Agilent HLMA-SH05
2 mm x 5 mm Rectangular AlInGaP Lamps
Data Sheet

Features

- Rectangular light emitting surface
- Excellent for flush mounting on panels
- Long life: solid state reliability
- Excellent uniformity of light output

Description

The HLMA-SH05 is an epoxy encapsulated lamp in rectangular package which are easily stacked in arrays or used for discrete front panel indicators. Contrast and light uniformity are enhanced by a special epoxy diffusion and tinting process.

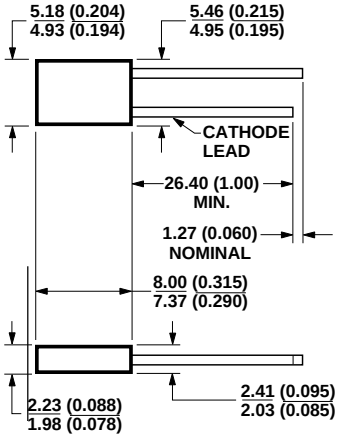
Technology

This 2x5 rectangular solid state lamp utilizes the newly developed Aluminum Indium Gallium Phosphide (AlInGaP) LED technology. This material has a very high luminous efficiency, capable of producing high light output over a wide range of drive currents.

Device Selection Guide

Package Description	Viewing Angle $2\theta_{1/2}$	Dominant Wavelength
Rectangular, 2mm x 5 mm, Tinted, Diffused	110	615 nm

Package Dimensions



NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. AN EPOXY MENISCUS MAY EXTEND ABOUT 1 mm (0.040") DOWN THE LEADS.
3. THERE IS A MAXIMUM 1° TAPER FROM BASE TO THE TOP OF LAMP.

Absolute Maximum Ratings

DC Forward Current[1]	50 mA
Peak Forward Current[2]	200 mA
Average Forward Current (at I_{PEAK} = 200 mA, f ≥ 1 KHz)[2]	45 mA
Transient Forward Current[3] (10 μs Pulse)	500 mA
Reverse Voltage (I_R = 100 μA)	5 V
LED Junction Temperature	110°C
Operating Temperature Range	-40 to +100°C
Storage Temperature Range	-55 to +100°C

Notes:

1. Derate linearly as shown in Figure 4.
2. Refer to Figure 5 to establish pulsed operating conditions.
3. The transient peak current is the maximum non-recurring peak current the device can withstand without damaging the LED die and wire bonds.

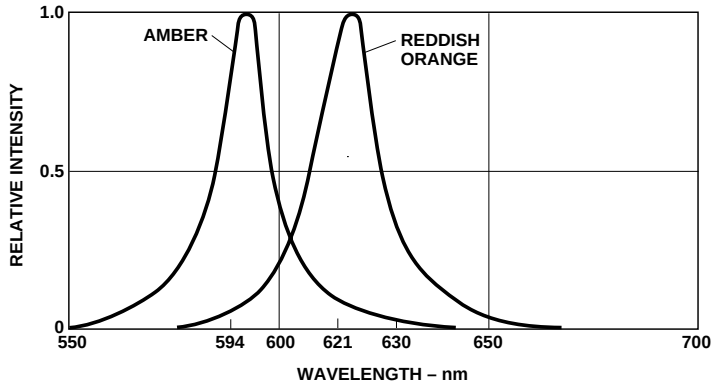


Figure 1. Relative intensity vs. wavelength.

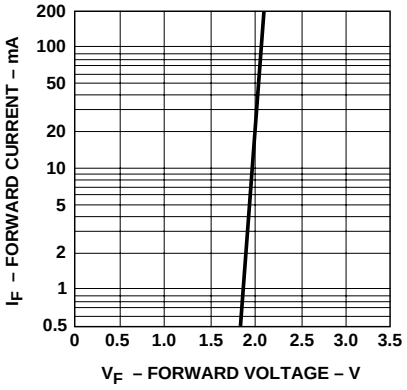


Figure 2. Forward current vs. forward voltage.

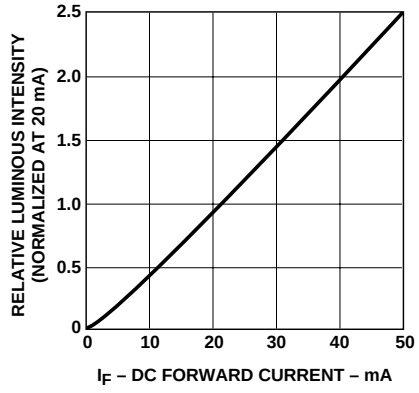


Figure 3. Relative luminous intensity vs. foward current.

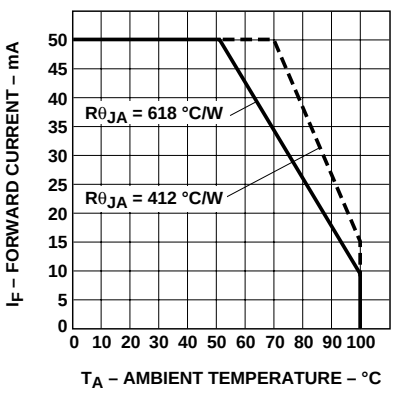


Figure 4. Maximum forward current vs. ambient temperature. Derating based on T Max = 110°C.

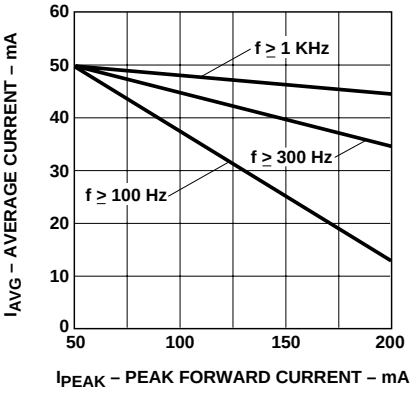


Figure 5. Maximum average current vs. peak foward current.

Optical Characteristics at T_A = 25°C

Part Number HLMA-	Luminous Intensity I_V (mcd) @ 20 mA Min.	Typ.	Peak Wavelength λ_{peak} (nm) Typ.	Color, Dominant Wavelength λ_d[1] (nm) Typ.	Viewing Angle $2\theta_{1/2}$ Degrees[2] Typ.	Luminous Efficacy η_v (lm/w)
SH05	8	20	621	615	110	263

Notes:
1. The dominant wavelength, λ_d, is derived from the CIE Chromaticity Diagram and represents the color of the device.
2. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.

Electrical Characteristics at T_A = 25°C

Part Number HLMA-	Forward Voltage V_F (Volts) @ I_F = 20 mA Min.	Typ.	Reverse Breakdown V_R (Volts) @ I_R = 100 μA Min.	Typ.	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/τ_s} Typ.
SH05	1.9	2.4	5	20	40	260	13

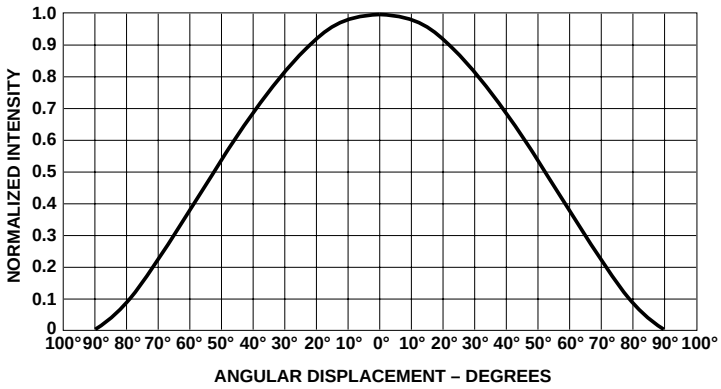


Figure 6.

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.

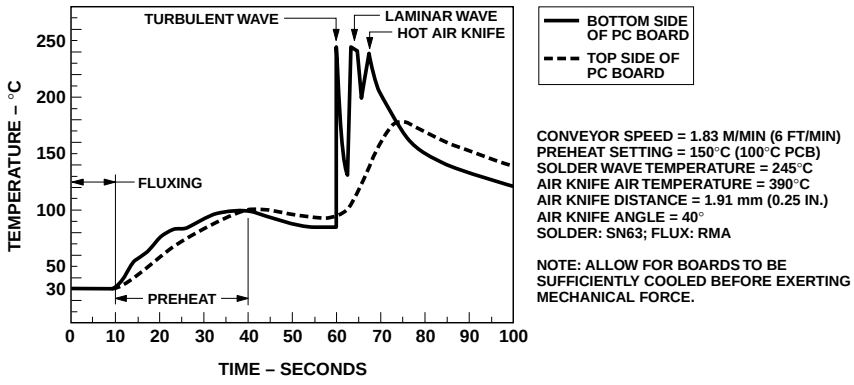


Figure 7. Recommended wave soldering profile.

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Data subject to change.

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