

# Cree® SMD LED

## Model # LM6-THR1-3B-N1

### Data Sheet

120-degree, 3.3 x 3.5-mm, SMT LED in red color with water-transparent lens and black coated surface

#### Applications

- Indoor and Outdoor Displays
- Backlighting
- Coupling into Light Guides
- RGB Full-Color Displays

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

| Items   | Symbol     | Absolute Maximum Rating<br>R | Unit |
|---|------------|------------------------------|------|
| Forward Current <sup>Note 1</sup>             | $I_F$      | 3 x 50                       | mA   |
| Peak Forward Current <sup>Note 2</sup>        | $I_{FP}$   | 3 x 200                      | mA   |
| Reverse Voltage                               | $V_R$      | 5                            | V    |
| Power Dissipation                             | $P_D$      | 3 x 160                      | mW   |
| Operation Temperature                         | $T_{opr}$  | -40 ~ +100                   | °C   |
| Storage Temperature                           | $T_{stg}$  | -40 ~ +100                   | °C   |
| Junction Temperature                          | $T_J$      | 110                          | °C   |
| Junction/ambient 1 chip on <sup>Note 3</sup>  | $R_{THJA}$ | 450                          | °C/W |
| Junction/ambient 3 chips on <sup>Note 3</sup> | $R_{THJA}$ | 650                          | °C/W |
| Junction/solder point 1 chip on               | $R_{THJS}$ | 300                          | °C/W |
| Junction/solder point 3 chips on              | $R_{THJS}$ | 450                          | °C/W |

#### Notes:

1. Single-color light.
2. Pulse width  $\leq 0.1$  msec, duty  $\leq 1/10$ .
3.  $R_{TH}$  test condition: mounted on PC Board FR 4 (pad size  $\geq 16$  mm<sup>2</sup>)

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

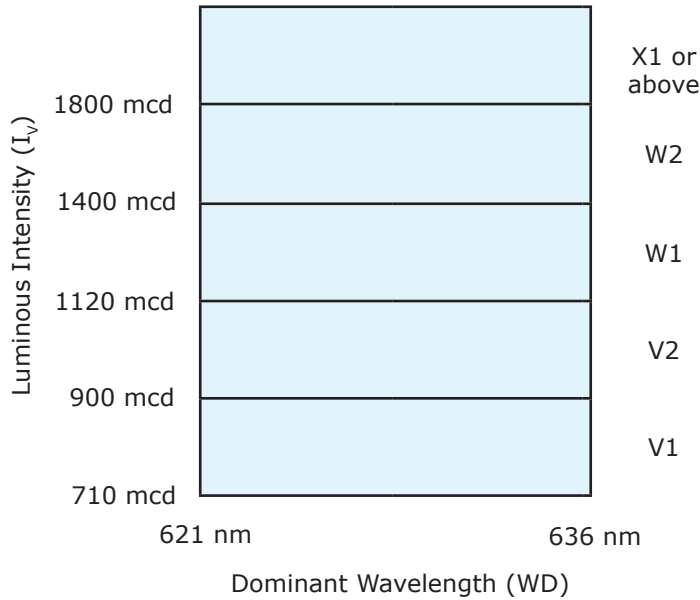
| Characteristics       | Condition              | Symbol          | Minimum | Typical | Maximum | Unit          |
|-----------------------|------------------------|-----------------|---------|---------|---------|---------------|
| Dominant Wavelength   | $I_F = 3 \times 20$ mA | $\lambda_{DOM}$ | 621     | 628     | 636     | nm            |
| Viewing Angle at 50%  | $I_F = 3 \times 20$ mA | $2\theta_{1/2}$ |         | 120     |         | deg           |
| Forward Voltage       | $I_F = 3 \times 20$ mA | $V_F$           |         | 2.5     | 3.2     | V             |
| Luminous Intensity    | $I_F = 3 \times 20$ mA | $I_V$           | 710     | 1100    |         | mcd           |
| Reverse Current (max) | $V_R = 5$ V            | $I_R$           |         |         | 10      | $\mu\text{A}$ |

**Standard Bins for LM6-THR1-3B-N1 ( $I_F = 3 \times 20 \text{ mA}$ )**

Lamps are sorted to luminous intensity ( $I_v$ ) and dominant wavelength ( $\lambda_D$ ) bins shown.

Orders for LM6-THR1-3B-N1 may be filled with any or all bins contained as below.

All luminous intensity ( $I_v$ ) and dominant wavelength ( $\lambda_D$ ) values shown and specified are at  $I_F = 3 \times 20 \text{ mA}$ .



**Important Notes:**

1. All ranks will be included per delivery; rank ratio will be based on the dice distribution.
2. Tolerance of measurement of luminous intensity is  $\pm 10\%$ .
3. Tolerance of measurement of the dominant wavelength is  $\pm 1 \text{ nm}$ .
4. Tolerance of measurement of  $V_F$  is  $\pm 0.05 \text{ V}$ .
5. Packaging methods are available for selection; please refer to the "Cree LED Lamp Packaging Standard" document.
6. Please refer to the "Cree LED Lamp Reliability Test Standards" document for reliability test conditions.
7. Please refer to the "Cree LED Lamp Soldering & Handling" document for information about how to use this LED product safely.

**Graphs**

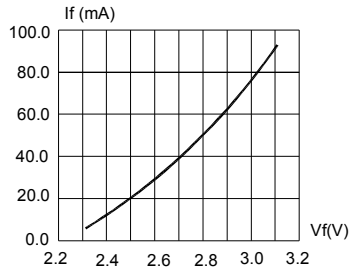


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

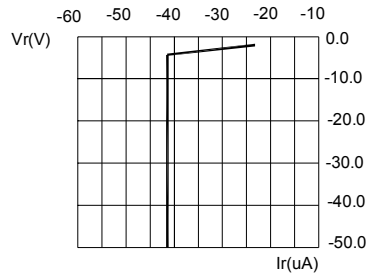


FIG.2 REVERSE CURRENT VS. REVERSE VOLTAGE.

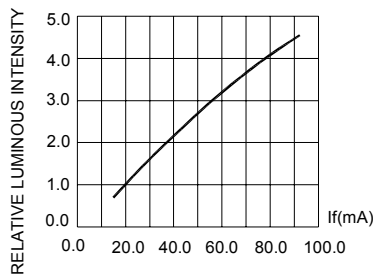


FIG.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

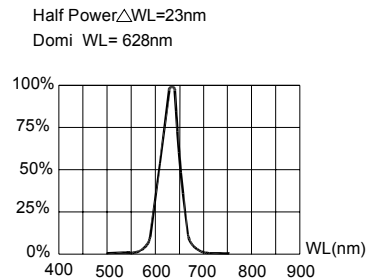


FIG.4 RELATIVE INTENSITY VS. WAVE LENGTH.

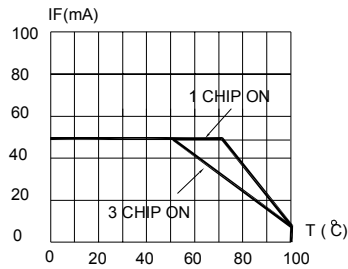


FIG.5 MAXIMUM FORWARD DC CURRENT VS SOLDER POINT TEMPERATURE

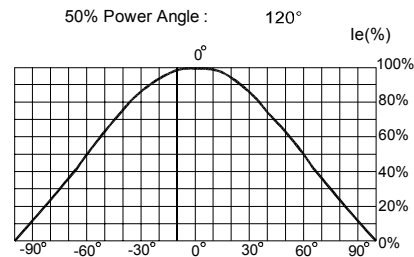


FIG.6 FAR FIELD PATTERN.

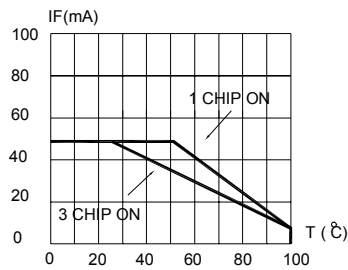
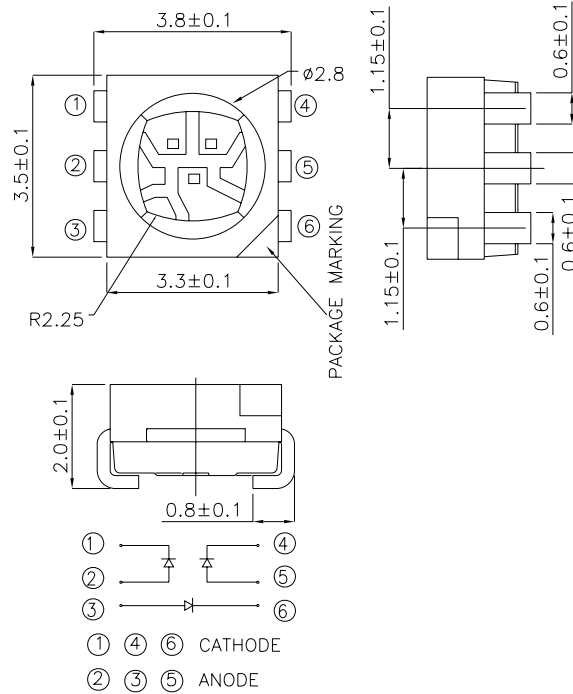


FIG.7 MAXIMUM FORWARD DC CURRENT VS AMBIENT TEMPERATURE

## Mechanical Dimensions

All dimensions are in mm.



## 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.

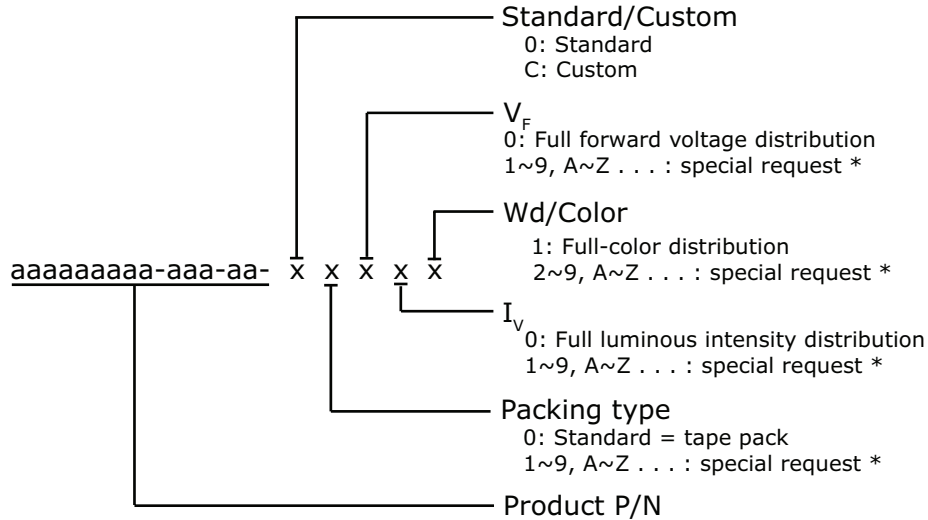
### Vision Advisory Claim

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                                    |
|----------------------|--|
| LM6-THR1-3B-N1-00001 | SMD 120 High Red 628nm, FULL RANK, Tape & Reel |

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