

UVC3535ZL

PRELIMINARY SPECIFICATIONS



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1. Description

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

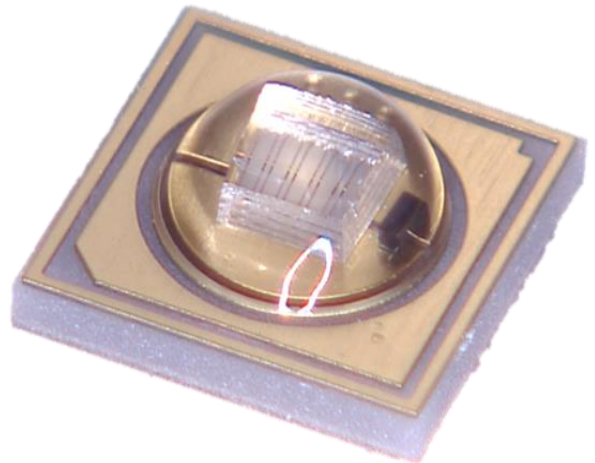
The UVC3535 product series is a specially designed for high radiant power in a AlN based LED that suitable for UV application.

◆Features

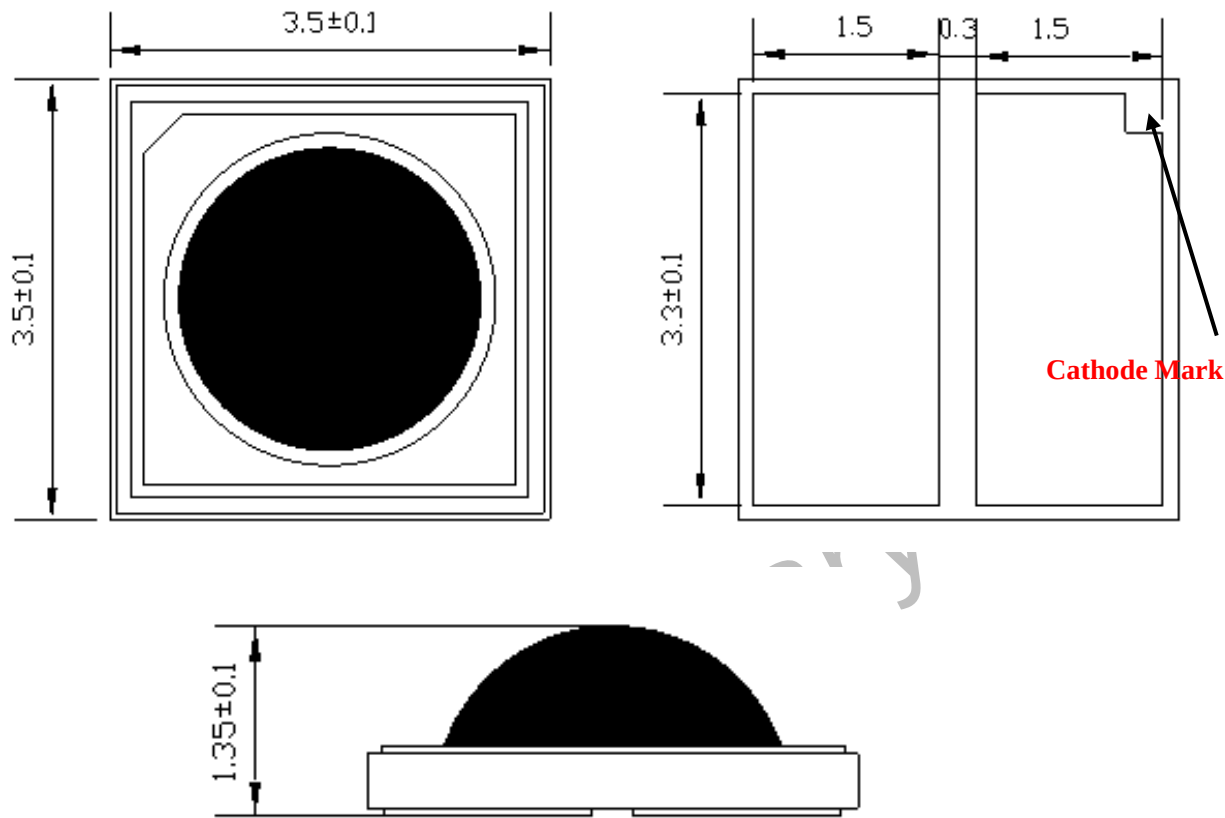
- Lighting Color(Peak Wavelength): 260~280nm
- Surface Mount Type LED Package: 3.5 × 3.5 ×1.35 (L × D × H) [Unit: mm]
- View angle ($2\Theta_{1/2}$ =160deg)
- RoHS compliant
- ESD Protection up to 2KV
- Pb free

◆Applications

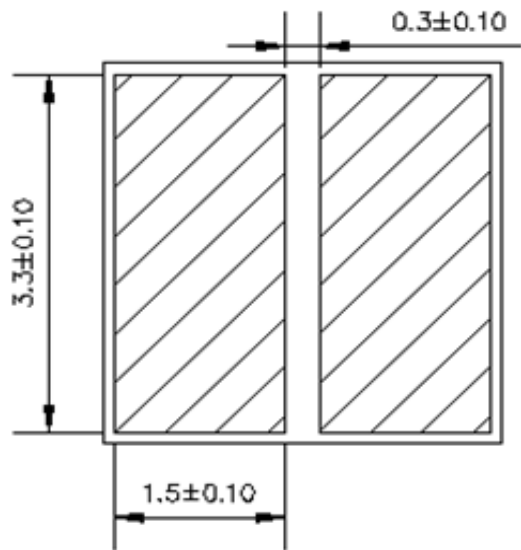
- Air/ Surface / water Disinfection and Sterilization
- Fluorescent Spectroscopy
- Sensor Light
- Medical Spectroscopy



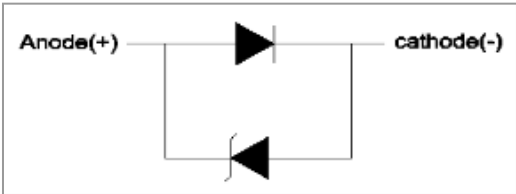
2. Outline Dimensions



Recommend Solder Pattern



Electrical scheme of SMD



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

3. Absolute Maximum Rating at Ta = 25°C

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max	
Forward Current	IF	-	-	500	mA
Power Dissipation	PD	-	-	3.5	W
Operating Temperature	TOPR	-40	-	+60	°C
Storage Temperature	TSTG	-40	-	+100	°C
Junction Temperature	Tj	-	-	80	°C

4. Electro-Optical Characteristics at Ta = 25°C

Parameter	Conditions	Symbol	Min.	Typ.	Max	Unit
Peak Wavelength	IF=350mA	Wp	260	-	280	nm
Radiant Flux		φe	70	-	160	mW
Forward Voltage		VF	5.5	-	7.0	V
Spectrum Half Width		Δλ	-	10	-	nm
View Angle		2θ½	-	160	-	°
Thermal Resistance, Junction - Board		RJ-b	-	10	-	°C/W

Note

- * These values measured by Optical spectrum analyzer and integrating sphere measuring system. And tolerances are followings as below.
- * Rth j-b is the thermal resistance from chip junction to bottom of MCPCB
- * Reference for thermal resistance: Using 2.5x2.5x1.6cm aluminum MCPCB

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 °C, 350mA]

Rank	Peak Wavelength(nm)		Radiant Flux(mW)		Forward Voltage(V)	
	Min	Max	Min	Max	Min	Max
W260-P100-V5.5	260	270	70	90	5.5	6.0
W260-P120-V5.5			90	110		
W260-P140-V5.5			110	130		
W260-P100-V6.0			70	90	6.0	6.5
W260-P120-V6.0			90	110		
W260-P140-V6.0			110	130		
W260-P100-V6.5			70	90	6.5	7.0
W260-P120-V6.5			90	110		
W260-P140-V6.5			110	130		

Note : Bin code (W260-P100-V6.0)

- Peak Wavelength = W260 (260-270nm)
- Radiant Flux = P100 (100-120mW)
- Forward Voltage = V6.0 (6.0-6.5V)

5. Bin Structure

[Ta = 25℃, 350mA]

Rank	Peak Wavelength(nm)		Radiant Flux(mW)		Forward Voltage(V)	
	Min	Max	Min	Max	Min	Max
W270-P100-V5.5	270	280	100	120	5.5	6.0
W270-P120-V5.5			120	140		
W270-P140-V5.5			140	160		
W270-P100-V6.0			100	120	6.0	6.5
W270-P120-V6.0			120	140		
W270-P140-V6.0			140	160		
W270-P100-V6.5			100	120	6.5	7.0
W270-P120-V6.5			120	140		
W270-P140-V6.5			140	160		

6. Characteristics Diagrams at Ta=25°C, IF=350mA

FIG 1. Forward Current vs. Forward Voltage

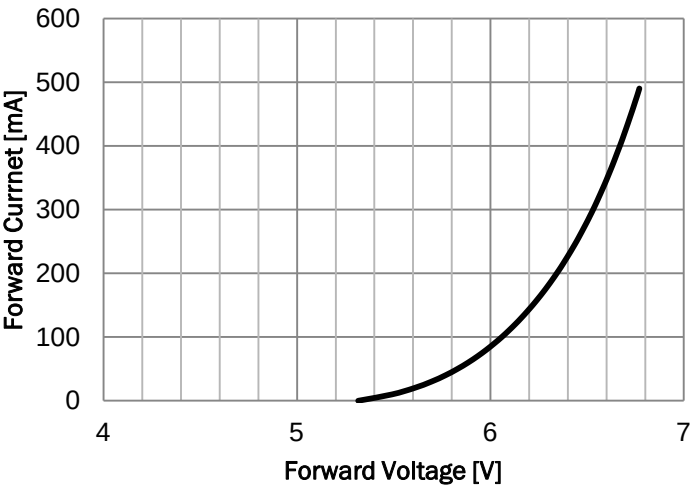


FIG 2. Relative Radiant Flux vs. Forward Current

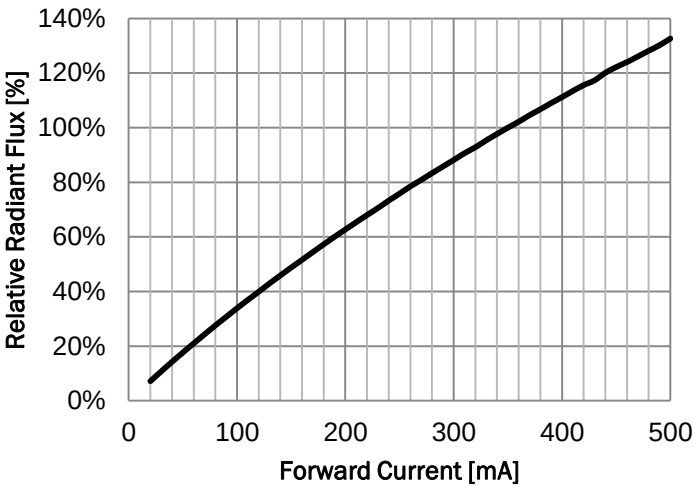


FIG 3. Peak Wavelength vs. Temperature

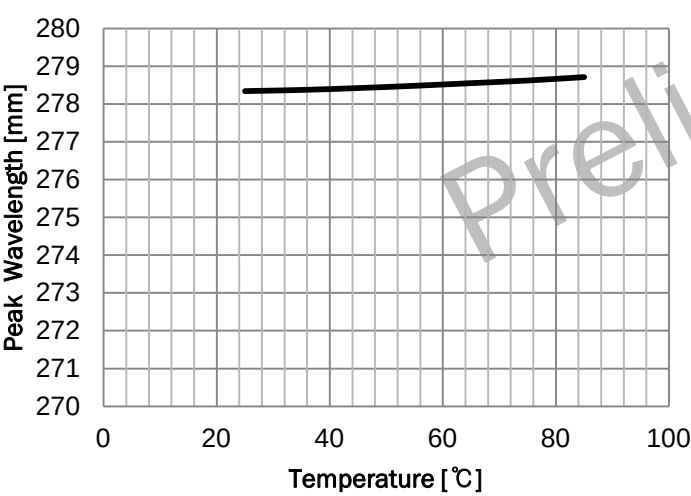


FIG 4. Typical Spectrum

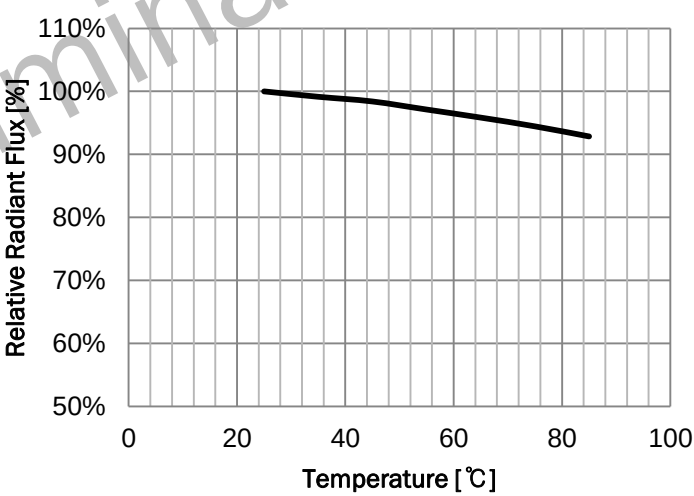


Fig 5. Forward Voltage vs Ambient Temperature

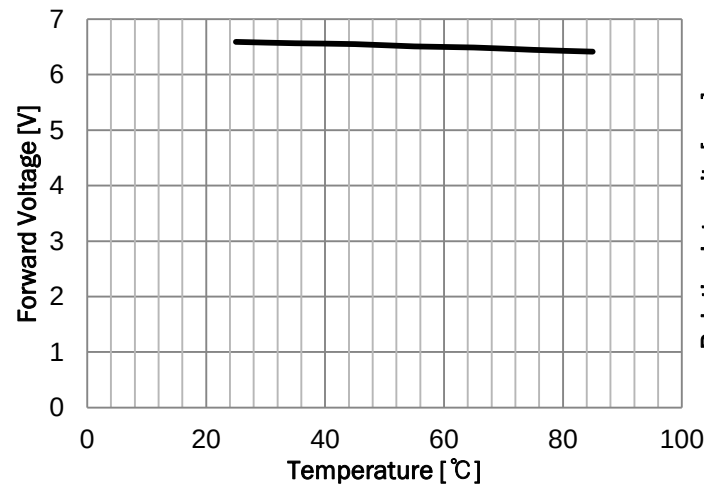
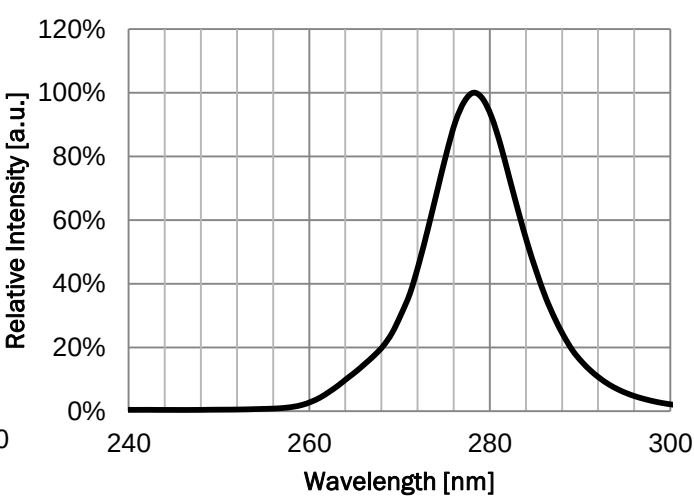
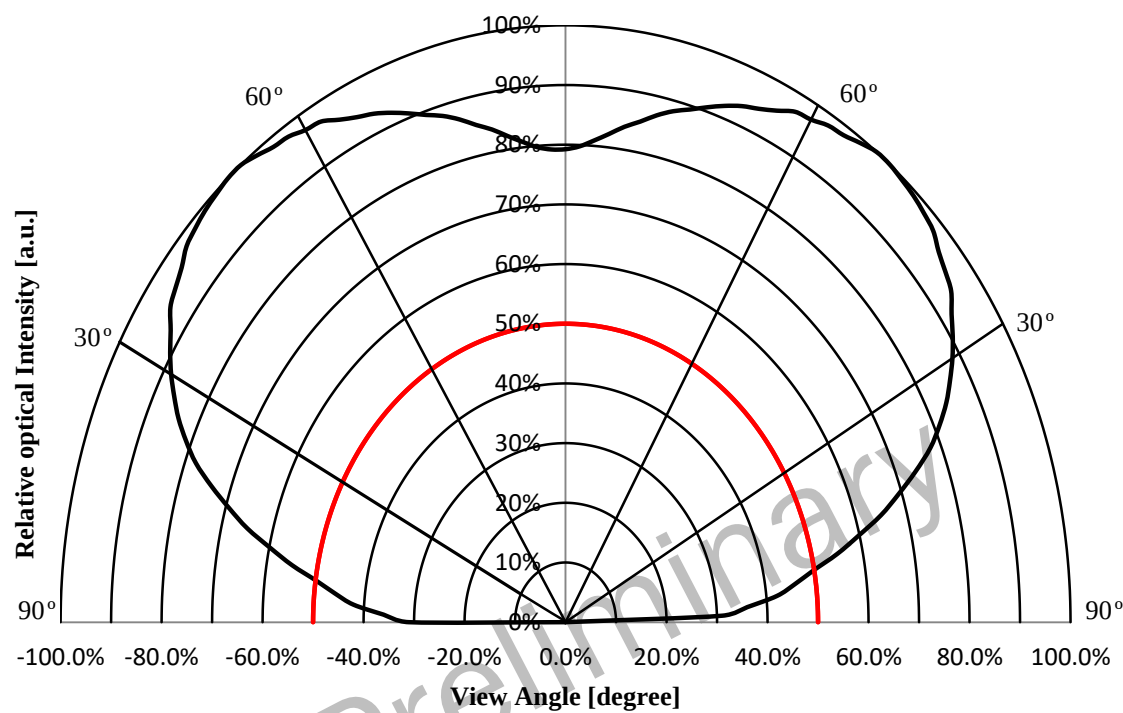


Fig 6. Relative Radiant Flux vs Ambient Temperature



6. Characteristics Diagrams at Ta=25°C, IF=350mA

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=350mA	-	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°C, If=350mA	1000hrs	6 pcs
High Temperature Operating Life [HTOL]	Ta=60°C, If=150mA	1000hrs	6 pcs
High Temperature Operating Life2 [HTOL]	Ta=60°C, If=250mA	1000hrs	6 pcs
High Temperature Storage Life [HTSL]	Ta=100°C	1000hrs	6 pcs
Low Temperature Storage Life [LTSL]	Ta=-40°C	1000hrs	6 pcs
Thermal Cycle	Min = -40°C / Max = 125°C Dwell Time 30min / Transfer time: 15min 1 cycle = 1 hour	100 cycle	6 pcs
ESD	HBM, Voltage =2kV R=1.5kΩ, C=100pF	3 times Positive / negative	6 pcs

Note

- Using 2.5×2.5×1.6cm Aluminum MCPCB.
- 3ea of MCPCBs are mounted on 15×5×2.8cm metal thermal heat sink when reliability test.
- Measurements are performed after allowing the LEDs to return to room temperature.

8. Soldering Conditions

1) Recommended Soldering

- El photon recommends to use SnAgCu(Tin/Silver/Copper) of solder paste composition.
- The recommended stencil thickness is 60~80μm.
- The recommended stencil solder paste area is 60~80%.
- When soldering, do not use a hot plate, recommended to use a convection type reflow machine.

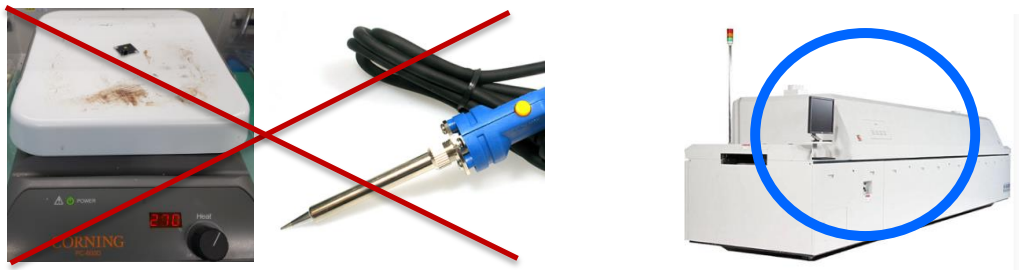
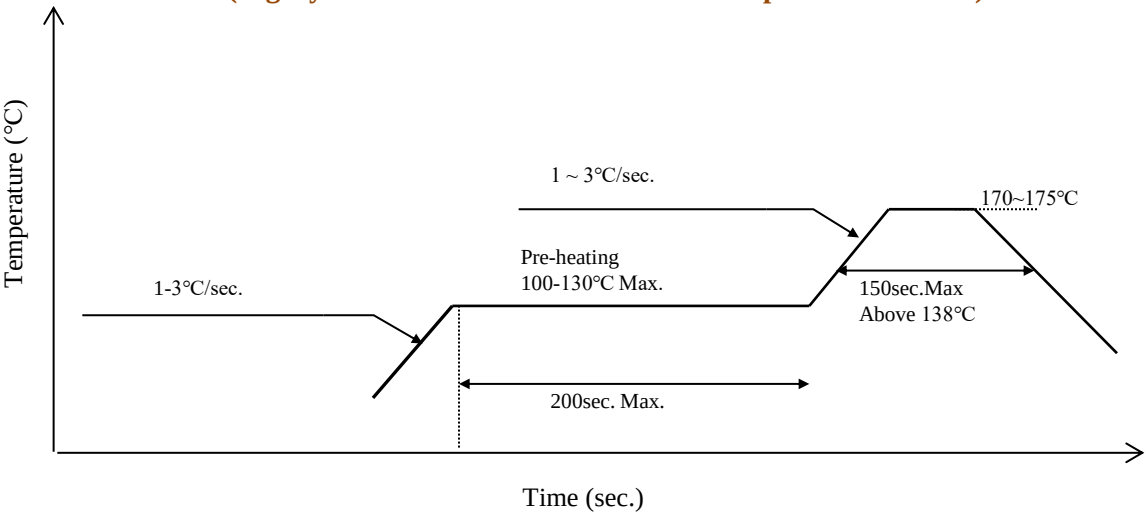


Figure1. Do not use a hot plate or Soldering Iron to mount led-package onto PCB, recommended to use a reflow machine.

2) Recommended Reflow Soldering profile

- Available Max temperature : 175°C – 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)



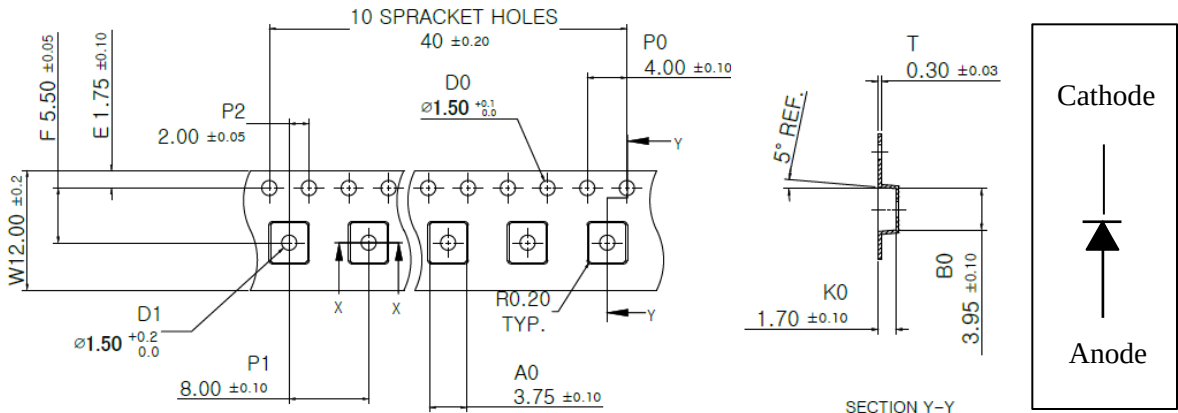
Note

- 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
- Reflow time may change depending on the environment.

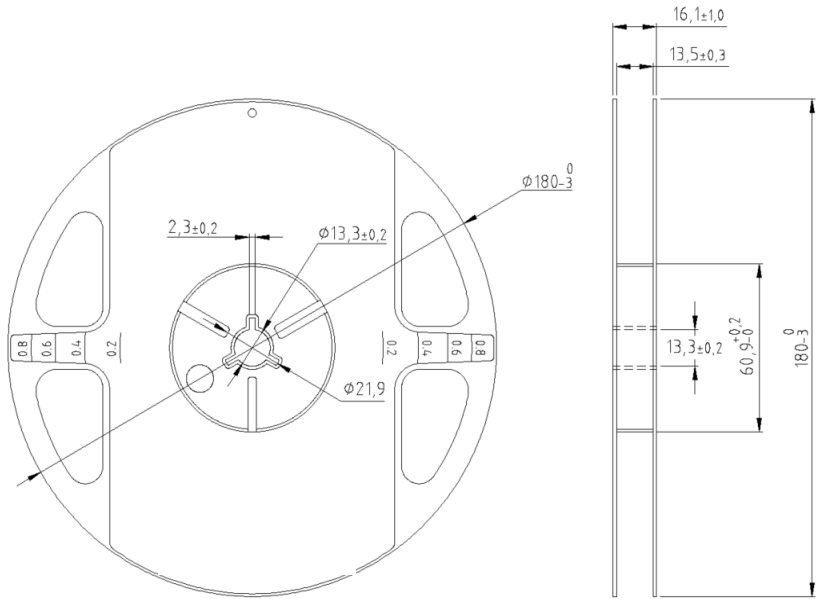
9. Packing

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

MODEL: UVC3535ZL [1]

BIN NAME: W270-P100-V6.0 [2]



	MIN	MAX
WP	270	280
PO	100	120
VF	6.0	6.5



①①①-②③③④④⑤⑤⑤⑤ [3]

QC
PASS

Q'TY: 1,000 EA



El photon

4308

RoHS

HF

- 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

MODEL: UVC3535ZL ^[1]

BIN NAME: W270-P100-V6.0 ^[2]

	MIN	MAX
WP	270	280
PO	100	120
VF	6.0	6.5

QC PASS

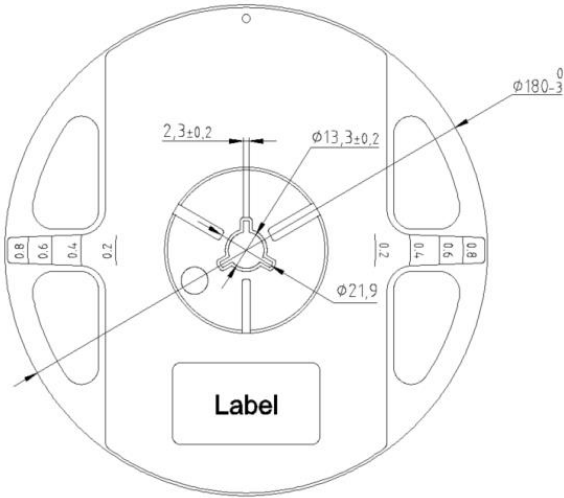
Q'TY: 1,000 EA

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RoHS HF

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①①①-②③③④④⑤⑤⑤ ^[3]



- Aluminum Foil Packing Bag

MODEL: UVC3535ZL ^[1]

BIN NAME: W270-P100-V6.0 ^[2]

	MIN	MAX
WP	270	280
PO	100	120
VF	6.0	6.5

QC PASS

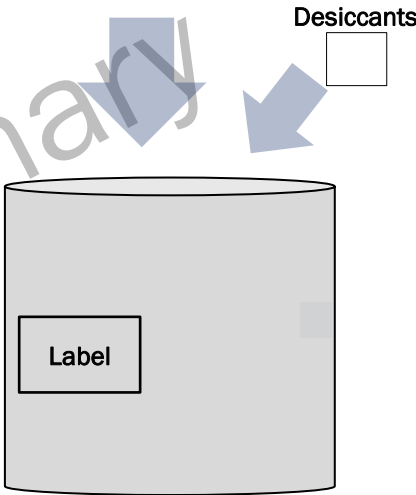
Q'TY: 1,000 EA

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RoHS HF

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①①①-②③③④④⑤⑤⑤ ^[3]



- Outer Box

CUSTOMER : XXX

MODEL: UVC3535ZL

Q'TY : XX,XXX

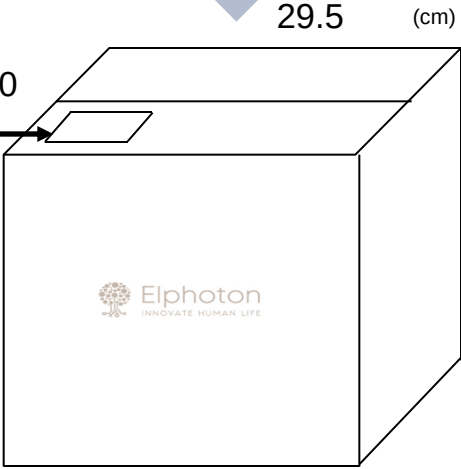
DATE : YYYY-MM-DD

REEL : XX

El photon

RoHS HF

YYYYMMDD-XXX



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

- This product is equivalent to IPC/JEDEC J-STD-020D MSL 5a
- LED packages may absorb moisture; therefore, we recommend the LEDs in moisture-proof bags.
- 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.

Conditions		Temperature	Humidity	Time
Storage	Before opening Aluminum bag	$\leq 30^{\circ}\text{C}$	$\leq 60\% \text{RH}$	1 year
	After opening Aluminum bag	$\leq 30^{\circ}\text{C}$	$\leq 60\% \text{RH}$	24hours
Baking		$65 \pm 5^{\circ}\text{C}$		$\geq 24\text{hr}$

- To avoid failure, solder the LEDs onto PCBs within 24 hours after opening the moisture-proof bags.
- If not used within 24 hours, El photon recommends drying for within 24hr at $65 \pm 5^{\circ}\text{C}.$.

12. Precaution

4. Handling Precautions

- Workplace setup should follow the recommendations given in JEDEC standard document JESD625B “Requirements for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices” or IEC 61340-5-1,2 and 3. In addition, properly train operators to handle UV LED according to the guidelines listed below:
- Always wear conductive wrist straps when handling UV LEDs—both on or off boards. Continuously monitor the conductive straps to ensure that they start and remain grounded.
- Use an ion blower to neutralize the static discharge that may build up on the surface of the UV LED during storage and handling.
- Always keep new UV LED in the protective ESD storage bag. Depending on the final application, it may be necessary to include additional ESD protection, such as a TVS protection diode on the substrate on which the UV LED is reflowed. El Photon UV LEDs have a TVS chip inside each package.
- Use tweezers to pick up UV LEDs. To avoid scratching UV LEDs, El Photon recommends using Teflon-coated tweezers.
- El Photon recommends holding the LED from the sidewalls (see Figure 2.)
- Do not apply pressure to the dome lens on packaged LED.

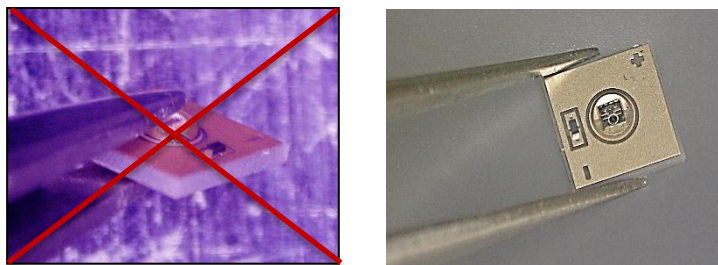


Figure 2. incorrect handling (left) and correct handling(right) of UV Package

12. Precaution

5. Assembly precautions

- UV LED consists of the chip and Flat substrate. The chip is protected by a specific material in the form of lens.
- Touching the lens, it may damage the chip.
- Pick up Point : Out area of lens of LED as Shown in Fig.3(a)
- It is recommended to use collet as shown in Fig.3(b). The Collet can carry out “Pick and Place Process” properly by avoiding damages of Lens.

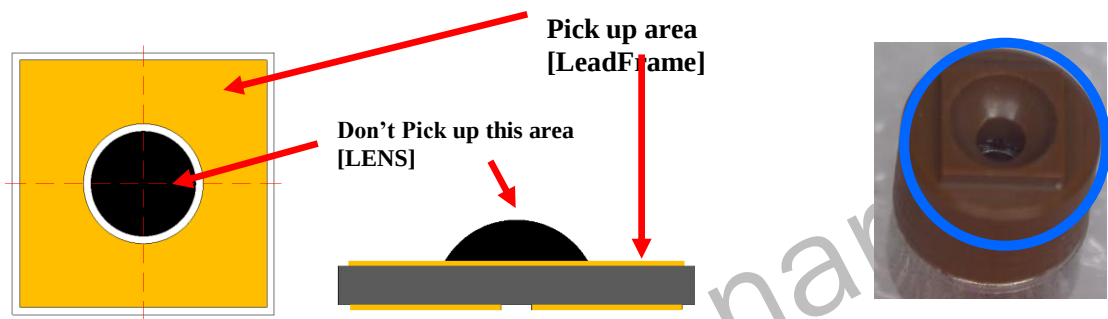
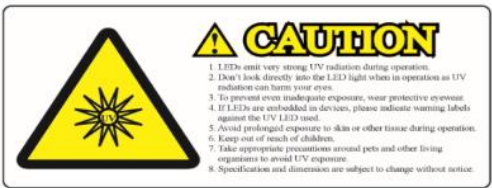


Figure 3(a). Pick up point of LED

Figure 3(b). Recommend collet design

6. General Precaution and UVC Safety

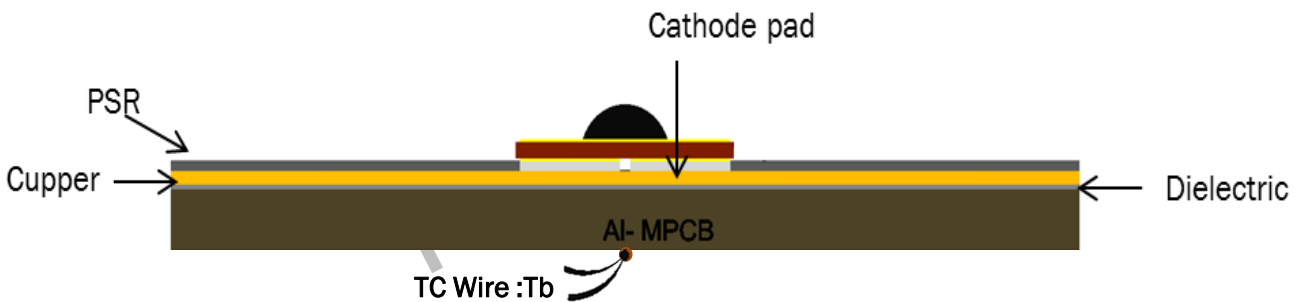
- UVC LEDs emit deep ultraviolet radiation with extremely high intensity near their surface. High irradiance allows rapid disinfection, but users must observe safety precautions during assembly, testing, and field use.
- By purchasing the UVC chips and packaged LEDs or arrays from El Photon, the customer agrees to indemnify the manufacturer of any bodily harm due to failure to follow the common-sense precautions or warnings and guidelines contained within this Specification.
- It is the buyer’s responsibility to design products that ensure the safety of end users.
- All assembly workers, operators, and bystanders must wear eye and skin protection when the UVC LEDs are energized. Therefore, bare-eye observation (including through microscopes) and bare-hand handling of a UVC LED in operation is PROHIBITED.
- Because most materials readily absorb UVC light, any oil or other absorbent liquid or solid substance must NOT be allowed to touch the sapphire side of the UVC chip or the dome lens on a packaged LED.



12. Precaution

7. Tb Measurement Guideline

- The recommended location of the sensor pad is right next to the cathode of the UV LED on the PCB, as shown in below.
- To ensure accurate reading, the thermocouple (TC) tip must make direct contact to the copper of the PCB onto which the UV LED cathode pad is soldered (i.e. any solder mask or other masking layer must first be removed before mounting the thermocouple onto the PCB).
- The tip of the TC wire should be placed as close as possible to the UV LED on the exposed cathode copper layer. The thermal resistance ($R_{\theta j-b}$) between the sensor pad and the UV LED junction was experimentally determined on a 1mm thick Al-MCPCB and Heatsink with the following PCB properties: 1 or 2 oz. copper and 100um thick dielectric layer with $2 \text{ W}/(\text{m}\cdot\text{K})$.



This specifications of the product may be revised without notice.

[illegible]