HEWLETT® PACKARD

2 mm x 5 mm Rectangular LED Lamps

Technical Data

HLMP-S100
HLMP-S20X Series
HLMP-S30X Series
HLMP-S40X Series
HLMP-S50X Series
HLMP-S600

Features

- **Rectangular Light Emitting Surface**
- **Excellent for Flush Mounting on Panels**
- **Choice of Five Bright Colors**
- **Long Life: Solid State Reliability**
- **Excellent Uniformity of Light Output**

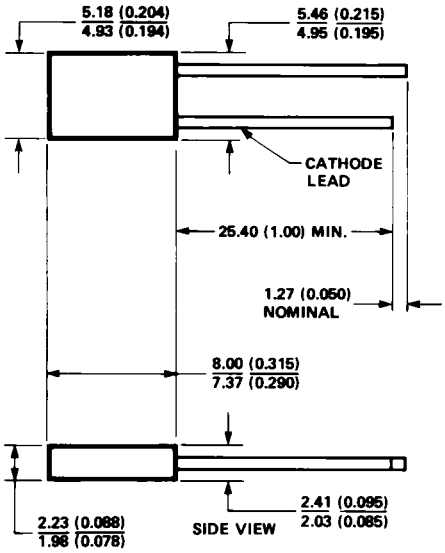
Description

The HLMP-S100, -S200, -S300,

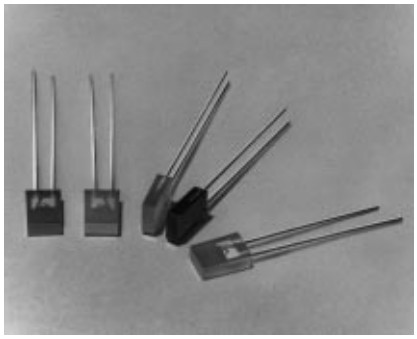
-S400, -S500, S600 are epoxy encapsulated lamps in rectangular packages which are easily stacked in arrays or used for discrete front panel indicators. Contrast and light uniformity are enhanced by a special epoxy diffusion and tinting process.

The HLMP-S100 uses double heterojunction (DH) absorbing substrate (AS) aluminum gallium arsenide (AlGaAs) LEDs to produce outstanding light output

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.



Electrical/Optical Characteristics at T_A = 25°C

Sym.	Description	Device HLMP-	Min.	Typ.	Max.	Units	Test Conditions
I_v	Luminous Intensity	AlGaAs Red				mcd	I_F = 20 mA
		S100	3.4	7.5			
		High Efficiency Red					
		S200	2.1	3.5			
		S201	3.4	7.5			
		Orange					
		S400	2.1	3.5			
		S401	3.4	7.5			
		Yellow					
		S300	1.4	2.1			
		S301	2.2	4.0			
		Green					
		S500	2.6	4.0			
		S501	4.2	8.0			
		Emerald Green					
		S600[4]	1.0	3.0			
$2\theta_{1/2}$	Included Angle Between Half Luminous Intensity Points	All		110		Deg.	I_F = 20 mA See Note 1
λ_{PEAK}	Peak Wavelength	AlGaAs Red		645		nm	Measurement at Peak
		High Efficiency Red		635			
		Orange		600			
		Yellow		583			
		Green		565			
		Emerald Green		558			
λ_d	Dominant Wavelength	AlGaAs Red		637		nm	See Note 2 Time const, $e^{-t/\tau s}$
		High Efficiency Red		626			
		Orange		602			
		Yellow		585			
		Green		569			
		Emerald Green		560			
τ_s	Speed of Response	AlGaAs Red		30		ns	
		High Efficiency Red		90			
		Orange		280			
		Yellow		90			
		Green		500			
		Emerald Green		3100			
C	Capacitance	AlGaAs Red		30		pF	V_F = 0; f = 1 MHz
		High Efficiency Red		11			
		Orange		4			
		Yellow		15			
		Green		18			
		Emerald Green		35			
$R\theta_{J\text{-}PIN}$	Thermal Resistance	All		260		°C/W	Junction to Cathode Lead at Seating Plane
V_F	Forward Voltage	AlGaAs Red	1.6	1.8	2.2	V	I_F = 20 mA
		HER/Orange	1.5	1.9	2.6		
		Yellow	1.5	2.1	2.6		
		Green/Emerald Green	1.5	2.2	3.0		
V_R	Reverse Breakdown Voltage	All	5.0			V	I_R = 100 µA

Electrical/Optical Characteristics at T_A = 25°C (cont'd)

Sym.	Description	Device HLMP-	Min.	Typ.	Max.	Units	Test Conditions
η_V	Luminous Efficacy	AlGaAs Red High Efficiency Red Orange Yellow Green Emerald Green		80 145 380 500 595 656		lumens/ watt	See 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.
4. Please refer to Application Note 1061 for information comparing standard green and emerald green light output degradation.

Absolute Maximum Ratings at T_A = 25°C

Parameter	AlGaAs Red	High Efficiency Red/Orange	Yellow	Green/ Emerald Green	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
Transient Forward Current[3] (10 μsec Pulse)	500				mA
LED Junction Temperature	110	110	110	110	°C
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.) below seating plane]	260°C for 5 seconds				

Notes:
1. See Figure 5 to establish pulsed operating conditions.
2. For AlGaAs Red, Red, Orange, and Green series derate linearly from 50°C at 0.5 mA/°C. For Yellow series derate linearly from 50°C at 0.34 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 wire bond. It is not recommended that the device be operated at peak currents beyond the peak forward current listed in the Absolute Maximum Ratings.

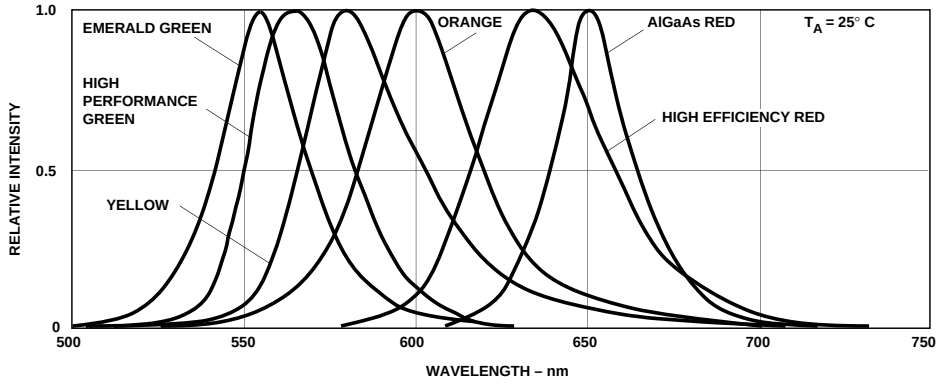


Figure 1. Relative Intensity vs. Wavelength.

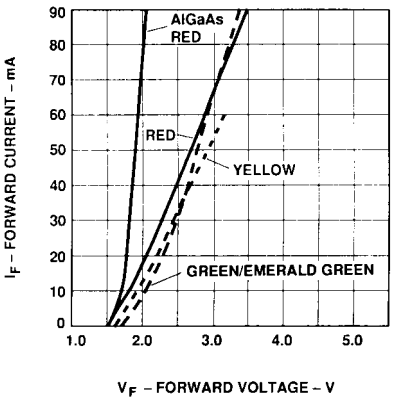


Figure 2. Forward Current vs. Forward Voltage Characteristics. V_F (300 mA) for AlGaAs Red = 2.6 Volts Typical.

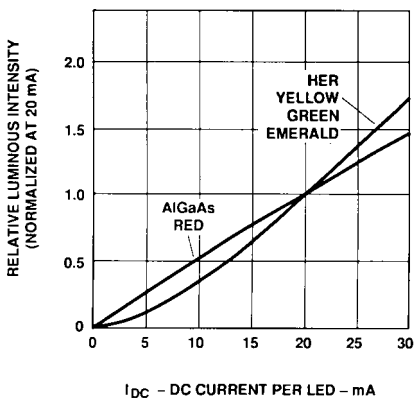


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

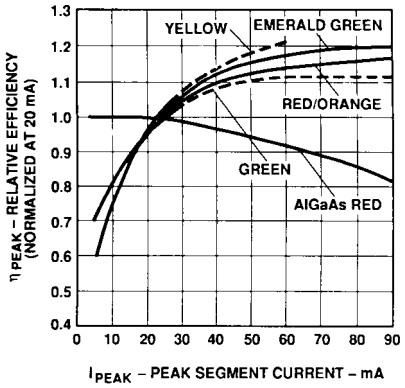


Figure 4. Relative Efficiency (Luminous Intensity per Unit Current) vs. LED Peak Current. ηv (300 mA) for AlGaAs Red = 0.7.

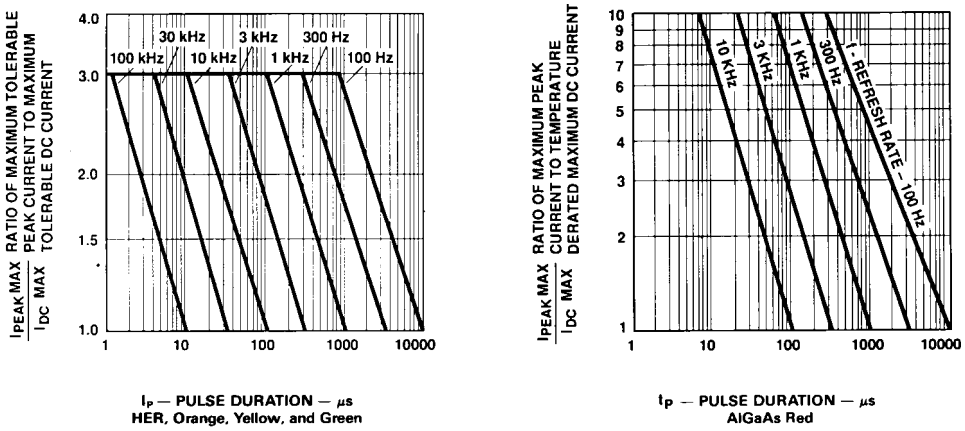


Figure 5. Maximum Tolerable Peak Current vs. Peak Duration. (I_{PEAK} MAX Determined from Temperature Derated I_{DC} MAX).

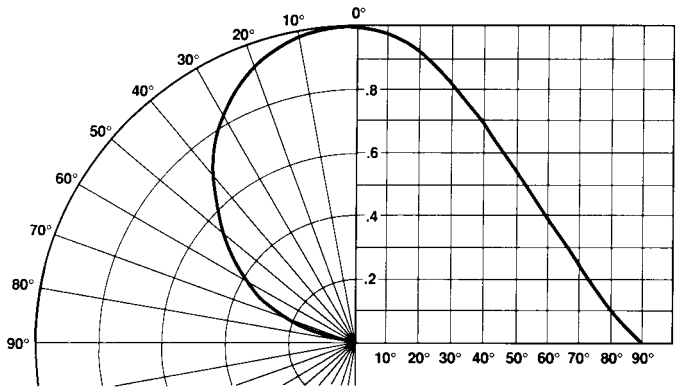


Figure 6. Relative Luminous Intensity vs. Angular Displacement.