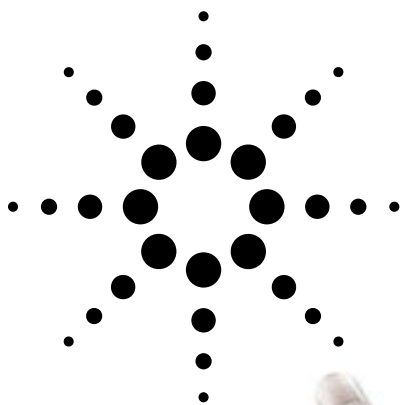




# Agilent Sun Power Series HLMP-CB15, HLMP-CM15, HLMP-CB30, HLMP-CM30 T-1<sup>3</sup>/<sub>4</sub> (5 mm) Precision Optical Performance Best Value InGaN Blue and Green Lamps Data Sheet



## Description

These high intensity blue and green LEDs are based on InGaN material technology. InGaN is the most efficient and cost effective material for LEDs in the blue and green region of the spectrum. The 472 nm typical dominant wavelength for blue and 526 nm typical dominant wavelength for green are well suited to color mixing in full color signs.

These LED lamps are untinted, nondiffused, T-1<sup>3</sup>/<sub>4</sub> packages incorporating second generation optics producing well defined spatial radiation patterns at specific viewing cone angles.

These lamps are made with an advanced optical grade epoxy, offering superior high temperature and high moisture resistance performance in outdoor signal and sign applications. The high maximum LED junction temperature limit of +130°C enables high temperature operation in bright sunlight conditions. The package epoxy contains both UV-A and UV-B inhibitors to reduce the effects of long term exposure to direct sunlight.

These lamps are available in two viewing angle options to give the designer flexibility with optical design.

## Features

- Well defined spatial radiation pattern
- Viewing angles: 15° and 30°
- High luminous output
- Colors: 472 nm Blue, 526 nm Green
- Superior resistance to moisture
- UV resistant epoxy

## Benefits

- Superior performance in outdoor environments
- Wavelengths suitable for color mixing in full color (RGB) signs

## Applications

- Commercial outdoor signs
- Automotive interior lights
- Front panel indicators
- Front panel backlighting

**CAUTION:** HLMP-CBxx and HLMP-CMxx LEDs are Class 1 ESD sensitive. Please observe appropriate precautions during handling and processing. Refer to Agilent Application Note AN-1142 for additional details.



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## LED Indicators

### Device Selection Guide

| Part Number     | Typical Viewing Angle | Color and Dominant Wavelength $\lambda_d$ (nm) Typ. | Luminous Intensity, $I_v$ (mcd) Min. | Leads with Stand-Offs |
|-----------------|-----------------------|-----------------------------------------------------|--------------------------------------|-----------------------|
| HLMP-CB15-P0000 | 15°                   | Blue 472                                            | 765                                  | No                    |
| HLMP-CB15-R0000 | 15°                   | Blue 472                                            | 1300                                 | No                    |
| HLMP-CB30-K0000 | 30°                   | Blue 472                                            | 270                                  | No                    |
| HLMP-CB30-M0000 | 30°                   | Blue 472                                            | 450                                  | No                    |
| HLMP-CM15-S0000 | 15°                   | Green 526                                           | 1650                                 | No                    |
| HLMP-CM15-W0000 | 15°                   | Green 526                                           | 4700                                 | No                    |
| HLMP-CM30-M0000 | 30°                   | Green 526                                           | 450                                  | No                    |
| HLMP-CM30-S0000 | 30°                   | Green 526                                           | 1650                                 | No                    |

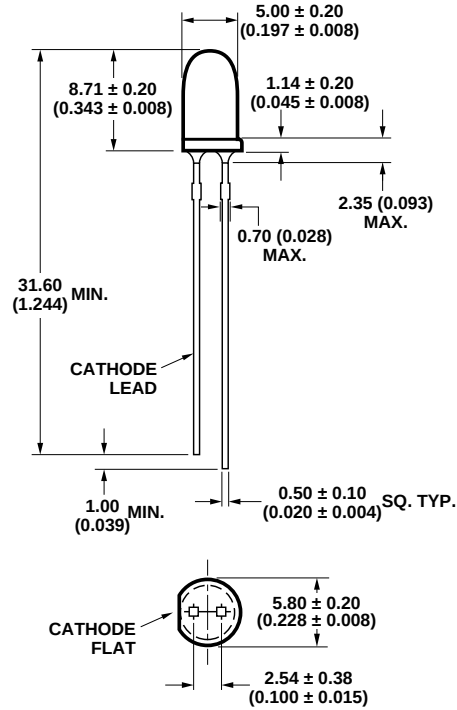
### Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

| Parameter                                    | Blue and Green      |
|----------------------------------------------|---------------------|
| DC Forward Current <sup>[1]</sup>            | 30 mA               |
| Peak Pulsed Forward Current                  | 100 mA              |
| Average Forward Current                      | 30 mA               |
| Reverse Voltage ( $I_R = 100\ \mu\text{A}$ ) | 5 V                 |
| Power Dissipation                            | 120 mW              |
| LED Junction Temperature                     | 130°C               |
| Operating Temperature Range                  | -40°C to +80°C      |
| Storage Temperature Range                    | -40°C to +100°C     |
| Soldering Temperature                        | 260°C for 5 seconds |

**Note:**

1. Derate linearly as shown in Figure 5 for temperatures above 50°C.

## Package Dimensions



### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).

## Electrical/Optical Characteristics at $T_A = 25^\circ\text{C}$

| Parameter                     | Symbol                  | Min. | Typ. | Max. | Units              | Test Conditions                                              |
|-------------------------------|-------------------------|------|------|------|--------------------|--------------------------------------------------------------|
| Forward Voltage               |                         |      |      |      |                    |                                                              |
| HLMP-CB15-P0000               | $V_F$                   |      | 3.8  | 4.0  | V                  | $I_F = 20$ mA                                                |
| HLMP-CB15-R0000               |                         |      | 3.5  | 4.0  |                    |                                                              |
| HLMP-CB30-K0000               |                         |      | 3.8  | 4.0  |                    |                                                              |
| HLMP-CB30-M0000               |                         |      | 3.8  | 4.0  |                    |                                                              |
| HLMP-CM15-S0000               |                         |      | 3.8  | 4.0  |                    |                                                              |
| HLMP-CM15-W0000               |                         |      | 3.5  | 4.0  |                    |                                                              |
| HLMP-CM30-M0000               |                         |      | 3.8  | 4.0  |                    |                                                              |
| HLMP-CM30-S0000               |                         |      | 3.5  | 4.0  |                    |                                                              |
| Reverse Voltage               | $V_R$                   | 5    |      |      |                    | $I_R = 100$ $\mu$ A                                          |
| Peak Wavelength               |                         |      |      |      |                    |                                                              |
| Blue ( $\lambda_d = 472$ nm)  | $\lambda_{\text{peak}}$ |      | 470  |      | nm                 | Peak of Wavelength of Spectral Distribution at $I_F = 20$ mA |
| Green ( $\lambda_d = 526$ nm) |                         |      | 524  |      |                    |                                                              |
| Spectral Halfwidth            |                         |      |      |      |                    |                                                              |
| Blue ( $\lambda_d = 472$ nm)  | $\Delta\lambda_{1/2}$   |      | 35   |      | nm                 | Wavelength Width at Spectral Power Point at $I_F = 20$ mA    |
| Green ( $\lambda_d = 526$ nm) |                         |      | 47   |      |                    |                                                              |
| Capacitance                   | C                       |      | 43   |      | pF                 | $V_F = 0$ , $F = 1$ MHz                                      |
| Luminous Efficacy             |                         |      |      |      |                    |                                                              |
| Blue ( $\lambda_d = 472$ nm)  | $\eta_v$                |      | 75   |      | lm/W               | Emitted Luminous Power/Emitted Radiant Power                 |
| Green ( $\lambda_d = 526$ nm) |                         |      | 520  |      |                    |                                                              |
| Thermal Resistance            | $R_{\Theta J-PIN}$      |      | 240  |      | $^\circ\text{C/W}$ | LED Junction-to-Cathode Lead                                 |

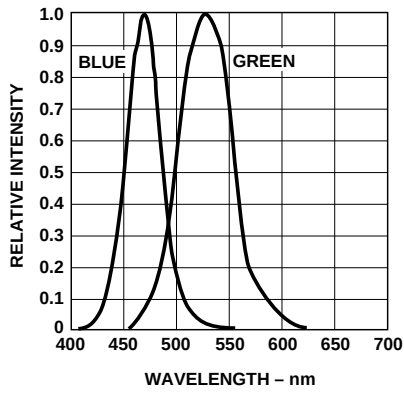


Figure 1. Relative intensity vs. wavelength.

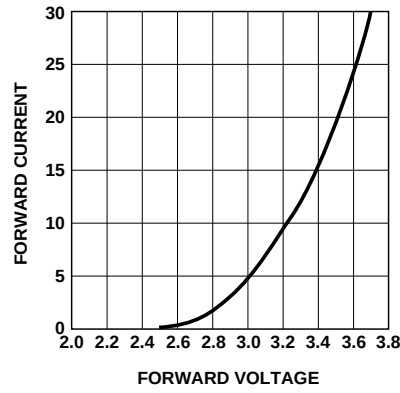


Figure 2. Forward current vs. forward voltage (for HLMP-CB15-R0000, HLMP-CM15-W0000 and HLMP-CM30-S0000).

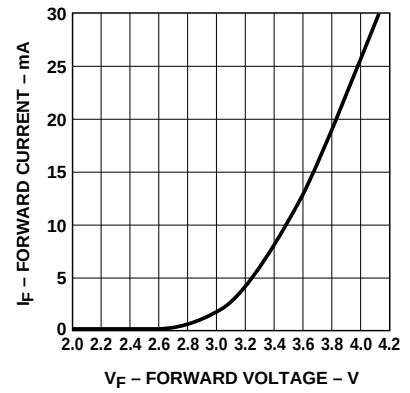


Figure 3. Forward current vs. forward voltage (for HLMP-CB15-P0000, HLMP-CB30-K0000, HLMP-CB30-M0000, HLMP-CM15-S0000 and HLMP-CM30-M0000).

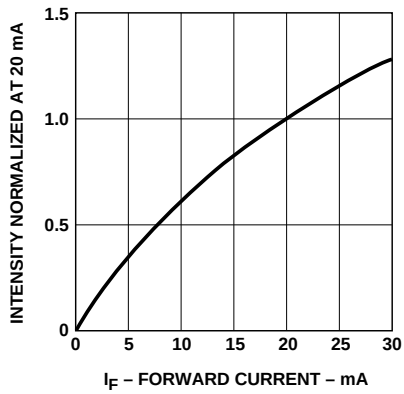


Figure 4. Relative luminous intensity vs. forward current.

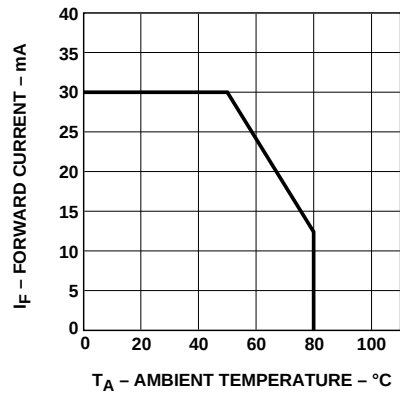


Figure 5. Maximum forward current vs. ambient temperature.

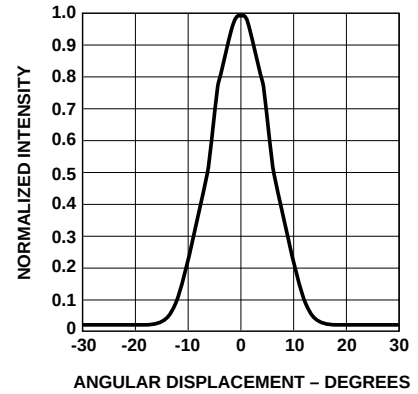


Figure 6. Spatial radiation pattern – 15° lamps.

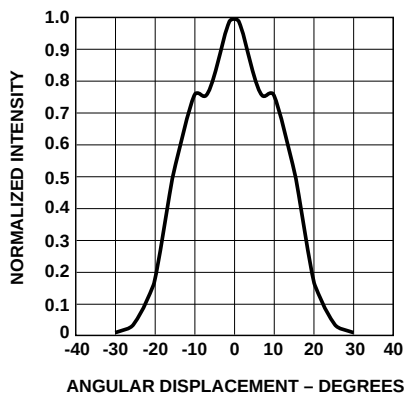


Figure 7. Spatial radiation pattern – 30° lamps.

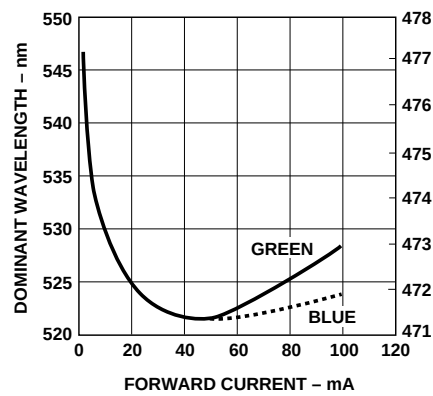


Figure 8. Color vs. forward current.

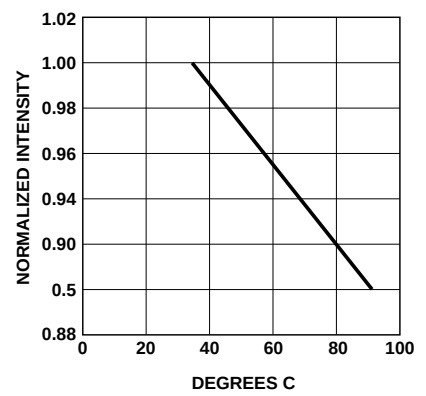


Figure 9. Normalized  $I_v$  vs.  $T$  (green).

**Color Bin Limits (nm at 20 mA)**

| <b>Blue</b>   | <b>Color Range (nm)</b> |             |
|---------------|-------------------------|-------------|
| <b>Bin ID</b> | <b>Min.</b>             | <b>Max.</b> |
| 1             | 460.0                   | 464.0       |
| 2             | 464.0                   | 468.0       |
| 3             | 468.0                   | 472.0       |
| 4             | 472.0                   | 476.0       |
| 5             | 476.0                   | 480.0       |

Tolerance for each bin limit is  $\pm 2$  nm.

| <b>Green</b>  | <b>Color Range (nm)</b> |             |
|---------------|-------------------------|-------------|
| <b>Bin ID</b> | <b>Min.</b>             | <b>Max.</b> |
| 3             | 520.0                   | 525.0       |
| 4             | 525.0                   | 530.0       |
| 5             | 530.0                   | 535.0       |
| 6             | 535.0                   | 540.0       |

Tolerance for each bin limit is  $\pm 2$  nm.

**Intensity Bin Limits**

| <b>Bin Name</b> | <b>Min.</b> | <b>Max.</b> |
|-----------------|-------------|-------------|
| K               | 310         | 400         |
| L               | 400         | 520         |
| M               | 520         | 680         |
| N               | 680         | 880         |
| P               | 880         | 1150        |
| Q               | 1150        | 1500        |
| R               | 1500        | 1900        |
| S               | 1900        | 2500        |
| T               | 2500        | 3200        |
| U               | 3200        | 4200        |
| V               | 4200        | 5500        |
| W               | 5500        | 7200        |

Tolerance of each minimum and maximum is  $\pm 15\%$ .

**Note:**

1. All bin categories are established for classification of products. Products may not be available in all bin categories. Please contact your Agilent representatives for further information.

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