Preliminary specification

## Specification

CUN*AF4A

<table>
<thead>
<tr>
<th>SVC</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawn</td>
<td>Approval</td>
</tr>
<tr>
<td>Approval</td>
<td>Approval</td>
</tr>
</tbody>
</table>

www.seoulviosys.com
[ Contents ]

1. Description
2. Outline dimensions
3. Characteristics of CUN*AF4A
4. Characteristic diagrams
5. Binning & Labeling
6. Reel packing
7. Recommended solder pad
8. Reflow Soldering profile
9. Precaution for use
10. Revision history
CUN*AF4A

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 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

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>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>PKG body</td>
<td>Metal</td>
</tr>
<tr>
<td>Lens</td>
<td>Glass</td>
</tr>
</tbody>
</table>

www.seoulviosys.com

4
Characteristics of CUN6AF4A

1. CUN6AF4A

1-1 Electro-Optical characteristics at 1A

<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>Forward Voltage [4]</td>
<td>$V_F$</td>
<td>7.8</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>116</td>
<td>deg.</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>$R_{\theta J-b}$[5]</td>
<td>3.3</td>
<td>°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>1400</td>
<td>mA</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>$T_J$</td>
<td>125</td>
<td>°C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>$T_{opr}$</td>
<td>-10 ~ +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{stg}$</td>
<td>-40 ~ +100</td>
<td>°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.
   The PCB is made of aluminum and the size of PCB is 3.5mm by 3.5mm.

$(T_a=25 ^\circ C, RH=30\%)$
Characteristics of CUN6AF4A

1. CUN8AF4A

1-1 Electro-Optical characteristics at 1A

\((T_a=25\, ^\circ\text{C},\ RH=30\%)\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak wavelength ([1])</td>
<td>(\lambda_p)</td>
<td>385</td>
<td>nm</td>
</tr>
<tr>
<td>Radiant Flux ([2])</td>
<td>(\Phi_e^{[3]})</td>
<td>3750</td>
<td>mW</td>
</tr>
<tr>
<td>Forward Voltage ([4])</td>
<td>(V_F)</td>
<td>7.4</td>
<td>V</td>
</tr>
<tr>
<td>Spectrum Half Width</td>
<td>(\Delta \lambda)</td>
<td>12</td>
<td>nm</td>
</tr>
<tr>
<td>View Angle</td>
<td>(2\Theta_{1/2})</td>
<td>116</td>
<td>deg.</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>(R_{\theta J-b}^{[5]})</td>
<td>2.3</td>
<td>°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>1400</td>
<td>mA</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>(T_J)</td>
<td>125</td>
<td>°C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>(T_{opr})</td>
<td>-10 ~ +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>(T_{stg})</td>
<td>-40 ~ +100</td>
<td>°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
   The PCB is made of aluminum and the size of PCB is 3.5mm by 3.5mm.
Characteristics of CUN6AF4A

1. CUN9AF4A

1-1 Electro-Optical characteristics at 1A

$$(T_a=25^\circ\text{C}, \text{RH}=30\%)$$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak wavelength</td>
<td>$\lambda_p$</td>
<td>395</td>
<td>nm</td>
</tr>
<tr>
<td>Radiant Flux</td>
<td>$\Phi_e$</td>
<td>3750</td>
<td>mW</td>
</tr>
<tr>
<td>Forward Voltage</td>
<td>$V_F$</td>
<td>7.2</td>
<td>V</td>
</tr>
<tr>
<td>Spectrum Half Width</td>
<td>$\Delta \lambda$</td>
<td>14</td>
<td>nm</td>
</tr>
<tr>
<td>View Angle</td>
<td>$2\Theta_{1/2}$</td>
<td>116</td>
<td>deg.</td>
</tr>
<tr>
<td>Thermal resistance</td>
<td>$R_{\theta J-b}$</td>
<td>2.3</td>
<td>°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>1400</td>
<td>mA</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>$T_J$</td>
<td>125</td>
<td>°C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>$T_{opr}$</td>
<td>-10 ~ +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{stg}$</td>
<td>-40 ~ +100</td>
<td>°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
   The PCB is made of aluminum and the size of PCB is 3.5mm by 3.5mm.
Characteristic Diagrams

1. Relative Spectral Power Distribution

\[ (I_F = 1A, T_a = 25^\circ C, RH=30\%) \]

\[ \text{Relative Spectrum Power Distribution} \]

\[ \text{Wavelength [nm]} \]

\[ \text{Relative Spectrum Power Distribution} \]

\[ \text{Wavelength [nm]} \]

2. Forward Current VS Forward Voltage

\[ (T_a = 25^\circ C) \]

\[ \text{Forward Current [mA]} \]

\[ \text{Forward Voltage [V]} \]
3. Relative Radiant Flux VS Forward Current

![Graph showing relative radiant flux vs forward current for different peak wavelengths.](image)

4. Peak Wavelength VS Forward Current

![Graph showing peak wavelength vs forward current for different peak wavelengths.](image)
5. Relative Radiant Flux VS Ambient Temperature

![Graph showing relative radiant flux vs ambient temperature for different wavelengths.](image)

6. Peak Wavelength VS Ambient Temperature

![Graph showing peak wavelength vs ambient temperature for different wavelengths.](image)
7. Forward Voltage VS Ambient Temperature

8-1. Allowable Forward Current VS Ambient Temperature (365nm)
8-2. Allowable Forward Current VS Ambient Temperature (385nm)

(T_{jmax} = 125 \degree C, I_F = 1.4A)

Rja = 6 \degree C/W
Rja = 8 \degree C/W
Rja = 10 \degree C/W

8-3. Allowable Forward Current VS Ambient Temperature (395nm)

(T_{jmax} = 125 \degree C, I_F = 1.4A)

Rja = 6 \degree C/W
Rja = 8 \degree C/W
Rja = 10 \degree C/W
9. Radiation pattern

![Graph showing radiation pattern with viewing angle and relative radiant flux.](image)
Binning & Labeling

1. Binning Structure (365 & 385nm)

\[
Y_1 Y_2 Y_3 Y_4
\]

(I_F=1A)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>BIN</th>
<th>Y_1 Wp [nm]</th>
<th>Y_2 Y_3 Radiant Flux [mW]</th>
<th>Y_4 Vf [V]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BIN MIN MAX</td>
<td>BIN MIN MAX</td>
<td>BIN MIN MAX</td>
</tr>
<tr>
<td>CUN6AF4A</td>
<td>j</td>
<td>360</td>
<td>370</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>L3 1760 1940</td>
<td>h 6.0 6.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>L4 1940 2140</td>
<td>i 6.6 7.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>L5 2140 2350</td>
<td>j 7.2 7.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M1 2350 2600</td>
<td>k 7.8 8.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M2 2600 2860</td>
<td>l 8.4 9.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M3 2860 3150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUN8AF4A</td>
<td>m</td>
<td>380</td>
<td>390</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M3 2860 3150</td>
<td>h 6.0 6.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M4 3150 3450</td>
<td>l 6.6 7.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M5 3450 3800</td>
<td>j 7.2 7.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N1 3800 4180</td>
<td>k 7.8 8.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N2 4180 4600</td>
<td>l 8.4 9.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N3 4600 5060</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Rank (365 & 385nm)

\[
Y_1 Y_2 Y_3 Y_4
\]

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

Notes:
1. Peak Wavelength Measurement tolerance : ±3nm
2. Radiant Flux Measurement tolerance : ±10%
3. Forward Voltage Measurement tolerance : ±3%
## Binning & Labeling

### 3. Binning Structure (395nm)

![Binning Structure](image)

(Y₁Y₂Y₃Y₄Y₅)

(Iᵢ=1A)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Y₁Y₂</th>
<th>Y₃Y₄</th>
<th>Y₅</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Υ₁Υ₂</td>
<td>Υ₃Υ₄</td>
<td>Υ₅</td>
</tr>
<tr>
<td>Υ₁Υ₂Υ₃Υ₄Υ₅</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:

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

### 4. Rank (395nm)

(Y₁Y₂Y₃Y₄Y₅)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Υ₁Υ₂</th>
<th>Υ₃Υ₄</th>
<th>Υ₅</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Υ₁Υ₂</td>
<td>Υ₃Υ₄</td>
<td>Υ₅</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BIN</th>
<th>MIN</th>
<th>MAX</th>
<th>BIN</th>
<th>MIN</th>
<th>MAX</th>
<th>BIN</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3</td>
<td>2860</td>
<td>3150</td>
<td>h</td>
<td>6.0</td>
<td>6.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M4</td>
<td>3150</td>
<td>3450</td>
<td>i</td>
<td>6.6</td>
<td>7.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M5</td>
<td>3450</td>
<td>3800</td>
<td>j</td>
<td>7.2</td>
<td>7.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N1</td>
<td>3800</td>
<td>4180</td>
<td>k</td>
<td>7.8</td>
<td>8.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N2</td>
<td>4180</td>
<td>4600</td>
<td>l</td>
<td>8.4</td>
<td>9.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N3</td>
<td>4600</td>
<td>5060</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AP Technologies Limited
The Coach House
Watery Lane
Bath BA2 1RL
Tel: +44 (0) 1225 780 400
Fax: +44 (0) 8701 266 449
Email: info@aptechnologies.co.uk
5. Label

(1) 365 & 385nm

RANK: \[ Y_1 Y_2 Y_3 Y_4 \]
QUANTITY: 500
LOT NUMBER: XXXXXXXXXXX-XXX-XXX-XXXXXXXX
SOC PART NUMBER: X:XXX:XXX:XXX:XXX

\[ X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 \]

(1) 395nm

RANK: \[ Y_1 Y_2 Y_3 Y_4 Y_5 \]
QUANTITY: 500
LOT NUMBER: XXXXXXXXXXX-XXX-XXX-XXXXXXXX
SOC PART NUMBER: X:XXX:XXX:XXX:XXX

\[ X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 \]

6. SVC PART NUMBER: \[ X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 \]

<table>
<thead>
<tr>
<th>Company</th>
<th>Product Line</th>
<th>Wavelength</th>
<th>PKG Series</th>
<th>Lens Type</th>
<th>Chip Q’ty</th>
<th>Ver</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVC C UV</td>
<td>Near 365 N6 AAP63 A Flat F 4 4 ver0 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Near 385 N8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Near 395 N9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reel Packaging

![Diagram of Reel Packaging](image)

- **CATHODE MARK**
- **Reel Dimensions**:
  - Diameter: 178.5 ± 3
  - Width: 17.5 ± 0.3
  - Height: 60.0 ± 1.0
  - Thickness: 19.4 ± 1

---

**Technical Data Sheet**

- **Manufacturer**: Seoul Viosys
- **Website**: www.seoulviosys.com

---

**AP Technologies Limited**

- **Address**: The Coach House, Watery Lane, Bath, BA2 1RL
- **Telephone**: +44 (0) 1225 780 400
- **Fax**: +44 (0) 8701 266 449
- **Email**: info@aptechnologies.co.uk

---

**www.aptechnologies.co.uk**
Recommended solder pad

Notes:
[1] Scale: none
[2] This drawing without tolerances are for reference only
[3] PCB requires special care in design because of the 2 electrical isolation layer of package

ⓐ : Cathode
ⓑ : Anode
ⓒ : Electrically connected

Recommended PCB solder pad

(Unit: ㎜)
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.
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 recommended 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.
## 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>February 21, 2014</td>
<td>Data update</td>
</tr>
</tbody>
</table>