Radiometrically Tested AlInGaP II LED Lamps for Sensor-Based Applications

Data Sheet

SunPower Series
Precision Optical Performance
HLMP-ED80-xxxxx

Description

Radiometrically Tested Precision Optical Performance AlInGaP II (aluminum indium gallium phosphide) LEDs offer increased sensor-based application design flexibility. High-resolution radiometric intensity bins (mW/sr) enable customers to precisely match LED lamp performance with sensor functionality.

Visible LEDs offer new styling alternatives – light can be leveraged to develop more attractive products. In comparison to invisible infrared sources, safety concerns are significantly improved by the human autonomic pupil response and reflexive movement away from bright light. Visible LEDs further indidcate system on / off status.

The AlInGaP II technology provides extremely stable light output over very long periods of time, with low power consumption.

These lamps are made with an advanced optical grade epoxy system offering superior high temperature and moisture resistance performance in outdoor systems. The epoxy contains both uv-a and uv-b inhibitors to reduce the effects of long term exposure to direct sunlight.

Please contact your Agilent Technologies Representative for more information and design for manufacture advice. Application Brief I-024 *Pulsed Operating Ranges for AlInGaP LEDs vs. Projected Long Term Light Output Performance* and other application information is available at: www.agilent.com/go/led_lamps.

Features

- **Characterized by radiometric intensity**
- **High optical power output**
- **Extremely long useful life**
- **Low power consumption**
- **Well defined spatial radiation patterns**
- **639 nm_{PEAK} red color**
- **30° viewing angle**
- **High operating temperature: T_{jLED} = +130°C**
- **Superior tesistance to moisture**
- **Suitable for outdoor use**

Benefits

- **Radiometric LED characterization decreases system variability**
- **Improved system reliability**
- **Visual styling**
- **Visible color for improved application safety**
- **On/off indication**
- **Suitable for a variety of sensor-based applications**

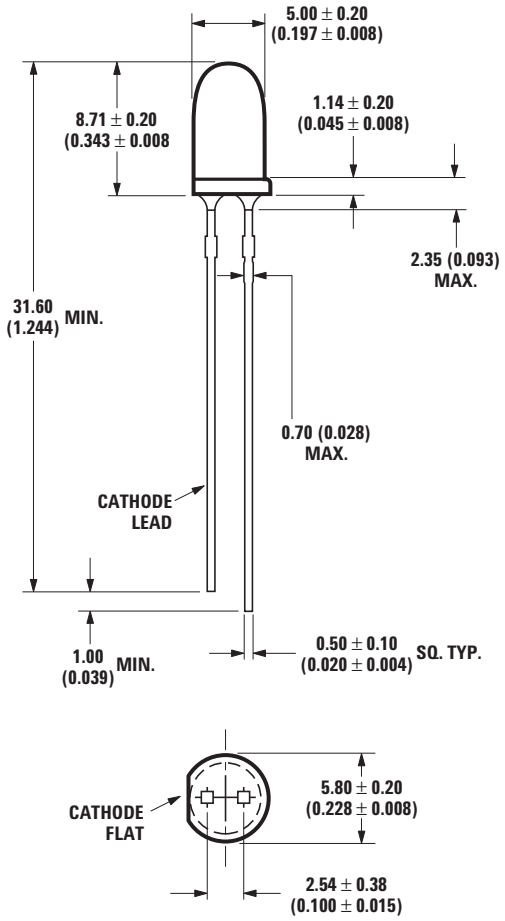
Applications

- **Photo sensor stimulus**
- **Infrared emitter replacement**
- **Solid state optical mouse sensors**
- **Surface imaging sensors**
- **Optical position and motion sensors**
- **Human interface devices**
- **Computer printer dot quality control**
- **Battery powered systems**

Device Selection Guide

Part Number	Minimum Radiometric Intensity (mW/Sr) at 20 mA	Maximum Forward Voltage (V) at 20 mA
HLMP-ED80-K0T00	7.2	2.6
HLMP-ED80-K0000	7.2	2.4

Package Dimensions



NOTE:
ALL DIMENSIONS ARE IN mm (INCHES).

Part Numbering System

HLMP - x x x x - x x x xx

Mechanical Option
00: Bulk

V_F Bin Selections
0: Maximum V_F 2.4 V
T: Maximum V_F 2.6 V

Maximum Intensity Bin
0: No maximum Iv bin limit

Minimum Intensity Bin
Refer to device selection guide

Color
D: 630 nm red

Package
E: T-1 3/4 (5 mm) round lamp

Absolute Maximum Ratings at T_A = 25°C

DC Forward Current[1,2,3] ..... 50 mA
Peak Pulsed Forward Current[2,3] ..... 100 mA
Average Forward Current ..... 30 mA
Reverse Voltage (I_R = 100 μA) ..... 5 V
LED Junction Temperature ..... 130° C
Operating Temperature ..... –40° C to +100° C
Storage Temperature ..... –40° C to +120° C
Wave Solder Temperature ..... 250° C for 3 seconds
[1.59 mm (0.060 in.) below body]

Notes:
1. Derate linearly as shown in Figure 4.
2. For long term performance with minimal light output degradation, drive currents between 10 mA and 30 mA are recommended. For more information on recommended drive conditions, please refer to HP Application Brief I-024 (5966-3087E).
3. 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						
ED80-xx0xx	V_F		2.00	2.40	V	$I_F = 20$ mA
ED80-xxTxx			2.35	2.60		
Reverse Voltage	V_R	5	20		V	$I_R = 100$ μA
Peak Wavelength	λ_{PEAK}		639		nm	Peak of Wavelength of Spectral Distribution at $I_F = 20$ mA
Dominant Wavelength[1]	λ_d		630		nm	
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/τ_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]	η_v		155		lm/W	Emitted Luminous Power/Emitted Radiant Power at $I_F = 20$ mA
Viewing Angle[2]	$2\theta 1/2$		30		Deg.	
Radiometric Intensity	I_e	7.23		50.50	mW/sr	Emitted Radiant Power at $I_F = 20$ mA

Notes:

1. Dominant wavelength, I_d, is derived from the CIE Chromaticity Diagram referenced to Illuminant E.
2. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is one half the on-axis intensity.
3. The radiometric intensity is measured on the mechanical axis of the lamp package.
4. The optical axis is closely aligned with the package mechanical axis.
5. The luminous intensity, I_v, in candelas, may be found from the equation $I_v = I_e \eta_v$, where I_e is the radiometric intensity in watts per steradian and η_v is the luminous efficacy in lumens/watt.
6. For option -xxTxx, max. forward votage (Vf) is 2.6 V. Refer to Vf bin table.

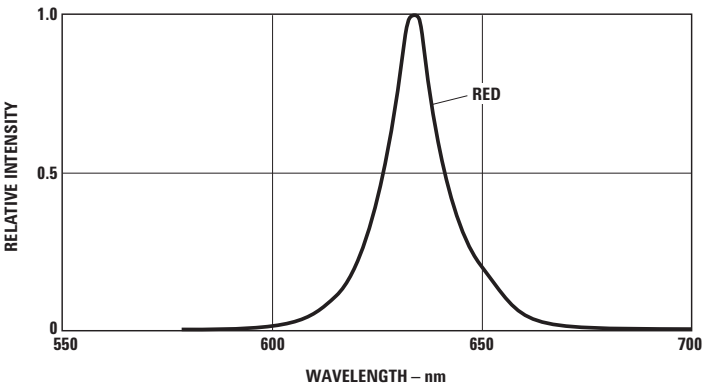


Figure 1. Relative Intensity vs. Peak Wavelength.

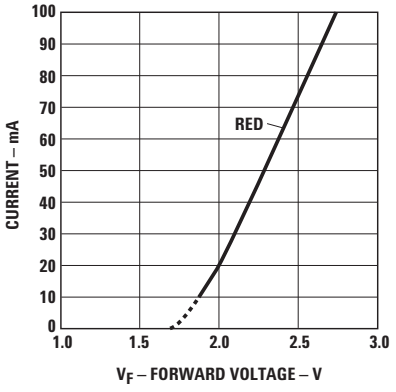


Figure 2a. Forward Current vs. Forward Voltage for Option -xx0xx.

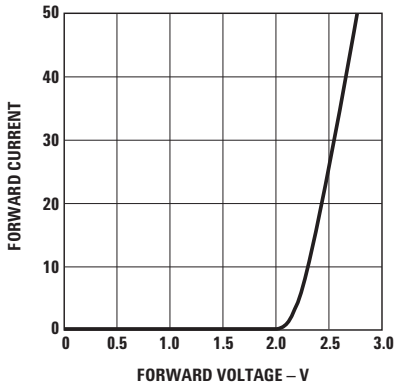


Figure 2b. Forward Current vs. Forward Voltage for Option -xxTxx.

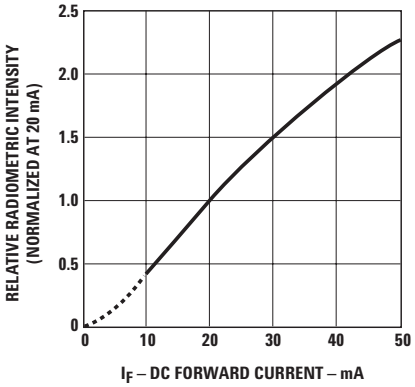


Figure 3. Relative Luminous Intensity vs. Forward Current.

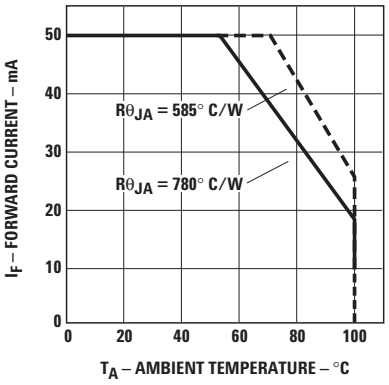


Figure 4. Maximum Forward Current vs. Ambient Temperature. Derating Based on T_{JMAX} = 130°C.

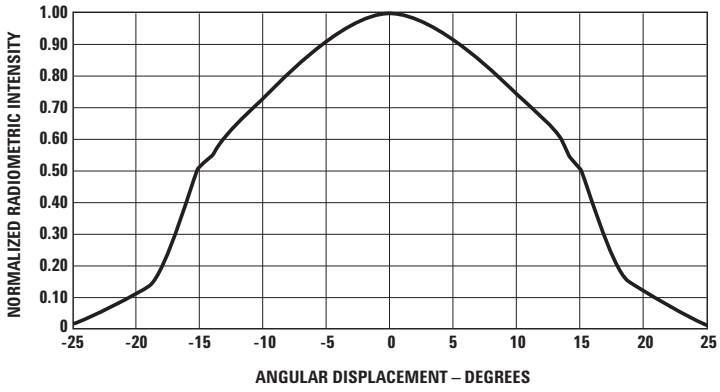


Figure 5. Representative Spatial Radiation Pattern for 30° Viewing Angle Lamps.

Radiometric Intensity Bin Limits (mW/sr at 20 mA)

Bin ID	Min.	Max.
K	8.5	10.2
L	10.2	12.2
M	12.2	14.7
N	14.7	17.6
P	17.6	21.2
Q	21.2	25.4
R	25.4	30.5
S	30.5	36.5
T	36.5	43.9

Vf Bin Table[3]

Bin ID	Min.	Max.
VA	2.0	2.2
VB	2.2	2.4
VC	2.4	2.6

Tolerance for each bin limit is ±0.05 V.

Notes:
1. Tolerance for each bin will be ± 15%.
2. Bin categories are established for classification of products. Products may not be available in all bin categories.
3. VF bin table only available for those number with options -xxTxx.

www.agilent.com/semiconductors

For product information and a complete list of distributors, please go to our web site.

For technical assistance call:

Americas/Canada: +1 (800) 235-0312 or (916) 788-6763

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Data subject to change.

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