HEWLETT® PACKARD

2.5 mm x 7.6 mm Rectangular LED Lamps

Technical Data

HLMP-R100
HLMP-0300/0301
HLMP-0400/0401
HLMP-0503/0504

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**

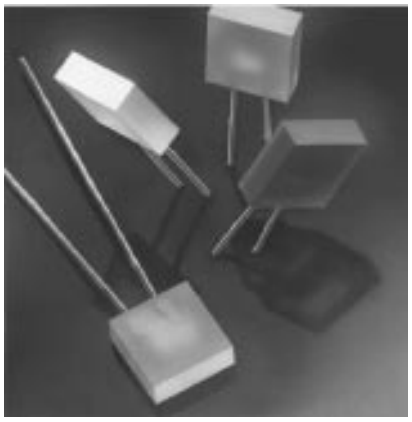
Description

The HLMP–R100, -030X, -040X, -050X 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.

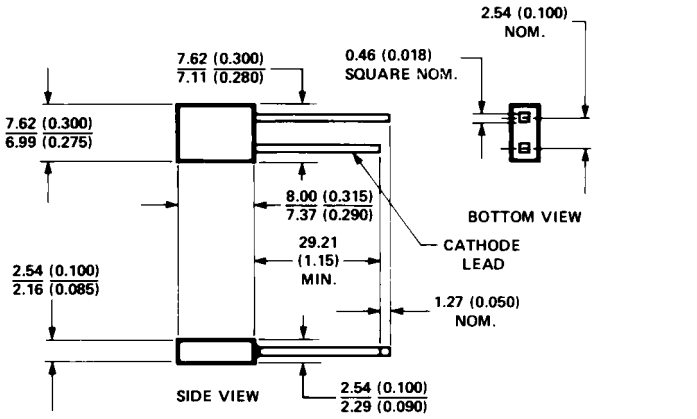
The HLMP-0300 and -0301 have a high efficiency red GaAsP on GaP LED chip in a light red epoxy package.

The HLMP-0400 and -0401 provide a yellow GaAsP on GaP LED chip in a yellow epoxy package.



The HLMP-0503 and -0504 provide a green GaP LED chip in a green epoxy package.

Package Dimensions



NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES (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 TOP OF LAMP.

Axial Luminous Intensity

Color	Part Number	I_V (mcd) @ 20 mA DC	
		Min.	Typ.
DH AlGaAs Red	HLMP-R100	3.4	11.0
High Efficiency Red	HLMP-0300	1.3	2.5
	HLMP-0301	2.1	5.3
Yellow	HLMP-0400	1.4	2.5
	HLMP-0401	3.6	5.0
High Performance Green	HLMP-0503	1.6	2.5
	HLMP-0504	2.6	8.0

Absolute Maximum Ratings at T_A = 25°C

Parameter	HLMP-R100	HLMP-0300/-0301	HLMP-0400/0401	HLMP-0503/-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 µA)	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	°C
Storage Temperature Range	-55 to +100			-55 to +100	
Lead Soldering Temperature (1.6 mm [0.063 in.] from body)	260°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°C at 0.5 mA/°C. For Yellow Series derate linearly from 50°C at 0.2 mA/°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 $T_A = 25°C$

Sym.	Description	HLMP-R100			HLMP -0300/-0301			HLMP -0400/-0401			HLMP -0503/-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 MHz
$R\theta_{J\text{-}PIN}$	Thermal Resistance		260			260			260			260		°C/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	$I_F = 20$ mA Figure 2.
V_R	Reverse Breakdown Voltage	5.0			5.0			5.0			5.0			V	$I_R = 100\ \mu A$
η_v	Luminous Efficacy		80			145			500			595		lm/W	Note 3

Notes:
1. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
2. The dominant wavelength, λ_d, is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
3. 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.

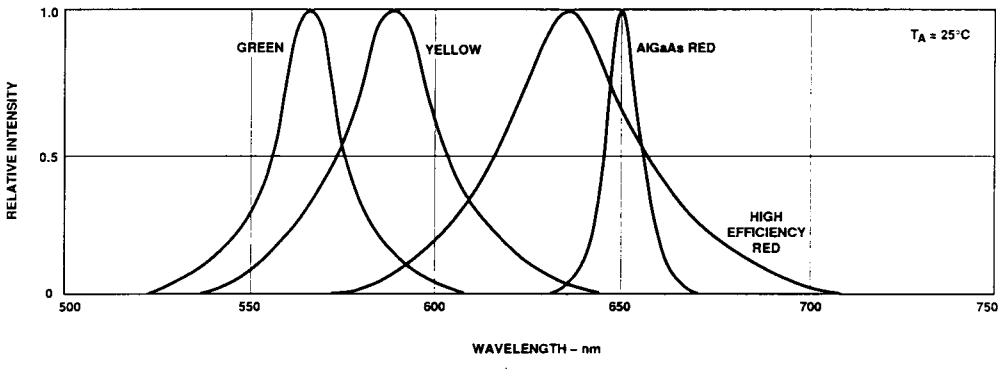


Figure 1. Relative Intensity vs. Wavelength.

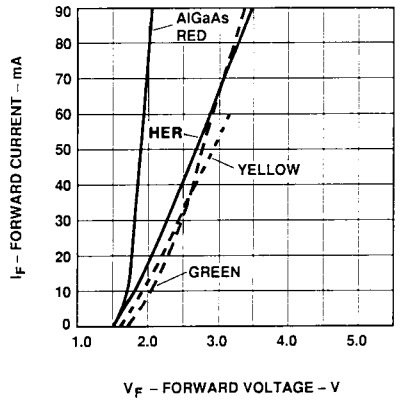


Figure 2. Forward Current vs. Forward Voltage. V_F (300 mA) for AlGaAs Red = 2.6 Volts Typical.

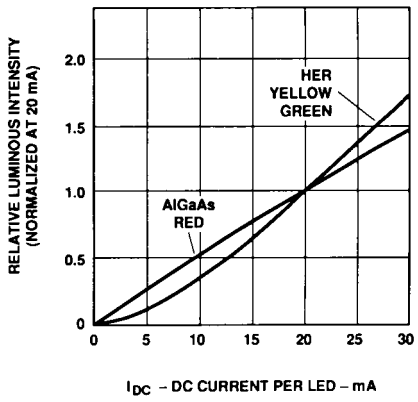


Figure 3. Relative Luminous Intensity vs. Forward Current.

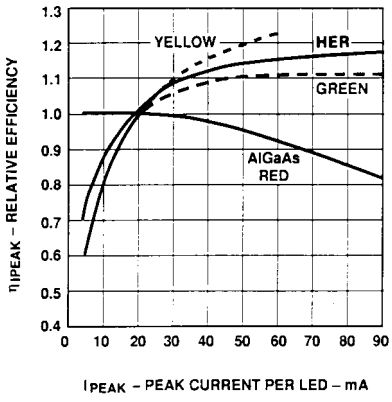


Figure 4. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak Current. η_v (300 mA) for AlGaAs Red = 0.7.

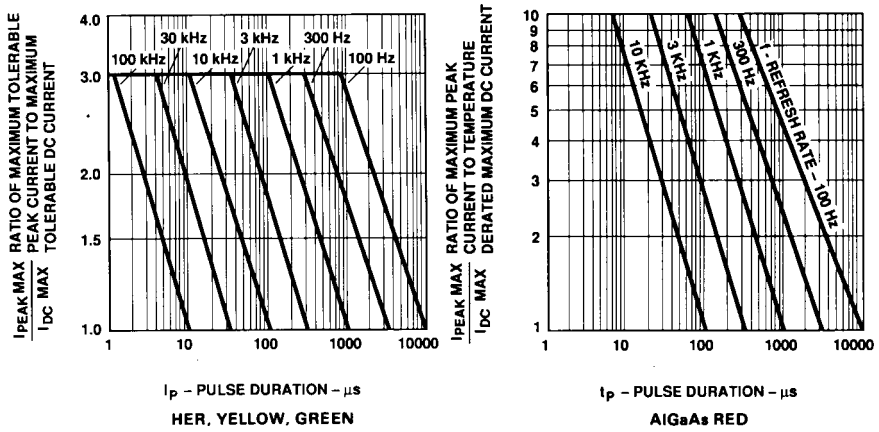


Figure 5. Maximum Tolerable Peak Current vs. Peak Duration (I_{PEAK} MAX Determined from Temperature Derated I_{DC} MAX).

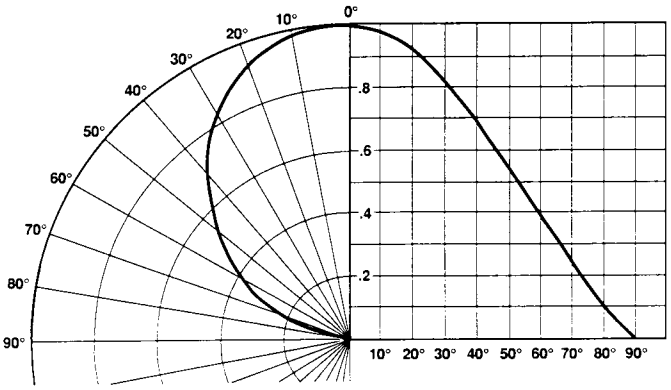


Figure 6. Relative Luminous Intensity vs. Angular Displacement.