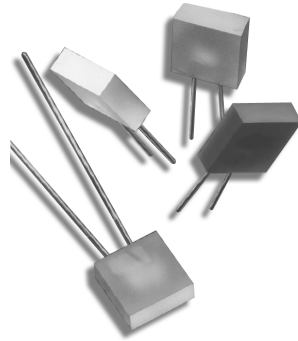
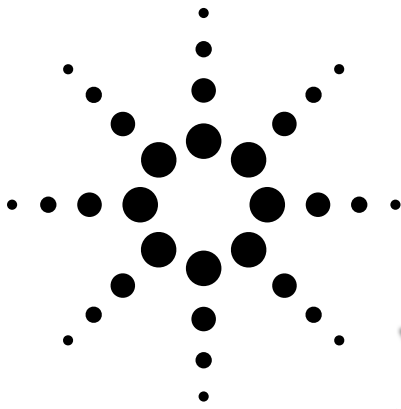


Agilent 2.5 mm x 7.6 mm Rectangular LED Lamps

Data Sheet



HLMP-R100, HLMP-0301, HLMP-0401, HLMP-0504

Description

The HLMP-R100, -0301, -0401, -0504 are solid state lamps encapsulated in a radial lead rectangular epoxy package. They utilize a tinted, diffused epoxy to provide high on-off contrast and a flat high intensity emitting surface. Borderless package design allows creation of uninterrupted light emitting areas.

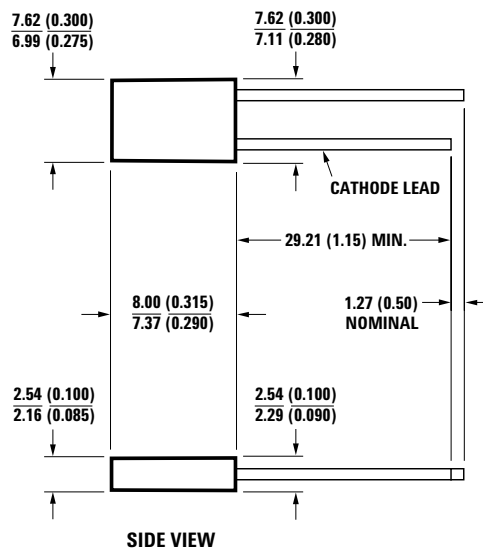
The HLMP-R100 uses a double heterojunction (DH) absorbing substrate (AS) aluminum gallium arsenide (AlGaAs) red LED chip in a light red epoxy package. This combination produces outstanding light output over a wide range of drive currents.

The HLMP-0301 has a high efficiency red GaAsP on GaP LED chip in a light red epoxy package.

The HLMP-0401 provides a yellow GaAsP on GaP LED chip in a yellow epoxy package.

The HLMP-0504 provides a green GaP LED chip in a green epoxy package.

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.

Features

- Rectangular light emitting surface
- Flat high sterance emitting surface
- Stackable on 2.54 mm (0.100 inch) centers
- Ideal as flush mounted panel indicators
- Ideal for backlighting legends
- Long life: solid state reliability
- Choice of 4 bright colors
 - DH AS AlGaAs Red
 - High Efficiency Red
 - Yellow
 - High Performance Green
- IC compatible/low current requirements

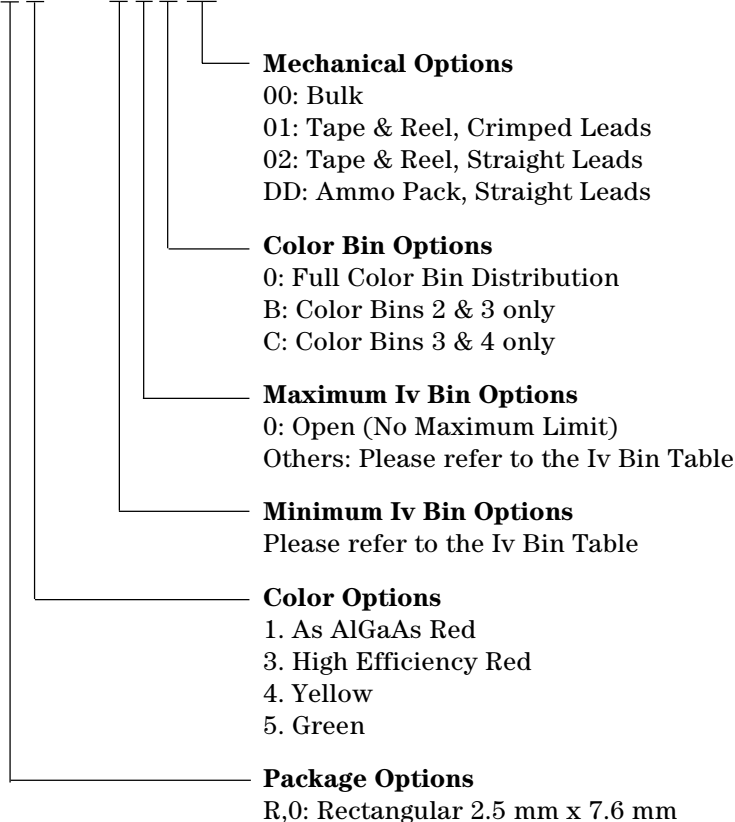


Selection Guide

Color	Part Number	Luminous Intensity Iv (mcd) at 20 mA	
		Min.	Typ.
DH AlGaAs Red	HLMP-R100	2.1	–
	HLMP-R100-FG0xx	5.4	17.2
Red	HLMP-0301	2.1	–
	HLMP-0301-C00xx	1.3	–
	HLMP-0301-DECxx	2.1	6.8
	HLMP-0301-CD0xx	1.3	4.2
Yellow	HLMP-0401	3.6	–
	HLMP-0401-B00xx	1.4	–
	HLMP-0401-D00xx	3.6	–
	HLMP-0401-CD0xx	2.2	7.2
	HLMP-0401-DEBxx	3.6	11.4
Green	HLMP-0504	2.6	–
	HLMP-0504-B00xx	1.6	–
	HLMP-0504-DECxx	4.2	13.4
	HLMP-0504-CD0xx	2.6	8.4
	HLMP-0504-C00xx	2.6	–

Part Numbering System

HLMP - x x xx - x x x xx



Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

Parameter	HLMP-R100	HLMP-0301	HLMP-0401	HLMP-0504	Units
Peak Forward Current	300	90	60	90	mA
Average Forward Current ^[1]	20	25	20	25	mA
DC Current ^[2]	30	30	20	30	mA
Power Dissipation	87	135	85	135	mW
Reverse Voltage ($I_R = 100 \mu\text{A}$)	5	5	5	5	V
Transient Forward Current ^[3] (10 μs Pulse)	500	500	500	500	mA
Operating Temperature Range	-20 to +100	-55 to +100	-55 to +100	-20 to +100	$^\circ\text{C}$
Storage Temperature Range	-55 to +100			-55 to +100	
Wave Soldering Temperature (1.59 mm [0.063 in.] from Body)		250 $^\circ\text{C}$ for 3 seconds			
Solder Dipping Temperature (1.59 mm [0.063 in.] from Body)		260 $^\circ\text{C}$ for 5 seconds			

Notes:

1. See Figure 5 to establish pulsed operating conditions.
2. For AlGaAs Red, Red, and Green Series derate linearly from 50 $^\circ\text{C}$ at 0.5 mA/ $^\circ\text{C}$. For Yellow Series derate linearly from 50 $^\circ\text{C}$ at 0.2 mA/ $^\circ\text{C}$.
3. The transient peak current is the maximum non-recurring peak current that can be applied to the device without damaging the LED die and wirebond. It is not recommended that the device be operated at peak current beyond the peak forward current listed in the Absolute Maximum Ratings.

Electrical/Optical Characteristics at $T_A = 25^\circ\text{C}$

Sym.	Description	HLMP-R100			HLMP-0301			HLMP-0401			HLMP-0504			Units	Test Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
$2\theta_{1/2}$	Included Angle Between Half Luminous Intensity Points		100			100			100				100	Deg.	Note 1. Fig. 6
λ_P	Peak Wavelength		645			635			583				565	nm	Measurement at Peak
λ_d	Dominant Wavelength		637			626			585				569	nm	Note 2.
$\Delta\lambda_{1/2}$	Spectral Line Halfwidth		20			40			36				28	nm	
τ_s	Speed of Response		30			90			90				500	ns	
C	Capacitance		30			16			18				18	pF	$V_F = 0$; $f = 1 \text{ MHz}$
$R_{\theta_{J-PIN}}$	Thermal Resistance		260			260			260				260	$^\circ\text{C}/\text{W}$	Junction to Cathode Lead
V_F	Forward Voltage		1.8	2.2		1.9	2.6		2.1	2.6		2.2	3.0	V	$I_F = 20 \text{ mA}$ Figure 2.
V_R	Reverse Breakdown Voltage	5.0			5.0			5.0			5.0			V	$I_R = 100 \mu\text{A}$
η_v	Luminous Efficacy		80			145			500				595	lm/W	Note 3.

Notes:

- $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
- The dominant wavelength, λ_d , is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
- Radiant intensity, I_e , in watts/steradian, may be found from the equation $I_e = I_v/\eta_v$, where I_v is the luminous intensity in candelas and η_v is the luminous efficacy in lumens/watt.

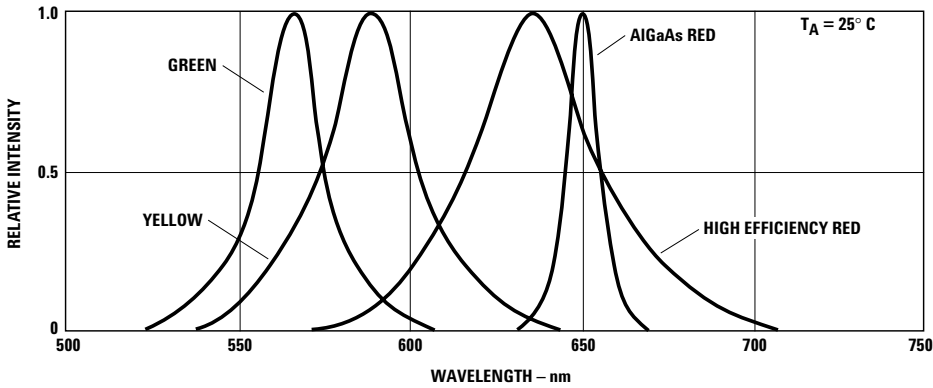


Figure 1. Relative intensity vs. wavelength.

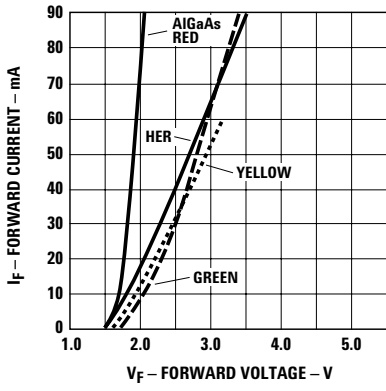


Figure 2. Forward current vs. forward voltage. V_F (300 mA) for AlGaAs Red = 2.6 volts typical.

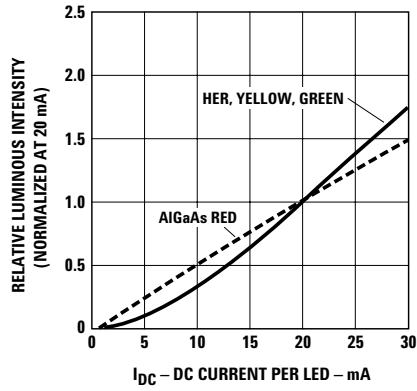


Figure 3. Relative luminous intensity vs. forward current.

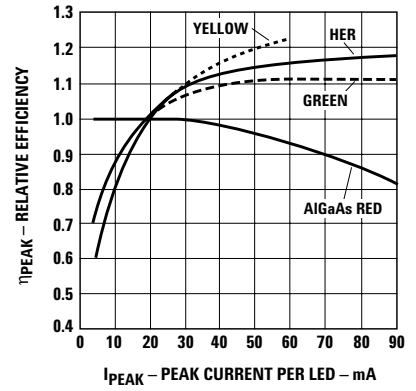


Figure 4. Relative efficiency (luminous intensity per unit current) vs. peak current. η_v (300 mA) for AlGaAs Red = 0.7.

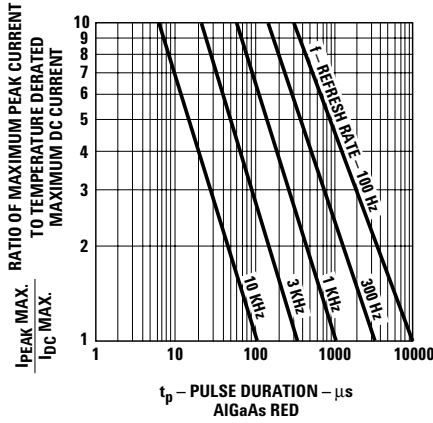
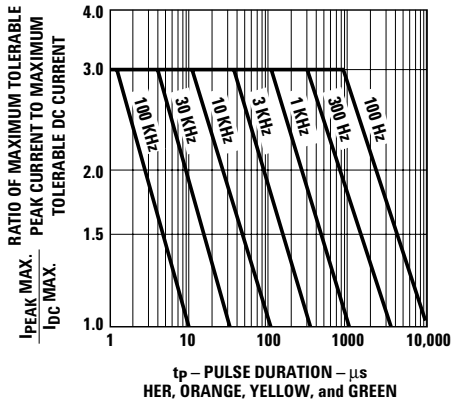


Figure 5. Maximum tolerable peak current vs. peak duration (I_{PEAK} MAX determined from temperature derated I_{DC} MAX).

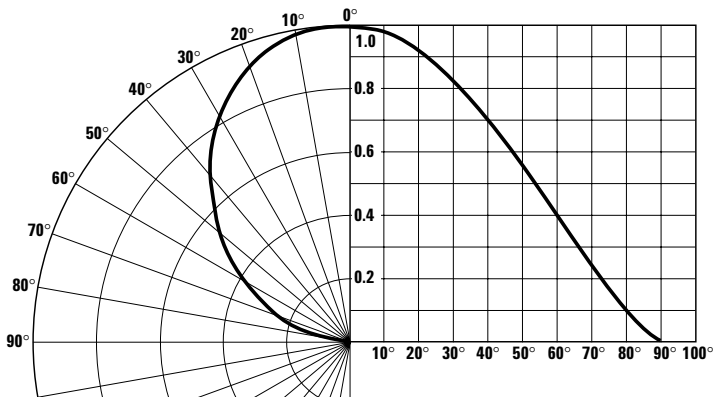


Figure 6. Relative luminous intensity vs. angular displacement.

Intensity Bin Limits

Color	Bin	Intensity Range (mcd)	
		Min.	Max.
Red	C	0.5	2.4
	D	2.4	3.8
	E	3.8	6.1
	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
	Q	850.0	1200.0
	R	1200.0	1700.0
	S	1700.0	2400.0
	T	2400.0	3400.0
	U	3400.0	4900.0
	V	4900.0	7100.0
	W	7100.0	10200.0
X	10200.0	14800.0	
Y	14800.0	21400.0	
Z	21400.0	30900.0	

Intensity Bin Limits, continued

Color	Bin	Intensity Range (mcd)	
		Min.	Max.
Yellow	B	1.6	2.5
	C	2.5	4.0
	D	4.0	6.5
	E	6.5	10.3
	F	10.3	16.6
	G	16.6	26.5
	H	26.5	42.3
	I	42.3	67.7
	J	67.7	108.2
	K	108.2	173.2
	L	173.2	250.0
	M	250.0	360.0
	N	360.0	510.0
	O	510.0	800.0
	P	800.0	1250.0
	Q	1250.0	1800.0
	R	1800.0	2900.0
	S	2900.0	4700.0
	T	4700.0	7200.0
	U	7200.0	11700.0
	V	11700.0	18000.0
W	18000.0	27000.0	
Green	B	1.8	2.9
	C	2.9	4.7
	D	4.7	7.6
	E	7.6	12.0
	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
	N	417.0	680.0
	O	680.0	1100.0
	P	1100.0	1800.0
Q	1800.0	2700.0	
R	2700.0	4300.0	
S	4300.0	6800.0	
T	6800.0	10800.0	
U	10800.0	16000.0	
V	16000.0	25000.0	
W	25000.0	40000.0	

Maximum tolerance for each bin limit is $\pm 18\%$.

Color Categories

Color	Category #	Lambda (nm)	
		Min.	Max.
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
	1	582.0	584.5
Yellow	3	584.5	587.0
	2	587.0	589.5
	4	589.5	592.0
	5	592.0	593.0

Tolerance for each bin limit is ± 0.5 nm.

Mechanical Option Matrix

Mechanical Option Code	Definition
00	Bulk Packaging, minimum increment 500 pcs/bag
01	Tape & Reel, crimped leads, minimum increment 1300 pcs/bag
02	Tape & Reel, straight leads, minimum increment 1300 pcs/bag
DD	Ammo Pack, straight leads with minimum increment 2K/pack

Note:

All categories are established for classification of products. Products may not be available in all categories. Please contact your local Agilent representative for further clarification/information.

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