

# LIGHT EMITTING DIODE SPECIFICATION

## Revise History

| Rev. | Descriptions | Date       | Page |
|------|--------------|------------|------|
| 1.0  | -            | 23-10-2017 | -    |
| 2.0  | Renew form   | 15-12-2018 | -    |
| 2.1  | Renew form   | 10-11-2020 | -    |
| 2.2  | Renew form   | 27-12-2023 | -    |
|      |              |            |      |
|      |              |            |      |



## Features:

- Long operating life
- Low Power Consumption
- Low voltage DC operated
- RoHS Compliant
- Anti-ultraviolet Packaging

## Application:

- Optoelectronic switch.
- IR Touch-Panel.
- Industrial IR equipment.
- Consumer Electronics.
- High Speed IR Communications.

| Part Number         | Dice Material | Emitted Color | Lens Color  |
|---------------------|---------------|---------------|-------------|
| IE-2835IR-HB-CE-0.7 | GaAlAs        | Infrared      | Water Clear |

## Electro-Optical Characteristics (Ta=25℃)

| Parameter                       | Symbol           | Min. | Typ. | Max. | Unit  | Test Condition |
|---------------------------------|------------------|------|------|------|-------|----------------|
| Radiant Intensity <sup>*1</sup> | Ee               | 40.0 | 45.0 | -    | mw/sr | IF=60mA        |
| Radiation Bandwidth             | $\Delta\lambda$  | -    | 35   | -    | nm    |                |
| Forward Voltage                 | VF               | 1.10 | -    | 1.60 | V     |                |
| Peak Wavelength <sup>*3</sup>   | $\lambda_p$      | 845  | 850  | 855  | nm    |                |
| Viewing Angle <sup>*2</sup>     | 2 $\theta_{1/2}$ | -    | 120  | -    | deg   |                |
| Reverse Current                 | IR               | -    | -    | 10   | uA    | VR=5V          |

Notes:

1. Radiant Intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
2.  $\theta_{1/2}$  is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The peak wavelength ( $\lambda_p$ ) is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

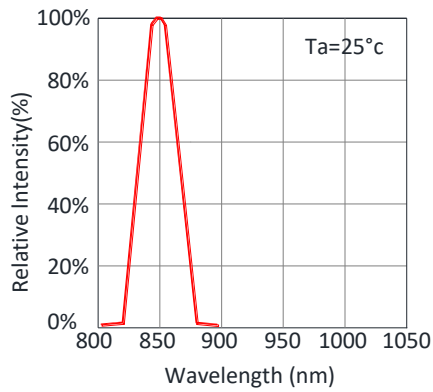
## Absolute Maximum Ratings (Ta=25℃)

| Parameter                          | Symbol | Max.           | Unit |
|------------------------------------|--------|----------------|------|
| Power Dissipation                  | Pd     | 160            | mW   |
| Peak Forward Current <sup>*1</sup> | IFP    | 1000           | mA   |
| Forward Current <sup>*2</sup>      | IF     | 100            | mA   |
| Reverse Voltage                    | VR     | 5              | v    |
| Operating Temperature Range        | Topr   | -40to+85       | °C   |
| Storage Temperature Range          | Tstg   | -40to+85       | °C   |
| Reflow Soldering                   | Tsld   | 260℃ for 5secs |      |

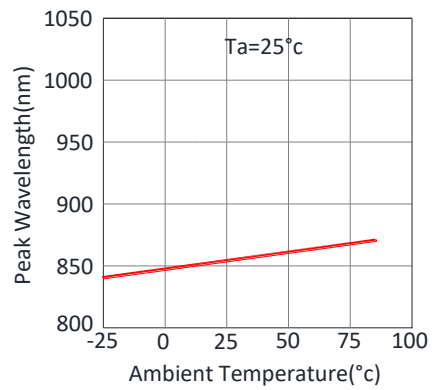
Notes: 1. Derate linearly as shown in derating curve. 2. Duty Factor = 10%, Frequency = 1 kHz

## Optical & Electrical Characteristics

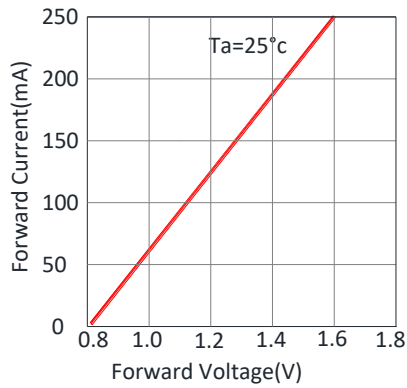
Relative Intensity vs.Wavelength



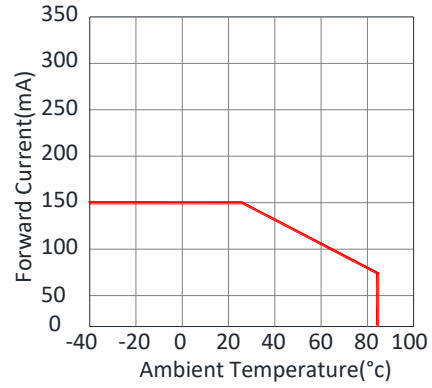
Peak Wavelength vs.Ambient Temperature(°C)



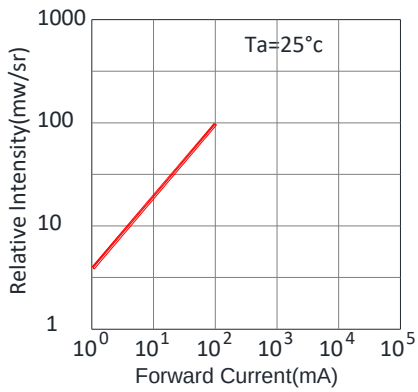
Forward Current vs.Forward Voltage



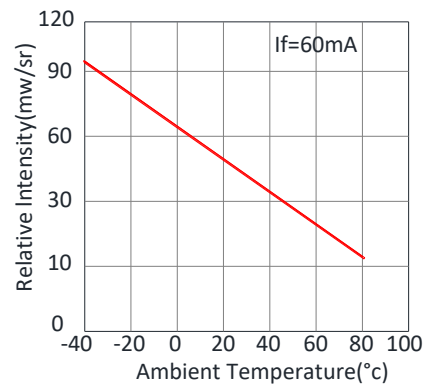
Forward Current vs.Ambient Temperature



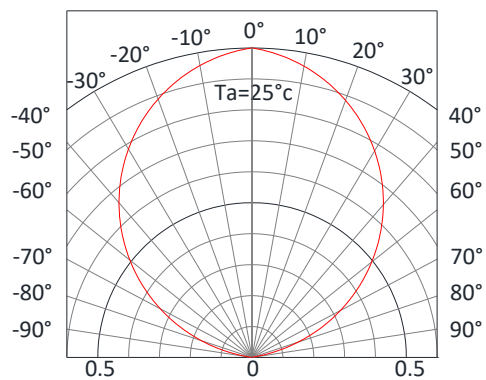
Relative Intensity vs.Forward Current



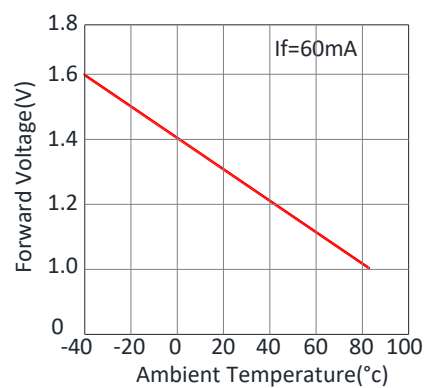
Relative Intensity vs.Ambient Temperature



Radiation Pattern



Forward Voltage vs.Ambient Temperature



## Bin Limits

Radiant Intensity(Unit:mW/sr)

| Bin Code | Min  | Max  | Condition |
|----------|------|------|-----------|
| 1        | 40.0 | 50.0 | IF=60mA   |
| 2        | 50.0 | 60.0 |           |
| 3        | -    | -    |           |
| 4        | -    | -    |           |
| 5        | -    | -    |           |

Bin Range Of Forward Voltage (Unit:V)

| Bin Code | Min | Max | Condition |
|----------|-----|-----|-----------|
| V1       | 1.1 | 1.2 | IF=60mA   |
| V2       | 1.2 | 1.3 |           |
| V3       | 1.3 | 1.4 |           |
| V4       | 1.4 | 1.5 |           |
| V5       | 1.5 | 1.6 |           |

Notes:

1.Radiant Intensity measurement tolerance:  $\pm 10\%$ .

2.Forward voltage measurement tolerance:  $\pm 0.1V$ .

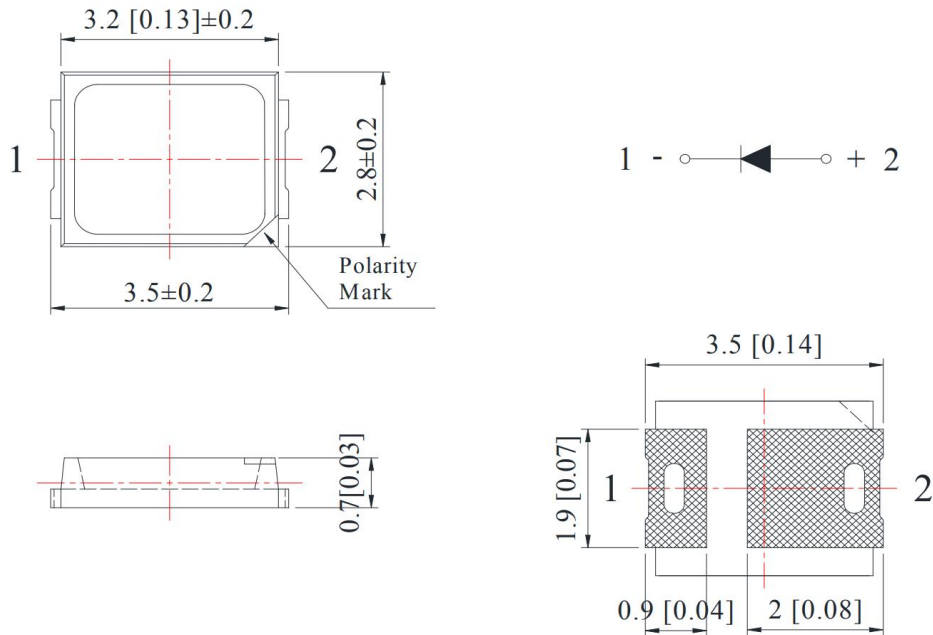
**Reliability Test Items And Conditions**

| Test Items                                | Reference                  | Test Conditions               | Time          | Quantity | Criterion |
|-------------------------------------------|----------------------------|-------------------------------|---------------|----------|-----------|
| Thermal Shock                             | MIL-STD-202G               | -40℃ (30min)<br>-100℃ (30min) | 100<br>Cycles | 22       | 0/22      |
| Temperature And Humidity<br>Cyclic        | JEITA ED-4701 200<br>203   | -10℃~65℃ ;<br>0%~90%RH        | 10cycles      | 22       | 0/22      |
| High Temperature Storage                  | JEITA ED -4071 200<br>201  | Ta=100℃                       | 1000H         | 22       | 0/22      |
| Low Temperature Storage                   | JEITA ED -4071 200<br>202  | Ta=-40℃                       | 1000H         | 22       | 0/22      |
| High Temperature High<br>Humidity Storage | JEITA ED -4071 100<br>103  | Ta=85℃ ;<br>RH=85%            | 1000H         | 22       | 0/22      |
| High Temperature Life Test                | JESD22-A108D               | Ta=80℃                        | 1000H         | 22       | 0/22      |
| Life Test                                 | JESD22-A108D               | Ta=25℃<br>IF=60mA             | 1000H         | 22       | 0/22      |
| Resistance to Soldering<br>Heat           | GB/T 4937, II ,<br>2.2&2.3 | Tsol*=(240±5)<br>℃ 10secs     | 2 times       | 22       | 0/22      |

**Criteria For Judging Damage**

| Test Items                      | Symbol         | Test Conditions                 | Criteria For Judging Damage                                                           |
|---------------------------------|----------------|---------------------------------|---------------------------------------------------------------------------------------|
| Forward Voltage                 | V <sub>F</sub> | I <sub>F</sub> =I <sub>FT</sub> | Initial Data±10%                                                                      |
| Reverse Current                 | I <sub>R</sub> | V <sub>R</sub> =5V              | I <sub>R</sub> ≤10uA                                                                  |
| Luminous Intensity              | I <sub>V</sub> | I <sub>F</sub> =I <sub>FT</sub> | Average I <sub>V</sub> degradation≤30% ; Single LED I <sub>V</sub><br>degradation≤50% |
| Resistance to<br>Soldering Heat | -              | -                               | Material without internal cracks,no material<br>between stripped,no dead light        |

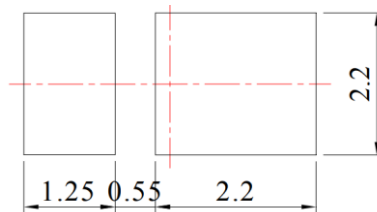
## Product size (Unit:mm)



### NOTES :

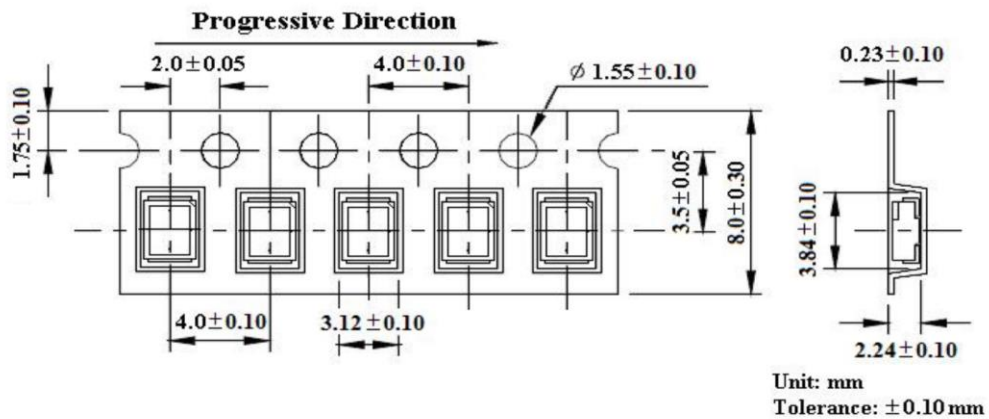
1. All dimensions are in millimeters (inches)
2. Tolerances are  $\pm 0.2\text{mm}$  (0.008inch) unless otherwise noted

## Recommended Soldering Pad Design (Unit:mm)

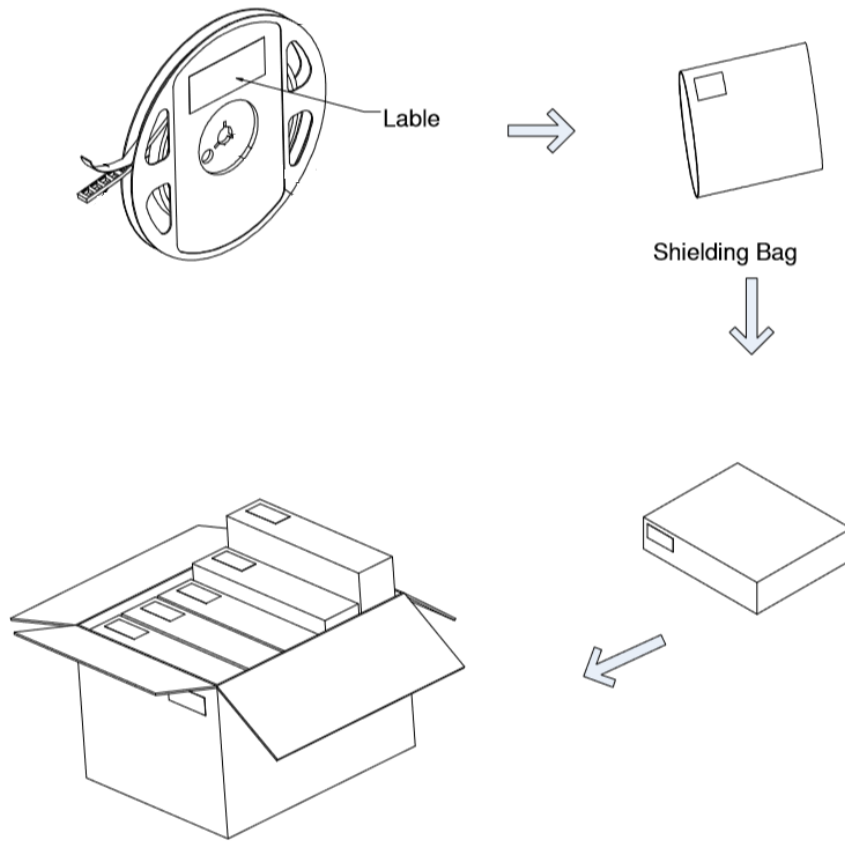


## Taping and package Spec

- Tape Specification: 2,000pcs Per Reel



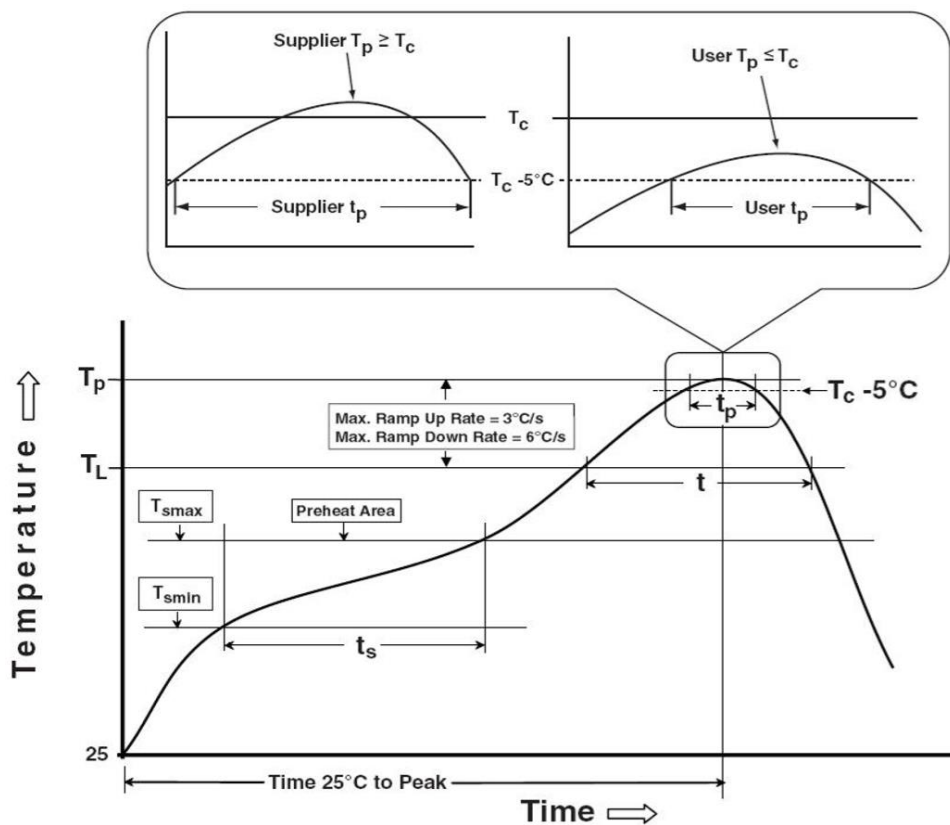
## Packaging



## Table of Classification Reflow Profiles

| Profile Feature                                                                                  | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|--------------------------------------------------------------------------------------------------|-------------------------|------------------|
| Preheat & Soak                                                                                   | 100 °C                  | 150 °C           |
| Temperature min (T <sub>min</sub> )                                                              | 150°C                   | 200 °C           |
| Temperature max (T <sub>max</sub> )                                                              | 60-120 seconds          | 60-120 seconds   |
| Time (T <sub>min</sub> to T <sub>max</sub> ) (t <sub>s</sub> )                                   |                         |                  |
| Average ramp-up rate (T <sub>max</sub> to T <sub>p</sub> )                                       | 3 °C/second max         | 3 °C/second max  |
| Liquidous temperature (T <sub>L</sub> )                                                          | 183 °C                  | 217 °C           |
| Time at liquidous (t <sub>L</sub> )                                                              | 60-150 seconds          | 60-150 seconds   |
| Peak package body temperature (T <sub>p</sub> )*                                                 | 230 °C ~235 °C          | 255 °C ~260 °C   |
| Classification temperature (T <sub>c</sub> )                                                     | 235 °C                  | 260 °C           |
| Time (t <sub>p</sub> ) within 5 °C of the specified Classification temperature (T <sub>c</sub> ) | 20 seconds              | 30 seconds       |
| Average ramp-down rate (T <sub>p</sub> to T <sub>max</sub> )                                     | 6 °C/second max         | 6 °C/second max  |
| Time 25 °C to peak temperature                                                                   | 6 minutes max           | 8 minutes max    |

1. Tolerance for peak profile temperature (T<sub>p</sub>) is defined as a supplier minimum and a user maximum.
2. Tolerance for time at peak profile temperature (t<sub>p</sub>) is defined as a supplier minimum and a user maximum.





## Precautions

### 1. Storage:

- Moisture proof and anti-electrostatic package with moisture absorbent material is used, to keep moisture to a minimum.
- Before opening the package, the product should be kept at 30°C or less and humidity less than 60% RH, and be used within a year.
- After opening the package, the product should be stored at 30°C or less and humidity less than 10%RH. It is recommended that the product be operated at the workshop condition of 30°C or less and humidity less than 60%RH.
- If the moisture absorbent material has faded away or the LEDs have exceeded the storage time, baking treatment should be performed based on the following condition: (70±5)°C for 24 hours.

### 2. Static Electricity:

- Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristics such as the forward voltage becoming lower, or the LEDs do not light at the low current. All devices, equipment and machinery must be properly grounded. At the same time, it is recommended that wrist bands or anti-electrostatic gloves, anti-electrostatic containers be used when dealing with the LEDs.

### 3. Vulcanization:

- LED curing is due to sulfur being in bracket and the +1 price of silver in the chemical reaction generated Ag<sub>2</sub>S in the process. It will lead to the capacity of reflecting of silver layer reducing, light color temperature drift and serious decline, seriously affecting the performance of the product. So we should take corresponding measures to avoid vulcanization, such as to avoid using sulphur volatile substances and keeping away from high sulphur content of the material.

### 4. Handling Precautions:

- Handle the component along the side surfaces by using forceps or appropriate tools.
- Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry.
- Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the epoxy resin lens or damage the internal circuitry.
- Compared 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.

