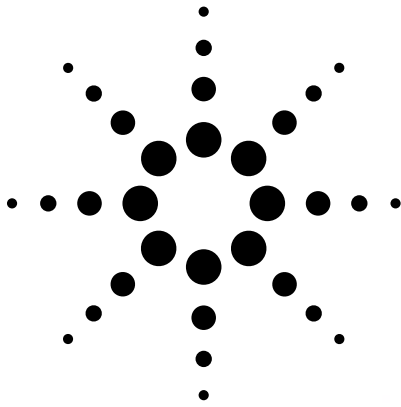




# Agilent HLMP-CWxx T-1<sup>3</sup>/<sub>4</sub> Precision Optical Performance White LED Lamps Data Sheet



HLMP-CW15, HLMP-CW16, HLMP-CW23, HLMP-CW24,  
HLMP-CW30, HLMP-CW31

## Description

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

These T-1<sup>3</sup>/<sub>4</sub> lamps are untinted, nondiffused, and incorporate precise optics producing well defined spatial radiation patterns at specific viewing cone angle.

## Features

- Highly luminous white emission
- 15°, 23°, and 30° viewing angle

## Applications

- Electronic signs and signals
- Small area illumination
- Legend backlighting
- General purpose indicators

## Benefit

- Reduced power consumption, higher reliability, and increased optical / mechanical design flexibility compared to incandescent bulbs and other alternative white light sources

**CAUTION:** These devices are Class 2 ESD sensitive. Please observe appropriate precautions during handling and processing. Refer to Agilent Technologies Application Note AN-1142 for additional details.



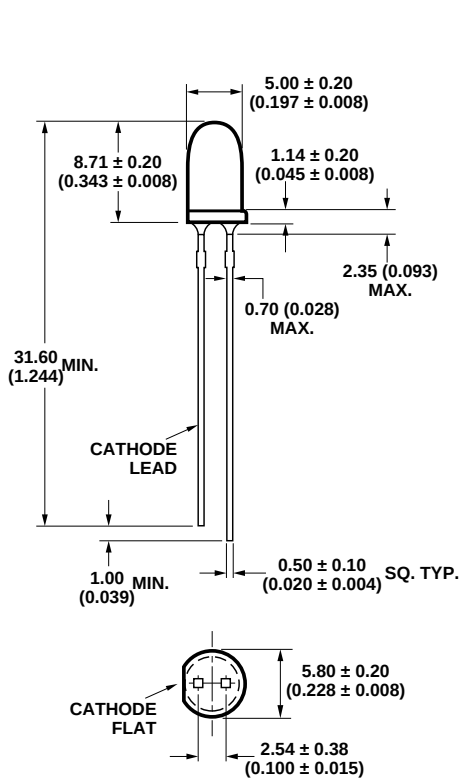
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## Device Selection Guide

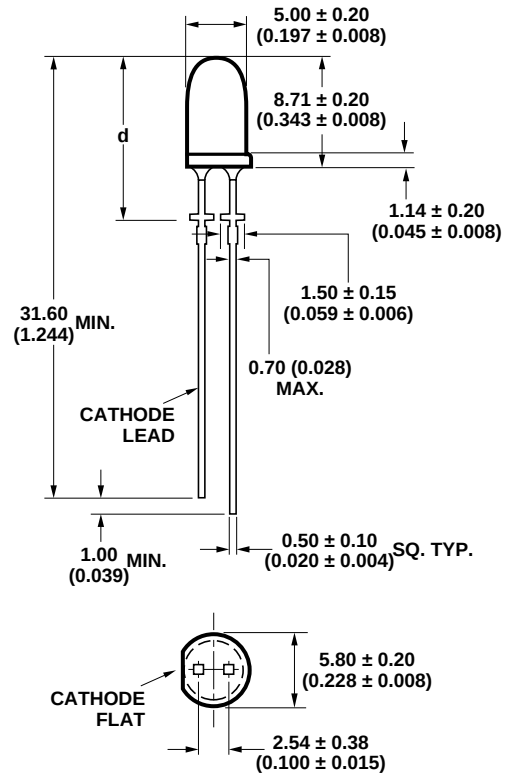
| Part Number     | Viewing Angle<br>Typ. | Min. Luminous Intensity<br>I <sub>v</sub> (mcd) @ 20 mA |       | Standoff Leads | Package Dimension |
|-----------------|-----------------------|---------------------------------------------------------|-------|----------------|-------------------|
|                 |                       | Min.                                                    | Max.  |                |                   |
| HLMP-CW15-TW0xx | 15°                   | 2500                                                    | 7200  | No             | A                 |
| HLMP-CW15-VY0xx | 15°                   | 4200                                                    | 12000 | No             | A                 |
| HLMP-CW16-TW0xx | 15°                   | 2500                                                    | 7200  | Yes            | B                 |
| HLMP-CW16-VY0xx | 15°                   | 4200                                                    | 12000 | Yes            | B                 |
| HLMP-CW23-SV0xx | 23°                   | 1900                                                    | 5500  | No             | A                 |
| HLMP-CW23-TW0xx | 23°                   | 2500                                                    | 7200  | No             | A                 |
| HLMP-CW24-SV0xx | 23°                   | 1900                                                    | 5500  | Yes            | B                 |
| HLMP-CW24-TW0xx | 23°                   | 2500                                                    | 7200  | Yes            | B                 |
| HLMP-CW30-PS0xx | 30°                   | 880                                                     | 2500  | No             | A                 |
| HLMP-CW30-SV0xx | 30°                   | 1900                                                    | 5500  | No             | A                 |
| HLMP-CW31-PS0xx | 30°                   | 880                                                     | 2500  | Yes            | B                 |
| HLMP-CW31-SV0xx | 30°                   | 1900                                                    | 5500  | Yes            | B                 |

Tolerance for each intensity limit is  $\pm 15\%$ .

## Package Dimensions



PACKAGE DIMENSION A



PACKAGE DIMENSION B

### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. EPOXY MENISCUS MAY EXTEND ABOUT 1 mm (0.040") DOWN THE LEADS.

| HLMP-CW16                                  | HLMP-CW24                                   | HLMP-CW31                                   |
|--------------------------------------------|---------------------------------------------|---------------------------------------------|
| d = $12.6 \pm 0.25$<br>(0.496 $\pm$ 0.010) | d = $12.52 \pm 0.25$<br>(0.493 $\pm$ 0.010) | d = $11.96 \pm 0.25$<br>(0.471 $\pm$ 0.010) |

## Part Numbering System

HLMP - CWXX - X X X XX

### Mechanical Option

00: Bulk  
DD: Ammo Pack

### Color Bin Option

0: Full color bin distribution

### Maximum Intensity Bin Limit

0: No maximum intensity bin limit

### Minimum Intensity Bin Limit

Refer to Device Selection Guide

### Viewing Angle and Standoff Option

15: 15° without standoffs  
16: 15° with standoffs  
23: 23° without standoffs  
24: 23° with standoffs  
30: 30° without standoffs  
31: 30° with standoffs

## Absolute Maximum Ratings

T<sub>A</sub> = 25°C

| Parameter                                 | Value          | Units |
|-------------------------------------------|----------------|-------|
| DC Forward Current <sup>[1]</sup>         | 30             | mA    |
| Peak Forward Current <sup>[2]</sup>       | 100            | mA    |
| Power Dissipation                         | 120            | mW    |
| Reverse Voltage (I <sub>R</sub> = 10 µA)  | 5              | V     |
| LED Junction Temperature                  | 110            | °C    |
| Operating Temperature Range               | –40 to +80     | °C    |
| Storage Temperature Range                 | –40 to +100    | °C    |
| Wave Solder Temperature <sup>[3]</sup>    | 250 for 3 secs | °C    |
| Solder Dipping Temperature <sup>[3]</sup> | 260 for 5 secs | °C    |

### Notes:

1. Derate linearly as shown in Figure 5.
2. Duty factor 10%, 1 kHz.
3. 1.59 mm (0.060 inch) below body.

## Electrical Characteristics

T<sub>A</sub> = 25°C

| Forward Voltage,<br>V <sub>F</sub> (V) @ I <sub>F</sub> = 20 mA | Reverse Breakdown,<br>V <sub>R</sub> (V) @ I <sub>R</sub> = 10 µA | Capacitance, C (pF),<br>V <sub>F</sub> = 0, f = 1 MHz | Thermal Resistance<br>R <sub>qJ-PIN</sub> (°C/W) |
|-----------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------|
| Typ. Max.                                                       | Min.                                                              | Typ.                                                  | Typ.                                             |
| 3.6 4.0                                                         | 5                                                                 | 70                                                    | 240                                              |

## Optical Characteristics

T<sub>A</sub> = 25°C

| Part Number     | Typical Chromaticity<br>Coordinates <sup>[1]</sup> |      | Viewing Angle<br>2θ <sub>1/2</sub> Degrees <sup>[2]</sup> |
|-----------------|----------------------------------------------------|------|-----------------------------------------------------------|
|                 | X                                                  | Y    | Typ.                                                      |
| HLMP-CW3x-xxxxx | 0.32                                               | 0.32 | 30                                                        |
| HLMP-CW2x-xxxxx | 0.32                                               | 0.32 | 23                                                        |
| HLMP-CW1x-xxxxx | 0.32                                               | 0.32 | 15                                                        |

### Notes:

1. The chromaticity coordinates are derived from the CIE 1931 Chromaticity Diagram and represent the perceived color of the device.
2. θ<sub>1/2</sub> is the off-axis angle where the luminous intensity is ½ the peak intensity.

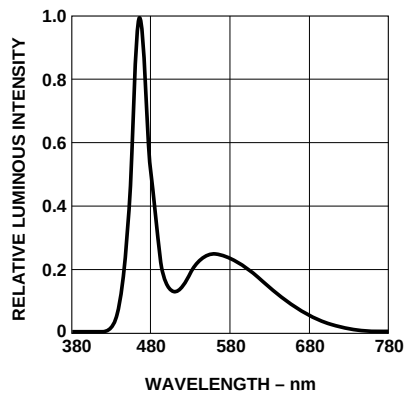


Figure 1. Relative intensity vs. wavelength.

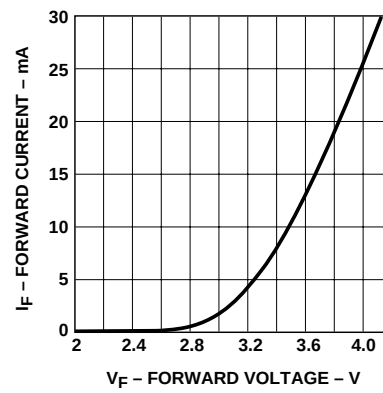


Figure 2. Forward current vs. forward voltage.

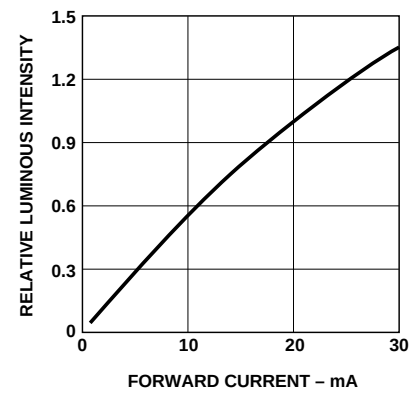


Figure 3. Relative  $I_v$  vs. forward current.

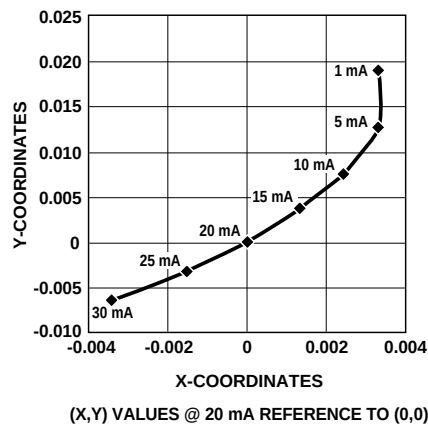


Figure 4. Chromaticity shift vs. current.

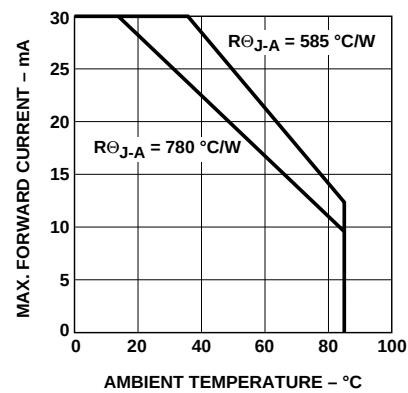


Figure 5. Maximum forward current vs. temperature.

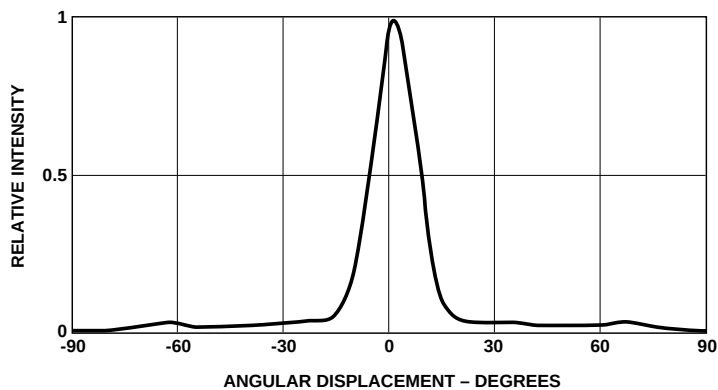


Figure 6a. CW1x spatial radiation pattern.

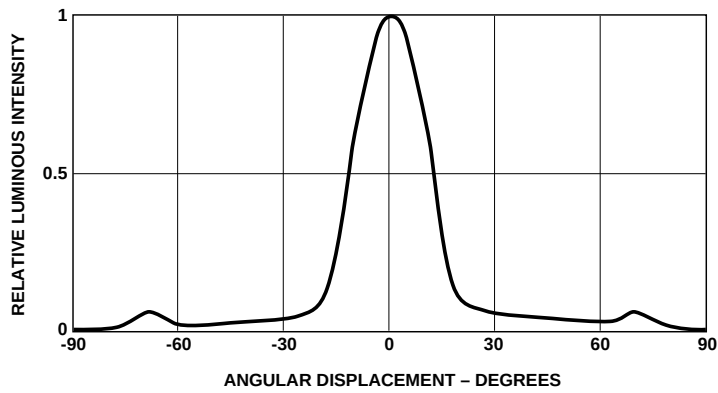


Figure 6b. CW2x spatial radiation pattern.

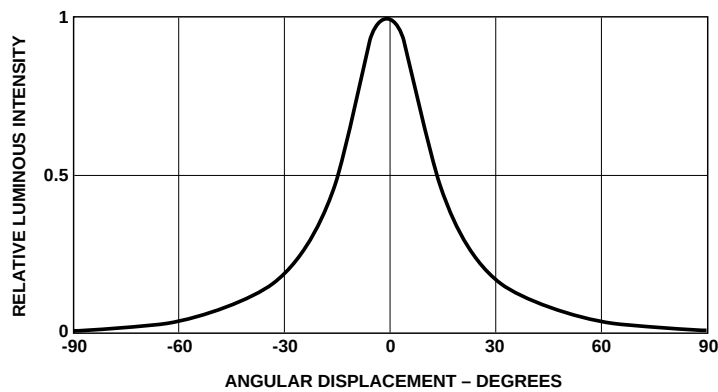


Figure 6c. CW3x spatial radiation pattern.

#### Intensity Bin Limits (mcd at 20 mA)

| Bin | Min.  | Max.  |
|-----|-------|-------|
| 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  |
| W   | 5500  | 7200  |
| X   | 7200  | 9300  |
| Y   | 9300  | 12000 |
| Z   | 12000 | 16000 |

Tolerance for each bin limit is  $\pm 15\%$ .

#### Color Bin Limit Table

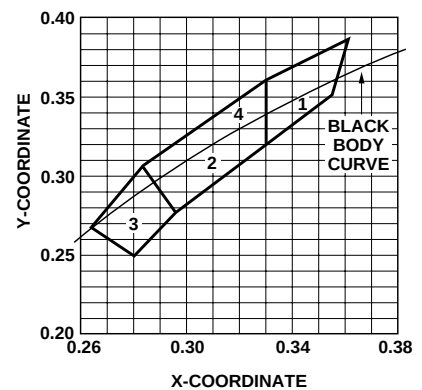
| Rank | Limits (Chromaticity Coordinates) |       |       |       |       |
|------|-----------------------------------|-------|-------|-------|-------|
| 1    | x                                 | 0.330 | 0.330 | 0.356 | 0.361 |
|      | y                                 | 0.360 | 0.318 | 0.351 | 0.385 |
| 2    | x                                 | 0.287 | 0.296 | 0.330 | 0.330 |
|      | y                                 | 0.295 | 0.276 | 0.318 | 0.339 |
| 3    | x                                 | 0.264 | 0.280 | 0.296 | 0.283 |
|      | y                                 | 0.267 | 0.248 | 0.276 | 0.305 |
| 4    | x                                 | 0.283 | 0.287 | 0.330 | 0.330 |
|      | y                                 | 0.305 | 0.295 | 0.339 | 0.360 |

Tolerance for each bin limit is  $\pm 0.01$ .

#### Note:

Bin categories are established for classification of products. Products may not be available in all bin categories. Please contact your Agilent representative for information on currently available bins.

#### Color Bin Limits with Respect to CIE 1931 Chromaticity Diagram



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Data subject to change.

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