

# T-1<sup>3</sup>/<sub>4</sub> (5 mm), T-1 (3 mm), High Intensity, Double Heterojunction AlGaAs Red LED Lamps

## Technical Data

HLMP-D101/D105  
HLMP-K101/K105

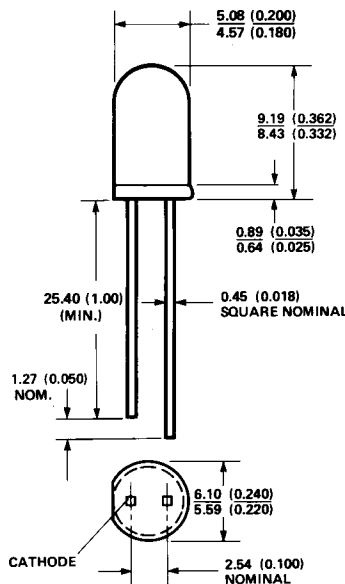
### Features

- Exceptional Brightness
- Wide Viewing Angle
- Outstanding Material Efficiency
- Low Forward Voltage
- CMOS/MOS Compatible
- TTL Compatible
- Deep Red Color

### Applications

- Bright Ambient Lighting Conditions
- Moving Message Panels

### Package Dimensions

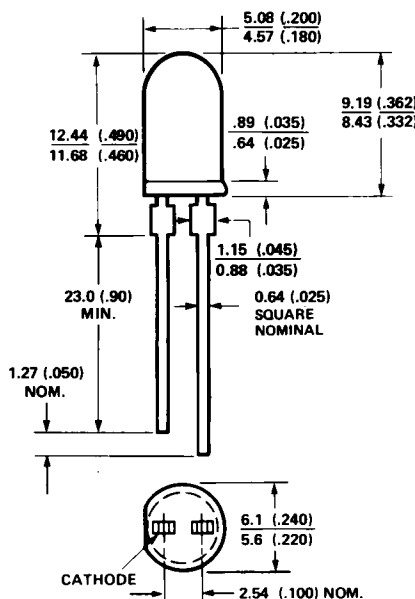


A

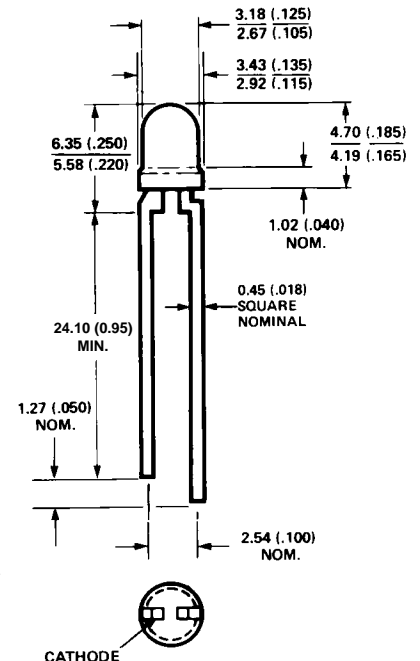
- Portable Equipment
- General Use

### Description

These solid state LED lamps utilize newly developed double heterojunction (DH) AlGaAs/GaAs material technology. This LED material has outstanding light output efficiency over a wide range of drive currents. The color is deep red at the dominant wavelength of 637 nanometres. These lamps may be DC or pulse driven to achieve desired light output.



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 <sub>v</sub> (mcd) @ 20 mA		2θ <sub>1/2</sub> [1] Degrees	Package Outline
		Min.	Typ.		
D101	T-1 <sup>3/4</sup> Red Tinted Diffused	35	70	65	A
D105	T-1 <sup>3/4</sup> Red Untinted, Non-diffused	90	240	24	B
K101	T-1 Red Tinted Diffused	22	45	60	C
K105	T-1 Red Untinted Non-diffused	35	65	45	C

**Note:**

1. θ<sub>1/2</sub> is the off axis angle from lamp centerline where the luminous intensity is 1/2 the on-axis value.

### Absolute Maximum Ratings at T<sub>A</sub> = 25°C

Peak Forward Current <sup>[1,2]</sup> .....	300 mA
Average Forward Current <sup>[2]</sup> .....	20 mA
DC Current <sup>[3]</sup> .....	30 mA
Power Dissipation .....	87 mW
Reverse Voltage (I <sub>R</sub> = 100 μA) .....	5 V
Transient Forward Current (10 μs Pulse) <sup>[4]</sup> .....	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<sub>PEAK</sub> at f = 1 kHz, DF = 6.7%.
2. Refer to Figure 6 to establish pulsed operating conditions.
3. Derate linearly as shown in Figure 5.
4. 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 $T_A = 25^\circ\text{C}$

Symbol	Description	Min.	Typ.	Max.	Unit	Test Condition
$V_F$	Forward Voltage		1.8	2.2	V	$I_F = 20 \text{ mA}$
$V_R$	Reverse Breakdown Voltage	5.0	15.0		V	$I_R = 100 \mu\text{A}$
$\lambda_p$	Peak Wavelength		645		nm	Measurement at Peak
$\lambda_d$	Dominant Wavelength		637		nm	Note 1
$\Delta\lambda^{1/2}$	Spectral Line Halfwidth		20		nm	
$\tau_S$	Speed of Response		30		ns	Exponential Time Constant, $e^{-t}/T_S$
C	Capacitance		30		pF	$V_F = 0$ , $f = 1 \text{ MHz}$
$R\theta_{J-PIN}$	Thermal Resistance		260 <sup>[3]</sup> 210 <sup>[4]</sup> 290 <sup>[5]</sup>		$^\circ\text{C/W}$	Junction to Cathode Lead
$\eta_V$	Luminous Efficacy		80		lm/W	Note 2

#### Notes:

1. The dominant wavelength,  $\lambda_d$ , 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  $\eta_V$  is luminous efficacy in lumens/watt.
3. HLMP-D101.
4. HLMP-D105.
5. HLMP-K101/-K105.

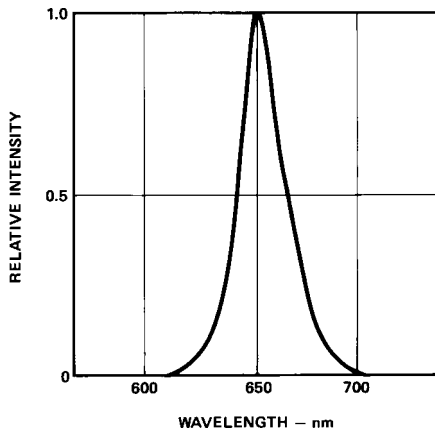


Figure 1. Relative Intensity vs. Wavelength.

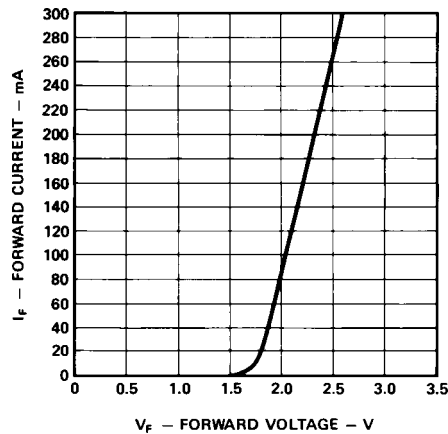


Figure 2. Forward Current vs. Forward Voltage.

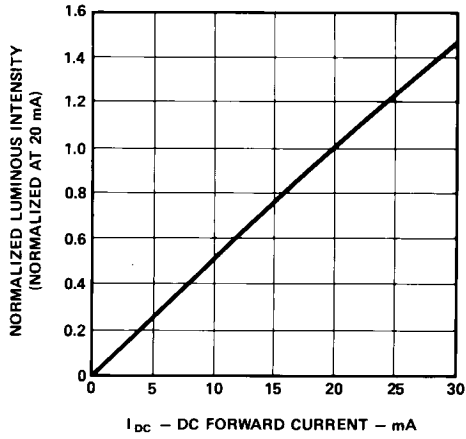


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

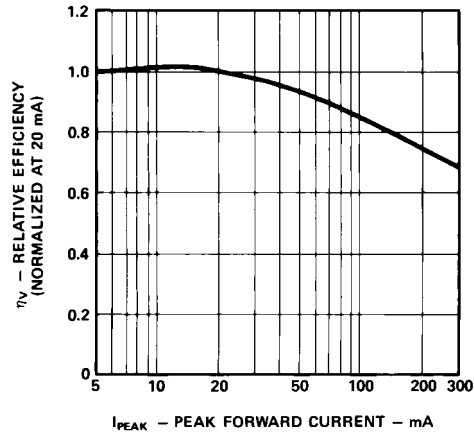


Figure 4. Relative Efficiency vs. Peak Forward Current.

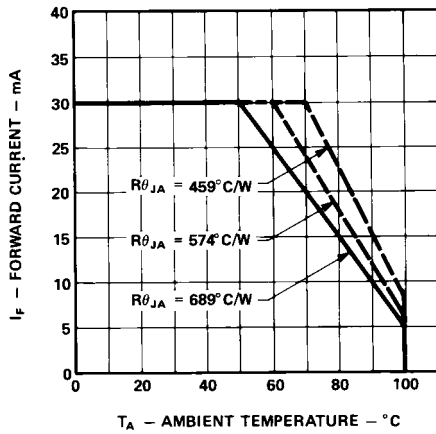


Figure 5. Maximum Forward DC Current vs. Ambient Temperature. Derating Based on T<sub>J</sub> MAX = 110°C.

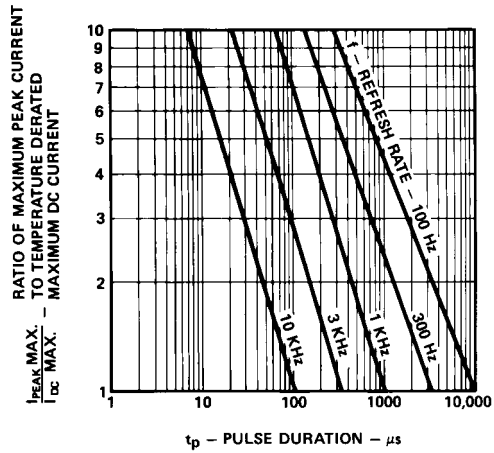


Figure 6. Maximum Tolerable Peak Current vs. Peak Duration (I<sub>PEAK MAX</sub> Determined from Temperature Derated I<sub>DC MAX</sub>).

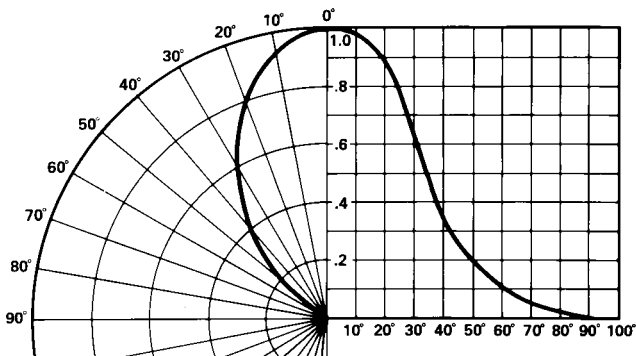


Figure 7. Relative Luminous Intensity vs. Angular Displacement. HLMP-D101.

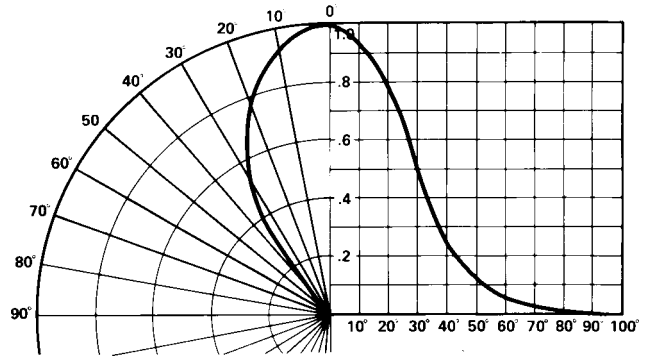


Figure 8. Relative Luminous Intensity vs. Angular Displacement. HLMP-K101.

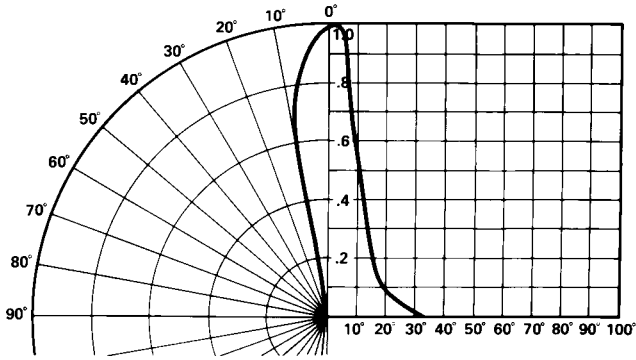


Figure 9. Relative Luminous Intensity vs. Angular Displacement. HLMP-D105.

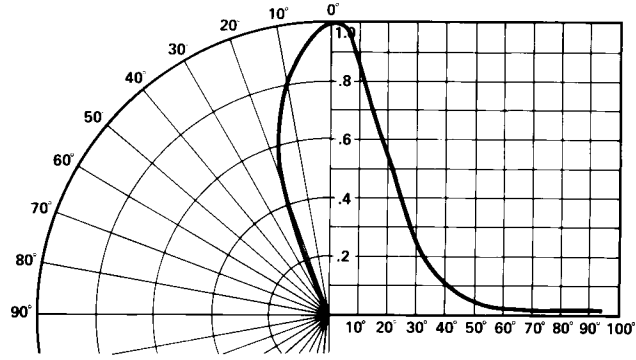


Figure 10. Relative Luminous Intensity vs. Angular Displacement. HLMP-K105.



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Data subject to change.

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Obsoletes 5964-9369E (4/96)

5968-1440E (1/99)