**Features**

- The smallest class 3 color type LED in the world PICOLED™-RGB
- 4pin type
- Low height contributes to the improvement of color mixture

**Size**

4pin type
1010 (0404)
1.0 × 1.0mm (t=0.2mm)

**Dimensions**

![Diagram of SMDP34 Series](image)

**Specifications**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Chip Structure</th>
<th>Emitting Color</th>
<th>Power* Dissipation P (mW)</th>
<th>Forward* Current I (mA)</th>
<th>Reverse* Current I (mA)</th>
<th>Reverse Voltage V (V)</th>
<th>Operating Temp Top(ºC)</th>
<th>Storage Temp Tstg(ºC)</th>
<th>Dominant Wavelength λD (nm)</th>
<th>Luminous Intensity I (mcd)</th>
<th>Tolerance : ±0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMLP34RGB2W</td>
<td>AIGaInP</td>
<td>Red</td>
<td>35</td>
<td>10</td>
<td>50</td>
<td>5</td>
<td>-40 to +85</td>
<td>-40 to +100</td>
<td>619</td>
<td>624</td>
<td>629</td>
</tr>
<tr>
<td>SMLP34RGB2W</td>
<td>InGaN</td>
<td>Green</td>
<td>35</td>
<td>10</td>
<td>50</td>
<td>5</td>
<td>-40 to +85</td>
<td>-40 to +100</td>
<td>520</td>
<td>527</td>
<td>535</td>
</tr>
<tr>
<td>SMLP34RGB2W</td>
<td>Blue</td>
<td>Blue</td>
<td>35</td>
<td>10</td>
<td>50</td>
<td>5</td>
<td>-40 to +85</td>
<td>-40 to +100</td>
<td>465</td>
<td>470</td>
<td>475</td>
</tr>
</tbody>
</table>

*1 : Total power dissipation in case of lighting several colors.
*2 : The above absolute maximum ratings are valid for the case of lighting a single color.
When lighting two colors at the same time, each of the figures in the absolute maximum ratings should be reduced down to 50% of it. When lighting three colors, it will be reduced down to 30% of it.
*3 : Duty ≤ 1/20, 1ms
*4 : Reference
※ : The value is based on the die destruction optical endurance optical : characteristics are not considered.

**Thermal resistance**

<table>
<thead>
<tr>
<th>Conditions</th>
<th>R8j-s</th>
<th>R8j-a</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>70ºC/W</td>
<td>170ºC/W</td>
</tr>
<tr>
<td>G</td>
<td>171ºC/W</td>
<td>311ºC/W</td>
</tr>
<tr>
<td>B</td>
<td>160ºC/W</td>
<td>260ºC/W</td>
</tr>
</tbody>
</table>

*PICOLED™ is ROHM's pending trademark.
● Electrical Characteristics Curves

Fig. 1 Forward Current - Forward Voltages

Fig. 2-1 Forward Voltage - Atmosphere Temperature (R)

Fig. 2-2 Forward Voltages - Atmosphere Temperature (G, B)

* Please take this data as a reference data for the samples are measured randomly.
● Electrical Characteristics Curves

**Fig.3 Luminous Intensity - Atmosphere Temperature**

![Graph showing Luminous Intensity vs Atmosphere Temperature](image)

**Fig.4 Luminous Intensity - Forward Current**

![Graph showing Luminous Intensity vs Forward Current](image)

**Fig.5 Derating**

![Graph showing Derating](image)

(Note) In case of lighting a single color.
*The value is based on the die destruction endurance; optical characteristics are NOT considered.*
**Viewing Angle**

<table>
<thead>
<tr>
<th>SCANNING ANGLE (deg)</th>
<th>RELATIVE INTENSITY</th>
</tr>
</thead>
</table>

**Rank Reference of Brightness**

<table>
<thead>
<tr>
<th>Emitting Color</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>A</td>
</tr>
<tr>
<td>Green</td>
<td>B</td>
</tr>
<tr>
<td>Red</td>
<td>C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SMLP34RGB2W (R)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>28 to 56</td>
<td>56 to 110</td>
<td>28 to 56</td>
<td>56 to 110</td>
<td>28 to 56</td>
<td>56 to 110</td>
<td>28 to 56</td>
<td>56 to 110</td>
<td>28 to 56</td>
<td>56 to 110</td>
<td>28 to 56</td>
<td>56 to 110</td>
</tr>
<tr>
<td>Green</td>
<td>56 to 90</td>
<td>90 to 140</td>
<td>140 to 220</td>
<td>56 to 90</td>
<td>90 to 140</td>
<td>140 to 220</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>14 to 28</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
<td>28 to 56</td>
</tr>
</tbody>
</table>

*Note: (Ta=25°C, IF=5mA)*
SMLP34 Series

● Taping

ROHM LED products are being shipped with desiccant (silica gel) concluded in moisture-proof bags.

● Part No. Construction

S M L P 3 4 R G B 2 W 3 A

Series name Package name Terminal Type Emitting Color Special Code RoHS Color Taping Specifications

R Red 634nm
G Green 527nm
B Blue 470nm

● Packing Specification

ROHM LED products are being shipped with desiccant (silica gel) concluded in moisture-proof bags.

Pasting the moisture sensitive label on the outer surface of the moisture-proof bags or enclosing the humidity indication card inside the bag is available upon request.

Please contact the nearest sales office or distributor if necessary.
Precaution (Surface Mount Device)

1. Storage
If the product is heated during the reflow under the condition of hygroscopic state, it may vaporize and expand which will influence the performance of the product. Therefore, the package is waterproof. Please use the product following the conditions:

- Using Conditions

<table>
<thead>
<tr>
<th>Classification</th>
<th>Temperature</th>
<th>Humidity</th>
<th>Expiration Date</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>① Before using</td>
<td>5 to 30°C</td>
<td>30 to 70%RH</td>
<td>Within 1 year from Receiving</td>
<td>Storage with waterproof package</td>
</tr>
<tr>
<td>② After opening package</td>
<td>5 to 30°C</td>
<td>Below 70%RH</td>
<td>Within 168h</td>
<td>Please storing in the airtight container with our desiccant (silica gel)</td>
</tr>
</tbody>
</table>

- Baking
Bake the product in case of below:
  ① The expiration date is passed.
  ② The color of indicator (silica gel) turned from blue to colorless or from green to pink.
(Even if the product is within the expiration date.)

- Baking Conditions

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Time</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>60±3°C</td>
<td>12 to 24h</td>
<td>Below 20%RH</td>
</tr>
</tbody>
</table>

Remark
- Bake products in reel.
- Reel and embossed tape are easy to be deformed when baking, so please try not to apply stress on it.
- Recommend bake once.

2. Application Methods

2-1. Precaution for Drive System and Off Mode
Design the circuit without the electric load exceeding the ABSOLUTE MAXIMUM RATING that applies on the products. If drive by constant voltage, it may cause current deviation of the LED and result in deviation of luminous intensity, so we recommend to drive by constant current. (Deviation of VF Value will cause deviation of current in LED.) Furthermore, for off mode, please do not apply voltage neither forward nor reverse. Especially, for the products with the Ag-paste used in the die bonding, there’s high possibility to cause electro migration and result in function failure.

2-2. Operation Life Span
There’s possibility for intensity of light drop according to working conditions and environments (applied current, surrounding temperature and humidity, corrosive gases), please call our Sales staffs for inquiries about the concerned application below.
  ① Longtime intensity of light life
  ② On mode all the time

2-3. Applied Stress on Product
The top of the LED is very soft, which the silicon resin is used as sealing resin. Therefore, please pay attention to the overstress on it which may influence its reliability.

2-4. Usage
The Product is LED. We are not responsible for the usage as the diode such as Protection Chip, Rectifier, Switching and so on.
3. Others

3-1. Surrounding Gas
Notice that if it is stored under the condition of acid gas (chlorine gas, sulfured gas) or alkali gas (ammonia), it may result in low soldering ability (caused by the change in quality of the plating surface) or optical characteristics changes (light intensity, chrominance) and change in quality of die bonding (Ag-paste) materials. All of the above will cause function failure of the products.

Therefore, please pay attention to the storage environment for mounted product (concern the generated gas of the surrounding parts of the products and the atmospheric environment).

3-2. Electrostatic Damage
The product is part of semiconductor and electrostatic sensitive, there’s high possibility to be damaged by the electrostatic discharge. Please take appropriate measures to avoid the static electricity from human body and earthing of production equipment. The resistance values of electrostatic discharge (actual values) vary with products, therefore, please call our Sales staffs for inquiries.

3-3. Electromagnetic Wave
Please concern the influence on LED in case of application with strong electromagnetic wave such as IH (Induction heating).

4. Mounting

4-1. Soldering
• No resin hardening agent such as filler is used in the sealing resin of the product. Therefore, resin expansion and moisture absorption at humidity will cause heat stress during soldering process and finally has bad influence on the product’s reliability.
• The product is not for flow soldering.
• Do not expose the product in the environment of high temperature (over 100ºC) or rapid temperature shift (within 3ºC of temperature gradient) during the flow soldering of surrounding parts.
• Please set appropriate reflow temperature based on our product usage conditions and specification.
• The max for reflowing is 2 times, please finish the second flow soldering and flow soldering with other parts within the usage limitation after open the moistureproof package.
• Compare with N2 reflow, during air reflow, because of the heat and surrounding conditions, it may cause the discoloration of the resin.

4-2. Automatic Mounting

4-2-1. Silicon Resin Sealing Product
The sealing resin of LED is very soft, so please select adsorption nozzle that would not apply stress directly on the sealing section.

4-2-2. Mini Package (Smaller than 1006 size)
Vibration may result in low mounting rate since it will cause the static electricity of product and adhere to top cover tape. Therefore, the magnet should be set on parts feeder cassette of the mounter to control the product stabilization. In addition, it is recommended to set ionizer to prevent electrostatic charge.

4-3. Mounting Location
The stress like bending stress of circuit board dividing after mounting, may cause LED package crack or damage of LED internal junction, therefore, please concern the mounting direction and position to avoid bending or screwing with great stress of the circuit board.
4-4. Mechanical Stress after Mounting

The mechanical stress may damage the LED after Circuit Mounting, so please pay attention to the touch on product.

Stress strength according to the mounting position:
A>B>C>D

4-5. Soldering Pattern for Recommendation

We recommend the soldering pattern that shows on the right. It will be different according to mounting situation of circuit board, therefore, please concern before designing.

*The product has adopted the electrode structure that it should solder with back electrode of the product. Thus, please be informed that the shape of electrode pin of solder fillet formation is not guaranteed.

4-6. Reflow Profile

For reflow profile, please refer to the conditions below: (※)

<table>
<thead>
<tr>
<th>Mark</th>
<th>Meanings</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{s_{\text{max}}}$</td>
<td>Maximum of pre-heating temperature</td>
<td>180ºC</td>
</tr>
<tr>
<td>$T_{s_{\text{min}}}$</td>
<td>Minimum of pre-heating temperature</td>
<td>140ºC</td>
</tr>
<tr>
<td>$T_s$</td>
<td>Time from $T_{s_{\text{min}}}$ to $T_{s_{\text{max}}}$ Over 60sec.</td>
<td></td>
</tr>
<tr>
<td>$T_r$</td>
<td>Reference temperature 230 to 260ºC</td>
<td></td>
</tr>
<tr>
<td>$t_r$</td>
<td>Retention time for $T_r$ Within 40sec.</td>
<td></td>
</tr>
<tr>
<td>$T_p$</td>
<td>Peak temperature 260ºC(Max)</td>
<td></td>
</tr>
<tr>
<td>$t_p$</td>
<td>Time for peak temperature Within 10sec.</td>
<td></td>
</tr>
<tr>
<td>$\Delta T_r/\Delta t$</td>
<td>Temperature rising rate Under 3ºC/sec.</td>
<td></td>
</tr>
<tr>
<td>$\Delta T_r/\Delta t$</td>
<td>Temperature decreasing rate Over -3ºC/sec.</td>
<td></td>
</tr>
</tbody>
</table>

*Above conditions are for reference. Therefore, evaluate by customer’s own circuit boards and reflow furnaces before using, because stress from circuit boards and temperature variations of reflow furnaces vary by customer’s own conditions.

4-7. Cleaning after Soldering

Please follow the conditions below if the cleaning is necessary after soldering.

<table>
<thead>
<tr>
<th>Solvent</th>
<th>Temperature</th>
<th>Ultrasonic Cleaning</th>
<th>Drying</th>
</tr>
</thead>
<tbody>
<tr>
<td>We recommend to use alcohols solvent such as, isopropyl alcohols</td>
<td>Under 30ºC within 3 minutes</td>
<td>15W / Below 1 liter (capacity of tank)</td>
<td>Under 100ºC within 3 minutes</td>
</tr>
</tbody>
</table>
**Notice**

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

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