BROADCOM®

Data Sheet

ASMT-Mx6x

Moonstone® ½W Power LED Light Source

Overview

The Broadcom® ½W power LED light source is a high-performance energy-efficient device that 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 temperatures ranging from 4000K to 10,000K 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

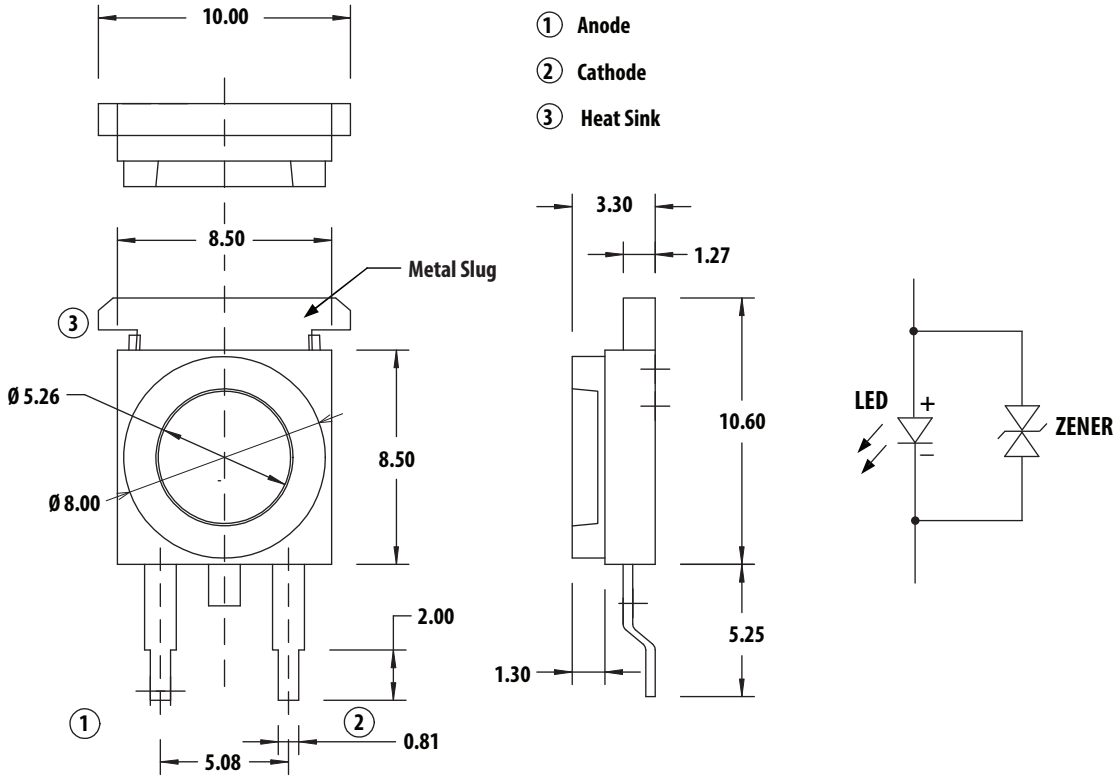
Features

- Available in cool white and warm white color
- 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
- 3.3V, 150 mA (typical)
- 110° viewing angle

Figure 1: Package Dimensions



NOTE:

1. All dimensions are in millimeters (mm).
2. Unless otherwise stated, the tolerance for dimension is ±0.1 mm.

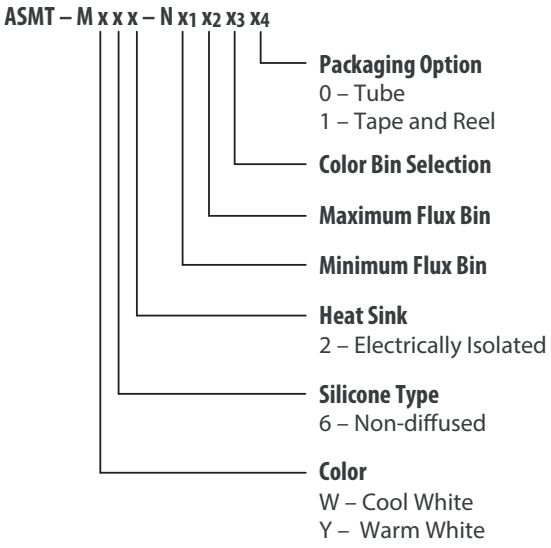
Device Selection Guide (T_J = 25°C)

Part Number	Color	Luminous Flux, ϕ_V[a,b] (lm)			Test Current (mA)	Dice Technology	Electrically Isolated Metal Slug
		Min.	Typ.	Max.			
ASMT-MW62-NGJ00	Cool White	25.5	41.0	56.0	150	InGaN	Yes
ASMT-MW62-NHK00		33.0	49.0	73.0	150	InGaN	Yes
ASMT-MY62-NGJ00	Warm White	25.5	38.0	56.0	150	InGaN	Yes

a. ϕ_V is the total luminous flux output as measured with an integrating sphere at 25-ms mono pulse condition.

b. Flux tolerance is ±10%.

Part Numbering System



Absolute Maximum Ratings (T_A = 25°C)

Parameter	ASMT-Mx6x	Units
DC Forward Current[a]	150	mA
Peak Pulsing Current[b]	300	mA
Power Dissipation	555	mW
LED Junction Temperature	145	°C
Operating Ambient Temperature Range	–40 to +120	°C
Storage Temperature Range	–40 to +120	°C

a. DC forward current – derate linearly based on Figure 8.

b. Pulse condition duty factor = 10%, frequency = 1 kHz.

Optical Characteristics (T_A = 25°C)

Part Number	Color	Correlated Color Temperature, CCT (Kelvin)		Viewing Angle $2\theta_{½}$[a] (Degrees)	Luminous Efficiency (lm/W)
		Min.	Max.	Typ.	Typ.
ASMT-MW62-NGJ00	Cool White	4000	10000	110	83
ASMT-MW62-NHK00		4000	10000	110	99
ASMT-MY62-NGJ00	Warm White	2600	4000	110	77

a. $\theta_{½}$ is the off-axis angle where the luminous intensity is ½ the peak intensity.

Electrical Characteristics (T_A = 25°C)

Dice Type	Forward Voltage V_F (Volts) @ I_F = 150 mA		Reverse Voltage V_R (Volts)	Thermal Resistance $R_{\theta j\text{-}ms}$ (°C/W)[a]
	Typ.	Max.	Max.	Typ.
InGaN	3.3	3.7	5	27

a. $R_{\theta j\text{-}ms}$ is the thermal resistance from the LED junction to the metal slug.

Figure 2: Relative Intensity vs. Wavelength

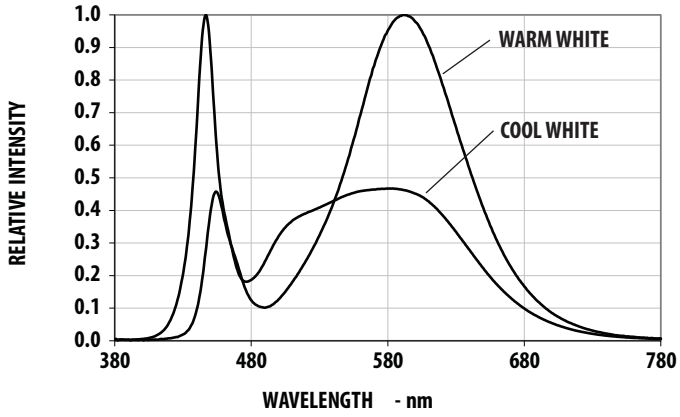


Figure 3: Forward Current vs. Forward Voltage

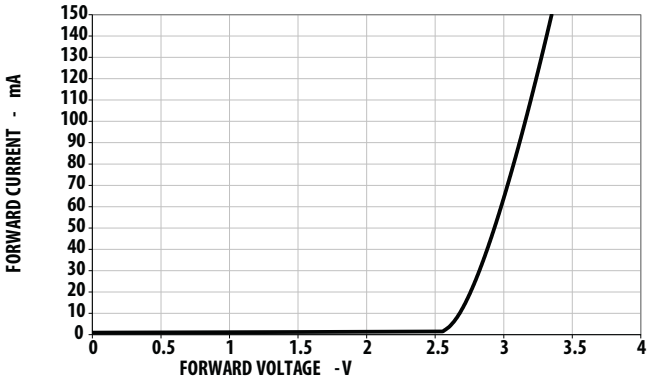


Figure 4: Relative Luminous Flux vs. Mono Pulse Current

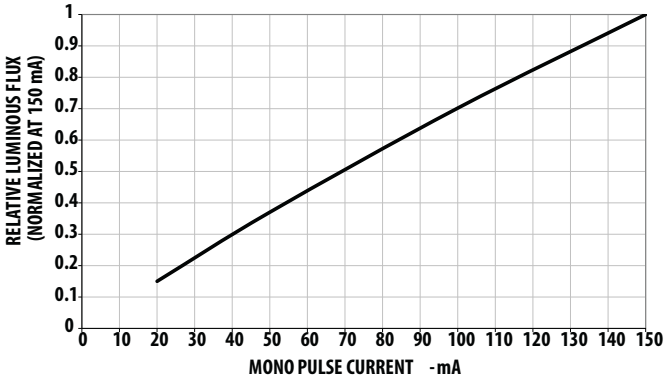


Figure 5: Radiation Pattern

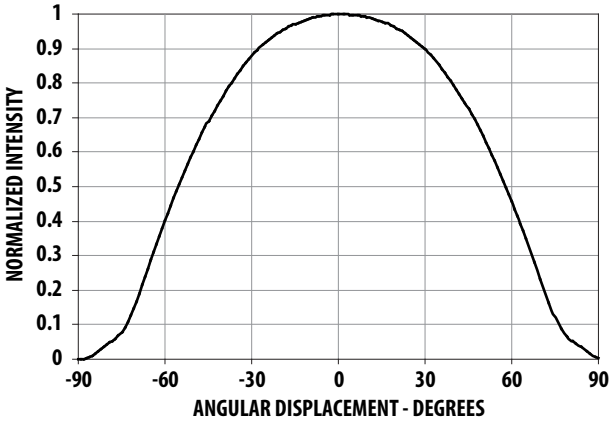


Figure 6: Relative Light Output vs. Junction Temperature

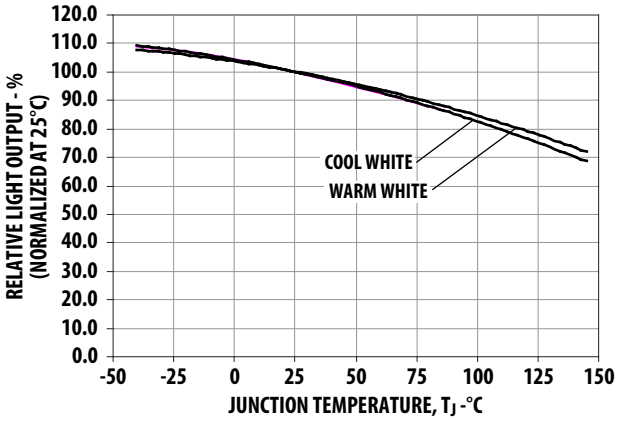


Figure 7: Forward Voltage Shift vs. Junction Temperature

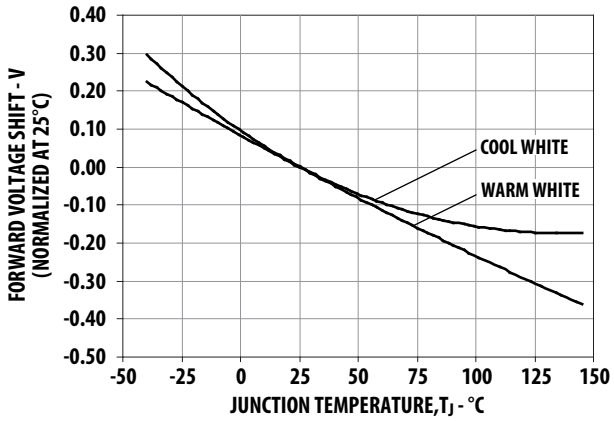


Figure 8: Maximum Forward Current vs. Ambient Temperature. Derated based on T_{JMAX} = 145°C, $R_{\theta JA}$ = 100°C/W, 120°C/W, and 140°C/W.

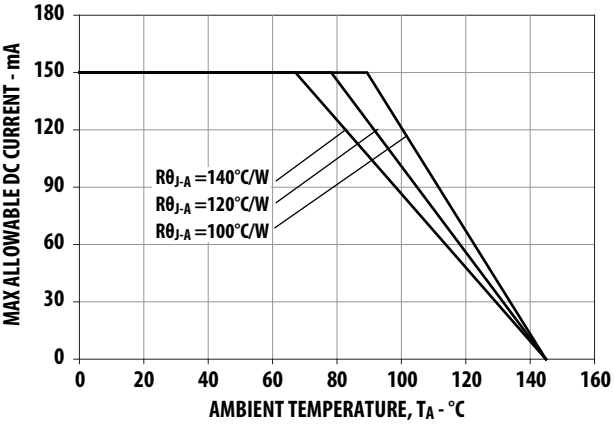


Figure 9: Maximum Forward Current vs. Metal Slug Temperature. Derated based on T_{JMAX} = 145°C, $R_{\theta J\text{-}MS}$ = 27°C/W.

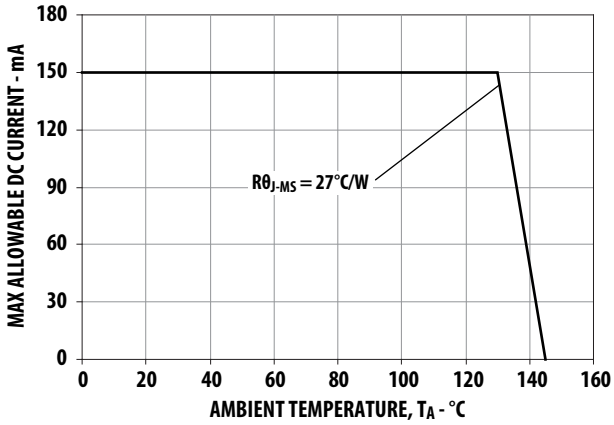


Figure 10: Recommended Reflow Soldering

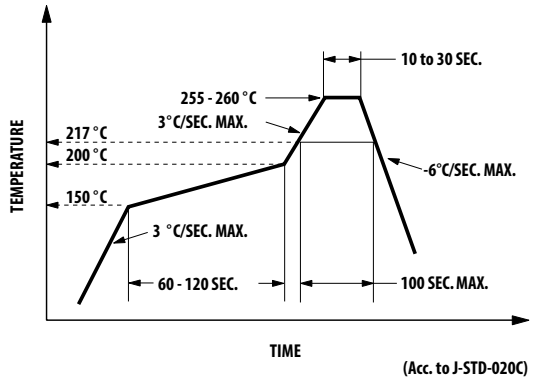
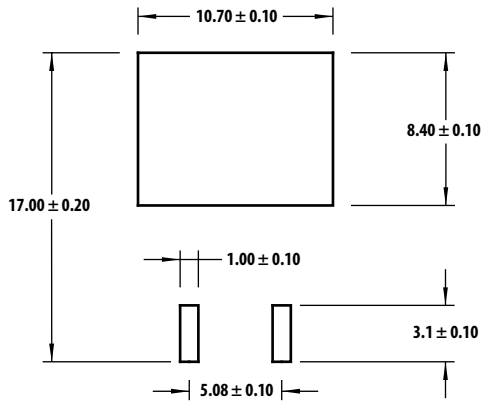


Figure 11: Recommended Soldering Pattern



Flux Bin Limit (for Reference Only) [x_1x_2]

Bin	Flux (lm) at 150mA	
	Min	Max
G	25.5	33
H	33	43
J	43	56
K	56	73
L	73	95

NOTE: Tolerance for each bin limits is ±10%.

Color Bin Selection [x_3]

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 12: Color Bins (Cool White)

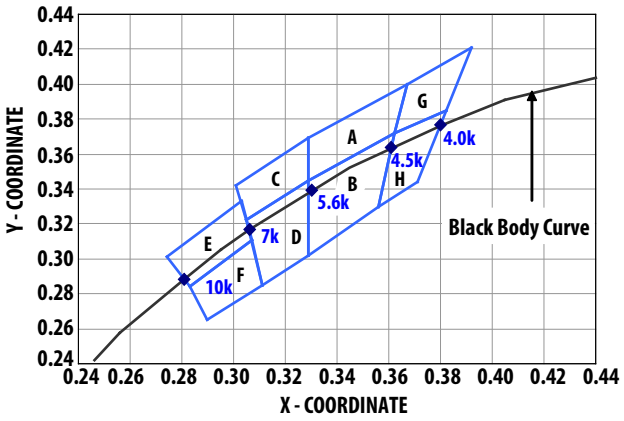
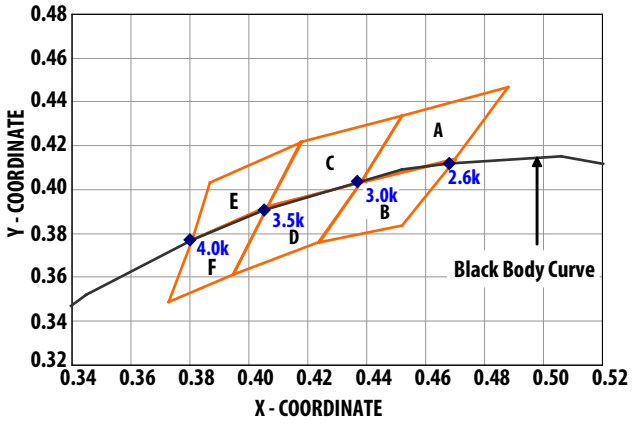


Figure 13: Color Bins (Warm White)



Sub-Color Binning

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

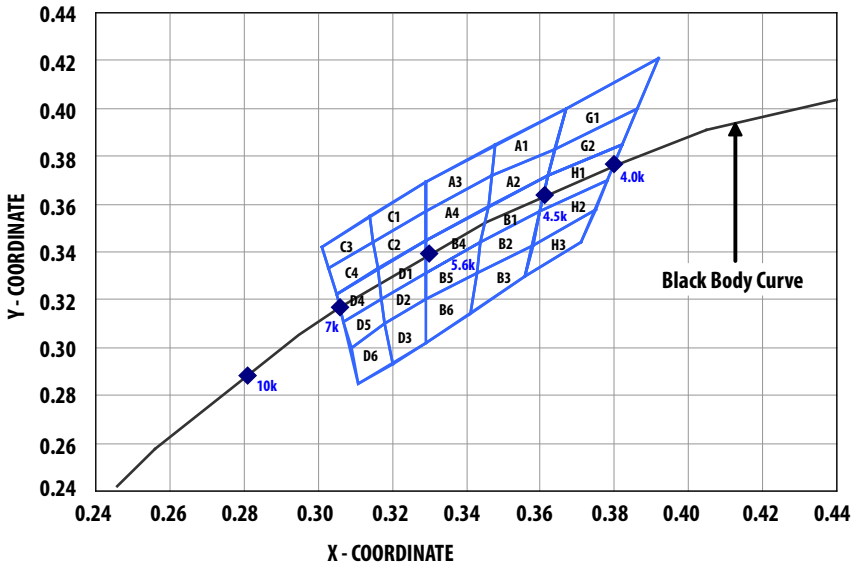
Color Limits

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

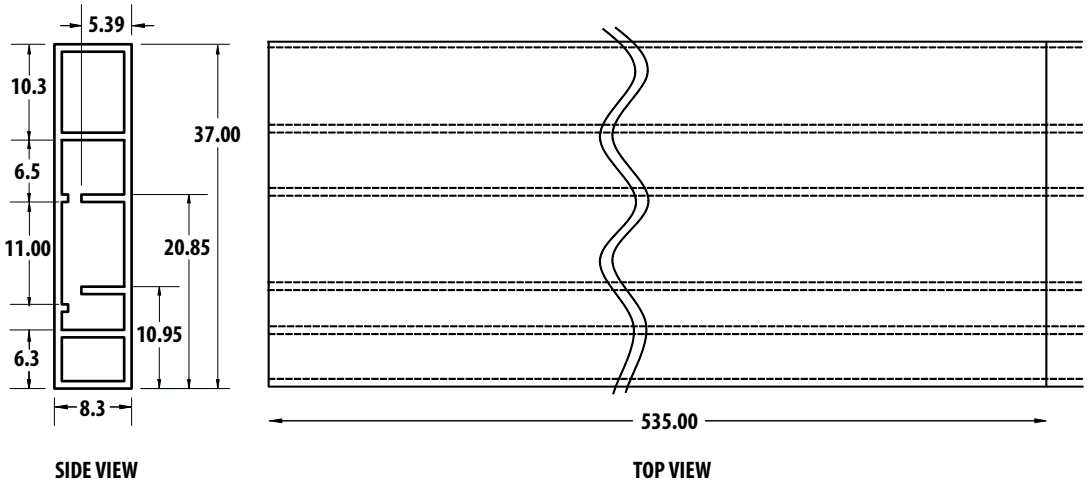
Tolerances = ±0.01

Figure 14: Sub-Color Bins (Cool White)



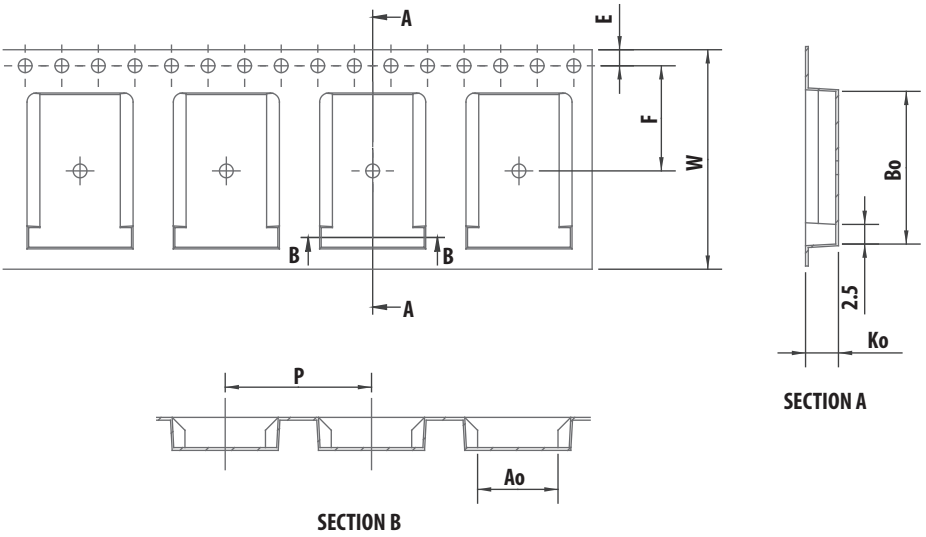
Package Tube – Option 0

Figure 15: Tube Dimensions



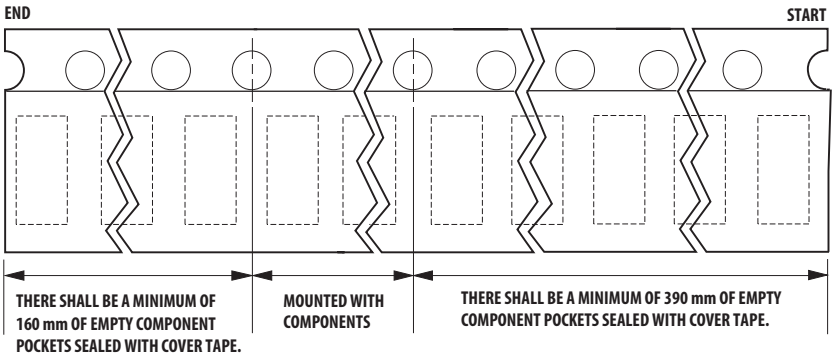
Tape and Reel – Option 1

Figure 16: Carrier Tape Dimensions



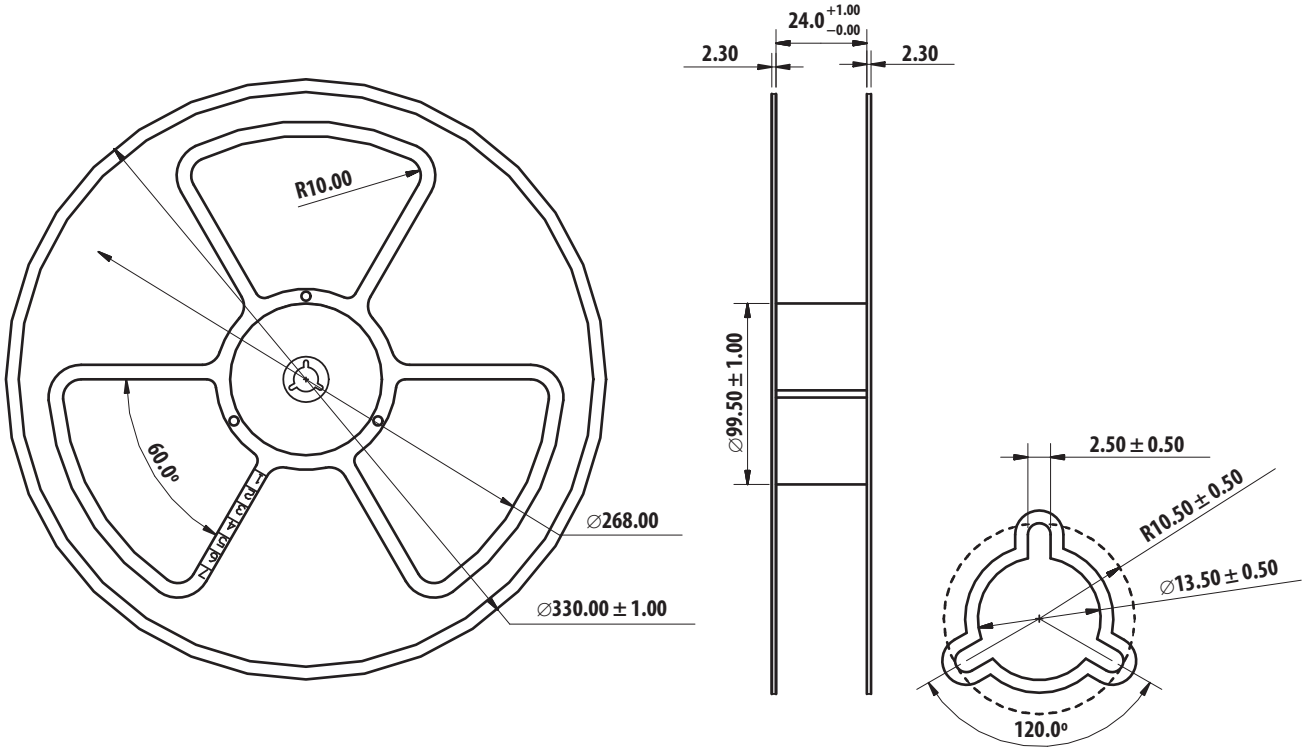
Dim	Value (in mm)
Ao	8.80 ± 0.10
Bo	16.45 ± 0.10
Ko	3.60 ± 0.10
W	24.0 ± 0.10
P	16.0 ± 0.10
Qty/Reel	500 each

Figure 17: Carrier Tape Leader and Trailer Dimensions



Reel Dimension

Figure 18: Reel Dimensions



Handling Precautions

The encapsulation material of the product is made of silicone for better reliability of the product. As silicone is a soft material, do not press on the silicone or poke a sharp object onto the silicone. These actions might damage the product and cause premature failure. During assembly or handling, hold the unit only on the body. Refer to Broadcom Application Note AN 5288 for detailed information.

Moisture Sensitivity

This product is qualified as Moisture Sensitive Level 4 per JEDEC J-STD-020. Take precautions when handling this moisture-sensitive product to ensure the reliability of the product. Refer to Broadcom Application Note AN 5305 *Handling of Moisture Sensitive Surface Mount Devices* for details.

- Storage before use
  - An unopened 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, it is safe to reflow the LEDs per the original MSL rating.
  - Do not open the MBB prior to assembly (for example, for IQC).
- Control after opening the MBB
  - Read the HIC immediately upon opening the MBB.
  - The LEDs must be kept at <30°C/60% RH at all times and all high temperature-related processes, including soldering, curing, or rework, must be completed within 72 hours.
- Control for unfinished reel

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

- 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 a sealed MBB with desiccant or desiccator at <5% RH to ensure that no LEDs have exceeded their floor life of 72 hours.
- Baking is required if
  - The HIC 10% indicator is not blue and the 5% indicator is pink.
  - The LEDs are exposed to conditions of >30°C/60% RH at any time.
  - The LEDs' floor life exceeded 72 hours.

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

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