HEWLETT PACKARD

T-1¾ (5 mm) Precision Optical Performance White LEDs

Technical Data

HP SunPower Series
HLMP-CW15
HLMP-CW16
HLMP-CW30
HLMP-CW31

Features

- **Highly Luminous White Emission**
- **Emission Color: 0.31, 0.32**
- **Viewing Angles: 15° & 30°**

Benefits

- **Reduced Power Consumption, Higher Reliability, and Increased Optical/Mechanical Design Flexibility, Compared to Incandescent Bulbs and Other Alternative White Light Sources**

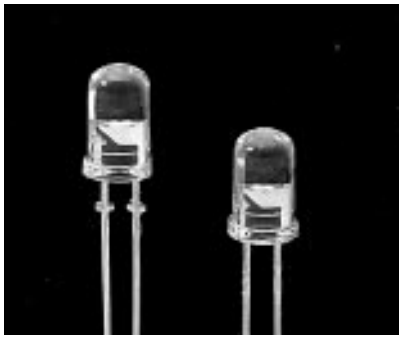
Applications

- **Electronic Signs and Signals**
- **Small Area Illumination**
- **Legend Backlighting**
- **General Purpose Indicators**

Description

These high intensity white LED lamps are based on InGaN material technology. A blue LED die is coated by a YAG phosphor to produce white. The typical resulting color is described by the coordinates x = 0.31, y = 0.32 using the 1931 CIE Chromaticity Diagram.

The T-1¾ lamps are untinted, nondiffused, and incorporate precise optics producing well defined spatial radiation patterns at specific viewing cone angles. The HLMP-CW15 and HLMP-CW16 offer a 15° viewing angle. The HLMP-CW30 and HLMP-CW31 offer a 30° viewing angle. The HLMP-CW16 and HLMP-CW31 have stand-offs on the leads.



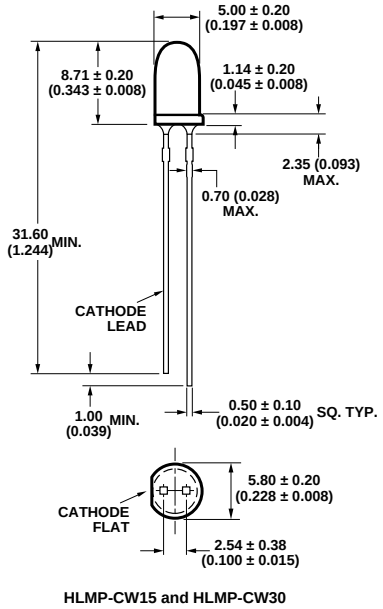
CAUTION: *HLMP-CWxx LEDs are Class 1 ESD sensitive. Please observe appropriate precautions during handling and processing. Refer to Hewlett-Packard Application Note AN-1142 for additional details.*

Device Selection Guide

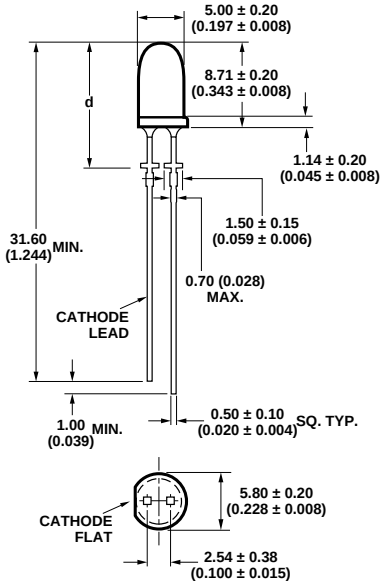
Part Number	Viewing Angle	Typical Intensity @ 20 mA (mcd)	Typical Luminous Flux @ 20 mA (mlm)[1]	Stand off
HLMP-CW15	15°	2000	160	No
HLMP-CW16	15°	2000	160	Yes
HLMP-CW30	30°	800	240	No
HLMP-CW31	30°	800	240	Yes

Note: 1. Values are based on approximate Flux/I_v conversion factors. Lamps are not tested for flux.

Package Dimensions



HLMP-CW15 and HLMP-CW30



HLMP-CW16 and HLMP-CW31

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. TOLERANCE ± 0.1 mm UNLESS OTHERWISE NOTED.

HLMP-CW16	HLMP-CW31
d = 12.60 ± 0.25 (0.496 ± 0.010)	d = 11.96 ± 0.25 (0.471 ± 0.010)

Absolute Maximum Ratings at T_A = 25°C

Parameter	Value	Units
DC Forward Current[1]	30	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	100	°C
Operating Temperature Range	–40 to +80	°C
Storage Temperature Range	–40 to +100	°C

Note: 1. Derate linearly as shown in Figure 4 for temperatures above 50°C.

Optical Characteristics at T_A = 25°C

Part Number	Luminous Intensity I_V (mcd) @ I_F = 20 mA Min.	Typ.	Typical Chromaticity Coordinates[1] x	y	Viewing Angle $2\theta_{1/2}$ Degrees[2] Typ.	Luminous Output η_V (lm/W)
HLMP-CW15/16	1300	2000	0.31	0.32	15	280
HLMP-CW30/31	450	800	0.31	0.32	30	280

Notes:
1. The chromaticity coordinates are derived from the CIE 1931 Chromaticity Diagram and represent the perceived color of the device.
2. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.
3. Luminous output is the ratio of luminous flux to radiant flux.

Electrical Characteristics at T_A = 25°C

Forward Voltage V_F (Volts) @ I_F = 20 mA Typ.	Max.	Reverse Breakdown V_R (Volts) @ I_R = 100 μA Min.	Capacitance C (pF), V_F = 0, f = 1 MHz Typ.	Thermal Resistance $R\theta_{J\text{-}PIN}$ (°C/W)
3.5	4.0	10	40	240

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
R	1500	1900
S	1900	2500
T	2500	3200
U	3200	4200
V	4200	5500

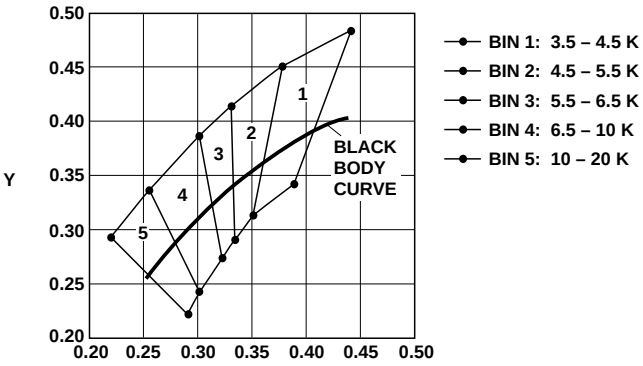
Tolerance for each bin limit is ± 15%.

Color Bin Limits (at 20 mA)

Rank	Limits (Chromaticity Coordinates)					Approximate Color Temperature
1	x	0.44	0.39	0.35	0.38	3500-4500 K
	y	0.48	0.34	0.31	0.45	
2	x	0.35	0.38	0.33	0.33	4500-5500 K
	y	0.31	0.45	0.42	0.29	
3	x	0.33	0.33	0.32	0.30	5500-6500 K
	y	0.42	0.29	0.27	0.39	
4	x	0.32	0.30	0.25	0.30	6500-10,000 K
	y	0.27	0.39	0.34	0.24	
5	x	0.30	0.26	0.22	0.29	10,000-20,000 K
	y	0.24	0.33	0.29	0.22	

Notes:
1. Bin categories are established for classification of products. Products may not be available in all bin categories. Please contact your Hewlett-Packard representative for information on currently available bins.

Color Bin Limits: CIE 1931 2' Chromaticity Diagram



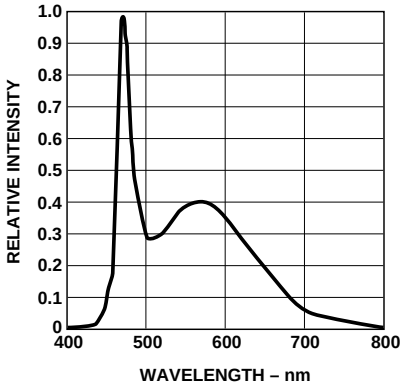


Figure 1. Relative Intensity vs. Wavelength.

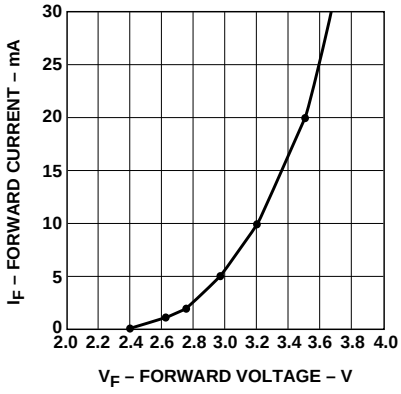


Figure 2. Forward Current vs. Forward Voltage.

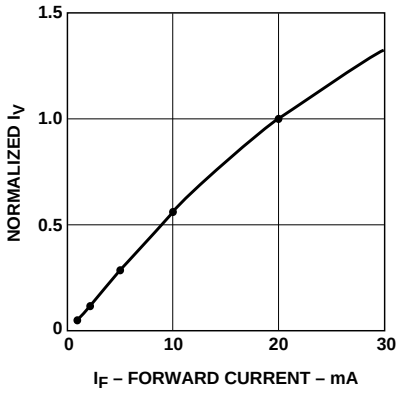


Figure 3. Relative Luminous Intensity vs. Forward Current.

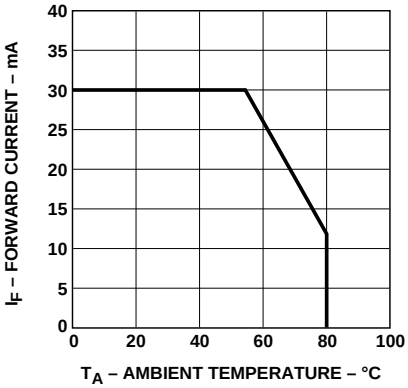


Figure 4. Maximum Forward Current vs. Ambient Temperature.

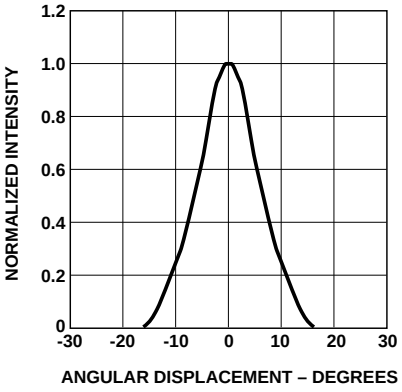


Figure 5. Representative Spatial Radiation Pattern for 15°.

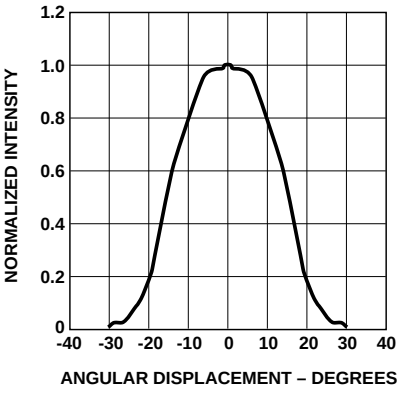


Figure 6. Representative Spatial Radiation Pattern for 30°.

www.hp.com/go/led

For technical assistance or the location of your nearest Hewlett-Packard sales office, distributor or representative call:

Americas/Canada: 1-800-235-0312 or 408-654-8675

Far East/Australasia: Call your local HP sales office.

Japan: (81 3) 3335-8152

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Data subject to change.

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