Snowdragon Industrial Co., Ltd

DATA SHEET

MODEL No: SD-S335RTU-S-AP-H

ATTENTION
OBSERVE PRECAUTIONS
ELECTROSTATIC
SENSITIVE DEVICES

Pb Free

CUSTOMER APPROVED SIGNATURES
1. Features

- Package (L/W/H): 4.0 × 0.8 × 1.4 mm
- Color: Ultra High Bright Red
- Lens: Water Clear Flat Mold
- EIA STD Package
- Meet ROHS, Green Product
- Compatible With SMT Automatic Equipment
- Compatible With Infrared Reflow Solder Process

2. Package Profile & Soldering PAD Suggested

Package Profile:

Soldering PAD Suggested:

Notes: 1. All dimensions are in millimeters;
2. Tolerance is ± 0.10 mm unless otherwise noted.
3. Soldering Profile Suggested

3.1. For Lead Solder

3.2. For Lead Free Solder

Notes:
We recommend the soldering temperature $245 \pm 5^\circ C$; The maximum temperature should be limited to $260^\circ C$. 

### 4. Absolute Maximum Ratings At Ta=25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Dissipation</td>
<td>Pd</td>
<td>90</td>
<td>mW</td>
</tr>
<tr>
<td>Peak Forward Current</td>
<td>IFp</td>
<td>70</td>
<td>mA</td>
</tr>
<tr>
<td>DC Forward Current</td>
<td>IF</td>
<td>30</td>
<td>mA</td>
</tr>
<tr>
<td>Reverse Voltage</td>
<td>Vr</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>Topr</td>
<td>-30°C to +85°C</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>Tstg</td>
<td>-40°C to +90°C</td>
<td></td>
</tr>
<tr>
<td>Soldering Condition</td>
<td>Tsol</td>
<td>Reflow soldering: 260°C For 5 Seconds</td>
<td>Hand soldering: 300°C For 3 Seconds</td>
</tr>
</tbody>
</table>

### 5. Electrical Optical Characteristics At Ta=25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Test Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luminous Intensity</td>
<td>IV</td>
<td>230</td>
<td></td>
<td></td>
<td>mcd</td>
<td>IF = 20mA</td>
</tr>
<tr>
<td>Viewing Angle</td>
<td>20/1/2</td>
<td></td>
<td>110</td>
<td></td>
<td>deg</td>
<td>IF = 20mA</td>
</tr>
<tr>
<td>Dominant Wavelength</td>
<td>λd</td>
<td></td>
<td>625</td>
<td></td>
<td>nm</td>
<td>IF=20mA</td>
</tr>
<tr>
<td>Peak Wavelength</td>
<td>λp</td>
<td>-615-</td>
<td></td>
<td>-625-</td>
<td>nm</td>
<td>IF=20mA</td>
</tr>
<tr>
<td>Spectral Line Half-Width</td>
<td>Δλ</td>
<td></td>
<td>20</td>
<td></td>
<td>nm</td>
<td>IF=20mA</td>
</tr>
</tbody>
</table>
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.

6. General Characteristics

<table>
<thead>
<tr>
<th>Bin</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2</td>
<td>140</td>
<td>180</td>
<td>MCD</td>
<td>IF=20mA</td>
</tr>
<tr>
<td>M1</td>
<td>180</td>
<td>230</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>230</td>
<td>285</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. VF

<table>
<thead>
<tr>
<th>Bin</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.8</td>
<td>2.0</td>
<td>V</td>
<td>IF=20mA</td>
</tr>
<tr>
<td>2</td>
<td>2.0</td>
<td>2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2.2</td>
<td>2.4</td>
<td>V</td>
<td>IF=20mA</td>
</tr>
<tr>
<td>4</td>
<td>2.4</td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Tolerance of Forward Voltage: ± 0.02V

3. WLD

<table>
<thead>
<tr>
<th>Bin</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>615</td>
<td>620</td>
<td>nm</td>
<td>IF=20mA</td>
</tr>
<tr>
<td>B</td>
<td>620</td>
<td>625</td>
<td>nm</td>
<td>IF=20mA</td>
</tr>
</tbody>
</table>
7. Typical Electrical-Optical Characteristics Curves

**Fig. 1** RELATIVE INTENSITY VS. WAVELENGTH

**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
8. Label Explanation

CAT: Luminous Intensity Rank (unit: mcd)
HUE: CIE 1931 Coordinate Rank
REF: Forward Voltage Rank (unit: V)

Rank Tolerance:
a. Luminous Intensity: ± 11%
b. HUE: ±0.005
c. Forward Voltage: ± 0.02V

9. Reel And Tape Dimensions:

Notes: 1. All dimensions are in millimeters;
        2. Tolerance is ± 0.1 mm unless otherwise noted.
10. Tape Leader & Trailer Dimensions And Reel

THERE SHALL BE A MINIMUM OF 150 mm (5.9 INCH) OF EMPTY COMPONENT POCKETS SEALED WITH COVER TAPE.
MOUNTED WITH COMPONENTS
THERE SHALL BE A MINIMUM OF 150 mm (5.9 INCH) OF EMPTY COMPONENT POCKETS SEALED WITH COVER TAPE.
MINIMUM OF 150 mm (5.9 INCH) MAY CONSIST OF CARRIER AND/OR COVER TAPE.

11. Packaging:

- Label
- Aluminum moisture-proof bag
- Desiccant
- Vacuum

Reel

Label

5 cartons/box

10 bags/carton

USER FEED DIRECTION
CATHODE SIDE
<table>
<thead>
<tr>
<th>Classification</th>
<th>Test Item</th>
<th>Test Condition</th>
<th>Reference Standard</th>
<th>Reference Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endurance Test</td>
<td>Operation Life</td>
<td>$T_a = \text{Under Room Temperature As Per Data Sheet Maximum Rating}$</td>
<td>$1000\text{HRS (}-24\text{HRS,}+72\text{HRS})^{*}@20mA$</td>
<td>MIL-STD-750D:1026 MIL-STD-883D:1005 JIS C 7021:B-1</td>
</tr>
<tr>
<td></td>
<td>High Temperature, High Humidity Storage</td>
<td>$T_a = 85\pm 5^\circ \text{C}, RH = 85%$</td>
<td>$1000\text{HRS}^{*}\pm2\text{HRS}$</td>
<td>JESD22-A101</td>
</tr>
<tr>
<td></td>
<td>High Temperature Storage</td>
<td>$T_a = 105\pm 5^\circ \text{C}$</td>
<td>$1000\text{HRS (}-24\text{HRS,}+72\text{HRS})^{*}$</td>
<td>MIL-STD-883D:1008 JIS C 7021:B-10</td>
</tr>
<tr>
<td></td>
<td>Low Temperature Storage</td>
<td>$T_a = -55\pm 5^\circ \text{C}$</td>
<td>$1000\text{HRS (}-24\text{HRS,}+72\text{HRS})^{*}$</td>
<td>JIS C 7021:B-12</td>
</tr>
<tr>
<td>Environmental Test</td>
<td>Temperature Cycling</td>
<td>$105^\circ \text{C} \sim 25^\circ \text{C} \sim -55^\circ \text{C} \sim 25^\circ \text{C}$ 30mins 5mins 30mins 5mins</td>
<td>10 Cycles</td>
<td>MIL-STD-202F:107D MIL-STD-750D:1051 MIL-STD-883D:1010 JIS C 7021:A-4</td>
</tr>
<tr>
<td></td>
<td>Thermal Shock</td>
<td>IR-Reflow In-Board, 2 Times $85 \pm 5^\circ \text{C} \sim -40^\circ \text{C} \pm 5^\circ \text{C}$ 10mins 10mins</td>
<td>10 Cycles</td>
<td>MIL-STD-202F:107D MIL-STD-750D:1051 MIL-STD-883D:1011</td>
</tr>
<tr>
<td></td>
<td>Solder Resistance</td>
<td>$T_{\text{sol}} = 260 \pm 5^\circ \text{C}$</td>
<td>10 $\pm$ 1secs</td>
<td>MIL-STD-202F:210A MIL-STD-750D:2031 JIS C 7021:A-1</td>
</tr>
<tr>
<td></td>
<td>IR-Reflow Normal Process</td>
<td>Ramp-up rate$ (183^\circ \text{C to Peak}) +3^\circ \text{C/ second max}$ Temp. maintain at $125(\pm 25)^\circ \text{C}$ 120 seconds max Temp. maintain above $183^\circ \text{C}$ 60-150 seconds Peak temperature range $235^\circ \text{C} +5^\circ /-0^\circ \text{C}$ Time within $5^\circ \text{C}$ of actual Peak Temperature (tp) 10-30 seconds Ramp-down rate $+6^\circ \text{C/second max}$</td>
<td>-------</td>
<td>MIL-STD-750D:2031.2 J-STD-020C</td>
</tr>
<tr>
<td></td>
<td>IR-Reflow Pb Free Process</td>
<td>Ramp-up rate$(217^\circ \text{C to Peak}) +3^\circ \text{C/ second max}$ Temp. maintain at $175(\pm 25)^\circ \text{C}$ 180 seconds max Temp. maintain above $217^\circ \text{C}$ 60-150 seconds Peak temperature range $260^\circ \text{C} +0^\circ /-5^\circ \text{C}$ Time within $5^\circ \text{C}$ of actual Peak Temperature (tp) 20-40 seconds Ramp-down rate $+6^\circ \text{C/second max}$</td>
<td>-------</td>
<td>MIL-STD-750D:2031.2 J-STD-020C</td>
</tr>
<tr>
<td></td>
<td>Solderability</td>
<td>$T_{\text{sol}} = 235 \pm 5^\circ \text{C}$ Immersion rate $25\pm2.5$ mm/sec Coverage $\geq 95%$ of the dipped surface</td>
<td>Immersion time $2\pm0.5$ sec</td>
<td>MIL-STD-202F:208D MIL-STD-750D:2026 MIL-STD-883D:2003 IEC 68 Part 2-20 JIS C 7021:A-2</td>
</tr>
</tbody>
</table>
12. Cautions

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 and Circuit model B](image)

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℃~30℃  
   - Humidity: 85%RH max. When the inventory over 2months, Should be done before treatment using dehumidification. Temperature: 60℃/8 hours.
2. After opening original package, the storage ambient for the LEDs should be in 5~30℃ 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 48hrs (2 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 48hrs (2 days), baking treatment should be performed using the conditions: 60℃ at least 24 hours.

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 (Grounding impedance value within 10Ω).
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.

Others
1. The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Snowdragon Sales in advance for the applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health. (such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices).
2. The light output from the high luminous intensity LEDs may cause injury to human eyes when viewed directly.
3. The appearance and specifications of the product may be modified for improvement without prior notice.
4. When 335 Side-View is used in led strip, the angle of bending cannot be over 60 degree
5. LED operating environment and sulfur element composition cannot be over 100PPM in the LED mating