
T-1³/₄ (5 mm) Precision Optical Performance AllInGaP LED Lamps

Technical Data



HP SunPower Series

HLMP-ELxx

HLMP-EJxx

HLMP-EHxx

HLMP-EGxx

Features

- **Well Defined Spatial Radiation Patterns**
- **Viewing Angles:** 6°, 15°, 23°, 30°
- **High Luminous Output**
- **Colors:**
 - 590 nm Amber
 - 605 nm Orange
 - 615 nm Reddish-Orange
 - 626 nm Red
- **High Operating Temperature:**
 $T_{j\text{ LED}} = +130^{\circ}\text{C}$
- **Superior Resistance to Moisture**
- **Package Options:**
With or Without Lead Stand-Offs

Benefits

- **Viewing Angles Match Traffic Management Sign Requirements**
- **Colors Meet Automotive and Pedestrian Signal Specifications**
- **Superior Performance in Outdoor Environments**
- **Suitable for Autoinsertion onto PC Boards**

Applications

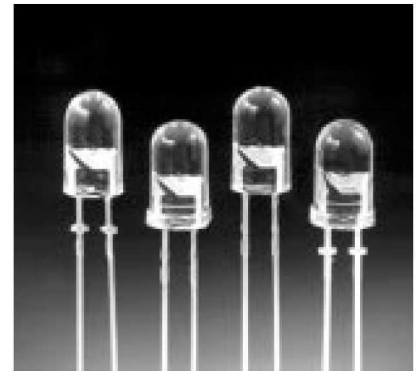
- **Traffic Management:**
 - Traffic Signals
 - Pedestrian Signals
 - Work Zone Warning Lights
 - Variable Message Signs
- **Commercial Outdoor Advertising:**
 - Signs
 - Marquees
- **Automotive:**
 - Exterior and Interior Lights

Description

These Precision Optical Performance AllInGaP LEDs provide superior light output for excellent readability in sunlight and are extremely reliable. AllInGaP LED technology provides extremely stable light output over long periods of time. Precision Optical Performance lamps utilize the aluminum indium gallium phosphide (AllInGaP) technology.

These LED lamps are untinted, nondiffused, T-1³/₄ packages incorporating second generation optics producing well defined spatial radiation patterns at specific viewing cone angles.

These lamps are made with an advanced optical grade epoxy, offering superior high temperature and high moisture resistance



performance in outdoor signal and sign applications. The high maximum LED junction temperature limit of +130°C enables high temperature operation in bright sunlight conditions. The package epoxy contains both uv-a and uv-b inhibitors to reduce the effects of long term exposure to direct sunlight.

These lamps are available in two package options to give the designer flexibility with device mounting.

The HLMP-Exxx Series replace the HLMP-Dxxx and HLMP-Uxxx series products. A cross reference is found on page 10 of this data sheet.

Device Selection Guide (Continued)

Typical Viewing Angle 2θ _{1/2} (Deg.) ^[4]	Color and Dominant Wavelength (nm), Typ. ^[3]	Lamps Without Standoffs on Leads (Outline Drawing A)	Lamps With Standoffs on Leads (Outline Drawing B)	Luminous Intensity I _v (mcd) ^[1,2] @ 20 mA	
				Min.	Max.
30°	Amber 590	HLMP-EL30-LP000	HLMP-EL32-LP000	345	1330
		HLMP-EL30-MQ000	HLMP-EL32-MQ000	450	1730
		HLMP-EL30-NQ000		590	1730
		HLMP-EL30-NQK00*		590	1730
		HLMP-EL30-NR000	HLMP-EL32-NR000	590	2200
		HLMP-EL30-NRK00*		590	2200
		HLMP-EL30-PQ000		765	1730
		HLMP-EL30-PQK00*		765	1730
		HLMP-EL30-PR000		765	2200
		HLMP-EL30-PR400**		765	2200
		HLMP-EL30-PRK00*		765	2200
		HLMP-EL30-PS000	HLMP-EL32-PS000	765	2900
		HLMP-EL30-PSK00*		765	2900
		Orange 605	HLMP-EJ30-MQ000	HLMP-EJ32-MQ000	450
	HLMP-EJ30-NR000		HLMP-EJ32-NR000	590	2200
	HLMP-EJ30-PS000		HLMP-EJ32-PS000	765	2900
	HLMP-EJ30-QT000		HLMP-EJ32-QT000	1000	3700
	Red-Orange 615	HLMP-EH30-KN000	HLMP-EH32-KN000	270	1000
		HLMP-EH30-LP000	HLMP-EH32-LP000	345	1330
		HLMP-EH30-MQ000	HLMP-EH32-MQ000	450	1730
		HLMP-EH30-NR000	HLMP-EH32-NR000	590	2200
	Red 626	HLMP-EG30-KN000	HLMP-EG32-KN000	270	1000
		HLMP-EG30-LN000		345	1000
		HLMP-EG30-LP000	HLMP-EG32-LP000	345	1330
		HLMP-EG30-MN000		450	1000
		HLMP-EG30-MP000		450	1330
		HLMP-EG30-MQ000	HLMP-EG32-MQ000	450	1730
		HLMP-EG30-NR000	HLMP-EG32-NR000	590	2200

Notes:

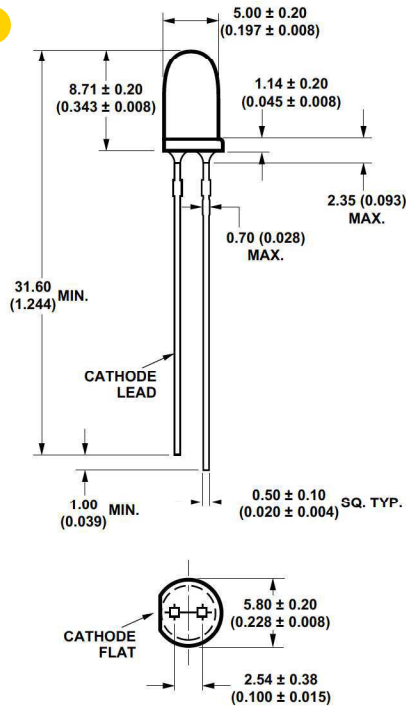
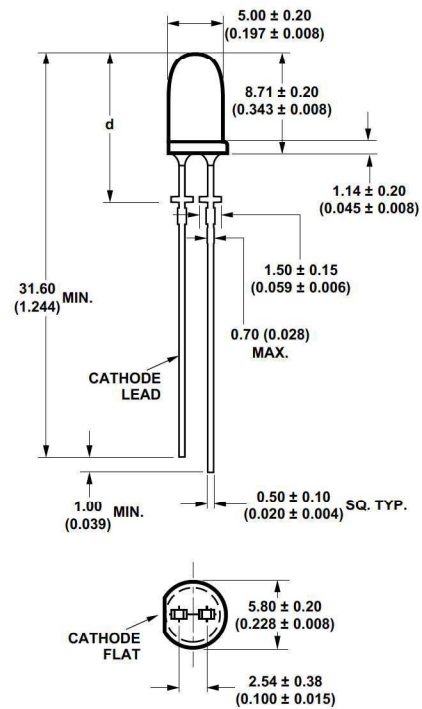
1. The luminous intensity is measured on the mechanical axis of the lamp package.
2. The optical axis is closely aligned with the package mechanical axis.
3. The dominant wavelength, λ_d , is derived from the CIE Chromaticity Diagram and represents the color of the lamp.
4. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is one half the on-axis intensity.
5. The intensity of narrow viewing angle lamps is measured at the intensity peak.

Part numbers in **bold** are recommended for new designs.

*HLMP-xLxx-xxK00 are selected to amber color bins 2 and 4 only.

**HLMP-xLxx-xx400 are selected to amber color bin 4 only.

Package Dimensions

A

B

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).
- LEADS ARE MILD STEEL, SOLDER DIPPED.
- TAPERS SHOWN AT TOP OF LEADS (BOTTOM OF LAMP PACKAGE) INDICATE AN EPOXY MENISCUS THAT MAY EXTEND ABOUT 1 mm (0.040 in.) DOWN THE LEADS.
- RECOMMENDED PC BOARD HOLE DIAMETERS:
 - LAMP PACKAGE A WITHOUT STAND-OFFS: FLUSH MOUNTING AT BASE OF LAMP PACKAGE = 1.143/1.067 (0.044/0.042).
 - LAMP PACKAGE B WITH STAND-OFFS: MOUNTING AT LEAD STAND-OFFS = 0.965/0.889 (0.038/0.035).
- FOR DOME HEIGHTS ABOVE LEAD STAND-OFF SEATING PLANE, d, LAMP PACKAGE B, SEE TABLE.

PART NO.	d
HLMP-XX10	12.37 ± 0.25 (0.487 ± 0.010)
HLMP-XX17	12.42 ± 0.25 (0.489 ± 0.010)
HLMP-XX26	12.52 ± 0.25 (0.493 ± 0.010)
HLMP-XX32	11.96 ± 0.25 (0.471 ± 0.010)

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

DC Forward Current ^[1,2,3]	50 mA
Peak Pulsed Forward Current ^[2,3]	100 mA
Average Forward Current ^[3]	30 mA
Reverse Voltage ($I_R = 100 \mu\text{A}$)	5 V
LED Junction Temperature	130°C
Operating Temperature	-40°C to +100°C
Storage Temperature	-40°C to +120°C
Dip/Drag Soldering Temperature	260°C for 6 seconds
Through-the-Wave Preheat Temperature	145°C
Through-the-Wave Solder Temperature	245°C for 3 seconds
[1.59 mm (0.060 in.) below seating plane]	

Notes:

1. Derate linearly as shown in Figure 4.
2. For long term performance with minimal light output degradation, drive currents between 10 mA and 30 mA are recommended. For more information on recommended drive conditions, please refer to IIP Application Brief I-024 (5966-3087E).
3. Please contact your Hewlett-Packard sales representative about operating currents below 10 mA.

Electrical/Optical Characteristics at $T_A = 25^\circ\text{C}$

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Forward Voltage Amber ($\lambda_d = 590 \text{ nm}$) Orange ($\lambda_d = 605 \text{ nm}$) Red-Orange ($\lambda_d = 615 \text{ nm}$) Red ($\lambda_d = 626 \text{ nm}$)	V_F		2.02 1.98 1.94 1.90	2.4	V	$I_F = 20 \text{ mA}$
Reverse Voltage	V_R	5	20		V	$I_F = 100 \mu\text{A}$
Peak Wavelength: Amber ($\lambda_d = 590 \text{ nm}$) Orange ($\lambda_d = 605 \text{ nm}$) Red-Orange ($\lambda_d = 615 \text{ nm}$) Red ($\lambda_d = 626 \text{ nm}$)	λ_{PEAK}		592 609 621 635		nm	Peak of Wavelength of Spectral Distribution at $I_F = 20 \text{ mA}$
Spectral Halfwidth	$\Delta\lambda_{1/2}$		17		nm	Wavelength Width at Spectral Distribution $1/2$ Power Point at $I_F = 20 \text{ mA}$
Speed of Response	τ_s		20		ns	Exponential Time Constant, e^{-t/τ_s}
Capacitance	C		40		pF	$V_F = 0, f = 1 \text{ MHz}$
Thermal Resistance	$R\theta_{\text{J-PIN}}$		240		$^\circ\text{C/W}$	LED Junction-to-Cathode Lead
Luminous Efficacy ^[1] Amber ($\lambda_d = 590 \text{ nm}$) Orange ($\lambda_d = 605 \text{ nm}$) Red-Orange ($\lambda_d = 615 \text{ nm}$) Red ($\lambda_d = 626 \text{ nm}$)	η_v		480 370 260 150		lm/W	Emitted Luminous Power/Emitted Radiant Power

Note:

1. 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.

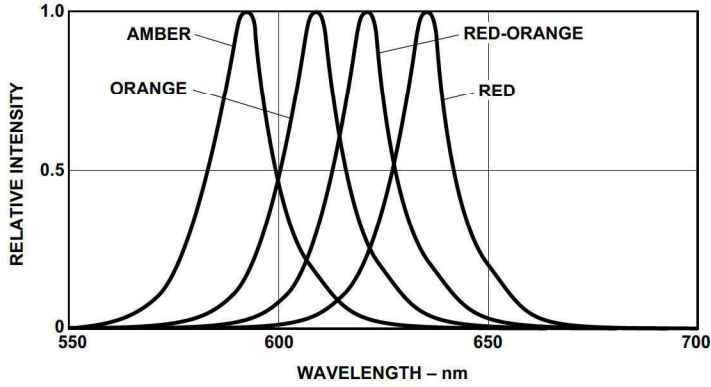


Figure 1. Relative Intensity vs. Peak Wavelength.

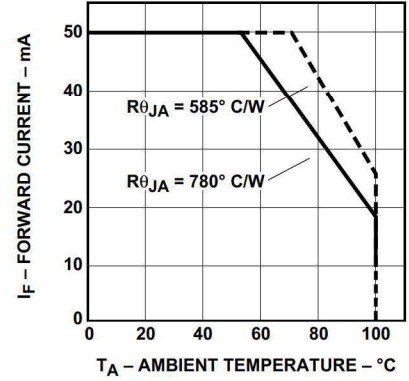


Figure 4. Maximum Forward Current vs. Ambient Temperature. Derating Based on $T_{JMAX} = 130^\circ \text{C}$.

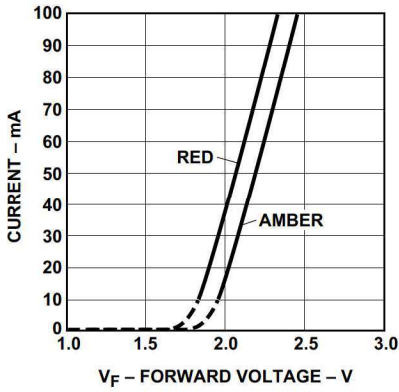


Figure 2. Forward Current vs. Forward Voltage.

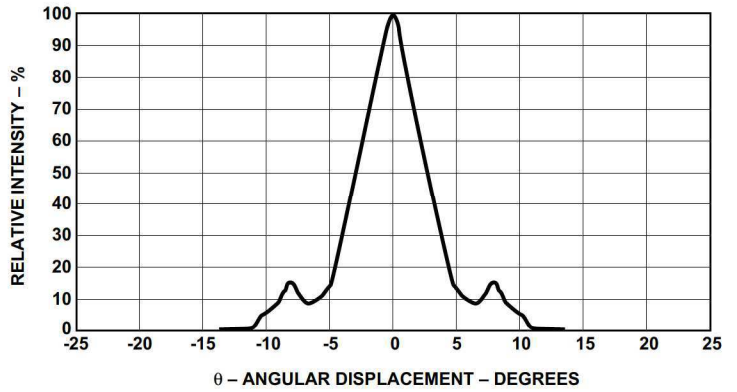


Figure 5. Representative Spatial Radiation Pattern for 6° Viewing Angle Lamps.

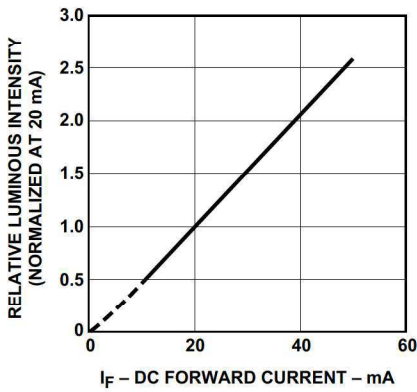


Figure 3. Relative Luminous Intensity vs. Forward Current.

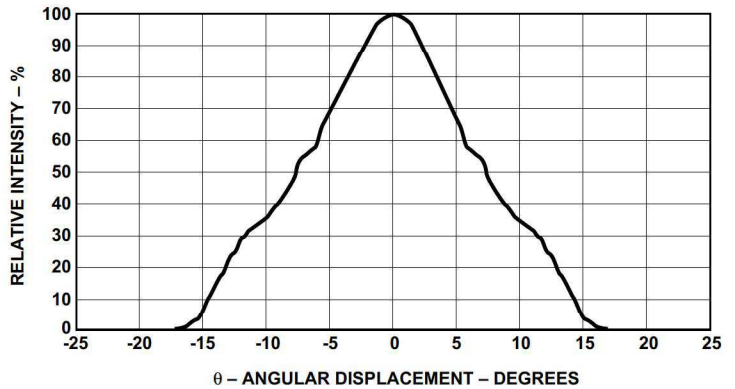


Figure 6. Representative Spatial Radiation Pattern for 15° Viewing Angle Lamps.