

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

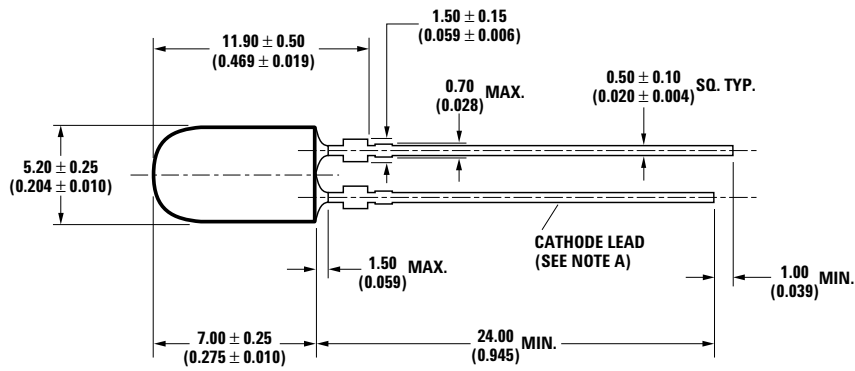
- Full color signs
- Commercial outdoor advertising

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.

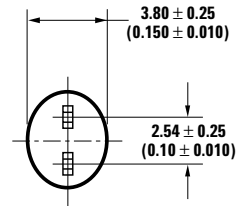


Package Dimensions

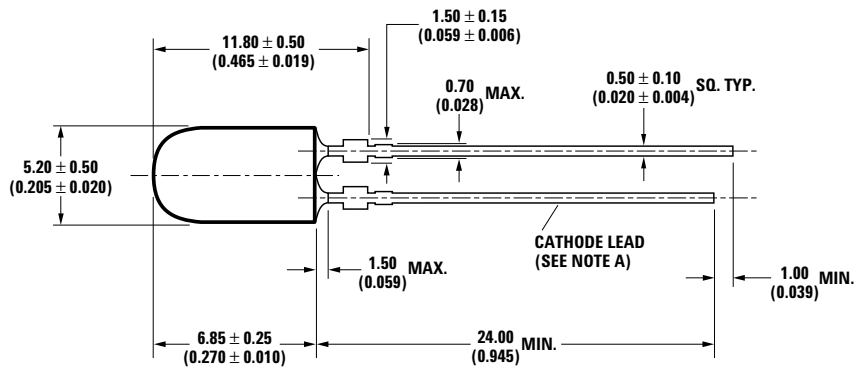
A



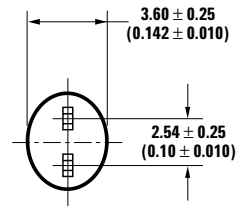
NOTE: MEASURED AT BASE OF LENS.



B



NOTE: MEASURED AT BASE OF LENS.



NOTES:

1. DIMENSIONS IN MILLIMETERS (INCHES).
2. IF HEAT-SINKING APPLICATION IS REQUIRED, THE TERMINAL FOR HEAT SINK IS ANODE.

Device Selection Guide

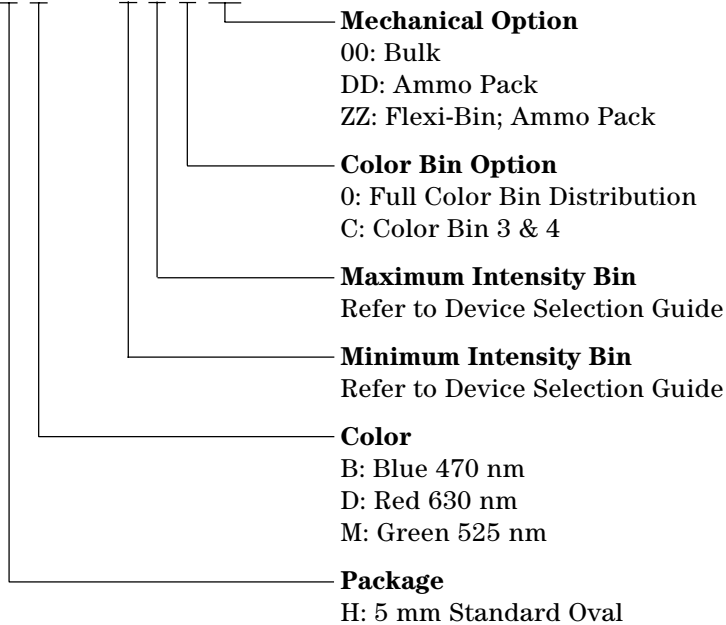
Part Number	Color	Typical Dominant Wavelength λ_d (nm)	Luminous Intensity I_v (mcd) at 20 mA		Lens Type	Package Dimension
			Minimum	Maximum		
HLMP-HD55-NR0xx	Red	630	680	1900	Tinted, Diffused	A
HLMP-HB57-KN0xx	Blue	470	310	880	Tinted, Diffused	B
HLMP-HB57-LMCxx	Blue	470	400	680	Tinted, Diffused	B
HLMP-HB57-LP0xx	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 $\pm 15\%$.
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



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

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	$^\circ\text{C}$
Operating Temperature Range	-40 to +85	-40 $^\circ\text{C}$ to 100 $^\circ\text{C}$	$^\circ\text{C}$
Storage Temperature Range	-40 to +100	-40 $^\circ\text{C}$ to 120 $^\circ\text{C}$	$^\circ\text{C}$
Wave Soldering Temperature ^[4]	250 $^\circ\text{C}$ for 3 secs	250 $^\circ\text{C}$ for 3 secs	
Solder Dipping Temperature ^[4]	260 $^\circ\text{C}$ for 5 secs	260 $^\circ\text{C}$ 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

$T_A = 25^\circ\text{C}$

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

Notes:

1. The reverse voltage of blue and green is equivalent to the forward voltage of the protective chip at $I_R = 10\ \mu\text{A}$.
The reverse voltage of red is equivalent to the forward voltage of the protective chip at $I_R = 100\ \mu\text{A}$.
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 $\pm 0.5\text{ nm}$.
5. The radiant intensity, I_e in watts/steradian, may be found from the equation $I_e = I_v/\eta_v$, where I_v is the luminous intensity in candelas and η_v is the luminous efficacy in lumens/watt.

AllnGaP Red 630nm

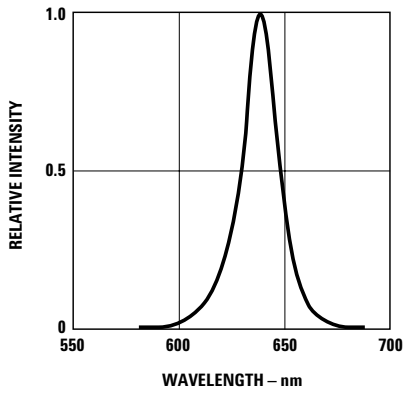


Figure 1. Relative intensity vs. wavelength.

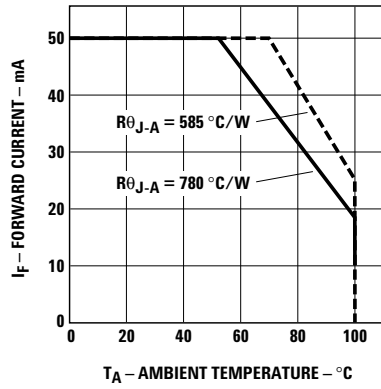


Figure 2. Forward current vs. ambient temperature.

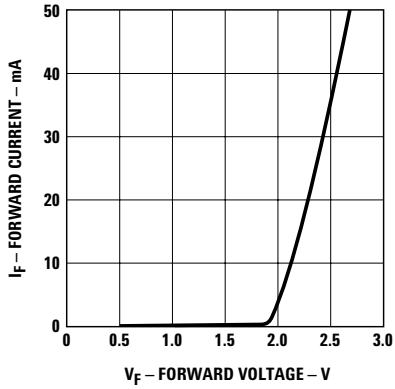


Figure 3. Forward current vs. forward voltage.

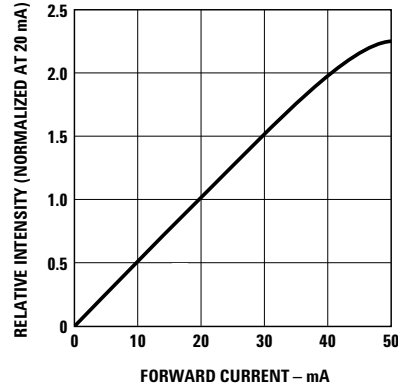


Figure 4. Relative luminous intensity vs. forward current.

InGaN Blue and Green

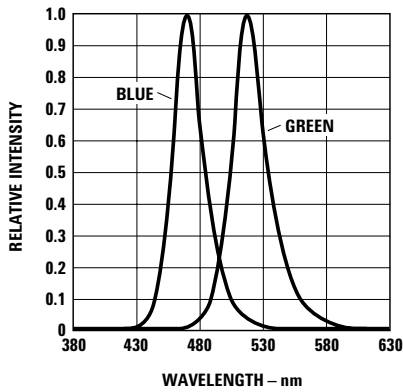


Figure 5. Relative intensity vs. wavelength.

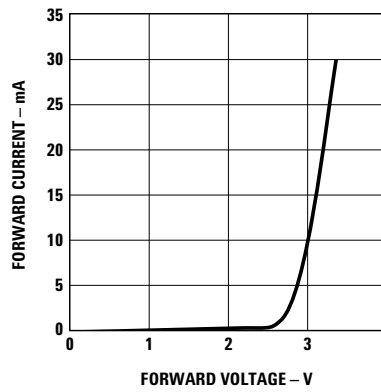


Figure 6. Forward current vs. forward voltage.

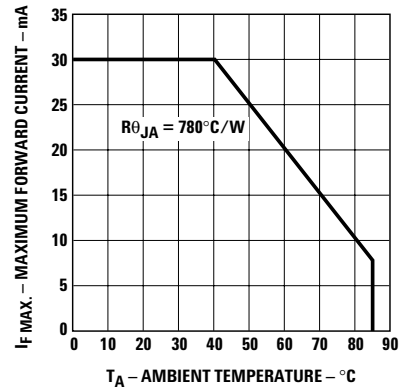


Figure 7. Forward current vs. ambient temperature.

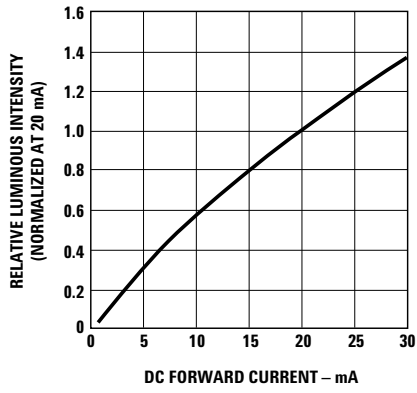


Figure 8. Relative intensity vs. forward current.

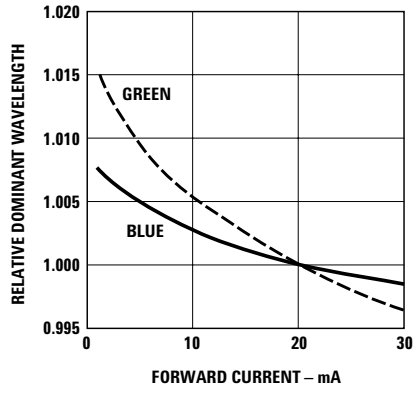


Figure 9. Relative dominant wavelength vs. DC forward current.

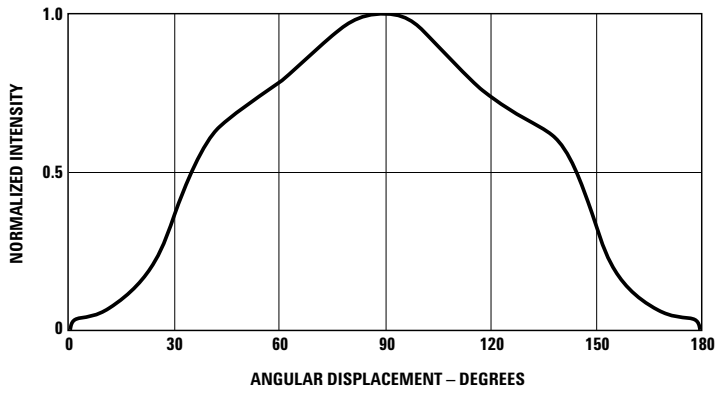


Figure 10. Spatial radiation pattern - major axis.

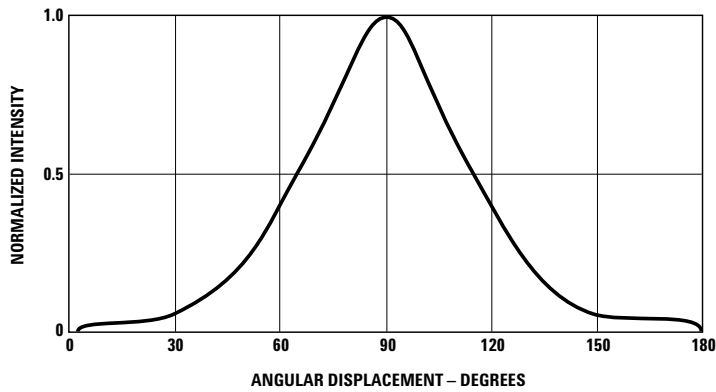


Figure 11. Spatial radiation pattern - minor axis.

Intensity Bin Limit Table

Bin	Intensity (mcd) at 20 mA	
	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 $\pm 15\%$.

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.

www.agilent.com/semiconductors

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

For technical assistance call:

Americas/Canada: +1 (800) 235-0312 or
(916) 788-6763

Europe: +49 (0) 6441 92460

China: 10800 650 0017

Hong Kong: (+65) 6756 2394

India, Australia, New Zealand: (+65) 6755 1939

Japan: (+81 3) 3335-8152(Domestic/International), or 0120-61-1280(Domestic Only)

Korea: (+65) 6755 1989

Singapore, Malaysia, Vietnam, Thailand,
Philippines, Indonesia: (+65) 6755 2044

Taiwan: (+65) 6755 1843

Data subject to change.

Copyright © 2005 Agilent Technologies, Inc.

Obsoletes 5989-1905EN

June 22, 2005

5989-3355EN



Agilent Technologies