Agilent HLMP-HB56, HLMP-HM56
5 mm Precision Optical Performance Blue and Green Oval LEDs

Data Sheet

Features

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

Benefits

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

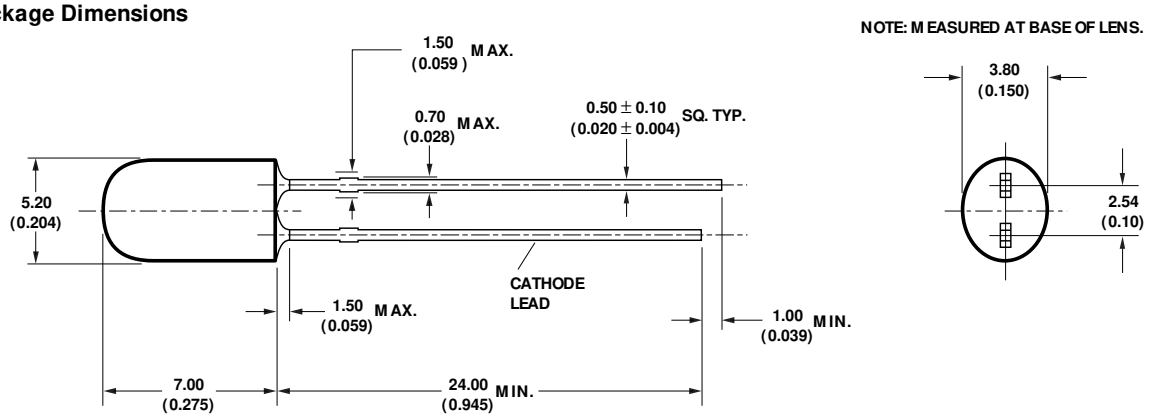
Applications

- Full color signs
- Commercial outdoor advertising

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: 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.

Package Dimensions



NOTES:
1. DIMENSIONS IN MILLIMETERS (INCHES).
2. TOLERANCE ± 0.25 mm UNLESS OTHERWISE NOTED.
3. IF HEAT-SINKING APPLICATION IS REQUIRED, THE TERMINAL FOR HEAT SINK IS ANODE.

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

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Device Selection Guide

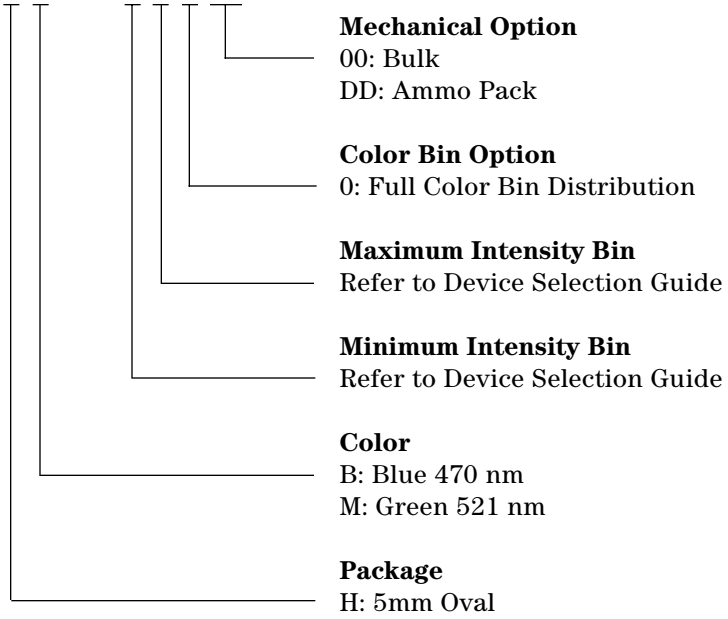
Part Number	Color	Typical Dominant Wavelength λ_d (nm)	Luminous Intensity, Iv (cd) at 20 mA		Standoffs	Lens Type
			Minimum	Maximum		
HLMP-HB56-LP0xx	Blue	470	0.40	1.15	No	Tinted, Diffused
HLMP-HM56-SV0xx	Green	521	1.90	5.50	No	Tinted, Diffused

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 56 - x x x xx



Mechanical Option
00: Bulk
DD: Ammo Pack

Color Bin Option
0: Full Color Bin Distribution

Maximum Intensity Bin
Refer to Device Selection Guide

Minimum Intensity Bin
Refer to Device Selection Guide

Color
B: Blue 470 nm
M: Green 521 nm

Package
H: 5mm Oval

Absolute Maximum Rating at T_A = 25°C

Parameters	Blue and Green	Unit
DC Forward Current[1]	30	mA
Peak Pulsed Forward Current[2]	100	mA
Average Forward Current	30	mA
Power Dissipation	105	mW
LED Junction Temperature	110	°C
Operating Temperature Range	-40 to +85	°C
Storage Temperature Range	-40 to +100	°C
Wave Soldering Temperature[3]	250 for 3 secs	°C
Solder Dipping Temperature[3]	260 for 5 secs	°C

Notes:

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

Electrical/ Optical Characteristics
T_A = 25°C

Parameters	Symbol	Value Min.	Typ.	Max.	Units	Test Condition
Forward Voltage	V_F				V	I_F = 20 mA
Green			3.60	4.00		
Blue			3.50	4.00		
Reverse Voltage[2]	V_R	5.0			V	I_R = 10 µA
Thermal Resistance	$R\theta_{J\text{-}PIN}$		240		°C/ W	LED Junction to cathode lead
Dominant Wavelength[3,4]	λ_d				nm	I_F = 20 mA
Green		520	521	540		
Blue		460	470	480		
Peak Wavelength	λ_{PEAK}				nm	Peak of wavelength of spectral
Green			516			distribution at I_F = 20 mA
Blue			464			
Spectral Half Width	$\Delta\lambda_{1/2}$				nm	Wavelength width at spectral
Green			32			distribution power point at
Blue			23			I_F = 20 mA
Luminous Efficacy[5]	η_v				lm/ W	Emitted luminous
Green			484			power/ emitted radiant power
Blue			74			

Notes:
1. $2\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/ 2 the on axis intensity.
2. The reverse voltage of blue and green is equivalent to the forward voltage of the protective chip at I_R = 100 µA.
3. The dominant wavelength λ_d is derived from the Chromaticy 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.

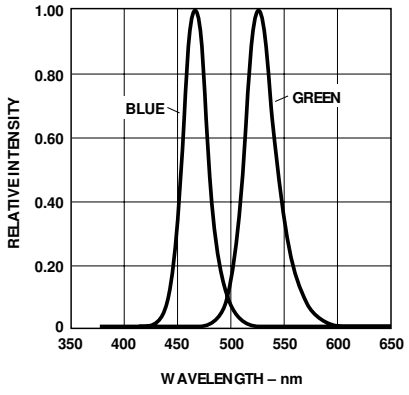


Figure 1. Relative intensity vs. wavelength.

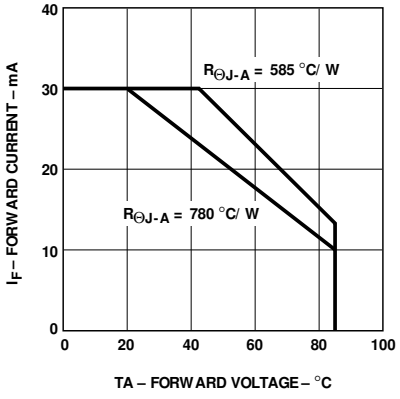


Figure 2. Forward current vs. ambient temperature.

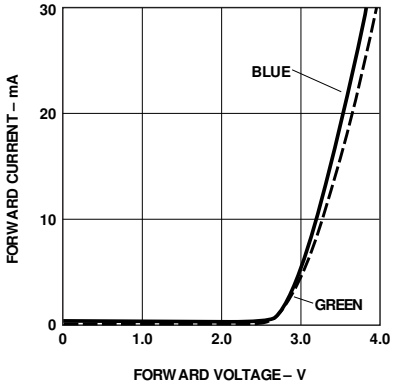


Figure 3. Forward current vs. forward voltage.

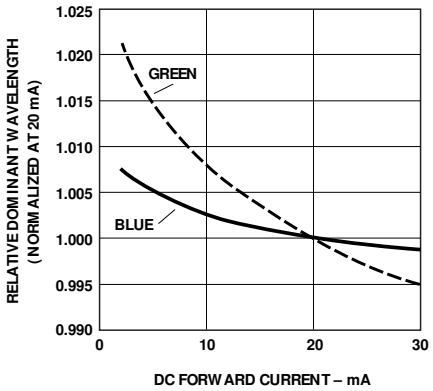


Figure 4. Relative dominant wavelength vs. DC forward current.

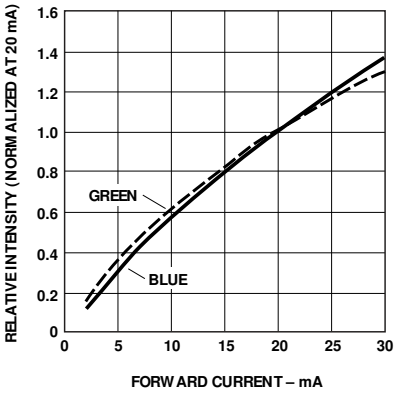


Figure 5. Relative intensity vs. DC forward current.

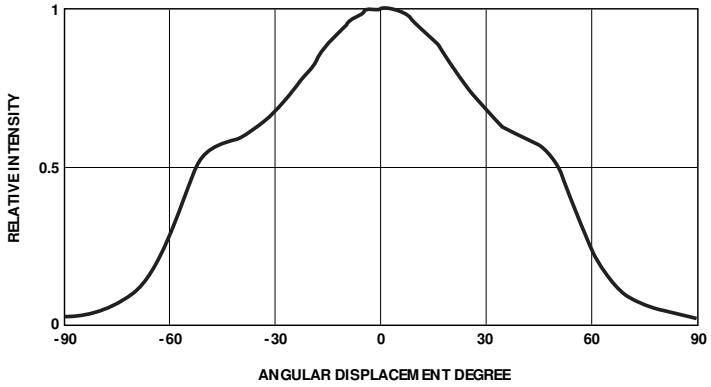


Figure 6. Spatial radiation pattern–major axis.

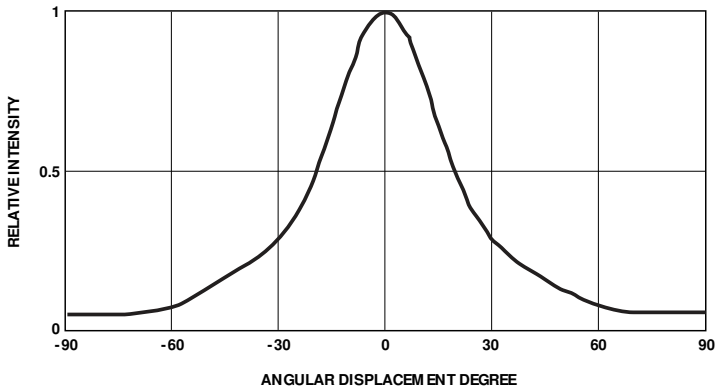


Figure 7. Spatial radiation pattern–minor axis.

Intensity Bin Limit Table

	Intensity (mcd) at 20 mA	
Bin	**Min**	**Max**
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.

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Data subject to change.

July 12, 2004
5989-1395EN

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