Agilent Technologies

T-1 3/4 (5 mm) Precision Optical Performance InGaN Blue and Green LEDs

Technical Data

SunPower Series

HLMP-CB15 HLMP-CM15
HLMP-CB16 HLMP-CM16
HLMP-CB30 HLMP-CM30
HLMP-CB31 HLMP-CM31

Features

- **Smooth, Consistent Spatial Radiation Patterns**
- **Viewing Angles: 15˚ and 30˚**
- **High Luminous Output**
- **Colors: 472 nm Blue, 526 nm Green**
- **Superior Resistance to Moisture**

Benefits

- **Superior Performance in Outdoor Environments**
- **Wavelengths Suitable for Color Mixing in Full Color (RGB) Signs**
- **Color to Color Consistency of Radiation Patterns (CBxx to CMxx to HLMP-EGxx Red) Enables Sign Color Uniformity at All Angles**

Applications

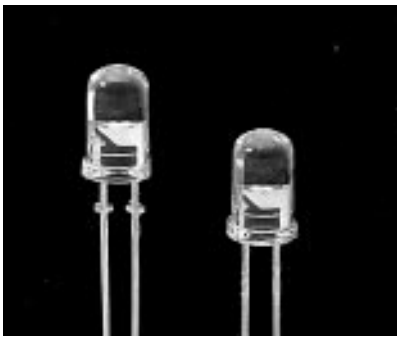
- **Commercial Outdoor Signs**
- **Automotive Interior Lights**
- **Front Panel Indicators**
- **Front Panel Backlighting**

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 3/4 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 temperature and moisture resistance 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.

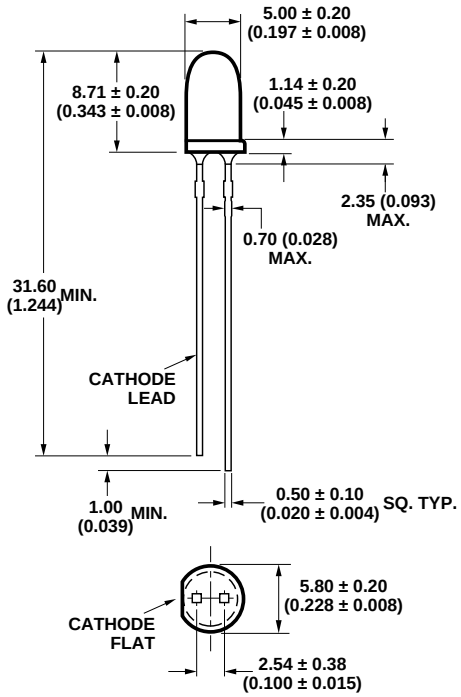
These lamps are available in two viewing angle options and two package options to give the designer flexibility with optical design and device mounting.

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

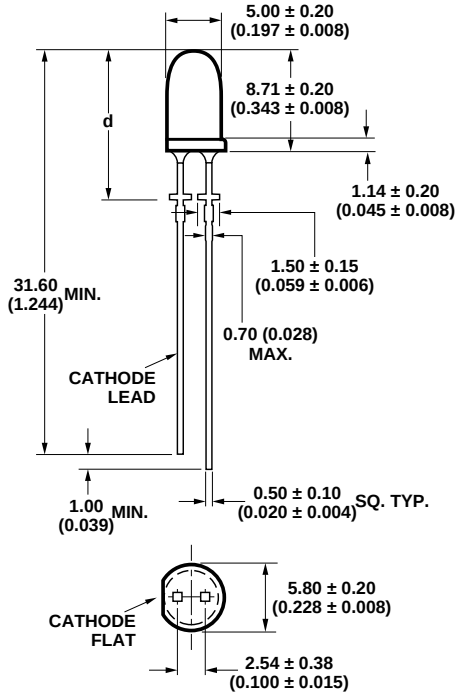
Device Selection Guide

Part Number	Color	Viewing Angle	Typical Intensity at 20 mA (mcd)	Stand Off
HLMP-CB15	Blue	15°	1575	No
HLMP-CB16	Blue	15°	1575	Yes
HLMP-CB30	Blue	30°	560	No
HLMP-CB31	Blue	30°	560	Yes
HLMP-CM15	Green	15°	4700	No
HLMP-CM16	Green	15°	4700	Yes
HLMP-CM30	Green	30°	1750	No
HLMP-CM31	Green	30°	1750	Yes

Package Dimensions



HLMP-Cx15 and HLMP-Cx30



HLMP-Cx16 and HLMP-Cx31

Notes:
1. Dimensions in mm.
2. Tolerance ± 0.1 mm unless otherwise noted.

HLMP-Cx16	HLMP-Cx31
d = 12.60 ± 0.25 (0.496 ± 0.010)	d = 11.96 ± 0.25 (0.471 ± 0.010)

Absolute Maximum Ratings at T_A = 25°C

Parameter	Value	Units
DC Forward Current[1]	30	mA
Peak Forward Current	100	mA
Average Forward Current	30	mA
Power Dissipation	120	mW
Reverse Voltage (I_R = 100 μA)	5	V
LED Junction Temperature	130	°C
Operating Temperature Range	–40 to +80	°C
Storage Temperature Range	–40 to +100	°C

Note:
1. Derate linearly as shown in Figure 4 for temperatures above 50°C.

Optical Characteristics at T_A = 25°C

Part Number	Luminous Intensity I_V[1] (mcd) at I_F = 20 mA Min.	Typ.	Peak Wavelength λ_{PEAK} (nm) Typ.	Color, Dominant Wavelength λ_d[2] (nm) Typ.	Spectral Halfwidth $\Delta\lambda_{1/2}$ (nm)	Viewing Angle $2\theta_{1/2}$ Degrees[3] Typ.	Luminous Efficacy[4] η_V (lm/W)
HLMP-CB15/16	765	1575	470	472	35	15	75
HLMP-CB30/31	270	560	470	472	35	30	75
HLMP-CM15/16	1650	4700	524	526	47	15	520
HLMP-CM30/31	765	1750	524	526	47	30	520

Notes:
1. All InGaN LEDs represented here are IEC825 Class 2. See *Application Brief 1009* and *1015* for details.
2. The dominant wavelength λ_d 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 1/2 the peak intensity.
4. Luminous efficacy is the ratio of luminous flux to radiant flux.

Electrical Characteristics at T_A = 25°C

Forward Voltage V_F (Volts) at I_F = 20 mA Typ.	Max.	Reverse Breakdown V_R (Volts) at I_R = 100 μA Min.	Capacitance C (pF), V_F = 0, f = 1 MHz Typ.	Thermal Resistance $R\theta_{J\text{-}PIN}$ (°C/W)
3.8	4.0	5	43	240

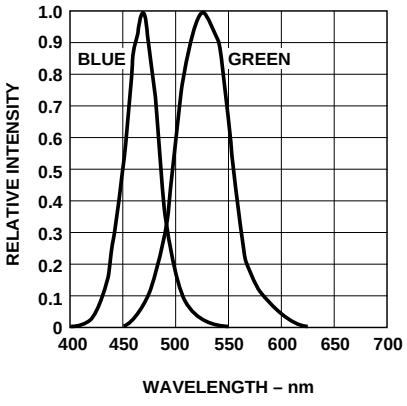


Figure 1. Relative Intensity vs. Wavelength.

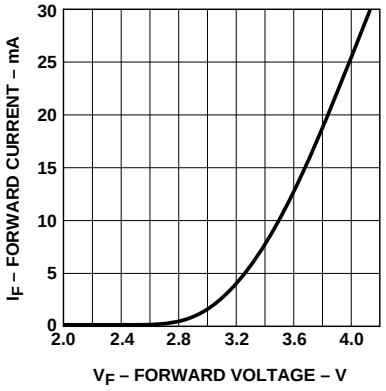


Figure 2. Forward Current vs. Forward Voltage.

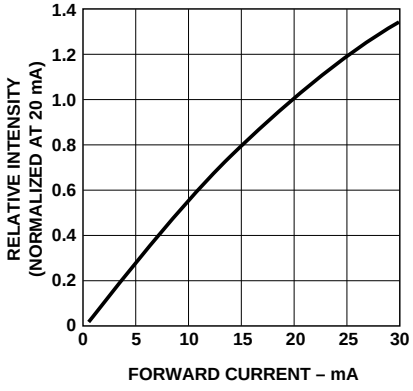


Figure 3. Relative Luminous Intensity vs. Forward Current.

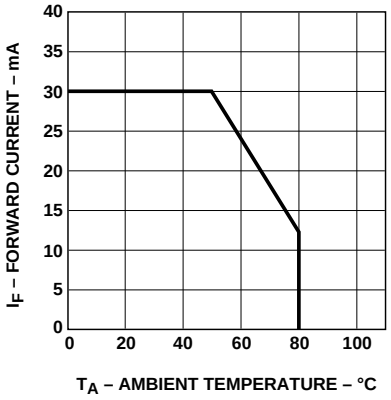


Figure 4. Maximum Forward Current vs. Ambient Temperature.

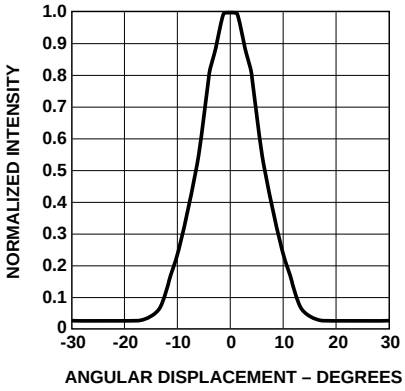


Figure 5. Spatial Radiation Pattern – 15° Lamps.

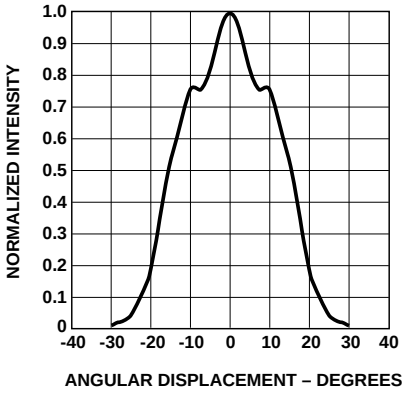


Figure 6. Spatial Radiation Pattern – 30° Lamps.

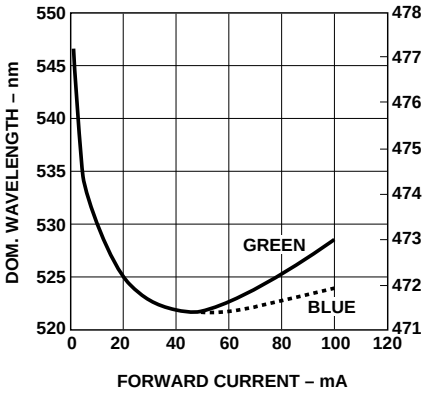


Figure 7. Color vs. Forward Current.

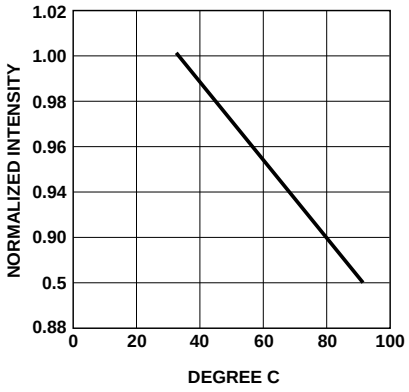


Figure 8. Normalized Iv vs. T (Green).

Color Bin Limits (nm at 20 mA)

Blue	nm @ 20 mA	
Bin ID	**Min.**	**Max.**
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 will be ± 2 nm.

Green	nm @ 20 mA	
Bin ID	**Min.**	**Max.**
3	520.0	525.0
4	525.0	530.0
5	530.0	535.0
6	535.0	540.0

Intensity Bin Limits (mcd @ 20 mA)		
Bin Name	**Min.**	**Max.**
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 = ± 15%.

For product information and a complete list of distributors, please go to our web site.

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