

ASMT-Mx6x & ASMT-MxHx Moonstone™ ½W Power LED Light Source



Data Sheet



Description

½W 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. Option with electrically isolated metal slug is also available

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

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

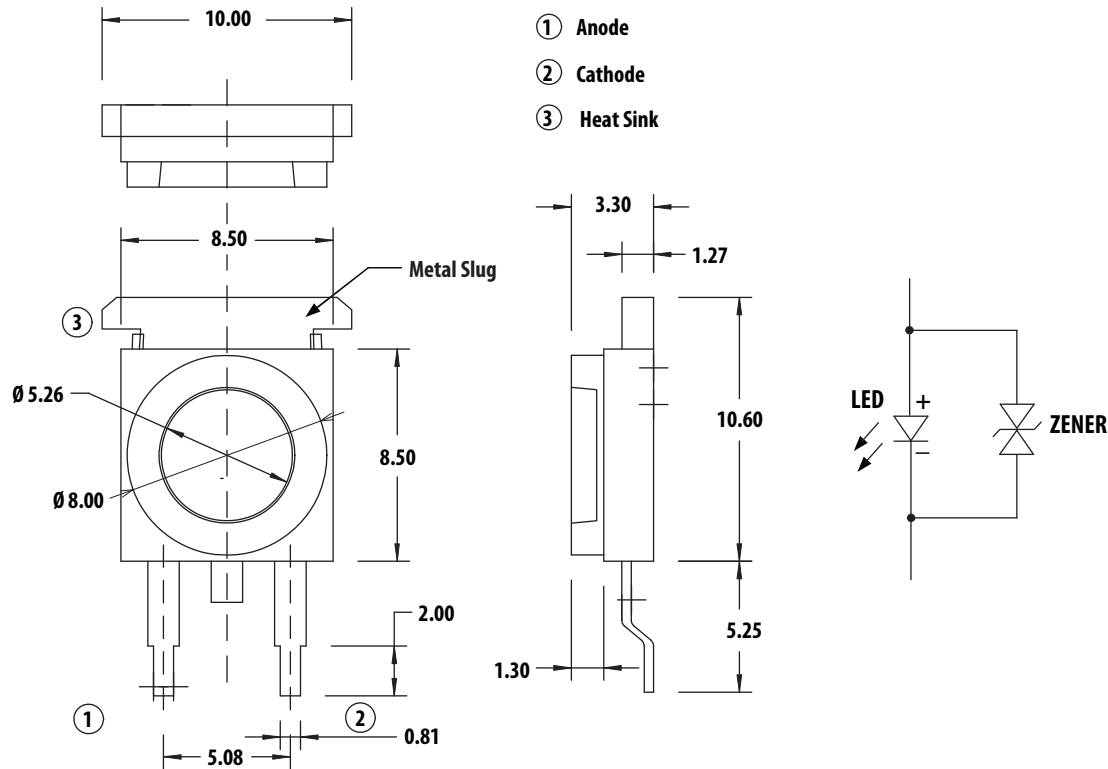
Features

- Available in Cool White and Warm White color
- Available in diffuse and non-diffuse version
- Available in both electrical isolated and non-isolated metal slug
- Energy efficient
- Exposed pad for excellent heat transfer
- Suitable for reflow soldering process
- High current operation
- Long operation life
- Wide viewing angle
- Silicone encapsulation
- ESD HBM Class 3B, > 8000
- MSL 4 products
- High junction temperature of 145°C

Specifications

- InGaN Technology
- 3.5V, 150mA (typical)
- 110 viewing angle

Package Dimensions



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.

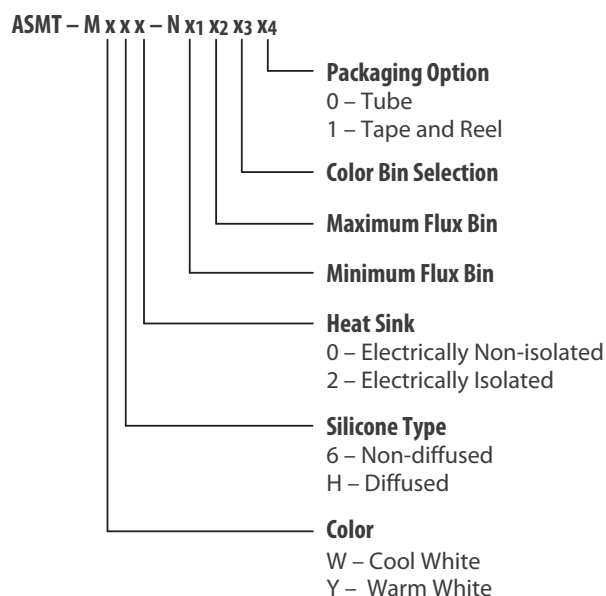
Device Selection Guide ($T_j = 25^\circ\text{C}$)

Part Number	Color	Luminous Flux, Φ_V [1,2] (lm)			Test Current (mA)	Dice Technology	Electrically Isolated Metal Slug
		Min.	Typ.	Max.			
ASMT-MW60	Cool White	19.5	30.0	43.0	150	InGaN	No
ASMT-MW62							Yes
ASMT-MY60	Warm White	15.0	25.0	33.0	150	InGaN	No
ASMT-MY62							Yes
ASMT-MWH0	Cool White Diffused	15.0	25.0	43.0	150	InGaN	No
ASMT-MWH2							Yes
ASMT-MYH0	Warm White Diffused	11.5	20.0	33.0	150	InGaN	No
ASMT-MYH2							Yes

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 at $T_A = 25^\circ\text{C}$

Parameter	ASMT-Mx6x / ASMT-MxHx	Units
DC Forward Current ^[1]	150	mA
Peak Pulsing Current ^[2]	300	mA
Power Dissipation	525	mW
LED Junction Temperature	145	$^\circ\text{C}$
Operating Ambient Temperature Range	-40 to +120	$^\circ\text{C}$
Storage Temperature Range	-40 to +120	$^\circ\text{C}$

Notes:

- DC forward current – derate linearly based on Figure 5.
- Pulse condition duty factor = 10%, Frequency = 1kHz

Optical Characteristics ($T_A = 25^\circ\text{C}$)

Part Number	Color	Correlated Color Temperature, CCT (Kelvin)		Viewing Angle $2\theta_{1/2}$ ^[1] (Degrees)	Luminous Efficiency (lm/W)
		Min	Max	Typ	Typ
ASMT-MW6x	Cool White	4000	10000	110	57
ASMT-MY6x	Warm White	2600	4000	110	48
ASMT-MWHx	Cool White Diffused	4000	10000	120	48
ASMT-MYHx	Warm White Diffused	2600	4000	120	38

Notes:

- $\theta_{1/2}$ is the off-axis angle where the luminous intensity is $1/2$ the peak intensity.

Electrical Characteristic ($T_A = 25^\circ\text{C}$)

Dice Type	Forward Voltage V_F (Volts) @ $I_F = 150\text{mA}$		Reverse Voltage V_R (Volts)	Thermal Resistance $R_{\theta j-ms}$ ($^\circ\text{C}/\text{W}$) ^[1]
	Typ.	Max.	Max.	Typ.
InGaN	3.5	4.0	5	27

Note:

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

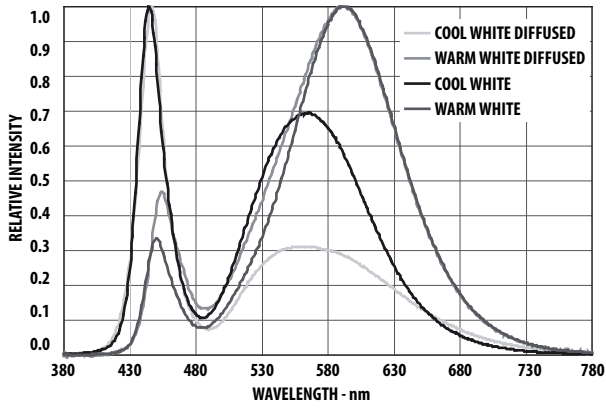


Figure 1. Relative Intensity vs. Wavelength

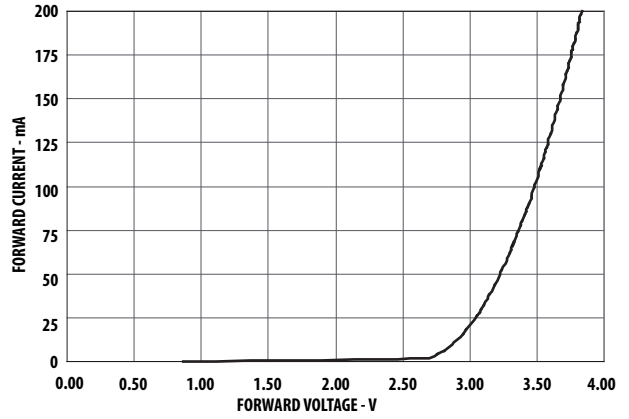


Figure 2. Forward Current vs Forward Voltage

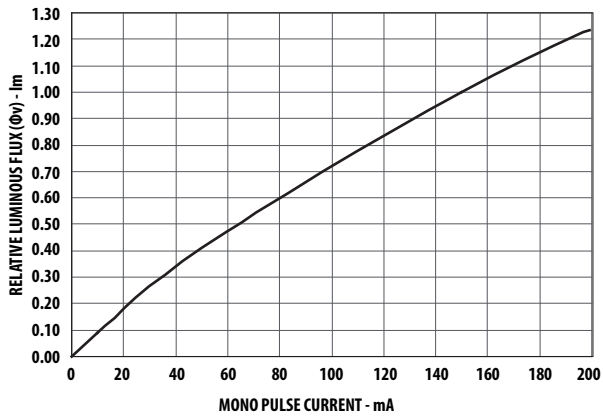


Figure 3. Relative Luminous Flux vs. Mono Pulse Current

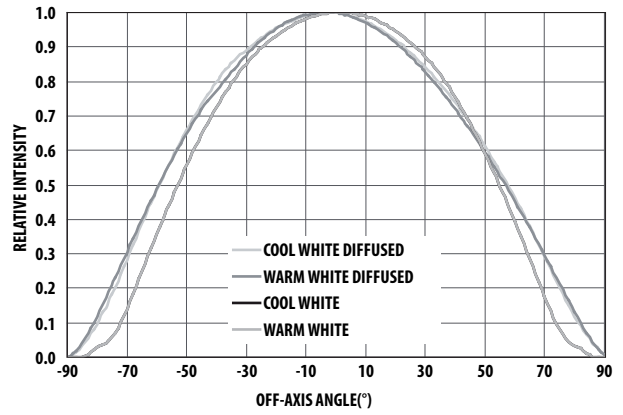


Figure 4. Radiation Pattern

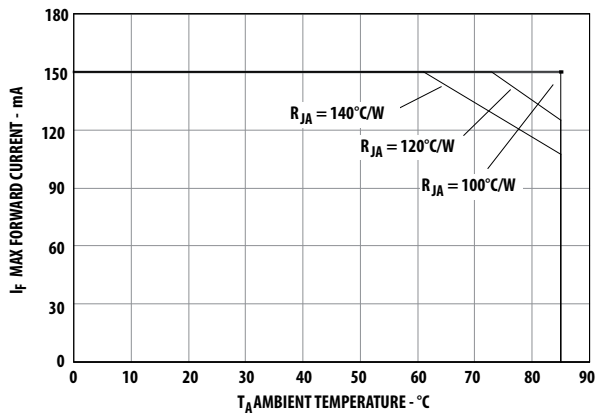


Figure 5. Maximum forward current vs. ambient temperature. Derated based on $T_{jMAX} = 145^{\circ}\text{C}$, $R_{\theta JA} = 100^{\circ}\text{C/W}$, 120°C/W and 140°C/W

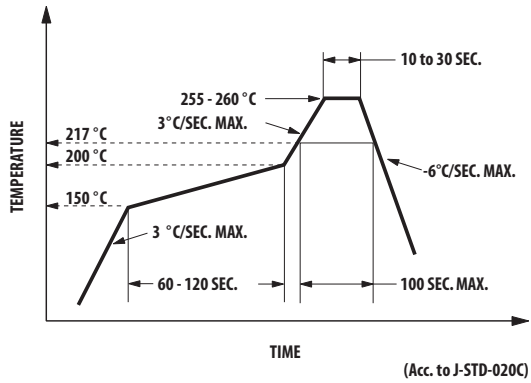


Figure 6. Recommended Reflow Soldering

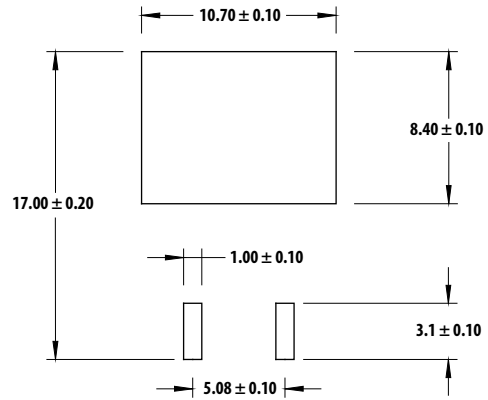


Figure 7. Recommended soldering land pattern

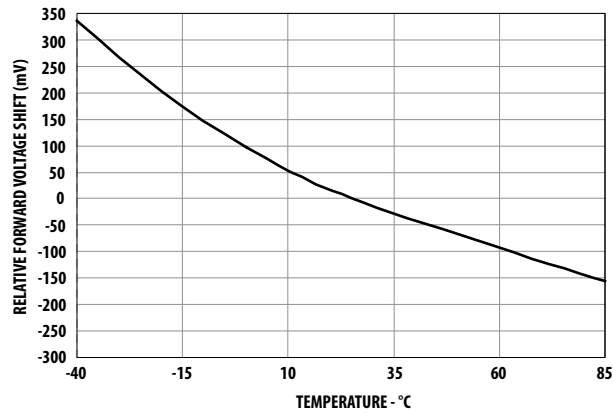


Figure 8. Temperature vs. relative forward voltage shift

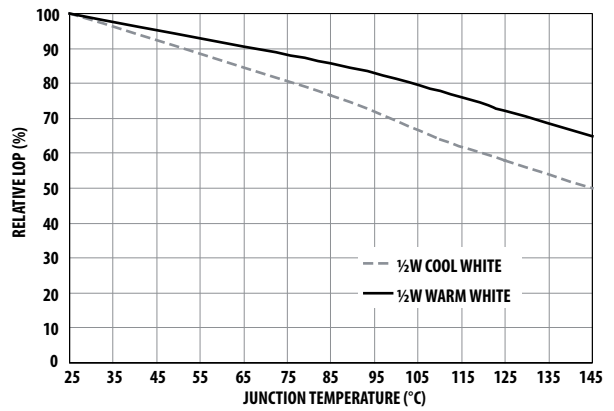


Figure 9. Relative LOP vs Junction Temperature for InGaN Devices

Flux Bin Limit^[1] (For reference only) [X₁ X₂]

Bin	Flux (lm) at 150mA	
	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

Tolerance for each bin limits is ±10 %

Color bin selection [x3]

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

Primary Color Binning

Cool White	Color Limits (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	0.302
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 (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

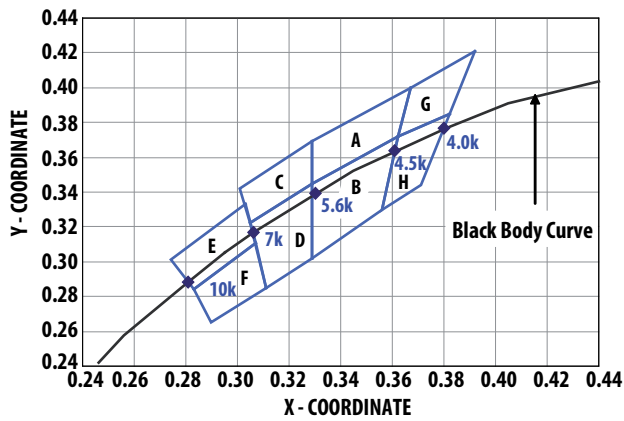


Figure 10. Color bins (Cool White)

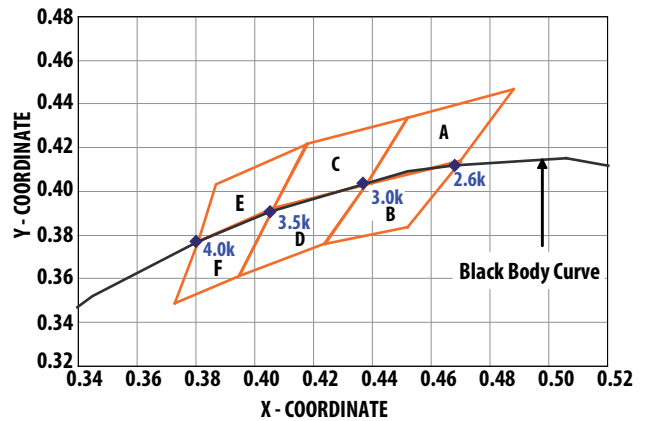


Figure 11. Color bins (Warm White)

Sub-Color Binning

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

Color Limits

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

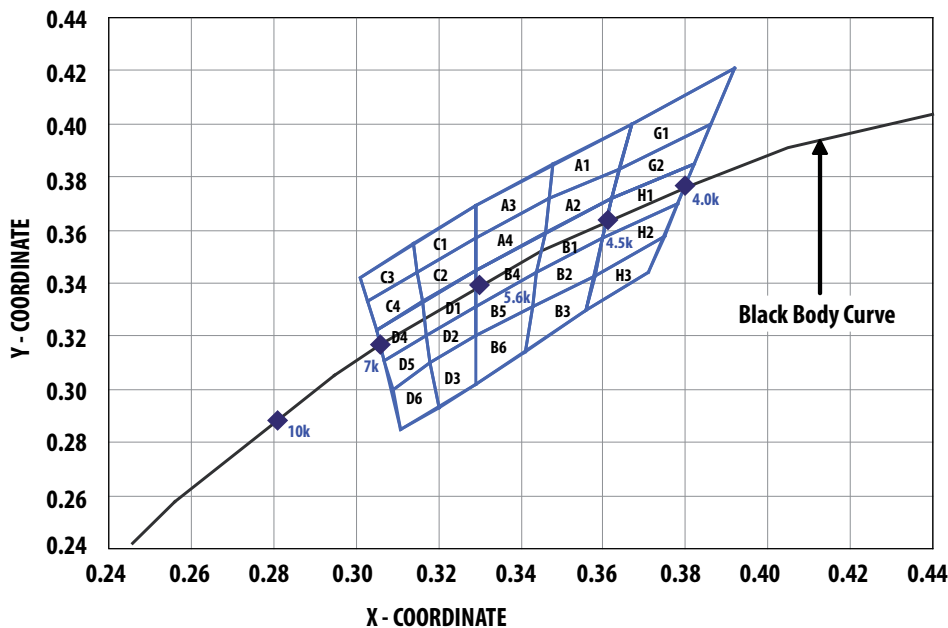


Figure 12. Sub-color bins (Cool White)

Package Tube – Option 0

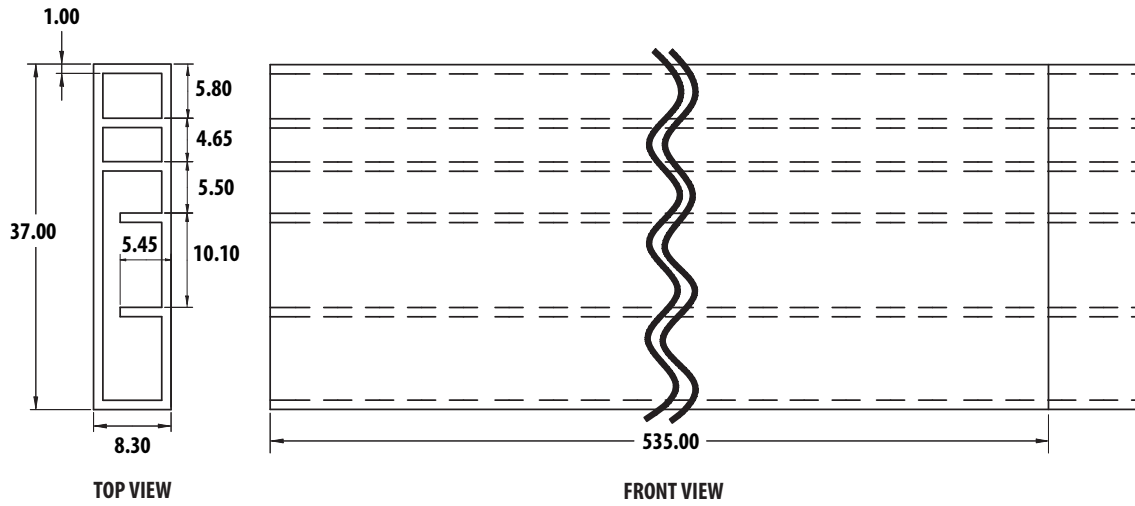


Figure 13. Tube dimensions

Tape & Reel – Option 1

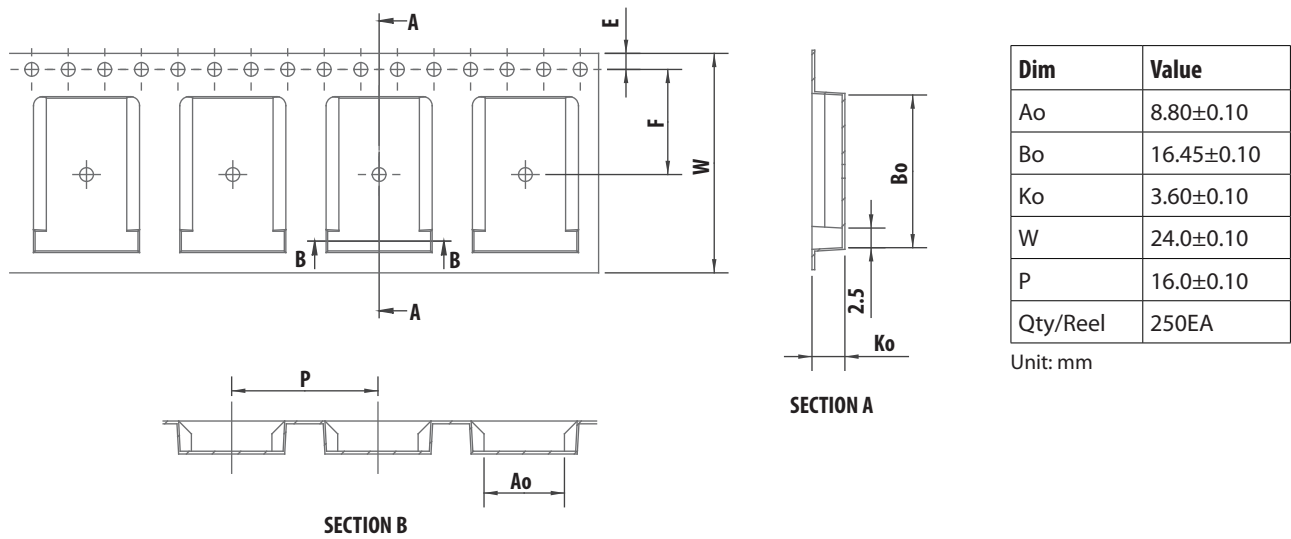
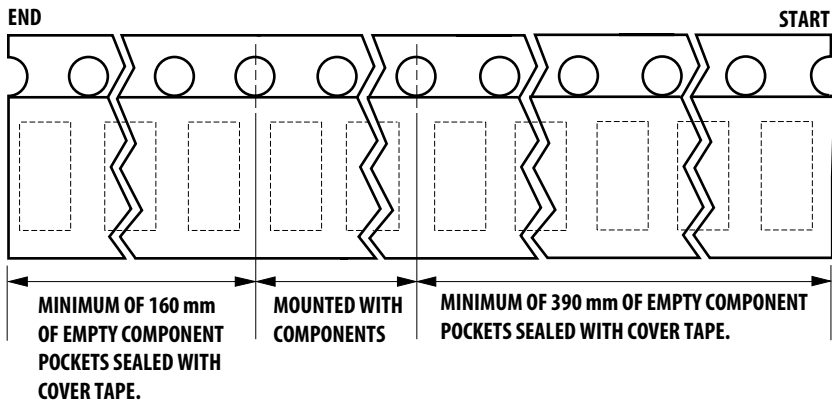


Figure 14. Carrier tape dimensions



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

Figure 15. Carrier tape leader and trailer dimensions

Reel Dimension

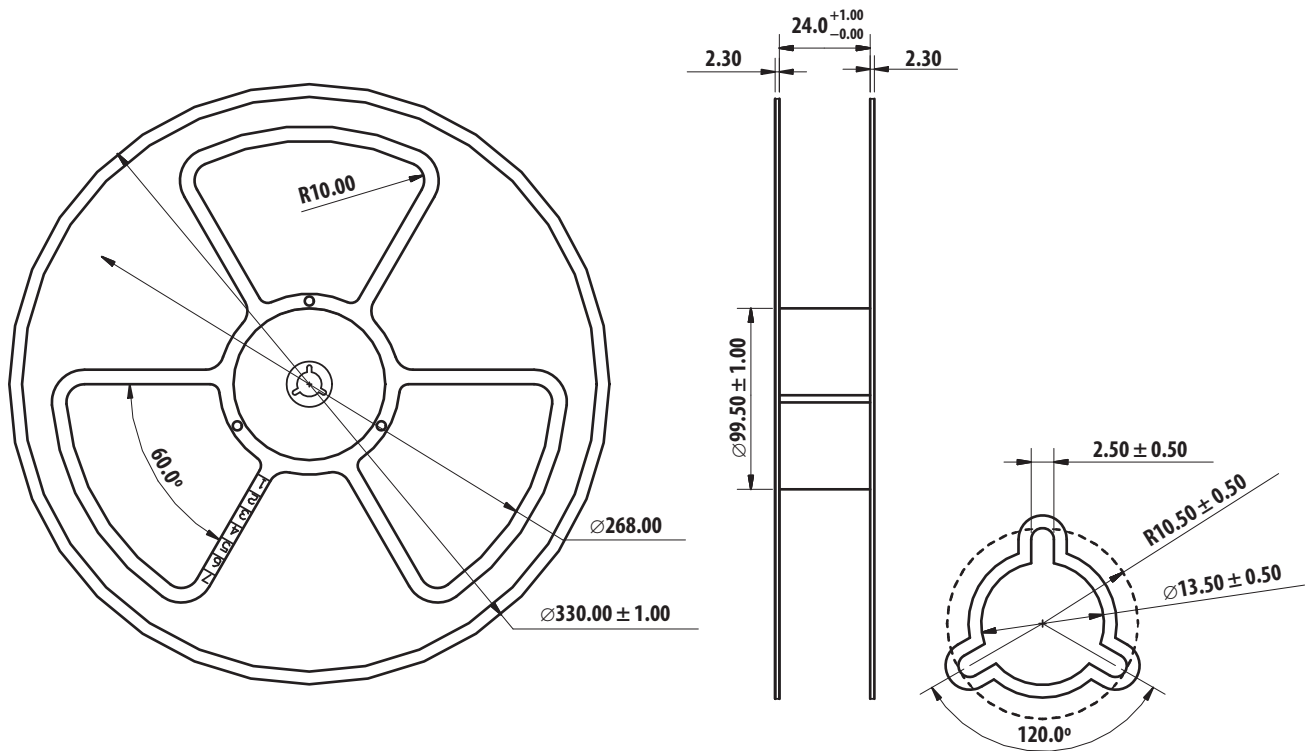


Figure 16. Reel dimensions

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 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 $40^{\circ}\text{C}/90\%\text{RH}$ 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 $30^{\circ}\text{C}/60\%\text{RH}$ 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 $5\%\text{RH}$.

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 $5\%\text{RH}$ 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 $30^{\circ}\text{C}/60\%\text{RH}$ at any time.
- The LEDs floor life exceeded 72hrs.

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

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