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# T-1<sup>3</sup>/<sub>4</sub> (5 mm) Precision Optical Performance White LEDs

## Technical Data

**HLMP-CW15**  
**HLMP-CW16**  
**HLMP-CW30**  
**HLMP-CW31**

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### 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-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 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.

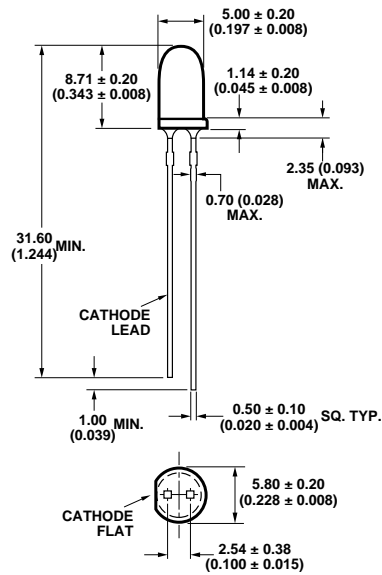


**CAUTION:** HLMP-CWxx LEDs are Class 1 ESD sensitive. Please observe appropriate precautions during handling and processing. Refer to Agilent Application Note AN-1142 for additional details.

## Device Selection Guide

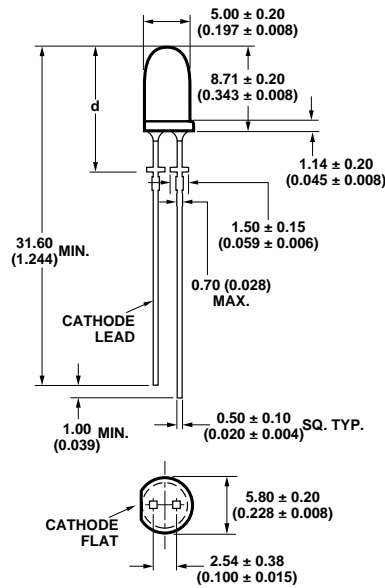
| Part Number | Viewing Angle | Typical Intensity @ 20 mA (mcd) | Stand off |
|-------------|---------------|---------------------------------|-----------|
| HLMP-CW15   | 15°           | 2000                            | No        |
| HLMP-CW16   | 15°           | 2000                            | Yes       |
| HLMP-CW30   | 30°           | 600                             | No        |
| HLMP-CW31   | 30°           | 600                             | Yes       |

## Package Dimensions



### NOTES:

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



| HLMP-CW16                           | HLMP-CW31                           |
|-------------------------------------|-------------------------------------|
| d = 12.60 ± 0.25<br>(0.496 ± 0.010) | d = 11.96 ± 0.25<br>(0.471 ± 0.010) |

## Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

| Parameter                                  | Value       | Units |
|--|-------------|-------|
| DC Forward Current <sup>[1]</sup>          | 30          | mA    |
| Peak Forward Current                       | 100         | mA    |
| Average Forward Current                    | 30          | mA    |
| Power Dissipation                          | 120         | mW    |
| Reverse Voltage ( $I_R = 10 \mu\text{A}$ ) | 5           | V     |
| LED Junction Temperature                   | 130         | °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  $50^\circ\text{C}$ .

### Optical Characteristics at $T_A = 25^\circ\text{C}$

| Part Number  | Luminous Intensity $I_V$<br>(mcd) @ $I_F = 20\text{ mA}$ |      | Typical Chromaticity<br>Coordinates <sup>[1]</sup> |      | Viewing Angle $2\theta_{1/2}$<br>Degrees <sup>[2]</sup><br>Typ. | Luminous<br>Output<br>$\eta_V$ (lm/W) |
|--------------|--|------|--|------|---|---------------------------------------|
|              | Min.   | Typ. | x  | y    |   |                                       |
| HLMP-CW15/16 | 1300   | 2000 | 0.31   | 0.32 | 15  | 280                                   |
| HLMP-CW30/31 | 450  | 600  | 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 $T_A = 25^\circ\text{C}$

| Forward Voltage<br>$V_F$ (Volts) @ $I_F = 20\text{ mA}$<br>Typ. Max. |     | Reverse<br>Breakdown<br>$V_R$ (Volts) @<br>$I_R = 100\text{ }\mu\text{A}$<br>Min. | Capacitance<br>$C$ (pF), $V_F = 0$ ,<br>$f = 1\text{ MHz}$<br>Typ. | Thermal<br>Resistance $R_{\theta J-PIN}$<br>( $^\circ\text{C/W}$ ) |
|--|-----|---|--|--|
| 3.5  | 4.0 | 10  | 40   | 240  |

### Color Bin Limits

| Rank | Limits<br>(Chromaticity Coordinates) |       |       |       |       |
|------|--------------------------------------|-------|-------|-------|-------|
|      |                                      |       |       |       |       |
| 1    | x                                    | 0.37  | 0.37  | 0.33  | 0.33  |
|      | y                                    | 0.42  | 0.375 | 0.32  | 0.365 |
| 2    | x                                    | 0.33  | 0.33  | 0.29  | 0.29  |
|      | y                                    | 0.365 | 0.32  | 0.26  | 0.306 |
| 3    | x                                    | 0.29  | 0.29  | 0.25  | 0.25  |
|      | y                                    | 0.306 | 0.26  | 0.205 | 0.25  |

**Note:**

1. 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.

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

| Bin<br>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  $\pm 15\%$ .

## Color Bin Limits: CIE 1931 2° Chromaticity Diagram

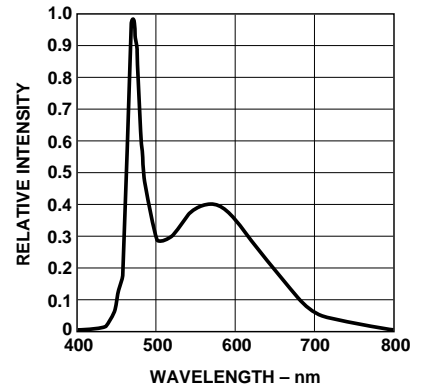
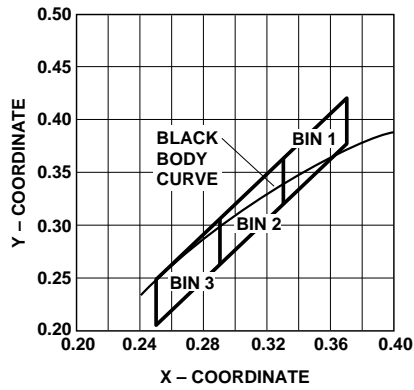


Figure 1. Relative Intensity vs. Wavelength.

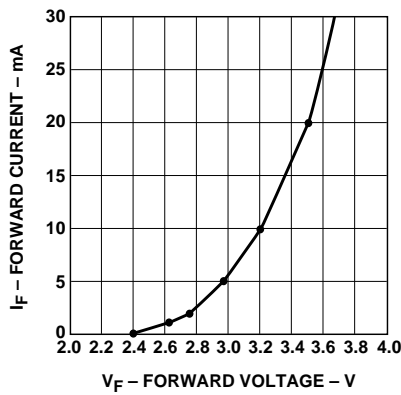


Figure 2. Forward Current vs. Forward Voltage.

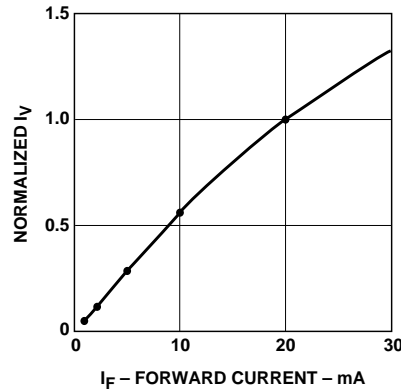


Figure 3. Relative Luminous Intensity vs. Forward Current.

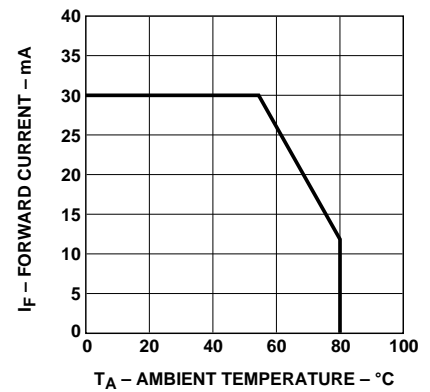


Figure 4. Maximum Forward Current vs. Ambient Temperature.

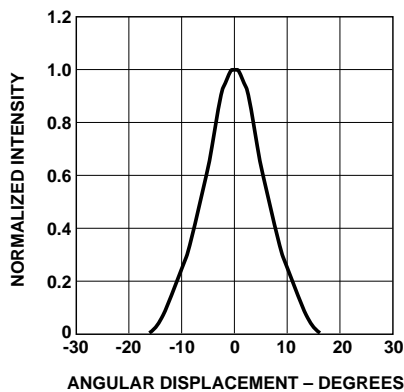


Figure 5. Representative Spatial Radiation Pattern for 15°.

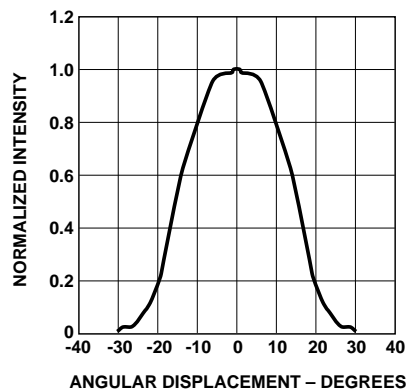


Figure 6. Representative Spatial Radiation Pattern for 30°.

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Data subject to change.  
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