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HLMP-Yxxx

T-1 (3 mm) AlInGaP LED Lamps

Data Sheet

Description

This family of T-1 lamps is widely used in general purpose indicator and back lighting applications. The optical design is balanced to yield superior light output and wide viewing angles. Several intensity choices are available in each color for increased design flexibility.

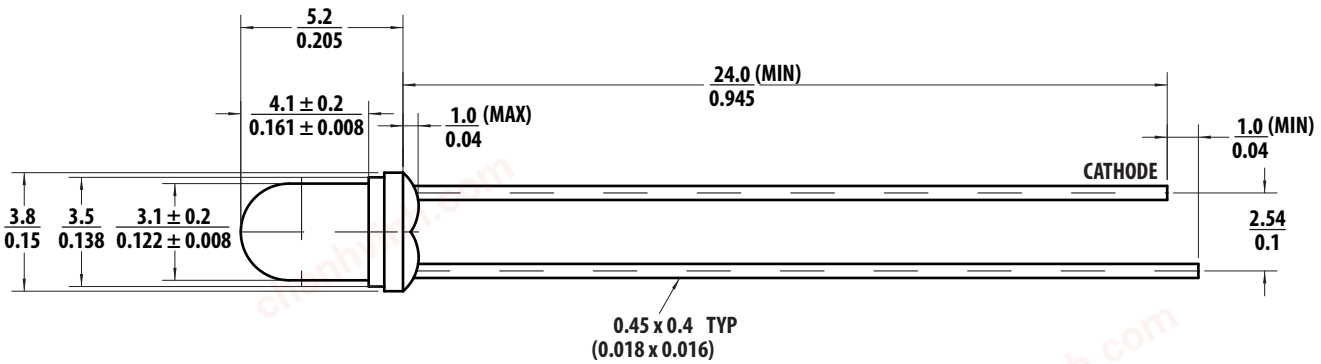
Applications

- Status indicator
- Backlighting front panels
- Light pipe sources
- Lighted switches

Features

- High luminous intensity output
- Low power consumption
- Choice of bright colors
  - Deep Red
  - Red
  - Red-Orange
  - Orange
  - Amber
  - Green
- High efficiency
- Versatile mounting on PCB or panel
- I.C. Compatible/low current requirement
- Popular T-1 diameter package
- Reliable and rugged
- RoHS compliant

Package Dimension



Notes:
1. All dimensions are in millimeter (inches).
2. Tolerance is ±0.25mm (.010) unless otherwise stated.
3. Lead spacing is measured where the leads emerge from the package.

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Selection Guide

Color	Part Number	Package Description	Luminous Intensity, Iv (mcd) @ 20 mA			Viewing Angle, 2θ½ (°)
			Min.	Typ.	Max.	
Deep Red	HLMP-Y651-G00xx	Untinted, Non-diffused	140	300		45
Red	HLMP-Y601-J00xx	Untinted, Non-diffused	240	680		
Red-Orange	HLMP-Y951-K00xx	Untinted, Non-diffused	310	680		
Yellow Orange	HLMP-Y901-J00xx	Untinted, Non-diffused	240	680		
	HLMP-Y902-J00xx	Tinted, Non-diffused	240	680		
Amber	HLMP-Y701-G00xx	Untinted, Non-diffused	140	400		
Green	HLMP-Y802-F00xx	Tinted, Non-diffused	110	240		

Part Numbering System

HLMP - Y x x x - x x x xx

Mechanical Options
00: Bulk

Color Bin Options
0: Full Color Bin Distribution

Maximum IV Bin Options
0: Open (no max. limit)
Others: Please refer to the IV Bin Table

Minimum IV Bin Options
Please refer to the IV Bin Table

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Absolute Maximum Ratings at $T_A = 25°C$

Parameter	HLMP-Yxxx	Units
DC Forward Current	20	mA
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	60	mA
Reverse Voltage (I_R = 100μA)	5	V
Junction Temperature	110	°C
Power Dissipation	48	mW
Storage Temperature Range	-40 to +100	°C
Operating Temperature Range	-40 to +100	°C

Electrical /Optical Characteristic at $T_A = 25°C$

Description	Symbol	Part Number	Min.	Typ.	Max.	Units	Test Conditions
Peak Wavelength	λ_{PEAK}	HLMP-Y651		652		nm	Measurement at peak
		HLMP-Y601		633			
		HLMP-Y951		622			
		HLMP-Y90x		611			
		HLMP-Y701		595			
		HLMP-Y802-F00xx		575			
Dominant Wavelength	λ_d	HLMP-Y651	635.0	638.0	646.0	nm	Note 1
		HLMP-Y601	620.0	627.0	635.0		
		HLMP-Y951	610.0	615.0	620.0		
		HLMP-Y90x	599.5	605.0	610.5		
		HLMP-Y701	582.0	592.0	597.0		
		HLMP-Y802-F00xx	564.5	572.0	576.5		
Spectrum Half Width	$\Delta\lambda$	HLMP-Y651		15		nm	
		HLMP-Y601		15			
		HLMP-Y951		17			
		HLMP-Y90x		17			
		HLMP-Y701		15			
		HLMP-Y802-F00xx		11			
Forward Voltage	V_F	HLMP-Y651		2.0	2.2	V	I_F = 20mA (Figure 1)
		HLMP-Y601		2.0	2.2		
		HLMP-Y951		2.0	2.2		
		HLMP-Y90x		2.0	2.4		
		HLMP-Y701		2.0	2.2		
		HLMP-Y802-F00xx		2.1	2.4		

Notes:
1. The dominant wavelength, λ_d, is derived from the Chromaticity Diagram and represents the color of the lamp.

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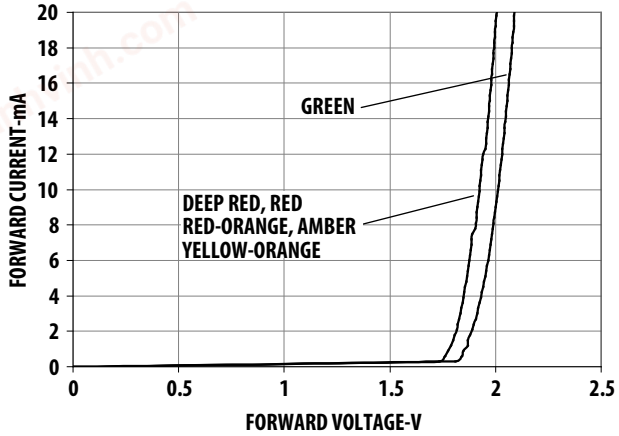

Figure 1. Forward Current vs. Forward Voltage.

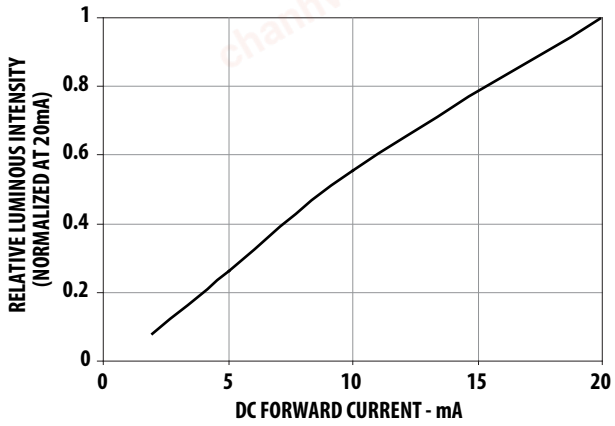

Figure 2. Relative Luminous Intensity vs. Forward Current.

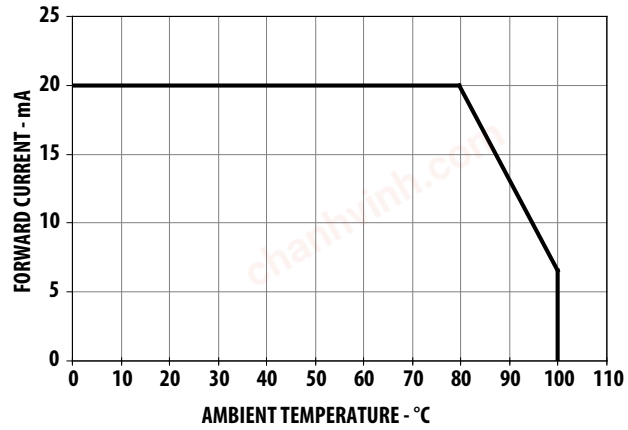

Figure 3. Ambient Temperature vs. Maximum DC Forward Current.

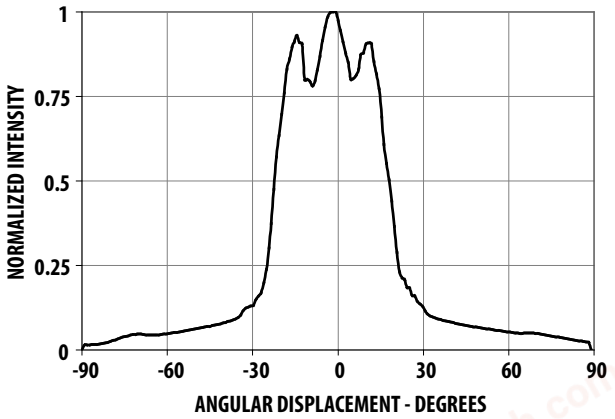

Figure 4. Relative Luminous Intensity vs. Angular Displacement for HLMP-Y651, HLMP-Y601, HLMP-Y951 and HLMP-Y701.

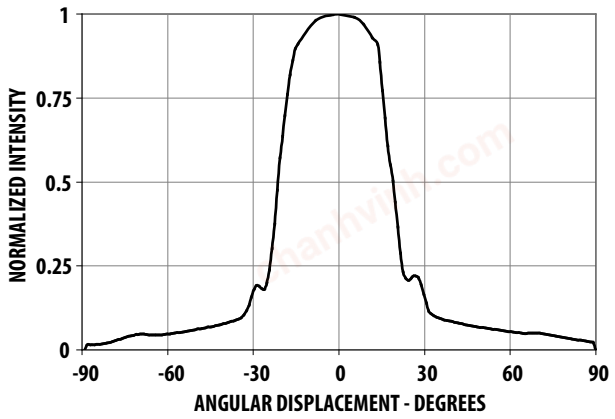

Figure 5. Relative Luminous Intensity vs. Angular Displacement for HLMP-Y90x and HLMP-Y80x.

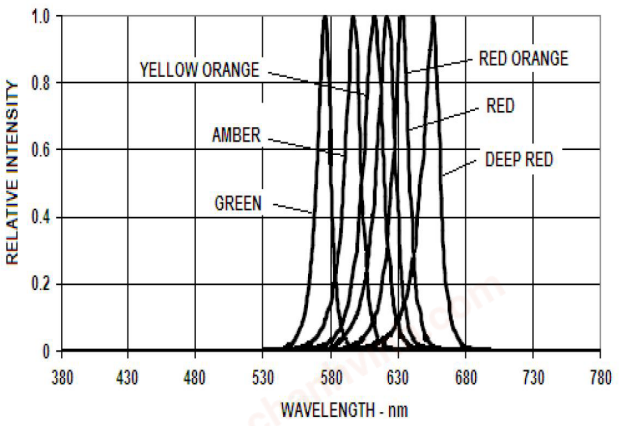

Figure 6. Wavelength vs. Relative Luminous Intensity.

Intensity Bin Limits

	Intensity Range (mcd)	
Bin	**Min.**	**Max.**
F	110.0	140.0
G	140.0	180.0
H	180.0	240.0
J	240.0	310.0
K	310.0	400.0
L	400.0	520.0
M	520.0	680.0
N	680.0	880.0
P	880.0	1150.0
Q	1150	1500

Tolerance for each bin limit is 15%.

Color Bin Limits Table

		Lambda (nm)	
Color	**Category #**	**Min.**	**Max.**
Red-Orange	1	610.5	613.5
	2	613.5	616.5
	3	616.5	619.5
Yellow-Orange	2	599.5	602.0
	3	602.0	604.5
	4	604.5	607.5
	5	607.5	610.5
Amber	1	584.5	587.0
	2	587.0	589.5
	4	589.5	592.0
	6	592.0	594.5
	7	594.5	597.0
Green	2	573.5	576.5
	3	570.5	573.5
	4	567.5	570.5
	5	564.5	567.5

Tolerance for each bin limit is ±1.0 nm.

Precautions:

Assembly method:

This product is not meant for auto-insertion.

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.
- During lead forming, the leads should be bent at a point at least 3mm from the base of the lens. Do not use the base of the lead frame as a fulcrum during forming. Lead forming must be done before soldering at normal temperature.
- It is recommended that tooling made to precisely form and cut the leads to length rather than rely upon hand operation.

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Precautions: (cont.)

Soldering Conditions:

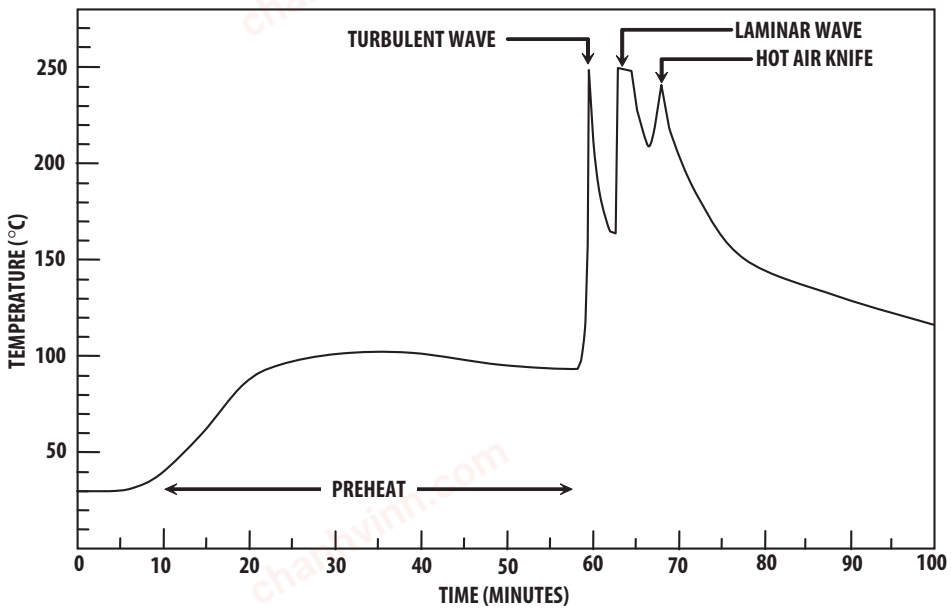
- Care must be taken during PCB assembly and soldering process to prevent damage to LED component.
- The closest LED is allowed to solder on board is 1.59 mm below the body (encapsulant epoxy) for those parts without standoff.
- Recommended soldering conditions:

	Wave Soldering	Manual Solder Dipping
Pre-heat Temperature	105°C Max.	–
Pre-heat Time	60 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.



Recommended solder:
Sn63 (Leaded solder alloy)
SAC305 (Lead free solder alloy)

Flux: Rosin flux

Solder bath temperature:
245°C± 5°C (maximum peak temperature = 250°C)

Dwell time: 1.5 sec - 3.0 sec (maximum = 3sec)

Note: Allow for board to be sufficiently cooled to room temperature before exerting mechanical force.

Figure 7. Recommended wave soldering profile.

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