



## AA4040SF4S-P22

4.0 x 4.0 mm Infrared Emitting Diode

### DESCRIPTION

- SF4 Made with Gallium Aluminum Arsenide Infrared Emitting diodes

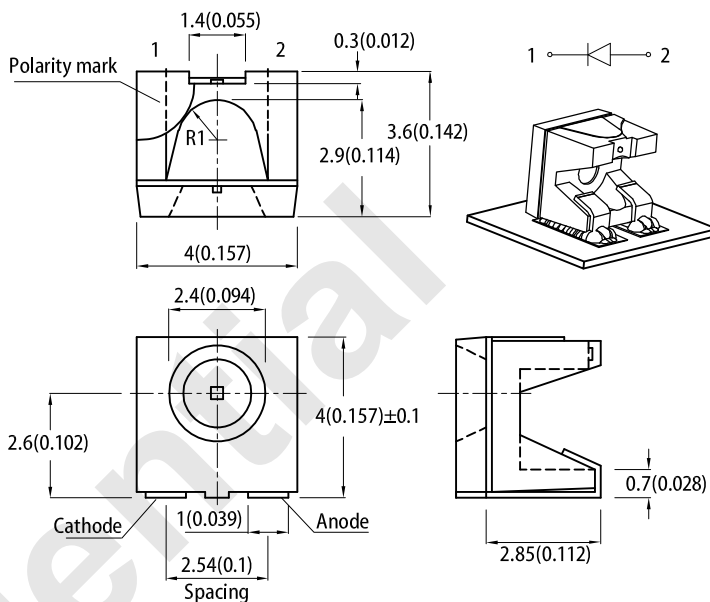
### FEATURES

- Suitable for all SMD assembly and solder process
- Mechanically and spectrally matched to the phototransistor
- Available on tape and reel
- Moisture sensitivity level: 3
- Package: 500 pcs / reel
- RoHS compliant

### APPLICATIONS

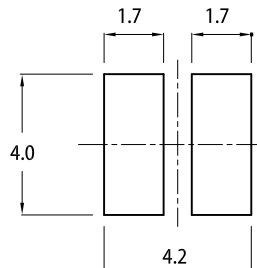
- Infrared Illumination for cameras
- Machine vision systems
- Surveillance systems
- Industrial electronics
- IR data transmission
- Remote control

### PACKAGE DIMENSIONS



### RECOMMENDED SOLDERING PATTERN

(units : mm; tolerance :  $\pm 0.1$ )



#### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.25(0.01)$  unless otherwise noted.
3. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.
4. The device has a single mounting surface. The device must be mounted according to the specifications.

### SELECTION GUIDE

| Part Number    | Emitting Color (Material) | Lens Type   | Po (mW/sr) @ 20mA <sup>[2]</sup> |      | Viewing Angle <sup>[1]</sup> |
|----------------|---------------------------|-------------|----------------------------------|------|------------------------------|
|                |                           |             | Min.                             | Typ. | 2 $\theta$ 1/2               |
| AA4040SF4S-P22 | Infrared (GaAlAs)         | Water Clear | 1.2                              | 2.5  | 120°                         |

#### Notes:

1.  $\theta$ 1/2 is the angle from optical centerline where the luminous intensity is 1/2 of the optical peak value.
2. Radiant Intensity / luminous flux:  $\pm 15\%$ .
3. Radiant intensity value is traceable to CIE127-2007 standards.

**ELECTRICAL / OPTICAL CHARACTERISTICS at T<sub>A</sub>=25°C**

| Parameter  | Symbol                        | Emitting Color | Value |      | Unit  |
|--|-------------------------------|----------------|-------|------|-------|
|  |                               |                | Typ.  | Max. |       |
| Wavelength at Peak Emission I <sub>F</sub> = 20mA                                    | λ <sub>peak</sub>             | Infrared       | 880   | -    | nm    |
| Spectral Bandwidth at 50% Φ REL MAX<br>I <sub>F</sub> = 20mA                         | Δλ                            | Infrared       | 50    | -    | nm    |
| Capacitance  | C                             | Infrared       | 90    | -    | pF    |
| Forward Voltage I <sub>F</sub> = 20mA  | V <sub>F</sub> <sup>[1]</sup> | Infrared       | 1.3   | 1.6  | V     |
| Reverse Current (V <sub>R</sub> = 5V)  | I <sub>R</sub>                | Infrared       | -     | 10   | uA    |
| Temperature Coefficient of Wavelength<br>I <sub>F</sub> = 20mA, -10°C ≤ T ≤ 85°C     | TC <sub>λ</sub>               | Infrared       | 0.3   | -    | nm/°C |
| Temperature Coefficient of V <sub>F</sub><br>I <sub>F</sub> = 20mA, -10°C ≤ T ≤ 85°C | TC <sub>V</sub>               | Infrared       | -1.3  | -    | mV/°C |

## Notes:

1. Forward voltage: ±0.1V.
2. Wavelength value is traceable to CIE127-2007 standards.
3. Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

**ABSOLUTE MAXIMUM RATINGS at T<sub>A</sub>=25°C**

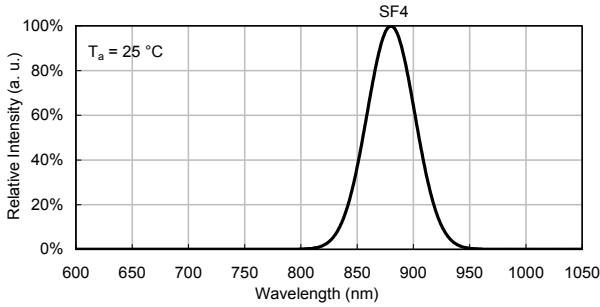
| Parameter                                    | Symbol                            | Value      | Unit |
|--|-----------------------------------|------------|------|
| Power Dissipation                            | P <sub>D</sub>                    | 85         | mW   |
| Reverse Voltage                              | V <sub>R</sub>                    | 5          | V    |
| Junction Temperature                         | T <sub>j</sub>                    | 125        | °C   |
| Operating Temperature                        | T <sub>op</sub>                   | -40 to +85 | °C   |
| Storage Temperature                          | T <sub>stg</sub>                  | -40 to +85 | °C   |
| DC Forward Current                           | I <sub>F</sub>                    | 50         | mA   |
| Peak Forward Current                         | I <sub>FM</sub> <sup>[1]</sup>    | 1200       | mA   |
| Electrostatic Discharge Threshold (HBM)      | -                                 | 8000       | V    |
| Thermal Resistance (Junction / Ambient)      | R <sub>th JA</sub> <sup>[2]</sup> | 250        | °C/W |
| Thermal Resistance (Junction / Solder point) | R <sub>th JS</sub> <sup>[2]</sup> | 135        | °C/W |

## Notes:

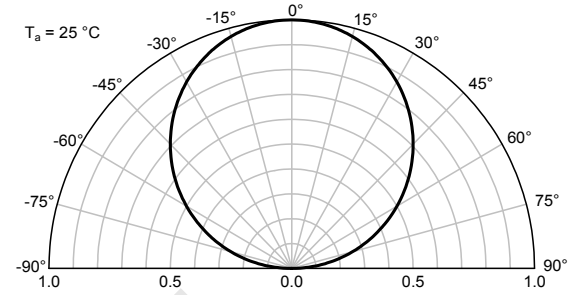
1. 1/100 Duty Cycle, 10μs Pulse Width.
2. R<sub>th JA</sub>, R<sub>th JS</sub> Results from mounting on PC board FR4 (pad size ≥ 16 mm<sup>2</sup> per pad).
3. Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.

## TECHNICAL DATA

### RELATIVE INTENSITY vs. WAVELENGTH

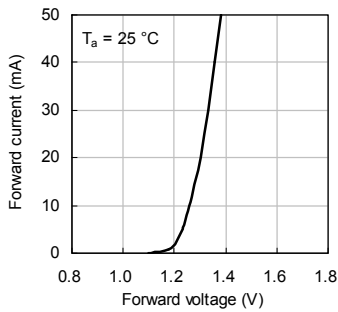


### SPATIAL DISTRIBUTION

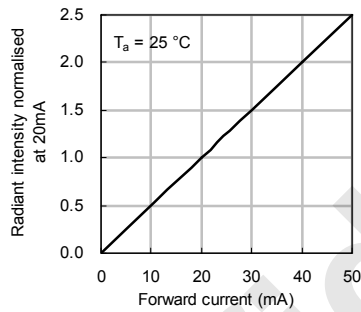


## INFRARED

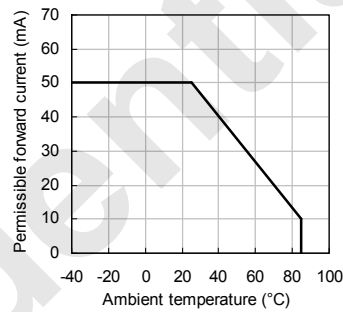
Forward Current vs. Forward Voltage



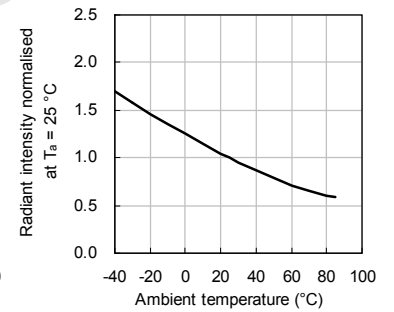
Radiant Intensity vs. Forward Current



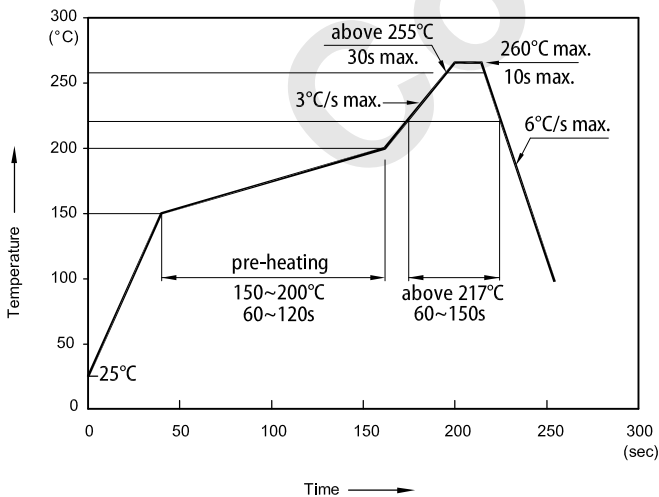
Forward Current Derating Curve



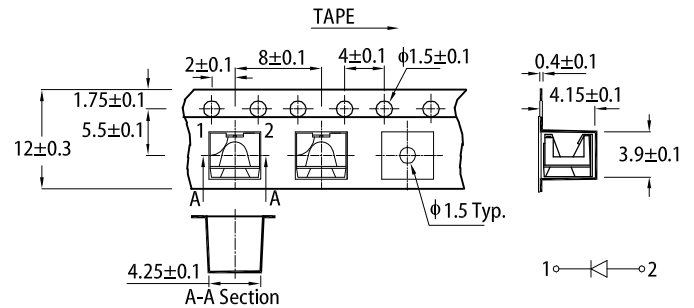
Radiant Intensity vs. Ambient Temperature



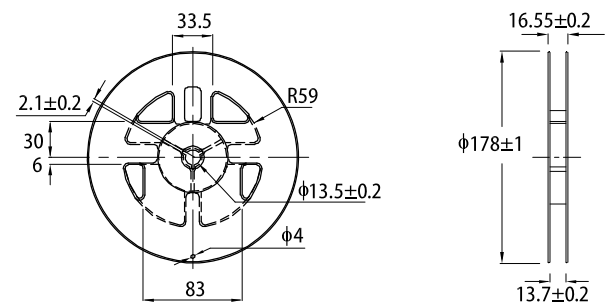
### REFLOW SOLDERING PROFILE for LEAD-FREE SMD PROCESS



### TAPE SPECIFICATIONS (units : mm)

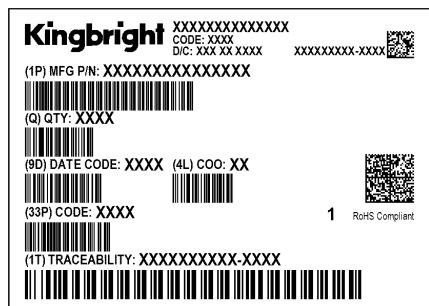
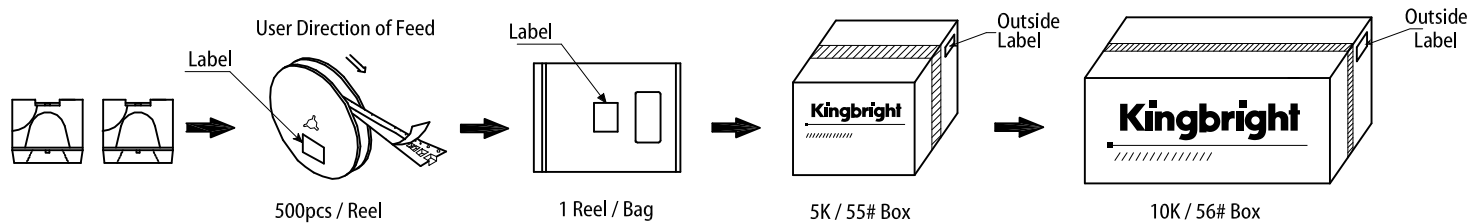


### REEL DIMENSION (units : mm)



- Notes:
1. Don't cause stress to the LEDs while it is exposed to high temperature.
  2. The maximum number of reflow soldering passes is 2 times.
  3. Reflow soldering is recommended. Other soldering methods are not recommended as they might cause damage to the product.

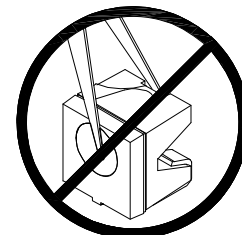
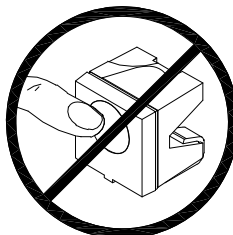
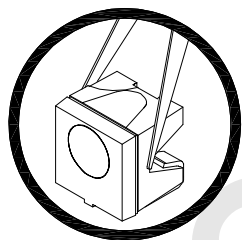
## PACKING & LABEL SPECIFICATIONS



## HANDLING PRECAUTIONS

Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force. As a result, special handling precautions need to be observed during assembly using silicone encapsulated LED products. Failure to comply might lead to damage and premature failure of the LED.

1. Handle the component along the side surfaces by using forceps or appropriate tools.
2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry.



3. As silicone encapsulation is permeable to gases, some corrosive substances such as H<sub>2</sub>S might corrode silver plating of lead frame. Special care should be taken if an LED with silicone encapsulation is to be used near such substances.

## PRECAUTIONARY NOTES

1. The information included in this document reflects representative usage scenarios and is intended for technical reference only.
2. The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
3. When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Kingbright will not be responsible for any subsequent issues.
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