

$I_V = 3100 \text{ mcd}$, $V_F = 2.9 \text{ V}$
Ultra-high Brightness, Surface Mount LED
SEP1E1L21DA



Preliminary

Data Sheet

Description

The SEP1E1L21DA is a surface mount blue LED. The product includes a protection diode for ESD protection.

Features

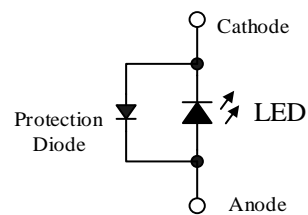
- Color -----Blue
- Luminous Intensity, I_V -3100 mcd (typ.) ($I_F = 100 \text{ mA}$)
- Forward Voltage, V_F -----2.9 V (typ.) ($I_F = 100 \text{ mA}$)
- Dominant Wavelength, λ_D ----- 470 nm
- Viewing Angle, $2\theta_{1/2}$ ----- 120
- MSL 3
- RoHS Compliant
- Pb-free, Reflow Soldering
- High Reliability

Applications

- Automotive Interior
- Switch
- Indicator

Package

Dimensions (L × W × H): 2.8 × 3.5 × 0.7 mm



Not to scale

Absolute Maximum RatingsUnless specifically noted, $T_A = 25\text{ }^{\circ}\text{C}$.

Parameter	Symbol	Conditions	Rating	Unit
Power Dissipation	P_D		540	mW
Forward Current	I_F		150	mA
Pulse Forward Current	I_{FP}	Frequency = 1 kHz Pulse Width $\leq 100\text{ }\mu\text{s}$	TBD	mA
Reverse Current	I_R		10	mA
Operating Temperature	T_{OP}		-40 to 100	$^{\circ}\text{C}$
Storage Temperature	T_{STG}		-40 to 100	$^{\circ}\text{C}$
Junction Temperature	T_J		150	$^{\circ}\text{C}$
Thermal Resistance	$\theta_{(J-A)}$		80	$^{\circ}\text{C}/\text{W}$
	$\theta_{(J-S)}$		25	$^{\circ}\text{C}/\text{W}$

Electrical / Optical CharacteristicsUnless specifically noted, $T_A = 25\text{ }^{\circ}\text{C}$.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$I_F = 100\text{ mA}$	2.4	2.9	3.6	V
Reverse Voltage	V_R	$I_R = 1\text{ mA}$	—	0.8	—	V
Luminous Intensity	I_V	$I_F = 100\text{ mA}$	2192	3100	4383	mcd
Dominant Wavelength	λ_D	$I_F = 100\text{ mA}$	465	470	475	nm
Viewing Angle	$2\theta_{1/2}$	$I_F = 100\text{ mA}$	—	120	—	deg

Mechanical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Package Weight		—	0.0214	—	g

Luminous Intensity Bins

The values have a tolerance of $\pm 10\%$.

Bin Number	Luminous Intensity Range	Unit
C	2192 to 3100	mcd
D	3100 to 4383	mcd

Wavelength Bins

The values have a tolerance of ± 1 nm.

Bin Number	Wavelength Range	Unit
B	465 to 470	nm
G	470 to 475	nm

Derating Curves

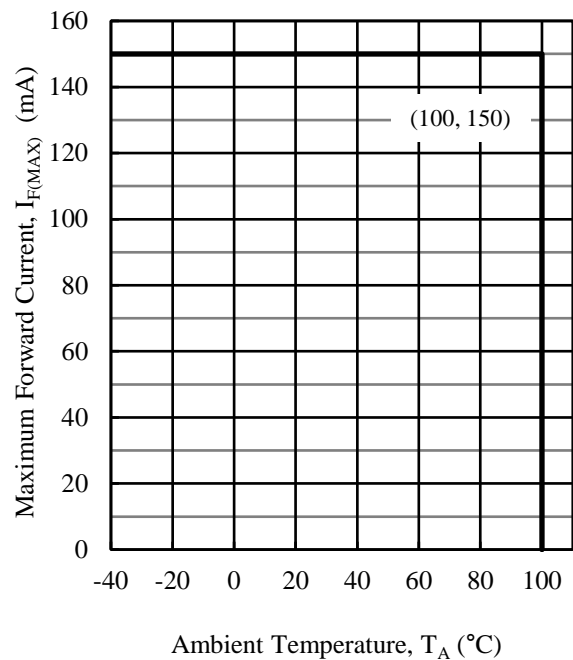


Figure 1. $I_{F(MAX)}$ vs. T_A

Characteristic Curves

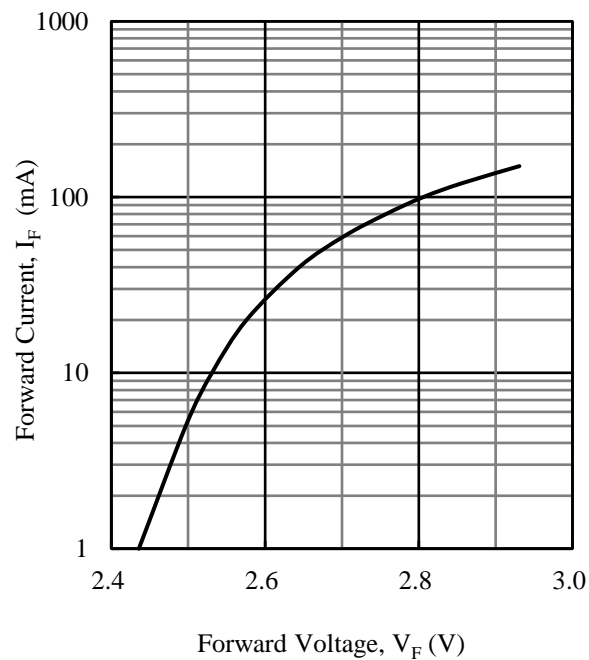


Figure 2. I_F vs. V_F

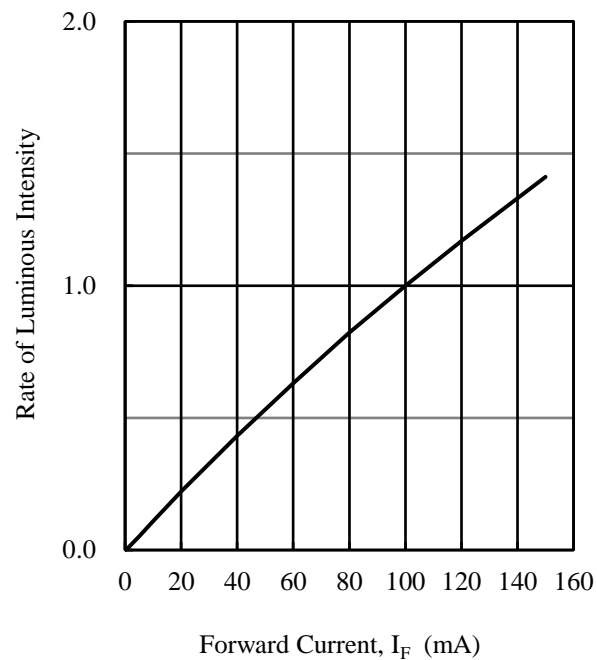


Figure 3. Rate of Luminous Intensity vs. I_F

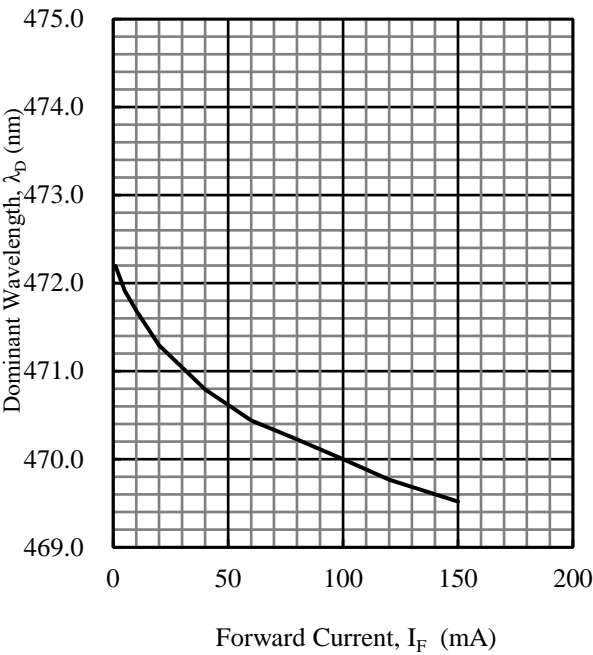


Figure 4. λ_D vs. I_F

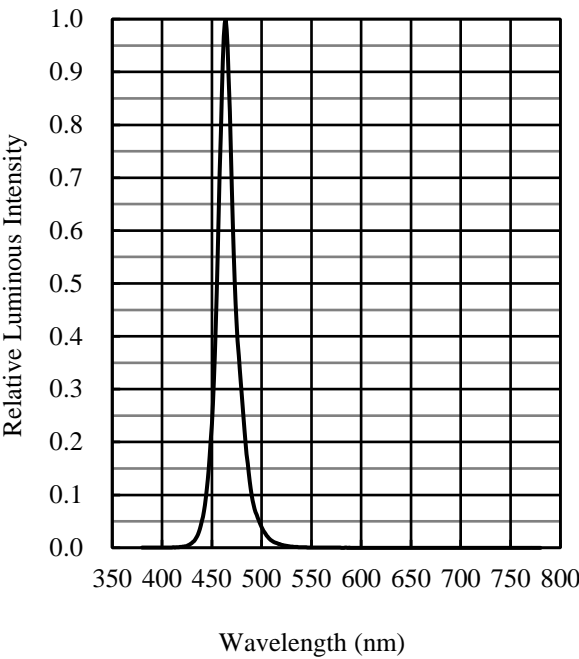


Figure 5. V_F vs. T_A

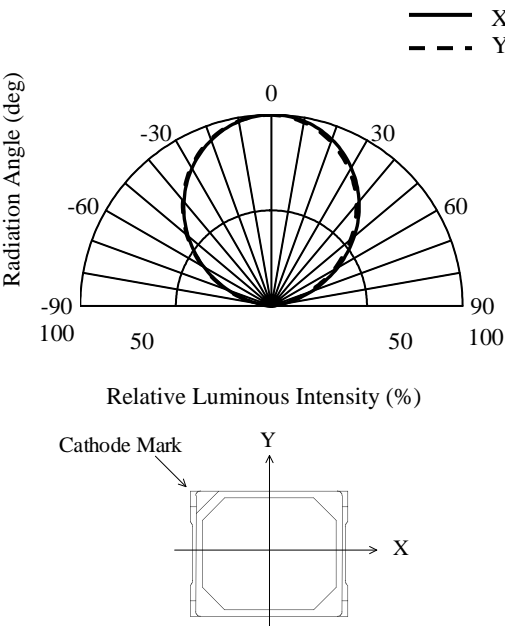


Figure 6. Directivity

Technical drawings of a cathode and anode assembly. The top left drawing shows a top view of the cathode with dimensions 2.8, 3.25, and 3.5. The top right drawing shows a side view of the cathode with dimensions 0.2 and 0.55. The bottom left drawing shows a top view of the anode with dimensions 0.7 and 0.25. The bottom right drawing shows a side view of the anode with dimensions 2.1, 1.8, (2.01), and (0.94). Labels 'Cathode Mark', 'Cathode', and 'Anode' are present.

- Dimensions in millimeters
- Tolerance: ± 0.2 mm
- All the values in parentheses are reference dimensions.
- Pb-free (RoHS compliant)
- MSL 3 (Moisture Sensitivity Level 3)

Technical drawing of a stepped block. The dimensions are as follows:

- Top horizontal edge: 2.1
- Left vertical edge (total height): 2.085
- Left vertical edge (bottom section height): 1.015
- Right vertical edge (top section height): 0.26
- Right vertical edge (bottom section height): 0.81

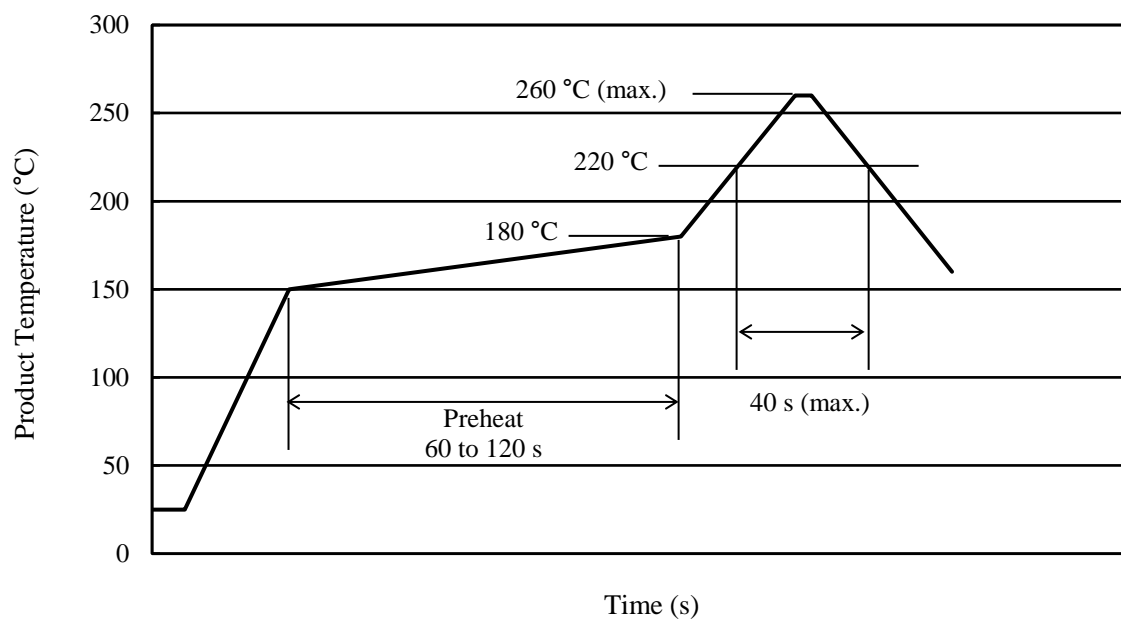
Unit: mm

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

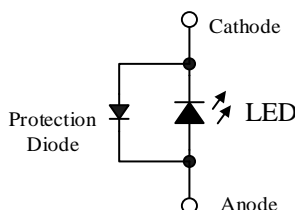


Precautions for Use

• 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.

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