HLMP-NW50

3mm White LED Lamp

Data Sheet

Lead (Pb) Free
RoHS 6 fully
compliant

Description

This 3mm white lamp is designed with untinted and diffused optics. It is ideal for the use as indicators and backlighting.

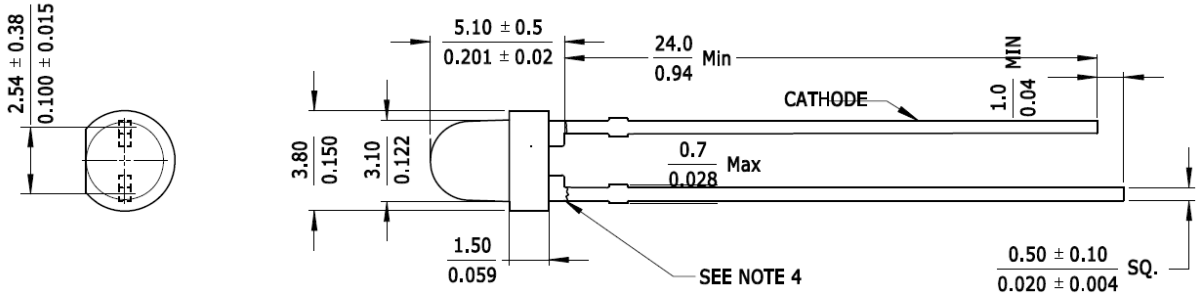
Features

- Low power consumption
- High efficiency & reliability
- Versatile mounting on PCB or panel
- I.C compatible/ low current requirement

Application

- Status indicator
- Sign backlight
  (Note: not for solid-state lighting)

Package dimension



Notes:
1. All dimensions are in millimeter (inches).
2. Tolerances are ±0.25mm unless otherwise specified.
3. Lead spacing is measured where the leads emerge from the package.
4. Epoxy meniscus may extend maximum 1mm (0.040") down the leads.

CAUTION: *InGaN devices are Class 1A HBM ESD sensitive per JEDEC Standard. Please observe appropriate precautions during handling and processing. Refer to application Note AN-1142 for additional details.*

Selection Guide

Part Number	Color	Package Description
HLMP-NW50-U0000	InGaN White	Untinted, Diffused

Part Numbering System

HLMP-NW50 – x x x xx

Mechanical Options
00: Bulk

Color Bin Selection
Please refer to the Color Bin Selection Table

Maximum Intensity Bin
0: Open (No maximum limit)

Minimum Intensity Bin
Please refer to the IV Bin Table

Absolute Maximum Rating at T_A = 25°C

Parameter	HLMP-NW50	Unit
DC Forward Current	20	mA
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	mA
Power Dissipation	74	mW
Operating Temperature Range	-30 to +85	°C
Storage Temperature Range	-40 to +85	°C

Electrical / Optical Characteristic at T_A = 25°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Luminous Intensity	Iv	3200	5300		mcd	I_F = 20mA Note 1
Viewing Angle (Horizontal)	2θ½		60		deg	Note 3
Forward Voltage	V_F	2.7	3.3	3.7	V	I_F = 20mA
Reverse Voltage	V_R	5.0			V	I_R = 100uA Note 4
Chromaticity Coordinates	x		0.28			Note 5
	y		0.26			

Notes:

1. The luminous intensity is measured on the mechanical axis of the lamp package.
2. Φ_V is the total luminous flux output as measured with an integrating sphere at 25ms mono pulse condition.
3. 2Θ½ is the off-axis angle where the luminous intensity is 1/2 the on axis intensity.
4. Indicates product final testing condition. Long term reverse bias is not recommended.
5. The chromaticity coordinates are derived from the CIE 1931 Chromaticity Diagram and represent the perceived color of the device.

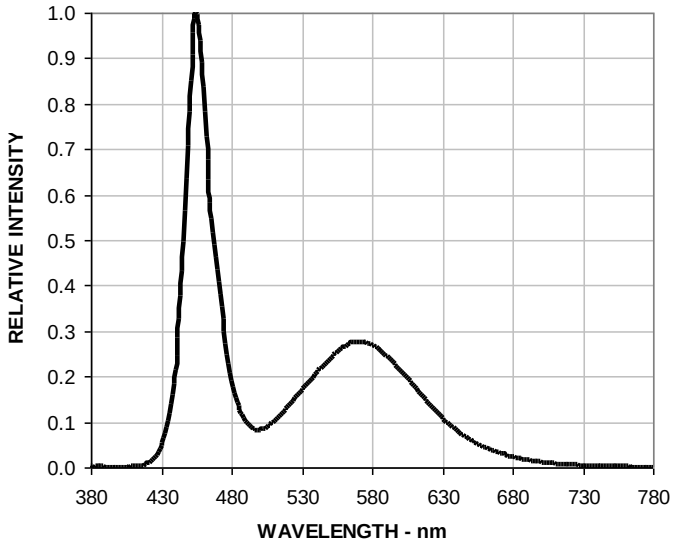


Figure 1: Relative Intensity vs. Wavelength

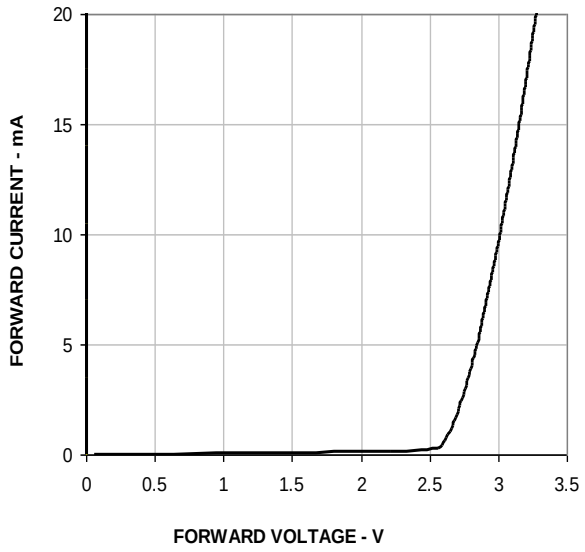


Figure 2: Forward Current vs. Forward Voltage

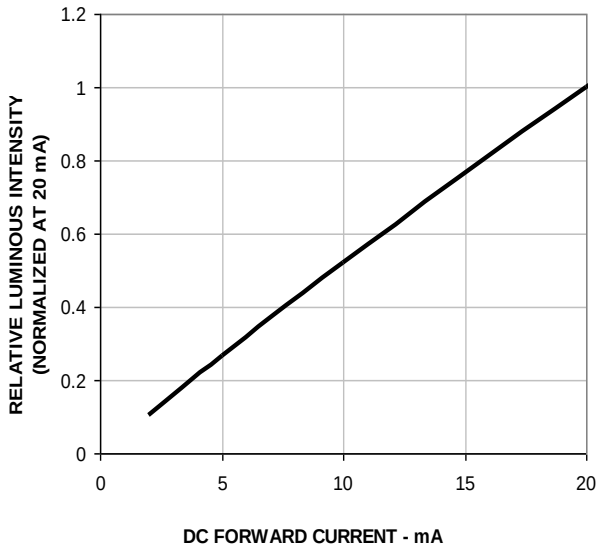


Figure 3: Relative Luminous Intensity vs. Forward Current

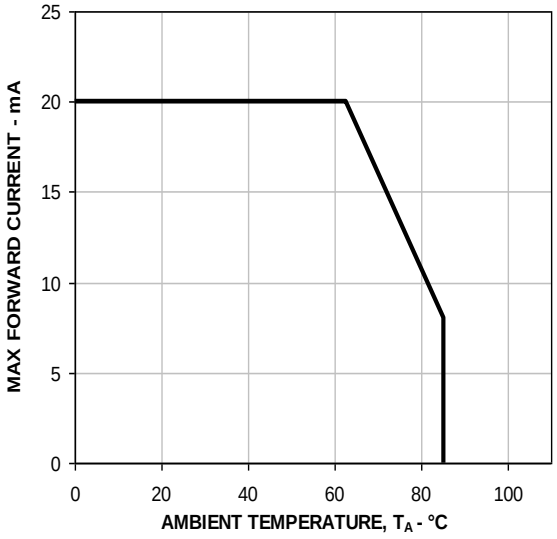


Figure 4: Maximum Forward Current vs. Ambient Temperature

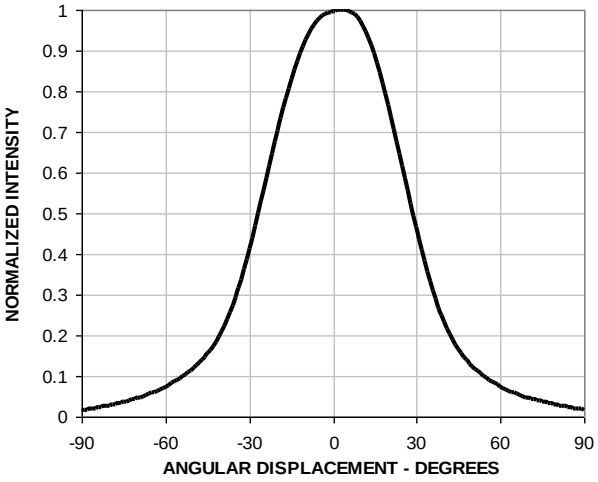


Figure 5: Radiation Pattern

Intensity Bin Limits

Bin ID	Intensity Range (mcd)	
	Min.	Max.
U	3200	4200
V	4200	5500
W	5500	7200
X	7200	9300

Tolerance for each bin limit is ±15%

Color Bin Limits

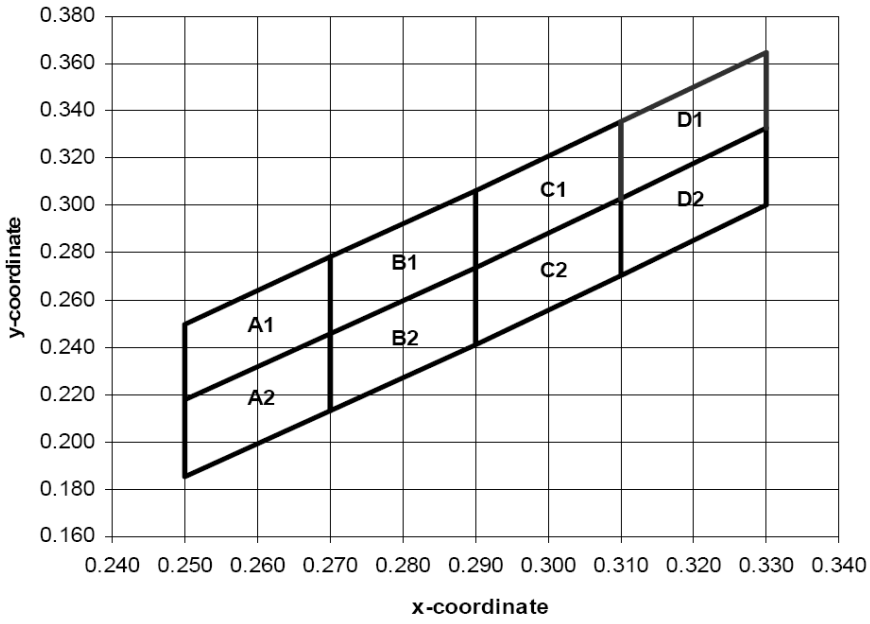
Rank		Chromaticity Coordinates			
A1	x	0.2700	0.2700	0.2500	0.2500
	y	0.2455	0.2780	0.2500	0.2175
A2	x	0.2700	0.2700	0.2500	0.2500
	y	0.2455	0.2130	0.1850	0.2175
B1	x	0.2700	0.2700	0.2900	0.2900
	y	0.2455	0.2780	0.3060	0.2735
B2	x	0.2700	0.2700	0.2900	0.2900
	y	0.2455	0.2130	0.2410	0.2735
C1	x	0.2900	0.3100	0.3100	0.2900
	y	0.3060	0.3355	0.3030	0.2735
C2	x	0.2900	0.3100	0.3100	0.2900
	y	0.2410	0.2705	0.3030	0.2735
D1	x	0.3100	0.3100	0.3300	0.3300
	y	0.3030	0.3355	0.3650	0.3325
D2	x	0.3100	0.3100	0.3300	0.3300
	y	0.3030	0.2705	0.3000	0.3325

Tolerance for each bin limit is ±0.01.

Color Bin Selection

Selection	Bin ID
0	Full Distribution
3	C1, C2, D1 and D2

Color Bin Limits with Respect to CIE 1931 Chromaticity Diagram



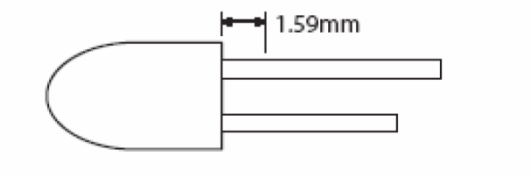
Precautions

Lead Forming:

- The leads of an LED lamp may be preformed or cut to length prior to insertion and soldering on PC board.
- During lead forming, the leads should be bent at a point at least 3mm from the base of the lens. Do not use the base of the lead frame as a fulcrum during forming. Lead forming must be done before soldering at normal temperature.
- For better control, it is recommended to use proper tool to precisely form and cut the leads to applicable length rather than doing it manually.
- If manual lead cutting is necessary, cut the leads after the soldering process. The solder connection forms a mechanical ground which prevents mechanical stress due to lead cutting from traveling into LED package. This is highly recommended for hand solder operation, as the excess lead length also acts as small heat sink.

Soldering and Handling:

- Care must be taken during PCB assembly and soldering process to prevent damage to the LED component.
- LED component may be effectively hand soldered to PCB. However, it is only recommended under unavoidable circumstances such as rework. The closest manual soldering distance of the soldering heat source (soldering iron's tip) to the body is 1.59mm. Soldering the LED using soldering iron tip closer than 1.59mm might damage the LED.



- ESD precaution must be properly applied on the soldering station and personnel to prevent ESD damage to the LED component that is ESD sensitive. Do refer to Avago application note AN 1142 for details. The soldering iron used should have grounded tip to ensure electrostatic charge is properly grounded.

- Recommended soldering condition:

	Wave Soldering [1],[2]	**Soldering Iron**
Pre-heat temperature	105 °C Max.	-
Preheat time	60 sec Max	-
Peak temperature	260 °C Max.	350 °C Max.
Dwell time	5 sec Max.	2 sec Max.

Note:

1) The conditions stated refer to measurement with thermocouple mounted at the bottom of PCB.

2) It is recommended to use only bottom preheaters in order to reduce thermal stress experienced by LED.

- Wave soldering parameters must be set and maintained according to the recommended temperature and dwell time. Customer is advised to perform daily check on the soldering profile to ensure that it is always conforming to recommended soldering conditions.
  Note:

  1. PCB with different size and design (component density) will have different heat mass (heat capacity). This might cause a change in temperature experienced by the board if same wave soldering setting is used. So, it is recommended to re-calibrate the soldering profile again before loading a new type of PCB.
  2. Customer is advised to take extra precaution during wave soldering to ensure that the maximum wave temperature does not exceed 260°C and the solder contact time does not exceeding 5sec. Over-stressing the LED during soldering process might cause premature failure to the LED due to delamination.

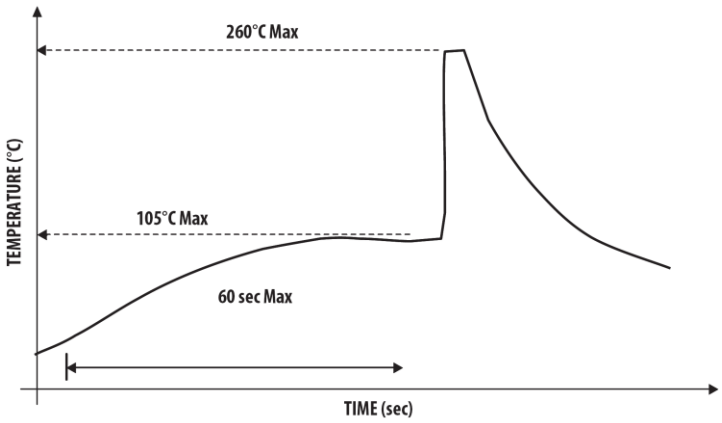
- Any alignment fixture that is being applied during wave soldering should be loosely fitted and should not apply weight or force on LED. Non metal material is recommended as it will absorb less heat during wave soldering process.
- At elevated temperature, LED is more susceptible to mechanical stress. Therefore, PCB must allowed to cool down to room temperature prior to handling, which includes removal of alignment fixture or pallet.
- If PCB board contains both through hole (TH) LED and other surface mount components, it is recommended that surface mount components be soldered on the top side of the PCB. If surface mount need to be on the bottom side, these components should be soldered using reflow soldering prior to insertion the TH LED.
- Recommended PC board plated through holes (PTH) size for LED component leads:

LED Component Lead Size	**Diagonal**	**Plated Through Hole Diameter**
0.50 x 0.50 mm (0.020 x 0.020 inch)	0.718 mm (0.029 inch)	1.050 to 1.150 mm (0.042 to 0.046 inch)

- Over-sizing the PTH can lead to twisted LED after clinching. On the other hand under sizing the PTH can cause difficulty inserting the TH LED.

Refer to application note AN5334 for more information on soldering and handling of TH LED lamp.

Recommended Wave Soldering Temperature Profile for TH LED



Recommended solder:
Sn63 (Leaded solder alloy)
SAC305 (Lead free solder alloy)

Flux: Rosin flux

Solder bath temperature: 255°C ± 5°C
(maximum peak temperature = 260°C)

Dwell time: 3.0 sec - 5.0 sec
(maximum = 5sec)

Note: Allow for board to be sufficiently cooled to room temperature before exerting mechanical force.

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