HLMP-Yxxx
T-1 (3 mm) GaP/GaAsP 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.

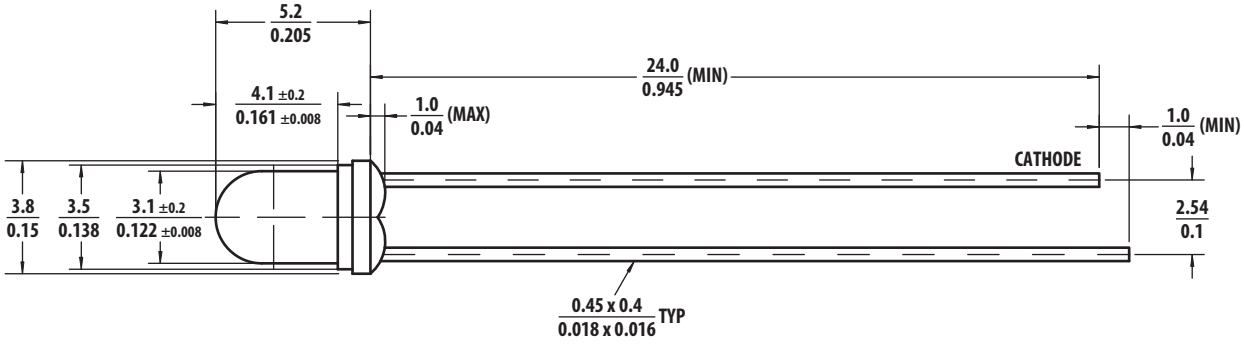
Features

- Low power consumption
- High efficiency
- Versatile mounting on PCB or panel
- I.C. Compatible/low current requirement
- Popular T-1 package
- RoHS compliant

Applications

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

Package Dimension



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

Selection Guide

Part Number	Color	Package Description	Luminous Intensity, Iv (mcd) @ 10 mA Min.	Typ.	Max.	Viewing Angle, 2θ½ (°)
HLMP-Y301-F00xx	GaAsP HER	Tinted, Non-diffused	6.1	19		45
HLMP-Y402-G00xx	GaAsP Orange		9.7	29		45
HLMP-Y502-F00xx	GaP Green		12	40		55

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

Absolute Maximum Ratings at $T_A = 25°C$

Parameter	HLMP-Y301	HLMP-Y402	HLMP-Y502	Units
DC Forward Current	20	20	20	mA
Peak Forward Current (1/10 Duty Cycle, 0.1 ms Pulse Width)	90	60	120	mA
Reverse Voltage (I_R = 100 μA)	5	5	5	V
Junction Temperature	110	110	110	°C
Power Dissipation	52	52	52	mW
Storage Temperature Range	-40 to +100			°C
Operating Temperature Range	-40 to +100			°C
Solder Temperature	260° C 5 sec			

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

Description	Symbol	Part Number	Min.	Typ.	Max.	Units	Test Conditions
Peak Wavelength	λ_{PEAK}	HLMP-Y301		635		nm	Measurement at peak
		HLMP-Y402		610			
		HLMP-Y502		565			
Dominant Wavelength	λ_d	HLMP-Y301	615	626	632	nm	Note 1
		HLMP-Y402	599.5	605	613.5		
		HLMP-Y502	561.5	573	576.5		
Spectrum Half Width	$\Delta\lambda$	HLMP-Y301		40		nm	
		HLMP-Y402		35			
		HLMP-Y502		30			
Forward Voltage	V_F	HLMP-Y301		2.1	2.6	V	$I_F = 20$ mA (Figure 1)
		HLMP-Y402		2.1	2.6		
		HLMP-Y502		2.2	2.6		
Reverse Voltage	V_R	HLMP-Y301	5			μA	$I_R = 100$ μA
		HLMP-Y402	5				
		HLMP-Y502	5				
Thermal Resistance	$R\theta_{J\text{-}PIN}$	HLMP-Y301		310		°C/W	Junction to Cathode Lead
		HLMP-Y402		310			
		HLMP-Y502		310			

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

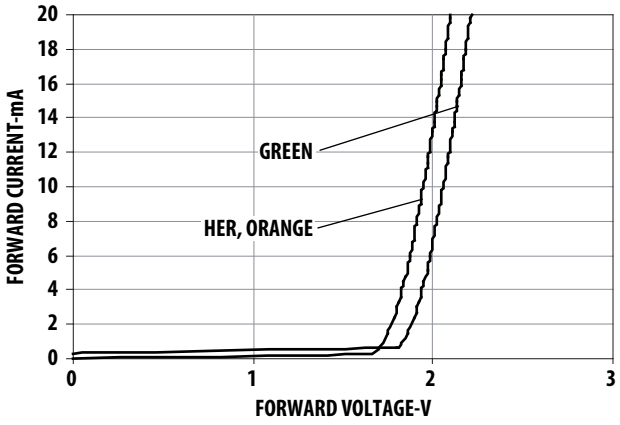


Figure 1. Forward Current vs. Forward Voltage

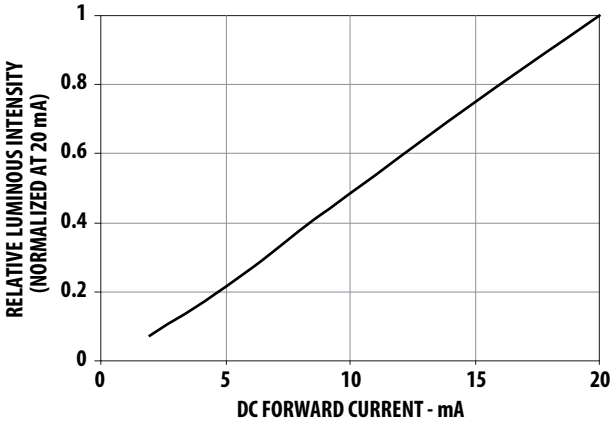


Figure 2. Relative Luminous Intensity vs. Forward Current

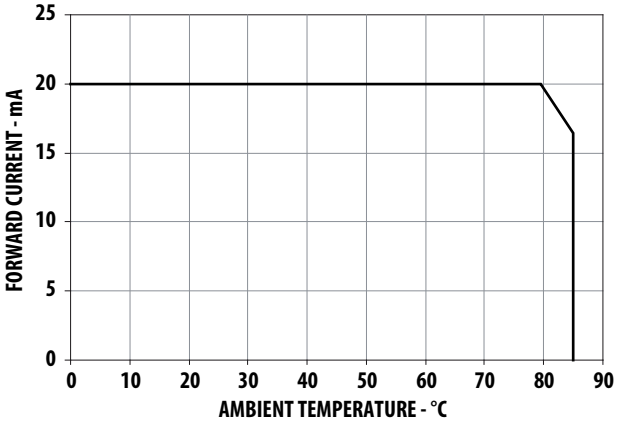


Figure 3. Ambient Temperature vs. Maximum DC Forward Current

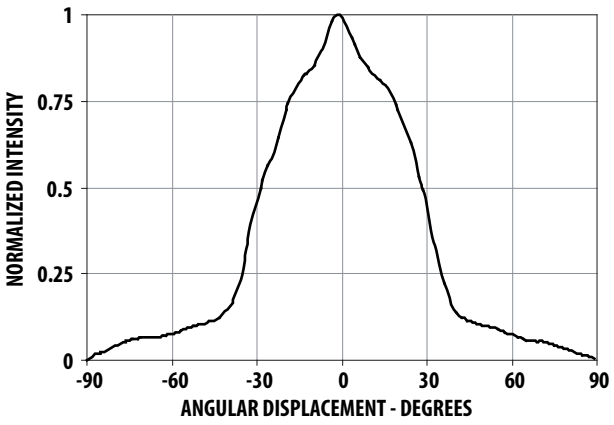


Figure 4. Relative Luminous Intensity vs. Angular Displacement for HLMP-Y502

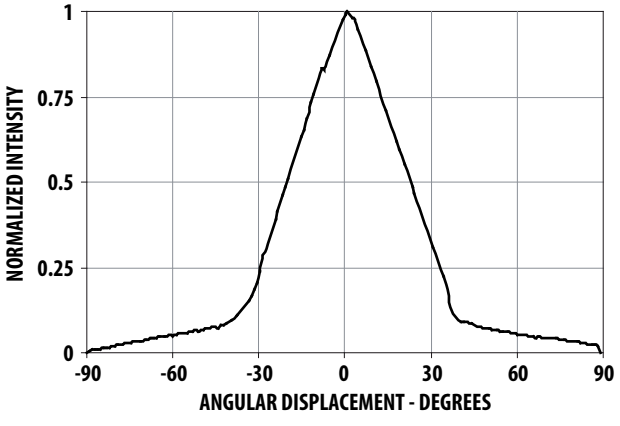


Figure 5. Relative Luminous Intensity vs. Angular Displacement for HLMP-Y301 and HLMP-Y402

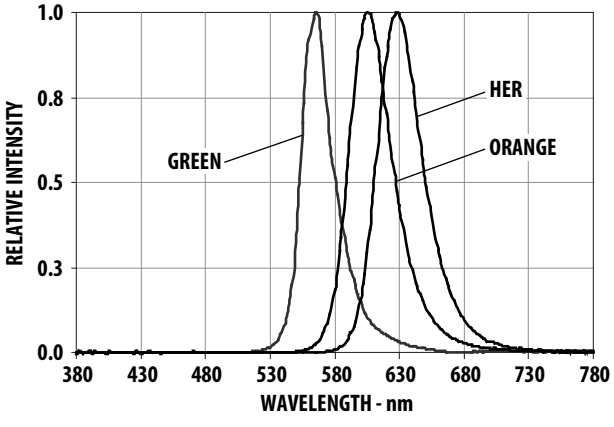


Figure 6. Wavelength vs. Relative Luminous Intensity

Intensity Bin Limits

		Intensity Range (mcd)	
Color	**Bin**	**Min.**	**Max.**
HER/Orange	F	6.1	9.7
	G	9.7	15.5
	H	15.5	24.8
	I	24.8	39.6
	J	39.6	63.4
	K	63.4	101.5
	L	101.5	162.4
	M	162.4	234.6
	N	234.6	340.0
	O	340.0	540.0
	P	540.0	850.0
Green	F	12.0	19.1
	G	19.1	30.7
	H	30.7	49.1
	I	49.1	78.5
	J	78.5	125.7
	K	125.7	201.1
	L	201.1	289.0
	M	289.0	417.0
	O	417.0	680.0

Tolerance for each bin limit is ±15%.

Color Bin Limits Table

		Lambda (nm)	
Color	**Category #**	**Min.**	**Max.**
Orange	2	599.5	602.0
	3	602.0	604.5
	4	604.5	607.5
	5	607.5	610.5
	6	610.5	613.5
Green	6	561.5	564.5
	5	564.5	567.5
	4	567.5	570.5
	3	570.5	573.5
	2	573.5	576.5

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.

Soldering Conditions:

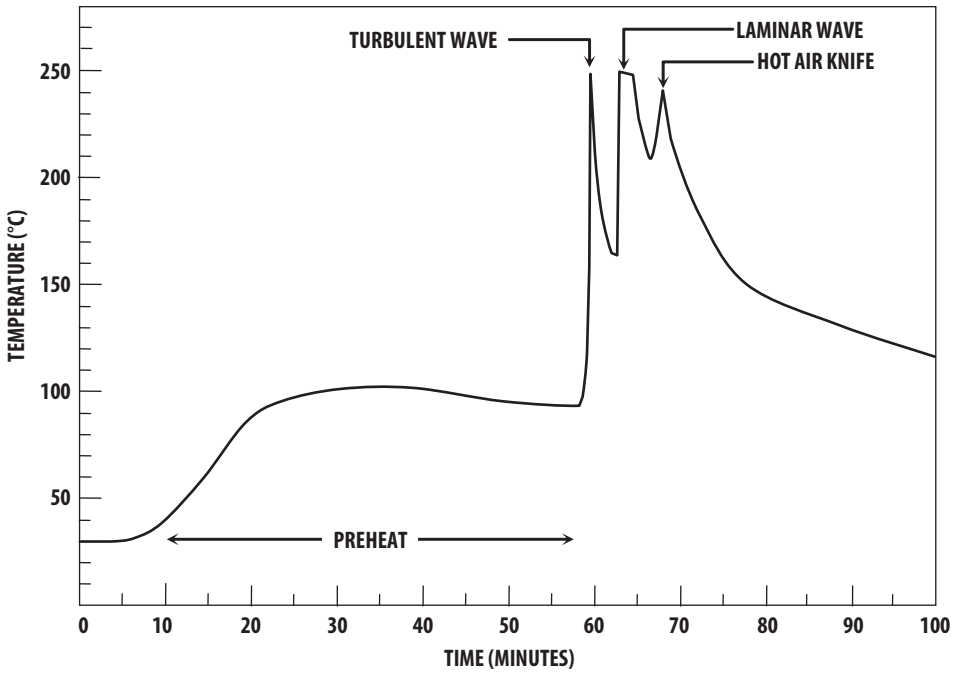
- Care must be taken during PCB assembly and soldering process to prevent damage to LED component.
- The closest LED is allowed to solder on board is 1.59 mm below the body (encapsulant epoxy) for those parts without standoff.
- Recommended soldering conditions:

	Wave Soldering	Manual Solder Dipping
Pre-heat Temperature	105° C Max.	–
Preheat 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 component.



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 = 3 sec)

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

Figure 7. Recommended Wave Soldering Profile

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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