Data Sheet

ASMT-CB00

InGaN Blue, 0.4 mm Low-Profile Right-Angle Surface-Mount ChipLED

Overview

The Broadcom® ASMT-CB00 blue color chip-type LED is designed with the smallest footprint to achieve high density of components on board. They have the industry standard footprint 1.6 mm x 1.0 mm and a height of only 0.4 mm. This makes them very suitable for cellular phone and mobile equipment backlighting and indication application where space is a constraint. In order to facilitate automated pick-and-place operation, these ChipLEDs are shipped in conductive tape and reel, with 4000 units per reel. These part are compatible with IR soldering.

Features

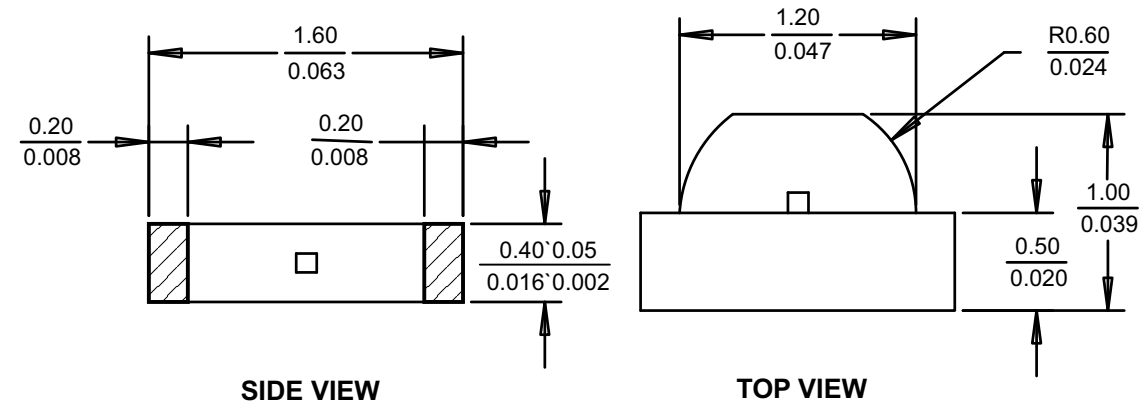
- Small size right-angle mount
- 0603 industry-standard footprint
- 0.4 mm low-profile type
- Operating temperature range of –40°C to +85°C
- Compatible with IR reflow soldering process
- Available in 8 mm tape on 178 mm (7 inch) diameter reels
- Reel sealed in zip-locked moisture barrier bags

Applications

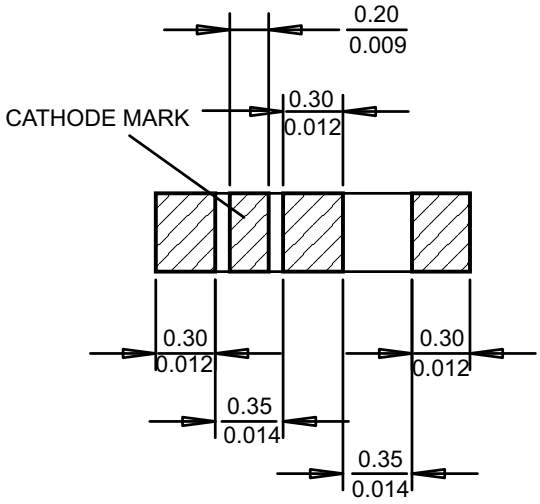
- LCD Backlighting
- Keypad Side / Backlighting
- Pushbutton backlighting
- Symbol Indicator

CAUTION! ASMT-CB00 LEDs are Class 1A ESD sensitive per JESD22-A114C.01. Please observe appropriate precautions during handling and processing. Refer to Application Note AN-1142 for additional details.

Package Dimension



SIDE VIEW **TOP VIEW**



TERMINAL VIEW

NOTE:

1. All dimensions will be in millimeters (inches).
2. Tolerance is ±0.1 mm (±0.004 inch) unless otherwise stated.

Device Selection Guide

Package Dimension (mm)	Parts per Reel	Package Description
1.6 (L) x 1.0 (W) x 0.4 (H)	4000	Untinted, Non-diffused

Absolute Maximum Ratings at T_A = 25°C

Parameter	ASMT-CB00	Unit
DC Forward Current[a]	10	mA
Power Dissipation	32	mW
Reverse Voltage (I_R = 100 µA)	5	V
LED Junction Temperature	95	°C
Operating Temperature Range	–40 to +85	°C
Storage Temperature Range	–40 to +85	°C
Soldering Temperature	See reflow soldering profile (Figure 7 and Figure 11)	

a. Derate linearly as shown in Figure 4.

Electrical Characteristics at T_A = 25°C

	Forward Voltage V_F (Volts)[a] @ I_F = 5 mA		Reverse Breakdown V_R (Volts) @ I_R = 100 µA	Thermal Resistance $R\theta_{J\text{-}PIN}$ (°C/W)
Part Number	**Typ.**	**Max.**	**Min.**	**Typ.**
ASMT-CB00	2.85	3.15	5	450

a. V_F tolerance: ±0.1V

Optical Characteristics at T_A = 25°C

	Luminous Intensity I_V[a] (mcd) @ 5 mA		Peak Wavelength λ_{peak} (nm)	Dominant Wavelength λd[b] (nm)	Viewing Angle $2\theta_{1/2}$[c] (Degrees)
Part Number	**Min.**	**Typ.**	**Typ.**	**Typ.**	**Typ.**
ASMT-CB00	7.2	18	469	473	150

a. The luminous intensity I_V is measured at the peak of the spatial radiation pattern which may not be aligned with the mechanical axis of the LED package.

b. The dominant wavelength, λ_d, is derived from the CIE Chromaticity Diagram and represents the perceived color of the device.

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

Light Intensity (I_V) Bin Limits[1]

Intensity (mcd)			Intensity (mcd)		
Bin ID	**Min.**	**Max.**	**Bin ID**	**Min.**	**Max.**
A	0.11	0.18	N	28.50	45.00
B	0.18	0.29	P	45.00	71.50
C	0.29	0.45	Q	71.50	112.50
D	0.45	0.72	R	112.50	180.00
E	0.72	1.10	S	180.00	285.00
F	1.10	1.80	T	285.00	450.00
G	1.80	2.80	U	450.00	715.00
H	2.80	4.50	V	715.00	1125.00
J	4.50	7.20	W	1125.00	1800.00
K	7.20	11.20	X	1800.00	2850.00
L	11.20	18.00	Y	2850.00	4500.00
M	18.00	28.50			

Tolerance: ±15%

1) Bin categories are established for classification of products. Products may not be available in all categories. Please contact your Broadcom representative for information on current available bins.

Color Bin Limits

	Dominant Wavelength (nm)	
Bin ID	**Minimum**	**Maximum**
A	460.0	465.0
B	465.0	470.0
C	470.0	475.0
D	475.0	480.0

Tolerance: ±1 nm

Forward Voltage (V_F) Bin Limits

	Forward Voltage (V)	
Bin ID	**Minimum**	**Maximum**
1	2.55	2.75
2	2.75	2.95
3	2.95	3.15

Tolerance: ±0.1V

Figure 1: Relative Intensity vs. Wavelength

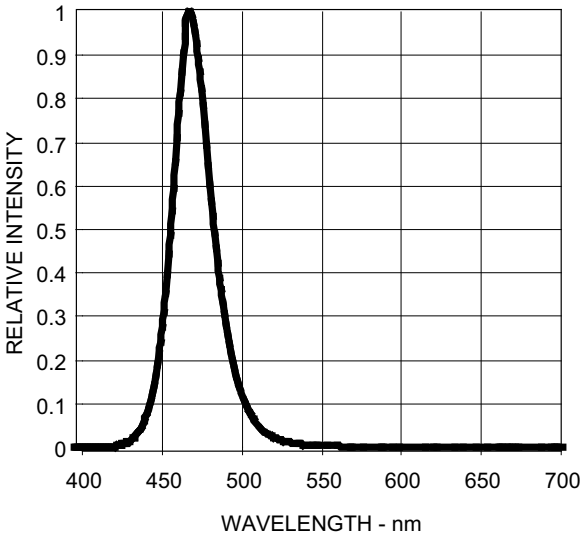


Figure 2: Forward Current vs. Forward Voltage

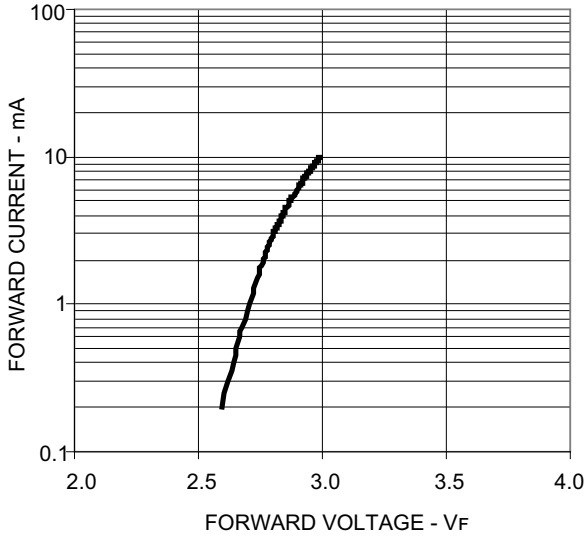


Figure 3: Luminous Intensity vs. Forward Current

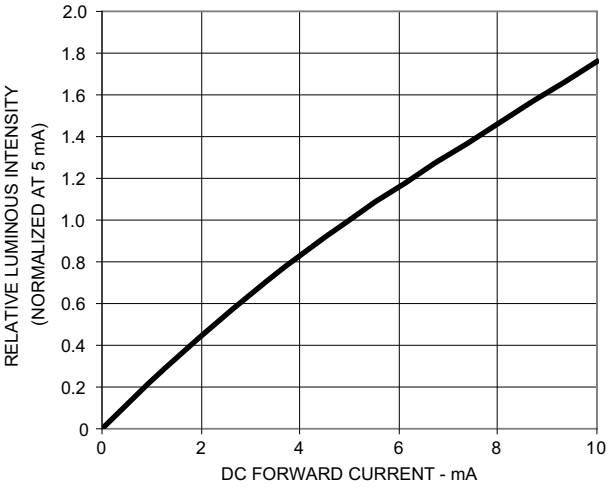


Figure 4: Maximum Forward Current vs. Ambient Temperature

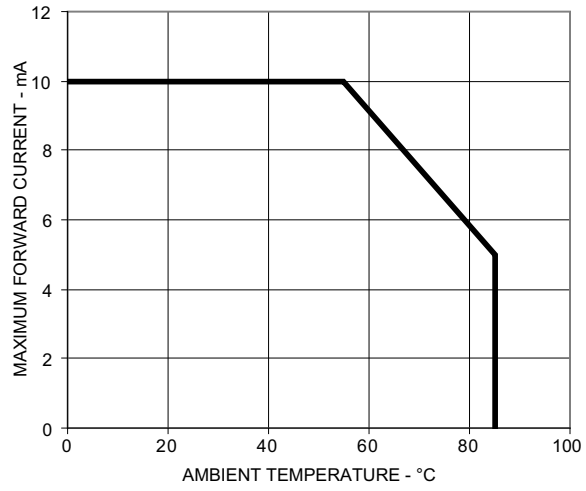


Figure 5: Radiation Pattern

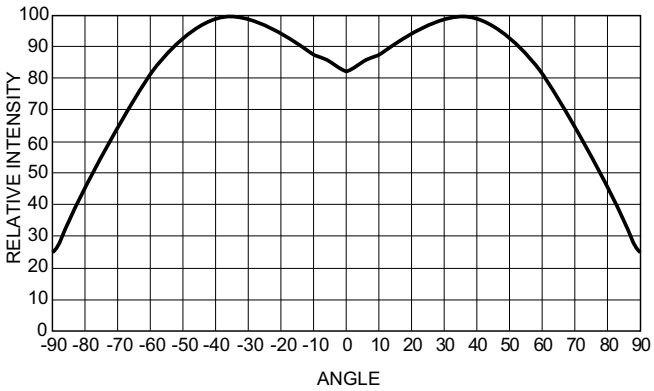
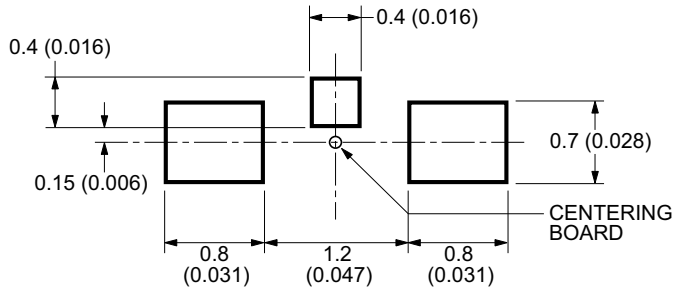


Figure 6: Recommended Soldering Land Pattern



Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.1 mm (±0.004 inch) unless otherwise specified

Figure 7: Recommended Reflow Soldering Profile

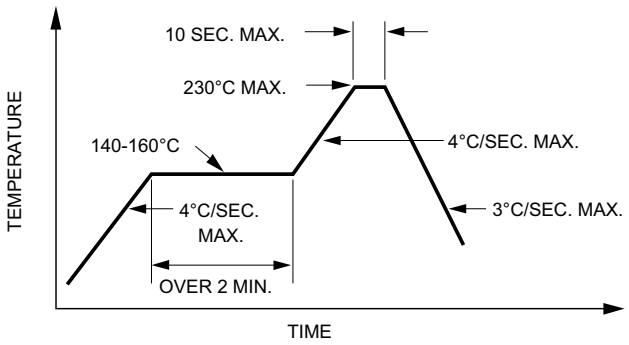


Figure 8: Reeling Orientation

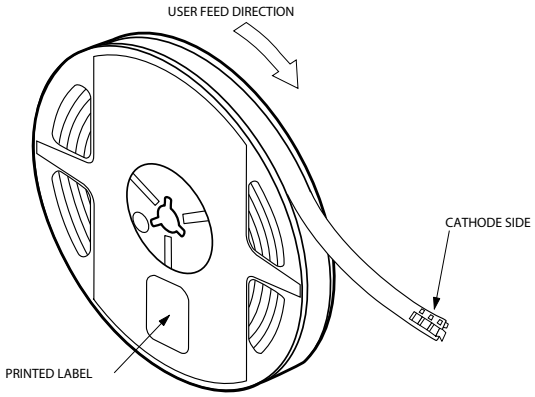
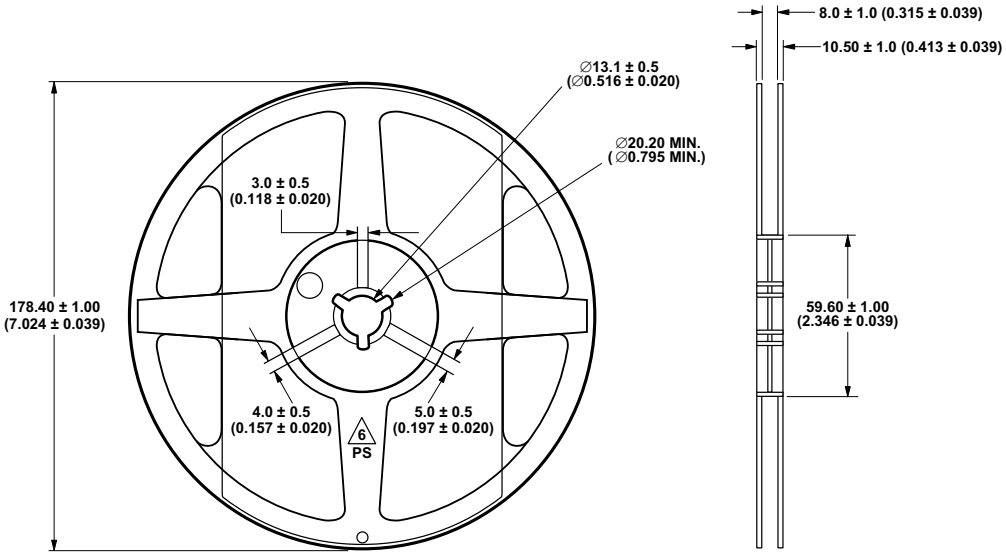


Figure 9: Reel Dimensions



NOTE:

1. All dimensions are in millimeters (inches).
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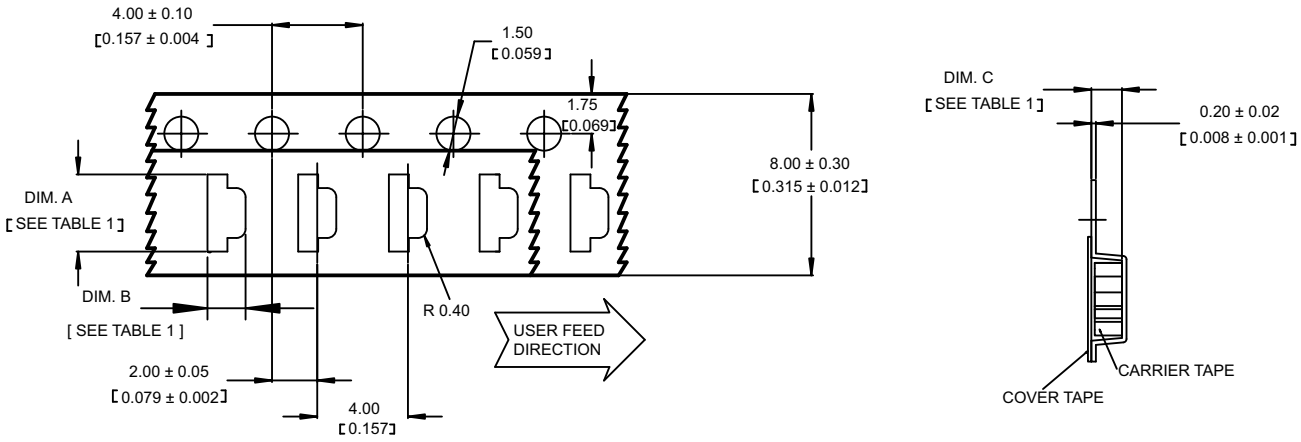
Figure 10: Tape Dimensions



Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.1 mm (±0.004 in.) unless otherwise specified.

Table 1

PART NUMBER	DIM. A ±0.10 (0.004)	DIM. B ±0.10 (0.004)	DIM. C ±0.10 (0.004)
ASMT-CB00	1.75 (0.069)	1.10 (0.043)	0.60 (0.024)

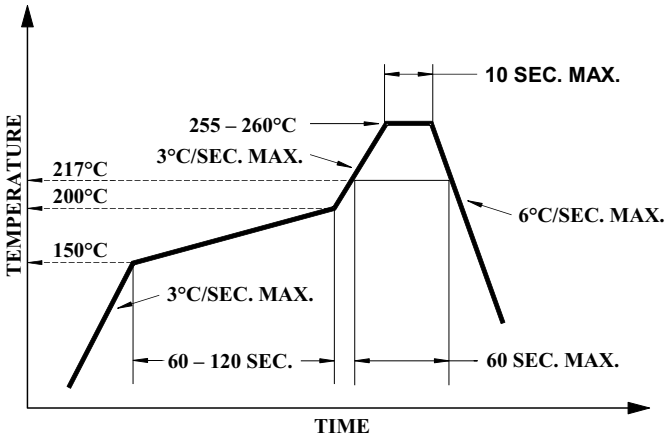
Dimensions in millimeters (inches)

Precautionary Notes

Soldering

- Do not perform reflow soldering more than twice. Observe necessary precautions of handling moisture-sensitive device as stated in the following section.
- Do not apply any pressure or force on the LED during reflow and after reflow when the LED is still hot.
- Use reflow soldering to solder the LED. Use hand soldering only for rework if unavoidable, but it must be strictly controlled to following conditions:
  - Soldering iron tip temperature = 310°C max.
  - Soldering duration = 2 seconds max.
  - Number of cycles = 1 only
  - Power of soldering iron = 50W max.
- Do not touch the LED package body with the soldering iron except for the soldering terminals, as it may cause damage to the LED.
- Confirm beforehand whether the functionality and performance of the LED is affected by soldering with hand soldering.

Figure 11: Recommended Pb-free Reflow Soldering Profile



Handling Precautions

This product has a Moisture Sensitive Level 2a rating per JEDEC J-STD-020. Refer to Broadcom Application Note AN5305, *Handling of Moisture Sensitive Surface Mount Devices* for additional details and a review of proper handling procedures.

- 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.
  - Do not open the MBB prior to assembly (for example, for IQC). If unavoidable, MBB must be properly resealed with fresh desiccant and HIC. The exposed duration must be taken in as floor life.
- Control after opening the MBB:
  - Read the HIC immediately upon opening of MBB.
  - Keep the LEDs at <30°/60%RH at all times, and complete all high temperature-related processes, including soldering, curing or rework within 672 hours.
- Control for unfinished reel:

  Store unused LEDs in a sealed MBB with desiccant or a desiccator at <5%RH.
- Control of assembled boards:

  If the PCB soldered with the LEDs is to be subjected to other high-temperature processes, store the PCB in a sealed MBB with desiccant or desiccator at <5% RH to ensure that all LEDs have not exceeded their floor life of 672 hours.
- Baking is required if:
  - The HIC indicator indicates a change in color for 10% and 5%, as stated on the HIC.
  - The LEDs are exposed to conditions of >30°C/60% RH at any time.
  - The LED's floor life exceeded 672 hours.

  The recommended baking condition is: 60°C ± 5°C for 20 hours.

  Baking can only be done once.

Application Precautions

- The drive current of the LED must not exceed the maximum allowable limit across temperature as stated in the data sheet. Constant current driving is recommended to ensure consistent performance.
- Circuit design must cater to the whole range of forward voltage (V_F) of the LEDs to ensure the intended drive current can always be achieved.
- The LED exhibits slightly different characteristics at different drive currents, which may result in a larger variation of performance (meaning: intensity, wavelength, and forward voltage). Set the application current as close as possible to the test current to minimize these variations.
- Driving the LED at low current (< 2 mA) will not cause functional failures to the LED (open/short, for example). However, the variation in intensity will be larger than the existing intensity bin ratio.
- If the LED is intended to be used along with LED of other color to achieve color mixing, Broadcom does not guarantee the consistency of the resultant color. Contact Broadcom Sale Representative for such application.
- The LED is not intended for reverse bias. Use other appropriate components for such purposes. When driving the LED in matrix form, ensure that the reverse bias voltage does not exceed the allowable limit of the LED.
- Avoid rapid change in ambient temperature, especially in high-humidity environments, because they cause condensation on the LED.
- If the LED is intended to be used in harsh or outdoor environment, protect the LED against damages caused by rain water, water, dust, oil, corrosive gases, external mechanical stresses, and so on.

Eye Safety Precautions

LEDs may pose optical hazards when in operation. Do not look directly at operating LEDs because it might be harmful to the eyes. For safety reasons, use appropriate shielding or personal protective equipment.

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