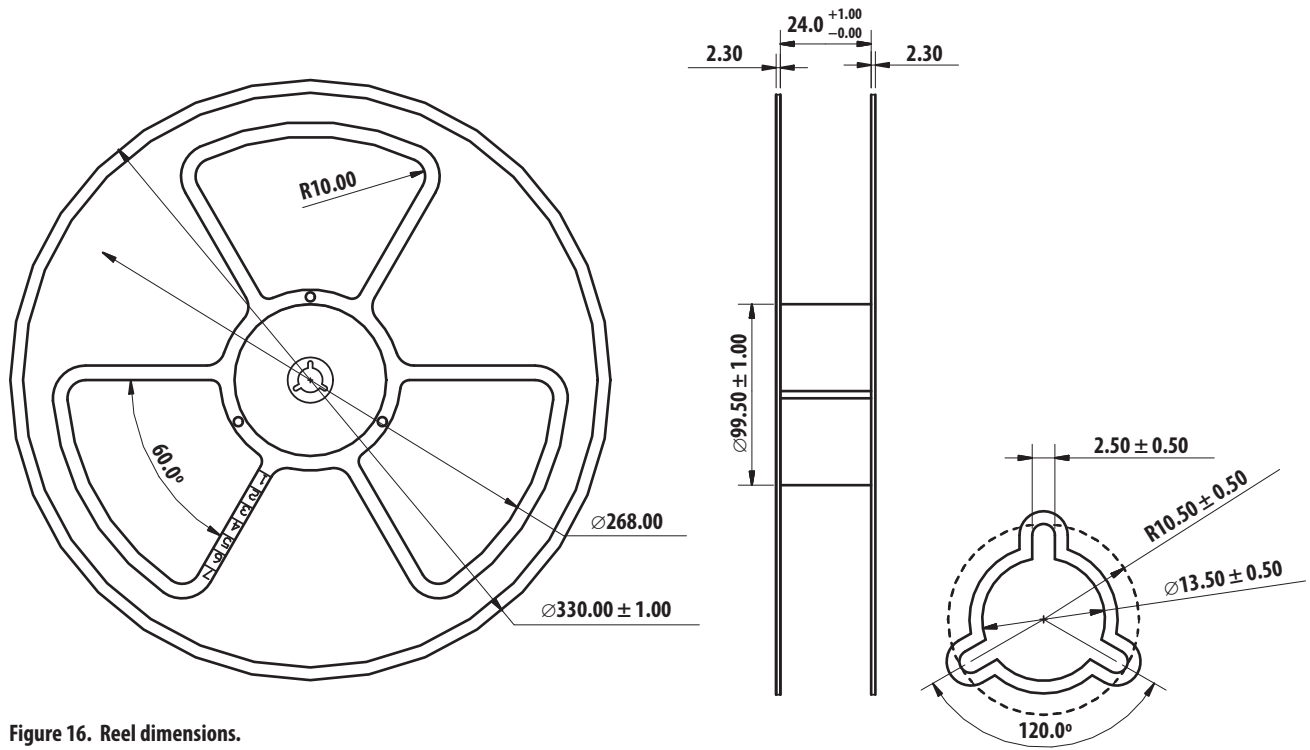


Figure 16. Reel dimensions.

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 2 per Jecdec 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 <math> < 40^{\circ}\text{C}/90\% \text{RH}</math> for 12 months. If the actual shelf life has exceeded 12 months and the 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 <math> < 30^{\circ}\text{C}/60\% \text{RH}</math> 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 unuse LEDs, they need to be stored in sealed MBB with desiccant or desiccator at <math> < 5\% \text{RH}</math>.

D. Control of assembled 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 <math> < 5\% \text{RH}</math> 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 $> 30^{\circ}\text{C}/60\% \text{RH}$ at any time.
- The LEDs floor life exceeded 72hrs.

Recommended baking condition: $60 \pm 5^{\circ}\text{C}$ for 20hrs.

For product information and a complete list of distributors, please go to our web site: www.avagotech.com