# SPECIFICATION

| | | | |
|---|---|---|---|
| Customer | **InterElcom** | Product | |
| Customer No. | | Type | IE-1010RGB-ST-BBI-N |

| APPROVED SIGNATURES | | | |
|---|---|---|---|
| | | | |

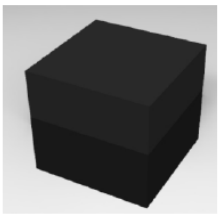
ISO14001 ISO9001

| Research & Development Center | | |
|---|---|---|
| APPROVE | CHECK | DRAW |
| | | |
| （Version NO）：A2 | | |
| (Release Date): 2014-01-01 | | |

# IE-1010RGB-ST-BBI-N

**Chip Light Emitting Diode**

**Technical Data Sheet**



This product is generally used for electronic equipment such as dashboard and signal LED board. And it also be widely used for indoor and outdoor decorative lighting.

**Features:**

- Material:

| Red | Green | Blue |
|---|---|---|
| AlGaInP | InGaN | InGaN |

- Encapsulation: Epoxy Resin
- Soldering methods: Pb-Free reflow soldering
- High Luminous Intensity ,Low Power Dissipation,good Reliability and Long Life
- Complied With ROHS Directive

## Catalogue



***The Specifications of the product may be modified for improvement without notice.**

## Electrical Characteristics

### ✧ Absolute Maximum Ratings (Temperature=25°C):

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Forward Current | | $I_F$ | 20 | mA |
| Pulse Forward Current* | | $I_{FP}$ | 50 | mA |
| Reverse Voltage | | $V_R$ | 5 | V |
| Operating Temperature | | $T_{OPR}$ | -30 ～+85 | ℃ |
| Storage Temperature | | Tstg | -40 ～+100 | ℃ |
| Power Dissipation | Red | $P_D$ | 52 | mW |
| | Green | | 72 | |
| | Blue | | 72 | |

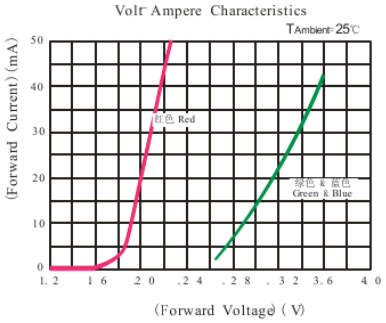
* Note: Pulse width≤0.1ms, Duty≤1/10

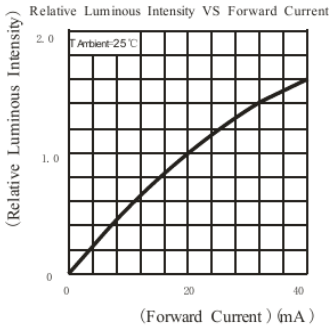
### ✧ Electro-Optical Charasteristics (Temperature=25°C)

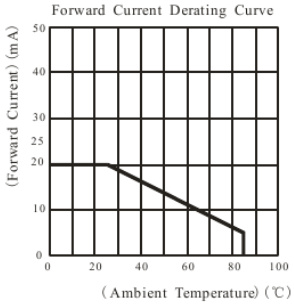
| Parameter | Symbol | Condition | Color | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Reverse Current | $I_R$ | $V_R$=5V | Red | | | 10 | μA |
| | | | Green | | | 10 | |
| | | | Blue | | | 10 | |
| Forward Voltage | $V_F$ | $I_F$=8mA | Red | 1.6 | 1.9 | 2. 6 | V |
| | | $I_F$=5mA | Green | 2.6 | 2.9 | 3.6 | |
| | | $I_F$=3mA | Blue | 2.6 | 2.8 | 3.6 | |
| Dominant Wavelength | $\lambda_D$ | $I_F$=8mA | Red | 610 | 620 | 630 | nm |
| | | $I_F$=5mA | Green | 515 | 530 | 540 | |
| | | $I_F$=3mA | Blue | 460 | 470 | 480 | |
| Spectrum Radiation Bandwidth | Δλ | $I_F$=8mA | Red | | 16 | | nm |
| | | $I_F$=5mA | Green | | 30 | | |
| | | $I_F$=3mA | Blue | | 25 | | |
| Luminous Intensity | $I_V$ | $I_F$=8mA | Red | 31 | 40 | | mcd |
| | | $I_F$=5mA | Green | 60 | 80 | | |
| | | $I_F$=3mA | Blue | 8 | 10 | | |
| View Angle | $2\theta_{1/2}$ | | | | 120 | | deg. |

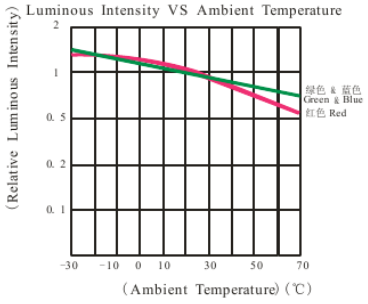
* Note: All the datas above just for reference, specific parameters please refer to the label ,and these datas come from the standard system

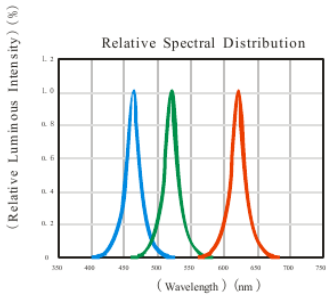
## Typical Characteristics Curves

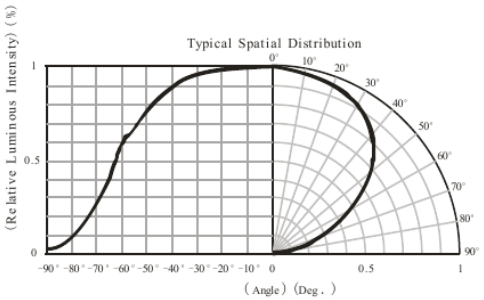


## Reliability Test Items And Conditions

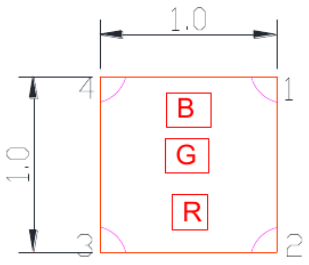
| Test Items | Reference | Test Conditions | Time | Quantity | Criterion |
|---|---|---|---|---|---|
| Thermal Shock | MIL-STD-202G | -40℃(15min)←→100℃(15min) | 200 cycles | 22 | 0/22 |
| Temperature And Humidity Cyclic | JEITA ED-4701 200 203 | (-10～65)℃ ，(1～90)%RH<br>24hrs./1cycle | 10 cycles | 22 | 0/22 |
| High Temperature Storage | JEITA ED-4701 200 201 | Ta=100℃ | 1000h | 22 | 0/22 |
| Low Temperature Storage | JEITA ED-4701 200 202 | Ta=-40℃ | 1000h | 22 | 0/22 |
| Life Test | JESD22-A108D | Ta=25℃<br>IF =10mA | 1000h | 22 | 0/22 |
| Resistance to Soldering Heat | GB/T 4937, Ⅱ ,2.2&2.3 | Tsol*=(260±5)℃ 10secs. | 2 times | 22 | 0/22 |

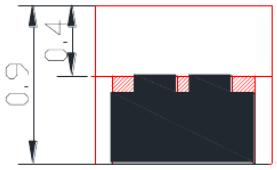
### Criteria For Judging Damage

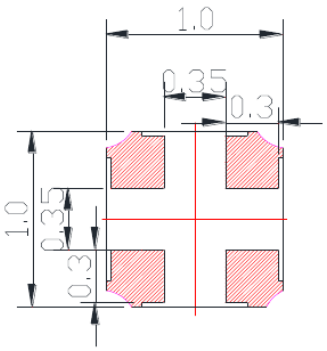
| Test Items | Symbol | Test Conditions | Criteria For Judging Damage |
|---|---|---|---|
| Forward Voltage | $V_F$ | $I_F$= $I_{FT}$ | Initial Data±10% |
| Reverse Current | $I_R$ | $V_R$= 5V | $I_R$≤10μA |
| Luminous Intensity | $I_V$ | $I_F$ = $I_{FT}$ | Average IV degradation≤30%;<br>Single LED IV degradation≤50% |
| Resistance to Soldering Heat | | | No deaded lamp. |

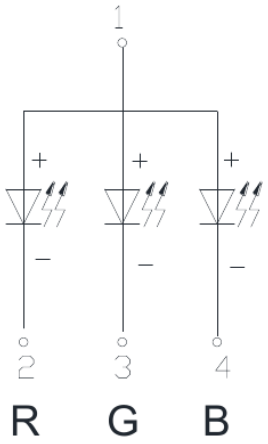
* Note: Tsol-Temperature of tin liquid； $I_{FT}$：Typical current.

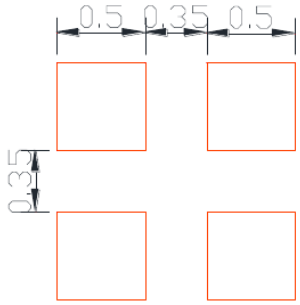
**Outline Dimension**



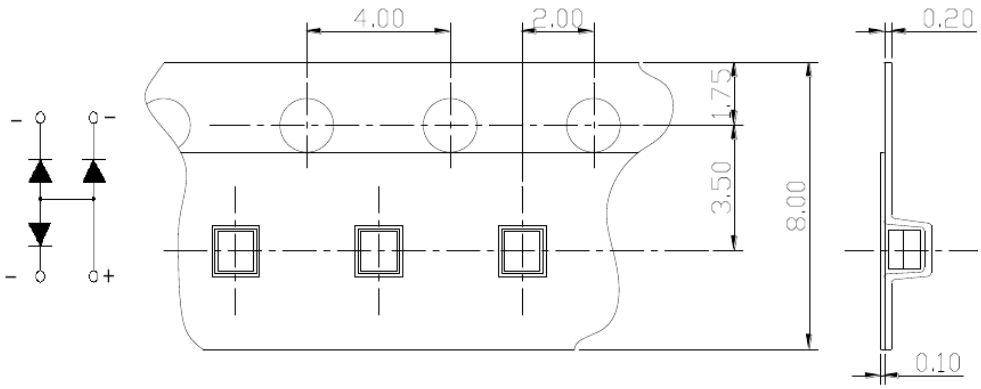

Recommended Soldering Pad

Cuprum Area:

The Tolerances Unless ： X.X ±0. 1， X.XX±0.05， Unit= mm

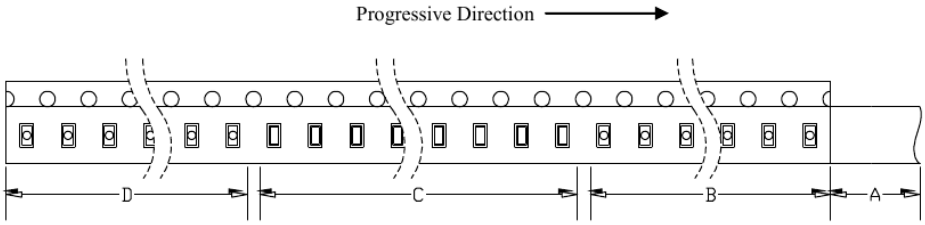
## Packaging (1)

### ✧ Carrier Tape



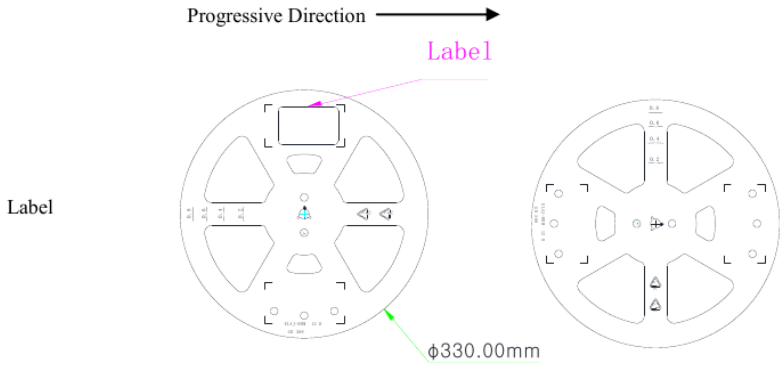

All dimensions in mm, tolerances unless mentioned is ±0.1 mm.

### ✧ Details Of Carrier Tape



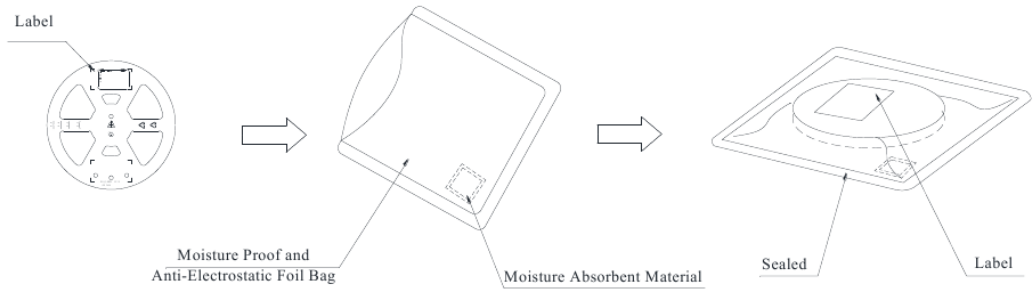

A: Top Cover Tape, 200mm; B: Leader, Empty, 100mm; C:15000 Lamps Loaded; D: Trailer, Empty, 100mm.

### ✧ Reel Dimension

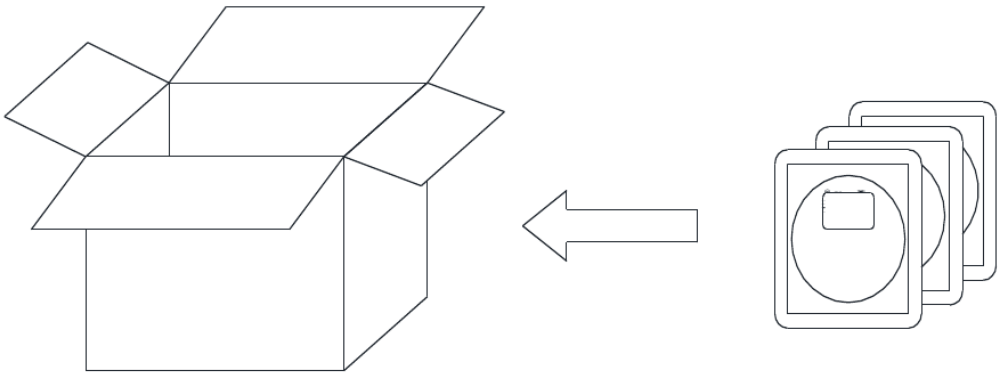


## Packaging (2)

✧ **Moisture Proof and Anti-Electrostatic Foil Bag**




✧ **Cardboard Box**



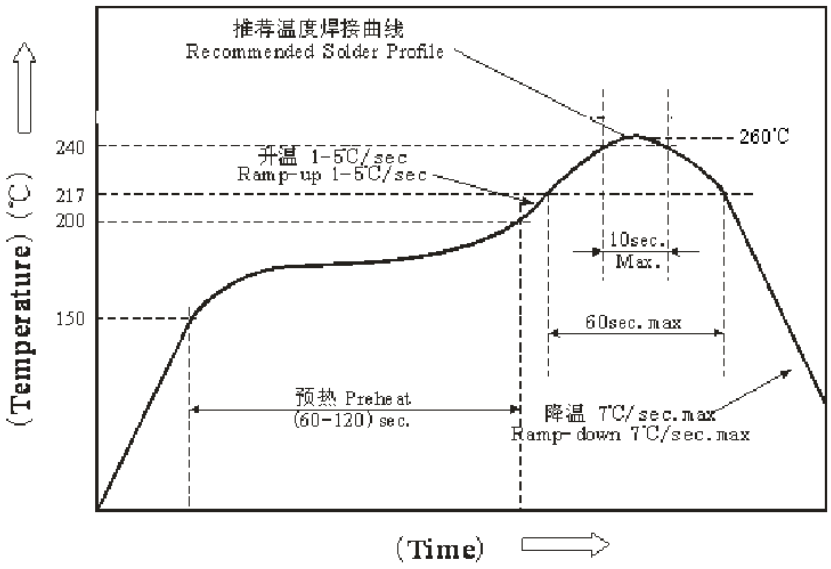
## Guideline for Soldering (1)

### 1. Hand Soldering

If manual soldering is necessary, the use of a soldering iron of less than 20W is recommended, and the temperature of the iron must be kept at below 360°C, with soldering time within 3 seconds.

No mechanical stress should be exerted on the resin portion of the SMD LED during soldering.

**2. Reflow Soldering:** Use the conditions shown in the under Figure of Pb-Free Reflow Soldering.




- Reflow soldering should not be done more than two times.
- No stress should be exerted on the package during soldering.
- After soldering, do not deal with the product before its temperature cooling down to room temperature.

## Guideline for Soldering (2)

### 1. Cleaning

It is recommended that alcohol be used as a solvent for cleaning after soldering. Cleaning is to go under 30℃ for 3 minutes or 50℃ for 30 seconds. When using other solvents, it should be confirmed beforehand whether the solvents will dissolve the package and the resin or not.

Ultrasonic cleaning is also an effective way for cleaning. But the influence of Ultrasonic cleaning on LED depends on factors such as ultrasonic power. Generally, the ultrasonic power should not be higher than 300W. Before cleaning, a pre-test should be done to confirm whether any damage to LEDs will occur.

∗ **Note:** This general guideline may not apply to all PCB designs and configurations of all soldering equipment. The technique in practice is influenced by many factors it should be specialized base on the PCB designs and configurations of the soldering equipment.

## Precautions (1)

**1.**

**Storage**

- Tn order to prevent moisture absorption into the SMD LEDs during the transportation and storage, the LEDs are packed in moistur barrier bag. Desiccants and a humidity indicator are packed together with the SMD LEDs as secondary protection. The humidity-indicator card indicates the humidity within the SMD packing.

- Before opening the package, the product should be kept at 30℃ or less and 60% RH or less。

- After opening the package :The Led's floor life is 168Hrs under 30℃ or less and 60%RH or less, if unused LEDS remain,it should be stored in moisture proof packages.

- If the moisture absorbent material has fade away or the LEDs have exceeded the storage time, baking treatment should be performed using the following condition.

  Bsking treatment:(60±5) ℃ for 24hours.

**2. Static Electricity**

Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristic such as the forward voltage becomes lower, or the LEDs do not light at the low current. even not light.

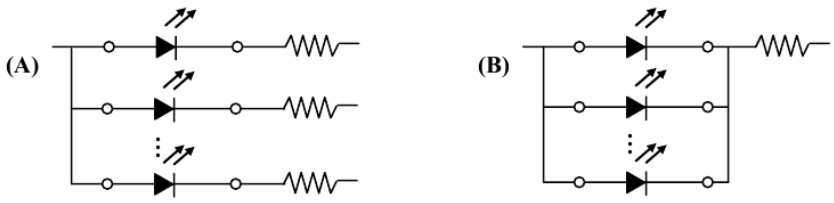
All devices, equipment and machinery must be properly grounded. At the same time, it is recommended that wrist bands or anti-electrostatic gloves, anti-electrostatic containers be used when dealing with the LEDs.

## Precautions (2)

### 1. Design Consideration

In designing a circuit, the current through each LED must not exceed the absolute maximum rating specified for each LED. In the meanwhile, Customer must apply rsistors for protection, otherwise slight voltage shift will cause big current change, burn out will happen.

It is recommended to use Circuit A which regulates the current flowing through each LED rather than Circuit B. When driving LEDs with a constant voltage in Circuit B, the current through the LEDs may vary due to the variation in Forward Voltage ($V_F$) of the LEDs. In the worst case, some LED may be subjected to stresses in excess of the Absolute Maximum Rating.




Thermal Design is paramount importance because heat generation may result in the Characteristics decline, such as brightness decreased, Color changed and so on. Please consider the heat generation of the LEDs when making the system design.

## Precautions (3)

### 1. Reverse voltage protection

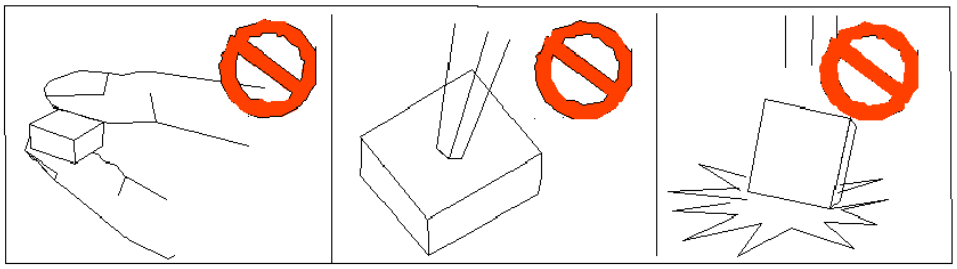
In generally the reverse current of LED is very small, it can't effect using the component normally, but when it often suffered the reverse voltage which exceed the limits of the component than it will be damaged，the reverse current increases rapidly causing the string light display grayscale so when designing , please pay attention to control the reverse voltage we suggest the reverse voltage less than 10V.

### 2. The safe temperature for LEDs working

The high temperature will make the LEDs' Luminous Intensity decreased radically, if LEDs worked in hot environment for a long time, they will be disabled easily. When LEDs are working in a closed array, we suggest that the LEDs' surface temperature should be lower than 55℃ and the legs' temperature should be lower than 75℃.

### 3. Others

When handling the product, touching the encapsulant with bare hands will not only contaminate its surface, but also affect on its optical characteristics. Excessive force to the encapsulant might result in catastrophic failure of the LEDs due to die breakage or wire deformation. For this reason, please do not put excessive stress on LEDs, especially when the LEDs are heated such as during Reflow Soldering.



The epoxy resin of encapsulant is fragile, so please avoid scratch or friction over the epoxy resin surface. While handling the product with tweezers, do not hold by the epoxy resin, be careful.