



佛山市国星光电股份有限公司

FOSHAN NATIONSTAR OPTOELECTRONICS CO., LTD

# SPECIFICATION

|              |  |         |                      |
|--------------|--|---------|----------------------|
| Customer     |  | Product | Lamp Type LED        |
| Customer No. |  | Type    | BT-586BID-31-470E-A6 |

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



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| Research & Development Center |       |      |
|-------------------------------|-------|------|
| APPROVE                       | CHECK | DRAW |
|                               |       |      |
| Version NO : A1               |       |      |
| Release Date : 2011-03-14     |       |      |

This product is generally used as indicator and luminant for electronic equipment, for commercial and entertainment decorative lighting. And it's also widely used to make up variable indoor and outdoor message signal boards.

### **Features**

- InGaN Blue LED LAMP
- $\phi 5.0\text{mm}$ , Round Top Lamp
- Blue diffused Package
- High Luminous Intensity and Low Power Dissipation
- Good Reliability and Long Life
- Complied with RoHS Directive

### **Catalogue**

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

**◇ Absolute Maximum Ratings (Temperature=25°C)**

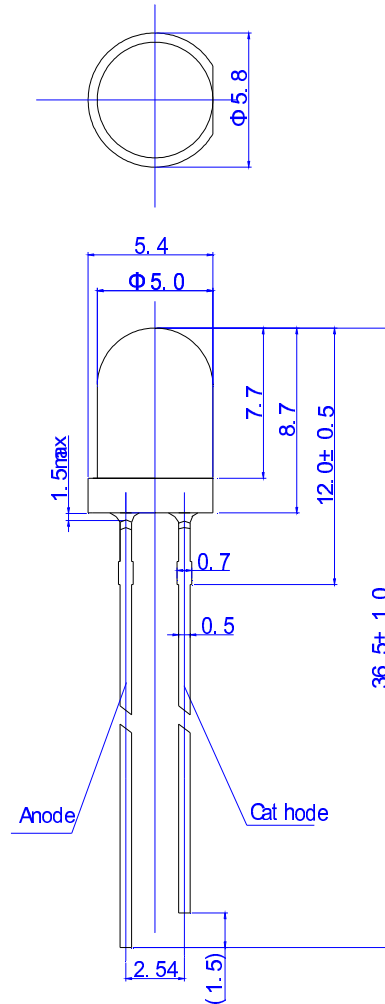
| Parameter              | Symbol    | Min. | Max. | Unit |
|------------------------|-----------|------|------|------|
| Forward Current        | $I_F$     |      | 30   | mA   |
| Pulse Forward Current* | $I_{FP}$  |      | 100  | mA   |
| Reverse Voltage        | $V_R$     |      | 5    | V    |
| Operating Temperature  | $T_{OPR}$ | -25  | +85  | °C   |
| Storage Temperature    | $T_{stg}$ | -40  | +100 | °C   |
| Power Dissipation      | $P_D$     |      | 135  | mW   |

\* Pulse Width: Max.10ms, Duty Ratio Max. 1/10

**◇ Electro-Optical Characteristics (Temperature=25°C)**

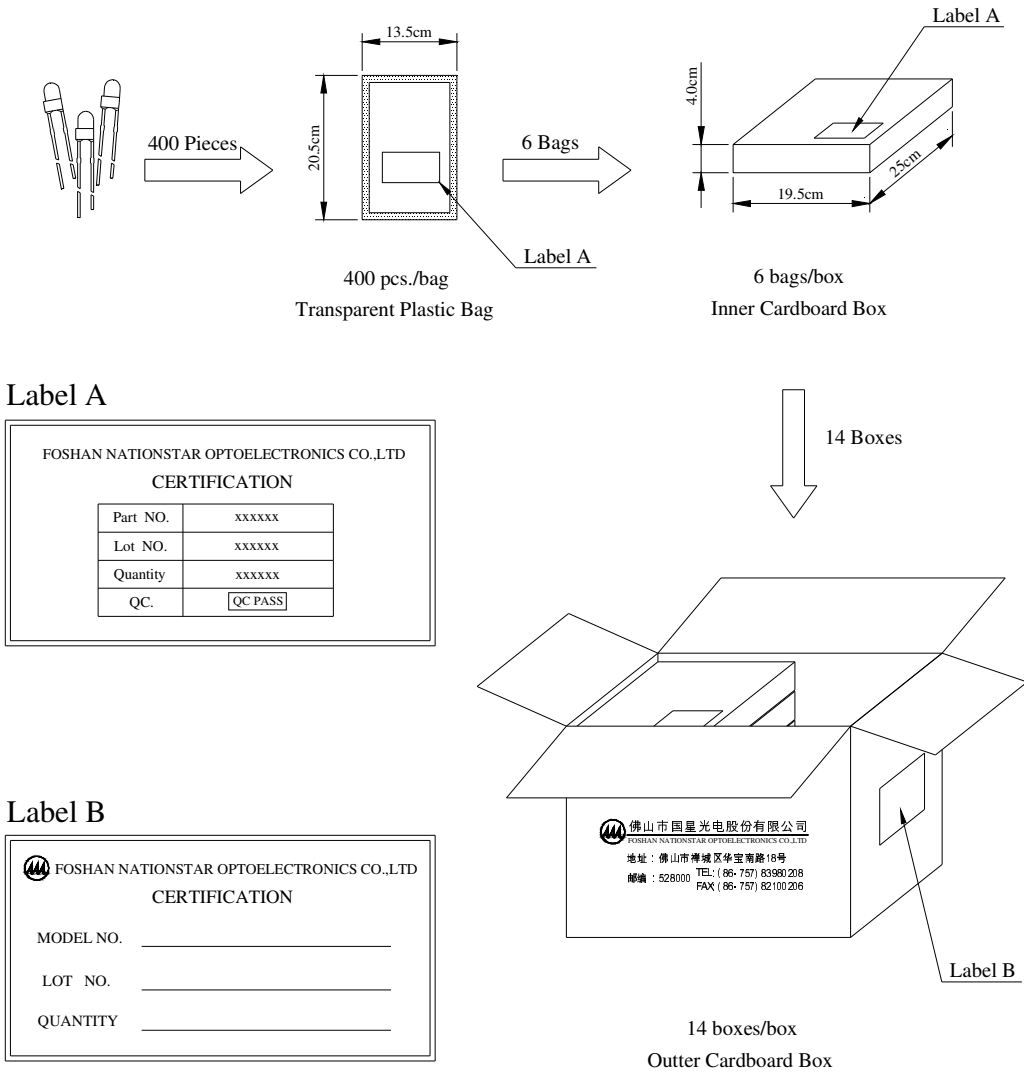
| Parameter                    | Symbol          | Condition  | Min. | Typ. | Max. | Unit    |
|------------------------------|-----------------|------------|------|------|------|---------|
| Reverse Current              | $I_R$           | $V_R=5V$   |      |      | 50   | $\mu A$ |
| Forward Voltage              | $V_F$           | $I_F=20mA$ |      | 3.2  | 4.5  | V       |
| Dominant Wavelength          | $\lambda_D$     |            |      | 471  |      | nm      |
| Spectrum Radiation Bandwidth | $\Delta\lambda$ |            |      | 24   |      | nm      |
| Luminous Intensity           | $I_V$           |            |      | 800  |      | mcd     |
| Viewing Angle                | $2\theta_{1/2}$ |            |      | 53   |      | (°)     |

◇ Dimension



All dimensions in mm, tolerances unless mentioned is  $\pm 0.2$  mm.

✧ Packaging



Note: The Outer Cardboard Box is 40.5cm; 27.0cm; 30.0cm

**◇ Reliability Test Items And Conditions:**

| Test Items  | Test Conditions  | Quantity | Judging Criteria |
|---|--|----------|------------------|
| Solderability   | Solder Temperature : (235±5) °C<br>Solder Duration : 5 sec.  | 15       | Good Wetting     |
| Resistance For Soldering Heat                                       | (260±5) °C → 10 Sec.   | 15       | I*               |
| Thermal Shock Followed by High Temperature And High Humidity Cyclic | -40°C → 10 min.<br>5 Cycles ↓↑ Shift (2~3) min.<br>100°C → 10 min.<br>↓<br>25°C~55°C<br>( 90%~95% ) RH<br>2 Cycles for 48 hrs., Recover for 2 hrs. | 20       | I*               |
| High Temperature And High Humidity Cyclic                           | 25°C~55°C<br>( 90%~95% ) RH<br>6 Cycles for 144 hrs., Recover for 2 hrs.   | 20       | I*               |
| DC Operating Life   | 1000 hrs.<br>Forward Current : 30mA  | 10       | I**              |
| High Temperature Storage  | 100°C → 1000 hrs.  | 15       | I**              |
| Terminal Strength   | Pull Test: 5N → 30 sec.<br>Bending Test: 2.5N → 2 times  | 15       | No Damaged       |

**\* Judging Criteria**

| Items              | Symbol         | Test Conditions      | Judging Criteria I* | Judging Criteria I** |
|--------------------|----------------|----------------------|---------------------|----------------------|
| Forward Voltage    | V <sub>F</sub> | I <sub>F</sub> =20mA | ≤USL                | ≤USL×1.2             |
| Reverse Current    | I <sub>R</sub> | V <sub>R</sub> =5V   | ≤USL                | ≤USL×2.0             |
| Luminous Intensity | I <sub>V</sub> | I <sub>F</sub> =20mA | ≥LSL                | ≥IL×0.5              |

\* USL: Upper Standard Level, LSL: Lower Standard Level, IL: Initial Level \*

### ✧ Soldering

Be careful because damages always caused during soldering. Please note that stress to the Leads and exposed bulb should be avoided during soldering particularly when heated. When soldering, leave certain distance from soldering joint to base, the distance is determined by different soldering techniques. It is recommended that soldering be performed base on the following conditions.

#### Recommended Soldering Conditions:

| DIP Soldering    |   | Hand Soldering     |   |
|------------------|---|--------------------|---|
| Pre-Heat         | 100 °C Max., 60 sec. Max.                   | Temperature        | 300 °C Max.                                 |
| Bath Temperature | 260 °C Max.                                 |                    |   |
| Dipping Time     | 5 sec. Max.                                 | Soldering Time     | 3 sec. Max.                                 |
| Dipping Position | 2 mm Min.<br>(from soldering joint to base) | Soldering Position | 4 mm Min.<br>(from soldering joint to base) |

- Either DIP Soldering or Hand Soldering should not be done more than one time.
- After soldering, the LEDs should be protected from mechanical shock or stress before the LEDs cool down to room temperature.
- Cut the leadframes after the LEDs return to room temperature.
- It is recommended that alcohol be used as a solvent for cleaning after soldering. When using other solvents, or other cleaning method it should be confirmed whether the solvents will dissolve the resin or not.

**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. Storage

Under the storage conditions of 30°C or less and humidity less than 70% RH, the LEDs can be storage for 3 months. Storage in a sealed container with moisture absorbent material can prolong the storage time to a certain extent. Bad storage conditions may cause the leadframes to corrode or degradation of LED characteristics. It is recommended that the LEDs be used as soon as possible.

### 2. Static electricity

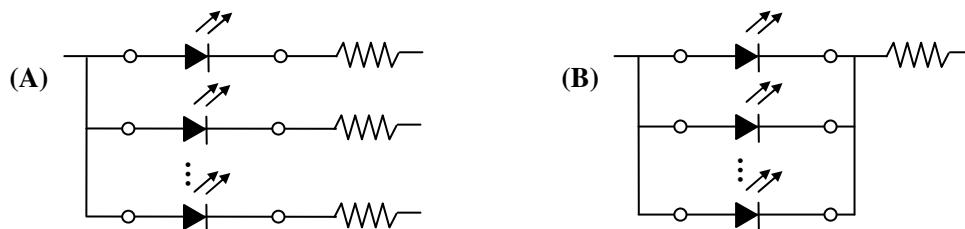
Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristic such as the forward voltage becomes lower, or the LEDs do not light at the low current, even not light.

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.

### 3. 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, resistors for protection should be applied, otherwise slight voltage shift will cause big current change, burn out may 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 (VF) 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.

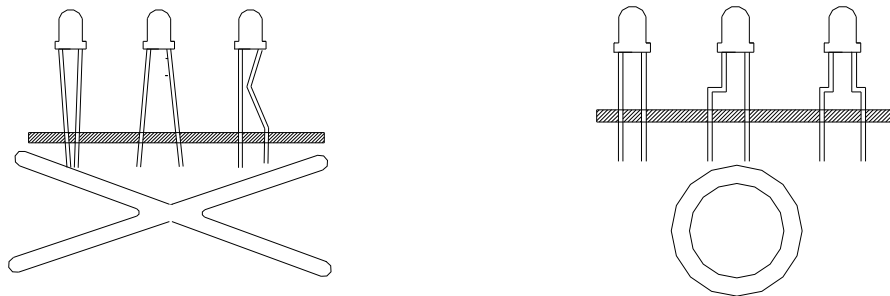


#### 4. Lead Forming

Any lead forming must be done before soldering, not during or after soldering. When forming leads, the leads should be bent at a point at least 3mm from the base of the exposed bulb. Bending at the same point twice or even more should be avoided.

Please use proper tools to hold and bent the leads, do not use the base of the leadframe as a fulcrum during lead forming. Bending stress to the base of the leadframe may cause characteristics change on LED or even break it.

Just for the same reason, when mounting the LEDs onto a printed circuit board, the holes on the circuit board should be exactly aligned with the leads of the LEDs.



#### 5. Safety Advice for Human Eyes

Viewing direct to the light emitting center of the LEDs, especially those of great Luminous Intensity, will cause great hazard to human eyes. Please be careful.



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