HEWLETT PACKARD

T-13/4 (5 mm), Wide Viewing Angle, High Intensity LED Lamps

Technical Data

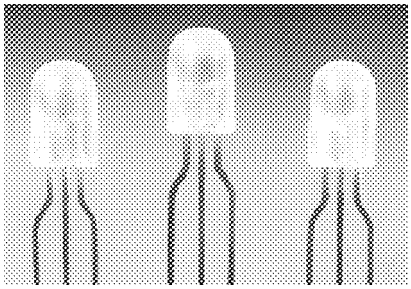
HLMA-VH00
HLMA-VL00
HLMP-V100
HLMP-V500

Features

- **Outstanding LED Material Efficiency**
- **Extremely Wide Horizontal Viewing Angle**
- **High Light Output over a Wide Range of Currents**
- **Untinted, Non-diffused Lens**
- **Choice of Four Colors: 644 nm Red, 590 nm Amber, 570 nm Green, and 615 nm Orange**

Description

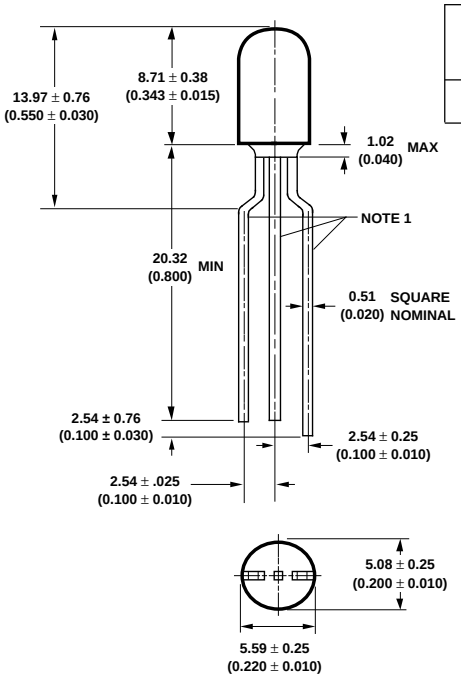
These high intensity LED lamps provide the user with an extremely wide 60° (horizontal) by 30° (vertical) oval shaped radiation pattern. Available in TS AlGaAs red, AlInGaP amber, AlInGaP orange, and GaP green colors, these untinted non-diffused T-1¾ (5 mm) LEDs are an excellent choice for outdoor applications requiring an extremely wide field of vision and high brightness.



Applications

- **Outdoor Message Boards**
- **Safety Lighting Equipment**
- **Changeable Message Signs**
- **Alternative to Incandescent Lamps**

Outline Drawing



Device Selection Guide

Amber λ_d = 590 nm	Red-Orange λ_d = 615 nm	Red λ_d = 644 nm	Green λ_d = 570 nm
HLMA-VL00	HLMA-VH00	HLMP-V100	HLMP-V500

NOTES:

1. LEAD ORIENTATION:

DEVICE TYPE	CENTER LEAD	OUTER LEADS
HLMP-V100	COMMON ANODE	CATHODE
HLMP-V500	COMMON CATHODE	ANODE
HLMA-VL00	COMMON CATHODE	ANODE
HLMA-VH00	COMMON CATHODE	ANODE

2. ALL DIMENSIONS ARE IN MM (INCHES).

Absolute Maximum Ratings at T_A = 25°C

Parameter	HLMA-VL00	HLMA-VH00	HLMP-V100	HLMP-V500	Units
DC Forward Current[1,3]	60[4,5]	60[4,5]	60	50	mA
Peak Forward Current[2,3]	400	400	600	180	mA
Average Input Power[2]	120	120	120	110	mW
Reverse Voltage (I_R = 200 μA)	5	5	5	5	V
Operating Temperature Range	-40 to +100	-40 to +100	-55 to +85	-20 to +100	°C
Storage Temperature Range	-55 to +100	-55 to +100	-55 to +100	-55 to +100	°C
Junction Temperature	110				°C
Soldering Temperature [1.59 mm (0.06 in.) below seating plane]	260°C for 5 seconds				

Notes:
1. Derate linearly as shown in Figure 5.
2. Any pulsed operation cannot exceed the Absolute Max Peak Forward Current or the Max Allowable Average Power as specified in Figure 6.
3. Specified with both die powered simultaneously.
4. Drive Currents between 10 mA and 30 mA are recommended for best long term performance.
5. Operation at currents below 10 mA is not recommended, please contact your Hewlett-Packard sales representative.

Optical Characteristics at T_A = 25°C

Part Number	Luminous Intensity I_V (mcd) @ 40 mA[1] Min.	Typ.	Peak Wavelength λ_{peak} (nm) Typ.	Color, Dominant Wavelength λ_d[2] (nm) Typ.	Viewing Angle $2\theta_{1/2}$ Degrees[3] Typ.	Luminous Efficacy η_V (lm/w)
HLMA-VL00	212	460	592	590	60° horizontal 30° vertical	480
HLMA-VH00	200	460	621	615		263
HLMP-V100	500	1000	654	644	60° horizontal 30° vertical	85
HLMP-V500	112	270	568	570	60° horizontal 30° vertical	595

Notes:
1. The luminous intensity, I_V, is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.
2. The dominant wavelength, λ_d, is derived from the CIE Chromaticity Diagram and represents the color of the device.
3. 2 $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the on-axis intensity.

Electrical Characteristics at T_A = 25°C

Part Number	Forward Voltage V_F (Volts) @ I_F = 40 mA Typ.	Max.	Reverse Breakdown V_R (Volts) @ I_R = 200 μA Min.	Capacitance C (pF) V_F = 0, f = 1 MHz Typ.	Thermal Resistance $R\theta_{J\text{-}PIN}$ (°C/W)	Speed of Response τ_s (ns) Time Constant $e^{-t/\tau s}$ Typ.
HLMA-VL00	1.90	2.4	5	120	100	13
HLMA-VH00	1.90	2.4	5	120	100	13
HLMP-V100	1.85	2.4	5	50	115	26
HLMP-V500	2.20	3.0	5	20	100	171

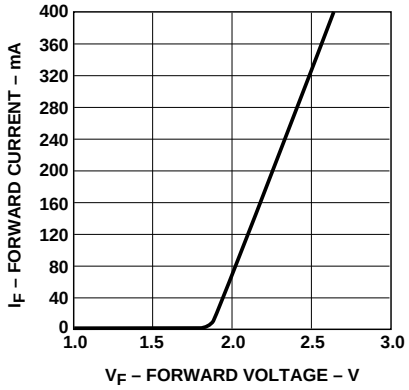


Figure 2a. Forward Current vs. Forward Voltage, HLMA-VL00/VH00.

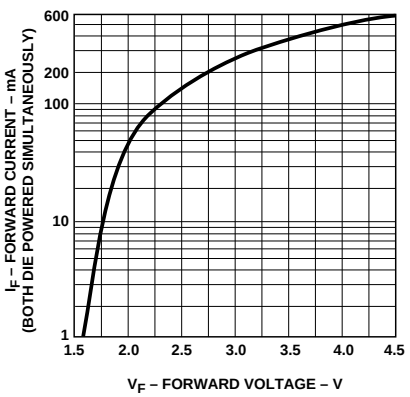


Figure 2b. Forward Current vs. Forward Voltage, HLMP-V100.

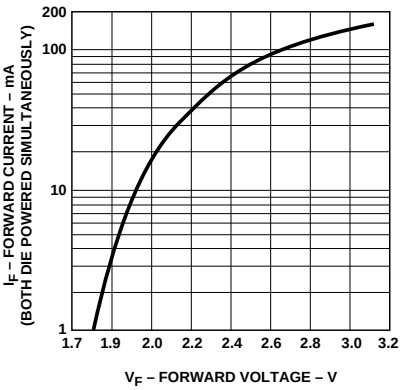


Figure 2c. Forward Current vs. Forward Voltage, HLMP-V500.

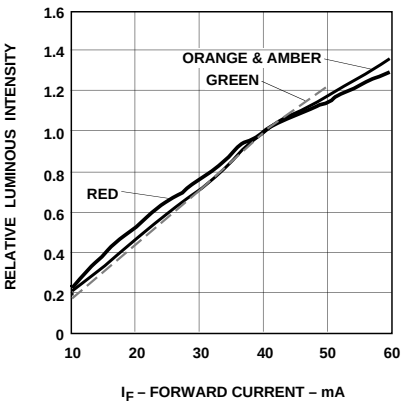


Figure 3. Relative Luminous Intensity vs. Forward Current.

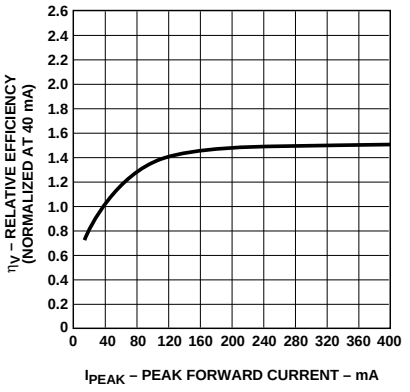


Figure 4a. Relative Efficiency vs. Peak Forward Current, HLMA-VL00/VH00.

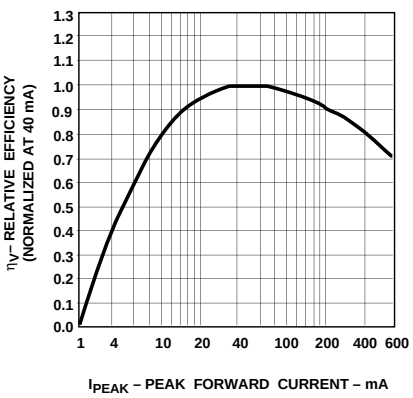


Figure 4b. Relative Efficiency vs. Peak Forward Current, HLMP-V100.

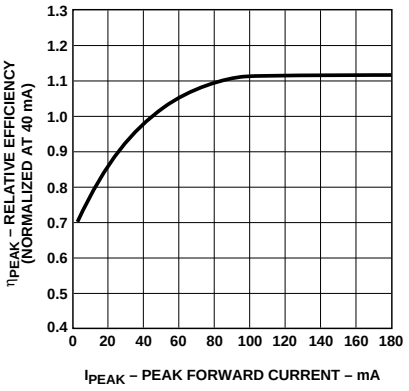


Figure 4c. Relative Efficiency vs. Peak Forward Current, HLMP-V500.

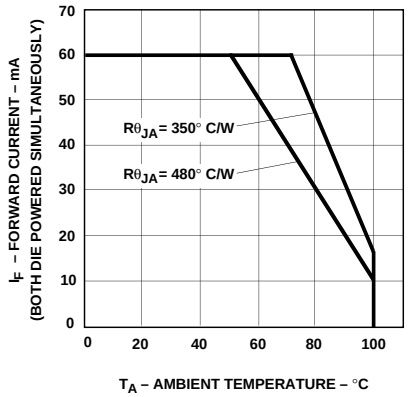


Figure 5a. Maximum Forward DC Current vs. Ambient Temperature, HLMA-VL00/VH00.

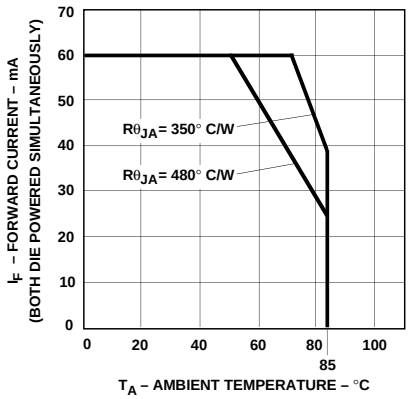


Figure 5b. Maximum Forward DC Current vs. Ambient Temperature, HLMP-V100.

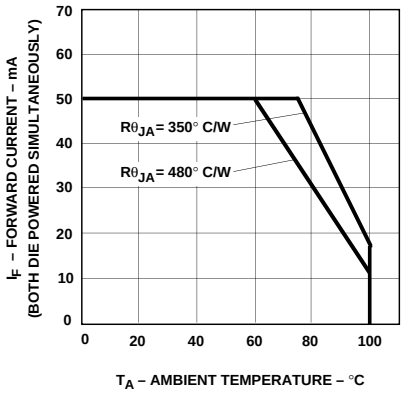


Figure 5c. Maximum Forward DC Current vs. Ambient Temperature, HLMP-V500.

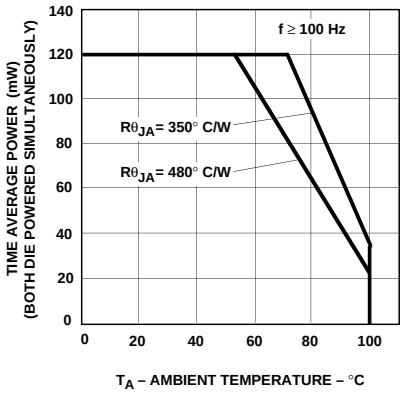


Figure 6a. Maximum Allowable Average Power vs. Ambient Temperature, HLMA-VL00/VH00.

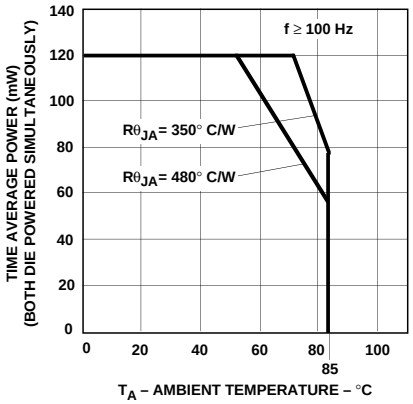


Figure 6b. Maximum Allowable Average Power vs. Ambient Temperature, HLMP-V100.

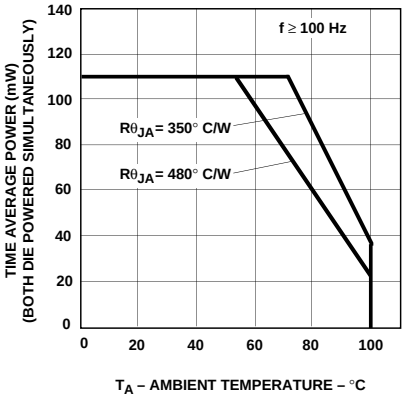


Figure 6c. Maximum Allowable Average Power vs. Ambient Temperature, HLMP-V500.

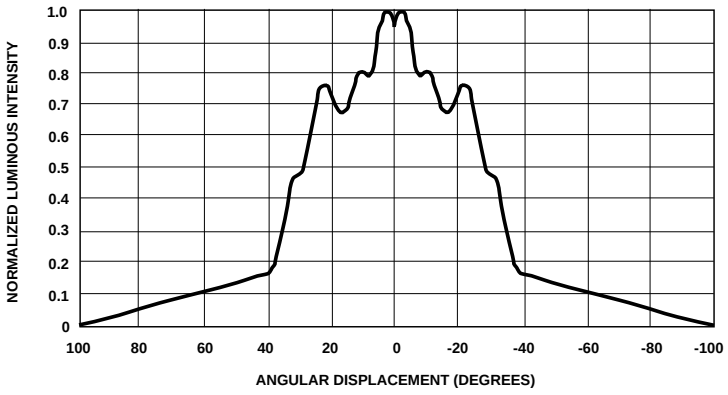


Figure 7a. Relative Intensity vs. Angle, HLMA-VL00/VH00 Horizontal Axis.

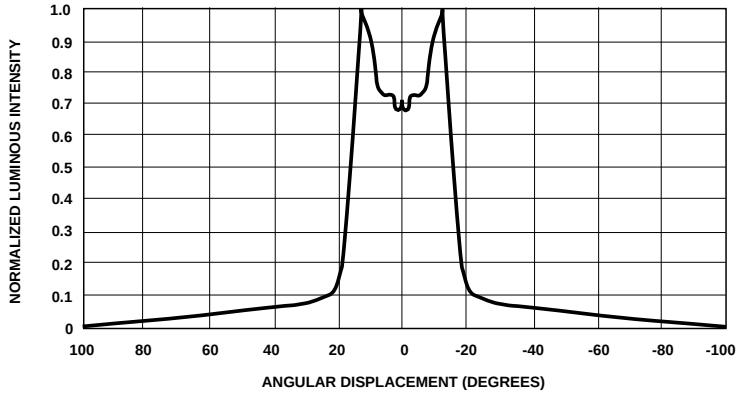


Figure 7b. Relative Intensity vs. Angle, HLMA-VL00/VH00 Vertical Axis.

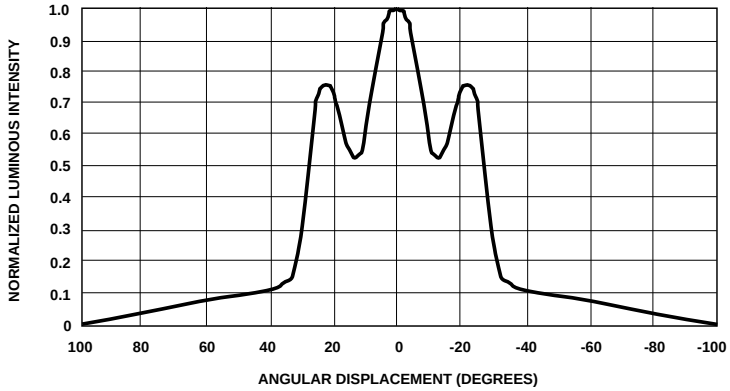


Figure 8a. Relative Intensity vs. Angle, HLMP-V100 Horizontal Axis.

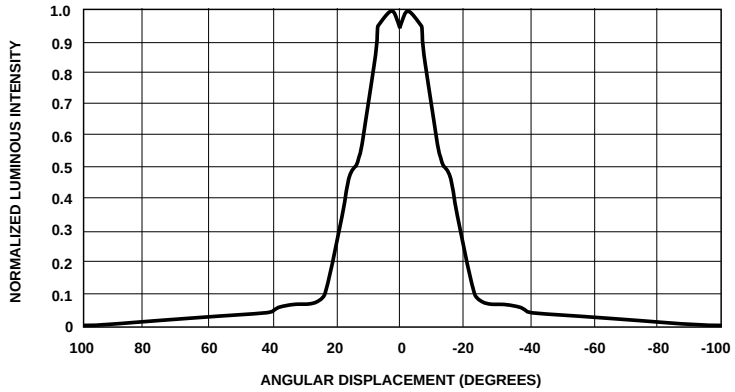


Figure 8b. Relative Intensity vs. Angle, HLMP-V100 Vertical Axis.

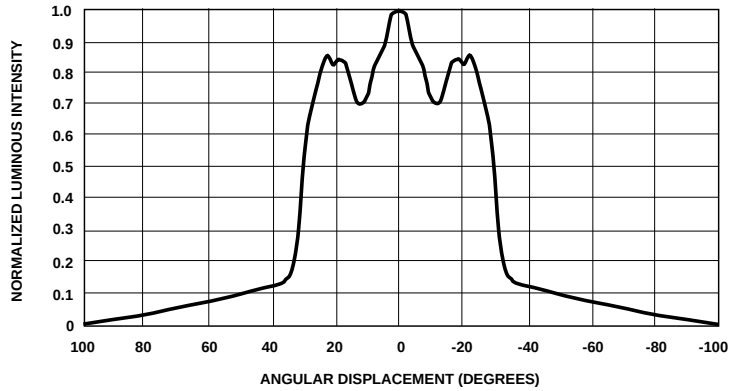


Figure 9a. Relative Intensity vs. Angle, HLMP-V500 Horizontal Axis.

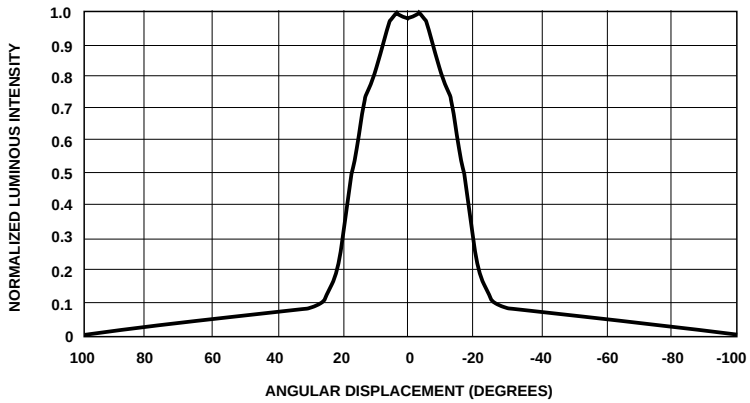


Figure 9b. Relative Intensity vs. Angle, HLMP-V500 Vertical Axis.