ASMT-Mxx3 / ASMT-Mxx4

Moonstone™ 1W Power LED Light Source

Data Sheet

Lead (Pb) Free
RoHS 6 fully
compliant

Description

The 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.

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, billboard illumination or backlight
- Exit sign or emergency sign lightings
- Commercial lightings
- Accent and marker lightings
- Pathway lighting
- Task lighting
- Reading lights
- Decorative lighting
- Garden lighting
- Architectural lighting
- Portable (flash light, bicycle head light

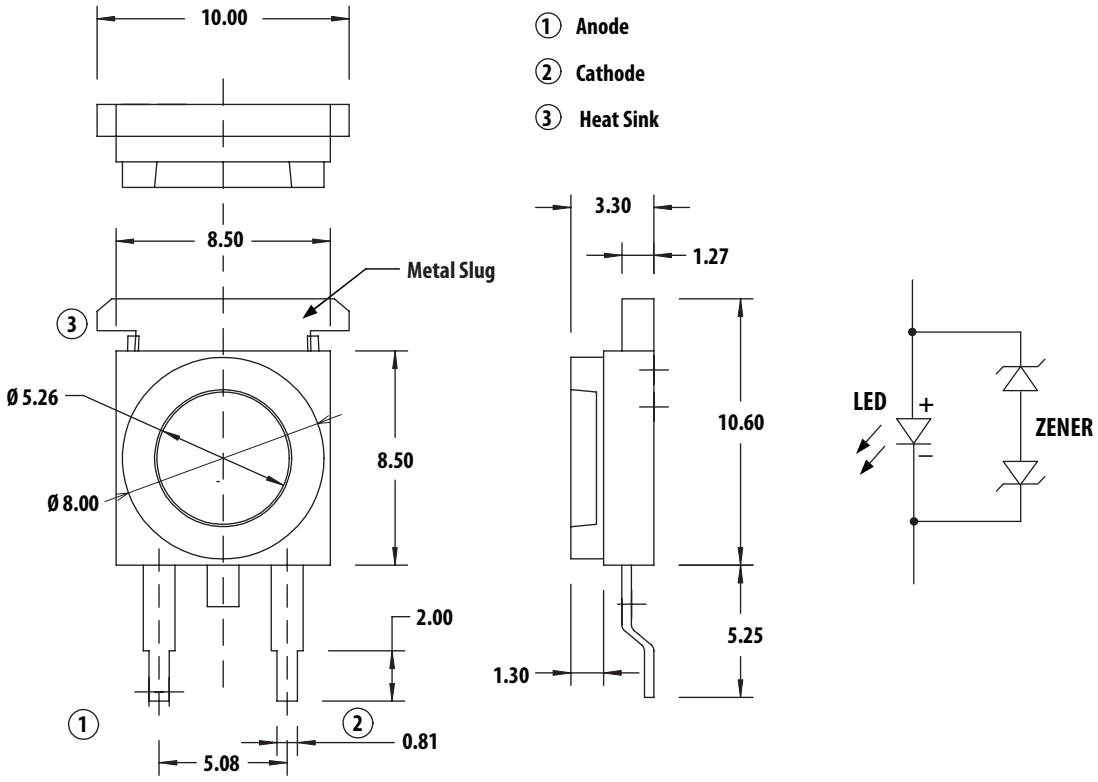
Features

- 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 2a products
- Available in both electrically isolated and non-isolated metal heat slug

Specifications

- InGaN Technology
- 4.0 V (max) at 350 mA
- 110° viewing angle

Package Dimensions



Notes:
1. All dimensions are in millimeters.
2. Tolerance is ±0.1 mm unless otherwise specified.
3. Metal slug is connected to anode for electrically non-isolated option.

Device Selection Guide ($T_J = 25°C$)

Color	Part Number	Luminous Flux, Φ_V[1,2] (lm) Min.	Typ.	Max.	Test Current (mA)	Dice Technology	Electrically Isolated Metal Slug
Cool White	ASMT-MW03	43	55	73	350	InGaN	No
	ASMT-MW04						Yes
Warm White	ASMT-MY03	43	50	73	350	InGaN	No
	ASMT-MY04						Yes
Cool White Diffused	ASMT-MWB3	33	50	73	350	InGaN	No
	ASMT-MWB4						Yes
Warm White Diffused	ASMT-MYB3	33	45	73	350	InGaN	No
	ASMT-MYB4						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 ±10%.

Part Numbering System

ASMT-M x x x – N x_1 x_2 x_3 x_4

Packaging Option

Color Bin Selection

Max Flux Bin Selection

Min Flux Bin Selection

Heat Sink
3 – Electrically Non-isolated
4 – Electrically Isolated

Silicone Type
0 – Non-diffused
B – Diffused

Color
W – Cool White
Y – Warm White

Note:
1. Please refer to Page 7 for selection details.

Absolute Maximum Ratings

Parameter	ASMT-Mxx3 / ASMT-Mxx4	Units
DC Forward Current [1]	350	mA
Peak Pulsing Current [2]	500	mA
Power Dissipation	1400	mW
Reverse Voltage	5	V
LED Junction Temperature	125	°C
LED Junction Temperature for short term application	145	°C
Operating Metal Slug Temperature Range at 350 mA	-40 to +110	°C
Storage Temperature Range	-40 to +120	°C
Soldering Temperature	Refer to Figure 8	

Note:
1. Derate linearly based on Figure 6.
2. Pulse condition: duty factor = 10%, Frequency = 1 kHz.

Optical Characteristics at 350 mA ($T_J = 25°C$)

		Correlated Color Temperature, CCT (Kelvin)		Viewing Angle, $2\theta_{½}$ [2] (°)	Luminous Efficiency (lm/W)
Part Number	**Color**	**Min.**	**Max.**	**Typ.**	**Typ.**
ASMT-MW03	Cool White	4000	10000	110	45
ASMT-MW04					
ASMT-MY03	Warm White	2600	4000	110	41
ASMT-MY04					
ASMT-MWB3	Cool White Diffused	4000	10000	110	41
ASMT-MWB4					
ASMT-MYB3	Warm White Diffused	2600	4000	110	37
ASMT-MYB4					

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

Electrical Characteristic at 350 mA ($T_J = 25°C$)

	Forward Voltage, V_F (Volts) at $I_F = 350$ mA			Thermal Resistance, $R\theta_{j\text{-}ms}$ (°C/W)[1]
Dice Type	**Min.**	**Typ.**	**Max.**	**Typ.**
InGaN	2.8	3.5	4.0	10

Note:
1. $R\theta_{j\text{-}ms}$ is the Thermal Resistance from LED junction to metal slug.

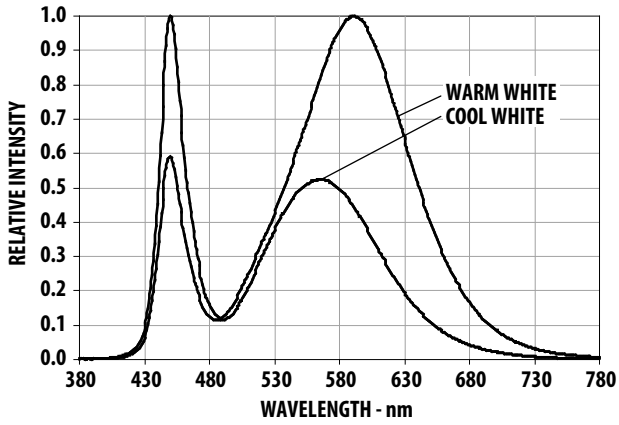


Figure 1. Relative Intensity vs. Wavelength.

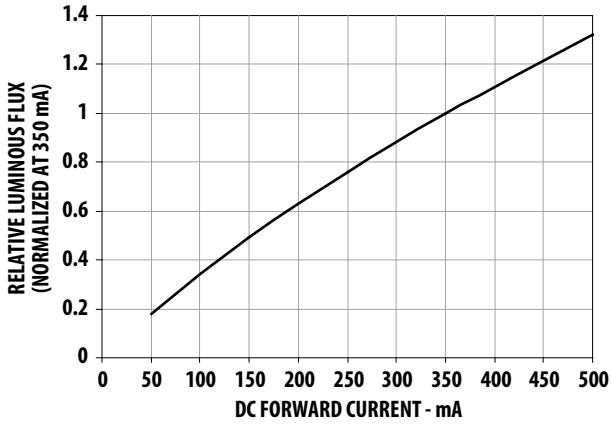


Figure 2. Relative Luminous Flux vs. Mono Pulse Current.

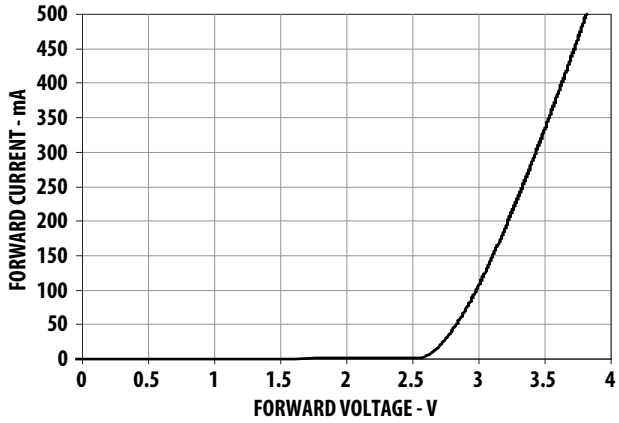


Figure 3. Forward Current vs. Forward Voltage.

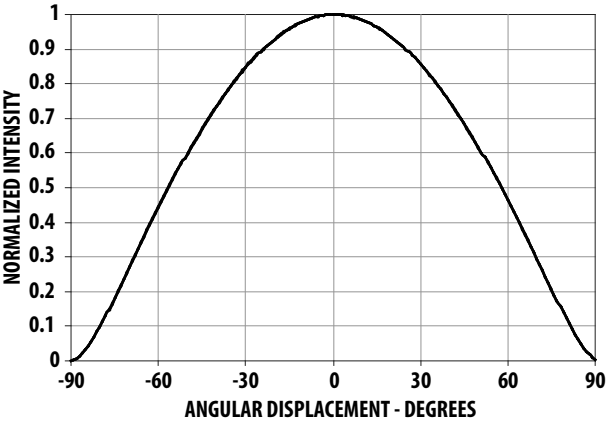


Figure 4. Radiation Pattern.

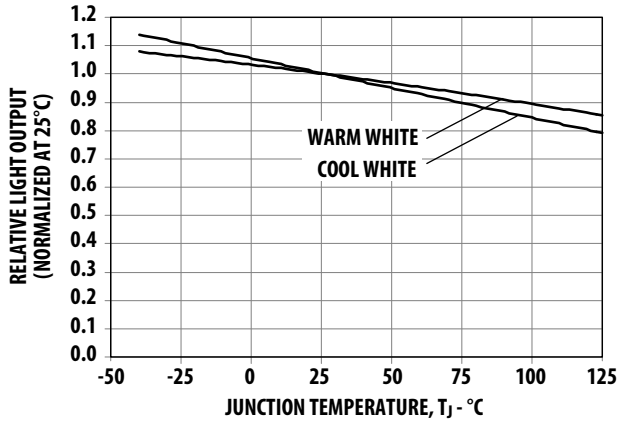


Figure 5. Relative Light Output vs. Junction Temperature.

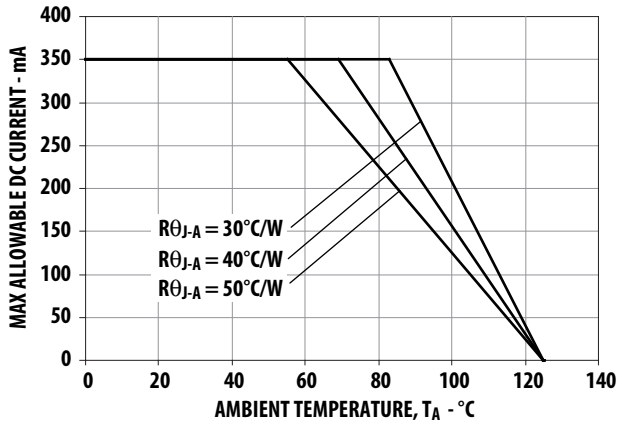


Figure 6. Maximum Forward Current vs. Ambient Temperature. Derated based on T_{JMAX} = 125°C, $R\theta_{J-A}$ = 30°C/W, 40°C/W and 50°C/W.

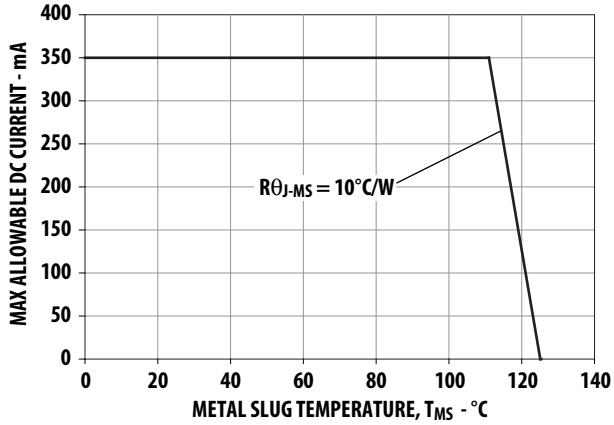


Figure 7. Maximum Forward Current vs. Metal Slug Temperature. Derated based on T_{JMAX} = 125°C, $R\theta_{J-MS}$ = 10°C/W.

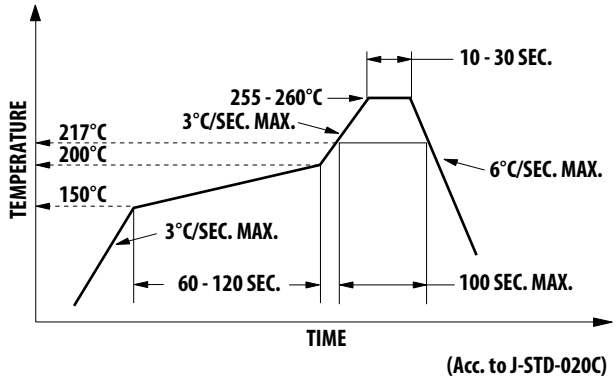


Figure 8. Recommended Reflow Soldering.

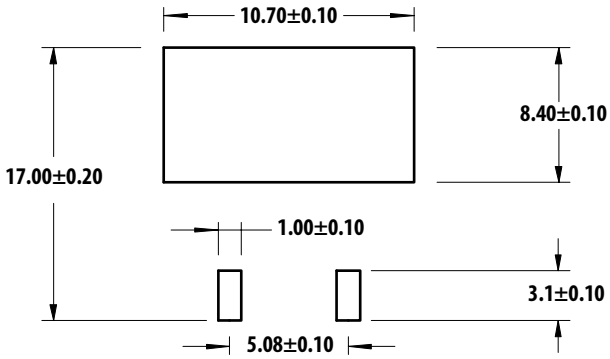


Figure 9. Recommended soldering land pattern.

Option Selection Details

ASMT-Mxxx – N x_1 x_2 x_3 x_4

x_1 – Minimum Flux Bin
x_2 – Maximum Flux Bin
x_3 – Color Bin Selection
x_4 – Packaging Option

Flux Bin Limit [x_1 x_2]

	Luminous Flux (lm) at I_F = 350mA	
Bin	**Min.**	**Max.**
H	33.0	43.0
J	43.0	56.0
K	56.0	73.0

Tolerance for each bin limits is ±10%.

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
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

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)				
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

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

Tolerance: ± 0.01

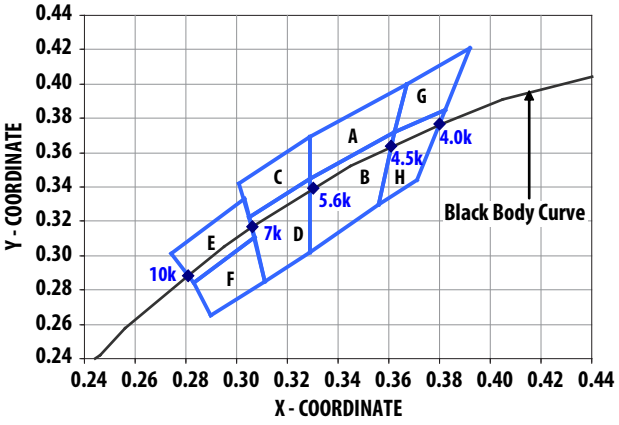


Figure 10. Color bins (Cool White).

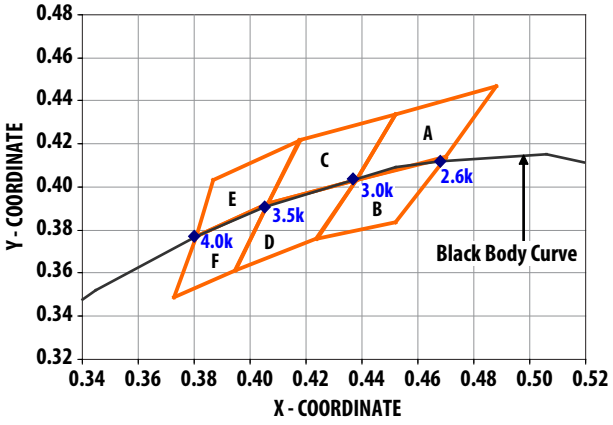


Figure 11. Color bins (Warm White).

Packaging Option [x_4]

Selection	Option
0	Tube
1	Tape and Reel

Example

ASMT-MW03-NJKZ0

ASMT-MW03-Nxxxx – Cool White, Electrically Non-isolated Heat Sink, Non-diffused

X_1 = L – Minimum Flux Bin J

X_2 = N – Maximum Flux Bin K

X_3 = Z – Color Bin A and B only

X_4 = 0 – Tube Option

Packing Tube – Option 0

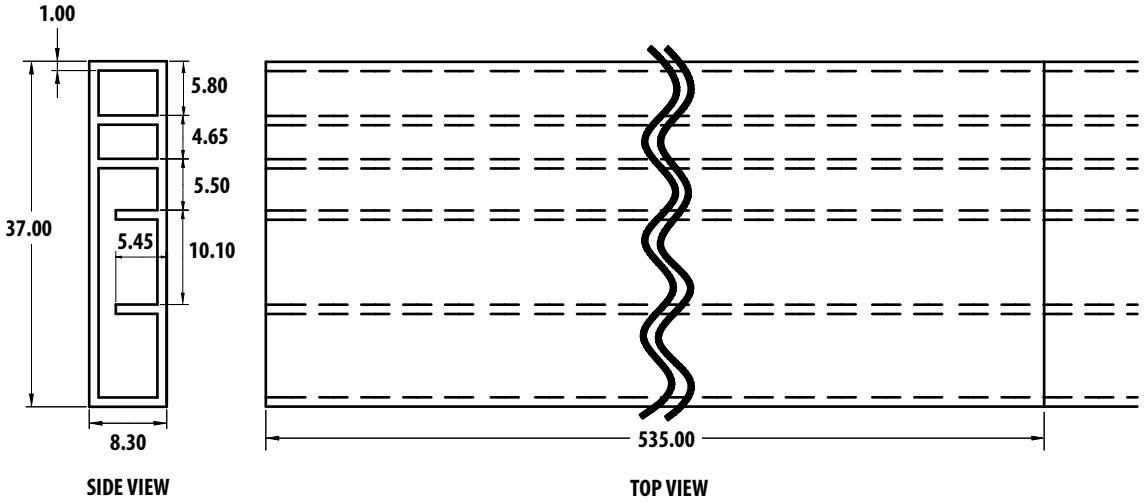
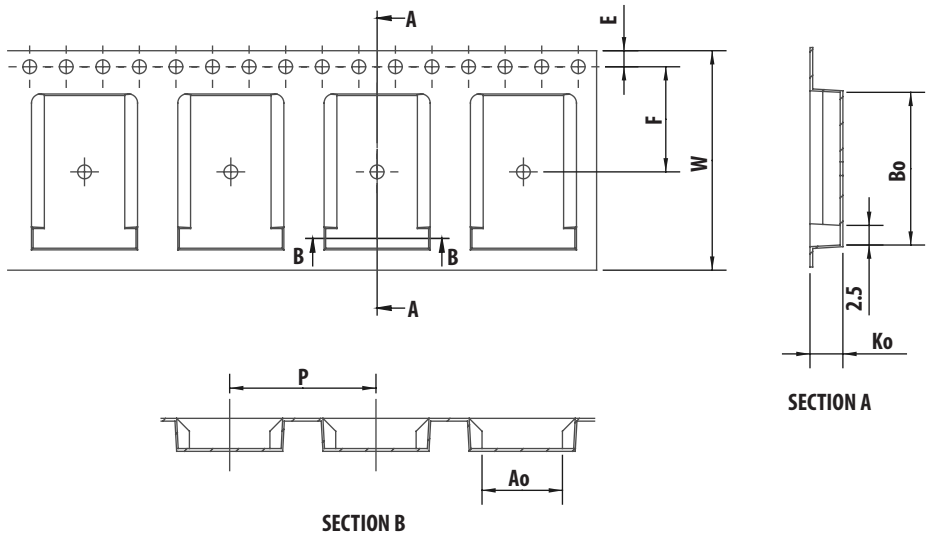


Figure 12. Tube dimensions.

Tape and Reel – Option 1



Dim	Value
A_O	8.80 ±0.10
B_O	16.45 ±0.10
K_O	3.60 ±0.10
E	1.75 ±0.10
F	11.50 ±0.10
W	24.0 ±0.10
P	16.0 ±0.10
Quantity/ Reel	250 units

All dimensions in millimeters.

Figure 13. Carrier tape dimensions.

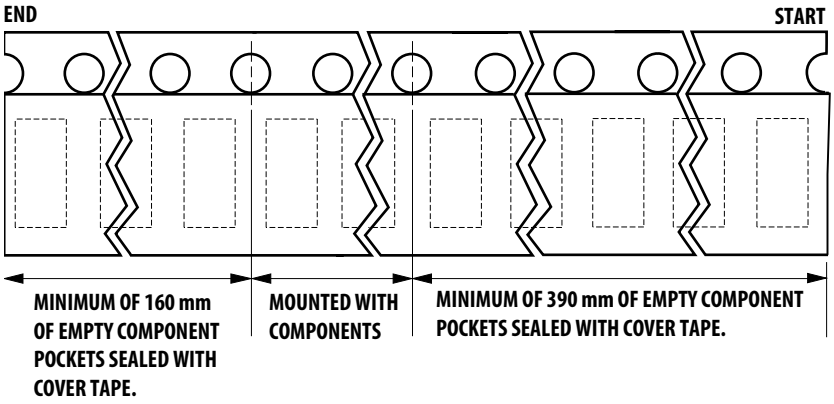


Figure 14. Carrier tape leader and trailer dimensions.

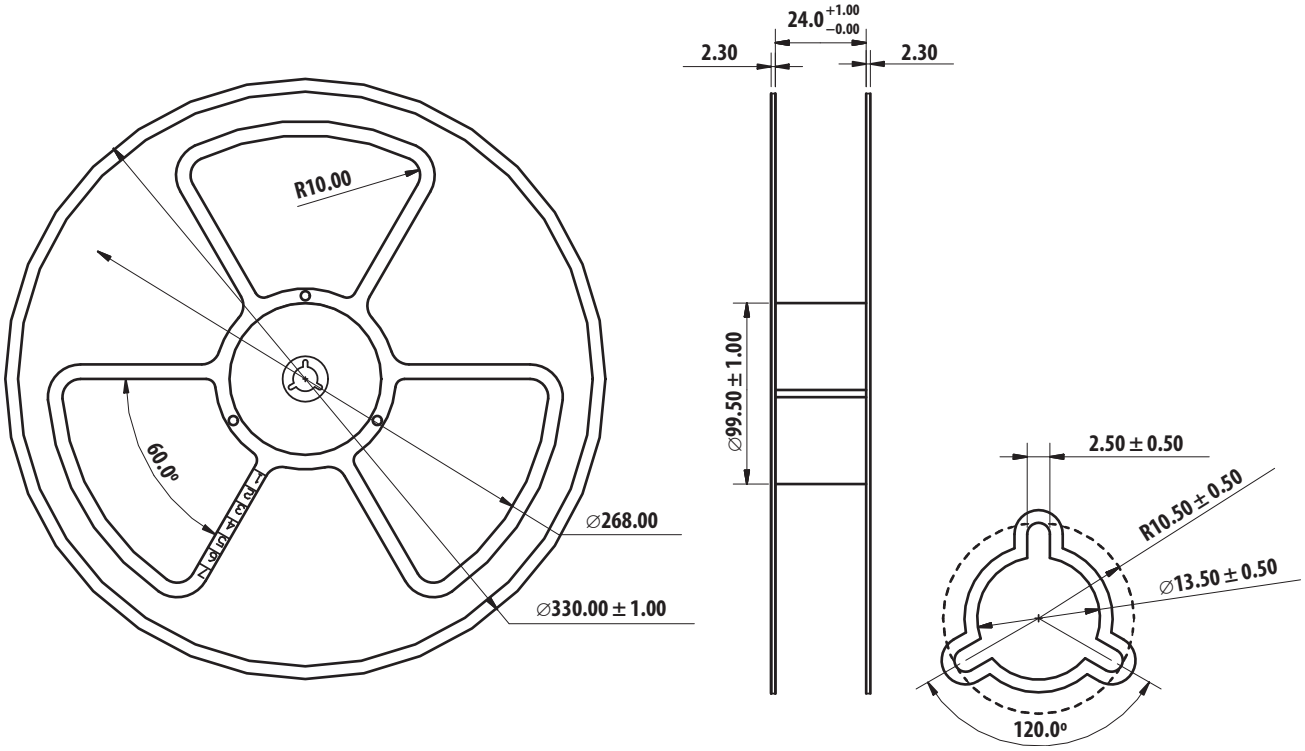


Figure 15. Reel dimensions.

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 of 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 2a 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°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, 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°C / 60%RH at all time and all high temperature related process including soldering, curing or rework need to be completed within 672 hours.

C. Control for unfinished reel

- For any unused LEDs, they need to be stored in sealed MBB with desiccant or desiccator at <5%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%RH to ensure no LEDs have exceeded their floor life of 672 hours.

E. Baking is required if

- "60%" HIC indicator is NOT blue.
- The LEDs are exposed to condition of >30°C / 60% RH at any time.
- The LED floor life exceeded 672hrs.

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

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

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