Agilent Technologies
Innovating the HP Way

High Intensity AlInGaP LED Lamps

Technical Data

SunPower Series

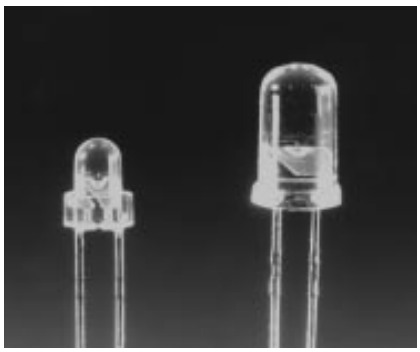
HLMP-WLxx **HLMP-NL06**
HLMP-WHxx **HLMP-NH04**
HLMP-WGxx **HLMP-NG07**

Features

- **T-1 (3 mm) and T-1 3/4 (5 mm) General Purpose LED Lamps**
- **AlInGaP *SunPower* Intensity**
- **High Light Output**
- **Clear and Tinted Diffused Lens Options**
- **Narrow and Wide Viewing Angles**
- **Amber, Red-Orange, and Red**
- **Available on Tape and Reel**

Description

This family of 3 mm and 5 mm LED lamps is specially designed for applications requiring higher levels of intensity than is achieved with a standard lamp. The 5 mm lamp is available with 15, 30, and 65 degree viewing angle options. The 3 mm lamp is available with a 60 degree viewing angle.



Applications

- **General Purpose**
- **Consumer Goods**
- **Indicator Lights**

Device Selection Guides

T-1 3/4 (5 mm) Lamp		Package		Luminous Intensity	Viewing Angle
Color	**Part Number**	**Diff.**	**Tint**	**Min. mcd, If @ 20 mA**	**2θ 1/2 (Degrees)**
Amber	HLMP-WL12			450	15
Amber	HLMP-WL27			205	30
Amber	HLMP-WL02	X	X	35	65
Red Orange	HLMP-WH12			270	15
Red Orange	HLMP-WH27			155	30
Red Orange	HLMP-WH02	X	X	35	65
Red	HLMP-WG12			270	15
Red	HLMP-WG27			155	30
Red	HLMP-WG02	X	X	26	65

T-1 (3 mm) Lamp		Package		Luminous Intensity	Viewing Angle
Color	**Part Number**	**Diff.**	**Tint**	**Min. mcd, If @ 20 mA**	**2θ 1/2 (Degrees)**
Amber	HLMP-NL06			96.2	60
Red Orange	HLMP-NH04			90.2	60
Red	HLMP-NG07			90.2	60

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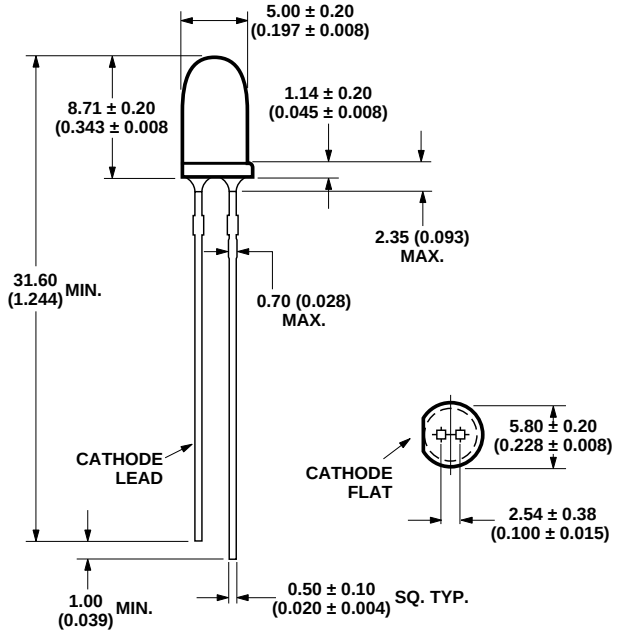
Typical Viewing Angle, $2\theta_{1/2}$ (Deg.)[2]	Amber (λ_d = 590 nm)[1]		Red-Orange (λ_d = 615 nm)[1]		Red (λ_d = 626 nm)[1]		Epoxy	Package Drawing/ Nominal Diameter
	Part No. HLMP-	Minimum Luminous Intensity I_v (mcd)[3,4], @ 20 mA	Part No. HLMP-	Minimum Luminous Intensity I_v (mcd)[3,4], @ 20 mA	Part No. HLMP-	Minimum Luminous Intensity I_v (mcd)[3,4], @ 20 mA		
15	WL12	450	WH12	270	WG12	270	clear	A/5 mm
30	WL27	205	WH27	155	WG27	155	clear	A/5 mm
65	WL02	35	WH02	35	WG02	26	tinted diffused[5]	A/5 mm
60	NL06	96.2	NH04	90.2	NG07	90.2	clear	B/3 mm

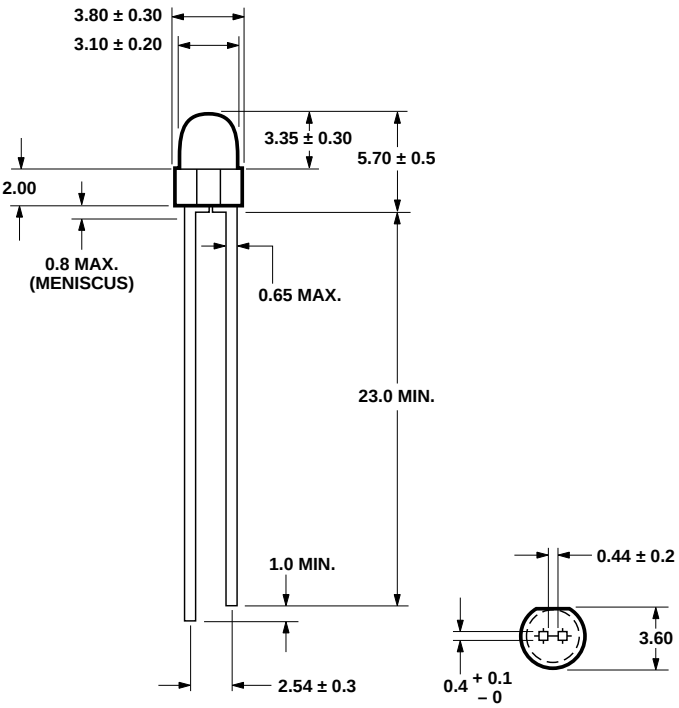
Notes:
1. Dominant Wavelength, λ_d, is derived from the CIE Chromaticity Diagram, and represents the color of the lamp.
2. $\Theta_{1/2}$ is the off-axis angle where the luminous intensity is one half the on-axis intensity.
3. The luminous intensity is measured on the mechanical axis of the lamp package.
4. The optical axis is closely aligned with the package mechanical axis.
5. Tinting of amber lamps is yellow, red-orange lamps are tinted a reddish orange, and red lamps are tinted red.

Package Dimensions

A



B



Absolute Maximum Ratings at T_A = 25°C

Parameter	5 mm	3 mm
DC Forward Current	50 mA[1,3,4]	30 mA[2,3,4]
Peak Pulsed Forward Current [3,4]	70 mA	50 mA
Average Forward Current	30 mA	30 mA
Reverse Voltage (I_R = 100 µA)	5 V	5 V
LED Junction Temperature	130°C	110°C
Operating Temperature	-40°C to +100°C	-40°C to +80°C
Storage Temperature	-40°C to +120°C	-40°C to +85°C
Dip/Drag Solder Temperature	260°C for 5 seconds	
Wave Solder Temperature	245°C for 3 seconds	
[1.59 mm (0.060 in.) below seating plane]		

Notes:
1. Derate linearly as shown in Figure 4.
2. Derate linearly as shown in Figure 5.
3. For long term performance with minimal light output degradation, drive currents between 10 and 30 mA are recommended.
4. Please contact your Agilent sales representative about operating currents below 10 mA.

Electrical/Optical Characteristics at T_A = 25°C

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Forward Voltage Amber (λ_d = 590 nm) Red-Orange (λ_d = 615 nm) Red (λ_d = 626 nm)	V_F		 2.02 1.94 1.90	2.4	V	I_F = 20 mA
Reverse Voltage	V_R	5	20		V	I_R = 100 µA
Peak Wavelength Amber Red-Orange Red	λ_{PEAK}		 592 621 635		nm	Peak of Wavelength of Spectral Distribution at I_F = 20 mA
Spectral Halfwidth	$\Delta\lambda_{1/2}$		17		nm	Wavelength Width at Spectral Distribution 1/2 Power point at I_F = 20 mA
Speed of Response	τ_s		20		ns	Exponential Time Constant, $e^{-t/\tau s}$
Capacitance	C		40		pF	V_F = 0, f = 1 MHz
Thermal Resistance	$R\Theta_{J\text{-}PIN}$		240		°C/W	LED Junction-to-Cathode Lead
Luminous Efficacy[5] Amber Red-Orange Red	η_v		 500 235 155		lm/W	Emitted Luminous Power/Emitted Radiant Power

Note:
1. The radiant intensity, I_e, in watts per steridian, 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.

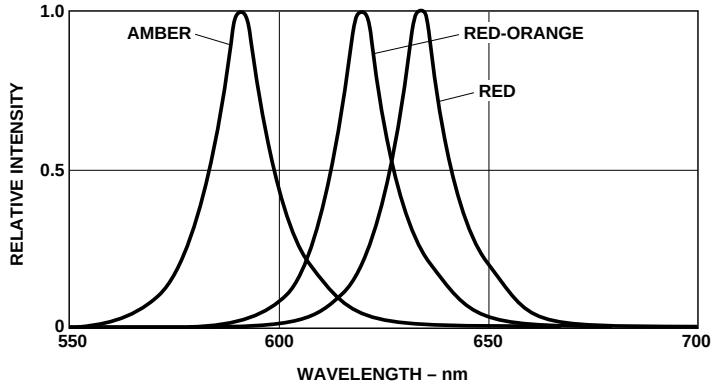


Figure 1. Relative Intensity vs. Peak Wavelength.

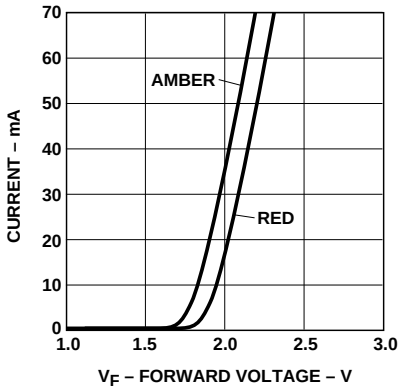


Figure 2. Forward Current vs. Forward Voltage.

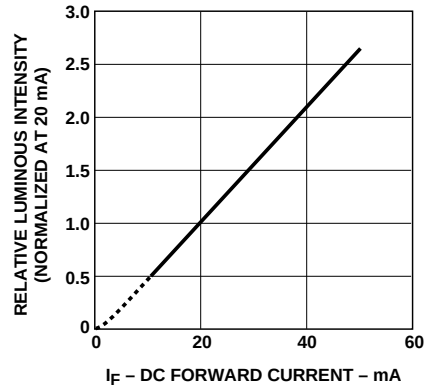


Figure 3. Relative Luminous Intensity vs. Forward Current.

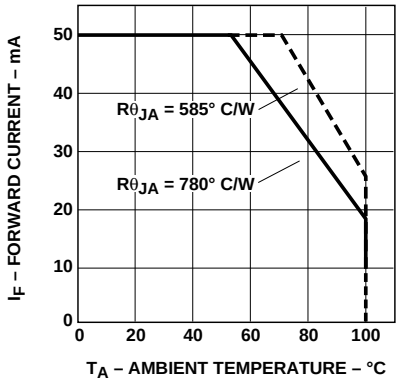


Figure 4. Maximum Forward Current vs. Ambient Temperature for 5 mm Lamps. Derating Based on T_{JMAX} = 130°C.

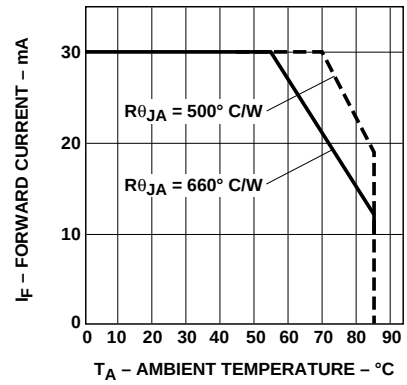


Figure 5. Maximum Forward Current vs. Ambient Temperature for 3 mm Lamps. Derating Based on T_{JMAX} = 110°C.

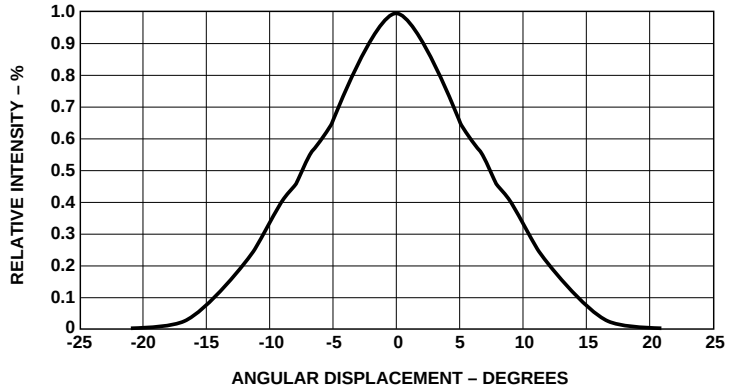


Figure 6. Representative Spatial Radiation Pattern for 15° Viewing Angle T-1 3/4 (5 mm) Lamps (HLMP-WX12).

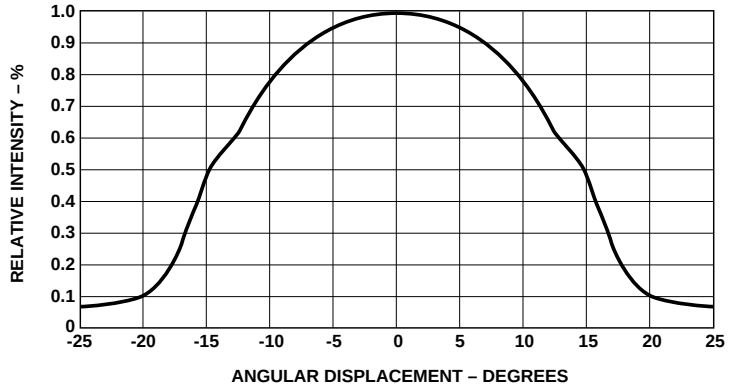


Figure 7. Representative Spatial Radiation Pattern for 30° Viewing Angle T-1 3/4 (5 mm) Lamps (HLMP-WX27).

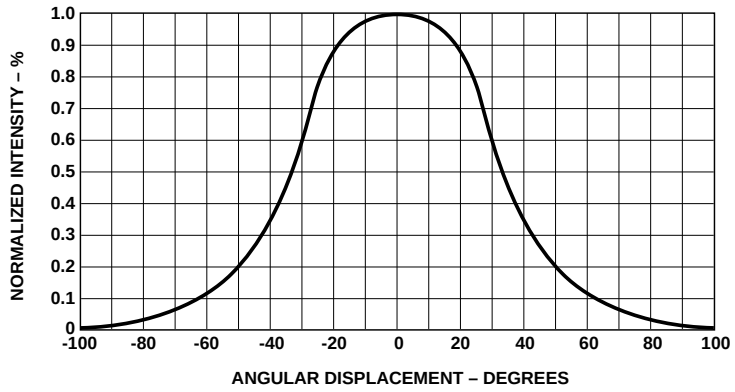


Figure 8. Representative Spatial Radiation Pattern for 65° Viewing Angle Tinted/Diffused T-1 3/4 (5 mm) Lamps (HLMP-WX02).

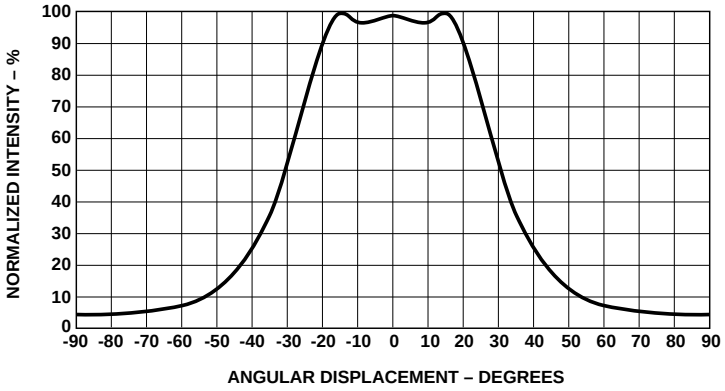


Figure 9. Representative Spatial Radiation Pattern for 60° Viewing Angle T-1 (3 mm) Lamps (HLMP-NL06/NH04/NG07).

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Obsoletes 5965-9780E (7/97)
5968-0947E (11/99)