Agilent Precision Optical Performance Red, Blue and Green LEDs 5 mm Standard Oval

Data Sheet

HLMP-HD55, HLMP-HB57, HLMP-HM57

Description

These Extra Bright Precision Optical Performance Oval LEDs are specifically designed for full color/video and passenger information signs. The oval shaped radiation pattern and high luminous intensity ensure these devices are excellent for wide field of view outdoor applications where a wide viewing angle and readability in sunlight are essential. These lamps have very smooth, matched radiation patterns ensuring consistent color mixing in full color applications, message uniformity across the viewing angle of the sign. High efficiency LED material is used in these lamps: higher performance Aluminum Indium Gallium Phosphide (AlInGaP II) for red color, Indium Gallium Nitride (InGaN) for blue and green. Each lamp is made with an advance optical grade epoxy offering superior high temperature and high moisture resistance in outdoor applications.

Features

- **Well defined spatial radiation pattern**
- **High brightness material**
- **Available in red, green and blue color**

Benefits

- **Viewing angle designed for wide field of view applications**
- **Superior performance for outdoor environments**

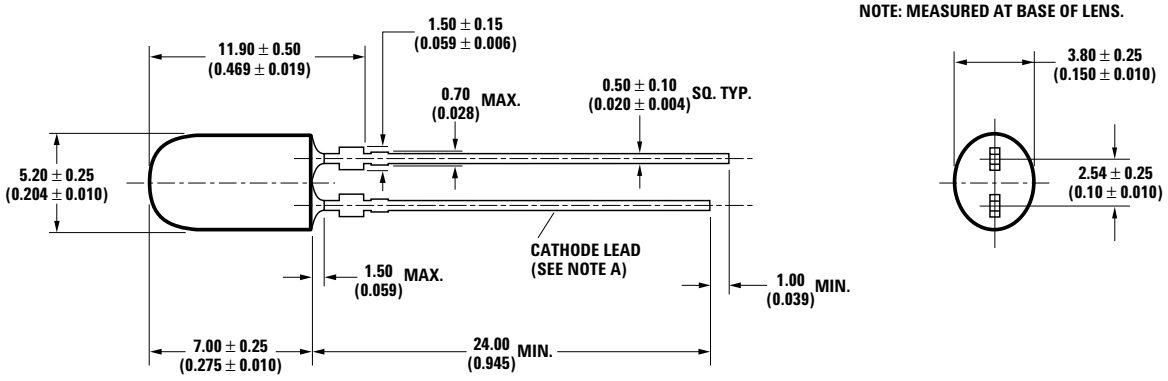
Applications

- **Full color signs**
- **Commercial outdoor advertising**

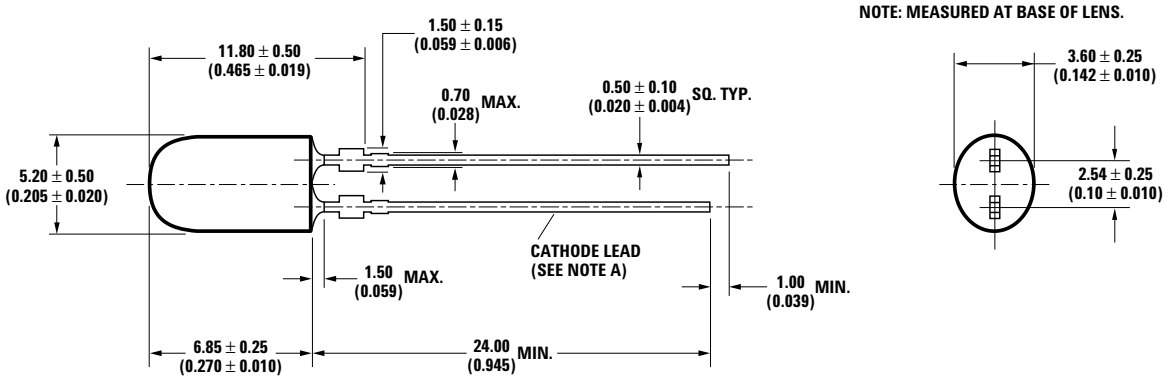
***Caution**: InGaN devices are Class I ESD sensitive. Please observe appropriate precautions during handling and processing. Refer to Application Note AN-1142 for additional details.*

Package Dimensions

A



B



NOTES:

1. DIMENSIONS IN MILLIMETERS (INCHES).

2. IF HEAT-SINKING APPLICATION IS REQUIRED, THE TERMINAL FOR HEAT SINK IS ANODE.

Device Selection Guide

Part Number	Color	Typical Dominant Wavelength λ_d (nm)	Luminous Intensity Iv (mcd) at 20 mA		Lens Type	Package Dimension
			Minimum	Maximum		
HLMP-HD55-NR0xx	Red	630	680	1900	Tinted, Diffused	A
HLMP-HB57-KN0xx	Blue	470	310	880	Tinted, Diffused	B
HLMP-HB57-LMCxx	Blue	470	400	680	Tinted, Diffused	B
HLMP-HB57-LP0xx	Blue	470	400	1150	Tinted, Diffused	B
HLMP-HM57-SV0xx	Green	525	1900	5500	Tinted, Diffused	B
HLMP-HM57-RSCxx	Green	525	1500	2500	Tinted, Diffused	B
HLMP-HM57-RU0xx	Green	525	1500	4200	Tinted, Diffused	B

Notes:
1. Tolerance for luminous intensity measurement is ±15%.
2. The luminous intensity is measured on the mechanical axis of the lamp package.
3. The optical axis is closely aligned with the package mechanical axis.
4. The dominant wavelength, λ_d, is derived from the Chromaticity Diagram and represents the color of the lamp.
5. LED light output is bright enough to cause injuries to the eyes. Precautions must be taken to prevent looking directly at the LED with unaided eyes.

Part Numbering System

HLMP - x x 5x - x x x xx

Mechanical Option
00: Bulk
DD: Ammo Pack
ZZ: Flexi-Bin; Ammo Pack

Color Bin Option
0: Full Color Bin Distribution
C: Color Bin 3 & 4

Maximum Intensity Bin
Refer to Device Selection Guide

Minimum Intensity Bin
Refer to Device Selection Guide

Color
B: Blue 470 nm
D: Red 630 nm
M: Green 525 nm

Package
H: 5 mm Standard Oval

Absolute Maximum Rating at T_A = 25°C

Parameters	Blue and Green	Red	Unit
DC Forward Current[1]	30	50	mA
Peak Pulsed Forward Current	100[2]	100[3]	mA
Power Dissipation	116	120	mW
LED Junction Temperature	130	130	°C
Operating Temperature Range	-40 to +85	-40°C to 100°C	°C
Storage Temperature Range	-40 to +100	-40°C to 120°C	°C
Wave Soldering Temperature[4]	250°C for 3 secs	250°C for 3 secs	
Solder Dipping Temperature[4]	260°C for 5 secs	260°C for 5 secs	

Notes:

1. Derate linearly as shown in Figures 2 and 7.
2. Duty factor 10%, frequency 1 KHz.
3. Duty factor 30%, frequency 1 KHz.
4. 1.59 mm (0.06 inch) below body.

Electrical/Optical Characteristics
T_A = 25°C

Parameters	Symbol	Value			Units	Test Condition
		Min.	Typ.	Max.		
Forward Voltage	V_F				V	I_F = 20 mA
Red			2.20	2.40		
Green			3.30	3.85		
Blue			3.20	3.85		
Reverse Voltage[1]	V_R				V	
Red		5.0				I_R = 100 μA
Green, Blue		5.0				I_R = 10 μA
Capacitance	C				pF	V_F = 0, f = 1 MHz
Red			40			
Green			65			
Blue			64			
Thermal Resistance[2]	$R\theta_{J\text{-}PIN}$		240		°C/W	LED Junction to Cathode Lead
Dominant Wavelength[3,4]	λ_d				nm	I_F = 20 mA
Red		622	630	634		
Green		520	525	540		
Blue		460	470	480		
Peak Wavelength	λ_{PEAK}				nm	Peak of Wavelength of Spectral
Red			639			Distribution at I_F = 20 mA
Green			516			
Blue			464			
Spectral Half Width	$\Delta\lambda_{1/2}$				nm	Wavelength Width at Spectral
Red			17			Distribution Power Point at
Green			32			I_F = 20 mA
Blue			23			
Luminous Efficacy[4]	η_v				lm/W	Emitted Luminous
Red			155			Power/Emitted Radiant Power
Green			484			
Blue			74			

Notes:
1. The reverse voltage of blue and green is equivalent to the forward voltage of the protective chip at I_R = 10 μA.
   The reverse voltage of red is equivalent to the forward voltage of the protective chip at I_R = 100 μA.
2. For AlInGaP Red, the thermal resistance applied to LED junction to cathode lead. For InGaN Blue and Green, the thermal resistance applied to LED junction to anode lead.
3. The dominant wavelength, λ_d, is derived from the Chromaticity Diagram and represents the color of the lamp.
4. Tolerance for each color bin limit is ± 0.5 nm.
5. The radiant intensity, Ie in watts/steradian, may be found from the equation Ie = Iv/η_v, where Iv is the luminous intensity in candelas and η_v is the luminous efficacy in lumens/watt.

AlInGaP Red 630nm

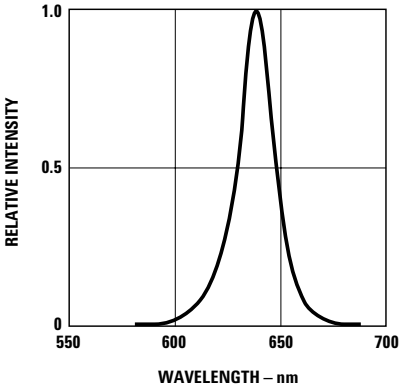


Figure 1. Relative intensity vs. wavelength.

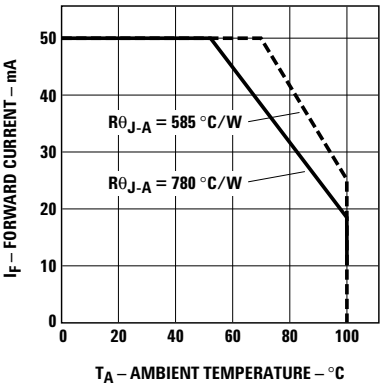


Figure 2. Forward current vs. ambient temperature.

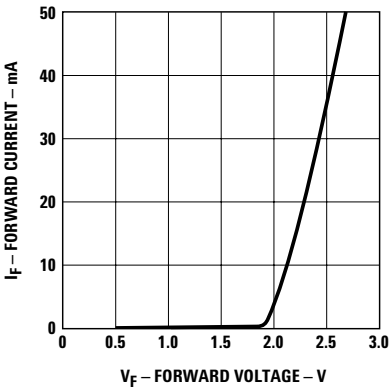


Figure 3. Forward current vs. forward voltage.

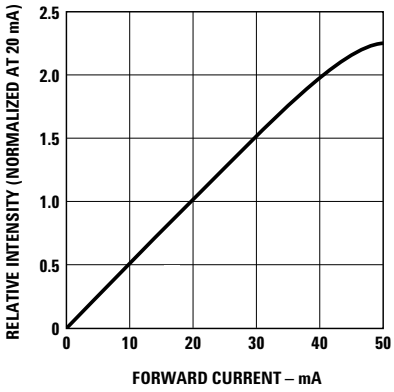


Figure 4. Relative luminous intensity vs. forward current.

InGaN Blue and Green

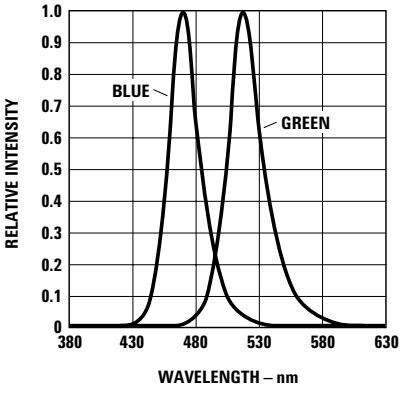


Figure 5. Relative intensity vs. wavelength.

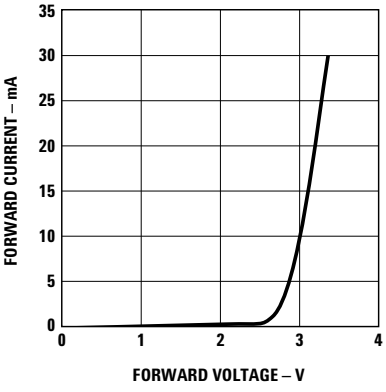


Figure 6. Forward current vs. forward voltage.

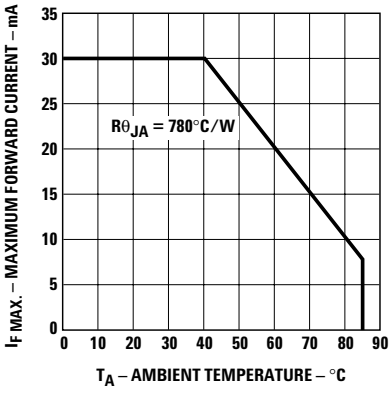


Figure 7. Forward current vs. ambient temperature.

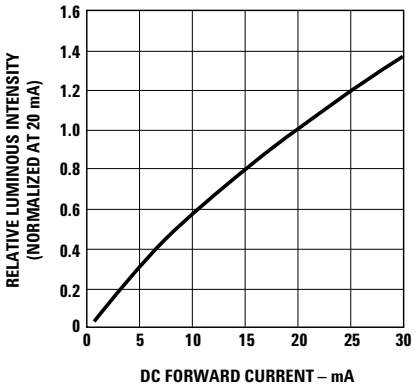


Figure 8. Relative intensity vs. forward current.

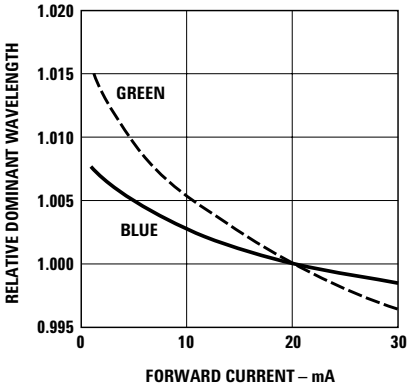


Figure 9. Relative dominant wavelength vs. DC forward current.

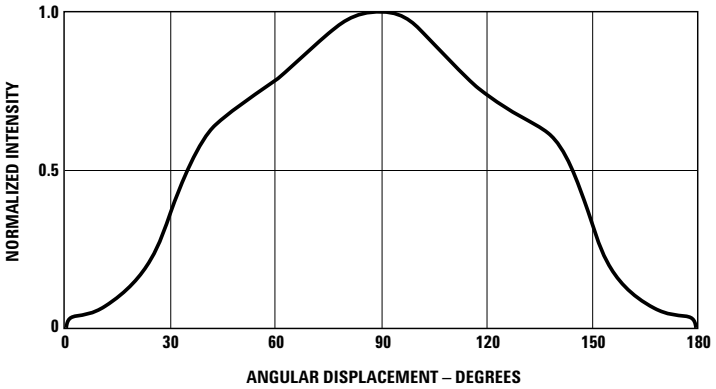


Figure 10. Spatial radiation pattern – major axis.

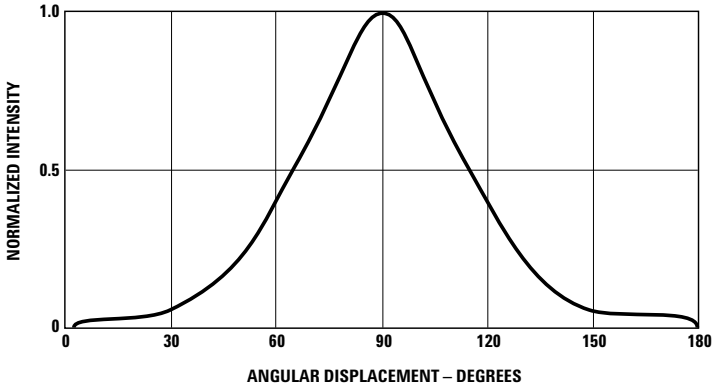


Figure 11. Spatial radiation pattern – minor axis.

Intensity Bin Limit Table

	Intensity (mcd) at 20 mA	
Bin	**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

Tolerance for each bin limit is ± 15%.

Blue Color Bin Table

Bin	Min. Dom	Max. Dom	Xmin	Ymin	Xmax	Ymax
1	460.0	464.0	0.1440	0.0297	0.1766	0.0966
			0.1818	0.0904	0.1374	0.0374
2	464.0	468.0	0.1374	0.0374	0.1699	0.1062
			0.1766	0.0966	0.1291	0.0495
3	468.0	472.0	0.1291	0.0495	0.1616	0.1209
			0.1699	0.1062	0.1187	0.0671
4	472.0	476.0	0.1187	0.0671	0.1517	0.1423
			0.1616	0.1209	0.1063	0.0945
5	476.0	480.0	0.1063	0.0945	0.1397	0.1728
			0.1517	0.1423	0.0913	0.1327

Tolerance for each bin limit is ± 0.5 nm.

Green Color Bin Table

Bin	Min. Dom	Max. Dom	Xmin	Ymin	Xmax	Ymax
1	520.0	524.0	0.0743	0.8338	0.1856	0.6556
			0.1650	0.6586	0.1060	0.8292
2	524.0	528.0	0.1060	0.8292	0.2068	0.6463
			0.1856	0.6556	0.1387	0.8148
3	528.0	532.0	0.1387	0.8148	0.2273	0.6344
			0.2068	0.6463	0.1702	0.7965
4	532.0	536.0	0.1702	0.7965	0.2469	0.6213
			0.2273	0.6344	0.2003	0.7764
5	536.0	540.0	0.2003	0.7764	0.2659	0.6070
			0.2469	0.6213	0.2296	0.7543

Tolerance for each bin limit is ± 0.5 nm.

Red Color Range

Min. Dom	Max. Dom	Xmin	Ymin	Xmax	Ymax
622	634	0.6904	0.3094	0.6945	0.2888
		0.6726	0.3106	0.7135	0.2865

Tolerance for each bin limit is ± 0.5 nm.

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Data subject to change.

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