

ASMB-MTB1-0A3A2 PLCC4 Tricolor Black Surface



Datasheet



Description

For easy pick & place, the LEDs are shipped in EIA-compliant tape and reel. Every reel is shipped from a single intensity and color bin; except red color for better uniformity.

These LEDs are compatible with reflow soldering process.

This super wide viewing angle at 115° together with the built in reflector pushing up the intensity of the light output makes these LED suitable to be used in the interior electronics signs.

The full black body of the LED provides extreme contrast enhancement for the fine pitch and short distance viewing full color display.

Features

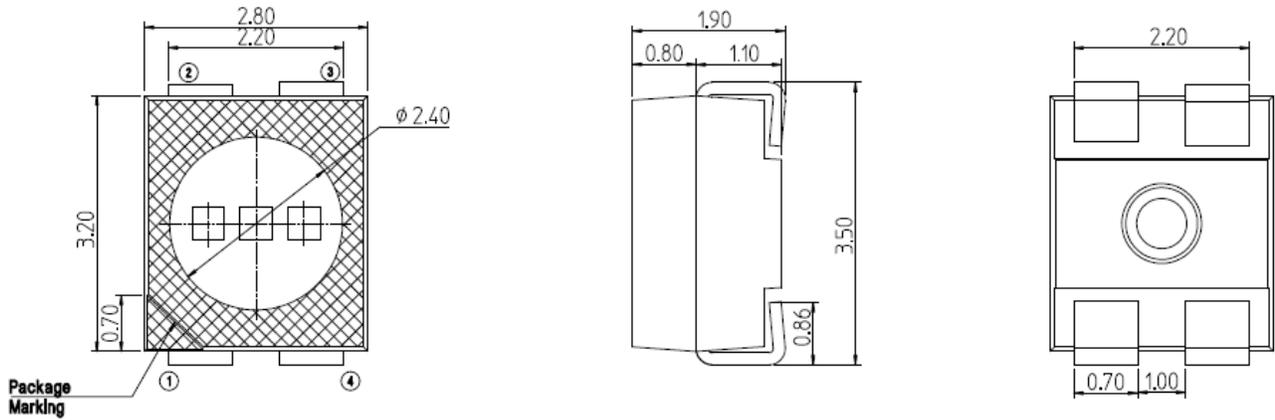
- Standard PLCC-4 package (Plastic Leaded Chip Carrier)
- LED package with diffused silicone encapsulation
- High brightness using AlInGaP and InGaN dice technologies
- Typical viewing angle at 115°
- Compatible with reflow soldering process
- Full contrast with black body package
- JEDEC MSL 3

Applications

- Indoor full color display

CAUTION: LEDs are ESD sensitive. Please observe appropriate precautions during handling and processing. Refer to Avago Application Note AN-1142 for additional details.

Package Dimensions



Notes:

1. All Dimensions are in millimeters
2. Tolerance = ± 0.2 mm unless otherwise specified
3. Terminal Finish: Ag plating

Lead Configuration

1	Cathode	Red
2	Cathode	Green
3	Cathode	Blue
4	Common Anode	

Part Numbering System

A S M B - M T B 1 - 0 X₂ X₃ X₄ X₅

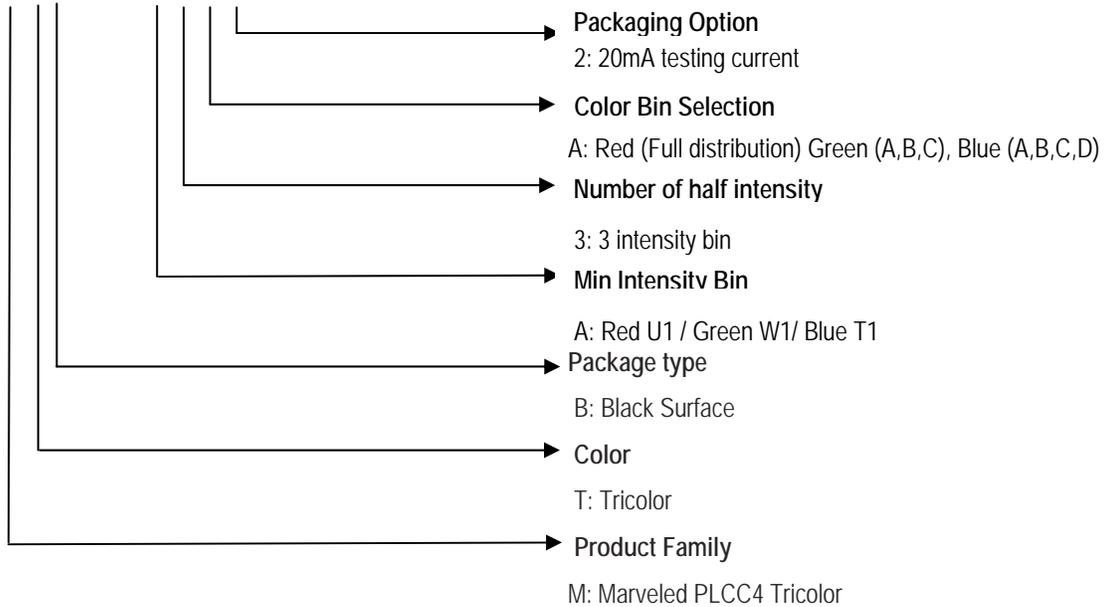


Table 1. Device Selection Guide

Parameter	Option Code	ASMB-MTB1-0A3A2		
		Red	Green	Blue
Intensity Bin	X ₂ X ₃ = A3	U1,U2,V1	W1,W2,X1	T1,T2,U1
Color Bin	X ₄ = S	Full Range	A,B,C	A,B, C,D
Packaging Option	X ₅ = 2	Test Current: 20mA		

Intensity Bin Limits

Bin ID	Min (mcd)	Max (mcd)
T1	285.0	355.0
T2	355.0	450.0
U1	450.0	560.0
U2	560.0	715.0
V1	715.0	900.0
V2	900.0	1125.0
W1	1125.0	1400.0
W2	1400.0	1800.0
X1	1800.0	2240.0

Tolerance of each bin limit ± 12%

Color Bin Limits

Red Color Bin Table

Bin ID	Dominant Wavelength		Chromaticity Coordinate						
	Min	Max	x	y	z	w			
Full range	619.0	629.0	0.6894	0.3104	0.6752	0.3113	0.6916	0.2934	0.7066

Tolerance of each bin limit is ± 1 nm

Green Color Bin Table

Bin ID	Dominant Wavelength		Chromaticity Coordinate						
	Min	Max	x	y	z	w			
A	525	531	0.1142	0.8262	0.1624	0.7178	0.2001	0.6983	0.8012
B	528	534	0.1387	0.8148	0.1815	0.7089	0.2179	0.6870	0.7867
D	531	535	0.1625	0.8012	0.2001	0.7089	0.2238	0.6830	0.7816

Tolerance of each bin limit is ± 1 nm

Blue Color Bin Table

Bin ID	Dominant Wavelength		Chromaticity Coordinate						
	Min	Max	x	y	z	w			
A	465	469	0.1355	0.0399	0.1751	0.0986	0.1680	0.1094	0.0534
B	467	471	0.1314	0.0459	0.1718	0.1034	0.1638	0.1167	0.1215
C	469	473	0.1267	0.0534	0.168	0.1094	0.1593	0.1255	0.0736

Tolerance of each bin limit is ± 1 nm

Table 2. Absolute Maximum Ratings (T_A = 25°C)

Parameter	Red	Green & Blue	Unit
DC forward current ^[1]	25	25	mA
Peak forward current ^[2]	100	100	mA
Power dissipation	65	90	mW
Maximum junction temperature T _{j max}	110		°C
Operating temperature range	- 40 to + 100		°C
Storage temperature range	- 40 to + 100		°C

Note:

1. Derate linearly as shown in Figure 4a & 4b
2. Duty Factor = 10% Frequency = 1KHz

Table 3. Optical Characteristics (T_A = 25°C)

Color	Luminous Intensity, I _v , mcd [1]			Dominant Wavelength, λ _d (nm) [2]			Peak Wavelength h, λ _p (nm)	Viewing Angle 2θ _½ (°)[3]
	Min	Typ	Max.	Min	Typ	Max	Typ.	Typ
Red	470	540	780	619.0	625.0	629.0	634	115
Green	1380	1600	2280	525.0	530.0	535.0	522	115
Blue	270	350	450	465.0	470.0	473.0	465	115

Notes:

1. The luminous intensity I_v is measured at the mechanical axis of LED package and it is tested in pulsing condition. The actual peak of the spatial radiation pattern may not be aligned with the axis.
2. The dominant wavelength is derived from the CIE Chromaticity Diagram and represents the perceived color of the device.
3. θ_½ is the off axis angle where the luminous intensity is ½ the peak intensity

Table 4. Electrical Characteristics (T_A = 25°C)

Color	Forward Voltage, V _F (V) [1]			Reverse Voltage V _R @ 100μA [2]	Reverse Voltage V _R @ 10μA [2]	Thermal Resistance Rθ _{J-P} (°C/W)	
	Min	Typ	Max.	Min.	Min.	Single chip on	3 chips on
Red	1.8	2.1	2.6	4	-	609	653
Green	2.8	3.1	3.6	-	4	320	430
Blue	2.8	3.1	3.6	-	4	320	430

Note:

1. Tolerance ± 0.1V.
2. Indicates product final testing condition. Reverse bias is not recommended.

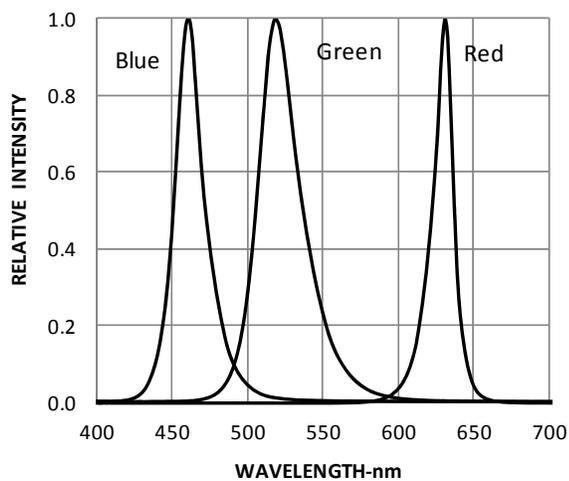


Figure 1: Relative Intensity vs Wavelength

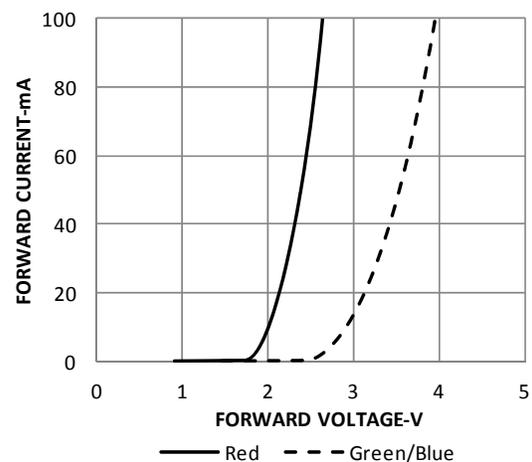


Figure 2: Forward Current vs Forward Voltage

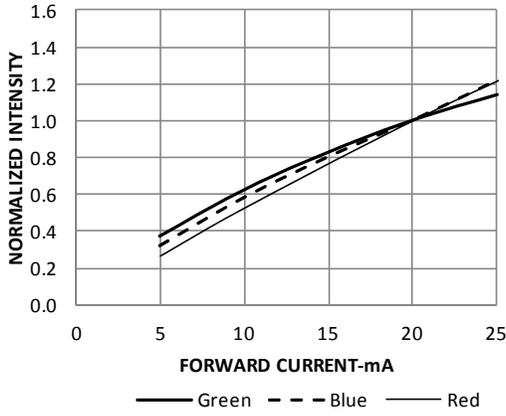


Figure 3. Relative Intensity vs Forward Current

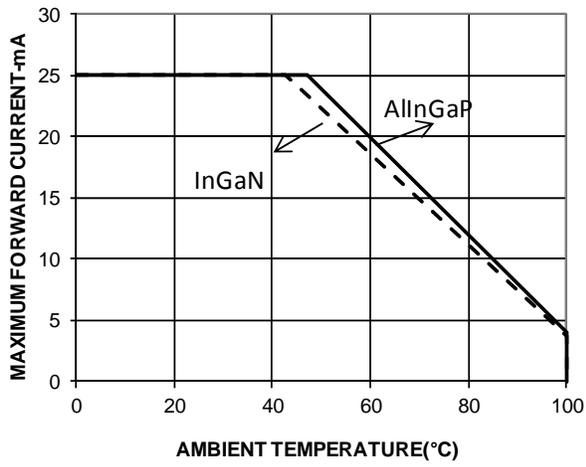


Figure 4a. Maximum forward current vs. ambient temperature. (3 chips)

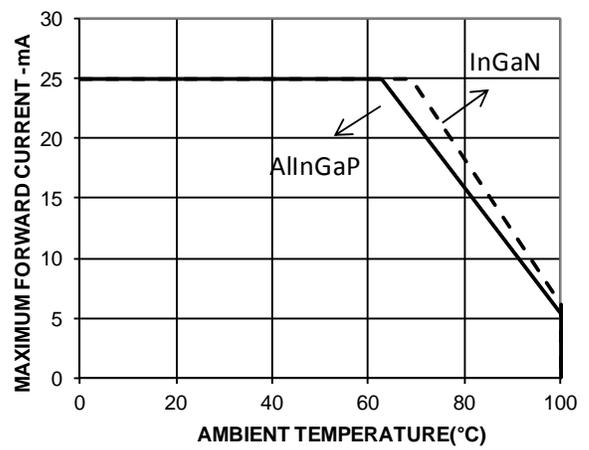


Figure 4b. Maximum forward current vs. ambient temperature. (single chip)

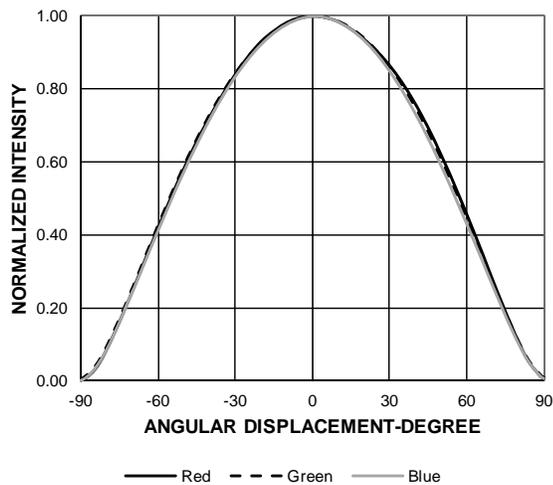


Figure 5a. Radiation Pattern for X axis

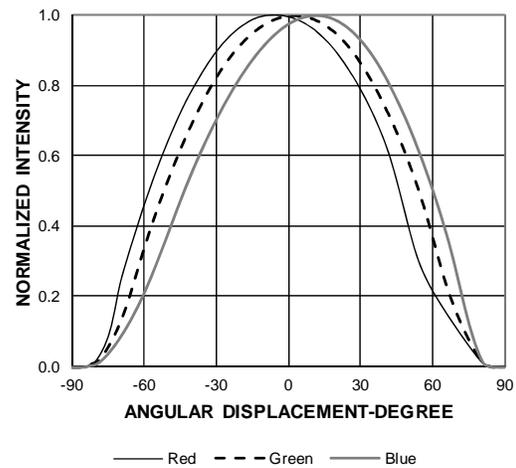


Figure 5b. Radiation Pattern for Y axis

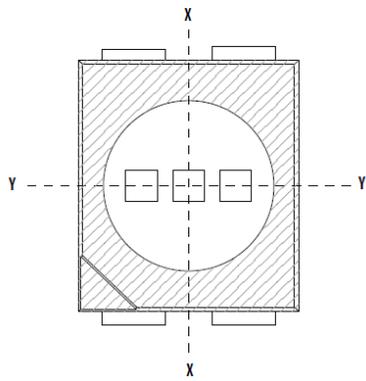


Figure 5c. Component Axis for Radiation Patterns

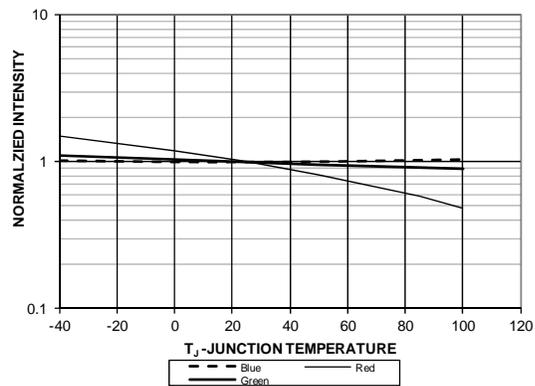


Figure 6. Relative Intensity vs Junction Temperature

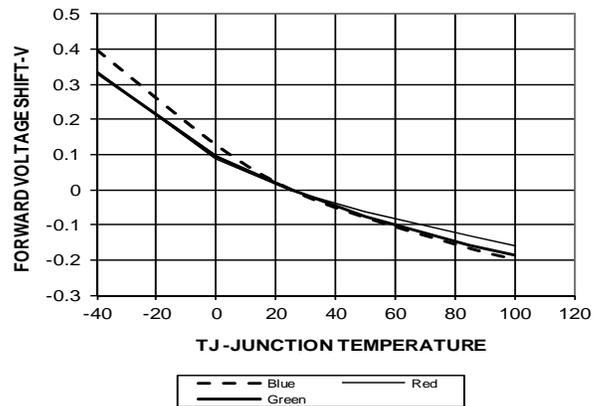


Figure 7. Forward Voltage vs Junction Temperature

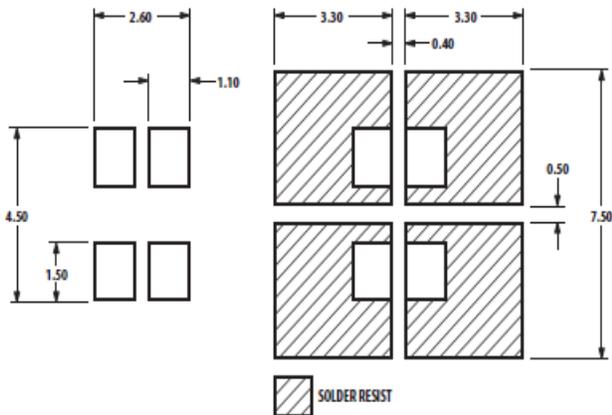


Figure 8a. Recommended soldering land pattern.

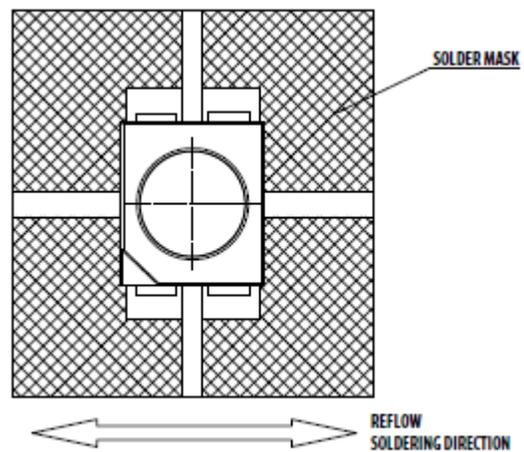


Figure 8b. LED configuration on land pattern

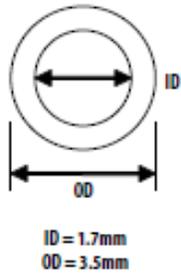


Figure 9. Recommended Pick and Place Nozzle Tip

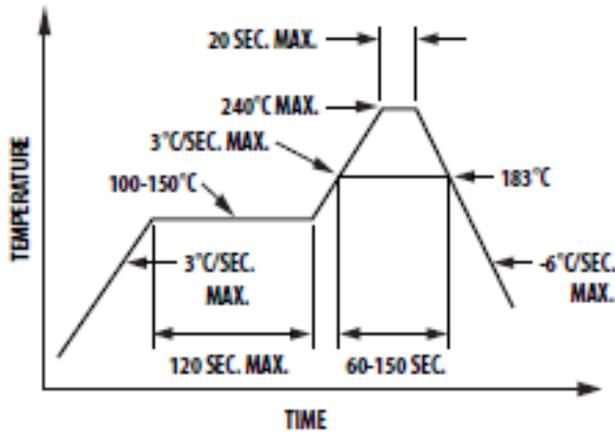


Figure 10. Recommended leaded reflow soldering profile.

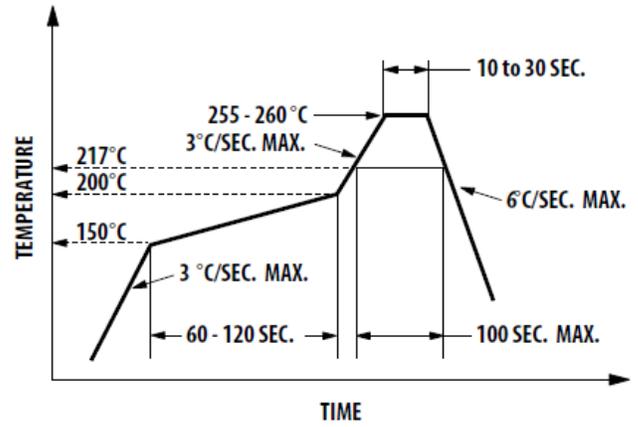


Figure 11. Recommended Pb-free reflow soldering profile.

Note:

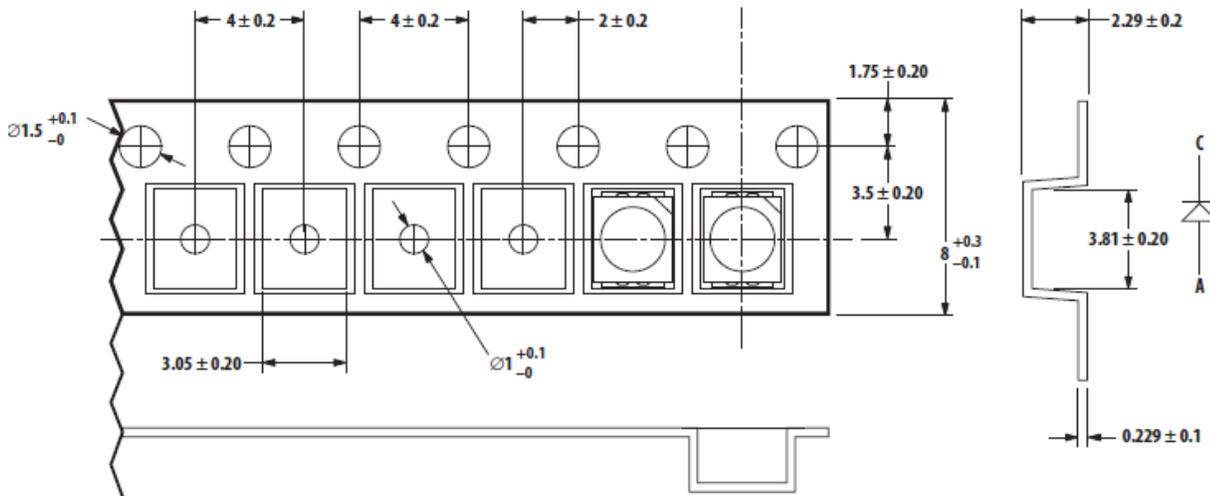


Figure 12. Carrier tape Dimension

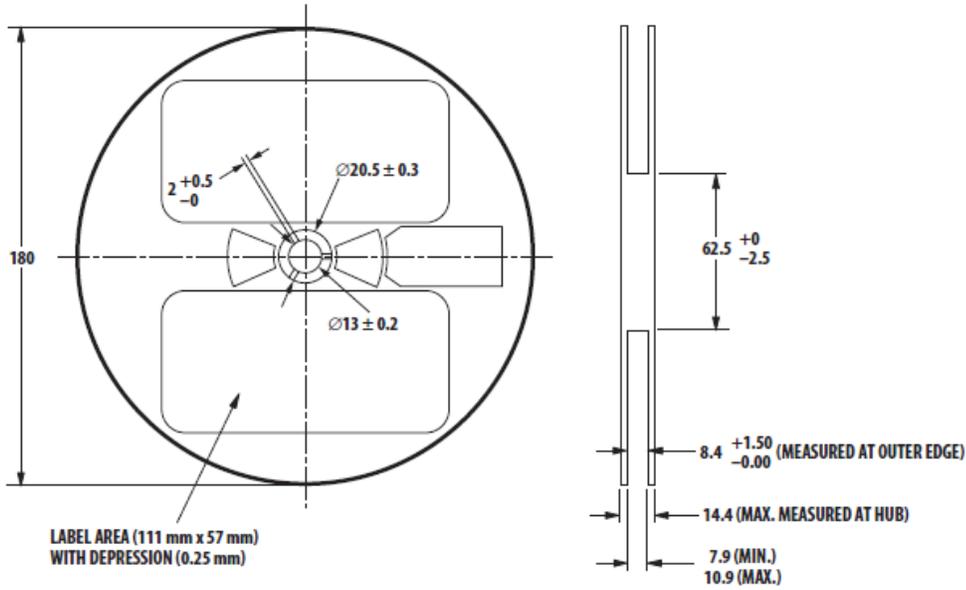


Figure 13. Reel Dimension

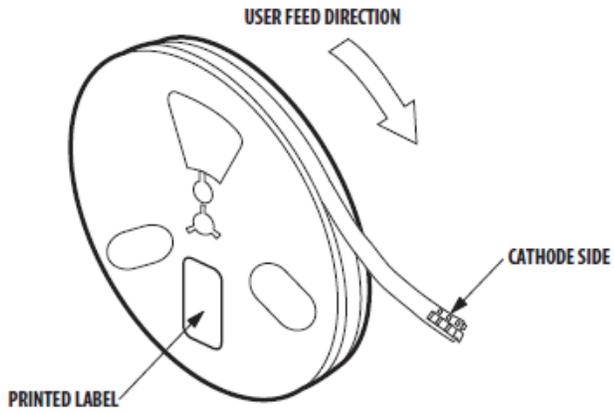


Figure 14. Reel Dimension

Packaging Label:

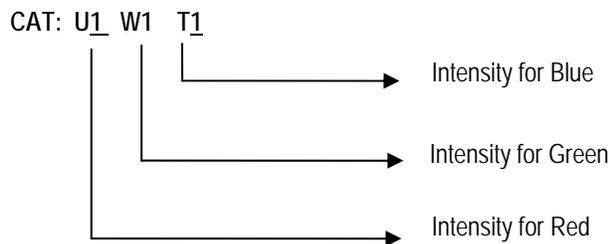
(i) Avago Mother Label (Available on MBB bags)

<p>(1P) Item: Part Number </p>		<p>Avago TECHNOLOGIES STANDARD LABEL LS0002 RoHS Compliant Halogen Free e4 Max Temp 260C MSL3 (Q) QTY: Quantity</p>
<p>(1T) Lot: Lot Number </p>		
<p>LPN: </p>	<p>CAT: Intensity Bin </p>	
<p>(9D)MFG Date: Manufacturing Date </p>	<p>BIN: Color Bin </p>	
<p>(P) Customer Item: </p>		
<p>(V) Vendor ID: </p>	<p>(9D) Date Code: Date Code </p>	
<p>DeptID: </p>	<p>Made In: Country of Origin </p>	

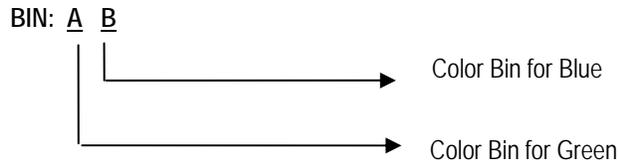
(ii) Avago Baby Label (Available on reel)

<p>(1P) PART #: Part Number </p>	<p>Avago TECHNOLOGIES BABY LABEL COSB001B</p>
<p>(1T) LOT #: Lot Number </p>	
<p>(9D)MFG DATE: Manufacturing Date </p>	<p>QUANTITY: Packing Quantity </p>
<p>C/O: Country of Origin</p>	<p>(9D): DATE CODE:</p>
<p>(1T) TAPE DATE: </p>	<p>D/C: Date Code VF: CAT: INTENSITY BIN BIN: COLOR BIN</p>

Example indicates luminous Intensity information for Red, Green and Blue respectively from label:



Example indicates color bin information for Green and Blue from label:



Note: There will be no red color bin information appear on label as it is not binned and support with full distribution range.

Handling Precaution

The encapsulation material of the LED is made of silicone for better product reliability. Since silicone is a soft material, avoid pressing on the silicon or poking the silicon with a sharp object as the product could be damaged and cause premature failure. During assembly handling, the unit should be held by the body only. Please refer to Avago Application Note AN 5288 for additional handling information and proper procedures.

Moisture Sensitivity

This product has a Moisture Sensitive Level 3 rating per JEDEC J-STD-020. Refer to Avago Application Note AN5305, Handling of Moisture Sensitive Surface Mount Devices, for additional details and a review of proper handling procedures.

A. 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, then it is safe to reflow the LEDs per the original MSL rating.
- It is recommended that the MBB not be opened 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 times and all high temperature related processes including soldering, curing or rework need to be completed within 168 hours.

C. Control for unfi nished reel

- Unused LEDs must be stored in a sealed MBB with desiccant or desiccator at <5%RH.

D. Control of assembled 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 that all LEDs have not exceeded their fl oor life of 168 hours.

E. Baking is required if:

- The HIC indicator is not BROWN at 10% and is AZURE at 5%.
- The LEDs are exposed to condition of >30°C / 60% RH at any time.
- The Led fl oor life exceeded 168hrs. The recommended baking condition is: 60±5°C for 20hrs

DISCLAIMER

AVAGO'S PRODUCTS AND SOFTWARE ARE NOT SPECIFICALLY DESIGNED, MANUFACTURED OR AUTHORIZED FOR SALE AS PARTS, COMPONENTS OR ASSEMBLIES FOR THE PLANNING, CONSTRUCTION, MAINTENANCE OR DIRECT OPERATION OF A NUCLEAR FACILITY OR FOR USE IN MEDICAL DEVICES OR APPLICATIONS. CUSTOMER IS SOLELY RESPONSIBLE, AND WAIVES ALL RIGHTS TO MAKE CLAIMS AGAINST AVAGO OR ITS SUPPLIERS, FOR ALL LOSS, DAMAGE, EXPENSE OR LIABILITY IN CONNECTION WITH SUCH USE.

Note:

All bin categories are established for classification of products. Products may not be available in all bin categories. Please contact Avago representative for further information.