ASMB-BTE1-0B332

High Brightness PLCC4 Tricolor LED

Data Sheet

Description

This family of SMT LEDs packaged in the form of PLCC-4 with common Anode pin.

The full black plastic housing with white inner reflector provides good contrast without compromising brightness. A typical viewing angle of 110° together with the built-in reflector drives up the intensity of light output, making these LEDs suitable for use in interior electronics signs.

These LEDs are compatible with reflow soldering process. For easy pick and place, every reel is shipped from a single intensity and color bin; except red color for better uniformity.

Features

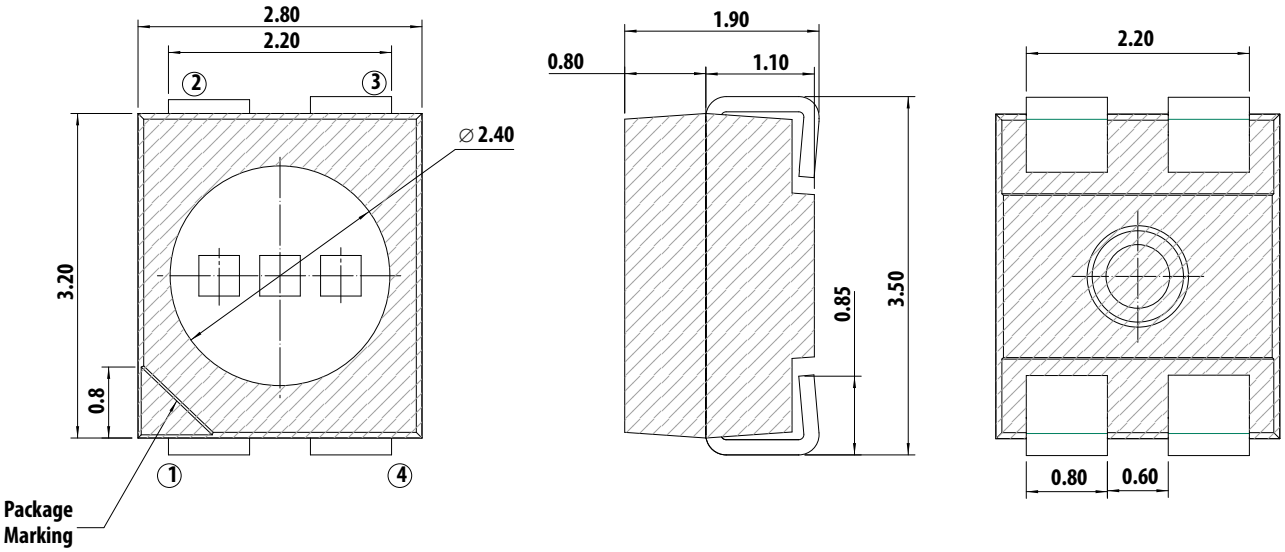
- PLCC-4 package (Plastic Leaded Chip Carrier) with common pin configuration
- LED package with diffused silicone encapsulation
- High brightness using AlInGaP and InGaN dice technologies
- Typical viewing angle at 110°
- Compatible with reflow soldering process
- Good contrast with black body and diffused encapsulation
- 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



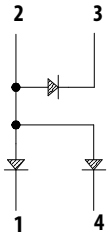
Notes:

1. All Dimensions are in millimeters

2. Tolerance ± 0.2 mm unless specified.

3. Terminal Finish: Ag plating

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



Part Numbering System

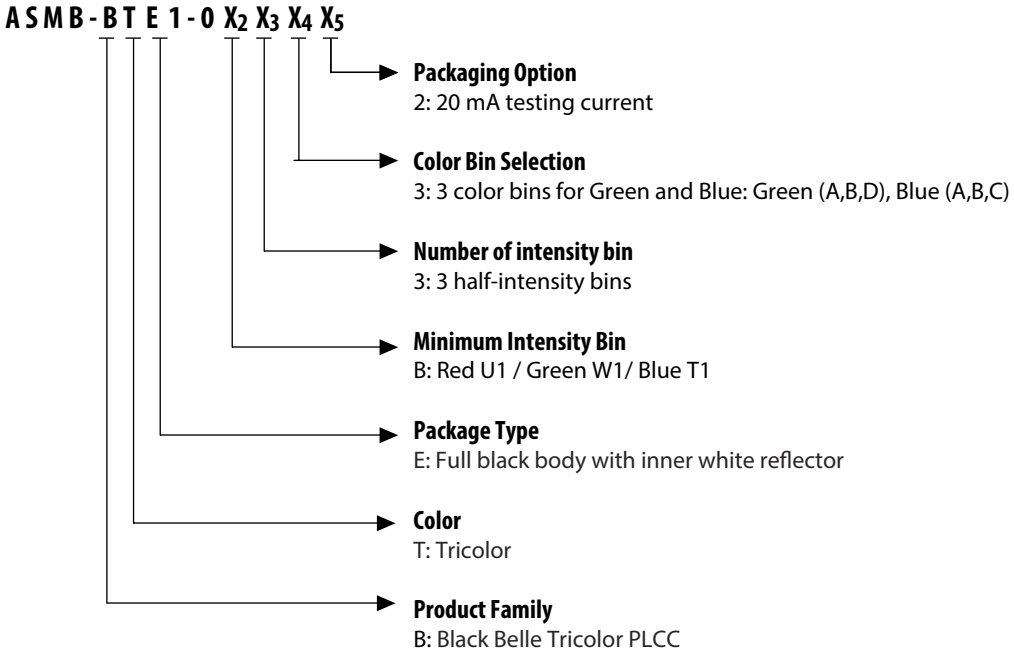


Table 1. Device Selection Guide

		ASMB-BTE1-0B332		
Parameter	**Option Code**	**Red**	**Green**	**Blue**
Intensity Bin	X_2X_3 = B3	U1, U2, V1	W1, W2, X1	T1, T 2, U1
Color Bin	X_4 = 3	Full Range	A,B,D	A,B,C
Packaging Option	X_5 = 2	Test Current: 20 mA		

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					
Full range	617.0	628.0	x	0.6850	0.6674	0.6866	0.7052
			y	0.3149	0.3158	0.2967	0.2948

Tolerance of each bin limit is ± 1 nm

Green Color Bin Table

Bin ID	Min Dom	Max Dom	Chromaticity Coordinate				
A	525.0	531.0	x	0.1142	0.1624	0.2001	0.1625
			y	0.8262	0.7178	0.6983	0.8012
B	528.0	534.0	x	0.1387	0.1815	0.2179	0.1854
			y	0.8148	0.7089	0.6870	0.7867
D	531.0	537.0	x	0.1625	0.2001	0.2238	0.1929
			y	0.8012	0.6983	0.6830	0.7816

Tolerance of each bin limit is ± 1 nm

Blue Color Bin Table

Bin ID	Min Dom	Max Dom	Chromaticity Coordinate				
A	465.0	469.0	x	0.1355	0.1751	0.168	0.127
			y	0.0399	0.0986	0.1094	0.053
B	467.0	471.0	x	0.1314	0.1718	0.1638	0.122
			y	0.0459	0.1034	0.1167	0.063
C	469.0	473.0	x	0.1267	0.168	0.1593	0.116
			y	0.0534	0.1094	0.1255	0.074

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]	30	25	mA
Peak forward current [2]	100	100	mA
Power dissipation	78	90	mW
Reverse Voltage	Not recommended for reverse bias		
Maximum junction temperature T_j max	110		°C
Operating board temperature, T_A range	- 40 to + 100 [3]		°C
Storage temperature range	- 40 to + 100		°C

Notes:
1. Derate linearly as shown in Figure 4a and Figure 4b.
2. Duty Factor = 10% Frequency = 1 kHz.
3. For more information, see Figure 4a and Figure 4b.

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

	Luminous Intensity, Iv, mcd [1]			Dominant Wavelength, λd (nm) [2]			Peak Wavelength, λp (nm)	Viewing Angle 2θ½ (°) [3]	Test Current
Color	Min	Typ	Max.	Min	Typ	Max	Typ.	Typ	(mA)
Red	450	630	900	617	622	628	629	110	20
Green	1125	1500	2240	525	529	535	521	110	20
Blue	285	350	560	465	469	473	464	110	20

Notes:
1. The luminous intensity Iv 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. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is ½ the peak intensity

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

	Forward Voltage, V_F (V) [1]			Reverse Voltage V_R @ 100 μA [2]	Reverse Voltage V_R @ 10 μA [2]	Thermal Resistance Rθ$_{J-P}$ (°C/W) [3]	
						Single chip on	3 chips on
Color	Min.	Typ.	Max.	Min.	Min.	Typ.	Typ.
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

Notes:
1. Tolerance ± 0.1 V.
2. Indicates product final testing condition. Long-term reverse bias is not recommended.

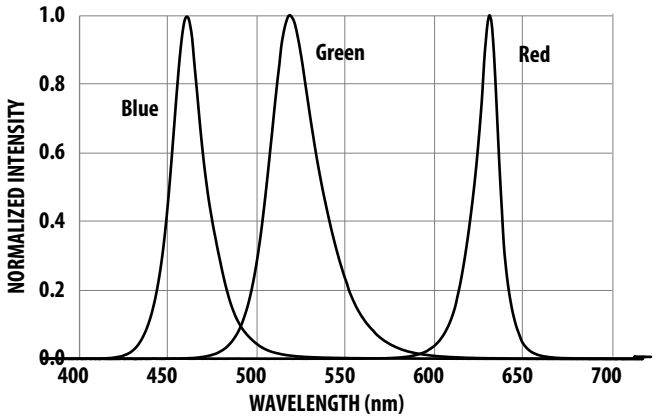


Figure 1. Relative Intensity vs. Wavelength

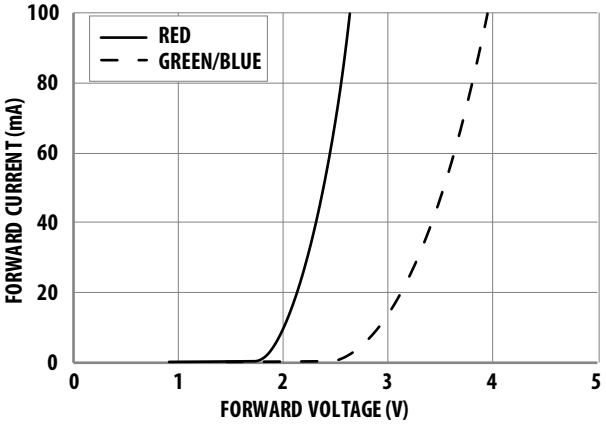


Figure 2. Forward Current vs. Forward Voltage

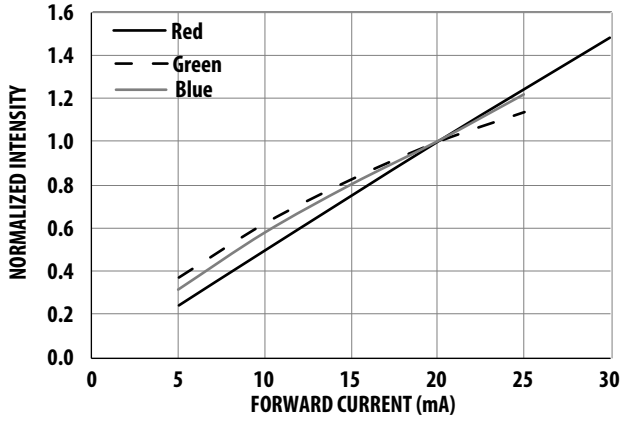


Figure 3. Relative Intensity vs. Forward Current

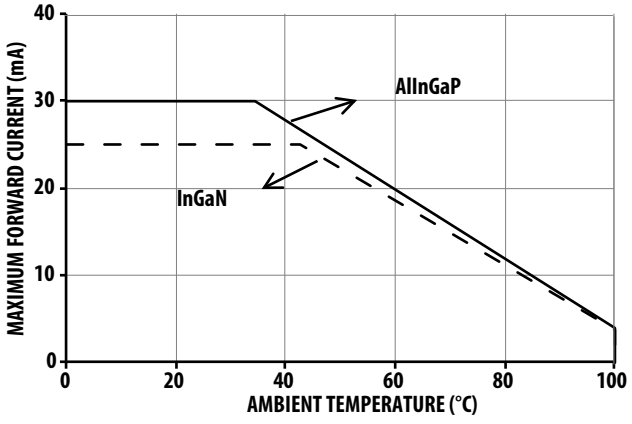


Figure 4a. Maximum forward current vs. ambient temperature (3 chips)

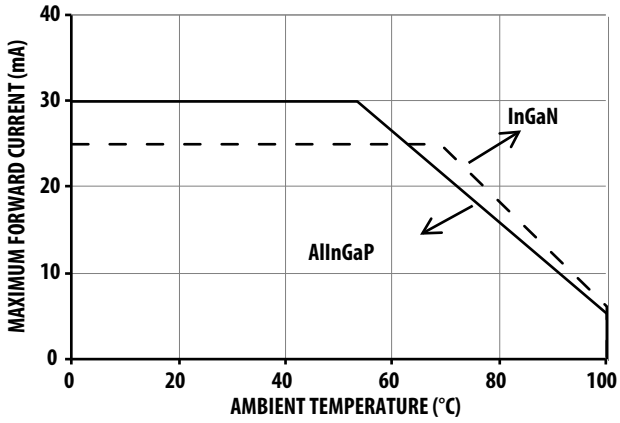


Figure 4b. Maximum forward current vs. ambient temperature (single chip)

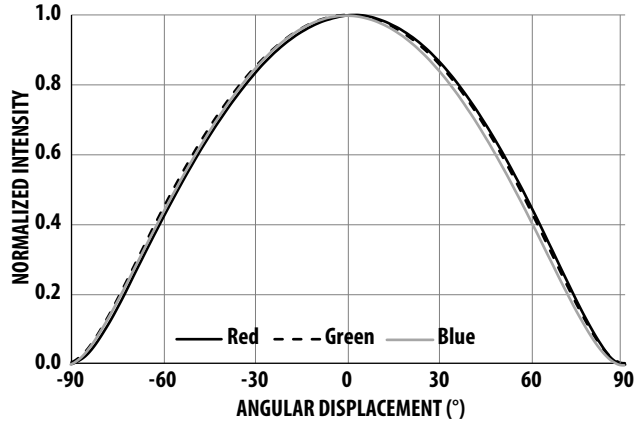


Figure 5a. Radiation Pattern for x-axis

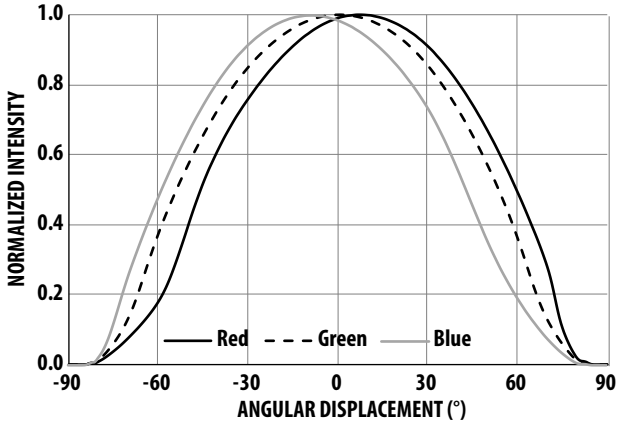


Figure 5b. Radiation Pattern for y-axis

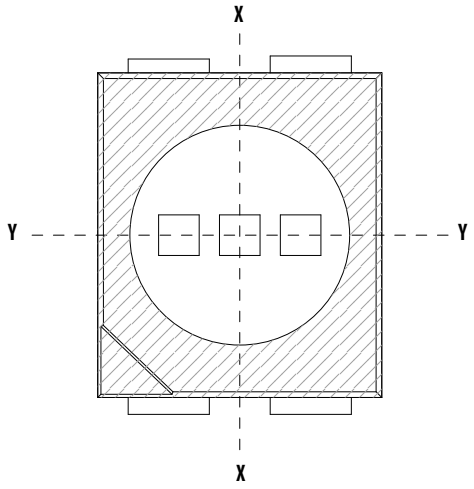


Figure 5c. Component Axis for Radiation Patterns

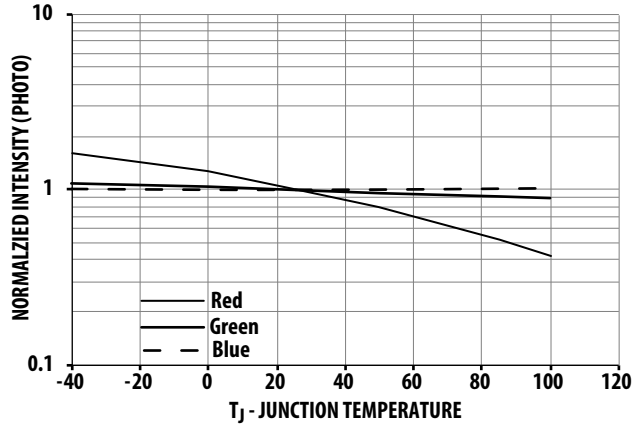


Figure 6. Relative Intensity vs. Junction Temperature

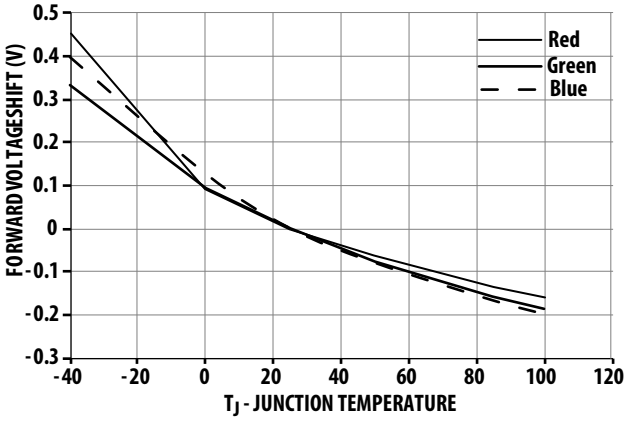


Figure 7. Forward Voltage vs. Junction Temperature

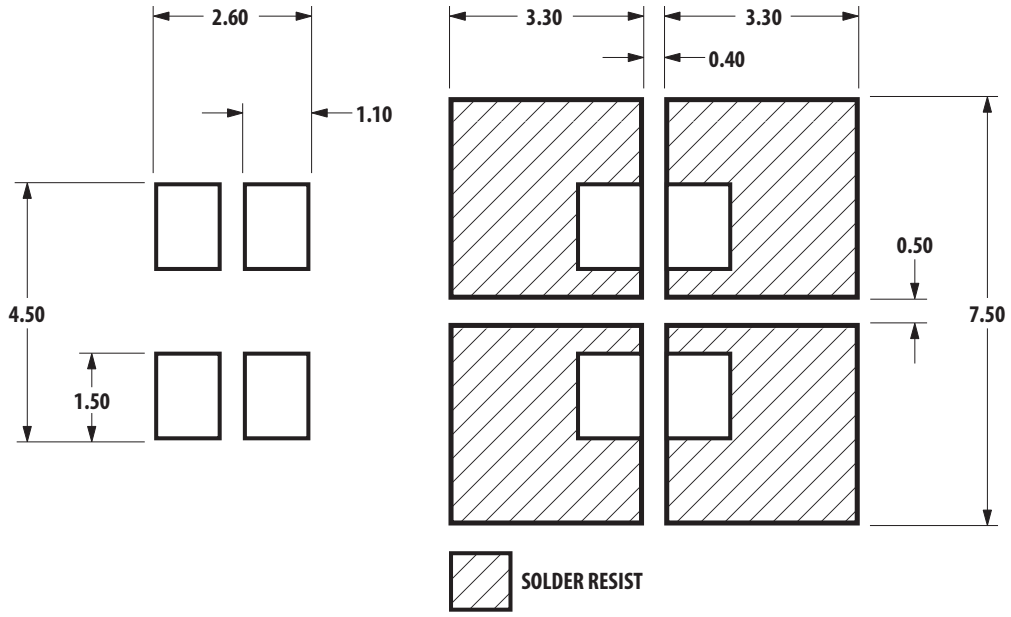


Figure 8a. Recommended soldering land pattern

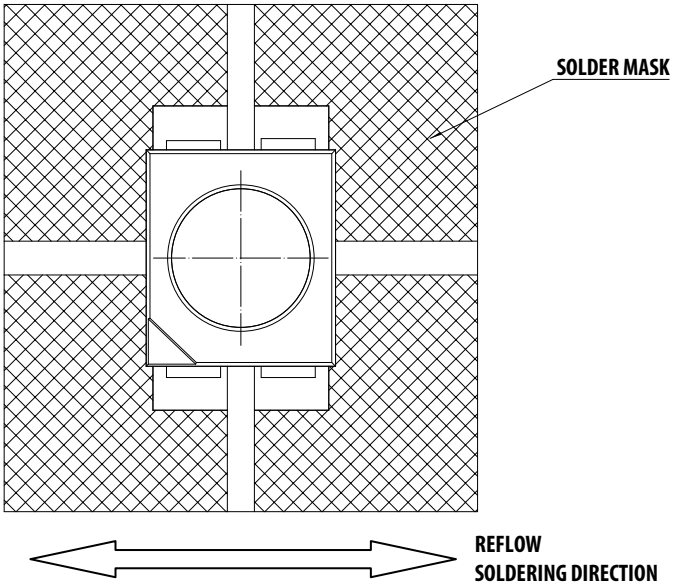
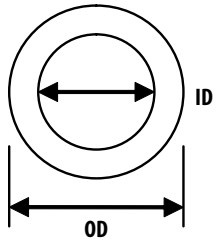


Figure 8b. LED configuration on land pattern



ID = 1.7mm
OD = 3.5mm

Figure 9. Recommended Pick and Place Nozzle Tip

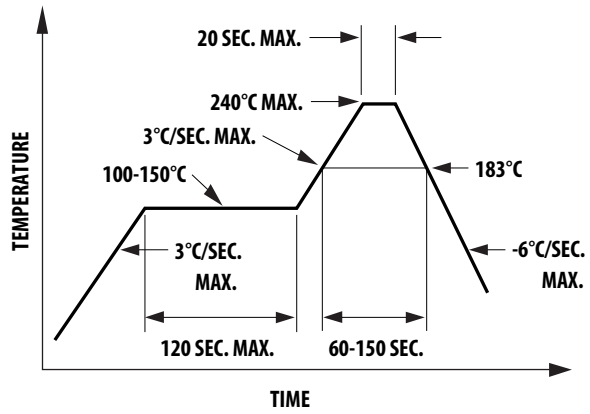


Figure 10. Recommended leaded reflow soldering profile

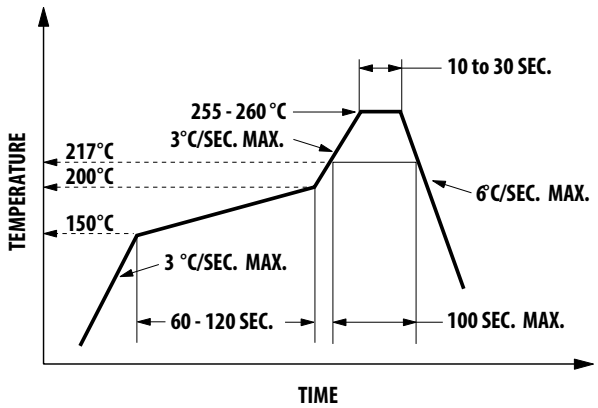


Figure 11. Recommended Pb-free reflow soldering profile

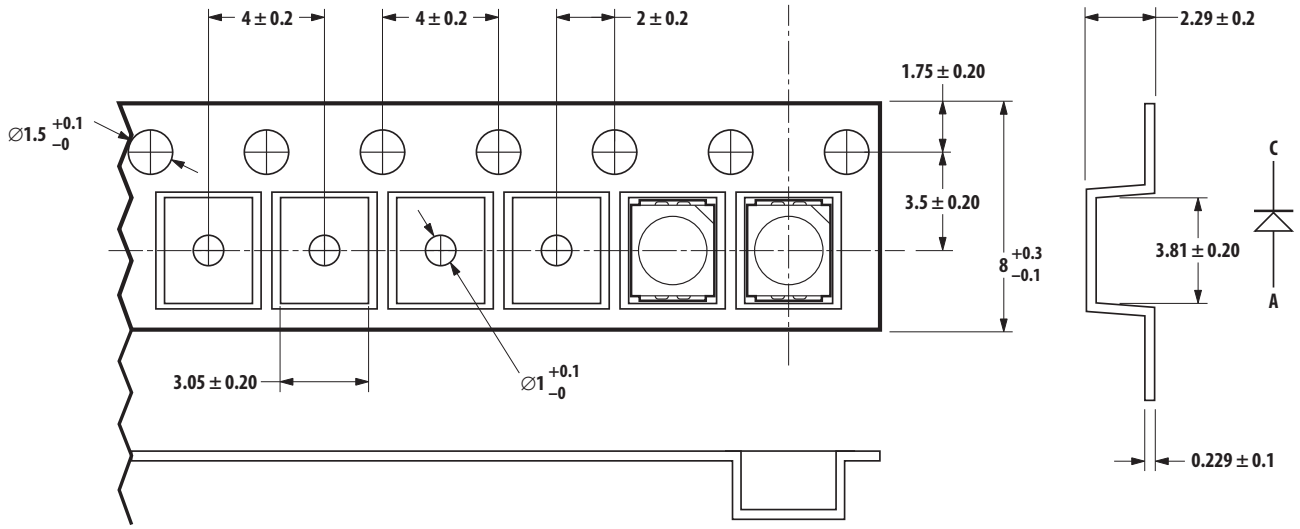


Figure 12. Carrier tape Dimension

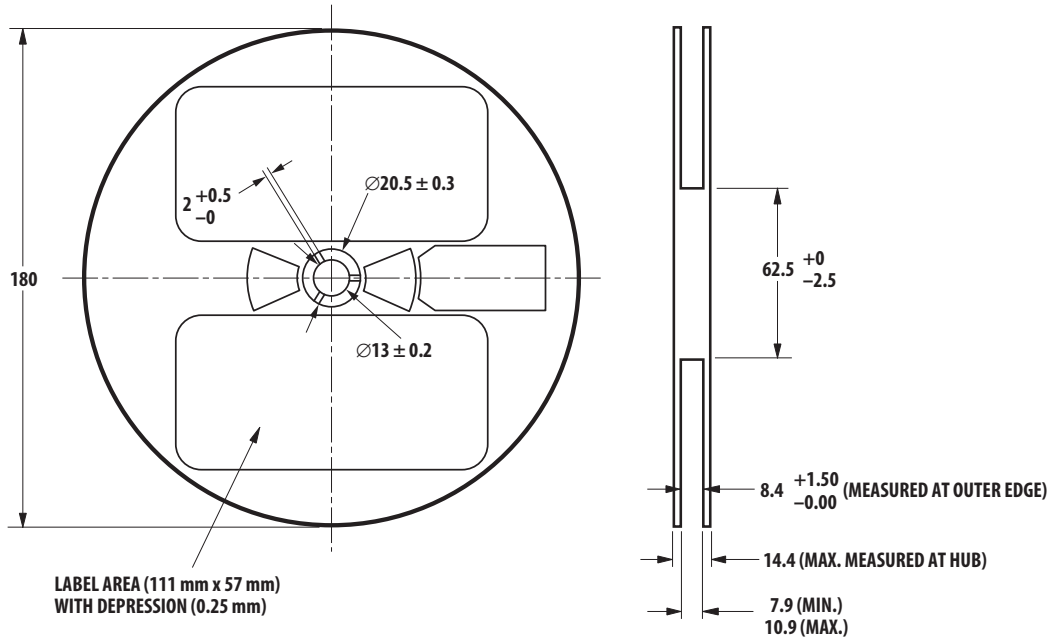


Figure 13. Reel Dimension

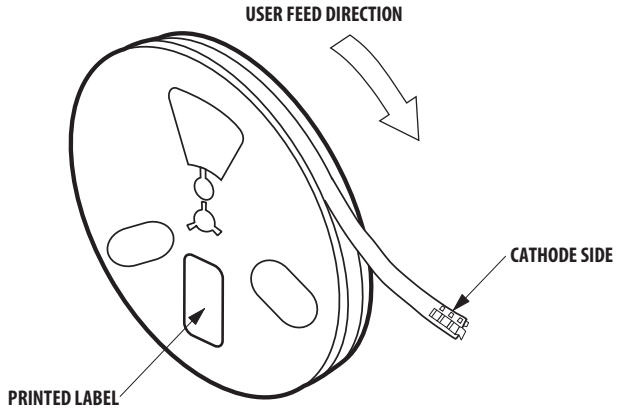
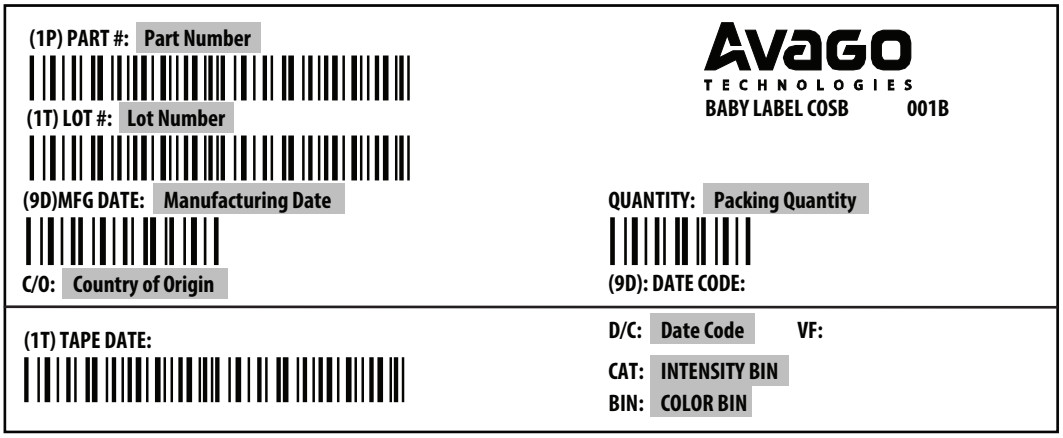


Figure 14. Reel Orientation

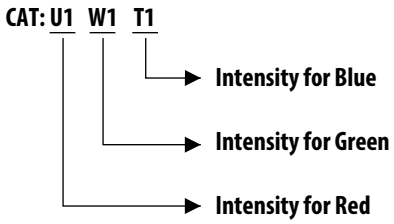
Packaging Label:

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

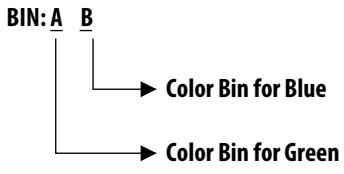
(ii) Avago Baby Label (Available on reel)



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 appearing on label; this is because it is not binned and supported with full distribution range.

Handling Precaution

The encapsulation material of the LED is made of silicone for better product reliability. As 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 is not opened before assembly (e.g., for IQC).

B. Control after opening the MBB

- The humidity indicator card (HIC) shall be read immediately upon opening of 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 need to be completed within 168 hours.

C. Control for unfinished 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 must be stored in a sealed MBB with desiccant or desiccator at < 5% RH to ensure that all LEDs have not exceeded their floor 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 floor life exceeded 168 hrs. The recommended baking condition is 60 ± 5 °C for 20 hrs.

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

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