



# PRODUCT SPECIFICATION

Model No: BOS-0603BDW

For reference only.

Subject to change maybe necessary in a limited number of cases

| Descriptions: |   |
|---------------|---|
| ▪             | <b>Miniature Surface Mounted Chip LED</b>                       |
| ▪             | <b>Upward-lightning And Surface Mounted Type (0603 Package)</b> |
| ▪             | <b>Emitting Color : Iceland-Blue</b>                            |
| ▪             | <b>Viewing Angle : 120°</b>                                     |



| CUSTOMER APPROVED SIGNATURES | APPROVED BY   | CHECKED BY | PREPARED BY |
|------------------------------|---------------|------------|-------------|
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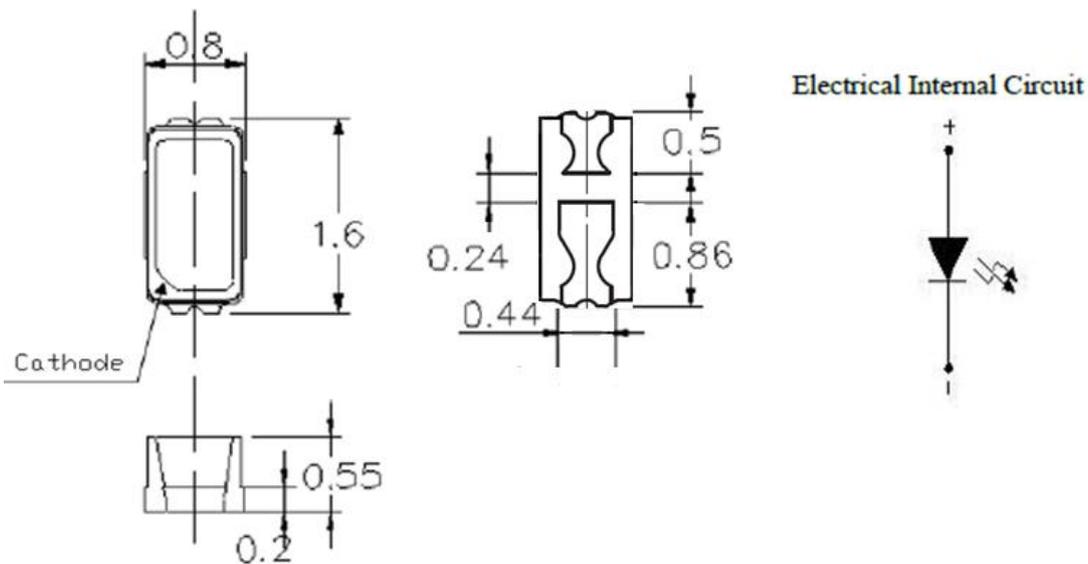
### ■ Applications

- Mobile Phone,
- Back\_light
- Indicator...

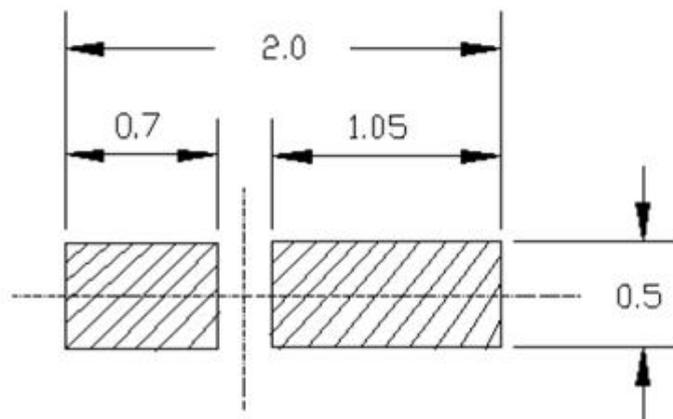
### Device Selection Guide

| Model No.   | Chip     |                | Epoxy Color         |
|-------------|----------|----------------|---------------------|
|             | Material | Emitting Color |                     |
| BOS-0603BDW | InGaN    | Iceland-Blue   | Aqua green Diffused |

### ■ Package Outline Dimensions



### Recommended Soldering Pad



Notes:

All dimensions in mm

tolerance  $\pm 0.1$ mm

unless otherwise noted



■ Absolute Maximum Ratings(Ta=25° C)

| Items                      | Symbol           | Absolute Maximum Ratings | Unit |
|----------------------------|------------------|--------------------------|------|
| Power Dissipation          | P <sub>d</sub>   | 70                       | mW   |
| Forward Current(DC)        | I <sub>F</sub>   | 20                       | mA   |
| Peak Forward Current*      | I <sub>FP</sub>  | 60                       | mA   |
| Reverse Voltage            | V <sub>R</sub>   | 5                        | V    |
| Junction Temperature       | T <sub>J</sub>   | 125                      | °C   |
| Operation Temperature      | T <sub>opr</sub> | -40 ~ +110               | °C   |
| Storage Temperature        | T <sub>stg</sub> | -40 ~ +110               | °C   |
| Electrostatic Discharge    | ESD              | 2000                     | V    |
| Lead Soldering Temperature | T <sub>sol</sub> | 260°C for 5 Seconds      |      |

\*Pulse Width  $\leq 0.1\text{msec}$  and Duty  $\leq 1/10$

■ Typical Electrical & Optical Characteristics (Ta=25°C)

| Items              | Symbol            | Condition           | Min. | Typ. | Max. | Unit |
|--------------------|-------------------|---------------------|------|------|------|------|
| Forward Voltage    | V <sub>F</sub>    | I <sub>F</sub> =5mA | 2.7  | 2.9  | 3.1  | V    |
| Reverse Current    | I <sub>R</sub>    | V <sub>R</sub> =5V  | ---  | ---  | 10   | μA   |
| Luminous Intensity | I <sub>v</sub>    | I <sub>F</sub> =5mA | ---  | 400  | ---  | mcd  |
| 50% Power Angle    | 2θ <sub>1/2</sub> | I <sub>F</sub> =5mA | ---  | 120  | ---  | deg  |

■ Forward Voltage Rank Limits ( I<sub>F</sub> =5mA )

| Code | Min | Max | Unit |
|------|-----|-----|------|
| 2H   | 2.7 | 2.8 | V    |
| 2J   | 2.8 | 2.9 |      |
| 2K   | 2.9 | 3.0 |      |
| 3A   | 3.0 | 3.1 |      |

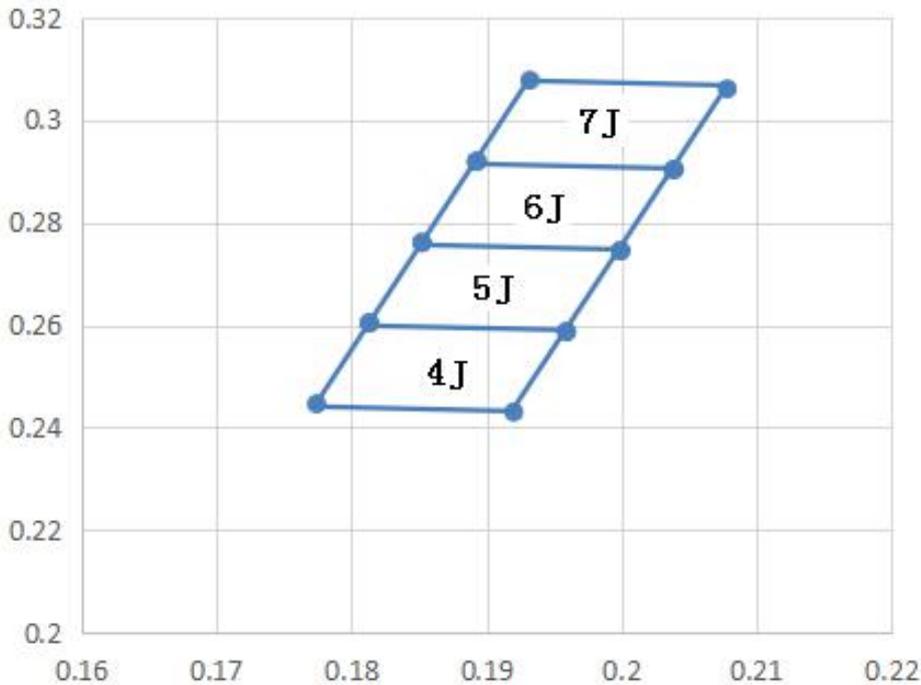
■ Luminous Intensity Rank Limits( I<sub>F</sub> =5mA )

| Code | Min | Max | Unit |
|------|-----|-----|------|
| J    | 330 | 380 | mcd  |
| K    | 380 | 450 |      |
| L    | 450 | 520 |      |



■ Chromaticity Coordinate Rank Limits( IF =5mA )

| Rank | Measure conditions: IF=5mA |        |         |        |         |        |         |        |
|------|----------------------------|--------|---------|--------|---------|--------|---------|--------|
|      | (x1,y1)                    |        | (x2,y2) |        | (x3,y3) |        | (x4,y4) |        |
|      | x1                         | y1     | x 2     | y2     | X3      | y 3    | X4      | y 4    |
| 4J   | 0.1813                     | 0.2604 | 0.1774  | 0.2446 | 0.192   | 0.243  | 0.1959  | 0.2587 |
| 5J   | 0.1852                     | 0.2761 | 0.1813  | 0.2604 | 0.1959  | 0.2587 | 0.1999  | 0.2745 |
| 6J   | 0.1892                     | 0.2919 | 0.1852  | 0.2761 | 0.1999  | 0.2745 | 0.2038  | 0.2903 |
| 7J   | 0.1932                     | 0.3078 | 0.1893  | 0.292  | 0.2039  | 0.2904 | 0.2078  | 0.3061 |



- Notes: 1.Tolerance of measurement of forward voltage is  $\pm 0.05V$  ;
- 2. Tolerance of measurement of luminous intensity is  $\pm 10\%$ ;

**Note: For long-term performance, the drive currents between 1 mA and 20 mA are recommended. If the drive currents is different with our condition ,Please contact our customer service.**



■ Typical Electrical / Optical Characteristics Curves  
( $T_a = 25^\circ\text{C}$  Unless Otherwise Noted)

Fig.1 Forward Current vs. Forward Voltage

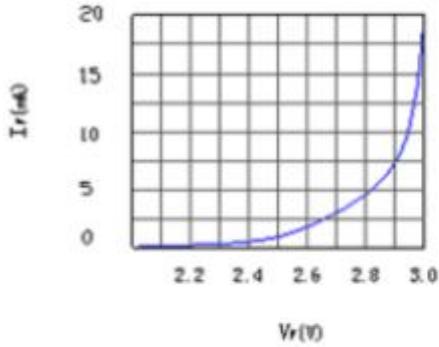


Fig.2 Relative Luminous Intensity vs. Forward Current

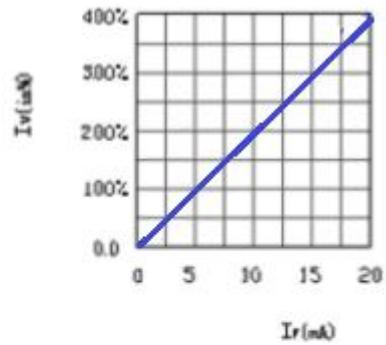


Fig.3 Relative Luminous Intensity vs. Wavelength

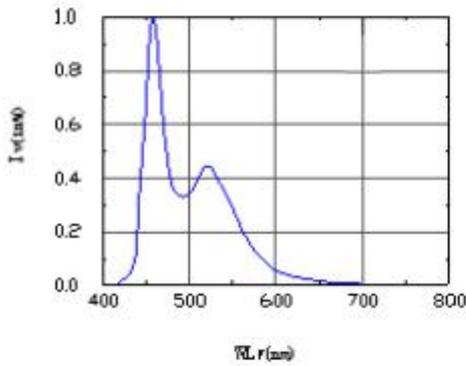


Fig.4 Relative Luminous Intensity vs. Ambient Temperature

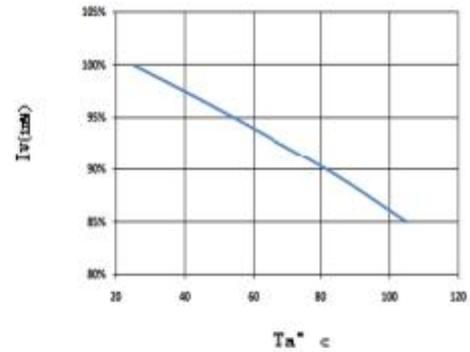


Fig.5 Maximum Forward Current vs. Ambient Temperature

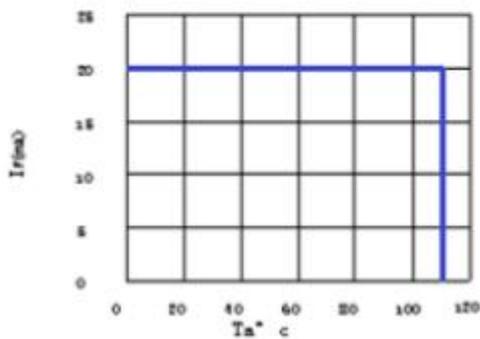
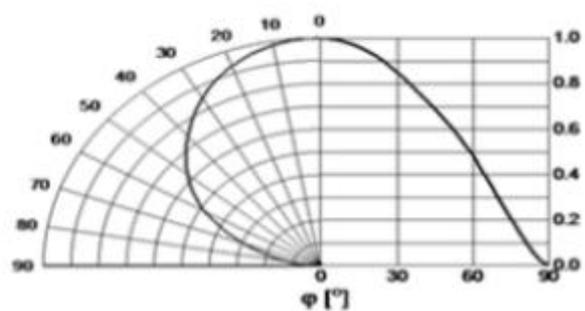


Fig.6 Relative Luminous Intensity vs. Radiation Angle



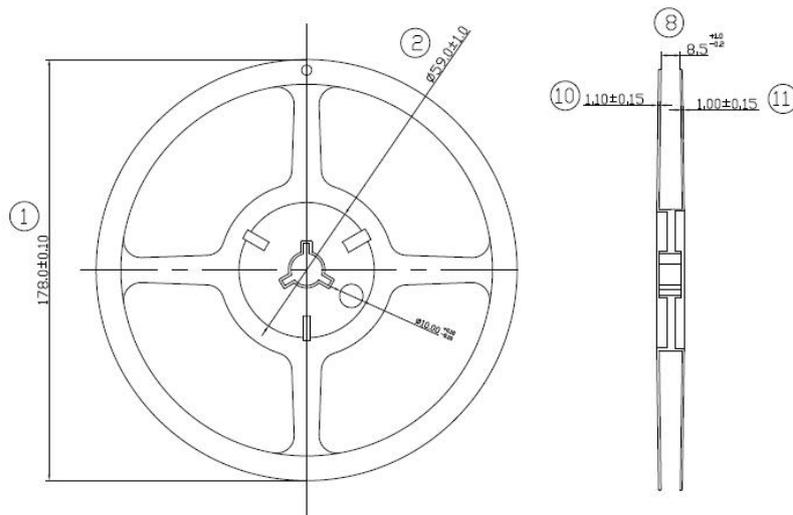
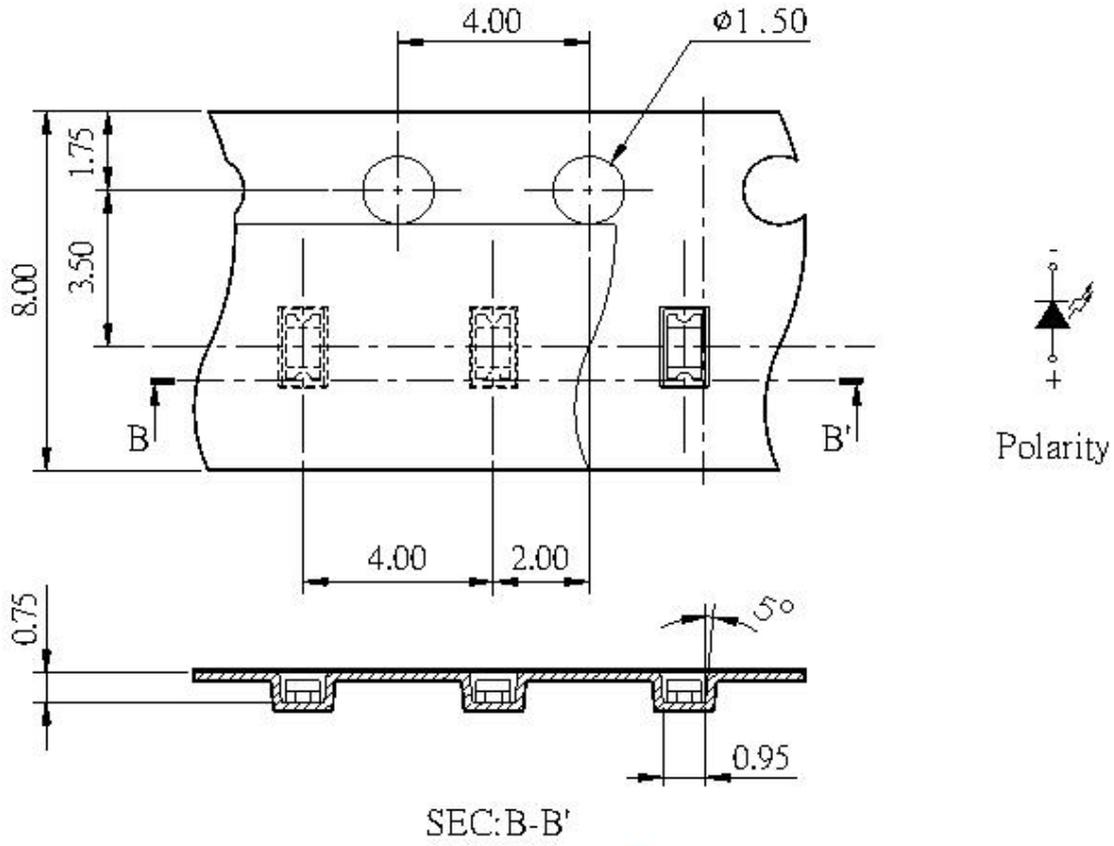


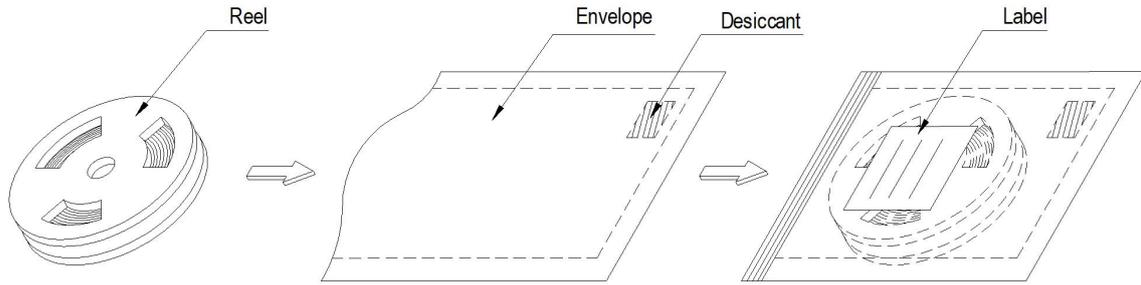
### ■ Packing Specification

1. Packing Type: Reel and Anti-electrostatic Bag

2. Packing Standard Quantity: 4000pcs/Reel, 40kpcs/box.

Note: The same Rank LED should be in the same box.





### 3. Label Form

| DIVISION VI LED Factory |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
|-------------------------|---|--|---------|-----|--|------|--|--|------|--|--|--|-------|-----|----|--|--|-----|--|--|-----|--|--|-----|--|--|-----|--|--|
| <b>BOS-0603BDW</b>      |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| SAP NO:<br>[Barcode]    | <table border="1"> <thead> <tr> <th colspan="3">LED烘烤标识</th> </tr> <tr> <th>产品型号</th> <td></td> <td></td> </tr> <tr> <th>客户料号</th> <td></td> <td></td> </tr> <tr> <th></th> <th>日期/时间</th> <th>责任人</th> </tr> </thead> <tbody> <tr> <td>拆封</td> <td></td> <td></td> </tr> <tr> <td>烘烤1</td> <td></td> <td></td> </tr> <tr> <td>取料1</td> <td></td> <td></td> </tr> <tr> <td>烘烤2</td> <td></td> <td></td> </tr> <tr> <td>取料2</td> <td></td> <td></td> </tr> </tbody> </table> |  | LED烘烤标识 |     |  | 产品型号 |  |  | 客户料号 |  |  |  | 日期/时间 | 责任人 | 拆封 |  |  | 烘烤1 |  |  | 取料1 |  |  | 烘烤2 |  |  | 取料2 |  |  |
| LED烘烤标识                 |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| 产品型号                    |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| 客户料号                    |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
|                         |   |  | 日期/时间   | 责任人 |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| 拆封                      |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| 烘烤1                     |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| 取料1                     |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| 烘烤2                     |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| 取料2                     |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| LOT NO:<br>[Barcode]    |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| VF(V):<br>[Barcode]     |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| IV(mcd):<br>[Barcode]   |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| CHC:<br>[Barcode]       |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| Q'ty(pcs)<br>[Barcode]  |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| CODE:                   |   |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |
| Made in China           | QA Date:  |  |         |     |  |      |  |  |      |  |  |  |       |     |    |  |  |     |  |  |     |  |  |     |  |  |     |  |  |

Notes:

- SAP NO. :BYD Products Number
- Custom P/N:Custom Molde Number
- Q'TY: Packing Quantity
- IV: Luminous Intensity
- VF: Forward Voltage
- CHC: Coordinate rank



■ Reliability

1) Test Items and Results:

| Classification   | Test Item                | Standard Test Method                                | Test Conditions                      | Duration    | Units Tested | Number Of Damaged |
|------------------|--------------------------|---|--------------------------------------|-------------|--------------|-------------------|
| Life Test        | Operating Life Test      | JIS7021:B4  | Ta=85°C±5°C, IF=20mA                 | 1000 Hrs    | 22           | 0/22              |
|                  |                          | MIL-STD-202:107D<br>MIL-STD-750:1026                |                                      |             |              |                   |
| Environment Test | High Temperature Storage | JIS7021:B10<br>MIL-STD-202:210A<br>MIL-STD-750:2031 | Ta=110°C±5°C                         | 1000Hrs     | 22           | 0/22              |
|                  | Low Temperature Storage  | JIS7021:B12   | Ta=-40°C±5°C                         | 1000Hrs     | 22           | 0/22              |
|                  | Temp. & Humidity Test    | JIS7021:B11<br>MIL-STD-202:103D                     | Ta=85°C±5°C<br>RH=85%±5%RH           | 1000 Hrs    | 22           | 0/22              |
|                  | Thermal Shock Test       | JIS7021B4<br>MIL-STD-202:107D<br>MIL-STD-750:1026   | -40°C ← - → 125°C<br>5min 10sec 5min | 1000 Cycles | 22           | 0/22              |
|                  | ESD                      | JESD22 A-114  | ±2KV                                 | 5 times     | 22           | 0/22              |
| Soldering Test   | Resistance to soldering  |   | Tsol=260±5°C, 10sec                  | 1 time      | 22           | 0/22              |

2) Criteria for Judge The Damage:

| Items              | Symbol         | Condition            | Criteria for Judge  |                     |
|--------------------|----------------|----------------------|---------------------|---------------------|
|                    |                |                      | Min.                | Max.                |
| Forward Voltage    | V <sub>F</sub> | I <sub>F</sub> =20mA | ---                 | initial value x 1.1 |
| Reverse Current    | I <sub>R</sub> | V <sub>R</sub> =5V   | ---                 | initial value x 1.1 |
| Luminous Intensity | I <sub>V</sub> | I <sub>F</sub> =20mA | initial value x 0.8 | ---                 |

**■Precautions For Use**

**1. Over –current –proof**

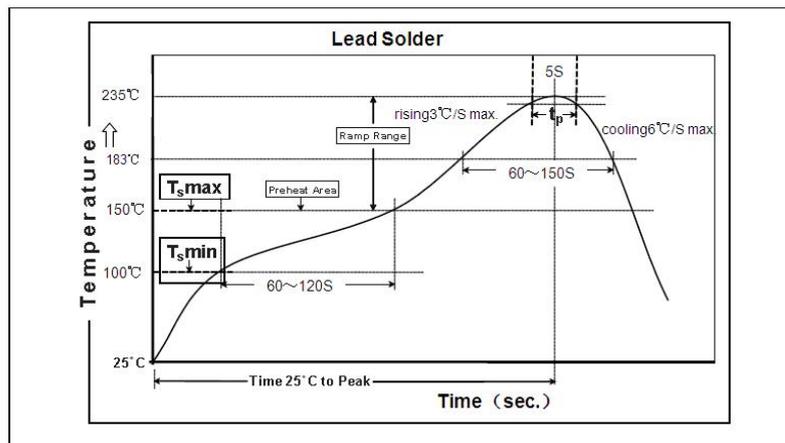
Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change (Burn out will happen)

**2. Storage Caution**

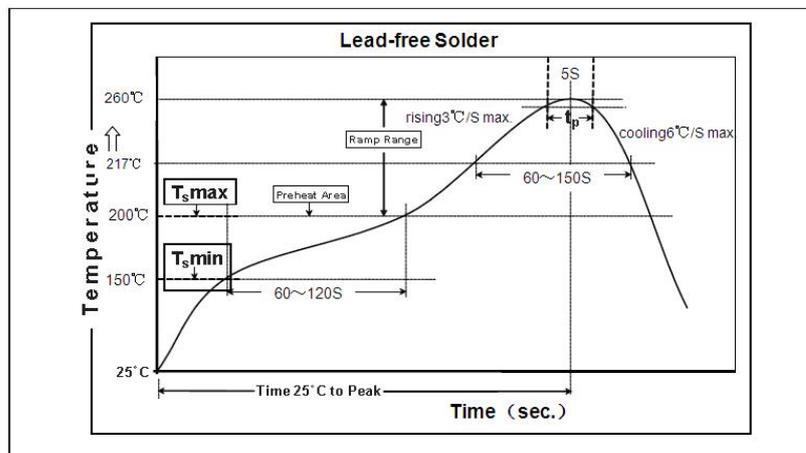
- 2.1 The storage condition in sealed bags: at 5-35 °C and <70% relative humidity.
- 2.2 After bags are opened, the devices must be mounted within 24 hrs at <60% relative humidity.
- 2.3 It will be better to bake all devices before soldering.
- 2.4 Devices must be baked before mounting, if
  - A, the color of humidity indicator card at point “>30%” is pink (the original color is blue);
  - B, bags are opened over 168 hrs.
  - C. the stroge time (begin with QA date ) is over 1 year.
- 2.5 The bake condition: 24 hrs at 65°C ±5 °C (12-48 hrs will be available if 24 is not suitable)

**3. Reflow Soldering / Time**

3.1 Lead Solder/Time



3.2 Lead-free Solder/Time



#### 4. Soldering Iron

- 4.1 When hand soldering, keep the temperature of iron below less 300°C less than 3 seconds
- 4.2 The hand solder should be done only one times
- 4.3 The basic spec is  $\leq 5$  sec. when the temperature of 260°C, do not contact the resin when hand soldering

#### 5. Rework

- 5.1. Customer must finish rework within 5 sec. under 260°C
- 5.2. The head of iron can not touch the resin
- 5.3. Twin-head type is preferred.

#### 6. Control method of LED devices Usage

1). Before baking, it is necessary to fill in the baking form that including detail information such as model and lot number of devices, starting and ending time of baking, operators, etc. Devices that have longest dehumidify time should be used previously for those baked over 24 hrs. LED products that will not use immediately should be vacuum sealed when the baking time is almost 72hrs. Devices must be baked before next soldering.

2). The baked devices must be mounted within 24 hrs. Devices each time get out from the oven should be mounted in 4 hrs.

3). Devices must be baked 24hrs at  $65 \pm 5$  °C if the exposure time is between 24hrs and 48 hrs. Bulk devices must be baked 12hrs at 125 °C in metal plate if the exposure time is over 48 hrs.

4). The soldering interval should be less than 24hrs if the PCB with devices will be SMT for two times. PCB with devices must be baked 24 hrs at  $65 \pm 5$  °C if the interval of two SMT is between 24hrs and 48hrs. Or PCB with devices must be baked 12 hrs at 100 °C to 125 °C if the interval of two SMT is between 24hrs and 48hrs.

#### 7. Caution in ESD

- 7.1 Electrostatic discharge (ESD) and surge current (EOS) can damage LEDs.
- 7.2 An ESD wrist strap, ESD shoe strap or antistatic gloves must be worn whenever handling LEDs
- 7.3 All devices equipment and machinery must be properly grounded.

#### 8. RESTRICTIONS ON PRODUCT USE

- The information contained herein is subject to change without notice.
  
- **BYD Semiconductor Company Limited** exerts the greatest possible effort to ensure high quality and reliability. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing products, to comply with the standards of safety in making a safe design for the entire system, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue. In developing your designs, please ensure that products are used within specified operating ranges as set forth in the most recent products specifications.



- The products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of products listed in this document shall be made at the customer’s own risk.