

**Technical Data Sheet**

**Full Color Top LEDs**

**67-23/R6GHBHC-B05/2T**

**Features**

- P-LCC-4 package.
- White package.
- Optical indicator.
- Colorless clear window.
- Pb-free.
- The product itself will remain within RoHS compliant version.



**Descriptions**

- The 67-23 series is available in soft red, green, blue and yellow. Due to the package design, the LED has wide viewing angle and optimized light coupling by inter reflector. This feature makes the ideal for light pipe application. The low current requirement makes this device ideal for portable equipment or any other application where power is at a premium.

**Applications**

- Telecommunication: indicator and backlighting in telephone and fax.
- Flat backlight for LCD's, switches and symbols.
- Light pipe application.
- General use.

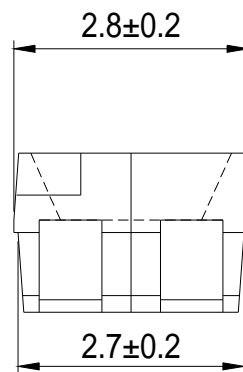
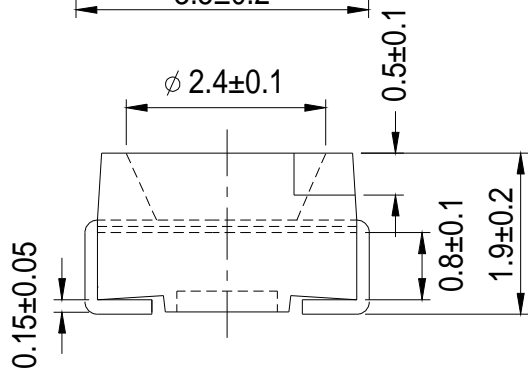
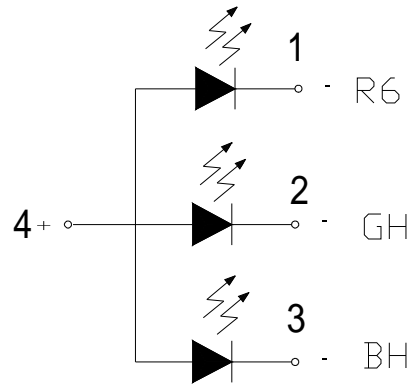
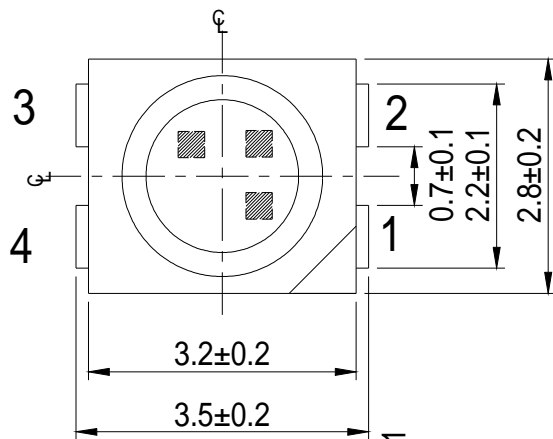
**Device Selection Guide**

| Chip |          | Emitted Color   | Lens Color  |
|------|----------|-----------------|-------------|
| Type | Material |                 |             |
| R6   | AlGaInP  | Brilliant Red   | Water Clear |
| GH   | InGaN    | Brilliant Green |             |
| BH   | InGaN    | Blue            |             |

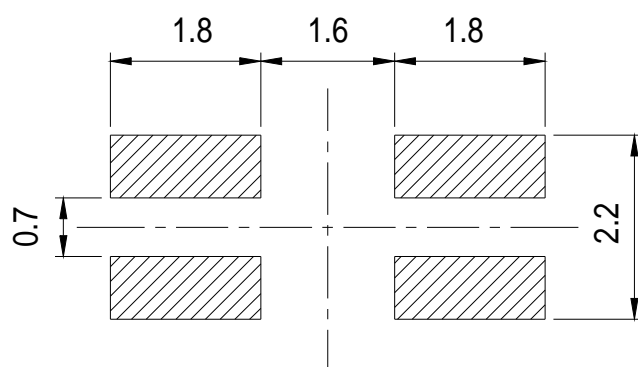
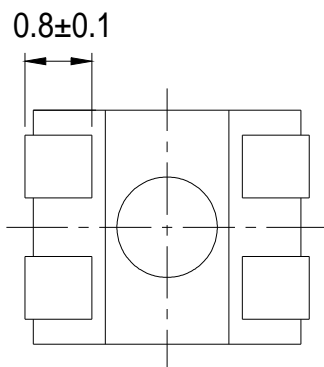
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**Package Outline Dimensions**



For reflow soldering(propose)



**Notes:** All dimensions are in millimeters.

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**Absolute Maximum Ratings (Ta=25 )**

| Parameter                                 | Symbol           | Rating                             |      | Unit |
|---|------------------|------------------------------------|------|------|
| Reverse Voltage                           | V <sub>R</sub>   | 5                                  |      | V    |
| Forward Current                           | I <sub>F</sub>   | R6                                 | 25   | mA   |
|   |                  | GH                                 | 25   |      |
|   |                  | BH                                 | 25   |      |
| Operating Temperature                     | T <sub>opr</sub> | -40 ~ +85                          |      |      |
| Storage Temperature                       | T <sub>stg</sub> | -40 ~ +100                         |      |      |
| Electrostatic Discharge(HBM)              | ESD              | R6                                 | 2000 | V    |
|   |                  | GH                                 | 150  |      |
|   |                  | BH                                 | 150  |      |
| Power Dissipation                         | P <sub>d</sub>   | R6                                 | 120  | mW   |
|   |                  | GH                                 | 110  |      |
|   |                  | BH                                 | 110  |      |
| Peak Forward Current(Duty<br>1/10 @ 1KHz) | I <sub>FP</sub>  | R6                                 | 100  | mA   |
|   |                  | GH                                 | 100  |      |
|   |                  | BH                                 | 100  |      |
| Soldering Temperature                     | T <sub>sol</sub> | Reflow Soldering : 260 for 10 sec. |      |      |
|   |                  | Hand Soldering : 350 for 3 sec.    |      |      |

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**Electro-Optical Characteristics (Ta=25 )**

| Parameter                    | Symbol | Min.  | Typ.  | Max.  | Unit  | Condition |         |
|------------------------------|--------|-------|-------|-------|-------|-----------|---------|
| Luminous Intensity           | Iv     | R6    | 112   | ----- | 285   | mcd       | If=20mA |
|                              |        | GH    | 180   | ----- | 715   |           |         |
|                              |        | BH    | 72    | ----- | 180   |           |         |
| Peak Wavelength              | p      | R6    | ----- | 632   | ----- | nm        | If=20mA |
|                              |        | GH    | ----- | 518   | ----- |           |         |
|                              |        | BH    | ----- | 468   | ----- |           |         |
| Dominant Wavelength          | d      | R6    | 621   | ----- | 631   | nm        | If=20mA |
|                              |        | GH    | 520   | ----- | 530   |           |         |
|                              |        | BH    | 465   | ----- | 475   |           |         |
| Spectrum Radiation Bandwidth |        | R6    | ----- | 20    | ----- | nm        | If=20mA |
|                              |        | GH    | ----- | 35    | ----- |           |         |
|                              |        | BH    | ----- | 35    | ----- |           |         |
| Forward Voltage              | VF     | R6    | ----- | 2.0   | 2.4   | V         | If=20mA |
|                              |        | GH    | ----- | 3.4   | 3.95  |           |         |
|                              |        | BH    | ----- | 3.4   | 3.95  |           |         |
| Viewing Angle                | 2 1/2  | ----- | 120   | ----- | deg   | If=20mA   |         |
| Reverse Current              | IR     | R6    | ----- | ----- | 10    | μ A       | VR=5V   |
|                              |        | GH    | ----- | ----- | 50    |           |         |
|                              |        | BH    | ----- | ----- | 50    |           |         |

**Notes:**

- 1.Tolerance of Luminous Intensity  $\pm 11\%$
- 2.Tolerance of Dominant Wavelength  $\pm 1$  nm

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**Bin Rang of Luminous Intensity**

| Chip | Bin | Min | Max | Unit | Condition            |
|------|-----|-----|-----|------|----------------------|
| R6   | R   | 112 | 180 | mcd  | I <sub>F</sub> =20mA |
|      | S   | 180 | 285 |      |                      |
| GH   | S   | 180 | 285 |      |                      |
|      | T   | 285 | 450 |      |                      |
|      | U   | 450 | 715 |      |                      |
| BH   | Q   | 72  | 112 |      |                      |
|      | R   | 112 | 180 |      |                      |

**Bin Rang of Dominate Wavelength**

| Chip | Bin | Min | Max | Unit | Condition            |
|------|-----|-----|-----|------|----------------------|
| R6   | FF1 | 621 | 626 | nm   | I <sub>F</sub> =20mA |
|      | FF2 | 626 | 631 |      |                      |
| GH   | X   | 520 | 525 |      |                      |
|      | Y   | 525 | 530 |      |                      |
| BH   | X   | 465 | 470 |      |                      |
|      | Y   | 470 | 475 |      |                      |

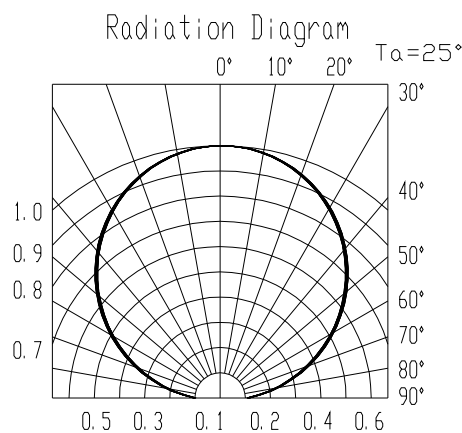
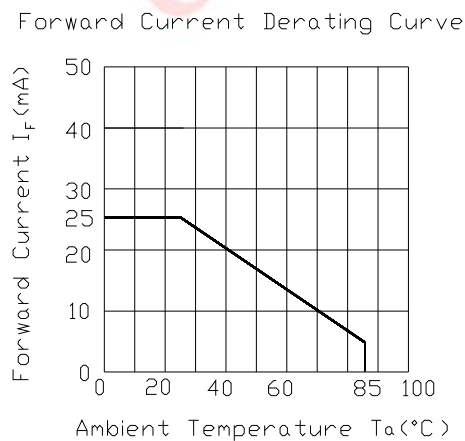
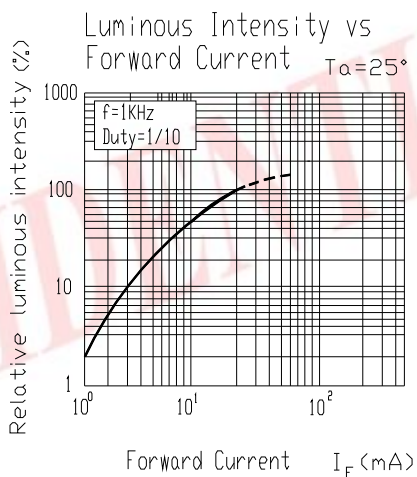
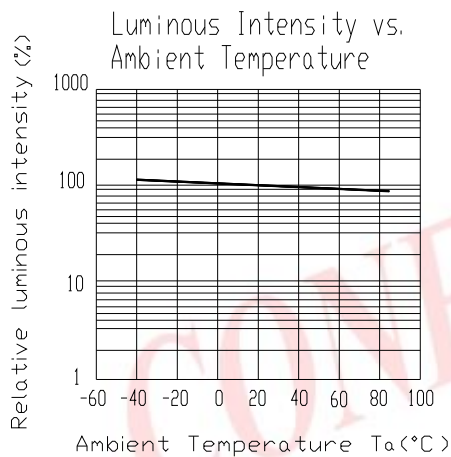
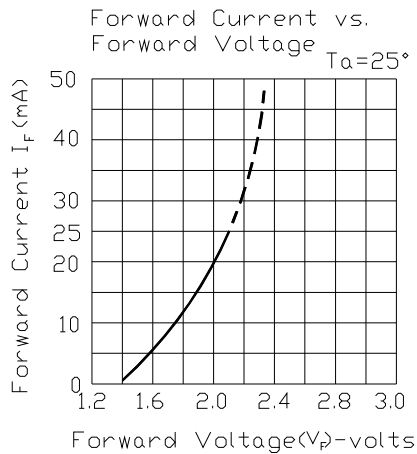
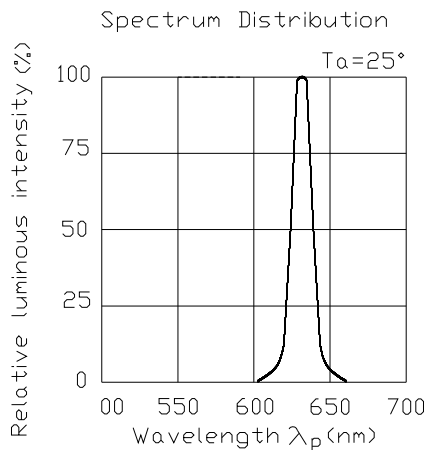
**Notes:**

- 1.Tolerance of Luminous Intensity  $\pm 11\%$
- 2.Tolerance of Dominant Wavelength  $\pm 1$  nm

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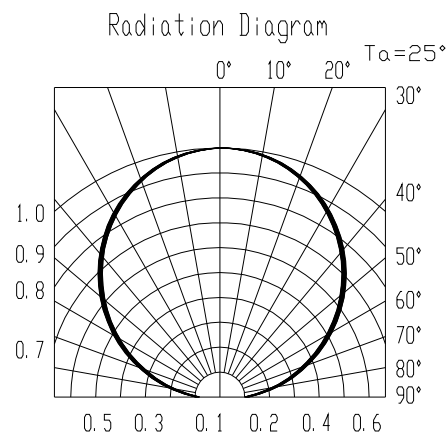
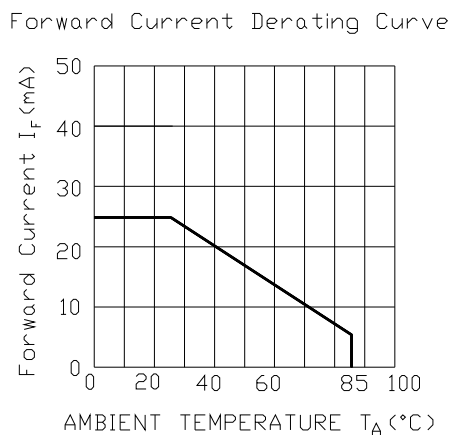
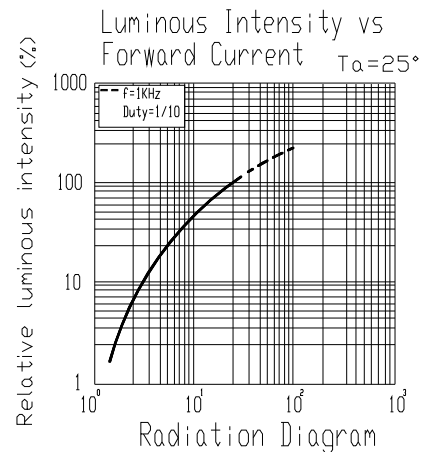
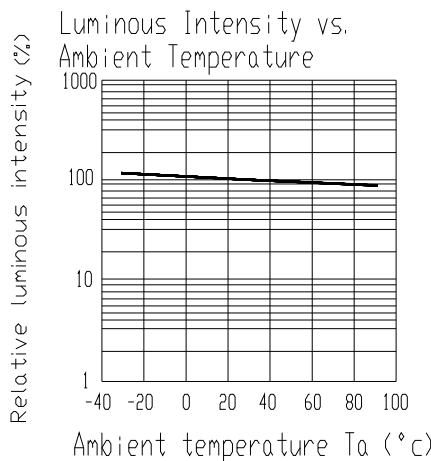
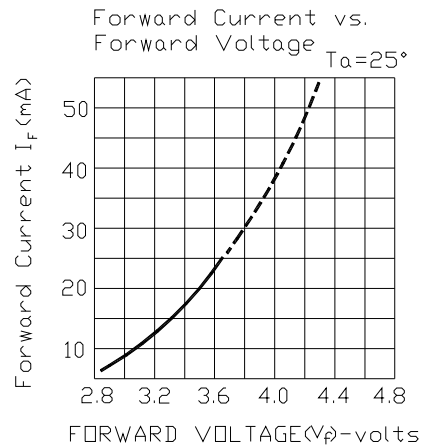
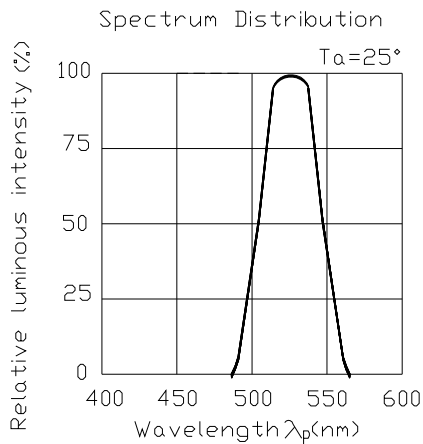
**Typical Electro-Optical Characteristics Curves (R6)**



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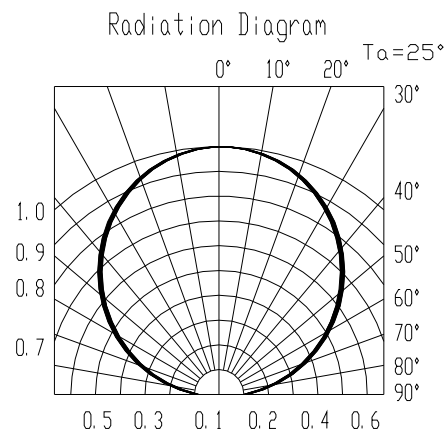
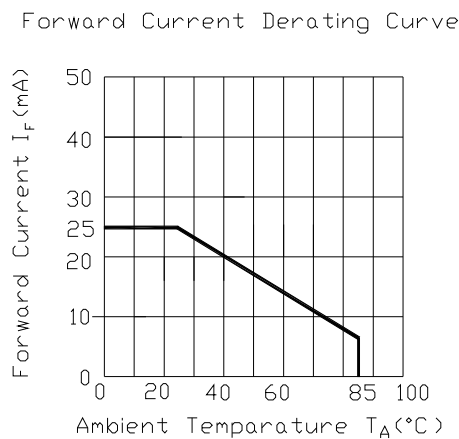
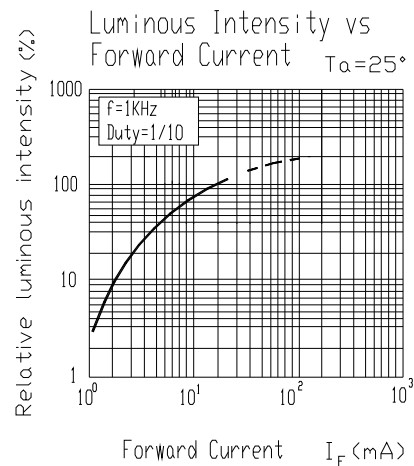
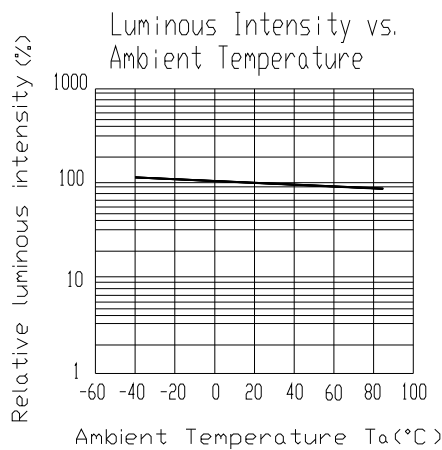
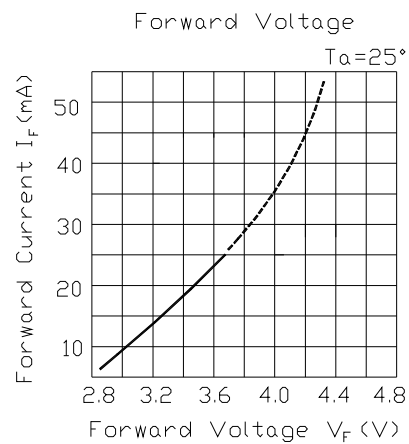
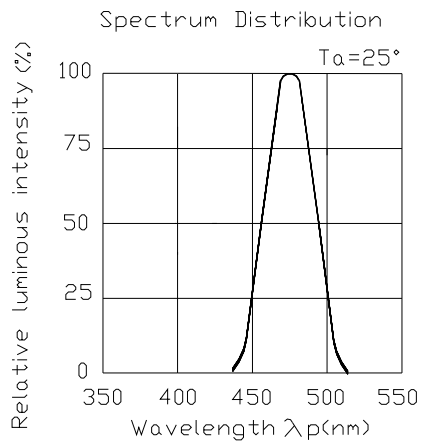
**Typical Electro-Optical Characteristics Curves (GH)**



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**67-23/R6GHBHC-B05/2T**

**Typical Electro-Optical Characteristics Curves (BH)**





**Technical Data Sheet**  
**Full Color Top LEDs**

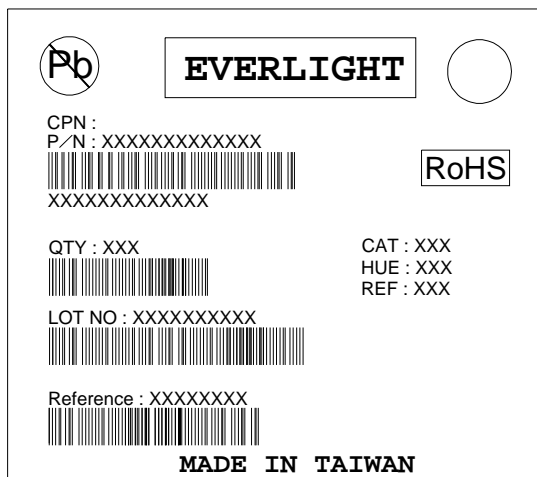
**67-23/R6GHBHC-B05/2T**

**Label Explanation**

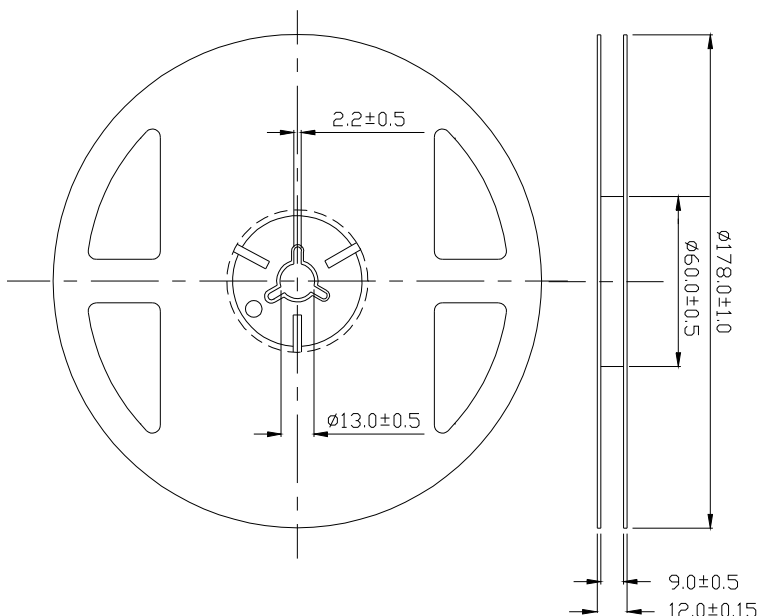
CAT: Luminous Intensity Rank

HUE: Dom. Wavelength Rank

REF: Forward Voltage Rank



**Reel Dimensions**

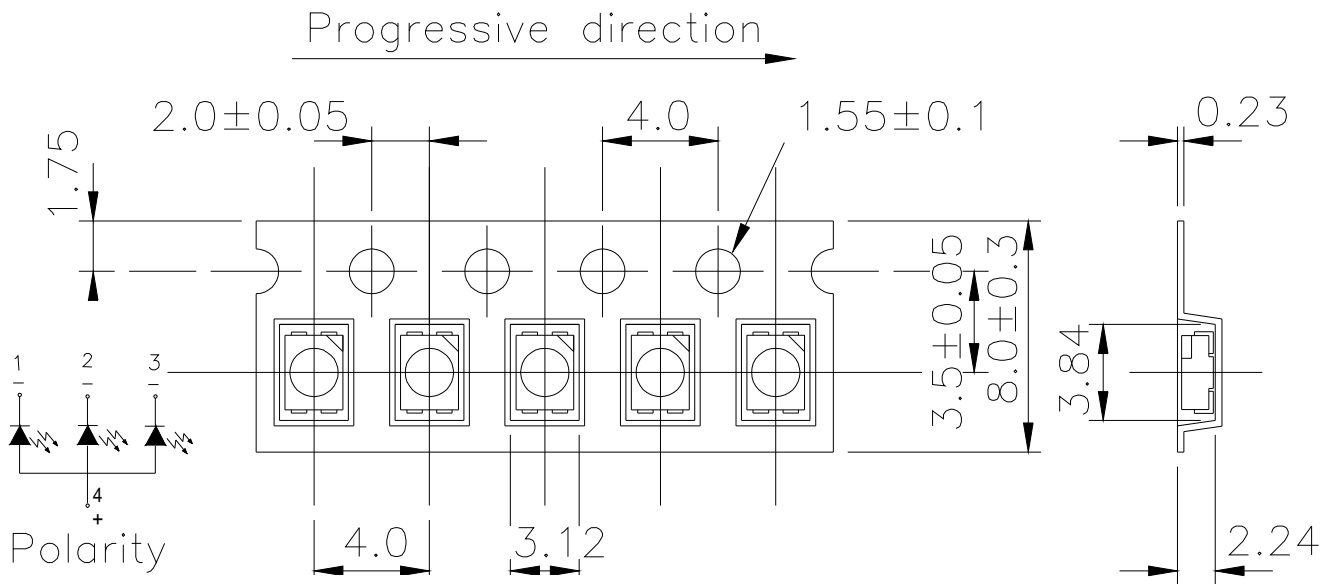


**Note:** Tolerances Unless Dimension  $\pm 0.1\text{mm}$  ,Unit = mm

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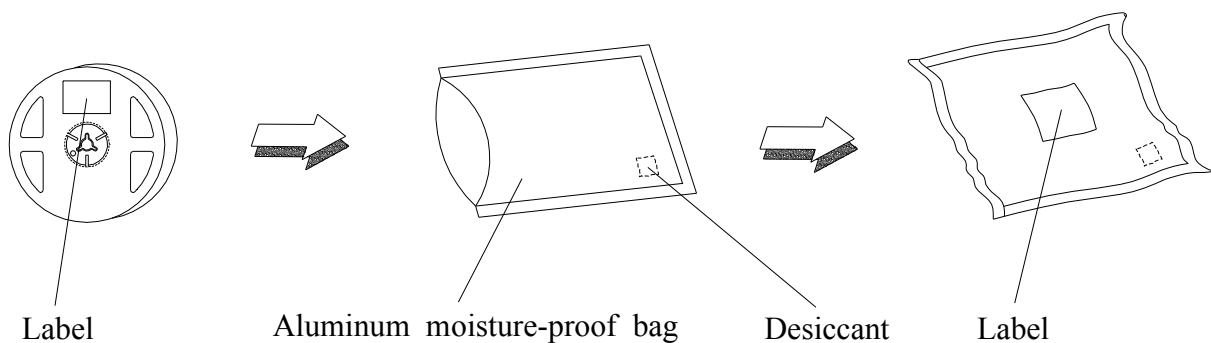
**Carrier Tape Dimensions: Loaded Quantity 2000 pcs Per Reel**



NOTE :TOLERANCES UNLESS DIMENSION  $\pm 0.1$  mm

UNIT: mm

**Moisture Resistant Packaging**



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**Reliability Test Items and Conditions**

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

Confidence level : 90%

LTPD : 10%

| No. | Items                            | Test Condition                             | Test Hours/Cycles | Sample Size | Ac/Re |
|-----|----------------------------------|--|-------------------|-------------|-------|
| 1   | Reflow Soldering                 | Temp. : 260 ±5<br>Max 10 sec.              | 6 min             | 22 PCS.     | 0/1   |
| 2   | Temperature Cycle                | H : +100 15min<br>↓ 5 min<br>L : -40 15min | 300 Cycles        | 22 PCS.     | 0/1   |
| 3   | Thermal Shock                    | H : +100 5min<br>↓ 10 sec<br>L : -10 5min  | 300 Cycles        | 22 PCS.     | 0/1   |
| 4   | High Temperature Storage         | Temp. : 100                                | 1000 Hrs.         | 22 PCS.     | 0/1   |
| 5   | Low Temperature Storage          | Temp. : -40                                | 1000 Hrs.         | 22 PCS.     | 0/1   |
| 6   | DC Operating Life                | I <sub>F</sub> = 20 mA                     | 1000 Hrs.         | 22 PCS.     | 0/1   |
| 7   | High Temperature / High Humidity | 85 /85%RH                                  | 1000 Hrs.         | 22 PCS.     | 0/1   |

## Technical Data Sheet

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#### Precautions For Use

##### 1. Over-current-proof

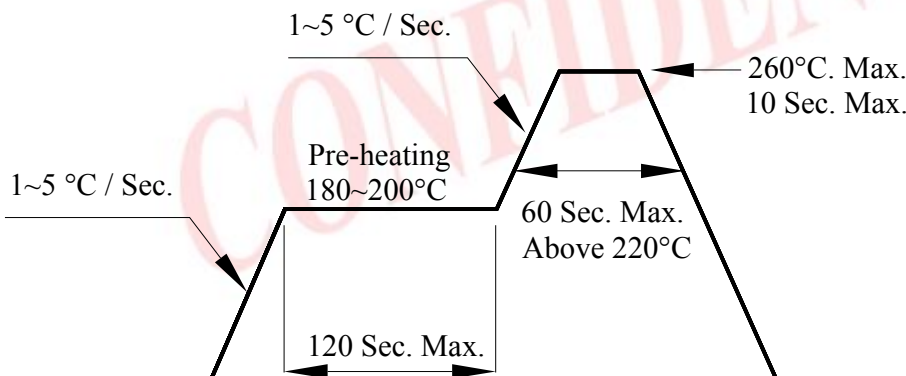
Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change ( Burn out will happen ).

##### 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 kept at 30 °C or less and 90%RH or less.
- 2.3 After opening the package: The LED's floor life are 72 hours under 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..

##### 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.

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### Full Color Top LEDs

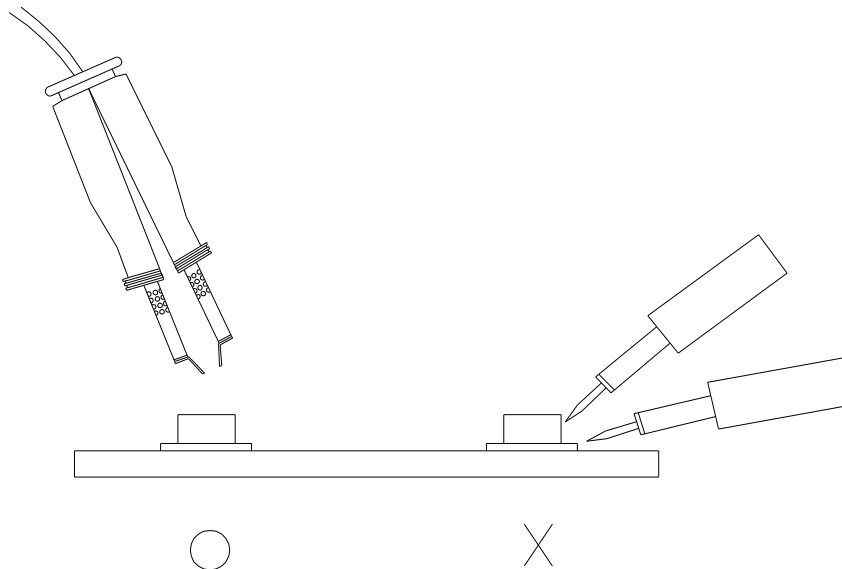
#### 67-23/R6GHBHC-B05/2T

#### 4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350 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.



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