

**$I_V = 500$ mcd, $V_F = 3.0$ V
Surface Mount LED
SEP1WP1446DTA**

Description

The SEP1WP1446DTA is a surface mount white LED. The product includes a protection diode for ESD protection.

Features

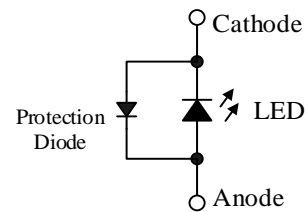
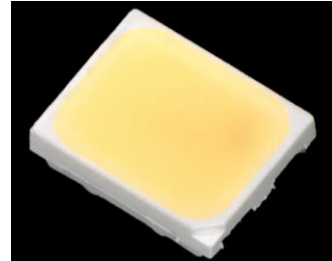
- Color----- White
- Luminous Intensity, I_V ----500 mcd (typ.) ($I_F = 10$ mA)
- Forward Voltage, V_F ----- 3.0 V (typ.) ($I_F = 10$ mA)
- Chromaticity (x, y)----- (0.2900, 0.2815)
- Viewing Angle, $2\theta_{1/2}$ ----- 120 deg
- MSL 3
- RoHS Compliant
- Pb-free, Reflow Soldering
- High Reliability

Applications

- Automotive Interior
- Switch
- Indicator

Package

Dimensions (L × W × H): 3.5 × 2.8 × 1.2 mm



Not to scale

SEP1WP1446DTA

Absolute Maximum Ratings

Unless specifically noted, $T_A = 25\text{ }^\circ\text{C}$.

| Parameter | Symbol | Conditions | Rating | Unit |
|---------------------------|--------------|--|------------|----------------------|
| Power Dissipation | P_D | | 108 | mW |
| Forward Current | I_F | | 30 | mA |
| Forward Current Reduction | ΔI_F | $T_A \geq 85\text{ }^\circ\text{C}$ | -0.8 | mA/ $^\circ\text{C}$ |
| Pulse Forward Current | I_{FP} | Frequency = 1 kHz Pulse Width $\leq 100\text{ }\mu\text{s}$ | 70 | mA |
| Reverse Current | I_R | | 10 | mA |
| Operating Temperature | T_{OP} | | -40 to 110 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | | -40 to 110 | $^\circ\text{C}$ |
| Junction Temperature | T_J | | 120 | $^\circ\text{C}$ |

Electrical / Optical Characteristics

Unless specifically noted, $T_A = 25\text{ }^\circ\text{C}$.

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--------------------|------------------|----------------------|------|--------|------|---------------------------|
| Forward Voltage | V_F | $I_F = 10\text{ mA}$ | — | 3.0 | 3.6 | V |
| Reverse Voltage | V_R | $I_R = 1\text{ mA}$ | — | 0.8 | — | V |
| Luminous Intensity | I_V | $I_F = 10\text{ mA}$ | 372 | 500 | 671 | mcd |
| Chromaticity | x | $I_F = 10\text{ mA}$ | — | 0.2900 | — | — |
| | y | | — | 0.2815 | — | — |
| Viewing Angle | $2\theta_{1/2}$ | $I_F = 10\text{ mA}$ | — | 120 | — | deg |
| Thermal Resistance | $\theta_{(J-A)}$ | | — | 200 | — | $^\circ\text{C}/\text{W}$ |

Mechanical Characteristics

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------------|------------|------|--------|------|------|
| Package Weight | | — | 0.0252 | — | g |

Luminous Intensity Bins

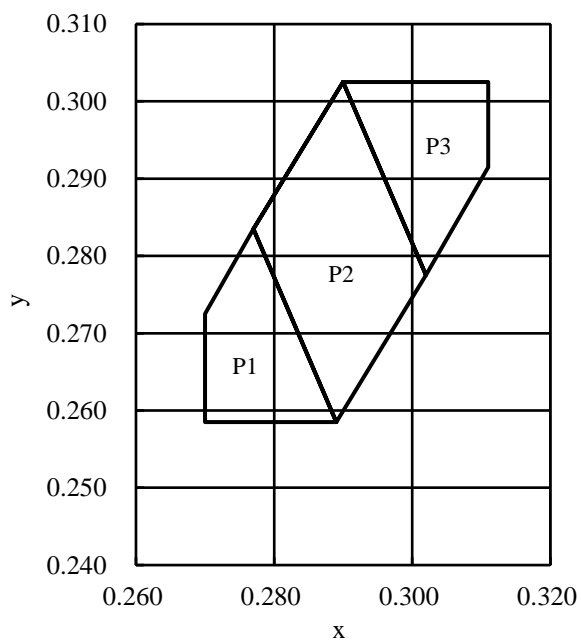
The values have a tolerance of $\pm 20\%$.

| Bin Number | Luminous Intensity Range | Unit |
|------------|--------------------------|------|
| C | 372 to 500 | mcd |
| D | 500 to 671 | mcd |

Chromaticity Bins

The values have a tolerance of ± 0.01 .

| Bin Number | x | y |
|------------|--------|--------|
| P1 | 0.2770 | 0.2835 |
| | 0.2700 | 0.2725 |
| | 0.2700 | 0.2585 |
| | 0.2890 | 0.2585 |
| P2 | 0.2900 | 0.3025 |
| | 0.2770 | 0.2835 |
| | 0.2890 | 0.2585 |
| | 0.3020 | 0.2775 |
| P3 | 0.2900 | 0.3025 |
| | 0.3110 | 0.3025 |
| | 0.3110 | 0.2915 |
| | 0.3020 | 0.2775 |



Derating Curves

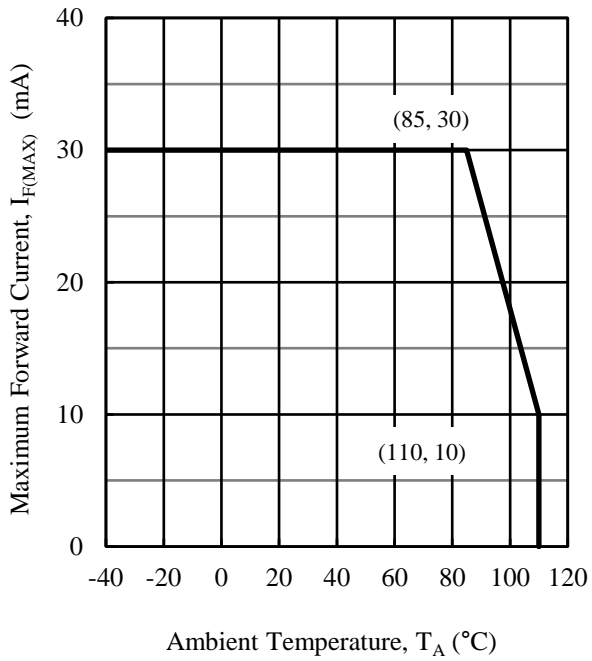


Figure 1. $I_{F(MAX)}$ vs. T_A

Characteristic Curves

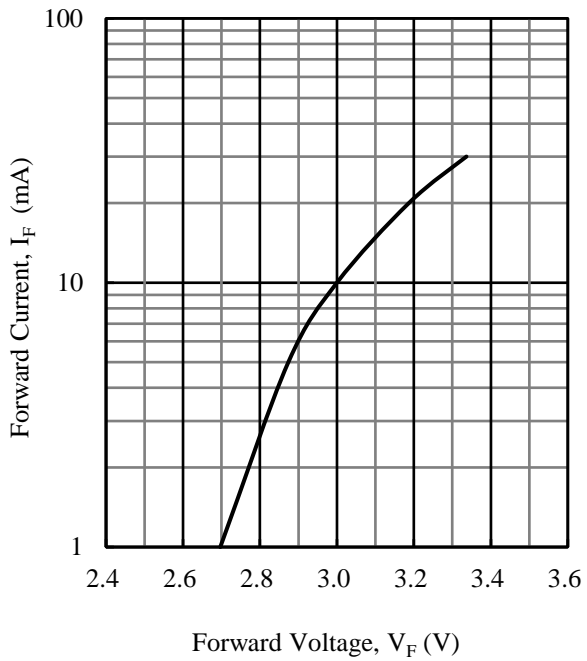


Figure 2. I_F vs. V_F

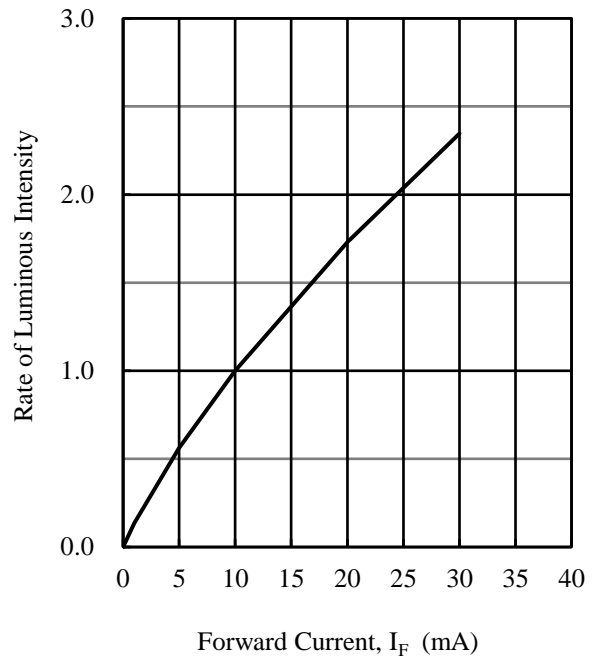


Figure 3. Rate of Luminous Intensity vs. I_F

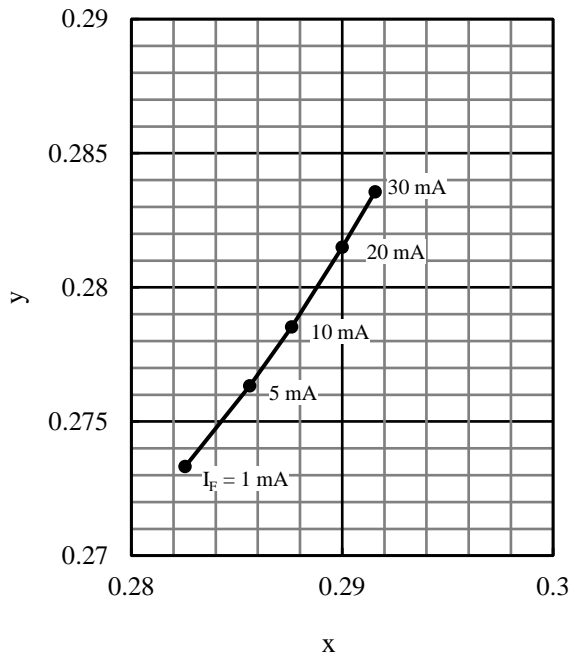


Figure 4. I_F vs. Chromaticity

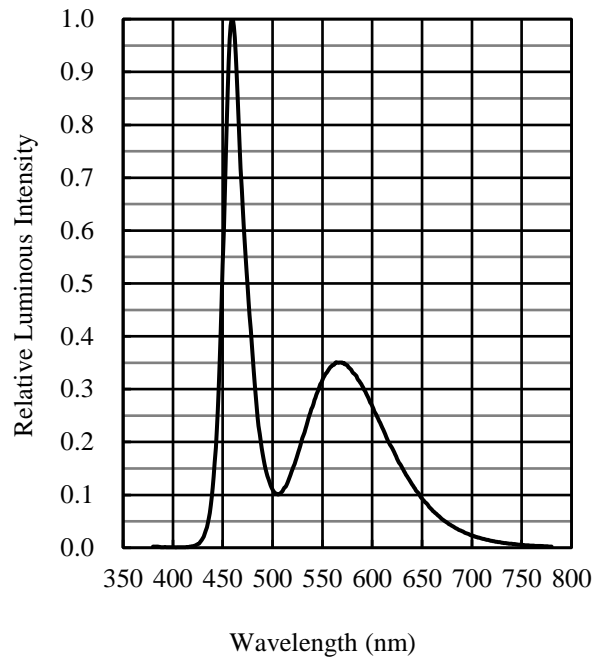


Figure 5. Spectrum

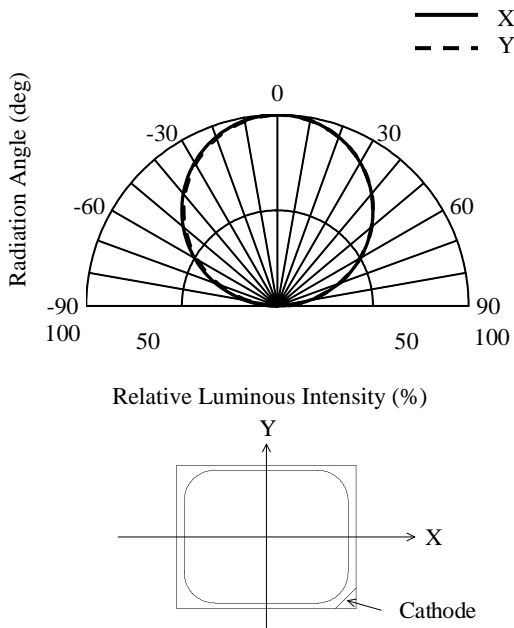
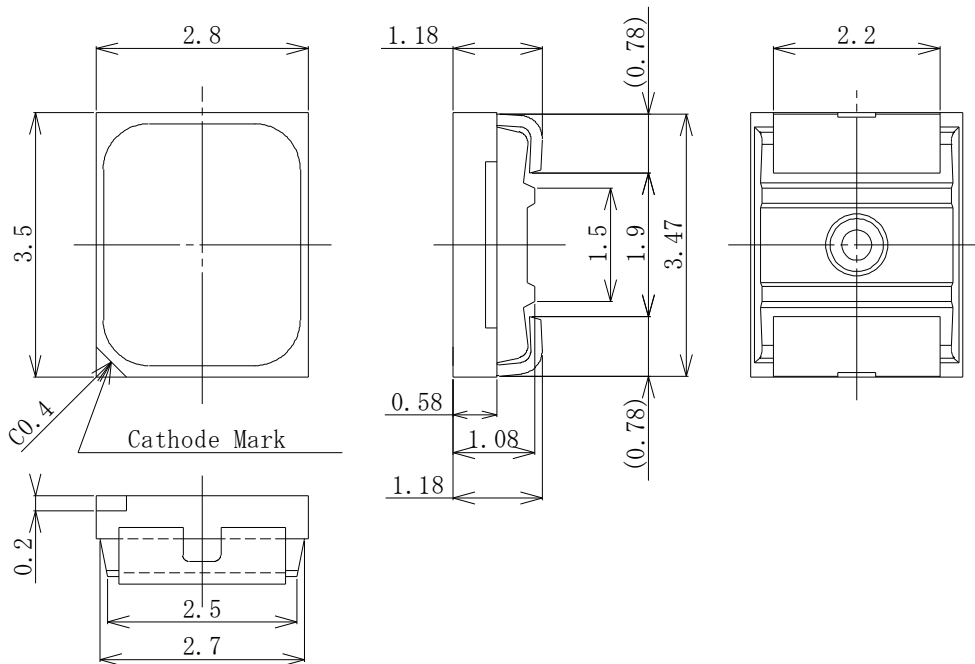


Figure 6. Directivity

SEP1WP1446DTA

Physical Dimensions

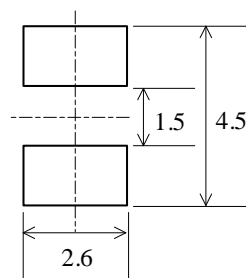
- Surface Mount (3.5 × 2.8 × 1.2 mm)



NOTES:

- Dimensions in millimeters
- Unless specifically noted, tolerance is ± 0.2 .
- RoHS compliant
- MSL 3 (Moisture Sensitivity Level 3)

- Land Pattern Example



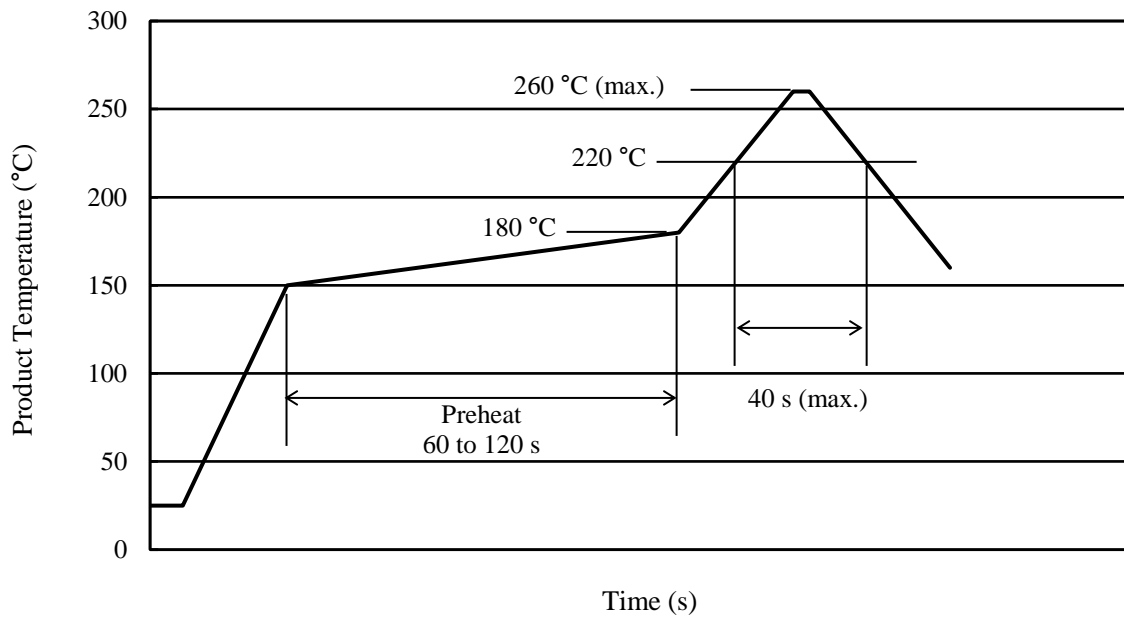
Unit: mm

Soldering Conditions

When soldering the products, it is required to minimize the working time within the following limits:

- Reflow:
 - Preheat: 150 to 180 °C / 60 to 120 s
 - Solder heating: 220 °C / 40 s (260 °C peak, 2 times)
- Soldering iron: 350 ±10 °C / 3 s, 1 time

● Reference Reflow Profile

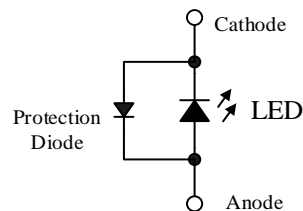


Precautions for Use

• Measures for Electrostatic Discharge (ESD)

In general, InGaN-based elements such as blue LEDs are very sensitive to ESD. For enhanced ESD withstand capability, this product is designed to include a surge protection diode as shown in the figure below. Therefore, the following ESD withstand capabilities are ensured: ≥ 200 V on machine model ($C = 200$ pF, $R = 0 \Omega$), and ≥ 2000 V on human body model ($C = 100$ pF, $R = 1.5$ k Ω). Note that, however, all the values mentioned above are not guaranteed.

When using the product, care should be taken not to apply a voltage in the opposite direction of the LED. If a voltage is applied in the opposite direction of the LED, the surge protection diode becomes conductive, and then an unintended current may flow through the set.



• Other

- After soldering the product, care should be taken not to apply mechanical stress or excessive vibration until it cools to room temperature.
- Do not cool the product rapidly.
- When mounting the product on a board, mounting position and orientation should be taken into account so that any stress due to board warpage is not applied to the product.
- Do not touch the encapsulating resin of the product with sharp objects such as a tweezer or fingernails. Also, do not use the product again after removal.
- Do not touch the product after mounting it on a board.
- The product emits a high-power light. Therefore, care should be taken not to look at the light emission directly for a long time because it may hurt your eyes.
- Use the product at rated current (sorting current) as much as possible. When the product is used at a current lower than the rated current (sorting current), a variation in forward voltage or luminous intensity may increase. Therefore, care should be taken for such variation when you use the product at low current.
- When the product comes into contact with material containing sulfide or is exposed to an atmosphere containing sulfide gas, the following may be caused: discoloration in the silver plating of the metal parts inside and outside the package; change in the brightness and tint of the original luminescent color.

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