

# Cree® P4 LED

## Model # LP476PWN1-90G

### Data Sheet

90-degree, 7.6 x 7.6 mm LED lamp in white color with water-transparent lens and stopper

#### Applications

- Indicators
- Illuminations

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

| Items                                | Symbol    | Absolute Maximum Rating   | Unit               |
|--------------------------------------|-----------|---|--------------------|
| Forward Current                      | $I_F$     | 30  | mA                 |
| Peak Forward Current <sup>Note</sup> | $I_{FP}$  | 100   | mA                 |
| Reverse Voltage                      | $V_R$     | 5   | V                  |
| Power Dissipation                    | $P_D$     | 132   | mW                 |
| Operation Temperature                | $T_{opr}$ | -40 ~ +95   | $^{\circ}\text{C}$ |
| Storage Temperature                  | $T_{stg}$ | -40 ~ +100  | $^{\circ}\text{C}$ |
| Lead Soldering Temperature           | $T_{sol}$ | Max. 260 $^{\circ}\text{C}$ for 3 sec. max.<br>(3 mm from the base of the epoxy bulb) |                    |

**Note:** Pulse width  $\leq 0.1$  msec, duty  $\leq 1/10$ .

#### Typical Electrical & Optical Characteristics ( $T_A = 25^{\circ}\text{C}$ )

| Characteristics          | Symbol               | Condition     | Unit          | Minimum | Typical | Maximum |
|--------------------------|----------------------|---------------|---------------|---------|---------|---------|
| Forward Voltage          | $V_F$                | $I_F = 30$ mA | V             |         | 3.6     | 4.4     |
| Reverse Current          | $I_R$                | $V_R = 5$ V   | $\mu\text{A}$ |         |         | 100     |
| Luminous Intensity       | $I_v$                | $I_F = 30$ mA | mcd           | 770     | 1500    |         |
| Luminous Flux            | $\Phi_v$             | $I_F = 30$ mA | lm            |         | 2200    |         |
| Chromaticity Coordinates | x                    | $I_F = 30$ mA |               |         | 0.31    |         |
|                          | y                    | $I_F = 30$ mA |               |         | 0.32    |         |
| 50% Power Angle          | 2 $\theta_{1/2}$ H-H | $I_F = 30$ mA | deg           |         | 95      |         |
|                          | 2 $\theta_{1/2}$ V-V | $I_F = 30$ mA | deg           |         | 40      |         |

## Standard Bins for LP476PWN1-90G ( $I_F = 30 \text{ mA}$ )

Lamps are sorted to luminous intensity ( $I_V$ ),  $V_F$  and chromaticity coordinates (x,y) bins shown.

Orders for LP476PWN1-90G may be filled with any or all bins contained as below.

All luminous intensity ( $I_V$ ),  $V_F$  and chromaticity coordinates (x,y) values shown and specified are at  $I_F = 30 \text{ mA}$ .

|                                | A1       | A2 | B1 | B2 | c |            |
|--------------------------------|----------|----|----|----|---|------------|
| Luminous Intensity ( $I_V$ )   |          |    |    |    |   | V or above |
|                                | 2130 mcd |    |    |    |   | U          |
|                                | 1520 mcd |    |    |    |   | T          |
|                                | 1100 mcd |    |    |    |   | S          |
|                                | 770 mcd  |    |    |    |   |            |
| Chromaticity Coordinates (x,y) |          |    |    |    |   |            |

| Rank                     |   | A1    |       |       |       | A2    |       |       |       | B1    |       |       |       |
|--------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Chromaticity Coordinates | x | 0.245 | 0.264 | 0.280 | 0.264 | 0.264 | 0.283 | 0.296 | 0.280 | 0.283 | 0.307 | 0.313 | 0.296 |
|                          | y | 0.229 | 0.267 | 0.248 | 0.220 | 0.267 | 0.305 | 0.276 | 0.248 | 0.305 | 0.337 | 0.297 | 0.276 |

| Rank                     |   | B2    |       |       |       | c     |       |       |       |
|--------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Chromaticity Coordinates | x | 0.307 | 0.330 | 0.330 | 0.313 | 0.330 | 0.361 | 0.356 | 0.330 |
|                          | y | 0.337 | 0.360 | 0.318 | 0.297 | 0.360 | 0.385 | 0.351 | 0.318 |

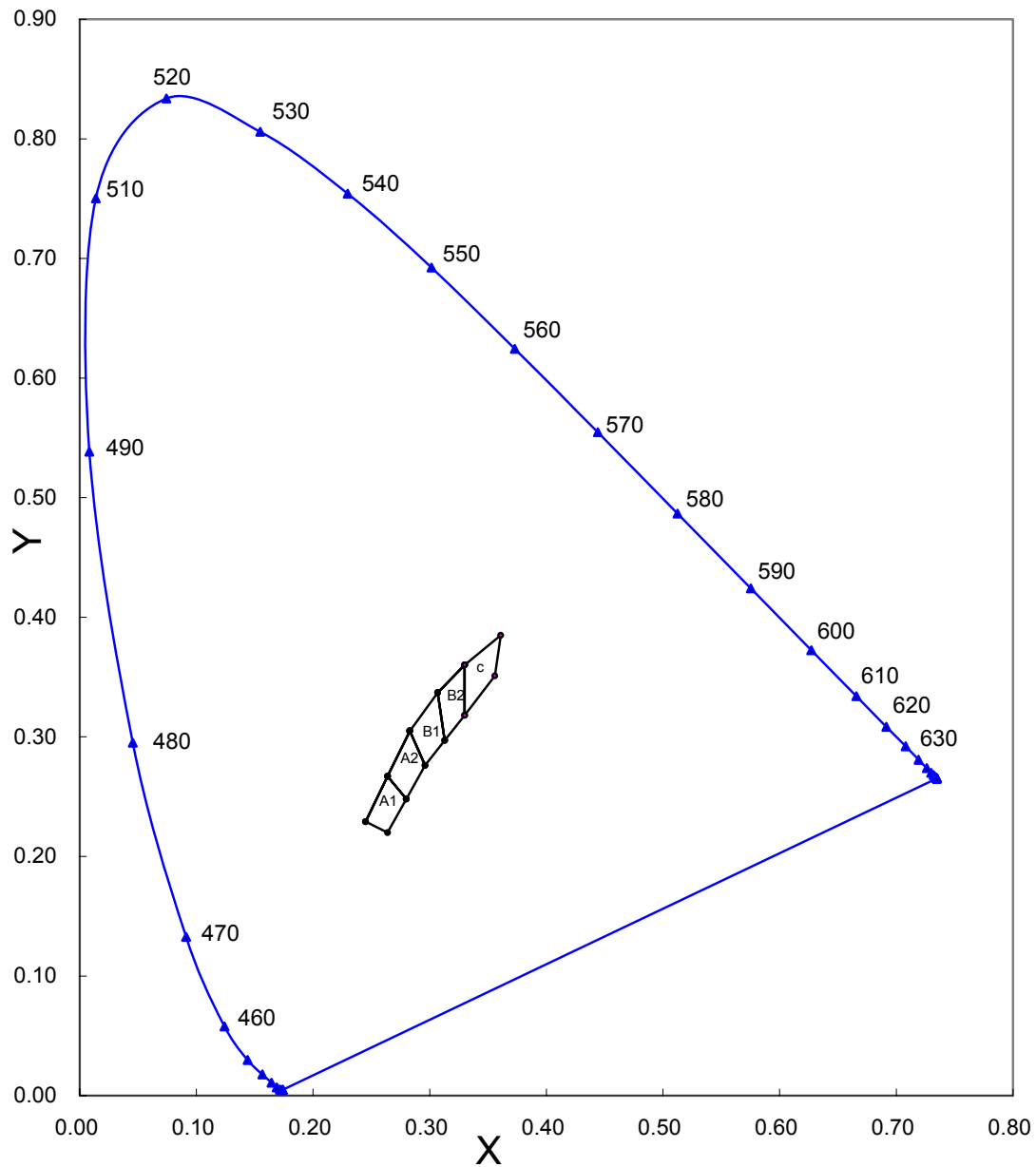
### Forward Voltage ( $V_F$ )

| Rank    | V7        | V8        | V9        | V10       | V11       | V12       | V13       | V14       |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Voltage | 2.8-3.0 V | 3.0-3.2 V | 3.2-3.4 V | 3.4-3.6 V | 3.6-3.8 V | 3.8-4.0 V | 4.0-4.2 V | 4.2-4.4 V |

### Important Notes:

1. All ranks will be included per delivery; rank ratio will be based on the dice distribution.
2. Pb content <1000 ppm.
3. Tolerance of measurement of luminous intensity is  $\pm 15\%$ .
4. Tolerance of measurement of the chromaticity coordinates is  $\pm 0.01$ .
5. Tolerance of measurement of  $V_F$  is  $\pm 0.05 \text{ V}$ .
6. Packaging methods are available for selection; please refer to the "Cree LED Lamp Packaging Standard" document.
7. Please refer to the "Cree LED Lamp Reliability Test Standards" document for reliability test conditions.
8. Please refer to the "Cree LED Lamp Soldering & Handling" document for information about how to use this LED product safely.

## CIE Chromaticity Diagram



## Graphs

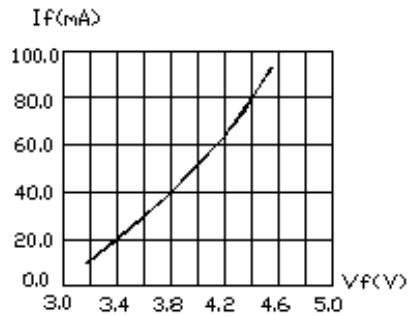


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE

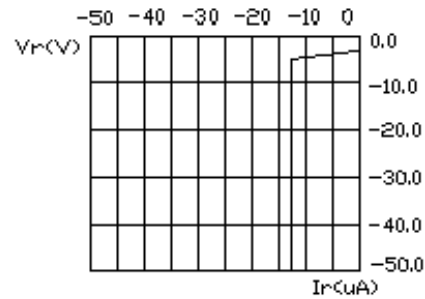


FIG.2 REVERSE CURRENT VS. REVERSE VOLTAGE

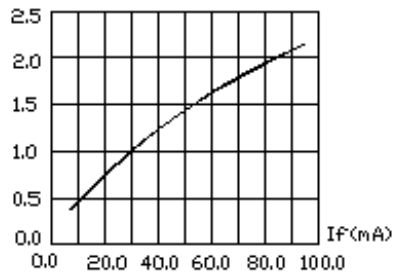


FIG.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

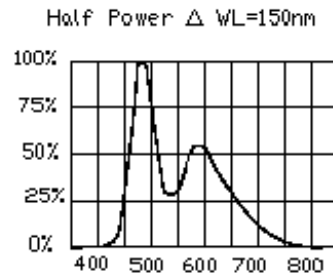


FIG.4 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

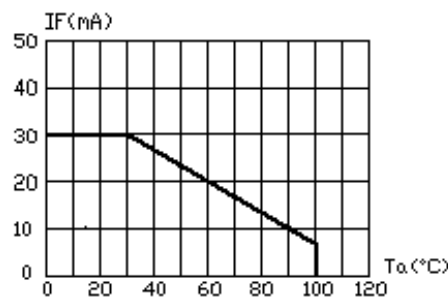


FIG.5 MAXIMUM FORWARD CURRENT VS. AMBIENT TEMPERATURE ( $T_{Jmax}=120^{\circ}$ C)

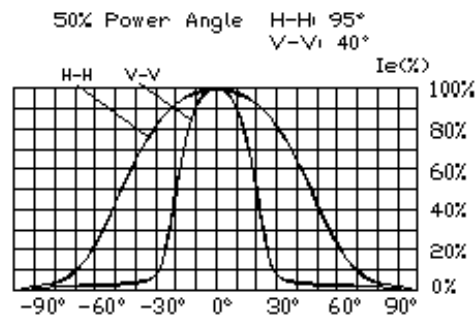


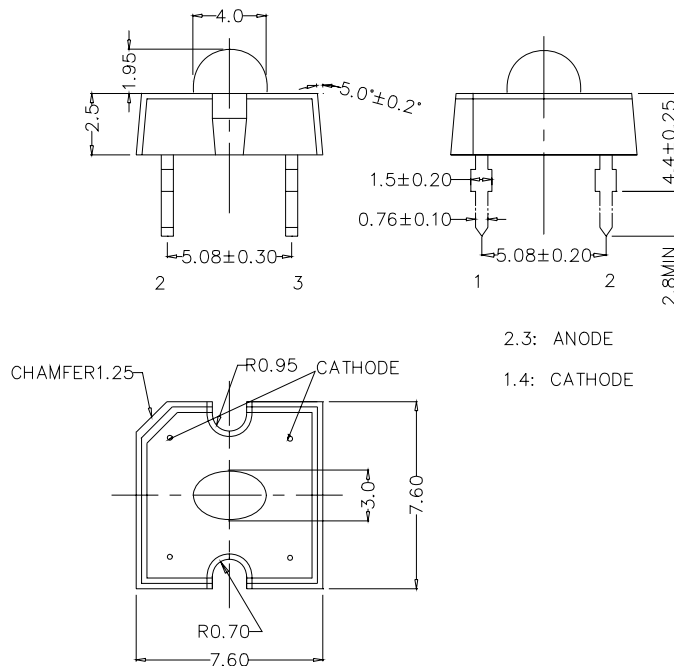
FIG.6 FAR FIELD PATTERN

## Mechanical Dimensions

All dimensions are in mm. Tolerance is  $\pm 0.25$  mm unless otherwise noted.

An epoxy meniscus may extend about 1.5 mm down the leads.

Burr around bottom of epoxy may be 0.5 mm max.



## Notes

### RoHS Compliance

The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended through April 21, 2006.

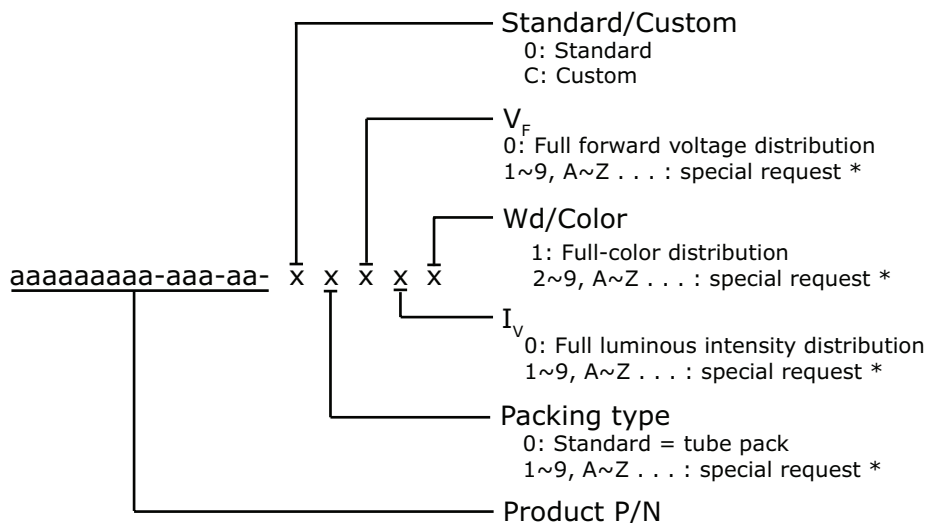
### Vision Advisory Claim

Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.

## Kit Number System

Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness. Sorted LEDs are packaged for shipping in various convenient options. Please refer to the "Cree LED Lamp Packaging Standard" document for more information about shipping and packaging options.

Cree LEDs are sold by order codes in combinations of bins called kits. Order codes are configured in the following manner:



\* Contact your Cree sales representative for ordering information.

## Standard Available Kits\*

| Kit Number          | Description                             |
|---------------------|---|
| LP476PWN1-90G-00001 | P4 90 White, FULL RANK, Tube Pack       |
| LP476PWN1-90G-00002 | P4 90 White\, A1, A2, B1, B2, Tube Pack |

\* Please contact your Cree representative about the availability of non-standard kits.