4 mm Oval Precision Optical Performance LED Lamps

Data Sheet

SunPower Series
Agilent HLMP-RG10, HLMP-SG10, HLMP-RL10, HLMP-SL10, HLMP-RD11, HLMP-SD11, HLMP-RL11, HLMP-SL11

Description

These Precision Optical Performance Oval LEDs are specifically designed for Full Color/Video and Passenger Information signs. The oval shaped radiation pattern (60° x 120°) and high luminous intensity ensure that 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 materials are used in these lamps: Aluminum Indium Gallium Phosphide (AlInGaP) for Red and Amber color. There are two families of red and amber lamps, AlInGaP and the higher performance AlInGaP II. Each lamp is made with an advanced optical grade epoxy offering superior high temperature and high moisture resistance in outdoor applications. The package epoxy contains both uv-a and uv-b inhibitors to reduce the effects of long term exposure to direct sunlight.

Designers can select parallel (where the axis of the leads is parallel to the wide axis of the oval radiation pattern) or perpendicular orientation. Both lamps are available in tinted version.

Features

- **Well defined spatial radiation pattern**
- **Viewing angle:**
  major axis 120°
  minor axis 60°
- **High luminous output**
- **Two red and amber intensity levels**
  AlInGaP (bright) and
  AlInGaP II (brightest)
- **Colors**
  626/630 nm red
  590/592 nm amber
- **Superior resistance to moisture**
- **UV resistant epoxy**

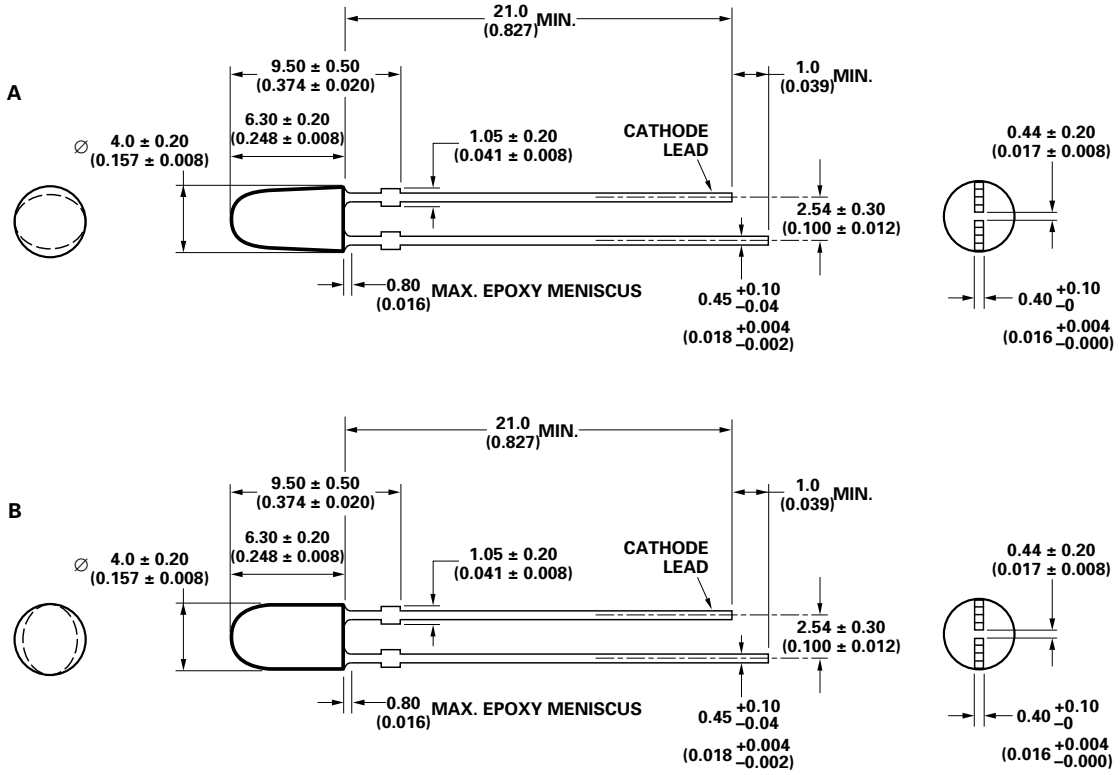
Benefits

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

Applications

- **Full color signs**

Package Dimensions



Dimensions are in millimeters (inches).

Device Selection Guide for AlInGaP

Part Number	Color and Dominant Wavelength λ_d (nm) Typ.	Luminous Intensity I_V (mcd) at 20 mA Min.	Max.	Leads with Stand-Offs	Leadframe Orientation	Package Drawing
HLMP-SG10-GK000	Red 626	120	460	Yes	Perpendicular	A
HLMP-RG10-GK000	Red 626	120	460	Yes	Parallel	B
HLMP-SL10-FJ000	Amber 590	96	360	Yes	Perpendicular	A
HLMP-RL10-FJ000	Amber 590	96	360	Yes	Parallel	B

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 CIE Chromaticity Diagram and represents the color of the lamp.

Device Selection Guide for AlInGaP II

Part Number	Color and Dominant Wavelength λ_d (nm) Typ.	Luminous Intensity I_V (mcd) at 20 mA Min.	Max.	Leads with Stand-Offs	Leadframe Orientation	Package Drawing
HLMP-SD11-LP000	Red 630	345	1330	Yes	Perpendicular	A
HLMP-RD11-LP000	Red 630	345	1330	Yes	Parallel	B
HLMP-SL11-LP000	Amber 592	345	1330	Yes	Perpendicular	A
HLMP-RL11-LP000	Amber 592	345	1330	Yes	Parallel	B

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 CIE Chromaticity Diagram and represents the color of the lamp.

Absolute Maximum Ratings

$T_A = 25°C$

Parameter	Amber and Red
DC Forward Current[1]	50 mA
Peak Pulsed Forward Current	70 mA
Average Forward Current	30 mA
Reverse Voltage (I_R = 100 μA)	5 V
Power Dissipation	120 mW
LED Junction Temperature	130°C
Operating Temperature Range	–40°C to +100°C
Storage Temperature Range	–40°C to +120°C
Soldering Temperature	260° for 5 sec

Note:

1. Derate linearly as shown in Figure 4.

Electrical/Optical Characteristics

$T_A = 25°C$

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Typical Viewing Angle						
Major	$2\theta_{1/2}$		120		deg	
Minor			60			
Forward Voltage						
Red (λ_d = 626 nm)	V_F		1.9	2.4	V	I_F = 20 mA
Red (λ_d = 630 nm)			2.0	2.4		
Amber (λ_d = 590 nm)			2.02	2.4		
Amber (λ_d = 592 nm)			2.15	2.4		
Reverse Voltage Amber and Red	V_R	5	20		V	I_R = 100 μA
Peak Wavelength	λ_{PEAK}				nm	Peak of Wavelength of
Red (λ_d = 626 nm)			635			Spectral Distribution
Red (λ_d = 630 nm)			639			at I_F = 20 mA
Amber (λ_d = 590 nm)			592			
Amber (λ_d = 592 nm)			594			

LED Indicators

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Spectral Halfwidth						Wavelength Width at
Red (λ_d = 626/630 nm)	$\Delta\lambda_{1/2}$		17		nm	Spectral Distribution
Amber (λ_d = 590/592 nm)			17			1/2 Power Point at I_F = 20 mA
Capacitance Red and Amber	C		40		pF	V_F = 0, F = 1 MHz
Thermal Resistance Red and Amber	$R\theta_{J\text{-}PIN}$		240		°C/W	LED Junction-to-Cathode Lead
Luminous Efficacy						Emitted Luminous Power/
Red (λ_d = 626 nm)	η_v		150		lm/W	Emitted Radiant Power
Red (λ_d = 630 nm)			155			
Amber (λ_d = 590 nm)			480			
Amber (λ_d = 592 nm)			500			

Notes:

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

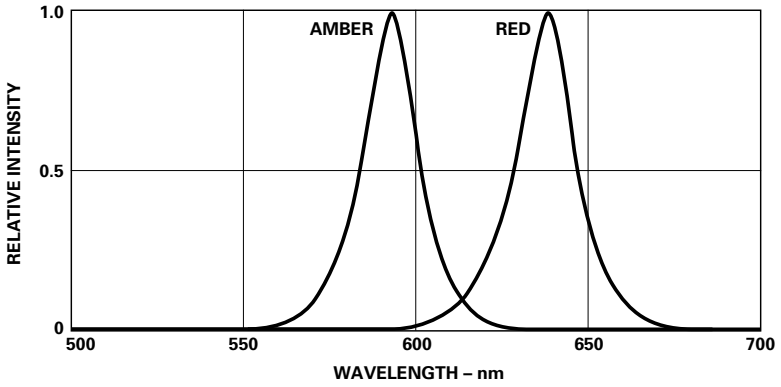


Figure 1. Relative Intensity vs. Wavelength.

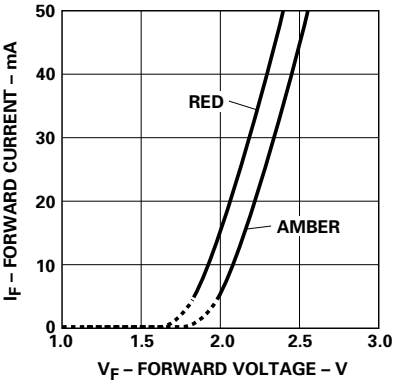


Figure 2. Forward Current vs. Forward Voltage.

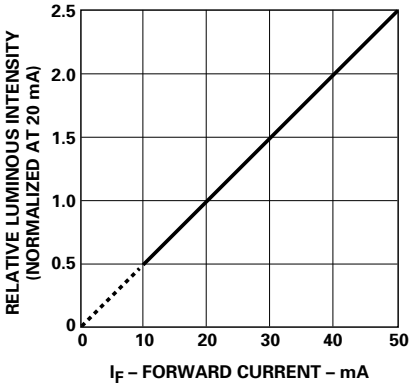


Figure 3. Relative Luminous Intensity vs. Forward Current.

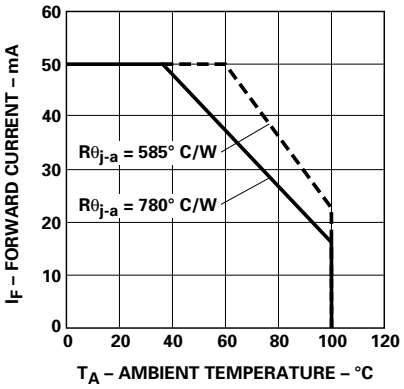


Figure 4. Maximum Forward Current vs. Ambient Temperature.

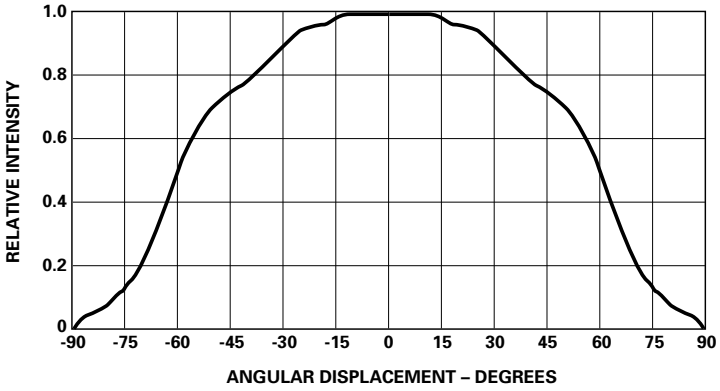


Figure 5a. Representative Spatial Radiation Pattern for Major Axis.

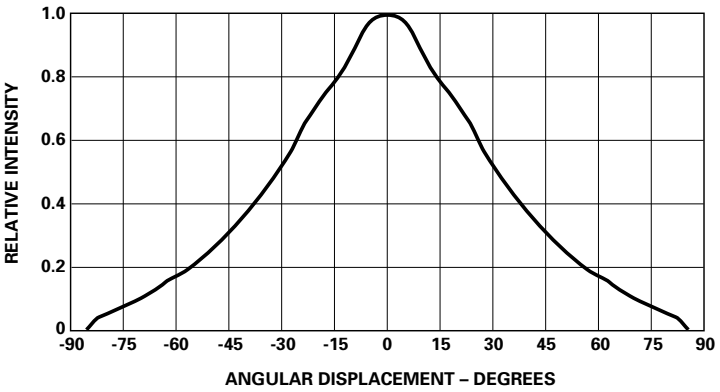


Figure 5b. Representative Spatial Radiation Pattern for Minor Axis.

Intensity Bin Limits
(mcd at 20 mA)

Bin Name	Min.	Max.
F	110	140
G	140	180
H	180	240
J	240	310
K	310	400
L	400	520
M	520	680
N	680	880
P	880	1150

Tolerance for each bin limit is ± 15%.

Note:

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

Data subject to change.
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