

## ASMT-MxK0

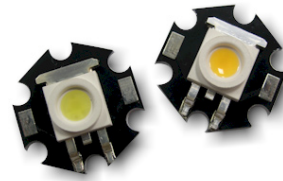
### Moonstone™ 1W Power LED Light Source on MCPCB



## Data Sheet



Lead (Pb) Free  
RoHS 6 fully  
compliant



### Description

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.

The 1W Power LED light source is mounted on to metal core PCB enabling optimum heat dissipation and ease of installation.

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

### Applications

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

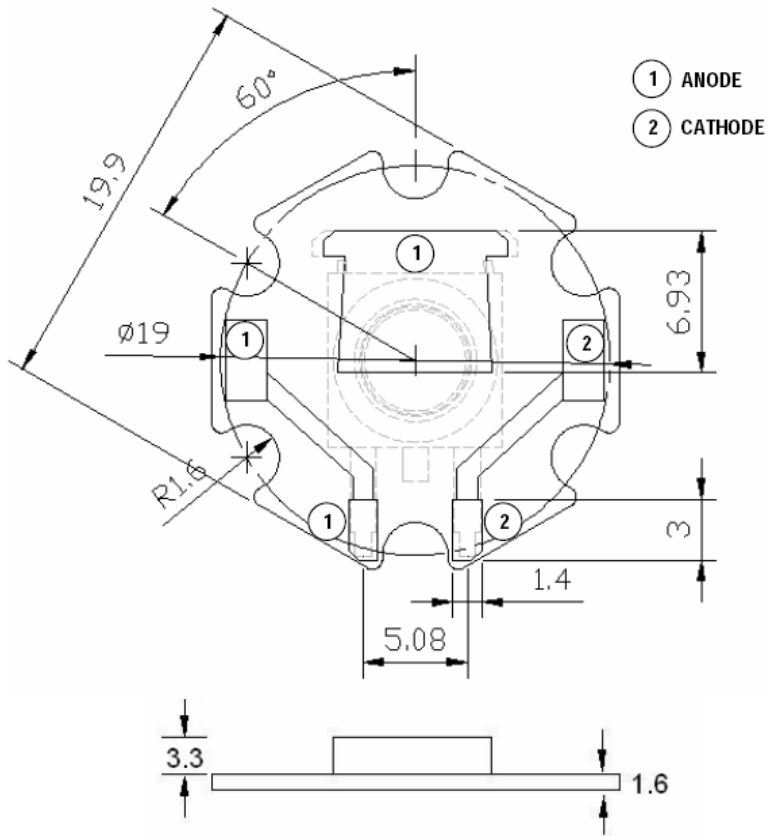
### Features

- Available in Red, Amber, Green, Blue, Cool White and Warm White color.
- Energy efficient
- High current operation.
- Long operation life.
- Wide viewing angle.
- Silicone encapsulation

### Specifications

- AllnGaP Technology for Red and Amber
- InGaN Technology for Green, Blue, Cool White and Warm White color
- 2.4V, 350mA (typical) for AllnGaP Technology
- 3.6V, 350 mA (typical) for InGaN Technology
- 110 viewing angle for White Products
- 120 viewing angle for Mono color Products

## Package Dimensions



### Notes:

1. All dimensions in millimeters
2. Tolerance is  $\pm 0.1$ mm unless otherwise specified.

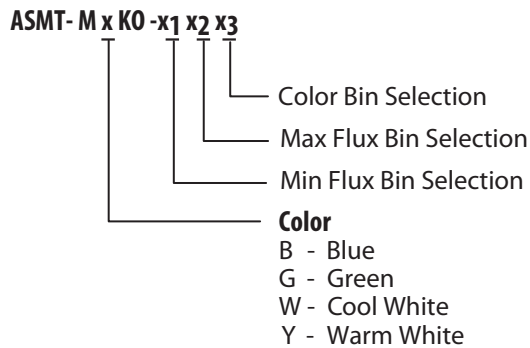
## Device Selection Guide at Junction Temperature $T_j = 25^\circ\text{C}$

| Color      | Part Number | Luminous Flux, $\Phi_v^{[1,2,3]}$ (lm) |      |      | Test Current | Dice Technology |
|------------|-------------|----------------------------------------|------|------|--------------|-----------------|
|            |             | Min                                    | Typ  | Max  | (mA)         |                 |
| Red        | ASMT-MRK0   | 25.5                                   | 40.0 | 56.0 | 350          | AllInGaP        |
| Amber      | ASMT-MAK0   | 25.5                                   | 35.0 | 43.0 | 350          | AllInGaP        |
| Green      | ASMT-MGK0   | 43.0                                   | 60.0 | 73.0 | 350          | InGaN           |
| Blue       | ASMT-MBK0   | 11.5                                   | 15.0 | 25.5 | 350          | InGaN           |
| Cool White | ASMT-MWK0   | 43.0                                   | 60.0 | 73.0 | 350          | InGaN           |
| Warm White | ASMT-MYK0   | 43.0                                   | 50.0 | 73.0 | 350          | InGaN           |

Notes:

- $\Phi_v$  is the total luminous flux output as measured with an integrating sphere at 25ms mono pulse condition.
- Flux tolerance is  $\pm 10\%$
- $\Phi_v$  data are only applicable for ASMT-Mx00 component level device only.

## Part Numbering System



## Absolute Maximum Ratings<sup>[4]</sup> at $T_A = 25^\circ\text{C}$

| Parameters                            | ASMT - Mx KO | Units            |
|---------------------------------------|--------------|------------------|
| DC Forward Current <sup>[5]</sup>     | 350          | mA               |
| Peak Pulsing Current <sup>[6]</sup>   | 500          | mA               |
| Power Dissipation for AllInGaP        | 1050         | mW               |
| Power Dissipation for InGaN           | 1400         | mW               |
| LED Junction Temperature for AllInGaP | 120          | $^\circ\text{C}$ |
| LED Junction Temperature for InGaN    | 110          | $^\circ\text{C}$ |
| Operating Ambient Temperature Range   | -40 to + 85  | $^\circ\text{C}$ |
| Storage Temperature Range             | -40 to + 100 | $^\circ\text{C}$ |

Note:

- Absolute Maximum Rating data are only applicable for ASMT-Mx00 component level device only.
- DC forward current – derate linearly based on Figure 5 for AllInGaP & Figure 11 for InGaN.
- Pulse condition duty factor = 10%, Frequency = 1kHz.

**Optical Characteristics<sup>[1]</sup> (T<sub>A</sub> = 25 °C)**

| Part Number | Color | Peak Wavelength       | Dominant Wavelength  | Viewing Angle                 | Luminous Efficiency |
|-------------|-------|-----------------------|----------------------|-------------------------------|---------------------|
|             |       | $\lambda_{PEAK}$ (nm) | $\lambda_D$ [2] (nm) | $2\theta_{1/2}$ [3] (Degrees) | (lm/W)              |
|             |       | Typ.                  | Typ.                 | Typ.                          | Typ.                |
| ASMT-MRK0   | Red   | 635                   | 625                  | 120                           | 48                  |
| ASMT-MAK0   | Amber | 598                   | 590                  | 120                           | 42                  |
| ASMT-MGK0   | Green | 519                   | 525                  | 120                           | 48                  |
| ASMT-MBK0   | Blue  | 460                   | 467                  | 120                           | 12                  |

| Part Number | Color      | Correlated Color Temperature, CCT (Kelvin) |       | Viewing Angle                 | Luminous Efficiency |
|-------------|------------|--------------------------------------------|-------|-------------------------------|---------------------|
|             |            | Min                                        | Max   | $2\theta_{1/2}$ [2] (Degrees) | (lm/W)              |
|             |            |                                            |       | Typ                           | Typ                 |
| ASMT-MWK0   | Cool White | 4000                                       | 10000 | 110                           | 48                  |
| ASMT-MYK0   | Warm White | 2600                                       | 4000  | 110                           | 40                  |

Notes:

- Optical Characteristics data are only applicable for ASMT-Mx00 component level device only.
- The dominant wavelength,  $\lambda_D$ , is derived from the CIE Chromaticity Diagram and represents the color of the device.
- $\theta_{1/2}$  is the off-axis angle where the luminous intensity is 1/2 the peak intensity.

**Electrical Characteristic<sup>[4]</sup> (T<sub>A</sub> = 25 °C)**

| Dice Type | Forward Voltage V <sub>F</sub> (Volts) @ I <sub>F</sub> = 350mA |     |      | Reverse Voltage V <sub>R</sub> (Volts) | Thermal Resistance R <sub>θj-b</sub> (°C/W) [5] |
|-----------|-----------------------------------------------------------------|-----|------|----------------------------------------|-------------------------------------------------|
|           | Min                                                             | Typ | Max. | Max.                                   | Typ.                                            |
| AllnGaP   | 2.0                                                             | 2.4 | 3.0  | 5                                      | 12                                              |
| InGaN     | 3.2                                                             | 3.6 | 4.0  | 5                                      | 18                                              |

Note:

- Electrical Characteristic data are only applicable for ASMT-Mx00 component level device only.
- R<sub>θj-b</sub> is Thermal Resistance from LED junction to MCPCB.

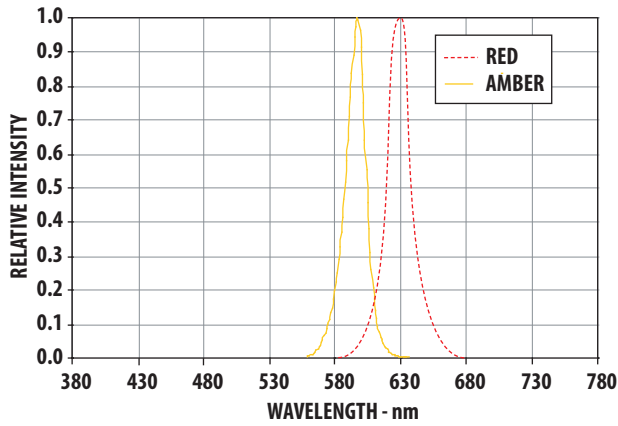


Figure 1. Relative Intensity vs. Wavelength for AlInGaP

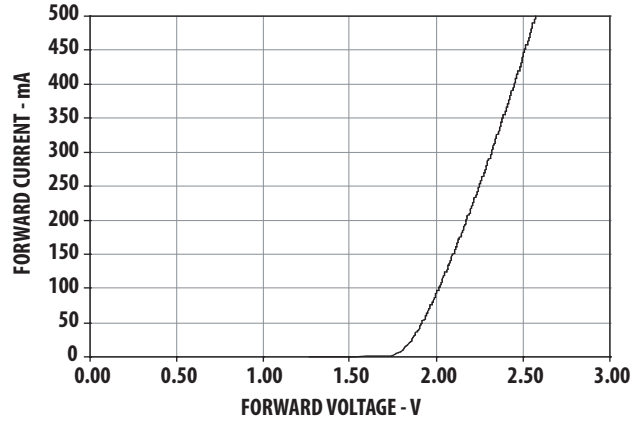


Figure 2. Forward Current vs Forward Voltage for AlInGaP

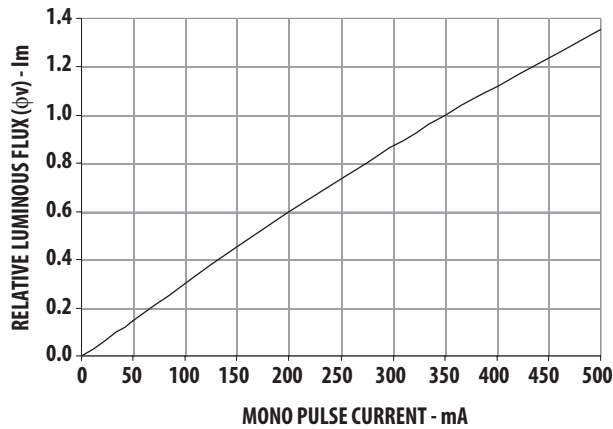


Figure 3. Relative Luminous Flux vs. Mono Pulse Current for AlInGaP

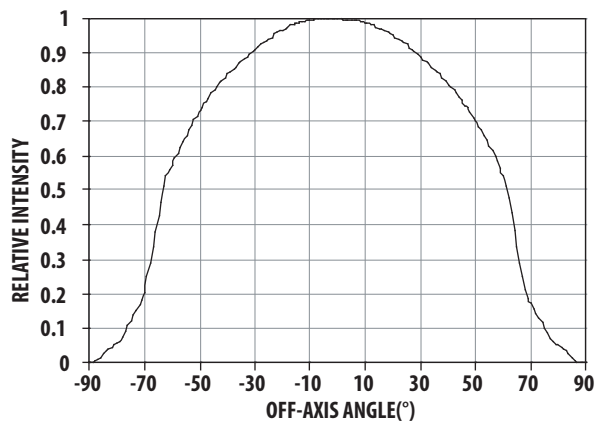


Figure 4. Radiation Pattern for AlInGaP

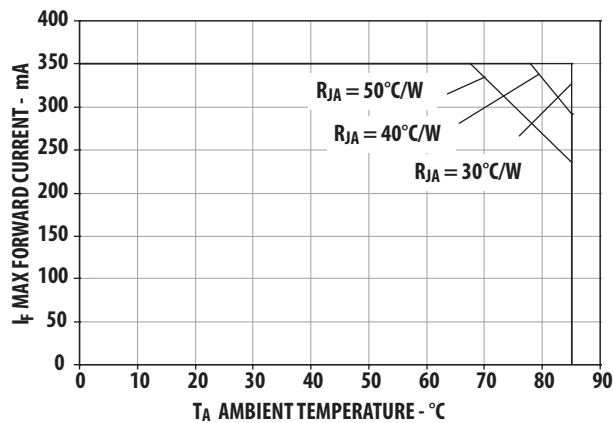


Figure 5. Maximum forward current vs. ambient temperature for AlInGaP Derated based on  $T_{jMAX} = 120^{\circ}\text{C}$ ,  $R_{\theta JA} = 30^{\circ}\text{C/W}$  /  $40^{\circ}\text{C/W}$  and  $50^{\circ}\text{C/W}$

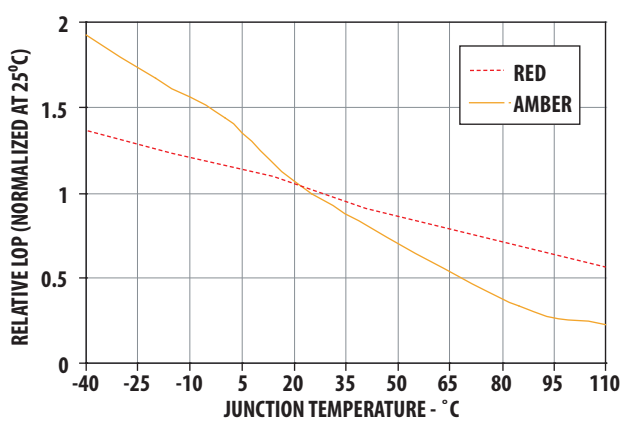


Figure 6. Relative LOP (Normalized at  $25^{\circ}\text{C}$ ) vs. junction temperature for AlInGaP

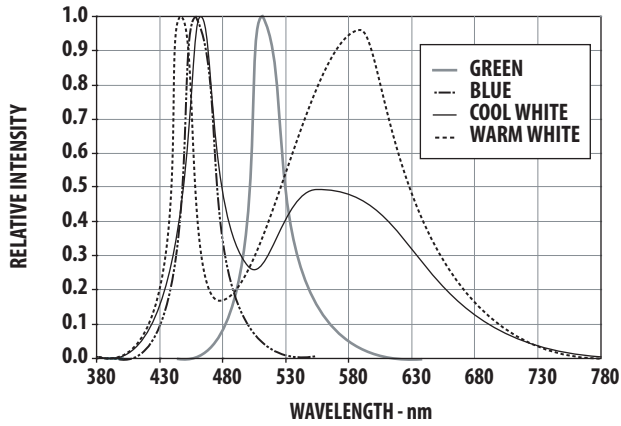


Figure 7. Relative Intensity vs. Wavelength for InGaN

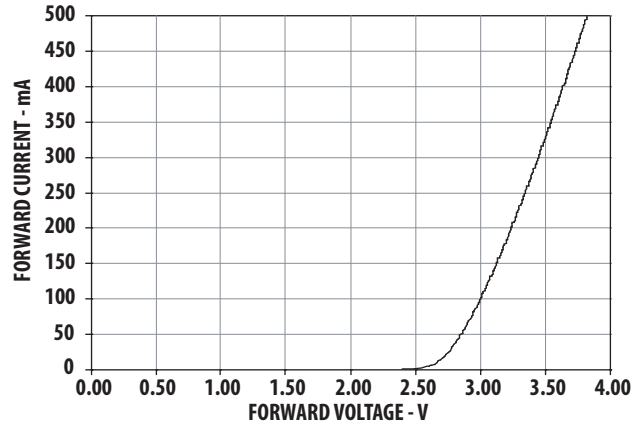


Figure 8. Forward Current vs Forward Voltage for InGaN

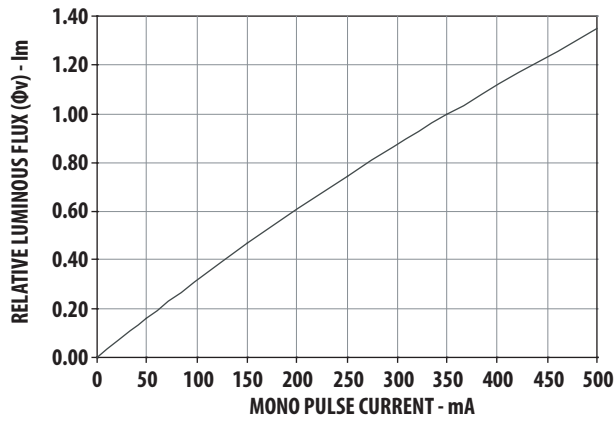


Figure 9. Relative Luminous Flux vs. Mono Pulse Current for InGaN

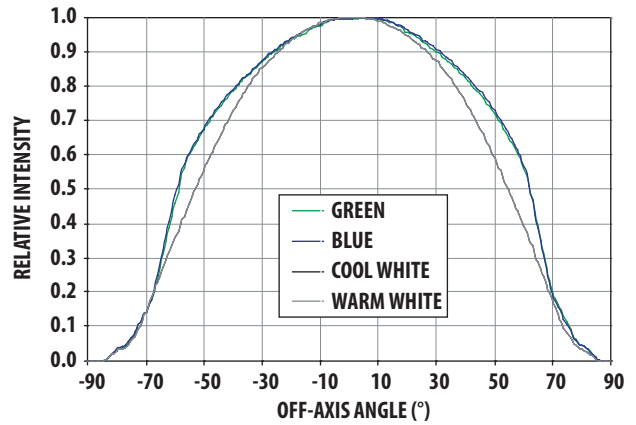


Figure 10. Radiation Pattern for InGaN

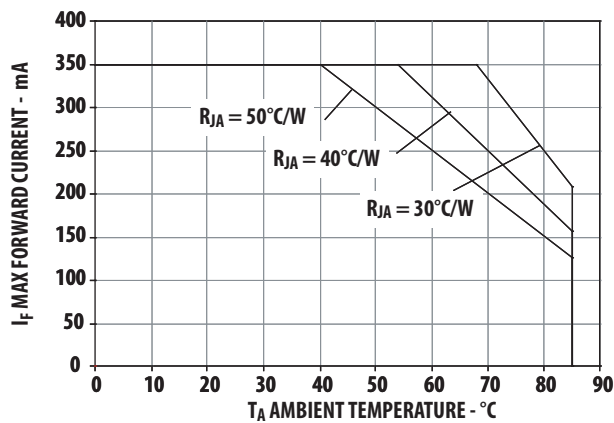


Figure 11. Maximum forward current vs. ambient temperature for InGaN  
Derated based on  $T_{jMAX} = 110^{\circ}C$ ,  $R_{\theta JA} = 30^{\circ}C/W$  /  $40^{\circ}C/W$  and  $50^{\circ}C/W$

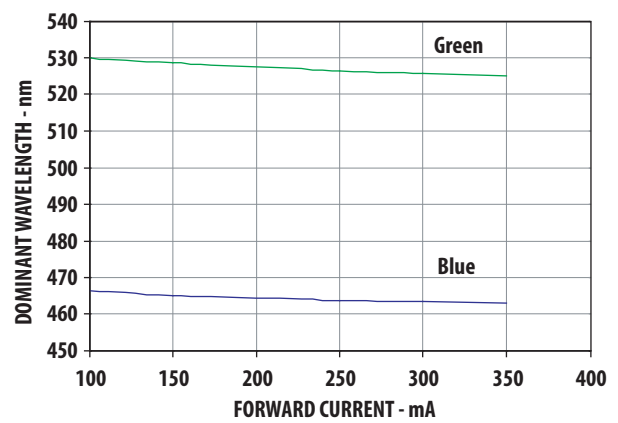


Figure 12. Dominant wavelength vs. forward current – InGaN devices

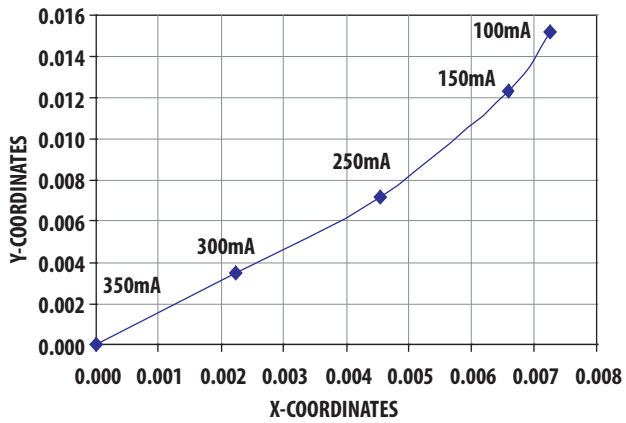


Figure 13. Chromaticity Shift vs. Current

\*Note: (x,y) values @ 350mA reference to (0,0)

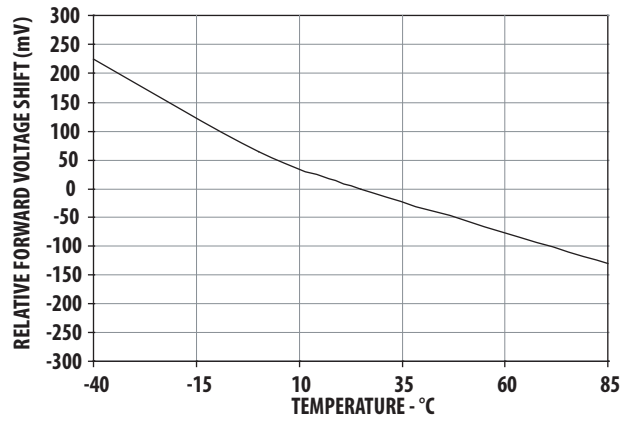


Figure 14. Temperature vs. relative forward voltage shift

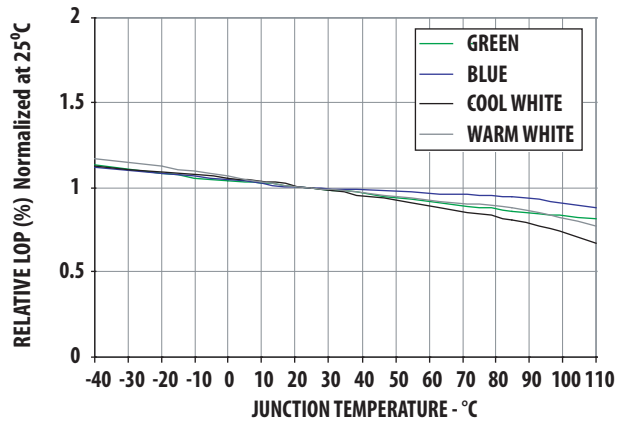


Figure 15. Relative LOP vs. junction temperature for InGaN

Note: All parametric charts are only applicable for ASMT-Mx00 component level device only

## Flux Bin Limit<sup>[1]</sup> (For reference only) [x<sub>1</sub> x<sub>2</sub>]

| Bin | Flux (lm) at 350mA |      |
|-----|--------------------|------|
|     | Min                | Max  |
| A   | 5.5                | 7.0  |
| B   | 7.0                | 9.0  |
| C   | 9.0                | 11.5 |
| D   | 11.5               | 15.0 |
| E   | 15.0               | 19.5 |
| F   | 19.5               | 25.5 |
| G   | 25.5               | 33.0 |
| H   | 33.0               | 43.0 |
| J   | 43.0               | 56.0 |
| K   | 56.0               | 73.0 |

Tolerance for each bin limits is  $\pm 10\%$

Note:

1. Flux Bin Limit is only applicable for ASMT-Mx00 component level device only

## Color Bin Selections [x<sub>3</sub>]

Individual reel will contain parts from one full bin only.

### Cool White

|   |                        |
|---|------------------------|
| 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                 |
| Z | A and B only           |
| Y | B and C only           |
| W | C and D only           |
| V | D and E only           |
| U | E and F only           |
| T | F and G only           |
| S | G and H only           |
| Q | A, B and C only        |
| P | B, C and D only        |
| N | C, D and E only        |
| M | D, E and F only        |
| L | E, F and G only        |
| K | F, G and H only        |
| J | Special Color Bin      |
| 1 | A, B, C and D only     |
| 2 | E, F, G and H only     |
| 3 | B, C, D and E only     |
| 4 | C, D, E and F only     |
| 5 | A, B, C, D and E only  |
| 6 | B, C, D, E, and F only |

## Color Bin Limits

| Amber | Min. (nm) | Max. (nm) |
|-------|-----------|-----------|
| A     | 582.0     | 584.5     |
| B     | 584.5     | 587.0     |
| C     | 587.0     | 589.5     |
| D     | 589.5     | 592.0     |
| E     | 592.0     | 594.5     |

| Blue | Min. (nm) | Max. (nm) |
|------|-----------|-----------|
| A    | 460.0     | 465.0     |
| B    | 465.0     | 470.0     |
| C    | 470.0     | 475.0     |
| D    | 475.0     | 480.0     |

| Green | Min. (nm) | Max. (nm) |
|-------|-----------|-----------|
| A     | 515.0     | 520.0     |
| B     | 520.0     | 525.0     |
| C     | 525.0     | 530.0     |
| D     | 530.0     | 535.0     |

### Warm White

|   |                        |
|---|------------------------|
| 0 | Full Distribution      |
| A | A only                 |
| B | B only                 |
| C | C only                 |
| D | D only                 |
| E | E only                 |
| F | F only                 |
| Z | A and B only           |
| Y | B and C only           |
| W | C and D only           |
| V | D and E only           |
| U | E and F only           |
| Q | A, B and C only        |
| P | B, C and D only        |
| N | C, D and E only        |
| M | D, E and F only        |
| J | Special Color Bin      |
| 1 | A, B, C and D only     |
| 2 | E, F, G and H only     |
| 3 | B, C, D and E only     |
| 4 | C, D, E and F only     |
| 5 | A, B, C, D and E only  |
| 6 | B, C, D, E, and F only |



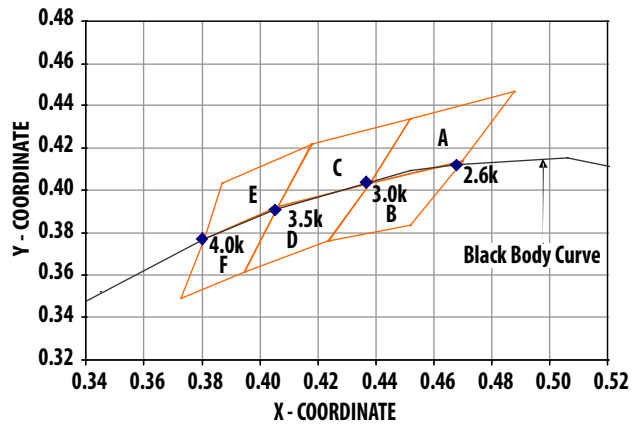
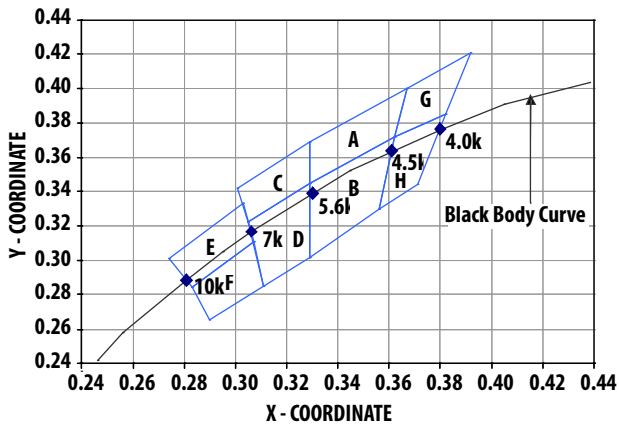
## Primary Color Binning

| Cool White |   | Color Limits <sup>[1]</sup><br>(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  $\pm 0.01$

| Warm White |   | Color Limits <sup>[1]</sup><br>(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 |

Tolerances  $\pm 0.01$



Note:

1. Color Limit and Color binning chart are only applicable for ASMT-Mx00 component level device only

## Sub-Color Binning

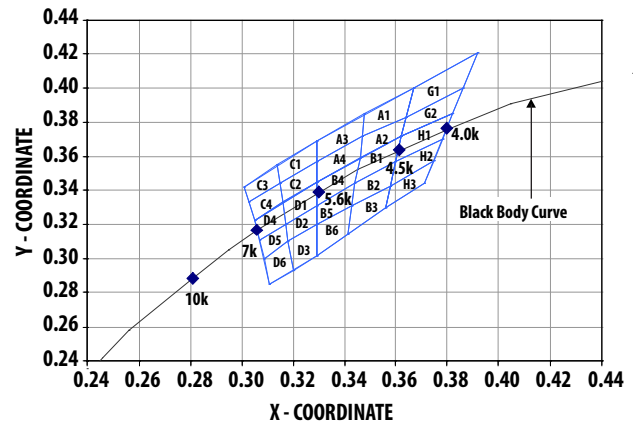
(Only Applicable for Color Bin A to Bin D and Bin G to Bin H)

### Color Limits<sup>[1]</sup>

| Cool White |   | (Chromaticity Coordinates) |       |       |       |
|------------|---|----------------------------|-------|-------|-------|
| Bin A1     | X | 0.364                      | 0.367 | 0.348 | 0.347 |
|            | Y | 0.383                      | 0.400 | 0.385 | 0.372 |
| Bin A2     | X | 0.364                      | 0.362 | 0.346 | 0.347 |
|            | Y | 0.383                      | 0.372 | 0.359 | 0.372 |
| Bin A3     | X | 0.329                      | 0.329 | 0.348 | 0.347 |
|            | Y | 0.357                      | 0.369 | 0.385 | 0.372 |
| Bin A4     | X | 0.329                      | 0.329 | 0.347 | 0.346 |
|            | Y | 0.345                      | 0.357 | 0.372 | 0.359 |
| Bin B1     | X | 0.362                      | 0.360 | 0.344 | 0.346 |
|            | Y | 0.372                      | 0.357 | 0.344 | 0.359 |
| Bin B2     | X | 0.360                      | 0.358 | 0.343 | 0.344 |
|            | Y | 0.357                      | 0.343 | 0.331 | 0.344 |
| Bin B3     | X | 0.358                      | 0.356 | 0.341 | 0.343 |
|            | Y | 0.343                      | 0.330 | 0.314 | 0.331 |
| Bin B4     | X | 0.329                      | 0.329 | 0.346 | 0.344 |
|            | Y | 0.331                      | 0.345 | 0.359 | 0.344 |
| Bin B5     | X | 0.329                      | 0.344 | 0.343 | 0.329 |
|            | Y | 0.331                      | 0.344 | 0.331 | 0.320 |
| Bin B6     | X | 0.343                      | 0.341 | 0.329 | 0.329 |
|            | Y | 0.331                      | 0.314 | 0.302 | 0.320 |
| Bin C1     | X | 0.329                      | 0.329 | 0.315 | 0.314 |
|            | Y | 0.369                      | 0.357 | 0.344 | 0.355 |
| Bin C2     | X | 0.329                      | 0.329 | 0.316 | 0.315 |
|            | Y | 0.357                      | 0.345 | 0.333 | 0.344 |
| Bin C3     | X | 0.314                      | 0.315 | 0.303 | 0.301 |
|            | Y | 0.355                      | 0.344 | 0.333 | 0.342 |
| Bin C4     | X | 0.315                      | 0.316 | 0.305 | 0.303 |
|            | Y | 0.344                      | 0.333 | 0.322 | 0.333 |

| Warm White |   | (Chromaticity Coordinates) |       |       |       |
|------------|---|----------------------------|-------|-------|-------|
| Bin D1     | X | 0.329                      | 0.329 | 0.317 | 0.316 |
|            | Y | 0.345                      | 0.331 | 0.320 | 0.33  |
| Bin D2     | X | 0.329                      | 0.329 | 0.318 | 0.317 |
|            | Y | 0.331                      | 0.320 | 0.310 | 0.320 |
| Bin D3     | X | 0.329                      | 0.329 | 0.320 | 0.318 |
|            | Y | 0.320                      | 0.302 | 0.293 | 0.310 |
| Bin D4     | X | 0.316                      | 0.317 | 0.307 | 0.305 |
|            | Y | 0.333                      | 0.320 | 0.311 | 0.322 |
| Bin D5     | X | 0.317                      | 0.318 | 0.309 | 0.307 |
|            | Y | 0.320                      | 0.310 | 0.300 | 0.311 |
| Bin D6     | X | 0.318                      | 0.320 | 0.311 | 0.309 |
|            | Y | 0.310                      | 0.293 | 0.285 | 0.300 |
| Bin G1     | X | 0.392                      | 0.386 | 0.364 | 0.367 |
|            | Y | 0.421                      | 0.400 | 0.383 | 0.400 |
| Bin G2     | X | 0.386                      | 0.382 | 0.362 | 0.364 |
|            | Y | 0.400                      | 0.385 | 0.372 | 0.383 |
| Bin H1     | X | 0.382                      | 0.378 | 0.360 | 0.362 |
|            | Y | 0.385                      | 0.370 | 0.357 | 0.372 |
| Bin H2     | X | 0.378                      | 0.375 | 0.358 | 0.360 |
|            | Y | 0.370                      | 0.358 | 0.34  | 0.357 |
| Bin H3     | X | 0.375                      | 0.371 | 0.356 | 0.358 |
|            | Y | 0.358                      | 0.344 | 0.330 | 0.343 |

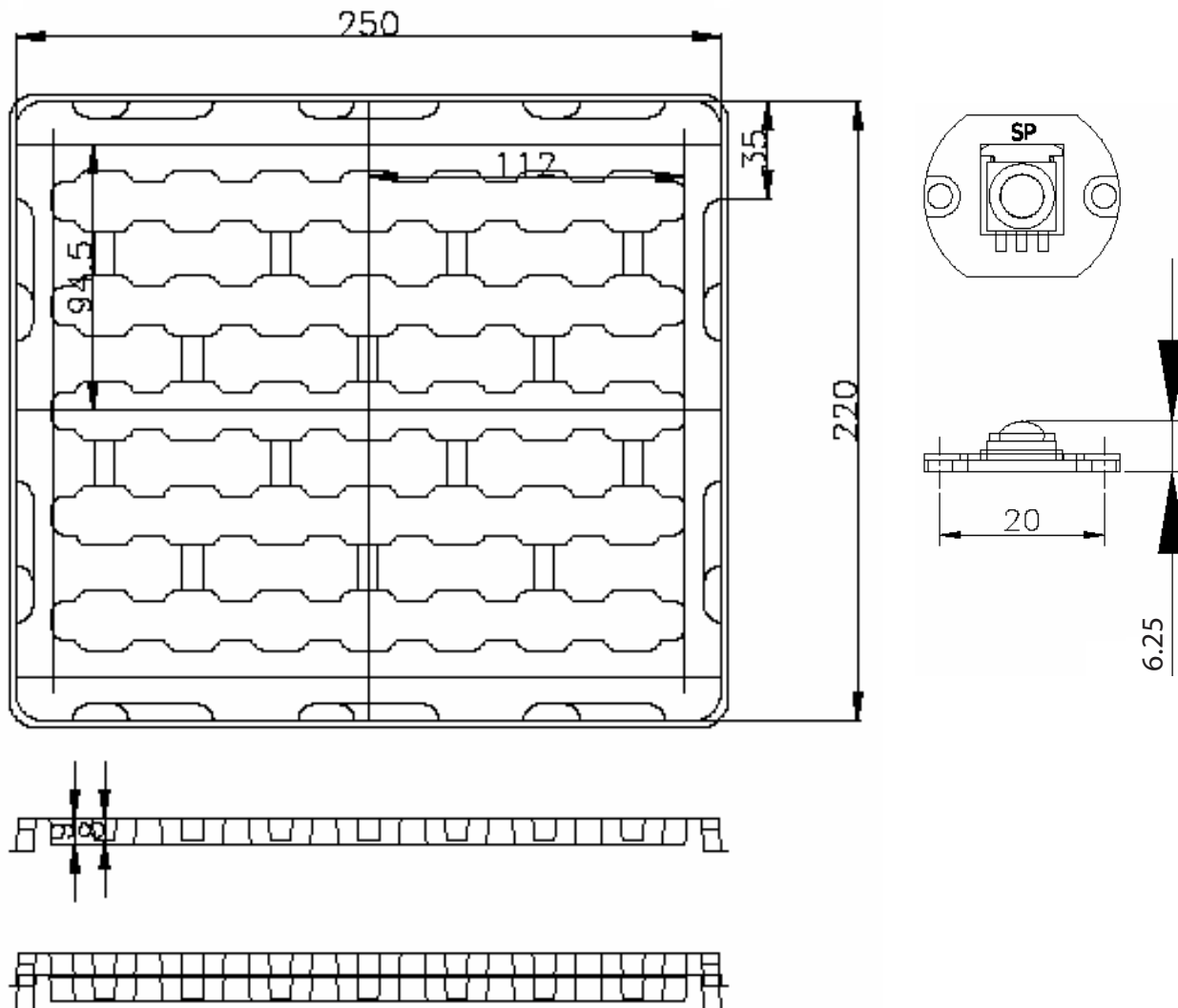
Tolerance  $\pm 0.01$



Note:

1. Color Limit and Color binning chart are only applicable for ASMT-Mx00 component level device only

## Package Tray 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 (white plastic).

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