UVC3535RS_1AA

PRELIMINARY SPECIFICATIONS

Elphoton
INNOVATE HUMAN LIFE

CONTENTS

1. Description

The El photon UVC3535 product series is a deep UV LED package with a Peak emission wavelength from 270nm to 280nm.

The UVC3535 product series is a specially designed for high radiant power in a AlN based LED that suitable for UV application.

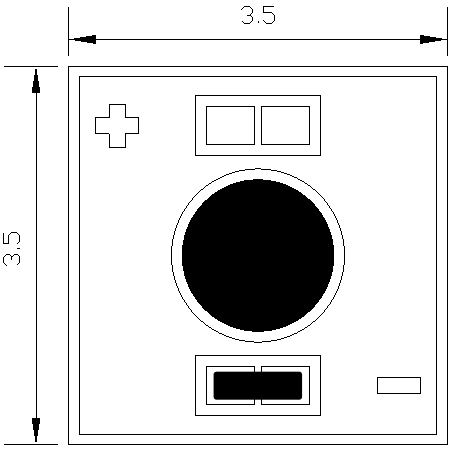
◆Features

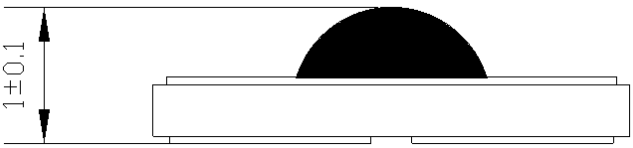
- Lighting Color(Peak Wavelength): 270~280nm
- Surface Mount Type LED Package: 3.5 × 3.5 ×1.0 (L × D × H) [Unit: mm]
- View angle (2Θ1/2=160deg)
- RoHS compliant
- ESD Protection up to 2KV
- Pb free

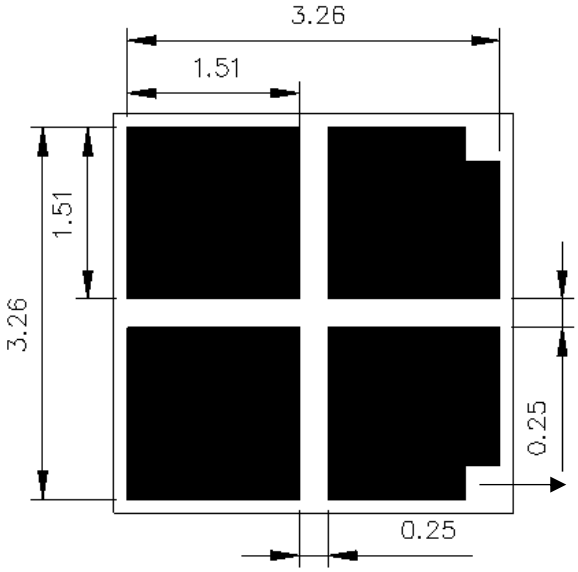
◆Applications

- Air/ Surface / water Disinfection and Sterilization
- Fluorescent Spectroscopy
- Sensor Light
- Medical Spectroscopy

2. Outline Dimensions

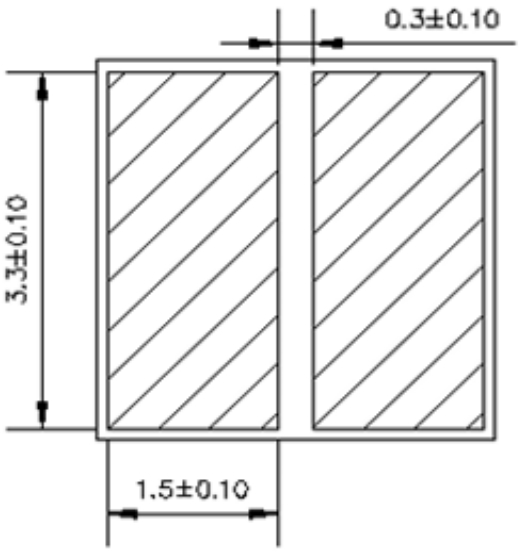




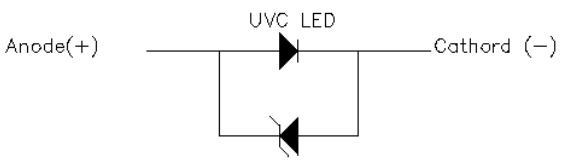


Cathode Mark [UVC]

Recommend Solder Pattern



Terminal connections



* Note

1. All dimensions are in millimeters.
2. Undefined tolerance is ±0.1mm
3. ESD protection

3. Absolute Maximum Rating at Ta = 25℃

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max	
Forward Current	I_F	-	-	40	mA
Power Dissipation	P_D	-	-	195	mW
Operating Temperature	T_{OPR}	-40	-	+85	℃
Storage Temperature	T_{STG}	-40	-	+100	℃
Junction Temperature	T_j	-	-	90	℃

4. Electro-Optical Characteristics at Ta = 25℃

Parameter	Conditions	Symbol	Min.	Typ.	Max	Unit
Peak Wavelength	I_F=30mA	W_p	270	-	280	nm
Radiant Flux		ϕe	6.0	-	16	mW
Forward Voltage		VF	5.0	-	6.0	V
Spectrum Half Width		Δλ	-	10	-	nm
View Angle		2θ½	-	160	-	°
Thermal Resistance, Junction - Solder		Rth $_{J-S}$	-	22.3	-	℃/W

Note
* These values measured by Optical spectrum analyzer and integrating sphere measuring system. And tolerances are followings as below.
* Rth j-s is the thermal resistance from chip junction to solder
* Reference for thermal resistance: Using 2.5x2.5x1.6cm aluminum MCPCB (Dielectric 2W/m·K layer and 1oz of cladding Cu)

1. Peak Wavelength Tolerance ± 3.5nm
2. Radiant Flux Measurement tolerance ±10%
3. Forward Voltage Tolerance ± 3%
4. View angle Tolerance ±10°
5. All characteristics are measured by El photon

5. Bin Structure

[Ta = 25℃, 30mA]

Rank	UVC@30mA					
	Peak Wavelength (nm)		Radiant Flux (mW)		Forward Voltage(V)	
	Min	Max	Min	Max	Min	Max
W270-P6.0-V5.0	270	280	6.0	8.0	5.0	5.2
W270-P8.0-V5.0			8.0	10.0		
W270-P10.0-V5.0			10.0	12.0		
W270-P12.0-V5.0			12.0	14.0		
W270-P14.0-V5.0			14.0	16.0		
W270-P6.0-V5.2			6.0	8.0	5.2	5.4
W270-P8.0-V5.2			8.0	10.0		
W270-P10.0-V5.2			10.0	12.0		
W270-P12.0-V5.2			12.0	14.0		
W270-P14.0-V5.2			14.0	16.0		
W270-P6.0-V5.4			6.0	8.0	5.4	5.6
W270-P8.0-V5.4			8.0	10.0		
W270-P10.0-V5.4			10.0	12.0		
W270-P12.0-V5.4			12.0	14.0		
W270-P14.0-V5.4			14.0	16.0		
W270-P6.0-V5.6			6.0	8.0	5.6	5.8
W270-P8.0-V5.6			8.0	10.0		
W270-P10.0-V5.6			10.0	12.0		
W270-P12.0-V5.6			12.0	14.0		
W270-P14.0-V5.6			14.0	16.0		
W270-P6.0-V5.8			6.0	8.0	5.8	6.0
W270-P8.0-V5.8			8.0	10.0		
W270-P10.0-V5.8			10.0	12.0		
W270-P12.0-V5.8			12.0	14.0		
W270-P14.0-V5.8			14.0	16.0		

Note : Bin code (W270-P8.0-V5.0)

- Peak Wavelength = W270 (270-280nm)
- Radiant Flux = P8.0 (8.0-10.0mW)
- Forward Voltage = V5.0 (5.0-5.2V)

6. Characteristics Diagrams at Ta=25℃, IF=30mA

FIG 1. Forward Current vs. Forward Voltage

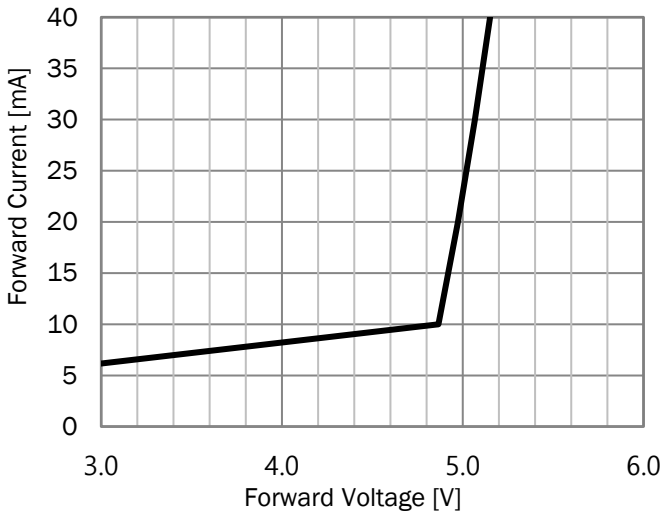


FIG 2. Relative Radiant Flux vs. Forward Current

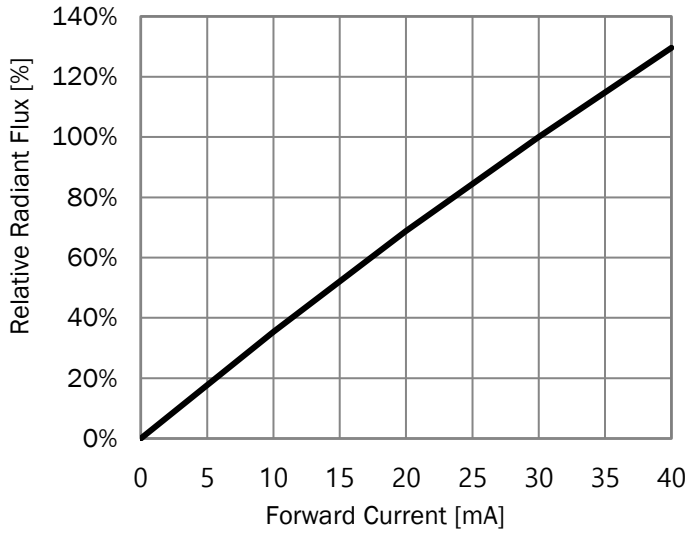


FIG 3. Peak Wavelength vs. Forward Current

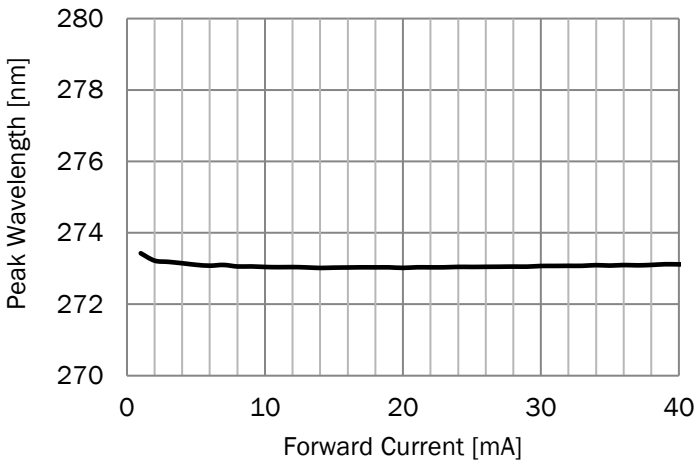


FIG 4. Typical Spectrum

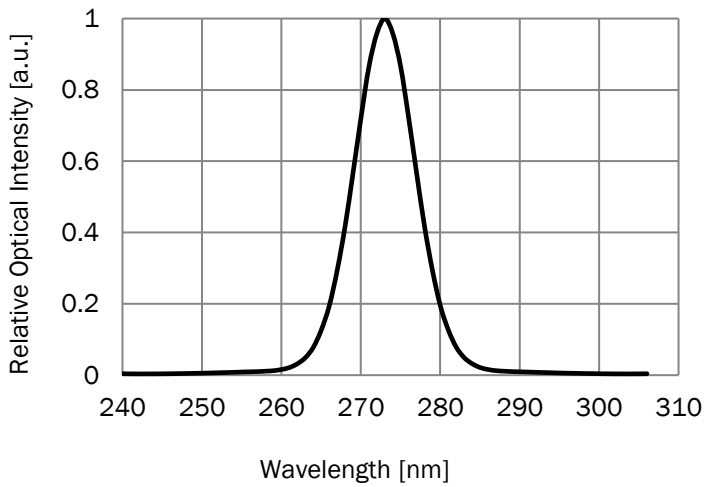


Fig 5. Forward Voltage vs Ambient Temperature

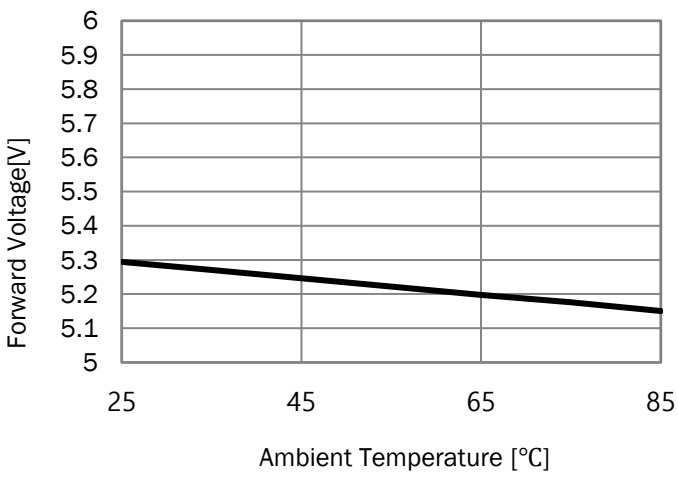
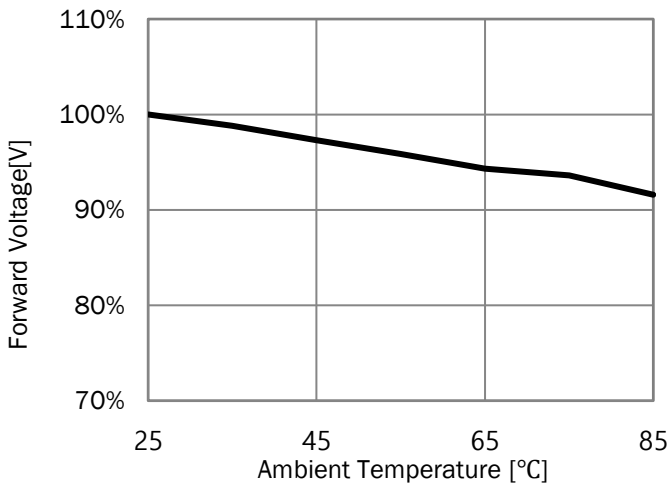
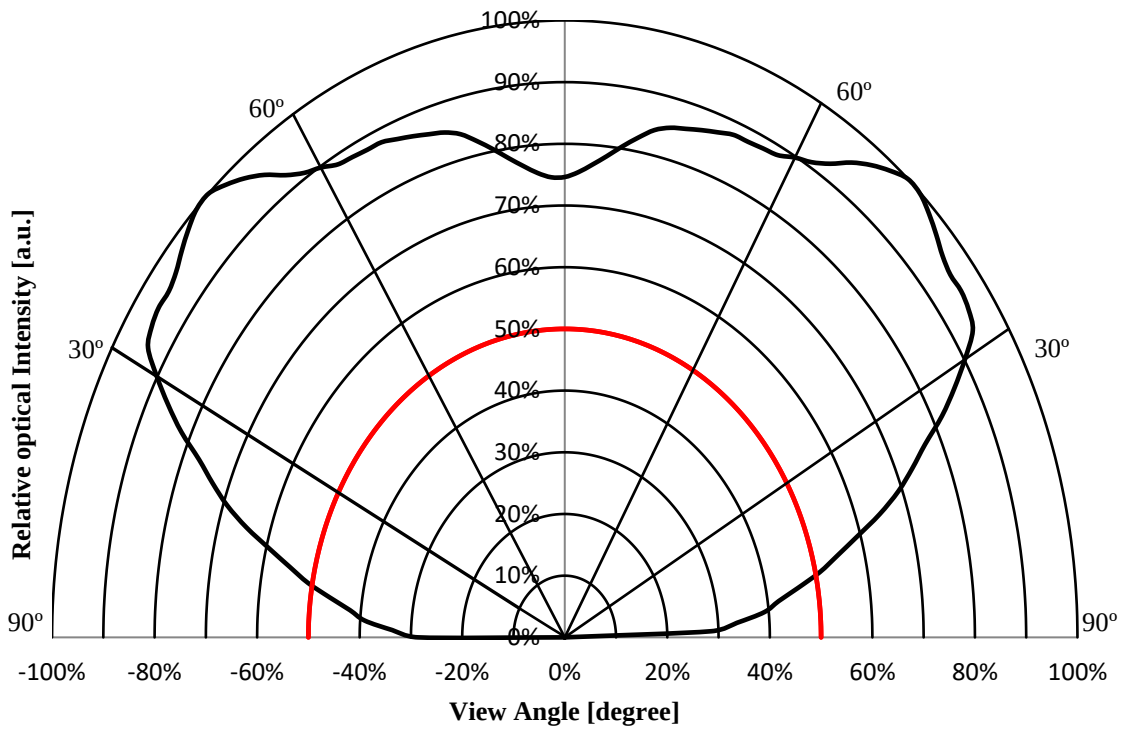


Fig 6. Relative Radiant Flux vs Ambient Temperature



6. Characteristics Diagrams at Ta=25℃, IF=30mA

FIG 7. Far-field Emission Pattern



7. Reliability Test Items and Conditions

1) Criteria for Judging the Damage

Parameter	Symbol	Condition	Criteria for Judgement	
			Min.	Max.
Forward Voltage	VF	IF=30mA	-	Initial value*1.1
Radiant Flux	ϕe		Initial value*0.5	-

2) Reliability Tests

Test Item	Test Conditions	Test Time	Sample Q'ty
Room Temperature Operating Life [RTOL]	Ta=25℃, If=40mA	1000hrs	6 pcs
High Temperature Operating Life [HTOL]	Ta=85℃, If=20mA	1000hrs	6 pcs
High Temperature Storage Life [HTSL]	Ta=100℃	1000hrs	6 pcs
Low Temperature Storage Life [LTSL]	Ta=-40℃	1000hrs	6 pcs
ESD	HBM, Voltage =2kV R=1.5kΩ, C=100pF	3 times Positive / negative	6 pcs

Note

- Measurements are performed after allowing the LEDs to return to room temperature

8. Soldering Conditions

1) Recommended Soldering

- **El photon recommends to use SnBiAg(Tin/bisemuth/silver) of solder paste composition**.
- The recommended stencil thickness is 60~80㎛.
- The recommended stencil solder paste area is 60~80%.
- When soldering, recommend using a convection reflow machine and not a hot plate.
- If must use a heat gun, we suggest that you use it carefully and be sure to follow the guidelines in the following chapters.

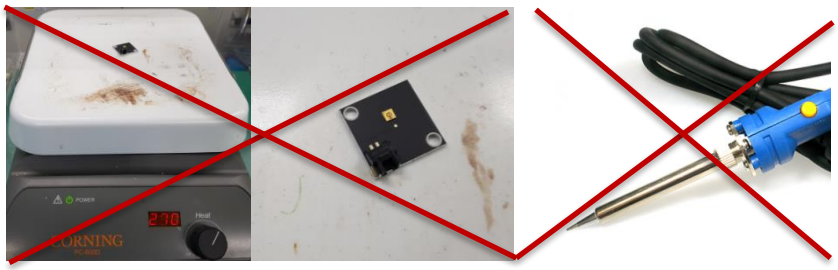


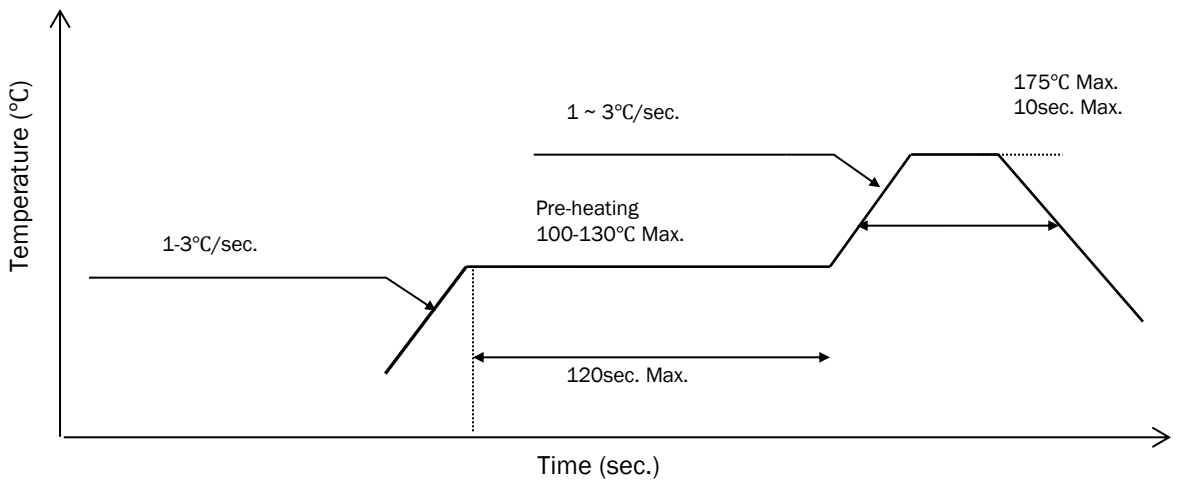
Figure1. When mounting the LED package on the PCB, it is not recommended to use a hot plate or soldering iron, and it is recommended to use a reflow machine.

2) Recommended Reflow Soldering profile

- Available Max temperature : 175℃ – 10 sec.
- A rapid-rate process is not recommended for the LEDs cooling down from the peak temperature.
- **Do not repeat Reflow soldering (UVC PKG must be a reflow process only once)**

Low Temperature Lead-Free Solder

(highly Recommended to use a low temperature solder)



Note

- Reflow soldering should not be done more than once.
- The peak temperature of the product can change depend on the material of the low temperature lead-free solder

8. Soldering Conditions : Convection Reflow Machine (2)

CAUTION

- **Temperature Limit for Soldering**

- It is not recommended to use solder paste that exceeds a peak temperature of 175°C.

- **Risk of Lens Deformation**

- Sudden temperature changes above 145°C can cause the lens to deform.

- **Lens Deformation Indicator**

- The most common sign of lens deformation is the presence of air bubbles inside the lens.

- **Impact on Product Performance**

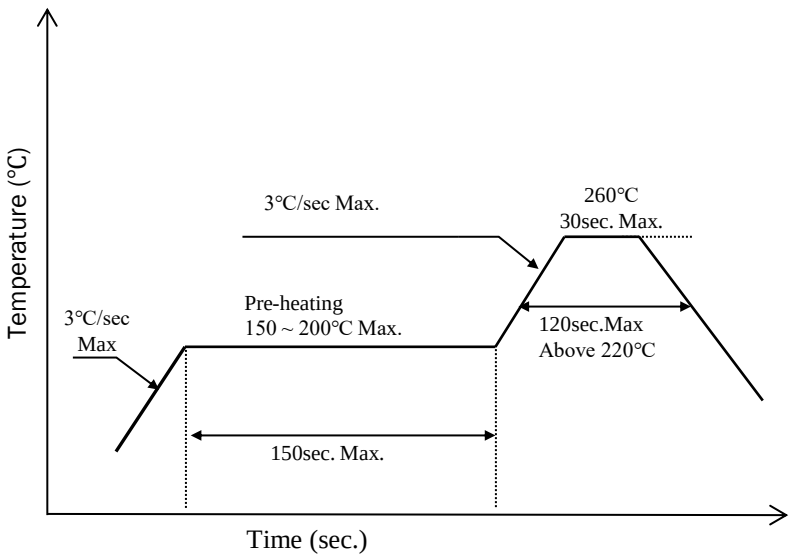
- Air bubbles inside the lens are a cosmetic issue and do not affect the product's performance or reliability.

1) Soldering

- SnAgCu (tin/silver/copper) solder paste composition is available.
- The recommended stencil thickness is 60~80㎛.
- The recommended stencil solder paste area is 60~80%.

2) Reflow Soldering profile

- Available Max temperature : 260℃
- A rapid-rate process is not recommended for the LEDs cooling down from the peak temperature
- Increasing the pre-heating time can help minimize lens distortion of this product
- Do not repeat Reflow soldering (UV PKG must be a reflow process only once)
- Recommend Mask Solder Pattern see page 4.



Reflow Soldering	
	Pb-free(SnAgCu)
Pre-Heating	150 ~ 200℃
Pre-Heat Time	150sec. Max.
Peak Temperature	260℃ Max.
Time within 5℃ at Peak Temperature	30sec. Max.

Note

- Reflow soldering should not be done more than once.
- The peak temperature of the product can change depend on the material of the lead-free solder
- Reflow time may change depending on the environment.

8. Non Reflow Machine Soldering Conditions Guide Line

CAUTION

- **Alternative Soldering Methods**

- This section provides instructions for melting solder using a hot plate or heat gun, without the use of a reflow machine, in order to minimize potent ial damage to the product.

- **Risk of Lens Deformation**

- Sudden temperature changes above 145℃ can cause the lens to deform.

- **Lens Deformation Indicator**

- The most common sign of lens deformation is the presence of air bubble s inside the lens.

- **Impact on Product Performance**

- Air bubbles inside the lens are a cosmetic issue and do not affect the pro duct's performance or reliability.

- **Optimal Soldering Recommendation**

- For the best results, we recommend using the convection reflow machine method 1 (refer to page 10).

1) Solder Melting Method Using a Hot Plate

- Solder Type :
  - Use solder with a low melting point, such as SnBi0.4Ag.
- Temperature Control :
  - Maintain the hot plate surface temperature between 140℃ and 145℃.
  - Be aware of potential discrepancies between set and actual temperatures.
  - Temperatures above 150℃ increase the risk of product damage.

2) Solder Melting Method Using a Heat Gun

- Temperature Control :
  - Keep the heat gun temperature below 250℃.
  - Account for potential differences between set and actual temperatures.
- Distance and Duration :
  - Maintain a distance of 3 to 5 cm between the heat gun and the product.
  - Limit solder melting time to 25 seconds.

3) Additional Tips

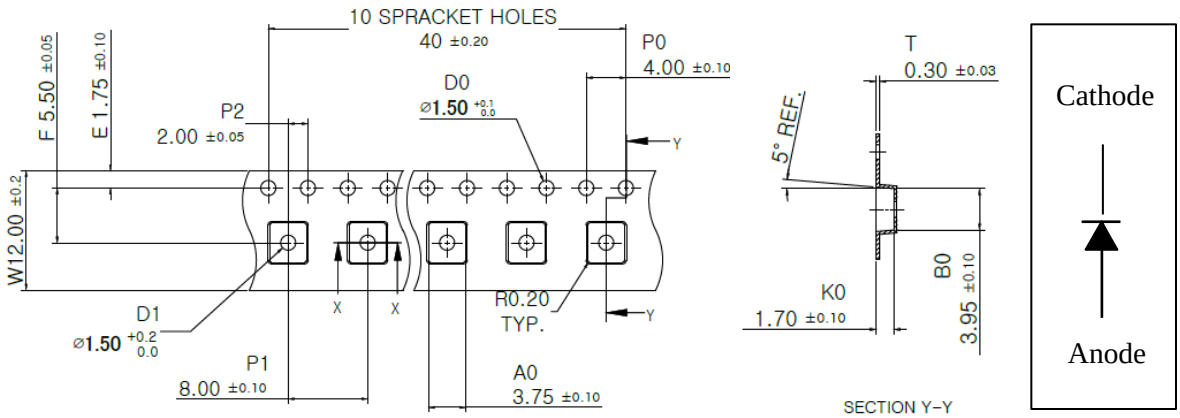
- Recommended Tools and Materials :
  - Use high-quality low-melting-point solder and reliable heat guns or hot plates.
- Troubleshooting Tips :
  - If solder doesn't melt properly, check the temperature settings and solder type.
  - For overheating, reduce the heat gun's temperature and increase the distance from the product.
- Testing and Quality Control :
  - Perform visual inspections and integrity tests on solder joints post-soldering.

By following these guidelines, you can significantly reduce the likelihood of defects, such as bubbles forming inside the lens.

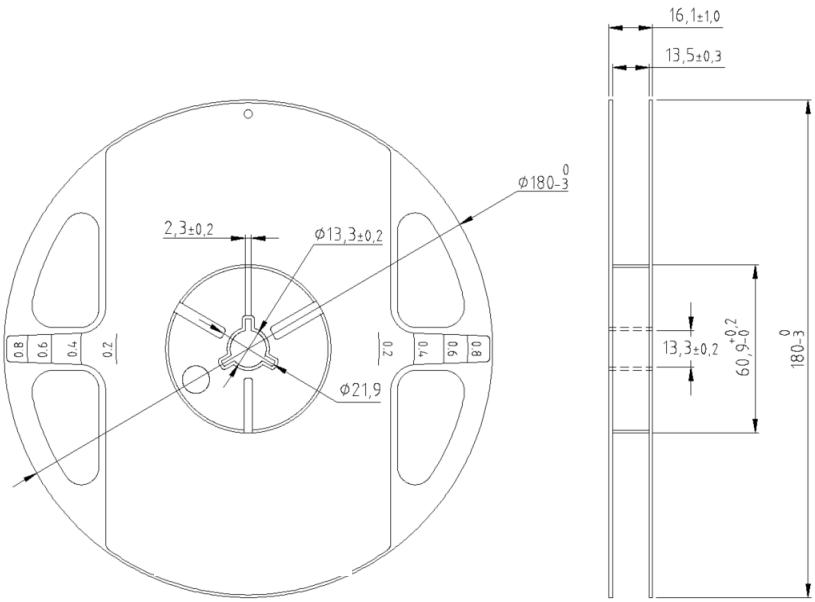
9. Packing

1) Tape & Reel Dimensions (unit : mm)

- Tape

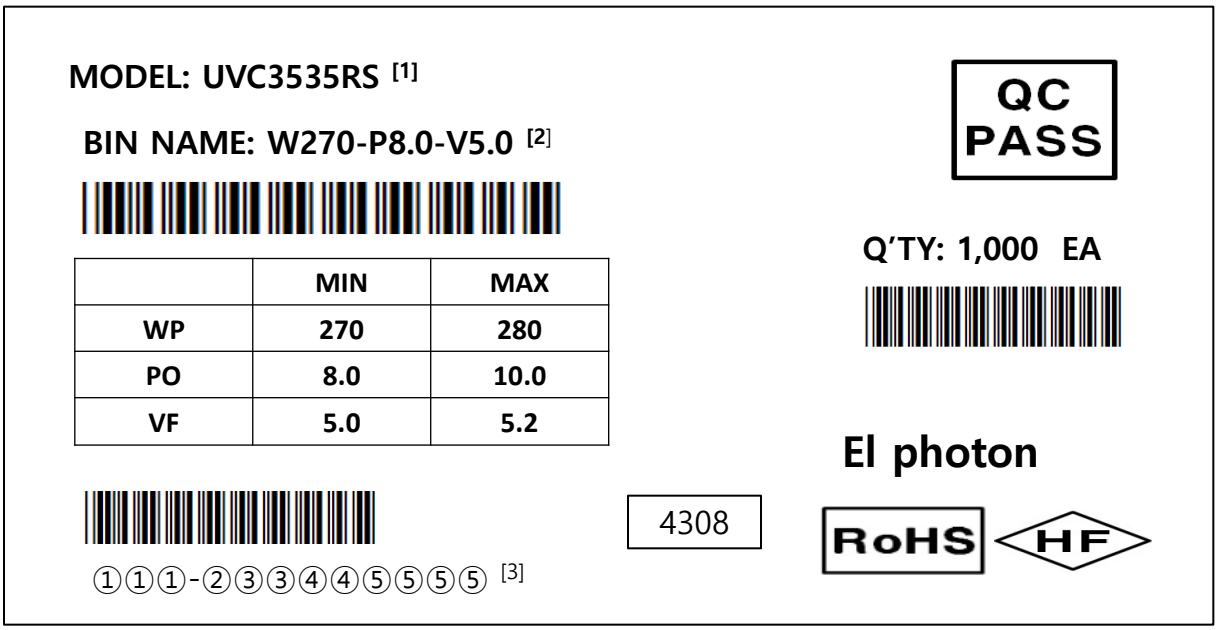


- Reel



Note
- Maximum quantity : 1,000pcs/7inch reel (Minimum quantity: 100pcs)
- Adhesion strength of cover tape is 0.1 ~ 0.7N when the cover tape is turned off from the carrier tape.
- The maximum number of consecutive missing lamps is two

10. Label Structure

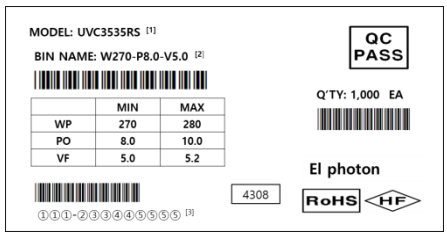


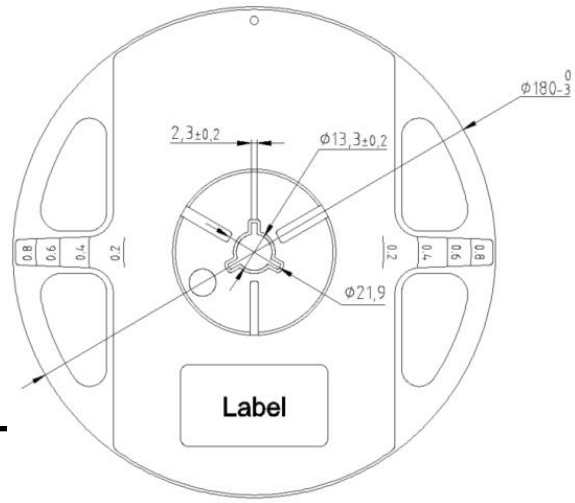
Note
- [1] Model name
- [2] BIN name : Consult to Page 6
- [3] Product Code : ① Bin No ② Reel type ③ Year ④ Month ⑤ Product Serial Number

11. Packing Structure

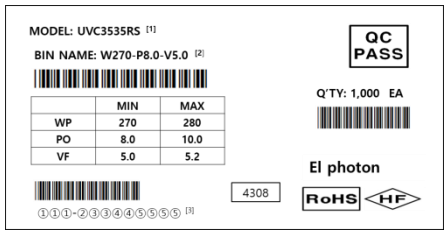
1) Packing Process

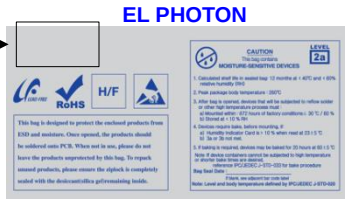
• Reel



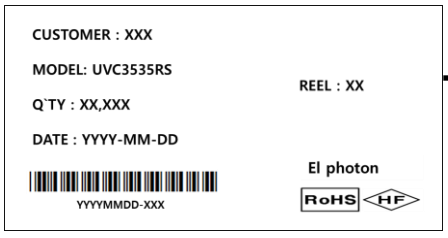


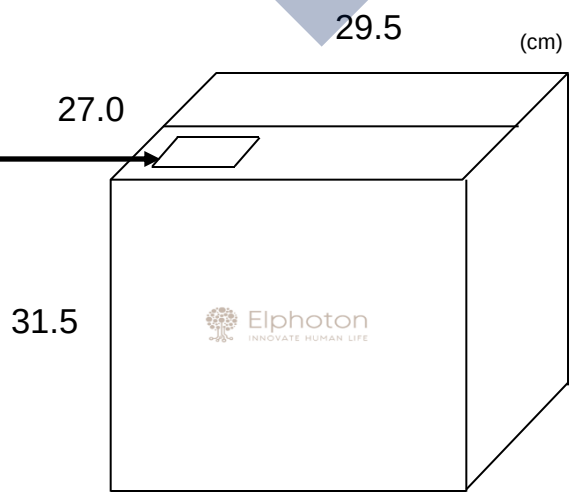
• Aluminum Foil Packing Bag





• Outer Box





12. Precaution

1. Cleaning.

- This Device is not allowed to be used in any type of fluid such as water, oil, organic Solvent, etc.
- If cleaning is required, IPA is recommended as cleaning solution.
- Pretests should be conducted with the actual cleaning process to validate that the process will not damage the UV LEDs

2. Mounting Precautions

- The time taken for a device to return to the room temperature after reflow soldering depends on the mounting board and environmental conditions.
- Pressure on the UV LEDs will influence to the reliability and easily scratched. Avoid friction against hard materials and strong pressure.
- It is recommend, do not put stress on the UV LEDs during heating .
- When installing an assembled board into equipment, ensure that the devices on the board do not contact with other components.
- Recommend once soldering. If re-soldering can not avoid, The UV LEDs characteristics should be carefully checked before and after such repair.

3. Packing

- Moisture-Proof Packaging
- These UV LED devices are packed in an aluminum envelope with a silica gel and a moisture indicator to avoid moisture absorption. The optical characteristics of the device may be affected by exposure to moisture in the air before soldering and the device should therefore be stored under the following conditions:
- This moisture proof bag may be stored unopened within 12 months at the following conditions.
- Temperature: 5 ℃ to 30 ℃ Humidity: 50 % (MAX)
- After opening the moisture proof bag, the device should be assembled within 4 weeks in an environment of 5 ℃ to 30 ℃/60 % RH or below.

12. Precaution

4. Handling Precautions

- The tape is antistatic-coated. However, if the tape is charged with excess static electricity, devices might cling to the tape or waggle in the tape when the cover tape peeled off. Be aware of the following to avoid this:
- Use an ionizer to neutralize the ions when utilizing an automatic mount Device..
- For transport and temporary storage of devices, use containers (boxes, jigs, bags) that are made with antistatic materials or materials that dissipate static electricity.
- Use preventive (ESD, EOS) measure; conductive floor mats, ground connection, wear conductive shoes, and wear a wrist strap
- Take suitable preventive measure s according to your working environment
- Note that the above measures are only examples
- When the device is in operation, the forward current should be carefully determined considering the maximum ambient temperature and corresponding junction temperature.

5. Manual Handling Precaution

- Do not pick up UV LEDs with fingers.
  - The emitting surface will get contaminated, affecting the optical characteristics.
- Use tweezers to pick up UV LEDs.
  - Teflon coated tweezers would be recommended that the UV LED is not to scratch
- During assembly processing, a mechanical stress on the surface should be minimized
- Recommend holding the sidewalls of UV LEDs (See figure 2.)
- Recommend using ESD protected or vacuum tweezers.

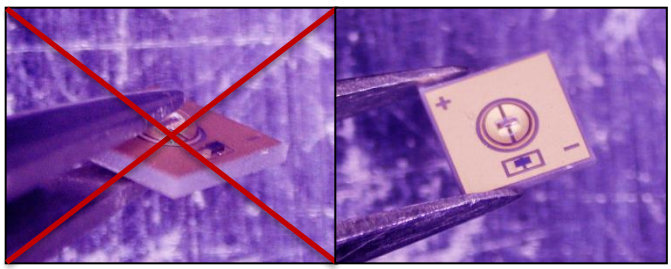


Figure 2. incorrect handling (left) and correct handling(right) of UV Package

12. Precaution

6. Assembly precautions

- UVC PKG consist of Lens and Zener (or Chip), which is placed outside of Lens. When using collet in the “Pick & Place process” as shown in fig.3(left), Chip or Zener can be damaged by Collet.
  (for example : LENS could be pressed, Chip could be broken or fell out) .
- It is recommended to use collet as shown in Fig.3(right). The Collet can carry out “Pick and Place Process” properly by avoiding damages of chips or Lens.
- Please verify the Collet before use.

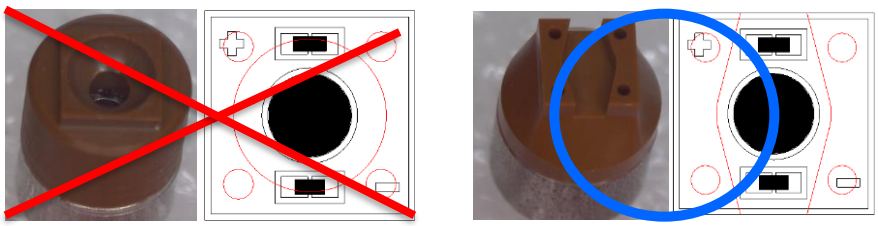


Figure 3. incorrect Collet(left) and correct collet(right) of UV Package

7. 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

13. Revision Sheet

Revision	Date	Page	Description	Remark
Rev.1.0	24.12.13	-	Preliminary edition	