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## Snowdragon Industrial Co.,Ltd

### DATA SHEET

**MODEL N.O.: SDS5050TCU-S-OK-B**

**ENG. N.O.: 12022102**

**Description:**

- **Shape: 5.0\*5.4\*1.6mm Surface Mount LEDs**
- **Emitting Color: RGB**
- **Lens Color : Clear Lucite**
- **Viewing Angle: 120°**
- **Chip Material: AlGaInP&InGaN**

| PREPARED BY                  | CHECKED BY | APPROVED BY |
|------------------------------|------------|-------------|
|                              |            |             |
| CUSTOMER APPROVED SIGNATURES |            |             |
|                              |            |             |

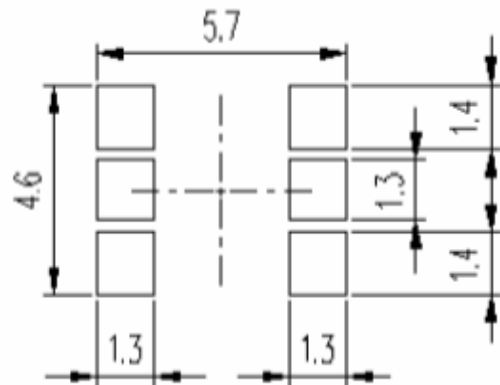
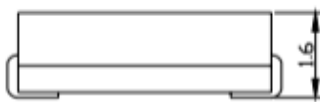
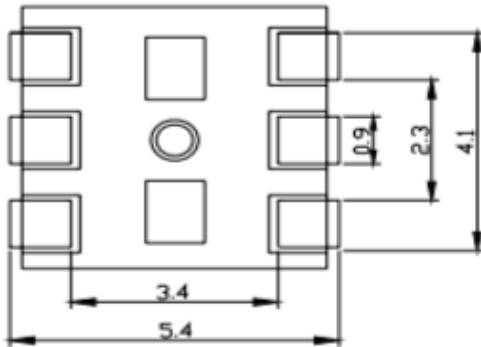
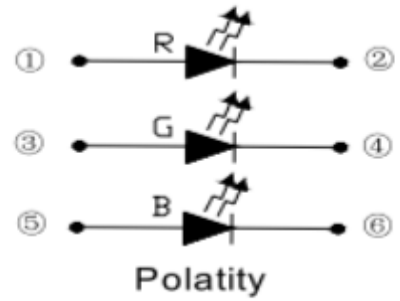
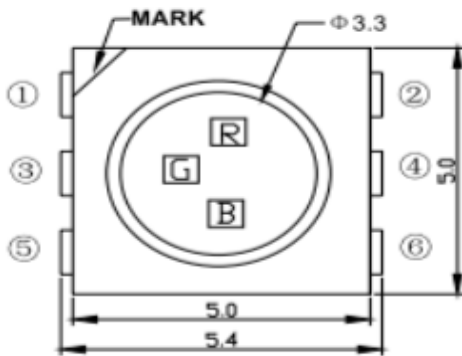


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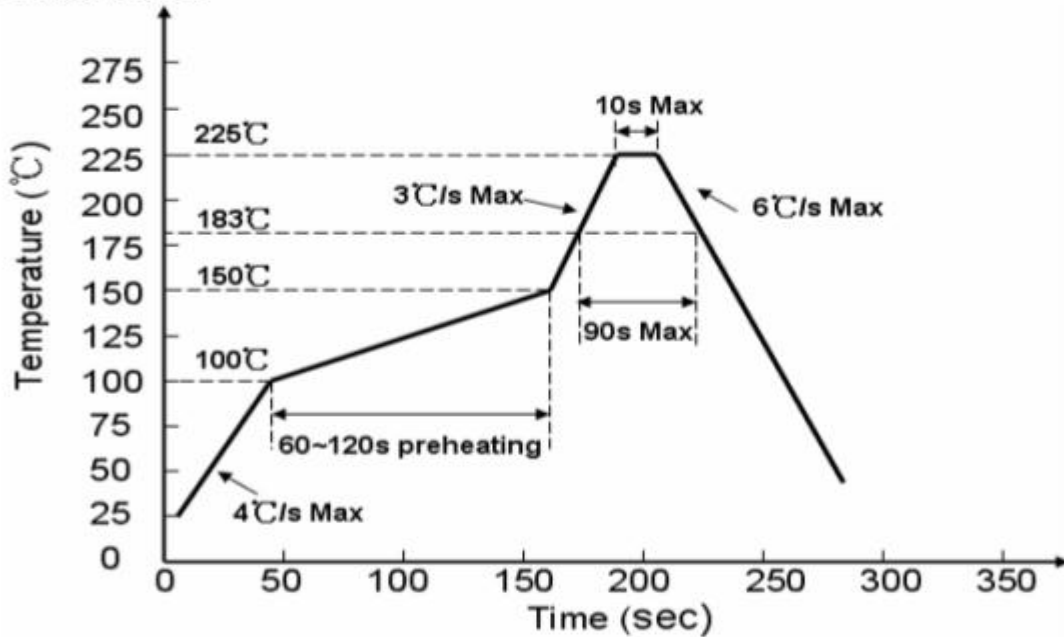


- Notes: 1. All dimensions are in millimeters ;  
2. Tolerance is  $\pm 0.10$  mm unless otherwise noted.

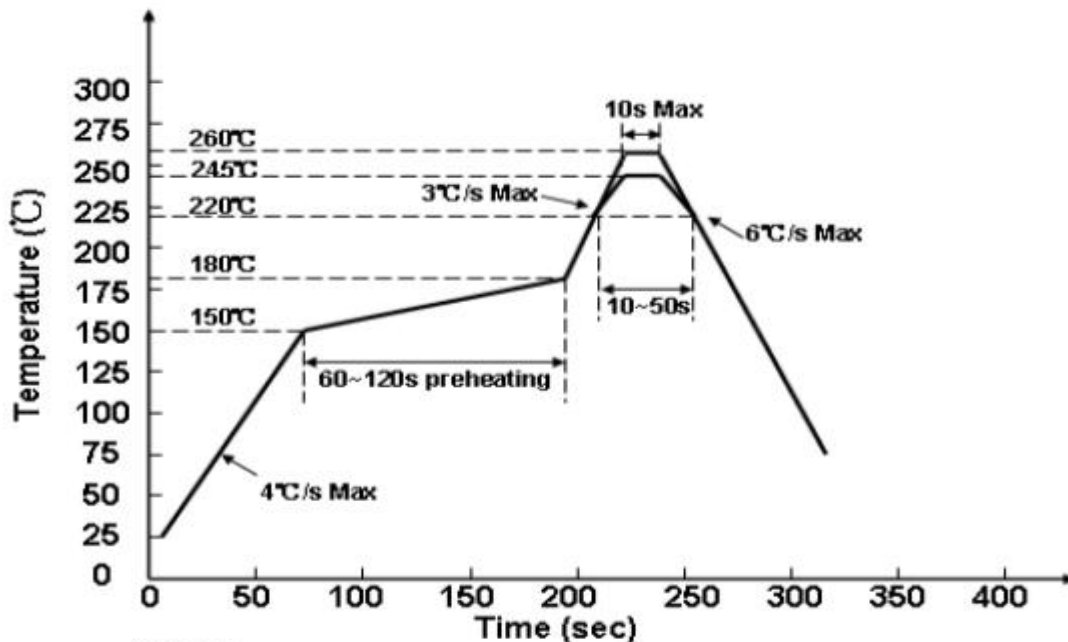
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For Lead Solder



For Lead Free Solder



Notes:

We recommend the soldering temperature  $245 \pm 5^\circ\text{C}$  ;

The maximum temperature should be limited to  $260^\circ\text{C}$ .



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**Absolute Maximum Ratings At Ta=25°C**

| <b>Parameter</b>   | <b>Symbol</b> | <b>Rating</b>   |     | <b>Unit</b> |  |
|--|---------------|---|-----|-------------|--|
| Power Dissipation  | Pd            | R   | 70  | mW          |  |
|  |               | G   | 90  |             |  |
|  |               | B   | 90  |             |  |
| Peak Forward Current<br>(1/10 Duty Cycle, 0.1ms Pulse Width) | IFP           | R   | 70  | mA          |  |
|  |               | G   | 100 |             |  |
|  |               | B   | 100 |             |  |
| DC Forward Current   | IF            | R   | 30  | mA          |  |
|  |               | G   | 30  |             |  |
|  |               | B   | 30  |             |  |
| Reverse Voltage  | VR            | R   | 5   | V           |  |
|  |               | G   | 5   |             |  |
|  |               | B   | 5   |             |  |
| Operating Temperature Range                                  | Topr          | -30°C ~ +85°C   |     |             |  |
| Storage Temperature Range                                    | Tstg          | -40°C ~ +90°C   |     |             |  |
| Soldering Condition  | Tsol          | Reflow soldering : 260°C For 5 Seconds<br>Hand soldering: 300°C For 3 Seconds |     |             |  |

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**Electrical Optical Characteristics At Ta=25°C**

| Parameter                | Symbol          | Color | Min. | Typ. | Max. | Unit | Test Condition |
|--------------------------|-----------------|-------|------|------|------|------|----------------|
| Luminous Intensity       | IV              | R     | ---  | 285  | ---  | mcd  | IF = 20mA      |
|                          |                 | G     | ---  | 1150 | ---  |      |                |
|                          |                 | B     | ---  | 350  | ---  |      |                |
| Dominant Wavelength      | $\lambda_d$     | R     | ---  | 624  | ---  | nm   | IF=20mA        |
|                          |                 | G     | ---  | 525  | ---  |      |                |
|                          |                 | B     | ---  | 468  | ---  |      |                |
| Peak Wavelength          | $\lambda_p$     | R     | ---  | 630  | ---  | nm   | IF=20mA        |
|                          |                 | G     | ---  | 530  | ---  |      |                |
|                          |                 | B     | ---  | 470  | ---  |      |                |
| Spectral Line Half-Width | $\Delta\lambda$ | R     | ---  | 25   | ---  | nm   | IF=20mA        |
|                          |                 | G     | ---  | 35   | ---  |      |                |
|                          |                 | B     | ---  | 30   | ---  |      |                |
| Forward Voltage          | VF              | R     | 1.8  | ---  | 2.6  | V    | IF=20mA        |
|                          |                 | G     | 2.8  | ---  | 3.6  |      |                |
|                          |                 | B     | 2.8  | ---  | 3.6  |      |                |
| Reverse Current          | IR              | R     | ---  | ---  | 10   | uA   | VR=5V          |
|                          |                 | G     | ---  | ---  | 10   |      |                |
|                          |                 | B     | ---  | ---  | 10   |      |                |
| Viewing Angle            | 2 $\theta$ 1/2  | ---   | ---  | 120  | ---  | deg  | IF = 20mA      |

- Notes: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
2.  $\theta$ 1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The dominant wavelength,  $\lambda_d$  is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

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### Typical Electrical-Optical Characteristics Curves

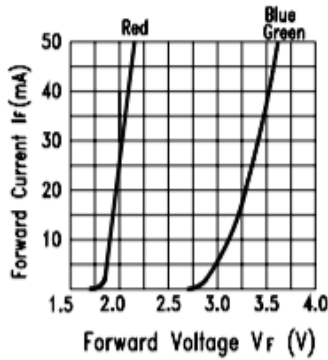
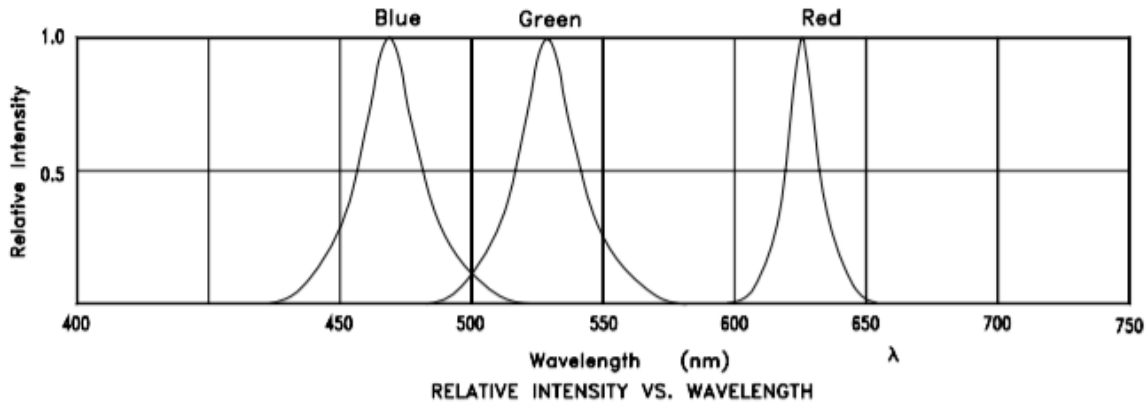


Fig.2 Forward Current vs. Forward Voltage

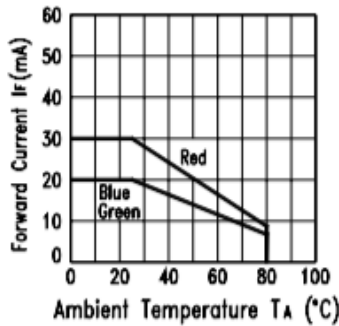


Fig.3 Forward Current Derating Curve

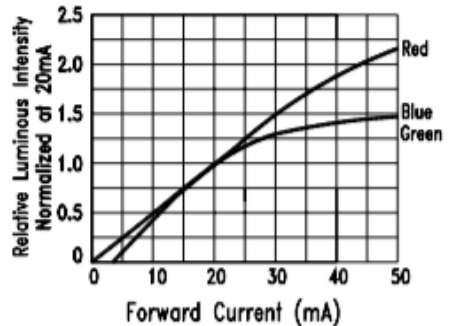


Fig.4 Relative Luminous Intensity vs. Forward Current

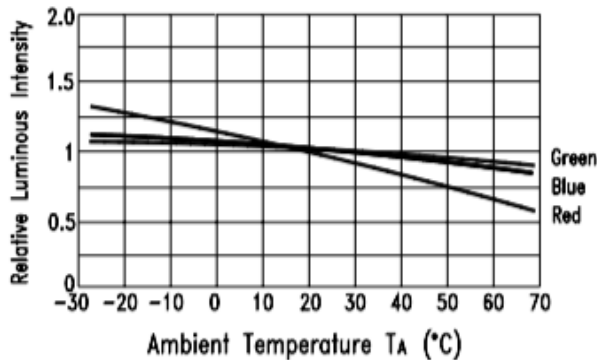


Fig.5 Luminous Intensity vs. Ambient Temperature

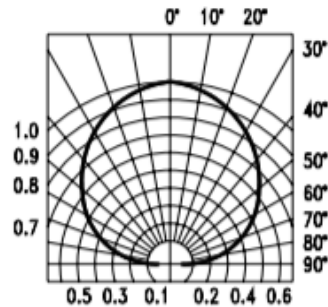


Fig.6 Spatial Distribution



**LED Lamp Reliability test standard**

| Type                  | Test Item                    | REF. Standard       | Test conditions  |  | Note             | Number of Damaged |
|-----------------------|------------------------------|---------------------|--|--|------------------|-------------------|
|                       |                              |                     | Binary / Trinary Chip                                      | Quaternary Chip                                |                  |                   |
| Environments Sequence | Temperature Cycle            | JIS C7021 (1977)A4  | -20°C~25°C~80°C~25°C<br>30min,5min,30min,5min              | -40°C~25°C~100°C~25°C<br>30min,5min,30min,5min | 100 cycles       | 0/100             |
|                       | Thermal shock                | MIL-STD-202G        | -20°C~80°C<br>30min, 30min                                 | -40°C~100°C<br>30min, 30min                    | 100 cycles       | 0/100             |
|                       | High Temperature Storage(*)  | JIS C7021 (1977)B10 | Ta=80°C  | Ta=100°C                                       | 1000Hrs          | 0/100             |
|                       | Low Temperature Storage      | JIS C7021 (1977)B12 | Ta=-30°C   | Ta=-40°C                                       | 1000Hrs          | 0/100             |
| Operation Sequence    | Life test                    | JIS C7035 (1985)    | Ta=25°C If=25mA  | Ta=25 °C If=25mA                               | 1000Hrs          | 0/100             |
|                       | High humidity Heat life test | -----               | 60°C RH=90%<br>If=20mA                                     | 60°C RH=90%<br>If=20mA                         | 500Hrs           | 0/100             |
|                       | Low temperature Life test    | -----               | Ta=-20°C<br>If=20mA  | Ta=-30°C<br>If=20mA                            | 1000Hrs          | 0/100             |
| Destructive Sequence  | Resistance to solderingHeat  | JIS C7021 (1977)A11 | Tsol=260±5°C ,10sec. (3mm from the base of the epoxy bulb) |  | 1 time           | 0/20              |
|                       | Solder ability               | JIS C7021 (1977)A2  | Tsol=235±5°C ,5sec. (using flux)                           |  | 1 time (over95%) | 0/20              |
|                       | Lead Pull/Bend Test          | JIS C7021 (1977)A11 | Load 2.5N(0.25kgf)<br>0°C~90°C~0°C;Bend 3times             |  | 3 time           | 0/10              |
| ESD Test              | ESD TEST                     | AEC (Q101002)       | Human body model 1000v                                     |  | -----            | 0/10              |

Items marked with \* are selective.

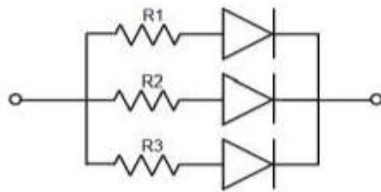


**Failure Criteria**

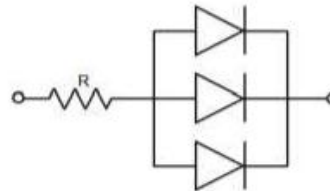
| Item                    | Symbol | Test Condition | Criteria for Judgment  |                    |
|-------------------------|--------|----------------|--|--------------------|
|                         |        |                | min  | Max                |
| Forward Voltage         | VF     | IF = 20 mA     | -----  | Initial Data x 1.1 |
| Reverse Current         | IR     | VR = 5 V       | -----  | 100 A              |
| Luminous Flux/Intensity | I/IV   | IF = 20 mA     | Initial Data x 0.7 (Total degradation)<br>Initial Data x 0.5 (Single lamp degradation) | -----              |

**Application**

1. A LED is a current-operated device. The slight shift of voltage will cause big change of current, which will damage LEDs. Customer should use resistors in series for the Over-Current-Proof.
2. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended to use individual resistor separately, as shown in Circuit A below. The brightness of each LED shown in Circuit B might appear difference due to the differences in the I-V characteristics of those LEDs.



**Circuit model A**



**Circuit model B**

3. High temperature may reduce LEDs' intensity and other performances, so keeping it away from heat source to get good performance is necessary.

**Storage**

1. Before opening original package, it is recommended to store them in the following environment:  
 Temperature: 5°C~30°C                      Humidity: 85%RH max.
2. After opening original package, the storage ambient for the LEDs should be in 5~30°C temperature and 60% or less relative humidity.
3. In order to avoid moisture absorption, it is recommended that the LEDs that out of the original package should be stored in a sealed container with appropriate desiccant, or in desiccators with nitrogen ambient.
4. The LEDs should be used within 168hrs (7 days) after opening the package. Once been mounted, soldering should be quick.
5. If the moisture absorbent material (silica gel) has faded away or the LEDs stored out of original package for more than 168hrs (7 days), baking treatment should be performed using the conditions:  
 60°C at least 24 hours.

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### **ESD (Electrostatic Discharge )-Protection**

A LED (especially the Blue、 White and Green product) is an ESD sensitive component, and static electricity or power surge will damage the LED. ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or “no light-up” at low currents, etc.

Some advice as below should be noticed:

1. A conductive wrist strap or anti-electrostatic glove should be worn when handling these LEDs.
2. All devices, equipment, machinery, work tables and storage racks, etc. must be properly grounded.
3. Use anti-static package or boxes to carry and storage LEDs. And ordinary plastic package or boxes is forbidden to use.
4. Use ionizer to neutralize the static charge during handling or operating.
5. All surfaces and objects within 1 ft close to LEDs measure less than 100V.

### **Cleaning**

Use alcohol-based cleaning solvents such as IPA (isopropyl alcohol) to clean LEDs if necessary.

### **Soldering**

1. Soldering condition refer to the draft “Soldering Profile Suggested” on page 1.
2. Reflow soldering should not be done more than 2 times.
3. Manual soldering is only suggested on repair and rework. The maximum soldering temperature should not exceed 300°C within 3 sec. And the maximum capacity of soldering iron is 30W in power.
4. During the soldering process, do not touch the lens at high temperature.
5. After soldering, any mechanical force on the lens or any excessive vibration shall not be accepted to apply, also the circuit board shall not be bent as well.

