Agilent HLMP-LD16/HLMP-MD16 4 mm Precision Optical Performance Red Oval LEDs

Data Sheet

Features

- **High brightness material AlInGaP 630 mm Red**
- **Viewing angles: major axis 100° minor axis 50°**
- **Well defined spatial radiation pattern**
- **Superior resistance to moisture**

Applications

- **Commercial outdoor advertising**
- **Full color signs**

Description

These Precision Optical Performance Oval LEDs are specifically designed for Full Color/Video and Passenger Information signs. The oval shaped radiation pattern (50° x 100°) and high luminous intensity ensure that these devices are excellent for wide field of view outdoor applications where a wide viewing angle and readability in sunlight are essential. These lamps have very smooth, matched radiation patterns ensuring consistent color mixing in full color applications, message uniformity across the viewing angle of the sign.

High efficiency LED materials are used in these lamps: Aluminum Indium Gallium Phosphide (AlInGaP) for Red color. The higher performance AlInGaP II is used. Each lamp is made with an advanced optical grade epoxy offering superior high temperature and high moisture resistance in outdoor applications. The package epoxy contains both UV-a and UV-b inhibitors to reduce the effects of long term exposure to direct sunlight.

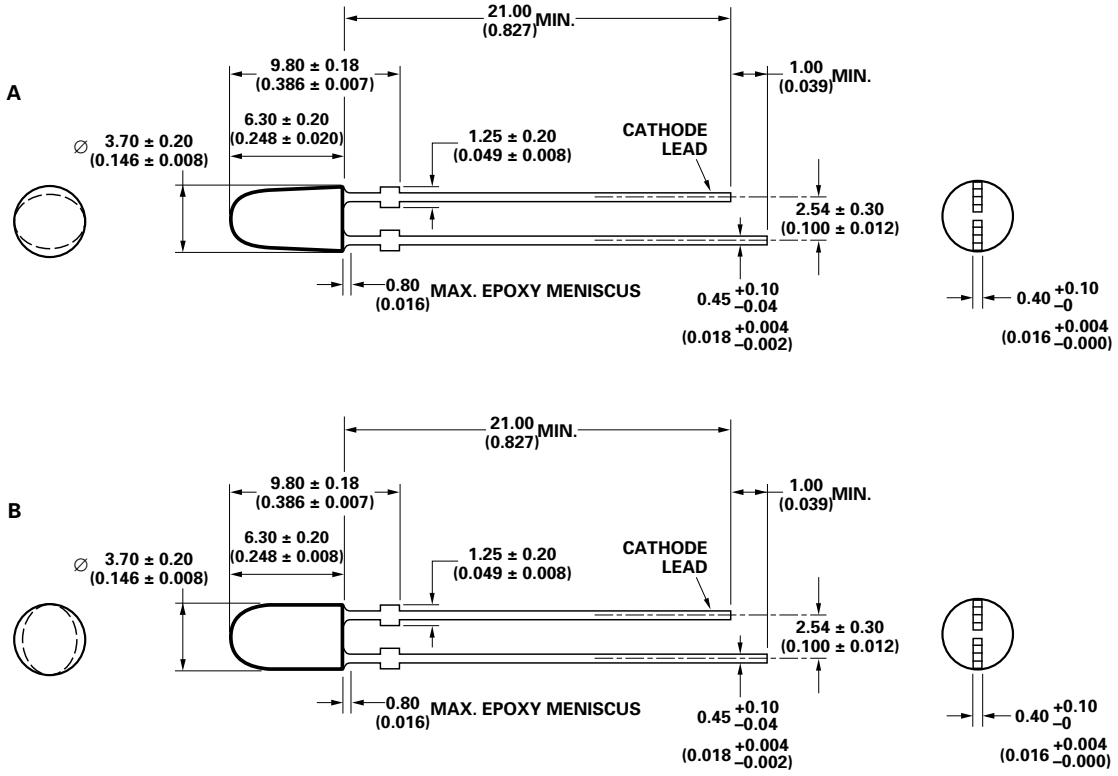
Designers can select parallel (where the axis of the leads is parallel to the wide axis of the oval radiation pattern) or perpendicular orientation. Both of the lamps are red diffused-tinted.

Device Selection Guide AlInGaP2

Part Number	Color Dominant Wavelength λ_d (nm) Typ.	Luminous Intensity I_V (mcd) at 20 mA Min.	Max.	Tinting Type	Leadframe Orientation	Package Drawing
HLMP-MD16-MQ000	Red 630	450	1730	Red	Perpendicular	A
HLMP-MD16-MQT00	Red 630	450	1730	Red	Perpendicular	A
HLMP-LD16-MQ000	Red 630	450	1730	Red	Parallel	B
HLMP-LD16-MQT00	Red 630	450	1730	Red	Parallel	B
HLMP-MD16-LP000	Red 630	345	1330	Red	Perpendicular	A
HLMP-MD16-LPT00	Red 630	345	1330	Red	Perpendicular	A
HLMP-LD16-LP000	Red 630	345	1330	Red	Parallel	B
HLMP-LD16-LPT00	Red 630	345	1330	Red	Parallel	B

Notes:
1. The luminous intensity is measured on the mechanical axis of the lamp package.
2. The optical axis is closely aligned with the package mechanical axis.
3. The dominant wavelength, λ_d, is derived from the CIE Chromaticity Diagram and represents the color of the lamp.

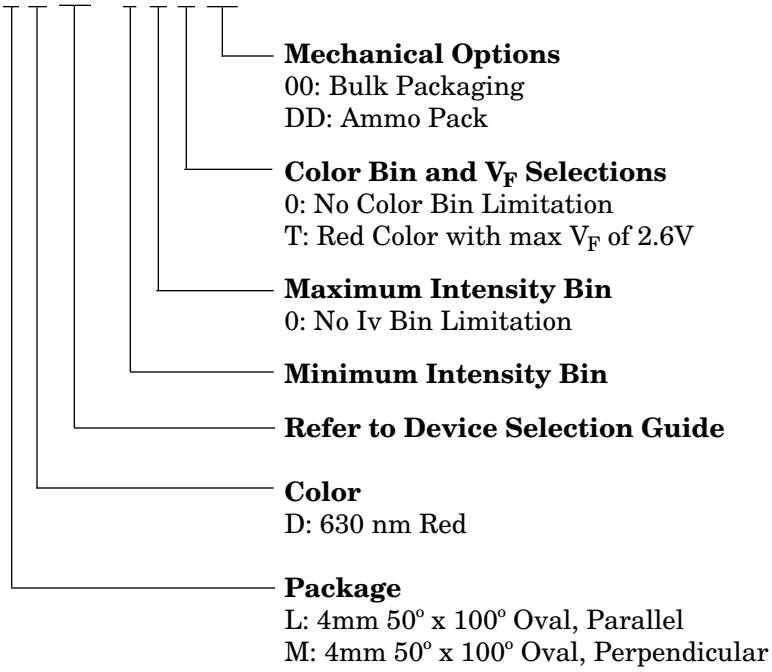
Package Dimensions



Notes:
1. **Dimensions in millimeters (inches).**
2. **Tolerance ± 0.1 mm unless otherwise noted.**

Part Numbering System

HLMP - x x xx - x x x xx



Mechanical Options
00: Bulk Packaging
DD: Ammo Pack

Color Bin and V_F Selections
0: No Color Bin Limitation
T: Red Color with max V_F of 2.6V

Maximum Intensity Bin
0: No Iv Bin Limitation

Minimum Intensity Bin

Refer to Device Selection Guide

Color
D: 630 nm Red

Package
L: 4mm 50° x 100° Oval, Parallel
M: 4mm 50° x 100° Oval, Perpendicular

Absolute Maximum Ratings

T_A = 25°C

Parameter	AlInGaP Value	Units
DC Forward Current[1]	50	mA
Peak Forward Current	100	mA
Average Forward Current	30	mA
Power Dissipation	120	mW
Reverse Voltage (I_R = 100 μA)	5	V
LED Junction Temperature	130	°C
Operating Temperature Range	–40 to +100	°C
Storage Temperature Range	–40 to +120	°C
Soldering Temperature	260 for 5 sec	°C

Note:
1. Derate linearly as shown in Figure 3 for temperatures above 50°C.

Electrical/Optical Characteristics

$T_A = 25°C$

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Typical Viewing Angle Major Minor	$2\theta_{1/2}$		100 50		deg	
Forward Voltage Red (λ_d = 630 nm)	V_F		2.0	2.4[1]	V	I_F = 20 mA
Reverse Voltage Red	V_R	5	20		V	I_R = 100 μA
Peak Wavelength Red (λ_d = 630 nm)	λpeak		639		nm	Peak of Wavelength of Spectral Distribution at I_F = 20 mA
Spectral Halfwidth Red (λ_d = 630 nm)	$\Delta\lambda_{1/2}$		17		nm	Wavelength Width at Spectral Distribution Power Point at I_F = 20 mA
Capacitance Red	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 Red (λ_d = 630 nm)	η_v		155		lm/W	Emitted Luminous Power/ Emitted Radiant Power

Notes:

1. For option -xxTxx, maximum forward voltage, V_F is 2.6V.
2. $2\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the on-axis intensity.
3. 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 the luminous efficacy in lumens/watt.

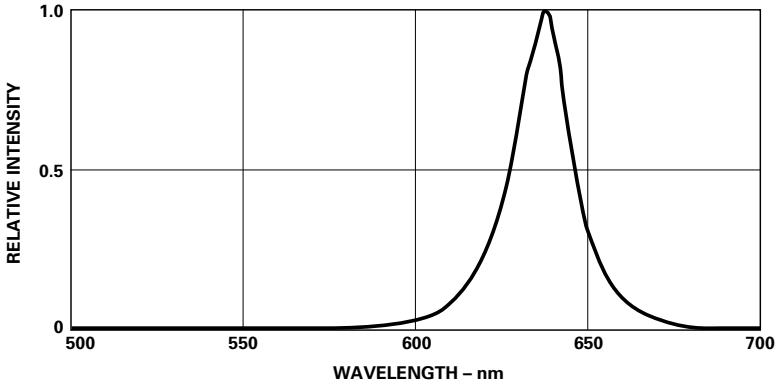


Figure 1. Relative intensity vs. wavelength.

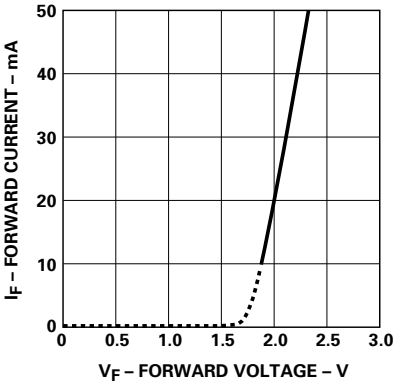


Figure 2. AlInGaP forward current vs. forward voltage.

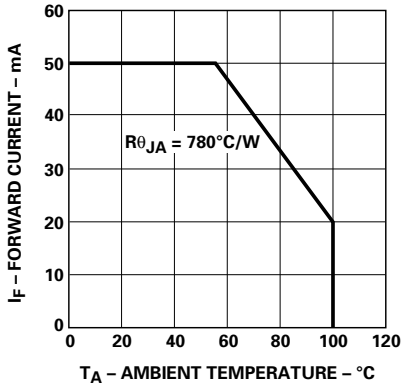


Figure 3. AlInGaP maximum forward current vs. ambient temperature.

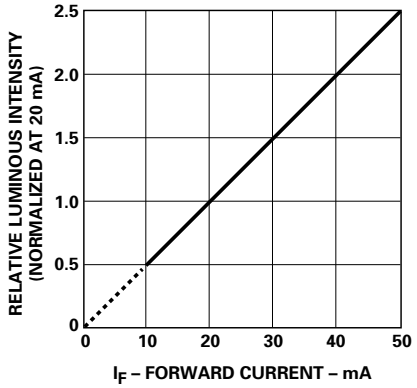


Figure 4. AlInGaP relative luminous intensity vs. forward current.

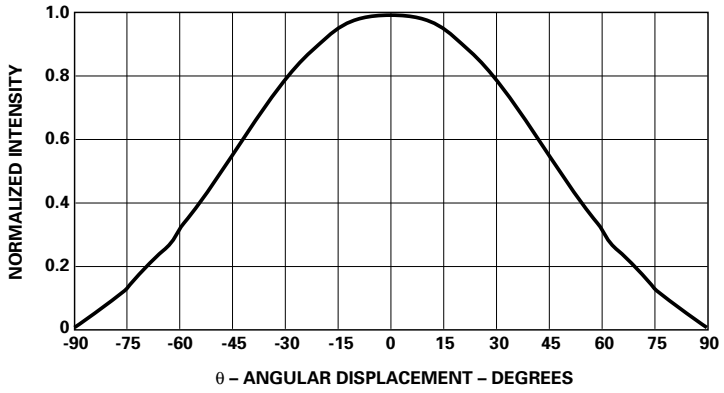


Figure 5a. Representative spatial radiation pattern – horizontal.

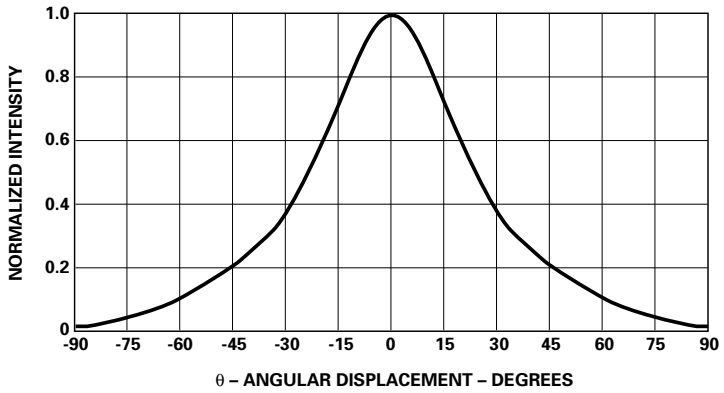


Figure 5b. Representative spatial radiation pattern – vertical.

Intensity Bin Limits

(mcd at 20 mA)

Bin Name	Min.	Max.
L	400	520
M	520	680
N	680	880
P	880	1150
Q	1150	1500

Tolerance for each bin limit is ± 15%.

Note:

1. Bin categories are established for classification of products. Products may not be available in all bin categories.

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Obsoletes 5988-1854EN
5988-4351EN

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