Specification

CUN6AF1B
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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. AAP63 LED is ideal UV light source for curing, printing, and detecting applications.

Features

- Super high power output
- Designed for high current operation
- Low thermal resistance
- SMT solderable
- 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

< Package Outline >

(Tolerance : ±0.2, Unit : mm)

< Circuit Diagram >

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>

Notes:
[1] All dimensions are in millimeters.
[2] Scale: none
[3] Undefined tolerance is ±0.2mm
Characteristics of CUN6AF1B

1-1 Electro-Optical characteristics at 500mA

\[(T_s = 25 \, ^\circ \text{C}, \, \text{RH}=30\%\)\]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak wavelength [1]</td>
<td>(\lambda_p)</td>
<td>365</td>
<td>nm</td>
</tr>
<tr>
<td>Radiant Flux [2]</td>
<td>(\Phi_e^{[3]})</td>
<td>690</td>
<td>mW</td>
</tr>
<tr>
<td>Forward Voltage [4]</td>
<td>(V_F)</td>
<td>3.8</td>
<td>V</td>
</tr>
<tr>
<td>Spectrum Half Width</td>
<td>(\Delta \lambda)</td>
<td>9</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}^{[5]})</td>
<td>5.6</td>
<td>(^\circ \text{C} / \text{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>(^\circ \text{C})</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>(T_{opr})</td>
<td>-10 \sim +85</td>
<td>(^\circ \text{C})</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>(T_{stg})</td>
<td>-40 \sim +100</td>
<td>(^\circ \text{C})</td>
</tr>
</tbody>
</table>

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

1. Relative Spectral Power Distribution

\[ (I_F=500\text{mA}, T_a=25^\circ\text{C}, RH=30\%) \]

2. Forward Current VS Forward Voltage

\[ (T_a=25^\circ\text{C}) \]
3. Relative Radiant Flux VS Forward Current

![Graph showing the relationship between relative radiant flux and forward current at T_a=25°C.]

4. Peak Wavelength VS Forward Current

![Graph showing the relationship between peak wavelength and forward current at T_a=25°C.]

www.seoulviosys.com
5. Relative Radiant Flux VS Ambient Temperature

![Graph showing Relative Radiant Flux vs Ambient Temperature]

Ambient Temperature [ ℃ ]

Relative Radiant Flux [%]

6. Peak Wavelength VS Ambient Temperature

![Graph showing Peak Wavelength vs Ambient Temperature]

Ambient Temperature [ ℃ ]

Peak Wavelength [nm]
7. Forward Voltage VS Ambient Temperature

![Graph showing Forward Voltage vs Ambient Temperature](attachment:image.png)

8. Radiation pattern

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

(T_{j\text{max}} = 125°C \ I_F = 700mA)

- \text{Rja} = 20°C/W
- \text{Rja} = 25°C/W
- \text{Rja} = 30°C/W

Maxium Current [mA] vs Ambient Temperature [℃]
Binning & Labeling

1. Binning Structure

\[ Y_1 Y_2 Y_3 Y_4 \]

\[ (I_F=500mA) \]

<table>
<thead>
<tr>
<th>Part Number</th>
<th>( Wp \text{ [nm]} )</th>
<th>Radiant Flux [mW]</th>
<th>( V_f \text{ [V]} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUN6AF1B</td>
<td>BIN MIN MAX</td>
<td>BIN MIN MAX</td>
<td>BIN MIN MAX</td>
</tr>
<tr>
<td>j</td>
<td>360 370</td>
<td>520 570</td>
<td>a 3.0 3.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>570 630</td>
<td>b 3.4 3.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>630 690</td>
<td>c 3.8 4.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>690 760</td>
<td>d 4.2 4.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>760 840</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Peak Wavelength Measurement tolerance : \( \pm 3\text{nm} \)
2. Radiant Flux Measurement tolerance : \( \pm 10\% \)
3. Forward Voltage Measurement tolerance : \( \pm 3\% \)

2. Rank

\[ Y_1 Y_2 Y_3 Y_4 \]

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

![Label Diagram]

4. **SVC PART NUMBER**: \( X_1X_2X_3X_4X_5X_6X_7X_8 \)

<table>
<thead>
<tr>
<th>( X_1 )</th>
<th>( X_2 )</th>
<th>( X_3X_4 )</th>
<th>( X_5 )</th>
<th>( X_6 )</th>
<th>( X_7 )</th>
<th>( X_8 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Product Line</td>
<td>Wavelength</td>
<td>PKG Series</td>
<td>Lens Type</td>
<td>Chip Q'ty</td>
<td>Ver</td>
</tr>
<tr>
<td>SVC</td>
<td>C</td>
<td>UV</td>
<td>U</td>
<td>Near 365</td>
<td>N6</td>
<td>AAP63</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reel Packaging

CATHODE MARK

178.5 ± 3
17.5 ± 0.3
2.5 ± 0.2
13.2 ± 0.2
60.0 ± 1.0
19.4 ± 1
Recommended solder pad

(Unit: mm)

Recommended PCB solder pad

ⓐ : Cathode
ⓑ : Anode

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>$Ta=85^\circ C$, $IF=500mA$</td>
<td>1000hrs</td>
<td>0/5</td>
</tr>
<tr>
<td>Room Temp. Operational Life</td>
<td>Internal Reference</td>
<td>$Ta=25^\circ C$, $IF=500mA$</td>
<td>1000hrs</td>
<td>0/5</td>
</tr>
<tr>
<td>High Temp. Storage</td>
<td>EIAJ ED-4701</td>
<td>$Ta = 100^\circ C$</td>
<td>1000hrs</td>
<td>0/22</td>
</tr>
<tr>
<td>Thermal shock</td>
<td>EIAJ ED-4701</td>
<td>$Ta_{max}=120^\circ C$, $Ta_{min}=-40^\circ C$; 30min dwell/transfer time : 10sec, 1 cycle=1hr</td>
<td>200 cycles</td>
<td>0/22</td>
</tr>
<tr>
<td>Resistance to Soldering</td>
<td>EIAJ ED-4701</td>
<td>$Temp=260\pm5^\circ C$, Time : $10\pm1$ sec</td>
<td>1 time</td>
<td>0/10</td>
</tr>
<tr>
<td>ESD</td>
<td>EIAJ ED-4701</td>
<td>$R=1.5k\Omega$, $C=100pF$, 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.
   • LEDs must be stored properly to maintain the device. If the LEDs are stored for 3 months or more after being shipped from SVC, a sealed container with a nitrogen atmosphere should be used for storage.
   • 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, components should be dried for 10-12hr at 60±5°C
   • The conditions of resealing are as follows
     - Temperature is 5 to 40°C and Relative humidity is less than 30%

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 optical window part of LED needs to be handled carefully as below
     - Avoid touching the optical window especially with sharp tools such as Pincettes (Tweezers)
     - Avoid leaving fingerprints on optical window parts.
     - Optical window 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 optical window parts must be prevented.
     - It is not recommend to cover the optical window 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.

CAUTION

• UV LEDs emit high intensity UV light.
• Do not look directly into the UV light during operation. This can be harmful to your eyes and skin.
• Wear protective eyewear to avoid exposure to UV light.
• Attach caution labels to your products which contain UV LEDs.

Avoid direct eye and skin exposure to UV light. Keep out of reach of children.
## Revision history

<table>
<thead>
<tr>
<th>REV</th>
<th>Change Date</th>
<th>Brief summary of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>November 28, 2013</td>
<td>Initial specification</td>
</tr>
<tr>
<td>01</td>
<td>January 13, 2014</td>
<td>Insert reliability data</td>
</tr>
<tr>
<td>02</td>
<td>April 18, 2014</td>
<td>Binning structure update</td>
</tr>
<tr>
<td></td>
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