

### SMD ■ Side View LEDs EAPL3811WA2



#### Features

- . Side view white LED.
- . White SMT package.
- . Lead frame package with individual 2 pins.
- . Wide viewing angle.
- . Soldering methods: IR reflow soldering.
- . Pb-free.
- . The product itself will remain within RoHS compliant version.

#### Descriptions

- Due to the package design, EAPL3811WA2 has wide viewing angle, low power consumption and white LEDs are devices which are materialized by combining Blue LEDs and special phosphors . This feature makes the LED ideal for light guide application.

#### Applications

- . Mobile phones .
- . Indicators.
- . Mobile Keyboard
- . Compliance with EU REACH.

## Device Selection Guide

| Chip<br>Materials | Emitted Color | Resin Color |
|-------------------|---------------|-------------|
| InGaN             | Pure White    | Water Clear |

## Absolute Maximum Ratings (Ta=25°C)

| Parameter                              | Symbol    | Rating                                                                      | Unit |
|----------------------------------------|-----------|-----------------------------------------------------------------------------|------|
| Reverse Voltage                        | $V_R$     | 5                                                                           | V    |
| Forward Current                        | $I_F$     | 30                                                                          | mA   |
| Peak Forward Current (Duty 1/10 @10ms) | $I_{FP}$  | 60                                                                          | mA   |
| Power Dissipation                      | $P_d$     | 110                                                                         | mW   |
| Operating Temperature                  | $T_{opr}$ | -40 ~ +85                                                                   | °C   |
| Storage Temperature                    | $T_{stg}$ | -40 ~ +90                                                                   | °C   |
| Soldering Temperature                  | $T_{sol}$ | Reflow Soldering : 260 °C for 10 sec.<br>Hand Soldering : 350 °C for 3 sec. |      |

Notes: \*1The products are sensitive to static electricity and must be carefully taken when handling products.

## Electro-Optical Characteristics (Ta=25°C)

| Parameter          | Symbol         | Min.  | Typ.  | Max.  | Unit | Condition            |
|--------------------|----------------|-------|-------|-------|------|----------------------|
| Luminous Intensity | I <sub>v</sub> | 1850  | ----- | 2150  | mcd  | I <sub>F</sub> =20mA |
| Viewing Angle      | 2θ1/2          | ----- | 120   | ----- | deg  | I <sub>F</sub> =20mA |
| Forward Voltage    | V <sub>F</sub> | 2.95  | ----- | 3.45  | V    | I <sub>F</sub> =20mA |
| Reverse Current    | I <sub>R</sub> | ----- | ----- | 50    | μA   | V <sub>R</sub> =5V   |

### Notes:

1. Tolerance of Luminous Intensity: ±7%.
2. Tolerance of Forward Voltage: ±0.05V.

## Bin Range of Luminous Intensity

| Bin Code | mcd(Min.) | mcd(Max.) | Unit | Condition            |
|----------|-----------|-----------|------|----------------------|
| 35       | 1850      | 1900      | mcd  | I <sub>F</sub> =20mA |
| 36       | 1900      | 1950      |      |                      |
| 37       | 1950      | 2000      |      |                      |
| 38       | 2000      | 2050      |      |                      |
| 39       | 2050      | 2100      |      |                      |
| 40       | 2100      | 2150      |      |                      |

**Notes:** Tolerance of Luminous Intensity: ±7%.

## Bin Range of Forward Voltage

| Bin Code | Min. | Max. | Unit | Condition            |
|----------|------|------|------|----------------------|
| 6-1      | 2.95 | 3.05 | V    | I <sub>F</sub> =20mA |
| 6-2      | 3.05 | 3.15 |      |                      |
| 7-1      | 3.15 | 3.25 |      |                      |

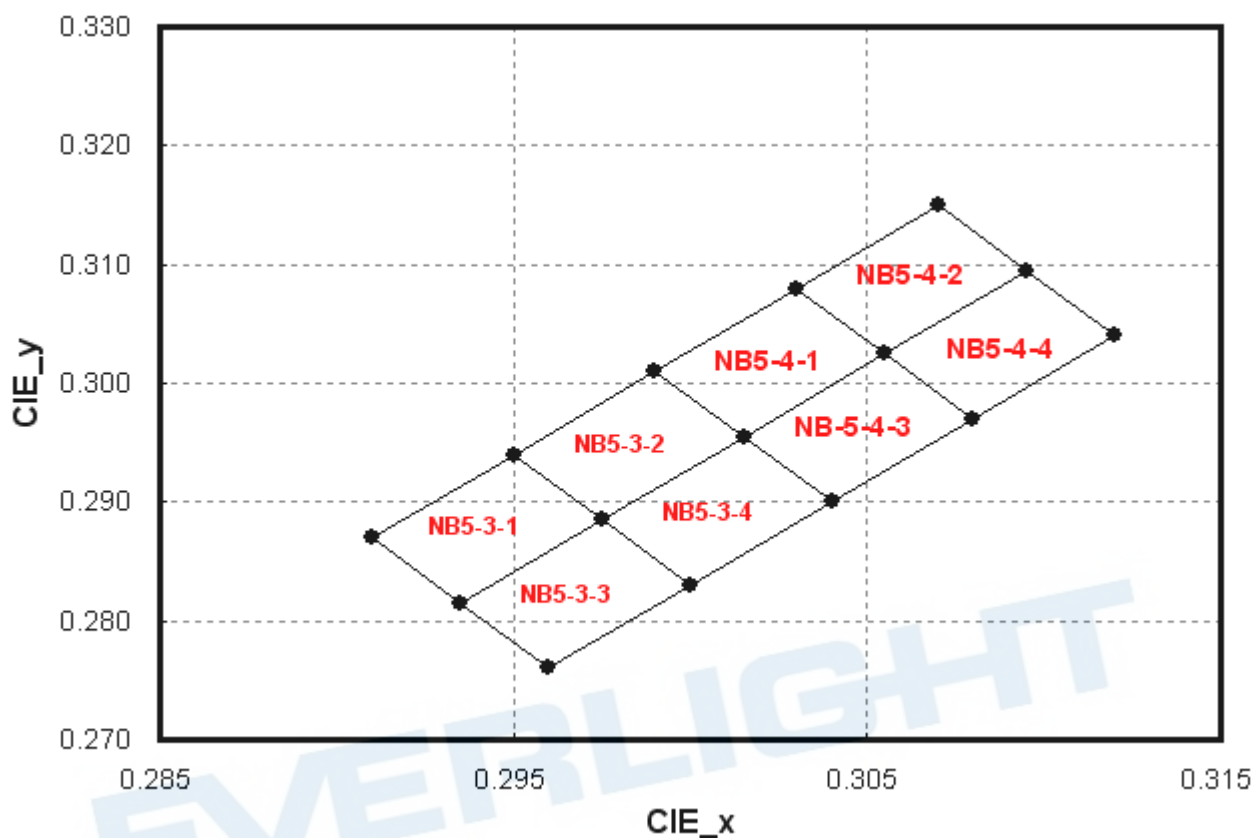
**Note:** Tolerance of Forward Voltage: ± 0.05V

### Chromaticity Coordinates of Bin Code

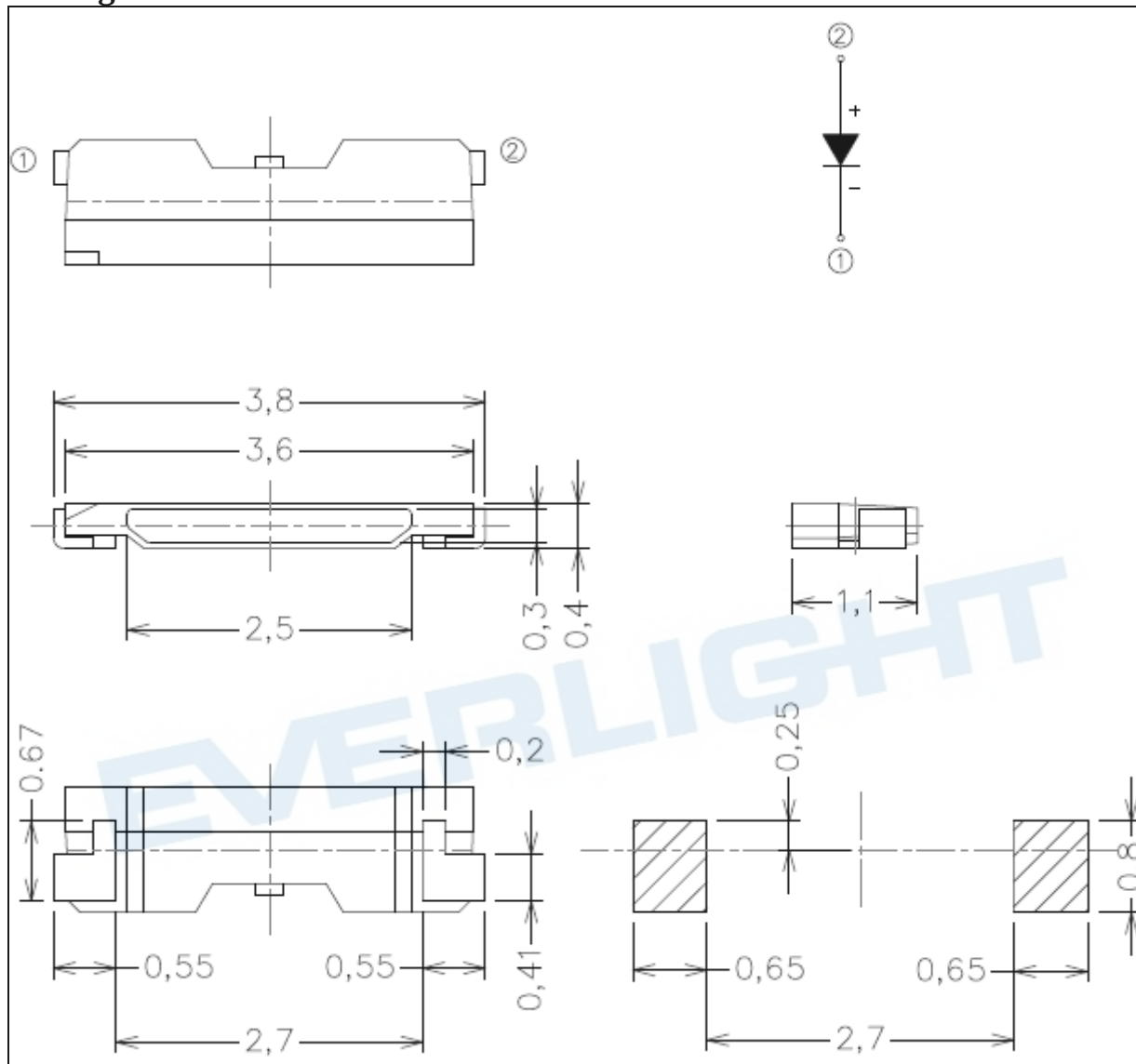
| Bin Code | CIE_x  | CIE_y  | Bin Code | CIE_x  | CIE_y  |
|----------|--------|--------|----------|--------|--------|
| NB5-3-1  | 0.2935 | 0.2815 | NB5-3-2  | 0.2975 | 0.2885 |
|          | 0.2910 | 0.2870 |          | 0.2950 | 0.2940 |
|          | 0.2950 | 0.2940 |          | 0.2990 | 0.3010 |
|          | 0.2975 | 0.2885 |          | 0.3015 | 0.2955 |
| NB5-3-3  | 0.2960 | 0.2760 | NB5-3-4  | 0.3000 | 0.2830 |
|          | 0.2935 | 0.2815 |          | 0.2975 | 0.2885 |
|          | 0.2975 | 0.2885 |          | 0.3015 | 0.2955 |
|          | 0.3000 | 0.2830 |          | 0.3040 | 0.2900 |
| NB5-4-1  | 0.3015 | 0.2955 | NB5-4-2  | 0.3055 | 0.3025 |
|          | 0.2990 | 0.3010 |          | 0.3030 | 0.3080 |
|          | 0.3030 | 0.3080 |          | 0.3070 | 0.3150 |
|          | 0.3055 | 0.3025 |          | 0.3095 | 0.3095 |
| NB5-4-3  | 0.3040 | 0.2900 | NB5-4-4  | 0.3080 | 0.2970 |
|          | 0.3015 | 0.2955 |          | 0.3055 | 0.3025 |
|          | 0.3055 | 0.3025 |          | 0.3095 | 0.3095 |
|          | 0.3080 | 0.2970 |          | 0.3120 | 0.3040 |

**Notes:** Tolerance of Chromaticity Coordinates:  $\pm 0.01$

## The C.I.E. 1931 Chromaticity Diagram



## Package Outline Dimensions

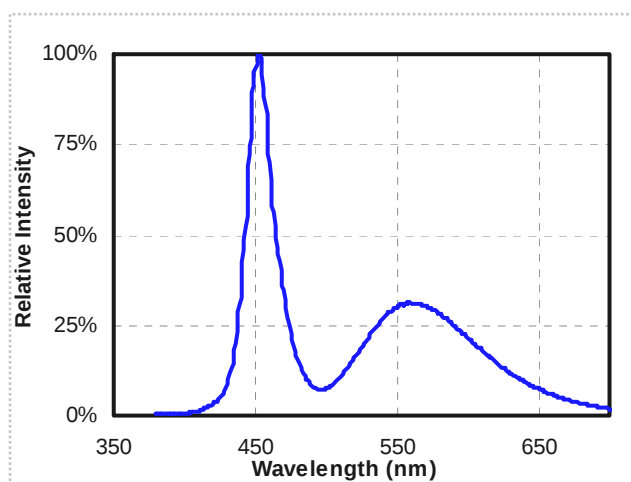


**Notes:** The tolerances unless mentioned is  $\pm 0.1\text{mm}$ , Unit = mm.

## Typical Electro-Optical-Thermal Characteristics Curves

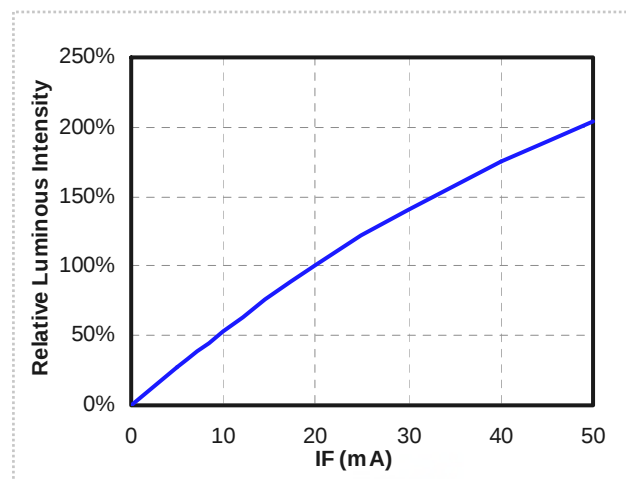
### 1. Spectrum Distribution

( $T_A=25^{\circ}\text{C}$ ,  $I_F=20\text{mA}$ )



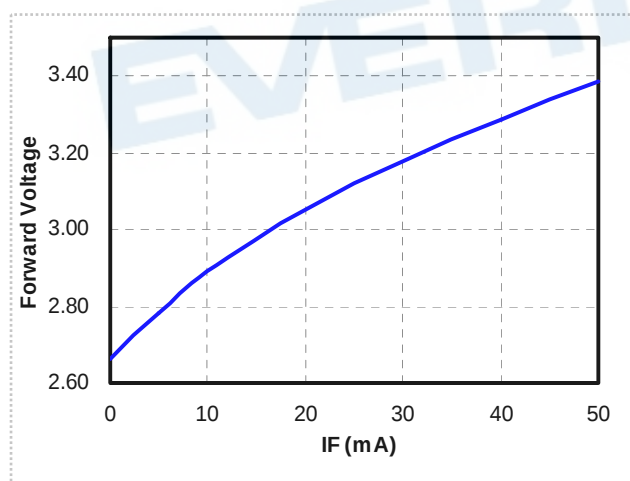
### 2. Relative Luminous Flux vs. Forward Current

( $T_A=25^{\circ}\text{C}$ )



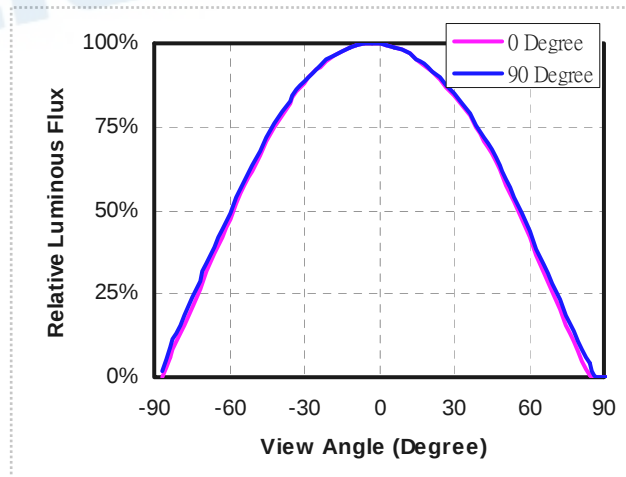
### 3. Relative Forward Voltage vs. Forward Current

( $T_A=25^{\circ}\text{C}$ )



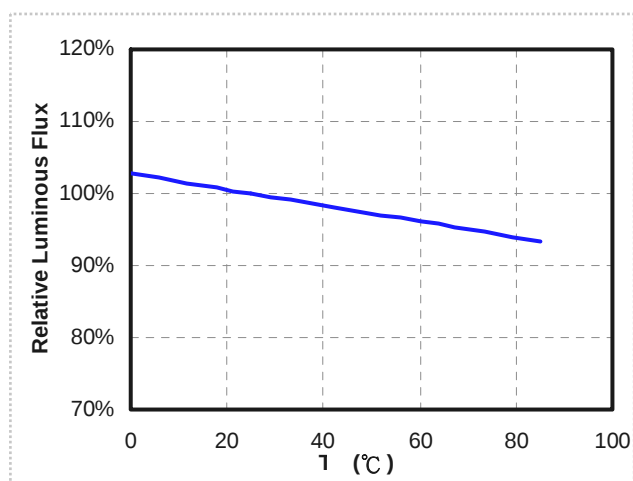
### 4. Radiation Diagram

( $T_A=25^{\circ}\text{C}$ ,  $I_F=20\text{mA}$ )

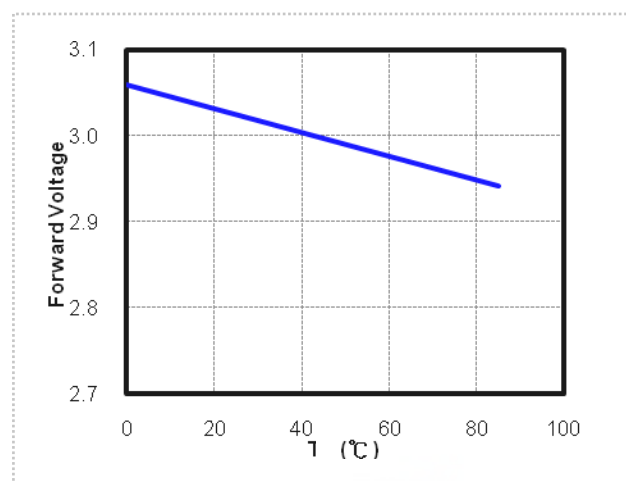


## Typical Electro-Optical-Thermal Characteristics Curves

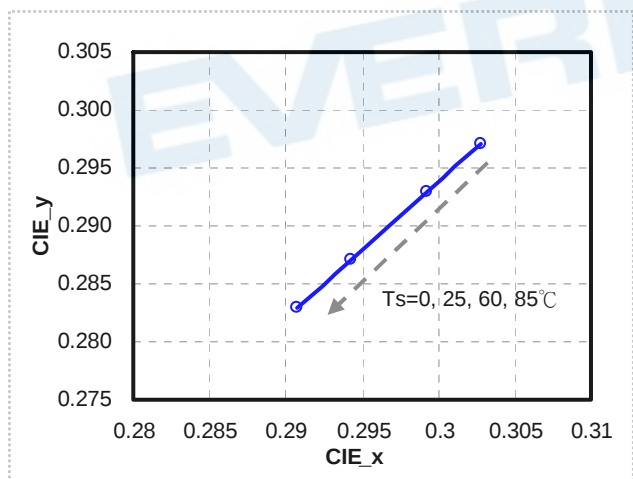
5. Relative Luminous Flux vs. Solder Temperature  
( $I_F=20\text{mA}$ )



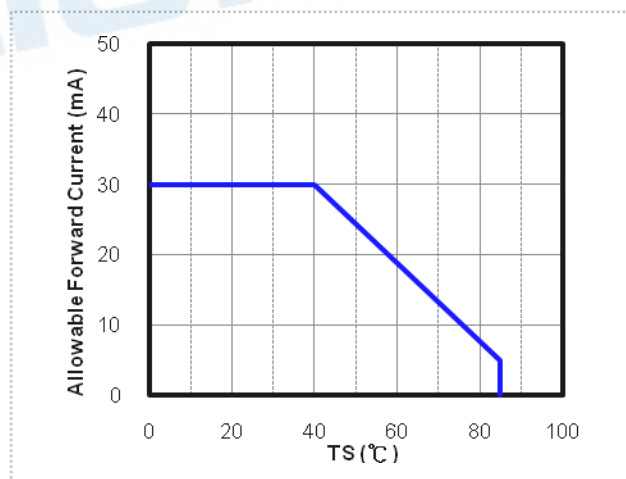
6. Forward Voltage vs. Solder Temperature  
( $I_F=20\text{mA}$ )



7. Chromaticity Coordinates vs. Solder Temperature  
( $I_F=20\text{mA}$ )



8. Forward Current De-rating Curve



## Label Explanation

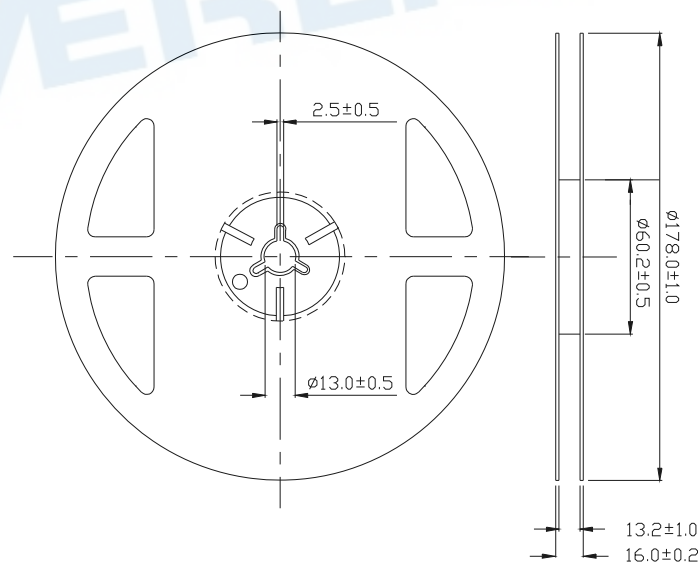
CAT: Luminous Intensity Rank

HUE: Chromaticity Coordinates

REF: Forward Voltage Rank



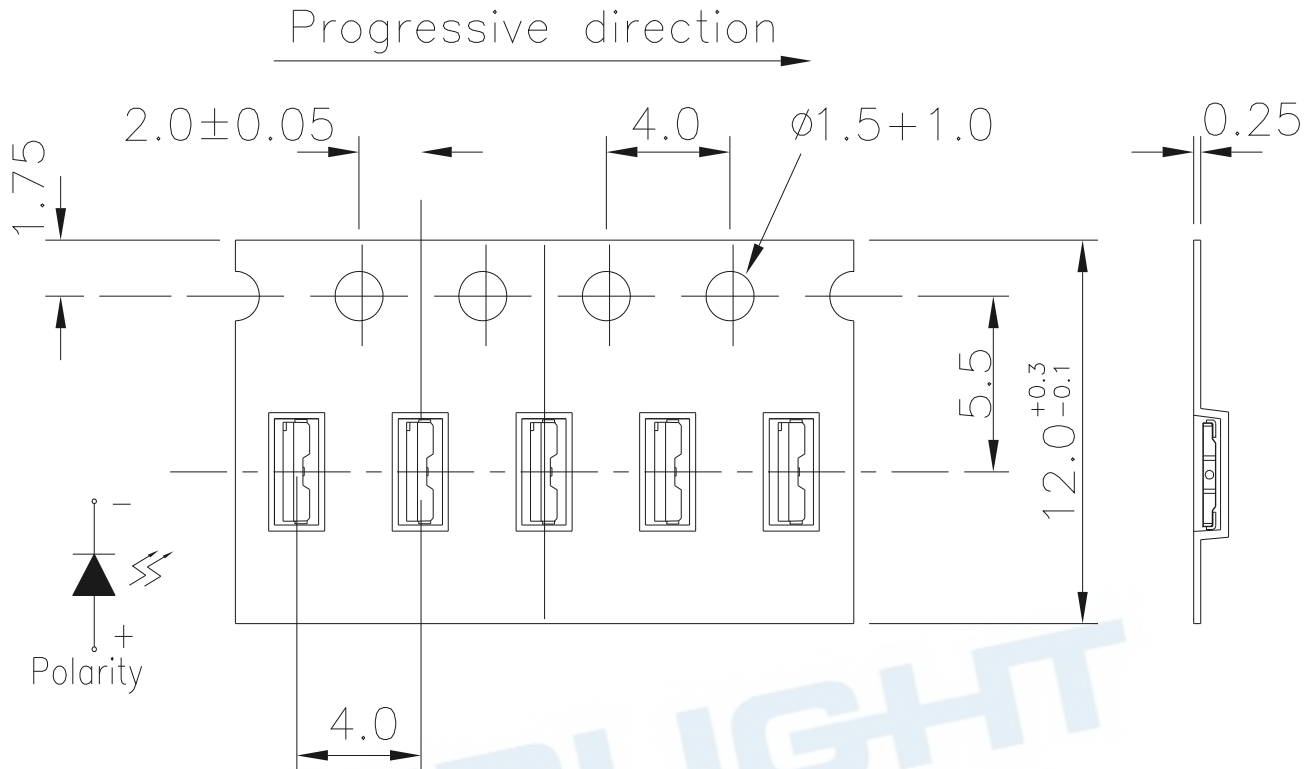
## Reel Dimensions



### Note:

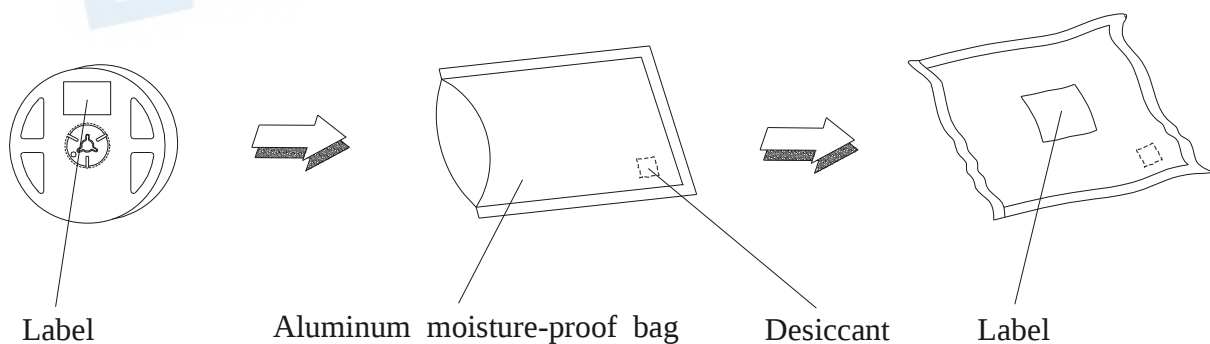
The tolerances unless mentioned is ±0.1mm, Unit = mm.

**Carrier Tape Dimensions: Loaded Quantity 1000/2000 pcs. Per Reel**



**Note:** The tolerances unless mentioned is  $\pm 0.1\text{mm}$ , Unit = mm.

**Moisture Resistant Packaging**



## Reliability Test Items and Conditions

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

| NO | Item                                              | Test Condition                           |                     | Test Hours / Times | Criteria                                        |                       |
|----|---------------------------------------------------|------------------------------------------|---------------------|--------------------|-------------------------------------------------|-----------------------|
|    |                                                   | Temp./ Humidity                          | I <sub>F</sub> (mA) |                    | I <sub>V</sub> @ 20mA                           | V <sub>F</sub> @ 20mA |
| 1  | Reflow Soldering                                  | T = 260°C, Max. 10sec.                   |                     | 2 times            | <±5%                                            | <±5%                  |
| 2  | Temperature Cycle                                 | -40°C ~ 100°C<br>30min. (5min.) 30min.   |                     | 200 cycles         | I <sub>V</sub> > 70%,<br>V <sub>F</sub> < 110%, |                       |
| 3  | Thermal Shock                                     | -10°C ~ 100°C<br>20min. (<15sec.) 20min. |                     | 200 cycles         |                                                 |                       |
| 4  | Low Temp. Storage                                 | Ta= -40°C                                | --                  | 1000 hrs           |                                                 |                       |
| 5  | High Temp. Storage                                | Ta= 100°C                                | --                  | 1000 hrs           |                                                 |                       |
| 6  | Temp. Humidity Storage                            | Ta= 60°C/ 90%RH                          | --                  | 1000 hrs           |                                                 |                       |
| 7  | Steady State Operating Life of Low Temp.          | Ta= -40°C                                | 20                  | 1000 hrs           |                                                 |                       |
| 8  | Steady State Operating Life Condition 1           | Ta= 25°C/<br>Room Humidity               | 20                  | 1000 hrs           |                                                 |                       |
| 9  | Steady State Operating Life Condition 2           | Ta= 60°C                                 | 20                  | 1000 hrs           |                                                 |                       |
| 10 | Steady State Operating Life of High Temp.         | Ta= 85°C                                 | 5                   | 1000 hrs           |                                                 |                       |
| 11 | Steady State Operating Life of High Humidity Heat | Ta= 60°C/ 90%RH                          | 20                  | 1000 hrs           |                                                 |                       |

Notes:

1. Sampling for each test item: 22 (pcs.)
2. Test board: MCPCB board thickness=1.0mm, copper layer thickness=0.07mm, R<sub>th j-a</sub>≒ 380°C/W.
3. Measurements are performed after allowing the LEDs to return to room temperature.

## Precautions for Use

### 1. Over-current-proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change ( Burn out will happen ).

### 2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

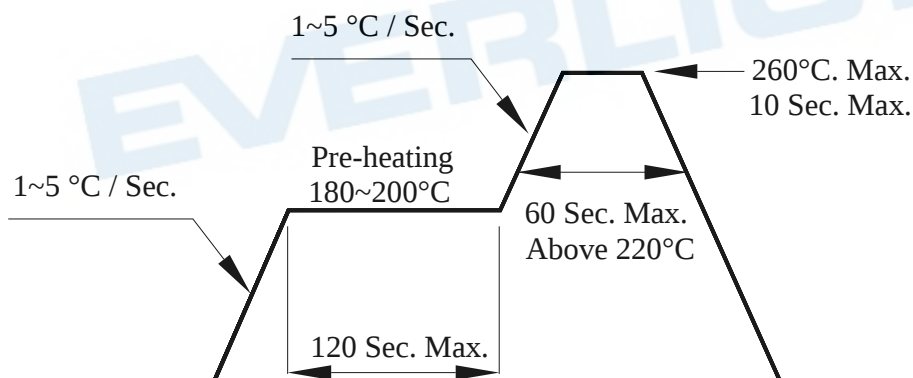
2.2 Before opening the package: The LEDs should be used within one year and kept at 30°C or less and 70%RH or less.

2.3 After opening the package: We recommend that the LED should be soldered quickly (within 3 days). The soldering condition is 30°C or less and 60%RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

2.4 If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: 60±5°C for 24 hours. (One time only)

### 3. Soldering Condition

#### 3.1 Pb-free solder temperature profile



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

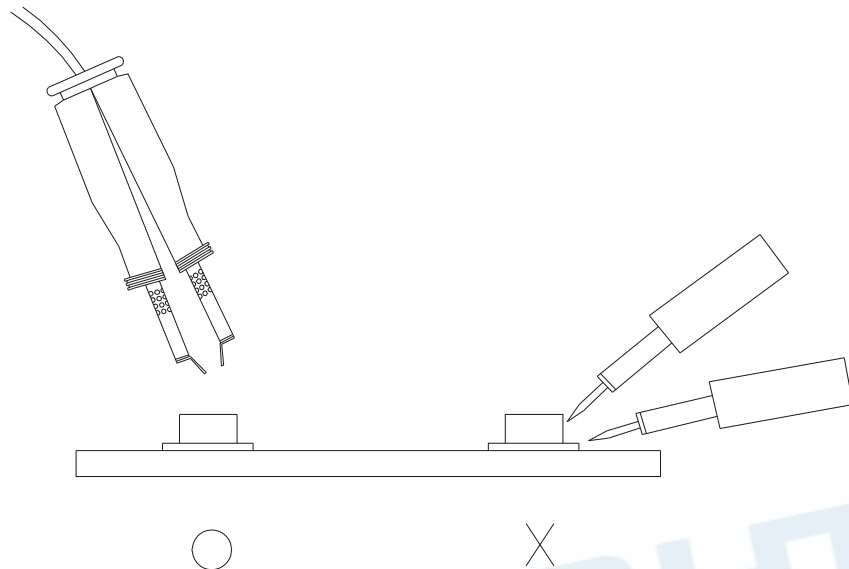
3.4 After soldering, do not warp the circuit board.

### 4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

#### 5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



#### 6. Handling Indications

During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound.