

HLMP-EL56

T-1 $\frac{3}{4}$ (5mm) Precision Optical Performance AlInGaP LED Lamps



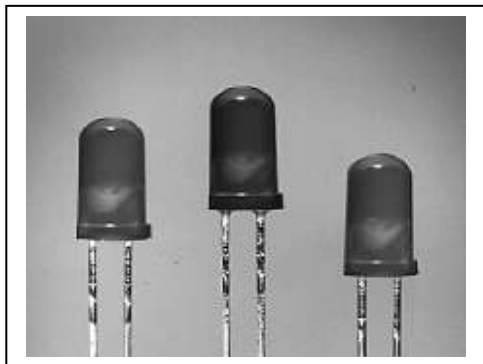
Datasheet

Description

These Precision Optical Performance AlInGaP LEDs provide superior light output for excellent readability in sunlight and are extremely reliable. AlInGaP LED technology provides extremely stable light output over long periods of time. Precision Optical Performance lamps utilize the aluminum indium gallium phosphide (AlInGaP) technology. These LED lamps are tinted, diffused, T-1 $\frac{3}{4}$ packages incorporating second generation optics producing well defined radiation patterns at specific viewing cone angles.

There are two families of amber, red, and red-orange lamps; AlInGaP and the higher performance AlInGaP II. The high maximum LED junction temperature limit of +130° C enables high temperature operation in bright sunlight conditions.

Component Image



Features

- Well defined and smooth spatial radiation patterns
- Wide viewing angle
- Tinted Diffused Lamp
- High Luminous Output
- Color: 590 Amber
- High Operating Temperature: T_{JLED} = 130°C
- Superior Resistance to Moisture

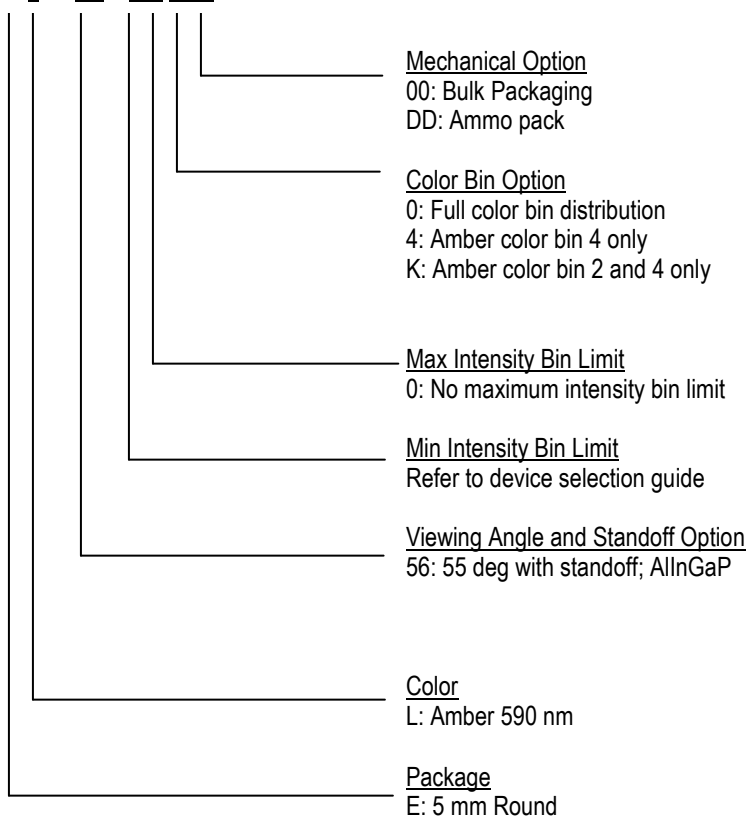
Applications

- Viewing Angles Match Traffic Management Sign Requirements
- Colors Meet Automotive Specifications
- Superior Performance in Outdoor Environments
- Suitable for Autoinsertion onto PC boards.

This preliminary data is provided to assist you in the evaluation of product(s) currently under development. Until Avago Technologies releases this product for general sales, Avago Technologies reserves the right to alter prices, specifications, features, capabilities, functions, release dates, and remove availability of the product(s) at anytime.

Part Numbering System

HLMP- x x xx - x x x xx

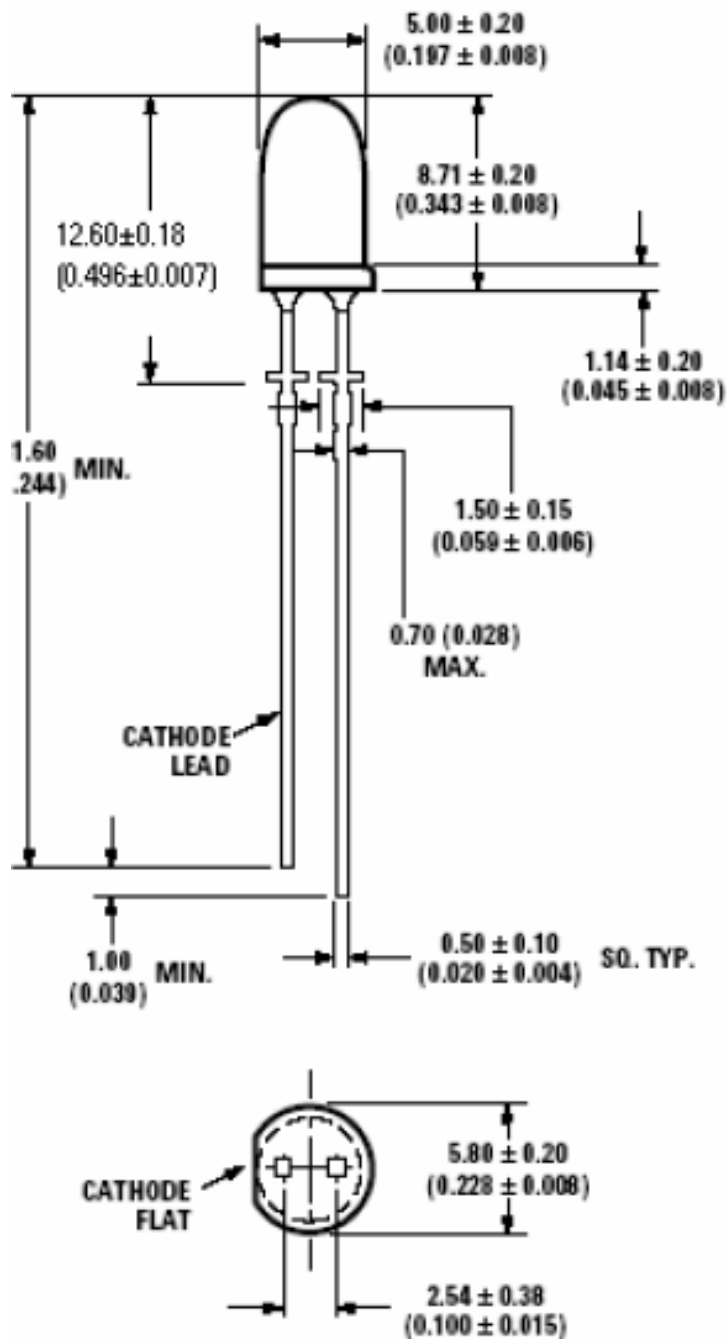


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Package Dimension



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. LEADS ARE MILD STEEL, SOLDER DIPPED.

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Absolute Maximum Ratings at TA = 25°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 (IR = 100 μ A)	5 V
LED Junction Temperature	130°C
Operating Temperature	-40°C to +100°C
Storage Temperature	-40°C to +120°C

Notes:

- Derate linearly as shown in Figure 4.
- 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 Application Brief I-024 (5966-3087E).
- Please contact your Agilent Technologies sales representative about operating currents below 10 mA.

Electrical/ Optical Characteristics at TA = 25°C

Parameter	Symbol	Minimum	Average	Maximum	Units	Test Condition
Forward Voltage	V _F		2.02	2.4	V	I _F = 20mA
Reverse Voltage	V _R	5	20		V	I _R = 100 μ A
Viewing Angle ^[2]	2 θ $\frac{1}{2}$		55		°	
Peak Wavelength	λ_{PEAK}		592		nm	Peak of Wavelength of Spectral Distribution at I _F = 20mA
Dominant Wavelength	λ_d		590		nm	
Spectral Halfwidth	$\Delta\lambda_{\frac{1}{2}}$		17		nm	Wavelength Width at Spectral Distribution 1/2 Power Point at I _F = 20 mA
Speed of Response	τ_S		20		ns	Exponential Time Constant, e-1/ τ_S
Capacitance	C		40		pF	V _F = 0, f = 1 MHz
Thermal Resistance	R θ_{J-PIN}		240		°C/W	LED Junction-to-Cathode Lead
Luminous Efficacy ^[1]	η_V		480		lm/W	Emitted Luminous Power/Emitted Radiant Power

Note:

- The radiant intensity, I_e, in watts per steradian, may be found from the equation I_e = I_v/ η_V , where I_v is the luminous intensity in candelas and η_V is the luminous efficacy in lumens/watt.
- $\theta \frac{1}{2}$ is the off axis angle where the luminous intensity is one half the on axis intensity
- The dominant wavelength, λ_d is derived from the CIE Chromaticity Diagram and represents the color of the lamp.

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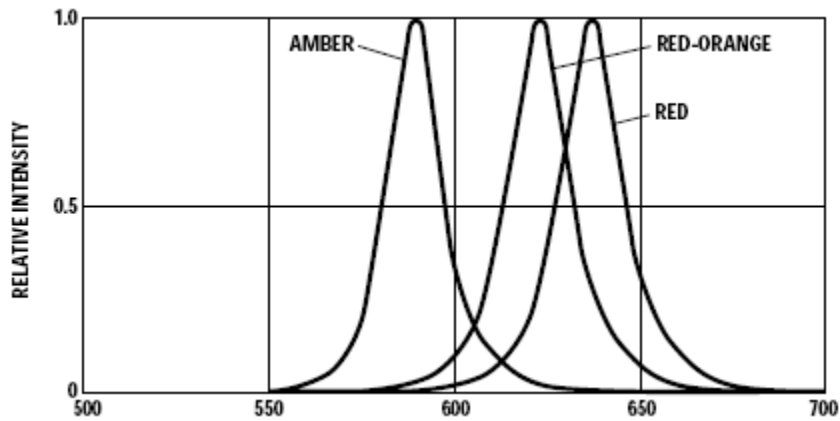


Figure 1: Relative intensity vs. peak wavelength.

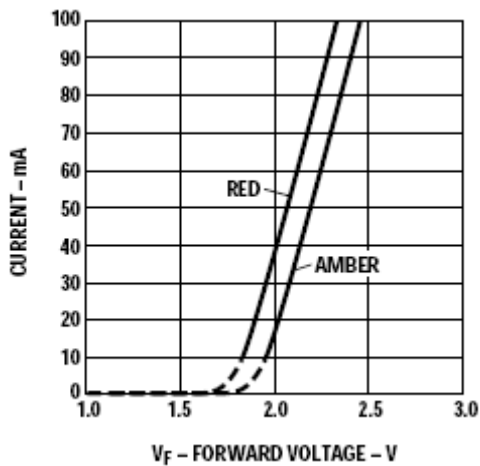


Figure 2: Forward current vs. forward voltage.

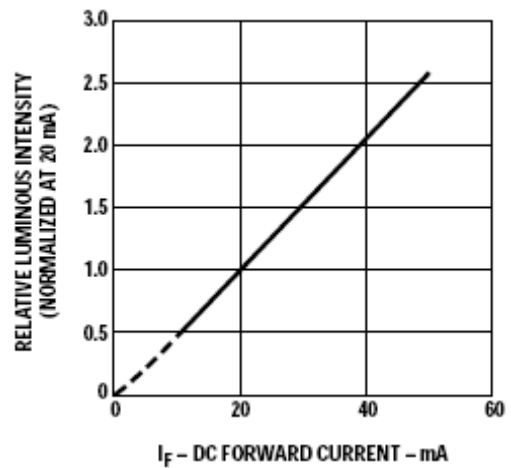


Figure 3: Relative luminous intensity vs. forward current.

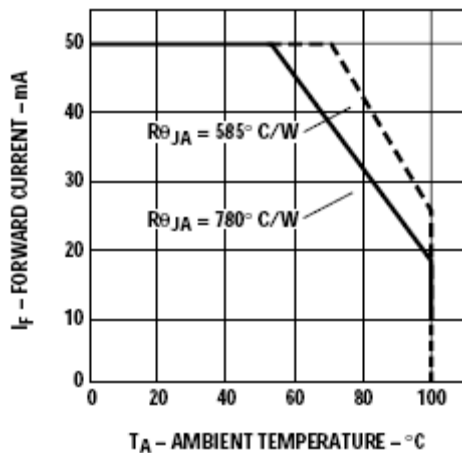


Figure 4: Maximum forward current vs. ambient temperature.
Derating based on $T_{JMAX} = 130^\circ\text{C}$.

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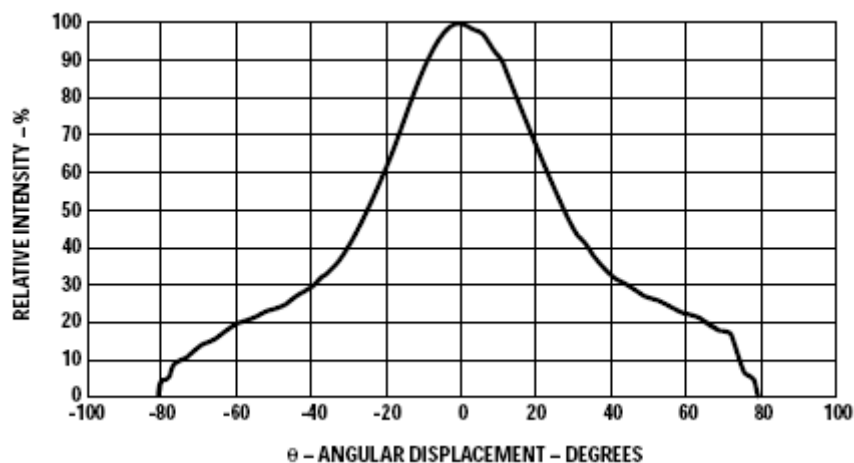


Figure 5: Representative spatial radiation pattern for 55° viewing angle lamps.

Intensity Bin Limit

BIN ID	Min.	Max.
G	140	180
H	180	240
J	240	310
K	310	400
L	400	520
M	520	680
N	680	880
P	880	1150

Notes :

1.Tolerance for each bin limit is $\pm 15\%$.

Color Bin Limit

BIN ID	Min.	Max.
1	584.5	587.0
2	587.0	589.5
4	589.5	592.0
6	592.0	594.5

Notes :

1.Tolerance for each bin limit is ± 0.5 nm

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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 Condition:

- ❖ 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 1.59mm below the body (encapsulant epoxy) for those parts without standoff.
- ❖ Recommended soldering condition:

	Wave Soldering	Manual Solder Dipping
Pre-heat temperature	105 °C Max.	-
Preheat 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 maintain 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 holes size for LED component leads.

LED component lead size	Diagonal	Plated through hole diameter
0.457 x 0.457mm (0.018 x 0.018inch)	0.646 mm (0.025 inch)	0.976 to 1.078 mm (0.038 to 0.042 inch)
0.508 x 0.508mm (0.020 x 0.020inch)	0.718 mm (0.028 inch)	1.049 to 1.150mm (0.041 to 0.045 inch)

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

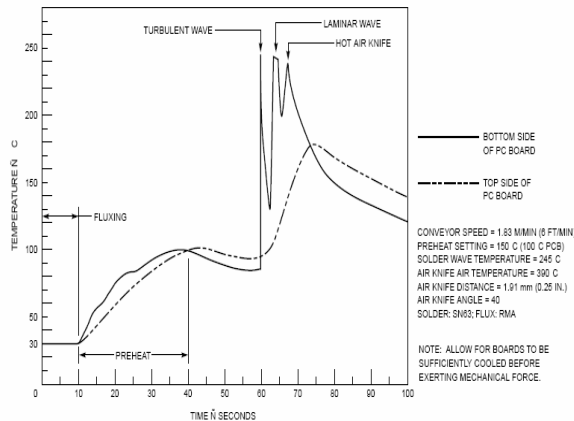


Figure 6: Recommended Wave Soldering Profile

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