Specification

CUN0AF1B
[ Contents ]

1. Description
2. Outline dimensions
3. Characteristics of CUN0AF1B
4. Characteristic diagrams
5. Binning & Labeling
6. Reel packing
7. Recommended solder pad
8. Reflow Soldering profile
9. Reliability
10. Precaution for use
**CUN0AF1B**

**Description**
High power UV LED series are designed for high current operation and high power output applications. It incorporates state of the art SMD design and low thermal resistant material. CUN0AF1B LED is ideal UV light source for curing, printing, and detecting applications.

**Features**
- High power output
- Designed for high current operation
- Low thermal resistance
- SMT type
- Lead Free product
- RoHS compliant

**Applications**
- UV Curing
- Printing
- Coating
- Adhesive
- Counterfeit Detection/Security
- UV Torch
- Fluorescence Photography
- Dental Curing
- Crime Inspection
- Oil leak Detection
Outline dimensions

<Top Outline>

(Cathode Mark: a, Anode: b)

(Top: 6.45, Bottom: 0.6, Sides: 1.55, Electrical Isolation: 3.735, 1.36, 1.135)

<Package Outline>

(Tolerance: ±0.2, Unit: mm)

<Circuit Diagram>

Notes:
[1] All dimensions are in millimeters.
[2] Scale: none
[3] Undefined tolerance is ±0.2mm

Material Information:

<table>
<thead>
<tr>
<th>Material</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>PKG body</td>
<td>Metal</td>
</tr>
<tr>
<td>Lens</td>
<td>Glass</td>
</tr>
</tbody>
</table>
Characteristics of CUN0AF1B

1-1 Electro-Optical characteristics at 500mA

(\(T_a=25\degree C, RH=30\%\))

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak wavelength</td>
<td>(\lambda_p)</td>
<td>405</td>
<td>nm</td>
</tr>
<tr>
<td>Radiant Flux</td>
<td>(\Phi_e)</td>
<td>900</td>
<td>mW</td>
</tr>
<tr>
<td>Forward Voltage</td>
<td>(V_F)</td>
<td>3.5</td>
<td>V</td>
</tr>
<tr>
<td>Spectrum Half Width</td>
<td>(\Delta \lambda)</td>
<td>15</td>
<td>nm</td>
</tr>
<tr>
<td>View Angle</td>
<td>(2\Theta_{1/2})</td>
<td>110</td>
<td>deg.</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>(R_{\theta J-b})</td>
<td>3.5</td>
<td>(\degree C /W)</td>
</tr>
</tbody>
</table>

1-2 Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Current</td>
<td>(I_F)</td>
<td>700</td>
<td>mA</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>(T_J)</td>
<td>125</td>
<td>(\degree C)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>(T_{opr})</td>
<td>-10 ~ +85</td>
<td>(\degree C)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>(T_{stg})</td>
<td>-40 ~ +100</td>
<td>(\degree C)</td>
</tr>
</tbody>
</table>

Notes:
1. Peak Wavelength Measurement tolerance: \(\pm 3\text{nm}\)
2. Radiant Flux Measurement tolerance: \(\pm 10\%\)
3. \(\Phi_e\) is the Total Radiant Flux as measured with an integrated sphere.
4. Forward Voltage Measurement tolerance: \(\pm 3\%\)
5. \(R_{\theta J-b}\) is the thermal resistance between chip junction to PCB board bottom. The PCB is made of aluminium and the size of PCB is 3.5cm by 3.5cm.
Characteristic Diagrams

1. Relative Spectral Power Distribution

(I_F=500mA, T_a=25°C, RH=30%)

2. Forward Current VS Forward Voltage

(T_a=25°C)
3. Relative Radiant Flux VS Forward Current

4. Peak Wavelength VS Forward Current

(T_a=25°C)
5. Relative Radiant Flux VS Ambient Temperature

![Graph showing Relative Radiant Flux VS Ambient Temperature](image)

6. Peak Wavelength VS Ambient Temperature

![Graph showing Peak Wavelength VS Ambient Temperature](image)
7. Forward Voltage VS Ambient Temperature

![Graph showing Forward Voltage VS Ambient Temperature](image)

8. Radiation pattern

![Graph showing Radiation pattern](image)
9. Allowable Forward Current VS Ambient Temperature

(T_{\text{max}} = 125^\circ \text{C} \ I_F = 700 \text{mA})

Maximum Current [mA]

Ambient Temperature [\text{^\circ \text{C}}]

- R_{ja} = 20^\circ \text{C}/W
- R_{ja} = 25^\circ \text{C}/W
- R_{ja} = 30^\circ \text{C}/W
## Binning & Labeling

### 1. Binning Structure

\[ Y_1 Y_2 Y_3 Y_4 Y_5 \]

(I\(_f\)=500mA)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>(Y_1 Y_2) Wp [nm]</th>
<th>(Y_3 Y_4) Radiant Flux [mW]</th>
<th>(Y_5) Vf [V]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BIN</td>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>CUN0AF1B</td>
<td>p1</td>
<td>400</td>
<td>405</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>p2</td>
<td>405</td>
<td>410</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2. Rank

\[ Y_1 Y_2 Y_3 Y_4 Y_5 \]

- \(Y_1 Y_2\) : Peak Wavelength [nm]
- \(Y_3 Y_4\) : Radiant Flux [mW]
- \(Y_5\) : Forward Voltage [V]

### Notes:

1. Peak Wavelength Measurement tolerance : ±3nm
2. Radiant Flux Measurement tolerance : ±10%
3. Forward Voltage Measurement tolerance : ±3%
3. Label

![Label Diagram]

4. SVC PART NUMBER:

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_1$</td>
<td>$X_2$</td>
<td>$X_3X_4$</td>
<td>$X_5$</td>
<td>$X_6$</td>
<td>$X_7$</td>
<td>$X_8$</td>
<td></td>
</tr>
<tr>
<td><strong>Company</strong></td>
<td><strong>Product Line</strong></td>
<td><strong>Wavelength</strong></td>
<td><strong>PKG Series</strong></td>
<td><strong>Lens Type</strong></td>
<td><strong>Chip Q’ty</strong></td>
<td><strong>Ver</strong></td>
<td></td>
</tr>
<tr>
<td>SVC</td>
<td>C</td>
<td>UV</td>
<td>U</td>
<td>Near 405</td>
<td>N0</td>
<td>AAP63</td>
<td>A</td>
</tr>
</tbody>
</table>

www.seoulviosys.com

Rev : 08
Reel Packaging

Notes:
(1) Quantity: Max 500pcs/Reel
Recommended solder pad

Recommended PCB solder pad

Notes:

[1] Scale: none
[2] This drawing without tolerances are for reference only
Reflow Soldering Profile

* Caution
1. Reflow soldering should not be done more than one time.
2. Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LEDs during heating.
5. After soldering, do not warp the circuit board.
6. Recommend to use a convection type reflow machine with 7 ~ 8 zones.
Reliability

1. Relative Spectral Power Distribution

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Standard Test Method</th>
<th>Test Condition</th>
<th>Duration /cycle</th>
<th>Number of damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Temp. Operational Life</td>
<td>Internal Reference</td>
<td>Ta=85°C, IF=300mA</td>
<td>1000hrs</td>
<td>0/5</td>
</tr>
<tr>
<td>Room Temp. Operational Life</td>
<td>Internal Reference</td>
<td>Ta=25°C, IF=500mA</td>
<td>1000hrs</td>
<td>0/5</td>
</tr>
<tr>
<td>High Temp. Storage</td>
<td>EIAJ ED-4701</td>
<td>Ta = 100°C</td>
<td>1000hrs</td>
<td>0/22</td>
</tr>
<tr>
<td>Thermal shock</td>
<td>EIAJ ED-4701</td>
<td>Ta max=120°C, Ta min=-40°C</td>
<td>200 cycles</td>
<td>0/22</td>
</tr>
<tr>
<td>Resistance to Soldering</td>
<td>EIAJ ED-4701</td>
<td>Temp=260±5°C, Time : 10±1 sec</td>
<td>1 time</td>
<td>0/10</td>
</tr>
<tr>
<td>ESD</td>
<td>EIAJ ED-4701</td>
<td>R=1.5kΩ, C=100pF Voltage level=2kV</td>
<td>3 times</td>
<td>0/22</td>
</tr>
</tbody>
</table>

2. Failure Criteria

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Max. or Min. allowable shift value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Voltage</td>
<td>(V_F)</td>
<td>IF=500mA</td>
<td>Max. Initial measurement x 1.2</td>
</tr>
<tr>
<td>Radiant Flux</td>
<td>(\Phi_e)</td>
<td>IF=500mA</td>
<td>Min. Initial measurement x 0.7</td>
</tr>
</tbody>
</table>

Notes:
1. The value is measured after the test sample is cooled down to the room temperature.
Precaution for use

1) Storage
   • To avoid moisture penetration, we recommend storing UV LEDs in a dry box with a desiccant. The recommended temperature and Relative humidity are between 5°C and 30°C and below 50% respectively.
   • Replace the remained LEDs into the moisture-proof bag and reseal the bag after work to avoid those LEDs being exposed to moisture. Prolonged exposure to moisture can adversely affect the proper functioning of the LEDs.
   • If the package has been opened more than 4 week (MSL_2a) or the color of the desiccant changes, components should be dried for 10-24 hr at 60±5°C
   • The conditions of resealing are as follows
     – Temperature is 5 to 30°C and Relative humidity is less than 60%

2) Handling Precautions
   • VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LEDs and discolor them when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues.
   • In case of attaching LEDs, do not use adhesives that outgas organic vapor.
   • Soldering should be done as soon as possible after opening the moisture-proof bag.
   • Do not rapidly cool device after soldering.
   • Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.
   • Components should not be mounted on warped (non coplanar) portion of PCB.
   • The UV LED is encapsulated with a silicone resin for the highest flux efficiency. So it needs to be handled carefully as below
     – Avoid touching silicone resin parts especially with sharp tools such as pincettes (Tweezers)
Avoid leaving fingerprints on silicone resin parts.
- Silicone resin will attract dust so use covered containers for storage.
- When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that excessive mechanical pressure on the surface of the resin must be prevented.
- It is not recommend to cover the silicone resin of the LEDs with other resin (epoxy, urethane, etc).

3) Safety for eyes and skin
   - The Products emit high intensity ultraviolet light which can make your eyes and skin harmful, So do not look directly into the UV light and wear protective equipment during operation.

4) Cleaning
   - This device is not allowed to be used in any type of fluid such as water, oil, organic solvent , etc.

5) Others
   - The appearance and specifications of the product may be modified for improvement without notice.
   - When the LEDs are in operation the maximum current should be decided after measuring the package temperature.
   - The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.
   - Do not handle this product with acid or sulfur material in sealed space.