HEWLETT PACKARD

T-1 3/4 (5 mm), T-1 (3 mm), Low Current, Double Heterojunction AlGaAs Red LED Lamps

Technical Data

HLMP-D150/D155
HLMP-K150/K155

Features

- **Minimum Luminous Intensity Specified at 1 mA**
- **High Light Output at Low Currents**
- **Wide Viewing Angle**
- **Outstanding Material Efficiency**
- **Low Power/Low Forward Voltage**
- **CMOS/MOS Compatible**
- **TTL Compatible**
- **Deep Red Color**

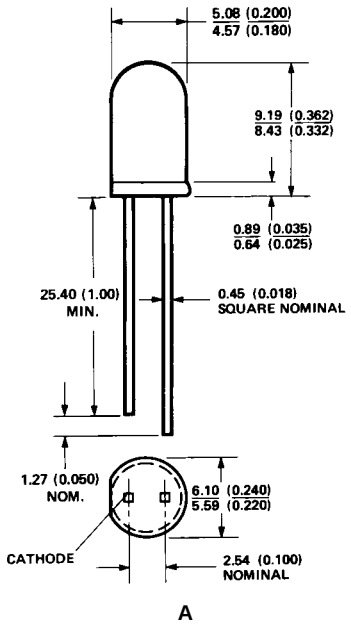
Applications

- **Low Power Circuits**
- **Battery Powered Equipment**
- **Telecommunication Indicators**

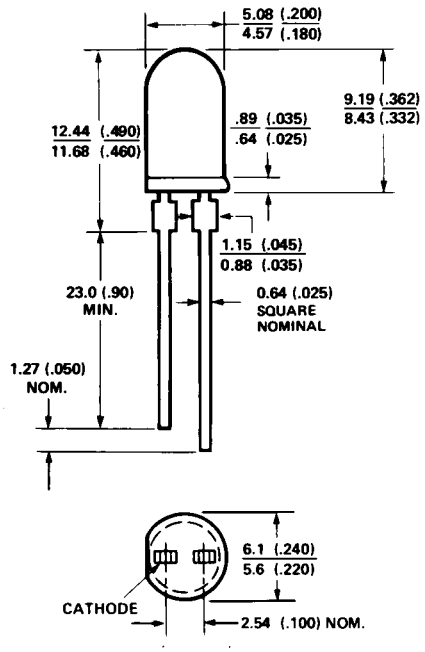
Description

These solid state LED lamps utilize newly developed double heterojunction (DH) AlGaAs/GaAs material technology. This LED material has outstanding light output efficiency at very low drive currents. The color is deep red at the dominant wavelength of 637 nanometres. These lamps are ideally suited for use in applications where high light output is required with minimum power output.

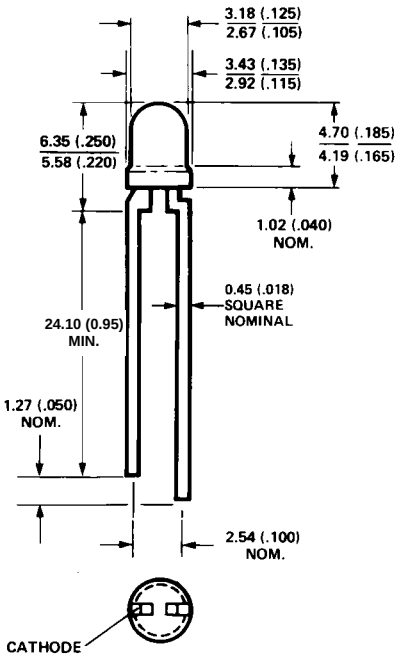
Package Dimensions



A



B



C

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES (INCHES).
2. AN EPOXY MINISCUS MAY EXTEND ABOUT 1 mm (0.040") DOWN THE LEADS.

Axial Luminous Intensity and Viewing Angle @ 25°C

Part Number HLMP-	Package Description	I_v (mcd) @ 1 mA DC		$2\theta_{1/2}$[1] Degrees	Package Outline
		Min.	Typ.		
D150	T-1 3/4 Red Tinted Diffused	1.3	3	65	A
D155	T-1 3/4 Red Untinted, Non-diffused	5.4	10	24	B
K150	T-1 Red Tinted Diffused	1.3	2	60	C
K155	T-1 Red Untinted Non-diffused	2.1	3	45	C

Note:
1. $\theta_{1/2}$ is the off axis angle from lamp centerline where the luminous intensity is 1/2 the on-axis value.

Absolute Maximum Ratings at T_A = 25°C

Peak Forward Current[1] ..... 300 mA
Average Forward Current ..... 20 mA
DC Current[2] ..... 30 mA
Power Dissipation ..... 87 mW
Reverse Voltage (I_R = 100 μA) ..... 5 V
Transient Forward Current (10 μs Pulse)[3] ..... 500 mA
LED Junction Temperature ..... 110°C
Operating Temperature Range ..... -20 to +100°C
Storage Temperature Range ..... -55 to +100°C
Lead Soldering Temperature [1.6 mm (0.063 in.) from body] ..... 260°C for 5 seconds

Notes:
1. Maximum I_{PEAK} at f = 1 kHz, DF = 6.7%.
2. Derate linearly as shown in Figure 4.
3. The transient peak current is the maximum non-recurring peak current the device can withstand without damaging the LED die and wire bonds. It is not recommended that the device be operated at peak currents beyond the Absolute Maximum Peak Forward Current.

Electrical/Optical Characteristics at T_A = 25°C

Symbol	Description	Min.	Typ.	Max.	Unit	Test Condition
V_F	Forward Voltage		1.6	1.8	V	I_F = 1 mA
V_R	Reverse Breakdown Voltage	5.0	15.0		V	I_R = 100 µA
λ_p	Peak Wavelength		645		nm	Measurement at Peak
λ_d	Dominant Wavelength		637		nm	Note 1
$\Delta\lambda 1/2$	Spectral Line Halfwidth		20		nm	
τ_S	Speed of Response		30		ns	Exponential Time Constant, e^{-t}/T_S
C	Capacitance		30		pF	V_F = 0, f = 1 MHz
$R\theta_{J\text{-}PIN}$	Thermal Resistance		260[3] 210[4] 290[5]		°C/W	Junction to Cathode Lead
η_V	Luminous Efficacy		80		Im/W	Note 2

Notes:

1. The dominant wavelength, λ_d, is derived from the CIE chromaticity diagram and represents the color of the device.
2. The radiant intensity, I_e, in watts per 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 luminous efficacy in lumens/watt.
3. HLMP-D150.
4. HLMP-D155.
5. HLMP-K150/-K155.

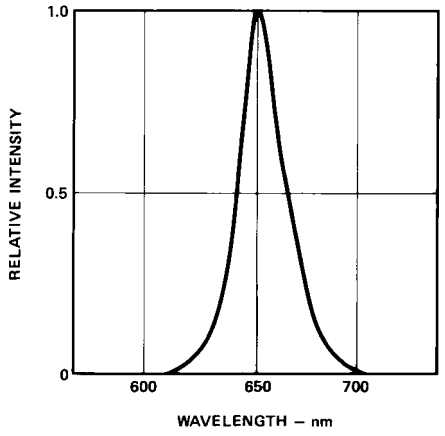


Figure 1. Relative Intensity vs. Wavelength.

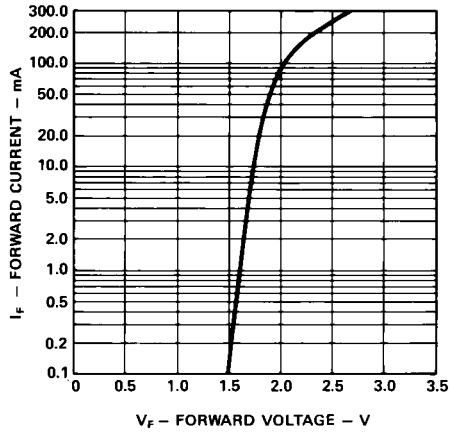


Figure 2. Forward Current vs. Forward Voltage.

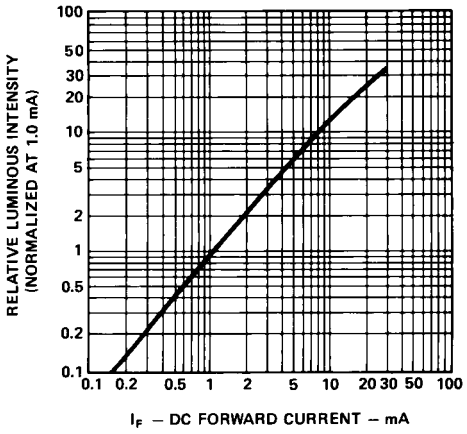


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

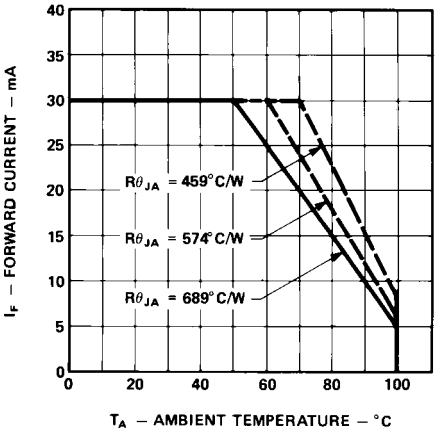


Figure 4. Maximum Forward DC Current vs. Ambient Temperature. Derating Based on T_J Max. = 110 °C.

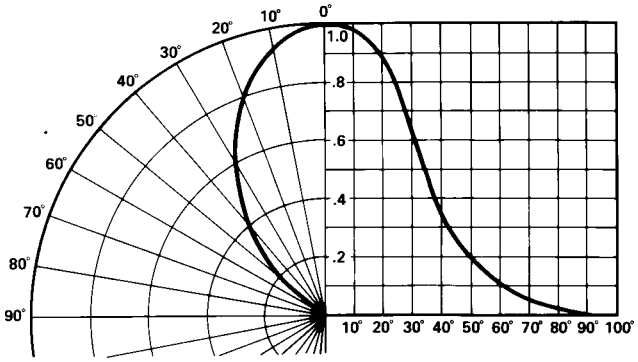


Figure 5. Relative Luminous Intensity vs. Angular Displacement. HLMP-D150.

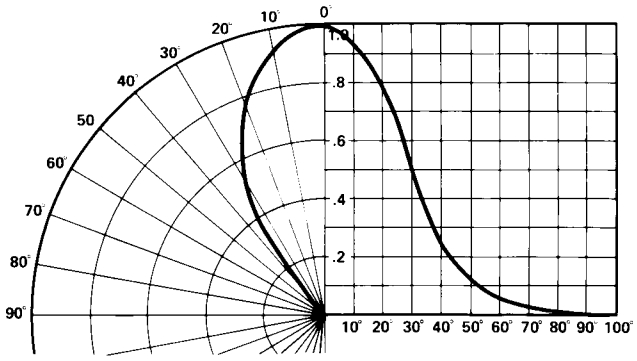


Figure 6. Relative Luminous Intensity vs. Angular Displacement. HLMP-K150.

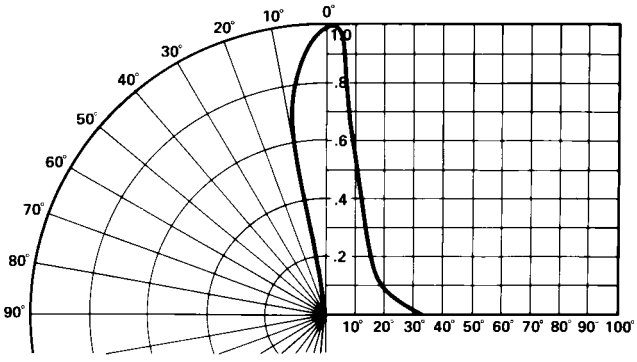


Figure 7. Relative Luminous Intensity vs. Angular Displacement. HLMP-D155.

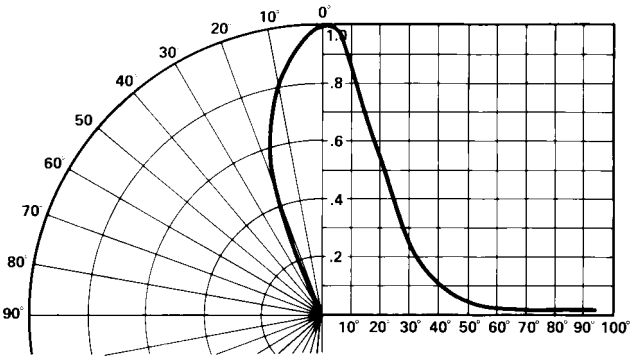


Figure 8. Relative Luminous Intensity vs. Angular Displacement. HLMP-K155.

For technical assistance or the location of your nearest Hewlett-Packard sales office, distributor or representative call: **Americas/Canada:** 1-800-235-0312 or 408-654-8675 **Far East/Australasia:** Call your local HP sales office. **Japan:** (81 3) 3335-8152 **Europe:** Call your local HP sales office.

Obsoletes 5964-9289E (4/96)
5968-1438E (1/99)