HLMP-CW46, HLMP-CW47. HLMP-CW76, HLMP-CW77

T-1 ¾ (5mm) Extra Bright Precision Optical Performance White LED Lamps.

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

These T-1 ¾ lamps are untinted, diffused, and incorporate precise optics which produce well-defined spatial radiation patterns at specific viewing cone angle.

- Well defined spatial radiation pattern
- High luminous white emission
- Viewing angle: 50° and 70°.
- Standoff or non-standoff leads
- Superior resistance to moisture

Applications

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

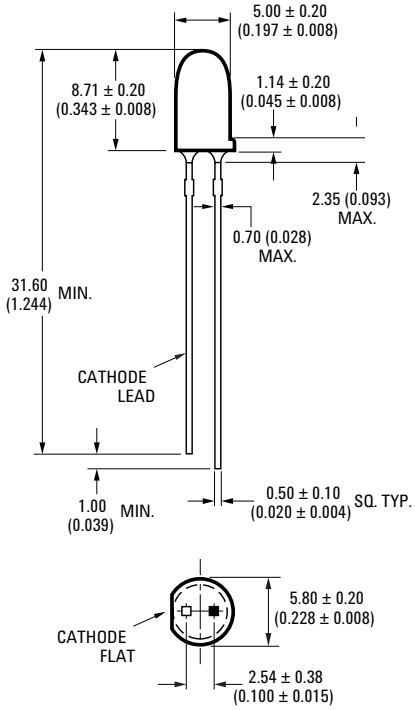
Benefit

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

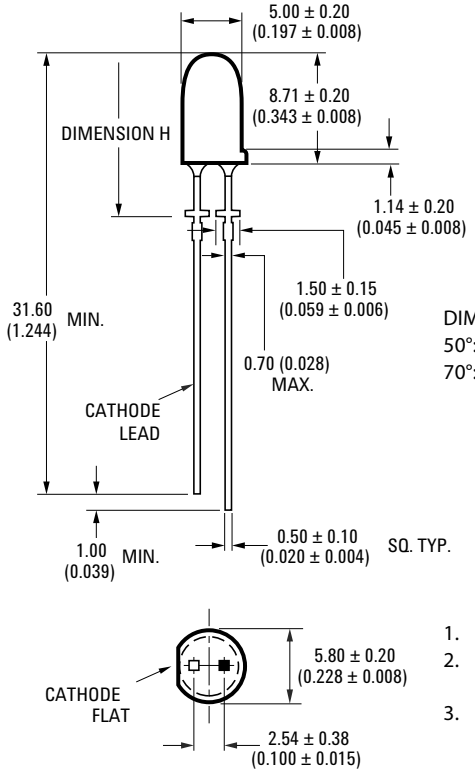
Caution: Devices are Class 1 ESD sensitive. Please observe appropriate precautions during handling and processing. Refer to Application Note AN-1142 for additional details.

Package Dimensions

Package Dimension A



Package Dimension B



DIMENSION H:
50°: 11.98 ± 0.25mm (0.4715 ± 0.01 inches)
70°: 11.09 ± 0.25mm (0.4365 ± 0.01 inches)

1. All dimensions are in millimeters /inches.
2. Epoxy meniscus may extend about 1mm (0.040") down the leads.
3. If heat-sinking application is required, the terminal for heat sink is anode.

Part Numbering System

HLMP - CW XX - X X X XX

Viewing Angle and Standoff Option
46: 50° without standoff
47: 50° with standoff
76: 70° without standoff
77: 70° with standoff

Minimum Intensity Bin
Refer to Device Selection Guide

Maximum Intensity Bin
0: No maximum intensity bin limit
Others: Refer to Device Selection Guide

Color Bin Options
0: Full color bin distribution
B: Color bin 2 & 3 only

00: Bulk
DD: Ammo Pack Straight Leads

Device Selection Guide

Part Number	Typical Viewing Angle, 2θ ½ (Degree)	Intensity (mcd) at 20 MA		Standoff	Package Dimension
		Min.	Max.		
HLMP-CW46-PS0xx	50	880	2500	No	A
HLMP-CW46-QR0xx	50	1150	1900	No	A
HLMP-CW46-QRBxx	50	1150	1900	No	A
HLMP-CW46-RU0xx	**50**	**1500**	**4200**	**No**	**A**
HLMP-CW46-ST0xx	**50**	**1900**	**3200**	**No**	**A**
HLMP-CW46-STBxx	**50**	**1900**	**3200**	**No**	**A**
HLMP-CW47-PS0xx	50	880	2500	Yes	B
HLMP-CW47-QR0xx	50	1150	1900	Yes	B
HLMP-CW47-QRBxx	50	1150	1900	Yes	B
HLMP-CW47-RU0xx	**50**	**1500**	**4200**	**Yes**	**B**
HLMP-CW47-ST0xx	**50**	**1900**	**3200**	**Yes**	**B**
HLMP-CW47-STBxx	**50**	**1900**	**3200**	**Yes**	**B**
HLMP-CW76-NR0xx	70	680	1900	No	A
HLMP-CW76-PQ0xx	70	880	1500	No	A
HLMP-CW76-PQBxx	70	880	1500	No	A
HLMP-CW76-QT0xx	**70**	**1150**	**3200**	**No**	**A**
HLMP-CW76-RS0xx	**70**	**1500**	**2500**	**No**	**A**
HLMP-CW76-RSBxx	**70**	**1500**	**2500**	**No**	**A**
HLMP-CW77-NR0xx	70	680	1900	Yes	B
HLMP-CW77-PQ0xx	70	880	1500	Yes	B
HLMP-CW77-PQBxx	70	880	1500	Yes	B
HLMP-CW77-QT0xx	**70**	**1150**	**3200**	**Yes**	**B**
HLMP-CW77-RS0xx	**70**	**1500**	**2500**	**Yes**	**B**
HLMP-CW77-RSBxx	**70**	**1500**	**2500**	**Yes**	**B**

Notes:
1. Tolerance for luminous intensity measurement is +/- 15%
2. The luminous intensity is measured on the mechanical axis of the lamp package.
3. The optical axis is closely aligned with the package mechanical axis.
4. $2\theta_{1/2}$ is the off-axis angle where the luminous intensity is ½ the on axis intensity
5. Part numbers in **BOLD** are recommended for new designs.

Absolute Maximum Rating at T_A = 25ºC

Parameters	Value	Unit
DC forward current [1]	30	mA
Peak pulsed forward current [2]	100	mA
Power dissipation	105	mW
LED junction temperature	110	ºC
Operating temperature range	-40 to +85	ºC
Storage temperature range	-40 to +100	ºC

1. Derate linearly as shown in figure 2.
2. Duty factor 10%, frequency 1KHz

Electrical/Optical Characteristics T_A = 25ºC

Parameters	Symbol	Min	Typ	Max	Units	Test Condition
Forward voltage	V_F		3.2	4.0	V	I_F = 20 mA
Reverse Voltage [1]	V_R	5.0			V	I_R = 10 μA
Thermal resistance	$R\theta_{J\text{-}PIN}$		240		ºC/W	LED Junction to anode lead
Chromaticity Coordinates [2]	X Y		0.31 0.31			I_F = 20 mA
Capacitance	C		70			V_F=0, f=1MHz

Notes:
1. The reverse voltage of the product is equivalent to the forward voltage of the protective chip at I_R = 10 μA
2. The chromaticity coordinates are derived from the CIE 1931 Chromaticity Diagram and represent the perceived color of the device.

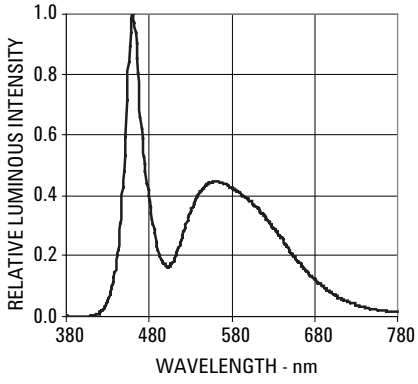


Figure 1. Relative Intensity vs. Wavelength

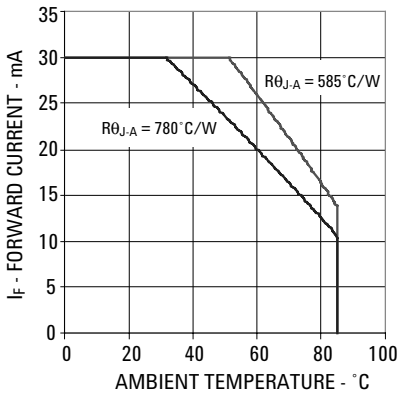
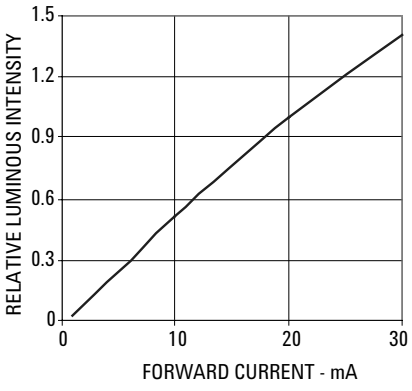


Figure 2. Forward Current vs. Ambient Temperature



Forward Current

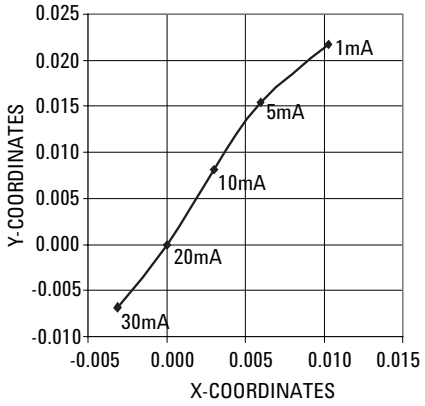


Figure 4. Chromaticity shift vs. Current

***Note: (x,y) values @ 20mA reference to (0,0)**

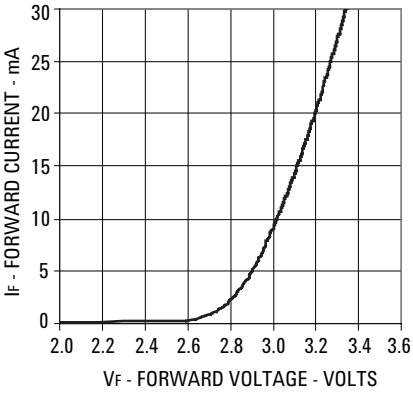


Figure 5. Forward Current vs. Forward Voltage

Intensity Bin Limit Table

	Intensity (mcd) at 20 mA	
Bin	**Min**	**Max**
N	680	880
P	880	1150
Q	1150	1500
R	1500	1900
S	1900	2500
T	2500	3200
U	3200	4200

± 15%

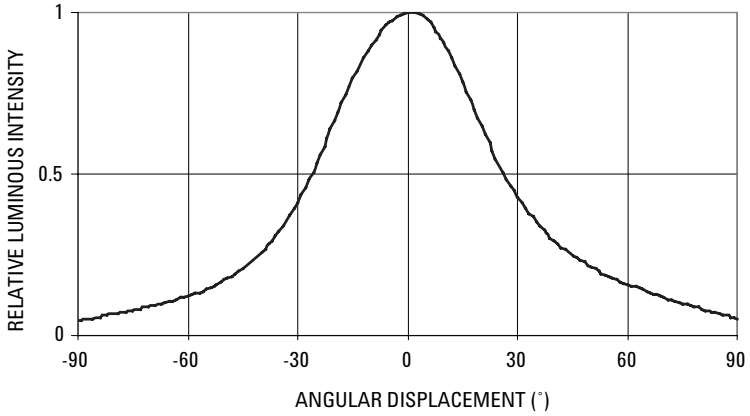


Figure 6. Spatial Radiation Pattern for CW4x

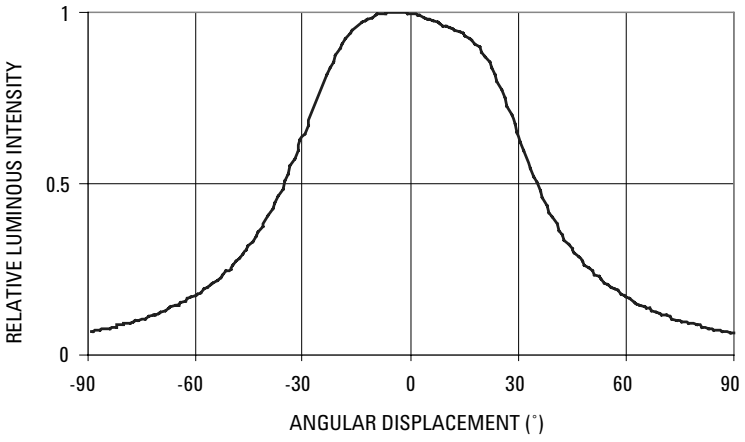


Figure 7. Spatial Radiation Pattern for CW7x

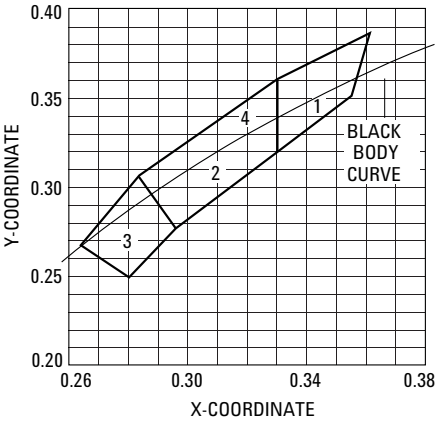
Color Bin Limit Table

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

$\pm$ 0.01

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

Color Bin Limits with Respect to CIE 1931 Chromaticity Diagram



Precautions:

Lead Forming:

- The leads of an LED lamp may be preformed or cut to length prior to insertion and soldering into PC board.
- If lead forming is required before soldering, care must be taken to avoid any excessive mechanical stress induced to LED package. Otherwise, cut the leads of LED to length after soldering process at room temperature. The solder joint formed will absorb the mechanical stress of the lead cutting from traveling to the LED chip die attach and wirebond.
- It is recommended that tooling made to precisely form and cut the leads to length rather than rely upon hand operation.

Soldering Condition:

- Care must be taken during PCB assembly and soldering process to prevent damage to LED component.
- The closest LED is allowed to solder on board is 1.59mm below the body (encapsulant epoxy) for those parts without standoff.
- Recommended soldering condition:

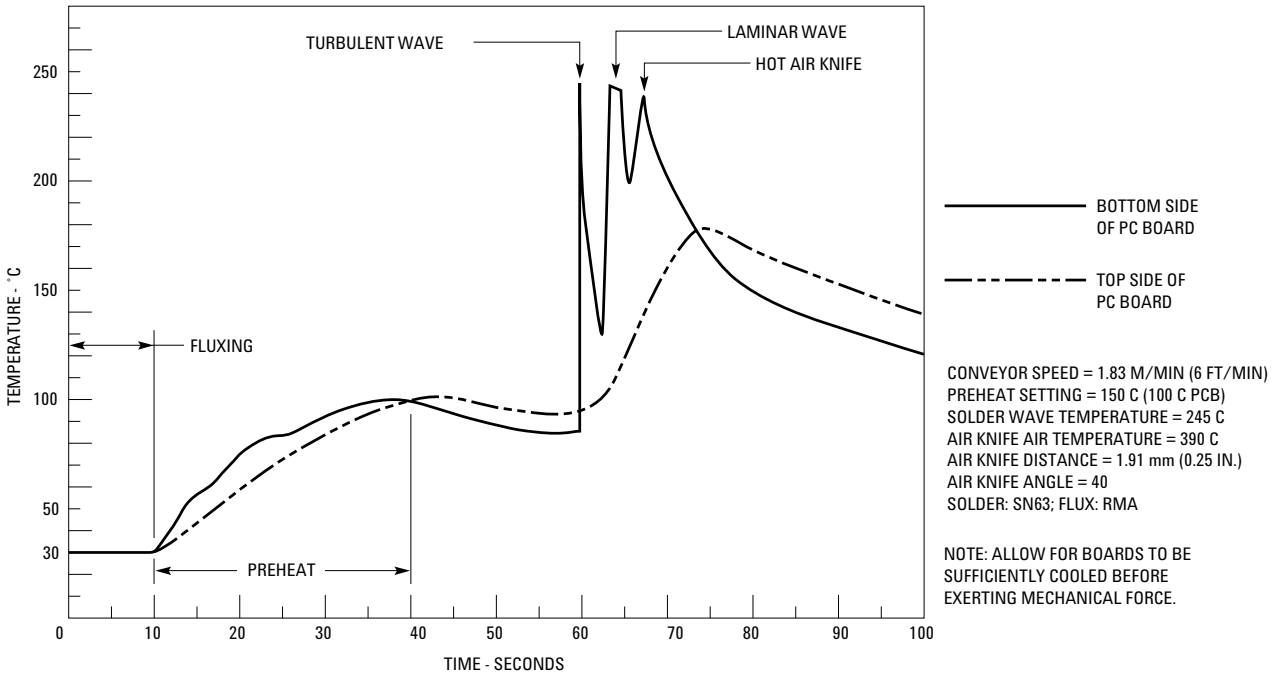
	Wave Soldering	Manual Solder Dipping
Pre-heat temperature	105 °C Max.	–
Preheat time	30 sec Max	–
Peak temperature	250 °C Max.	260 °C Max.
Dwell time	3 sec Max.	5 sec Max

- Wave soldering parameter must be set and maintain according to recommended temperature and dwell time in the solder wave. Customer is advised to periodically check on the soldering profile to ensure the soldering profile used is always conforming to recommended soldering condition.
- If necessary, use fixture to hold the LED component in proper orientation with respect to the PCB during soldering process.
- Proper handling is imperative to avoid excessive thermal stresses to LED components when heated. Therefore, the soldered PCB must be allowed to cool to room temperature, 25°C before handling.
- Special attention must be given to board fabrication, solder masking, surface plating and lead holes size and component orientation to assure solderability.
- Recommended PC board plated through holes size for LED component leads.

ead size	Diagonal	Plated through hole diameter
0.457 x 0.457mm (0.018 x 0.018inch)	0.646 mm (0.025 inch)	0.976 to 1.078 mm (0.038 to 0.042 inch)
0.508 x 0.508mm (0.020 x 0.020inch)	0.718 mm (0.028 inch)	1.049 to 1.150mm (0.041 to 0.045 inch)

Note: Refer to application note AN1027 for more information on soldering LED components.

Recommended Wave Soldering Profile



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