Agilent HLMP-HD57
5 mm Standard Oval Precision Optical Performance Red LED
Data Sheet

Features

- **Well defined spatial radiation pattern**
- **High brightness material**
- **Red AlInGaP 630 nm**

Description

This Precision Optical Performance Oval LED is specifically designed for Full Color/Video and Passenger Information Signs. The Oval shaped radiation pattern and high luminous intensity ensure that this device is excellent for wide field of view outdoor applications where a wide viewing angle and readability in sunlight are essential. This lamp has 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 this lamp: Aluminium Indium Gallium Phosphide (AlInGaP) for Red Color. The higher performance AlInGaP II is used.

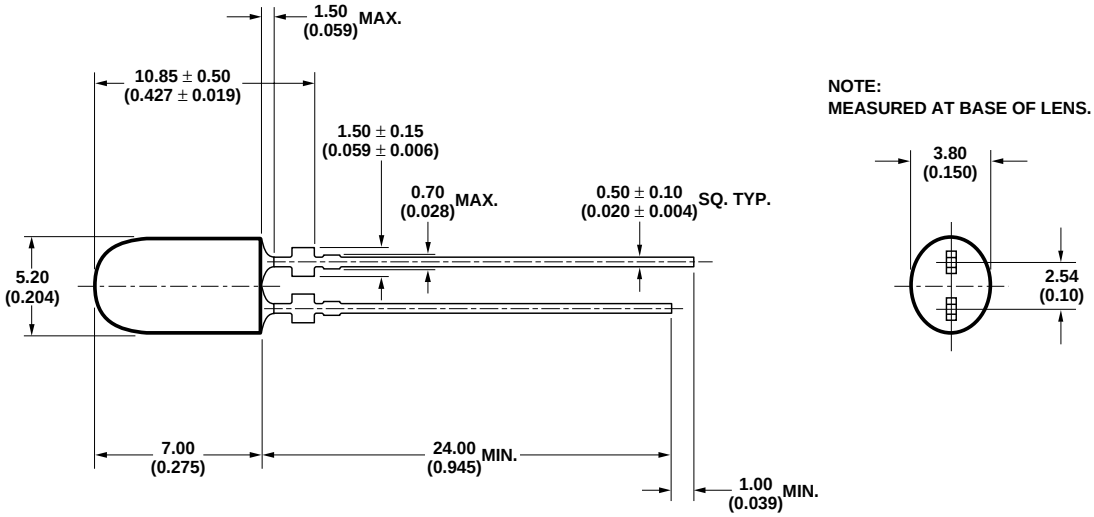
Benefits

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

Applications

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

Package Dimensions



NOTES:
1. DIMENSIONS IN MILLIMETERS (INCHES).
2. TOLERANCE ± 0.25 mm UNLESS OTHERWISE NOTED.

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Device Selection Guide

Part Number	Color and Dominant Wavelength λ_d (nm) Typ.	Luminous Intensity Iv (mcd) at 20 mA Min.	Luminous Intensity Iv (mcd) at 20 mA Max.	Tinting Type
HLMP-HD57-NROxx	Red 630	680	1900	Red

Notes:
1. The luminous intensity is measured on the mechanical axis of the lamp package.
2. The optical axis is closely aligned with the package mechanical axis.
3. The dominant wavelength, λ_d, is derived from the Chromaticity Diagram and represents the color of the lamp.
4. Tolerance for luminous intensity is ± 15%.

Part Numbering System

HLMP - x x xx - x x x xx

Mechanical Options
00: Bulk Packaging
zz: Flexi-bin; Ammo Packs

Color Bin Selections
0: No Color Bin Limitation

Maximum Intensity Bin
0: No Iv Bin Limitation

Minimum Intensity Bin

Refer to Device Selection Guide

Color
D: 630 nm Red

Package
H: 5 mm Oval 40° x 100°

Absolute Maximum Ratings at T_A = 25°C

Parameter	Value
DC Forward Current[1]	50 mA
Peak Pulsed Forward Current	100 mA
Average Forward Current	30 mA
Power Dissipation	140 mW
Reverse Voltage	5 V (I_R = 100 μA)
LED Junction Temperature	130°C
Operating Temperature Range	–40°C to +100°C
Storage Temperature Range	–40°C to +120°C

Notes:
1. Derate linearly as shown in Figure 3.
2. Duty Factor 30%, Frequency 1 KHz.

Electrical / Optical Characteristics
T_A = 25°C

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Forward Voltage	V_F		2.2	2.4	V	I_F = 20 mA
Reverse Voltage	V_R	5	20			I_R = 100 μA
Capacitance	C		40		pF	V_F = 0, f = 1 MHz
Thermal Resistance	$R\theta_{J\text{-}PIN}$		240		°C/W	LED Junction-to-Cathode Lead
Viewing Angle Major Axis Minor Axis	$2\theta_{1/2}$		 100 40		 deg	
Dominant Wavelength	λ_d		630		nm	I_F = 20 mA
Peak Wavelength	λ_p		639		nm	Peak of Wavelength of Spectral Distribution at I_F = 20 mA
Spectral Halfwidth	$\Delta\lambda_{1/2}$		17		nm	Wavelength Width at Spectral Distribution Power Point at I_F = 20 mA
Luminous Efficacy	η_v		155		lm/W	Emitted luminous power / Emitted radiant power

Notes:
1. $2\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the on axis intensity.
2. The radiant intensity, Ie in watts per 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.

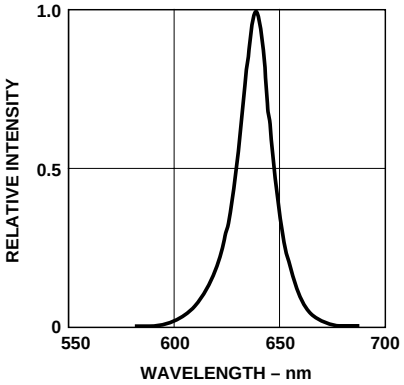

Figure 1. Relative intensity vs. wavelength.

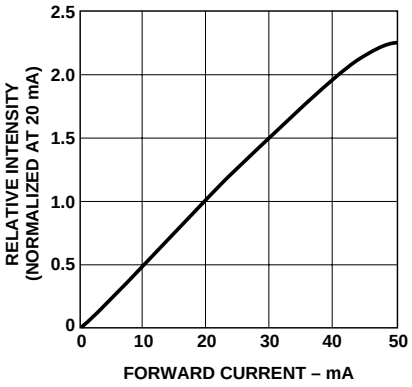

Figure 2. Relative luminous intensity vs. forward current.

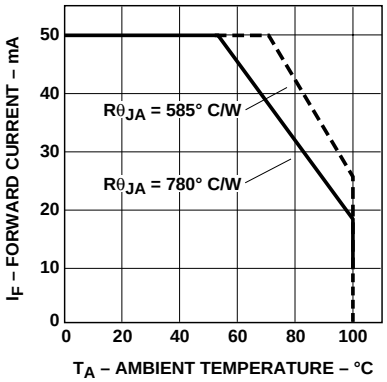

Figure 3. Forward current vs. ambient temperature.

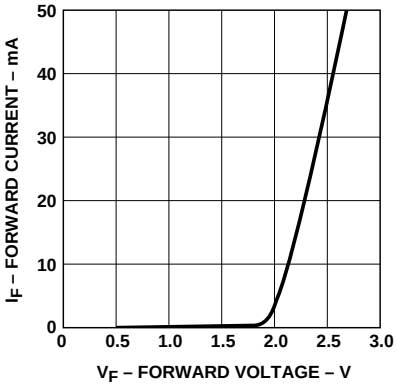

Figure 4. Forward current vs. forward voltage.

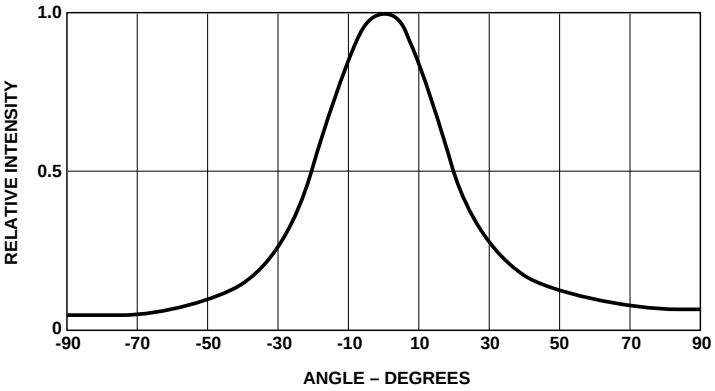

Figure 5. Spatial radiation pattern-minor axis.

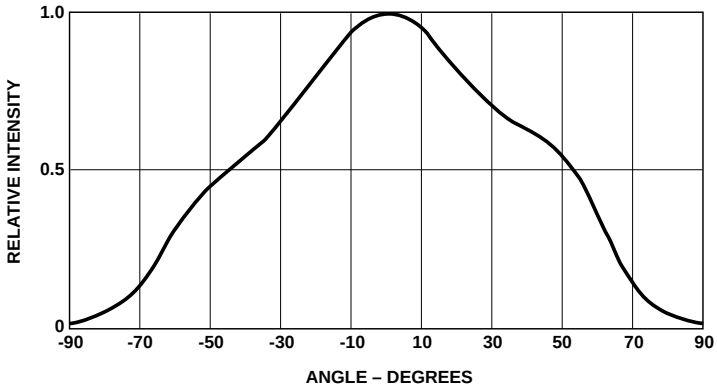

Figure 6. Spatial radiation pattern-major axis.

Intensity Bin Limits (mcd at 20 mA)

Bin Name	Min.	Max.
N	680	880
P	880	1150
Q	1150	1500
R	1500	1900

Tolerance will be ± 15% of these limits.

Note:

1. Bin categories are established for classification of products. Products may not be available in all bin categories.

Precautions

Lead Forming

- The leads of an LED lamp may be preformed or cut to length prior to insertion and soldering into PC board.
- If lead forming is required before soldering, care must be taken to avoid any excessive mechanical stress induced to LED package. Otherwise, cut the leads of LED to length after soldering process at room temperature. The solder joint formed will absorb the mechanical stress of the lead cutting from traveling to the LED chip die attach and wirebond.
- It is recommended that tooling made to precisely form and cut the leads to length rather than rely upon hand operation.

Soldering Conditions

- Care must be taken during PCB assembly and soldering process to prevent damage to LED component.
- The closest LED is allowed to solder on board is 1.59 mm below the body (encapsulant epoxy) for those parts without standoff.
- Recommended soldering conditions:

	Wave Soldering	Manual Solder Dipping
Pre-heat Temperature	105 °C Max.	–
Pre-heat Time	30 sec Max.	–
Peak Temperature	250 °C Max.	260 °C Max.
Dwell Time	3 sec Max.	5 sec Max.

- Wave soldering parameter must be set and maintained according to recommended temperature and dwell time in the solder wave. Customer is advised to periodically check on the soldering profile to ensure the soldering profile used is always conforming to recommended soldering condition.
- If necessary, use fixture to hold the LED component in proper orientation with respect to the PCB during soldering process.
- Proper handling is imperative to avoid excessive thermal stresses to LED components when heated. Therefore, the soldered PCB must be allowed to cool to room temperature, 25° C, before handling.
- Special attention must be given to board fabrication, solder masking, surface plating and lead holes size and component orientation to assure solderability.
- Recommended PC board plated through hole sizes for LED component leads:

LED Component Lead Size	Diagonal	Plated Through Hole Diameter
0.457 x 0.457 mm (0.018 x 0.018 inch)	0.646 mm (0.025 inch)	0.976 to 1.078 mm (0.038 to 0.042 inch)
0.508 x 0.508 mm (0.020 x 0.020 inch)	0.718 mm (0.028 inch)	1.049 to 1.150 mm (0.041 to 0.045 inch)

Note: Refer to application note AN1027 for more information on soldering LED components.

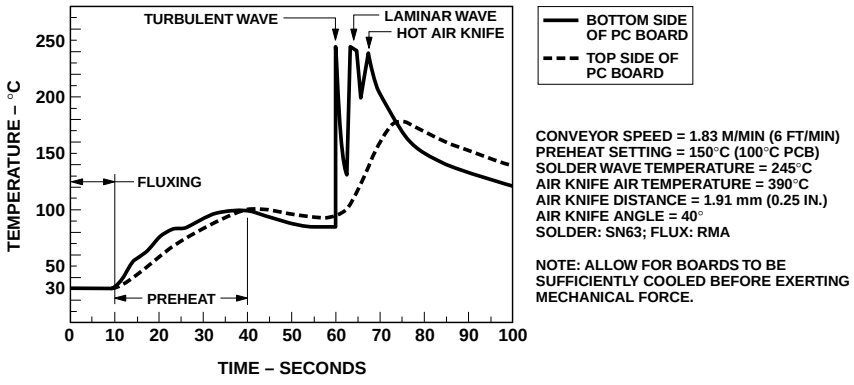

Figure 9. Recommended wave soldering profile.

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