ASMT-MxA0
Moonstone™ 1W Power LED Light Source on MCPCB

AVAGO TECHNOLOGIES

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

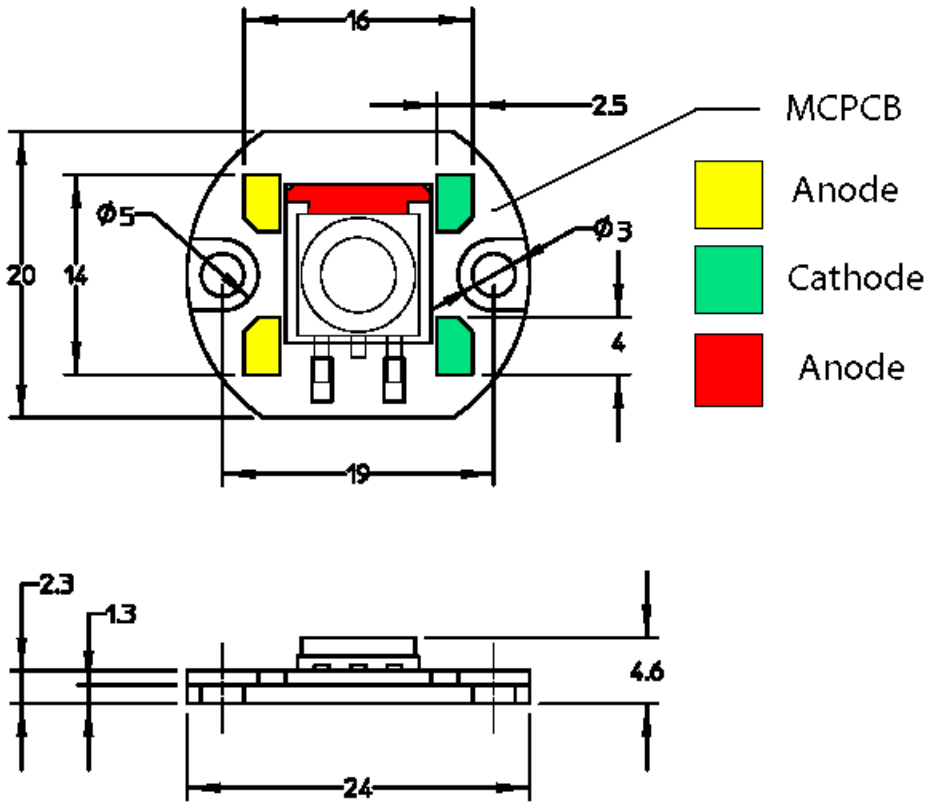
- AlInGaP Technology for Red and Amber
- InGaN Technology for Green, Blue, Cool White & Warm White Color
- 2.4V, 350mA (typical) for AlInGaP Technology
- 3.6V, 350mA (typical) for InGaN Technology
- 110 viewing angle for White Products
- 120 viewing angle for Mono color Products

Device Selection Guide at Junction Temperature $T_j = 25°C$

		Luminous Flux, Φv [1, 2, 3] (lm)			Test Current	Dice
Color	Part Number	Min	Typ	Max	(mA)	Technology
Red	ASMT-MRA0-AGH00	25.5	35.0	43.0	350	AlInGaP
Red	ASMT-MRA0-AHJ00	33.0	40.0	56.0	350	AlInGaP
Amber	ASMT-MAA0-AGH00	25.5	35.0	43.0	350	AlInGaP
Green	ASMT-MGA0	43.0	60.0	73.0	350	InGaN
Blue	ASMT-MBA0	11.5	15.0	25.5	350	InGaN
Cool White	ASMT-MWA0	43.0	60.0	73.0	350	InGaN
Warm White	ASMT-MYA0	43.0	50.0	73.0	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 ±10 %
3. Φ_V data are only applicable for ASMT-Mx00 component level device only.

Package Dimensions



NOTES:
1. ALL DIMENSIONS IN MILLIMETERS.
2. TOLERANCE IS ±0.1MM UNLESS OTHERWISE SPECIFIED.

Part Numbering System

ASMT - M x A0 - N x_1 x x_3 0

Color Bin Selection

Max Flux Bin Selection

Min Flux Bin Selection

Color

R – Red
A – Amber
B - Blue
G - Green
W - Cool White
Y - Warm White

Absolute Maximum Ratings [3] at $T_A = 25°C$

Parameter	ASMT-MxK0	Units
DC Forward Current [1]	350	mA
Peak Pulsing Current [2]	500	mA
Power Dissipation for AlInGaP	1050	mW
Power Dissipation for InGaN	1400	mW
LED Junction Temperature for AlInGaP	120	°C
LED Junction Temperature for InGaN	110	°C
Operating Ambient Temperature Range	-40 to +85	°C
Storage Temperature Range	-40 to +100	°C

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

Optical Characteristics [3] ($T_A = 25$ °C)

		Peak Wavelength λ_{PEAK} (nm)	Dominant Wavelength λ_D [1] (nm)	Viewing Angle $2\theta½$ [2] (Degrees)	Luminous Efficiency (lm/W)
Part Number	**Color**	**Typ.**	**Typ.**	**Typ.**	**Typ.**
ASMT-MRA0-AGH00	Red	635	625	120	42
ASMT-MRA0-AHJ00	Red	635	625	120	48
ASMT-MAA0-AGH00	Amber	598	590	120	42
ASMT-MGA0	Green	519	525	120	48
ASMT-MBA0	Blue	460	467	120	12

		Correlated Color Temperature, CCT (Kelvin)		Viewing Angle $2\theta½$ [2] (Degrees)	Luminous Efficiency (lm/W)
Part Number	**Color**	**Min.**	**Max.**	**Typ**	**Typ**
ASMT-MWA0	Cool White	4000	10000	110	48
ASMT-MYA0	Warm White	2600	4000	110	40

Notes:
1. The dominant wavelength, λ_D, is derived from the CIE Chromaticity Diagram and represents the color of the device.
2. $\theta½$ is the off-axis angle where the luminous intensity is ½ the peak intensity.
3. Optical Characteristics data are only applicable for ASMT-Mx00 component level device only.

Electrical Characteristic [2] ($T_A = 25°C$)

	Forward Voltage V_F (Volts) @ $I_F = 350mA$			Reverse Voltage V_R (Volts)	Thermal Resistance $R\theta_{j-b}$ (°C/W) [1]
Dice Type	**Min.**	**Typ**	**Max.**	**Max.**	**Typ.**
AlInGaP	2.0	2.4	3.0	5	12
InGaN	3.2	3.6	4.0	5	18

Note:
1. $R\theta_{j-b}$ is Thermal Resistance from LED junction to MCPCB.
2. Electrical Characteristic data are only applicable for ASMT-Mx00 component level device only.

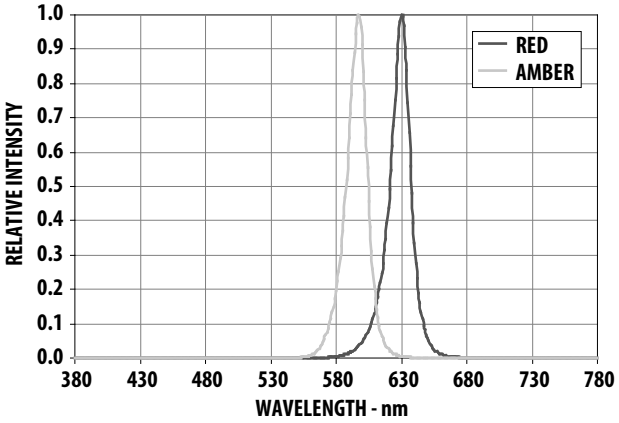


Figure 1. Relative Intensity vs. Wavelength for AlInGaP

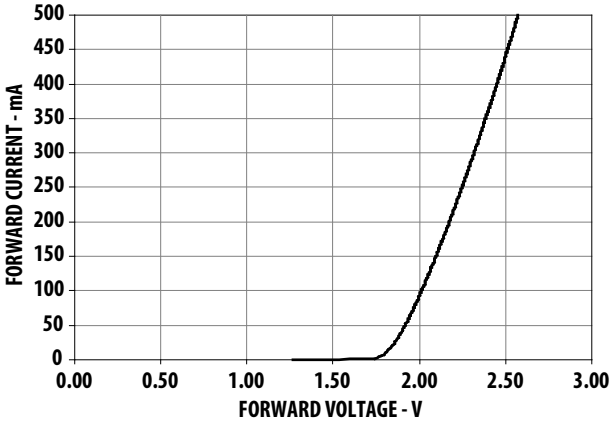


Figure 2. Forward Current vs Forward Voltage for AlInGaP

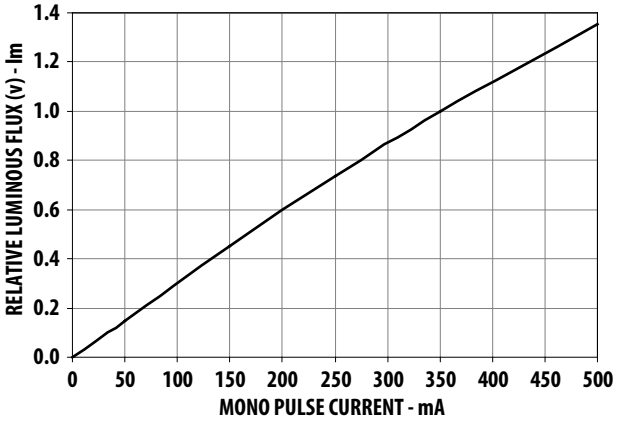


Figure 3. Relative Luminous Flux vs. Mono Pulse Current for AlInGaP

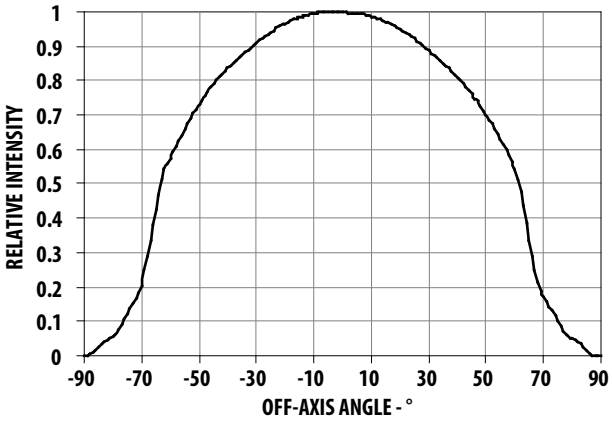


Figure 4. Radiation Pattern for AlInGaP

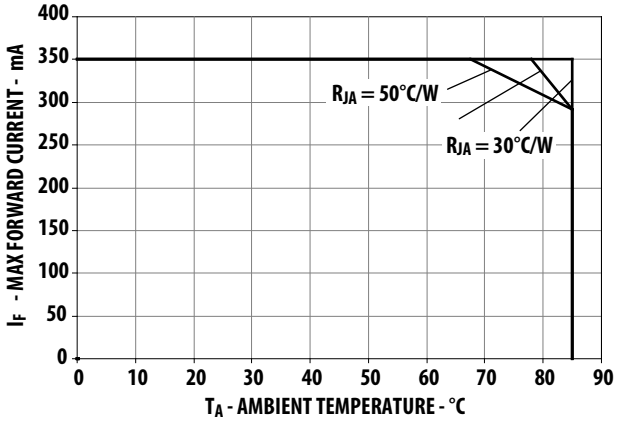


Figure 5. Maximum forward current vs. ambient temperature for AlInGaP Derated based on $T_JMAX = 110°C$, $R\theta_{JA} = 30°C/W$ / 40°C/W and 50°C/W

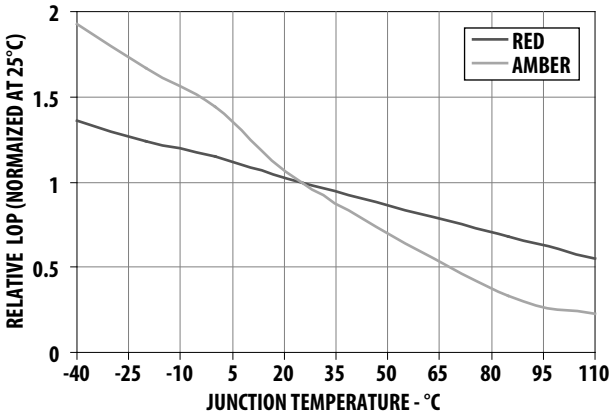


Figure 6. Dominant wavelength vs. forward current – AlInGaP devices

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

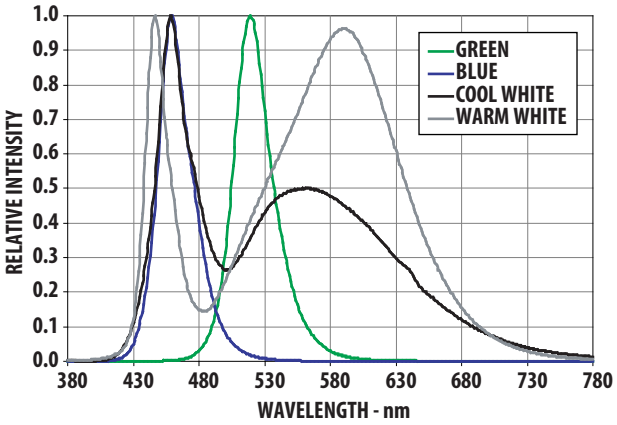


Figure 7. Relative Intensity vs. Wavelength for InGaN

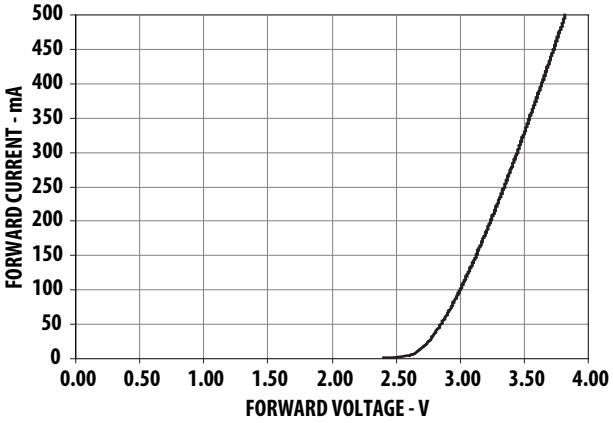


Figure 8. Forward Current vs Forward Voltage for InGaN

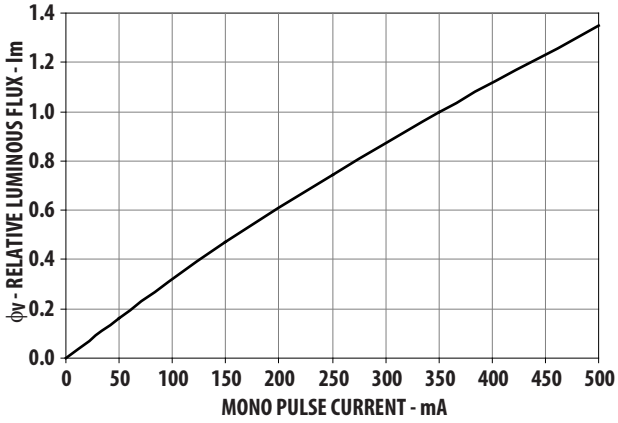


Figure 9. Relative Luminous Flux vs. Mono Pulse Current for InGaN

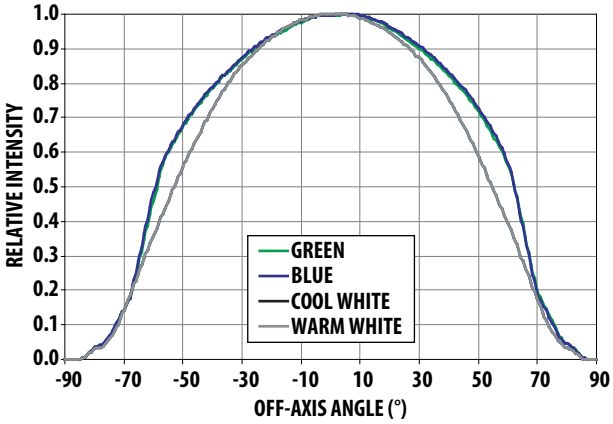


Figure 10. Radiation Pattern for InGaN

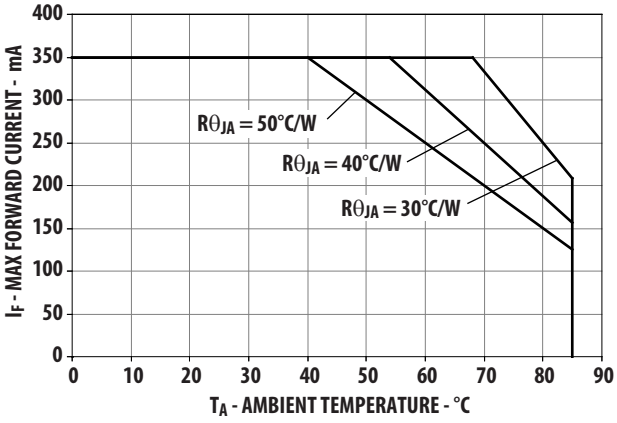


Figure 11. Maximum forward current vs. ambient temperature for InGaN
Derated based on $T_JMAX = 110°C$, $R\theta_{JA} = 30°C/W$ / 40°C/W and 50°C/W

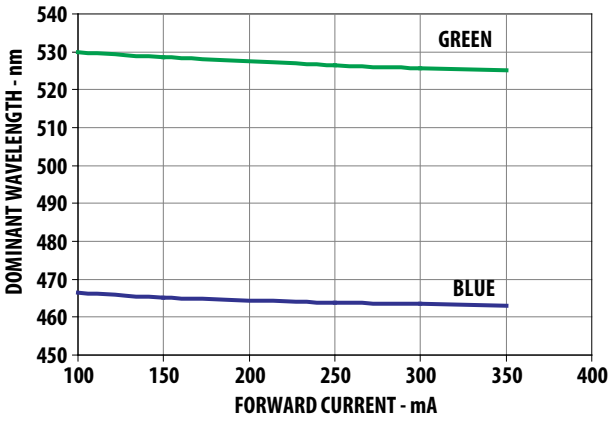


Figure 12. Dominant wavelength vs. forward current – InGaN devices

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

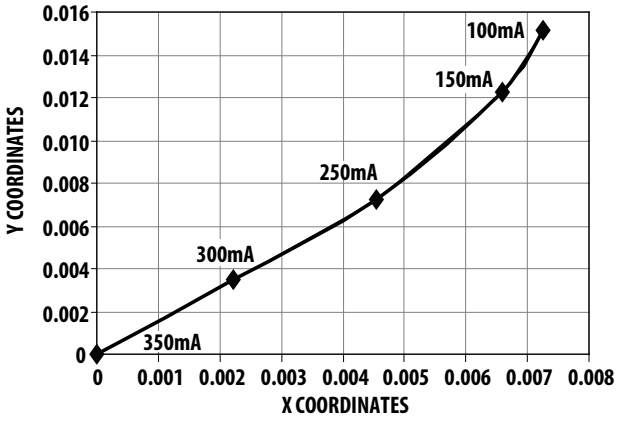


Figure 13. Chromaticity Shift vs. Current

*Note: (x,y) values @ 350mA reference to (0.0)

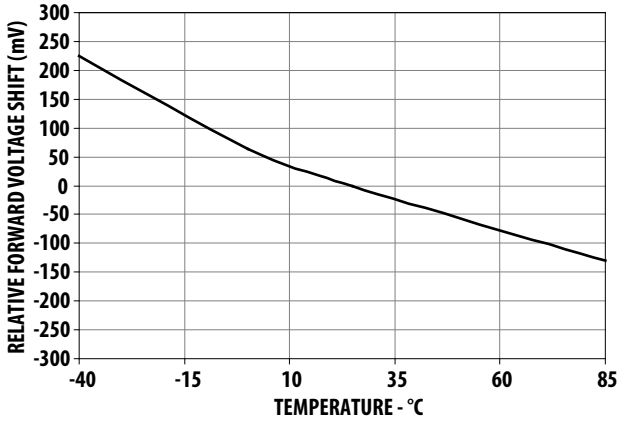


Figure 14. Temperature vs. relative forward voltage shift

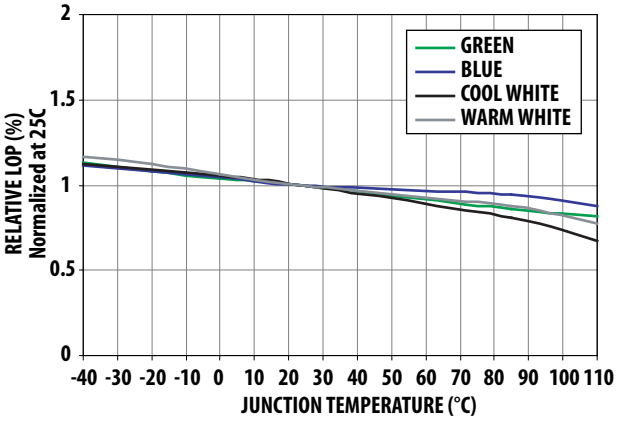


Figure 15. Relative LOP vs. junction temperature for InGaN

Flux Bin Limit[1] (For reference only) [x_1 x_2]

	Flux (lm) at 350mA	
Bin	**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 ±10 %

Note:
Flux Bin Limit is only applicable for ASMT-Mx00 component level device 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

Color Bin Selections [x_3]

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

Warm White

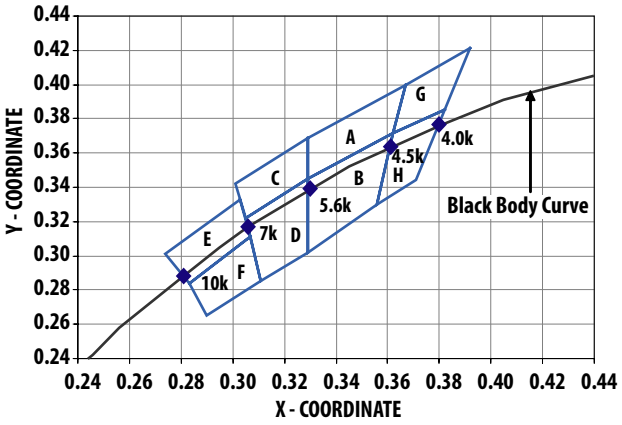
0	Full Distribution
A	A only
B	B only
C	C only
D	D only
E	E only
F	F only
Z	A and B only
Y	B and C only
W	C and D only
V	D and E only
U	E and F only
Q	A, B and C only
P	B, C and D only
N	C, D and E only
M	D, E and F only
J	Special Color Bin
1	A, B, C and D only
2	E, F, G and H only
3	B, C, D and E only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

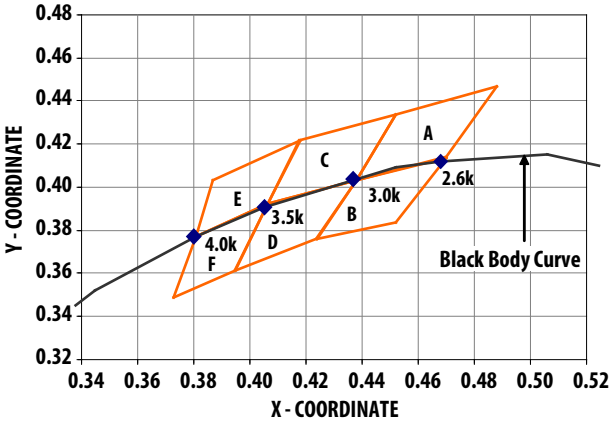
Cool White		Color Limits [1] Chromaticity Coordinates			
Bin A	X	0.367	0.362	0.329	0.329
	Y	0.400	0.372	0.345	0.369
Bin B	X	0.362	0.356	0.329	0.329
	Y	0.372	0.330	0.302	0.345
Bin C	X	0.329	0.329	0.305	0.301
	Y	0.369	0.345	0.322	0.342
Bin D	X	0.329	0.329	0.311	0.305
	Y	0.345	0.302	0.285	0.322
Bin E	X	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

Tolerances ± 0.01

Warm White		Color Limits [1] (Chromaticity Coordinates)			
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 ± 0.01





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

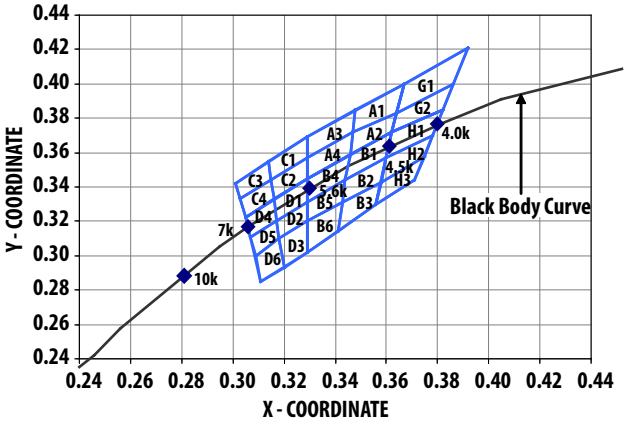
Sub-Color Binning

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

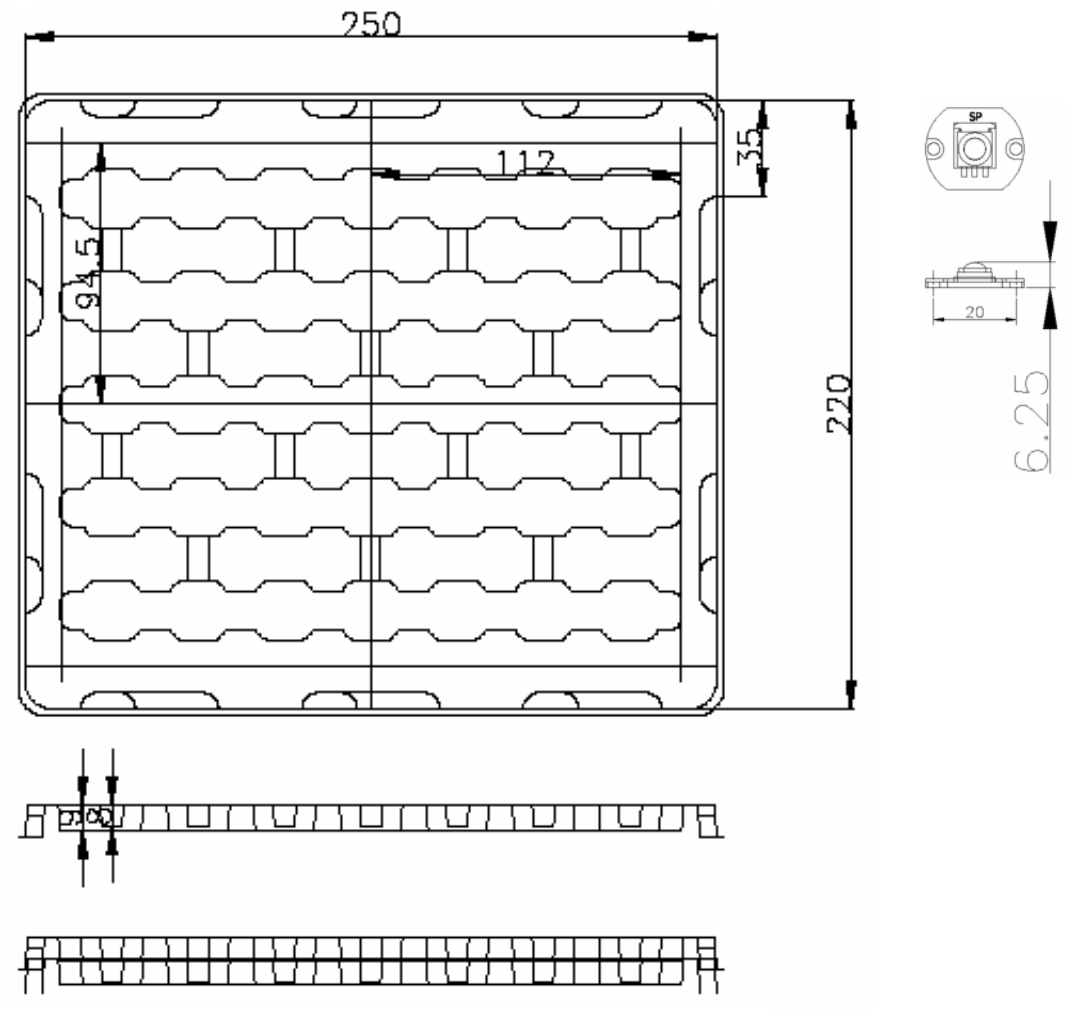
Cool White		Color Limits (Chromaticity Coordinates)			
Bin A1	X	0.364	0.367	0.348	0.347
	Y	0.383	0.400	0.385	0.372
Bin A2	X	0.364	0.362	0.346	0.347
	Y	0.383	0.372	0.359	0.372
Bin A3	X	0.329	0.329	0.348	0.347
	Y	0.357	0.369	0.385	0.372
Bin A4	X	0.329	0.329	0.347	0.346
	Y	0.345	0.357	0.372	0.359
Bin B1	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

Cool White		Color Limits (Chromaticity Coordinates)			
Bin D1	X	0.329	0.329	0.317	0.316
	Y	0.345	0.331	0.320	0.333
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	0.343	0.357
Bin H3	X	0.375	0.371	0.356	0.358
	Y	0.358	0.344	0.330	0.343

Tolerances ±0.01



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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