Agilent Technologies

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

Technical Data

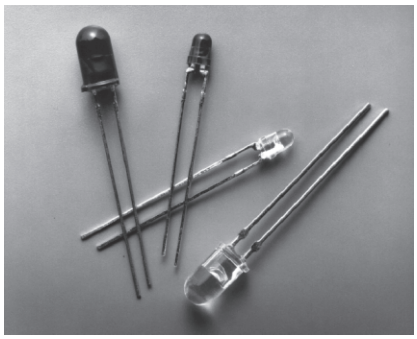
HLMP-D150/D155
HLMP-K150/K155

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

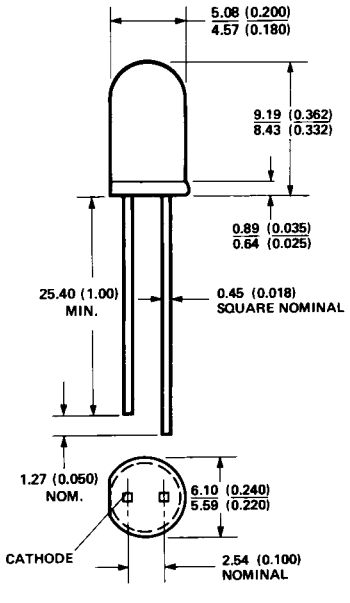
- **Low Power Circuits**
- **Battery Powered Equipment**
- **Telecommunication Indicators**



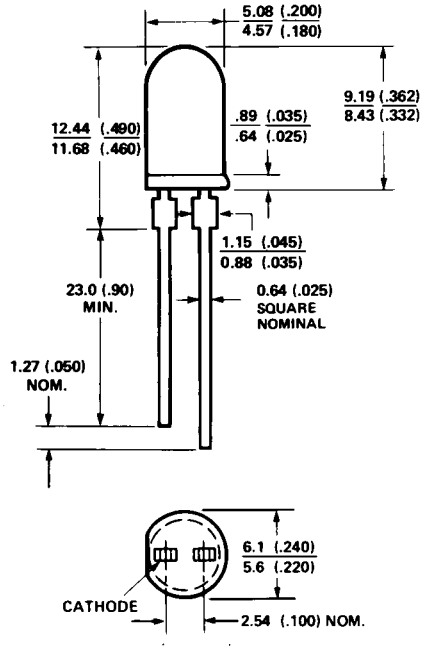
Description

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.

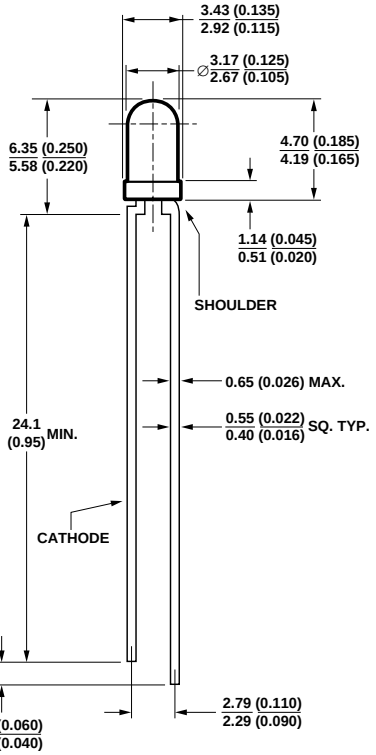
Package Dimensions



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.

Selection Guide

Package Description	Device HLMP-	Luminous Intensity Iv (mcd) at 1 mA			$2\theta^{1/2}$[1]	Package
		Min.	Typ.	Max.	Degree	Outline
T-1 3/4 Red Tinted Diffused	D150	1.3	3.0	–	65	A
	D150-C00xx	1.3	3.0	–	65	A
	D150-CD0xx	1.3	3.0	4.2	65	A
T-1 3/4 Red Untinted Non-diffused	D155	5.4	10.0	–	24	B
	D155-F00xx	5.4	10.0	–	24	B
T-1 Red Tinted Diffused	K150	1.3	2.0	–	60	C
	K150-C00xx	1.3	2.0	–	60	C
	K150-CD0xx	1.3	3.0	4.2	60	C
T-1 Red Untinted Non-diffused	K155	2.1	3.0	–	45	C
	K155-CD0xx	1.3	3.0	4.2	45	C
	K155-D00xx	2.1	3.0	–	45	C
	K155-DE0xx	2.1	3.0	6.8	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.

Part Numbering System

HLMP - x 1 xx - x x x xx

Mechanical Option
00: Bulk
01: Tape & Reel, Crimped Leads
02: Tape & Reel, Straight Leads
A1, B1: Right Angle Housing, Uneven Leads
A2, B2: Right Angle Housing, Even Leads
DD, DH: Ammo Pack

Color Bin Optioms
0: Full color bin distribution

Maximum Iv Bin Options
0: Open (No max. limit)
Others: Please refer to the Iv bin table

Minimum Iv Bin Options
Please refer to the Iv bin table

Lens Option
50: Tinted, Diffused
55: Untinted, Nondiffused

Package Options
D: T-1$^3/_4$ (5 mm)
K: T-1 (3 mm)

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.

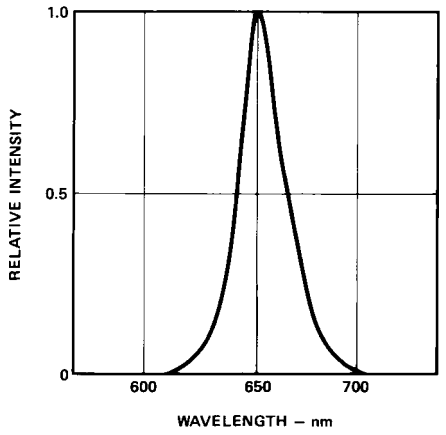


Figure 1. Relative Intensity vs. Wavelength.

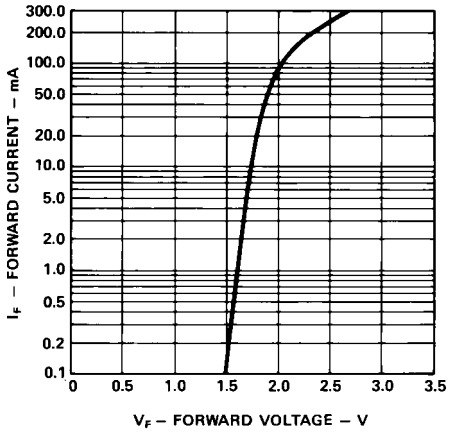


Figure 2. Forward Current vs. Forward Voltage.

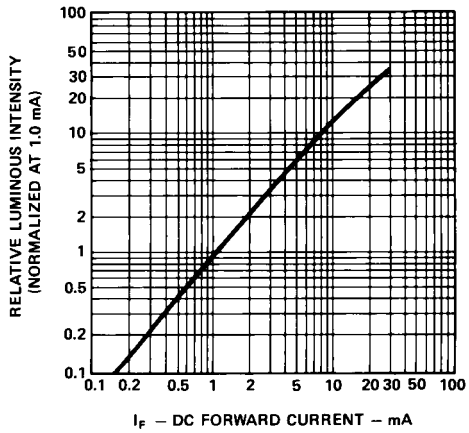


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

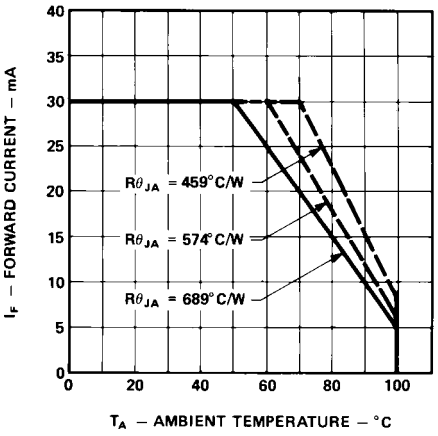


Figure 4. Maximum Forward DC Current vs. Ambient Temperature. Derating Based on T_J Max. = 110 °C.

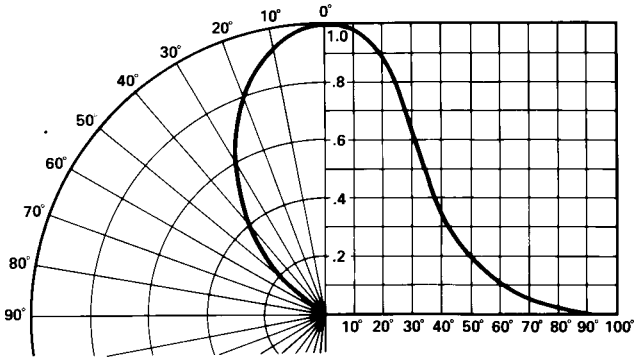


Figure 5. Relative Luminous Intensity vs. Angular Displacement. HLMP-D150.

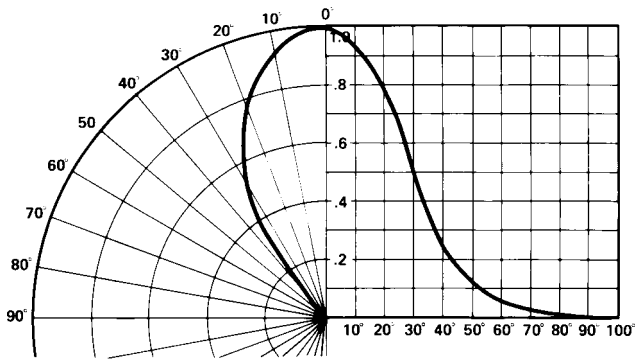


Figure 6. Relative Luminous Intensity vs. Angular Displacement. HLMP-K150.

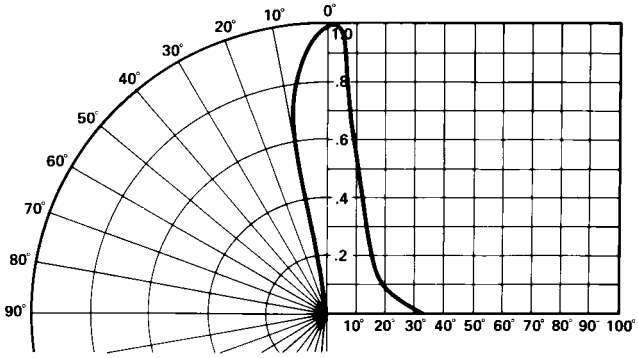


Figure 7. Relative Luminous Intensity vs. Angular Displacement. HLMP-D155.

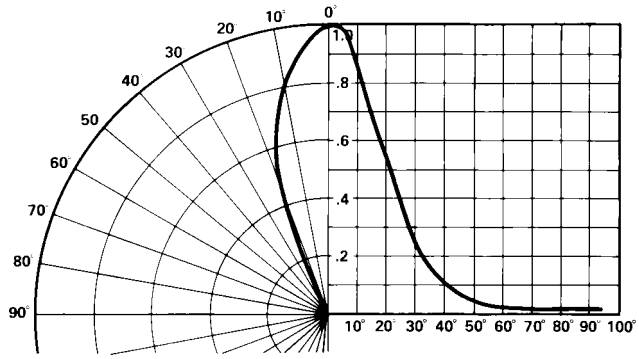


Figure 8. Relative Luminous Intensity vs. Angular Displacement. HLMP-K155.

Intensity Bin Limits

Color	Bin	Intensity Range (mcd) Min.	Max.
Red	C	1.5	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

Maximum tolerance for each bin limit is ± 18%.

Mechanical Option Matrix

Mechanical Option Code	Definition
00	Bulk Packaging, minimum increment 500 pcs/bag
01	Tape & Reel, crimped leads, minimum increment 1300 pcs for T-1 3/4, 1800 pcs for T-1
02	Tape & Reel, straight leads, minimum increment 1300 pcs for T-1 3/4, 1800 pcs for T-1
A1	T-1, Right Angle Housing, uneven leads, minimum increment 500 pcs/bag
A2	T-1, Right Angle Housing, even leads, minimum increment 500 pcs/bag
B1	T-1 3/4, Right Angle Housing, uneven leads, minimum increment 500 pcs/bag
B2	T-1 3/4, Right Angle Housing, even leads, minimum increment 500 pcs/bag
DD	Ammo Pack, straight leads with minimum 2K increment
DH	Ammo Pack, straight leads with minimum 2K increment

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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Data subject to change.

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