

Data Sheet

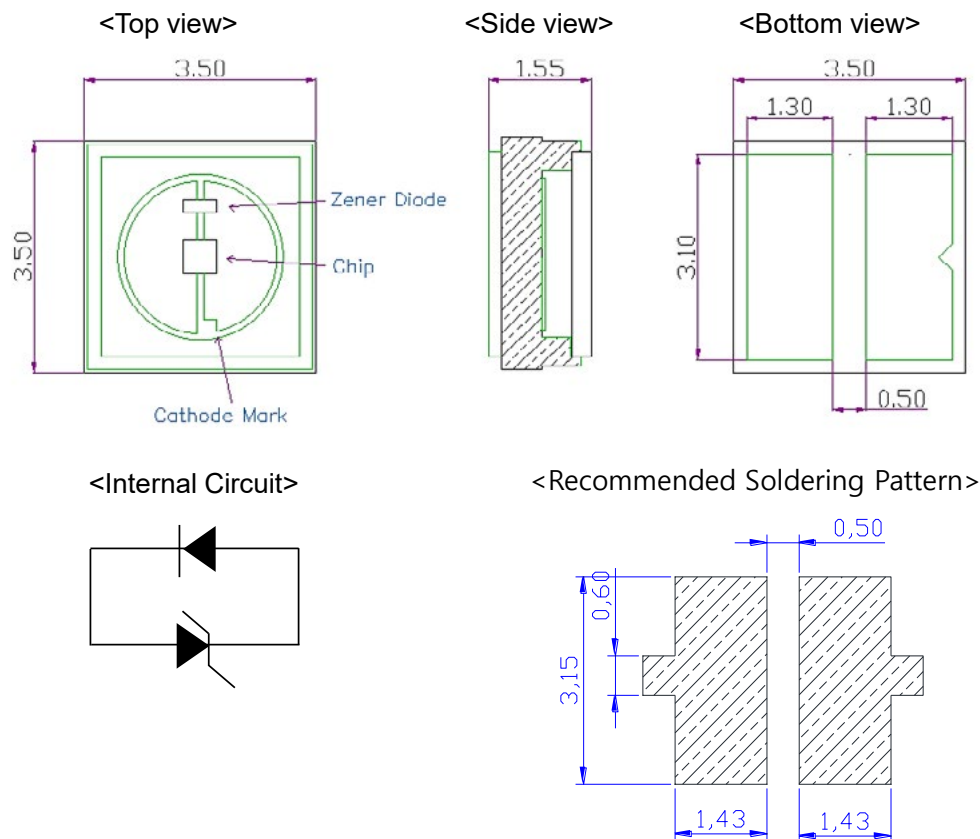
Photon Wave UV LED SOLUTION

1. Features

- Light Source for Sterilization and Medical Application
- Lighting Color(Peak Wavelength) : 255nm
- Surface Mount Type LED: 3.5 x 3.5 x 1.55(L x W x H)[Unit : mm]
- Soldering Methods: Reflow Soldering

2. Outline Dimension

Notes : All dimensions are in millimeter and tolerance is $\pm 0.2\text{mm}$ unless otherwise noted



Rev0.0, 30th, March, 2021

Data Sheet

Photon Wave UV LED SOLUTION

3. Application

- Disinfection, Phototherapy, Fluorescent Spectroscopy, Sensor Light, Bio-Analysis / Direction, Counterfeit Detector etc.

4. Absolute Maximum Ratings ($T_a = 25\text{ }^\circ\text{C}$)

Parameters	Symbol	Ratings	Unit
Power Dissipation	P_d	1.20	W
Forward Current	I_F	150	mA
Operating Temperature	T_{opr}	-30 ~ +60	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 ~ +100	$^\circ\text{C}$
Junction Temperature	T_j	85	$^\circ\text{C}$
Soldering Temperature	JEDEC-J-STD-020D		
ESD Classification	Class 2(ANSI / ESDA / JEDEC JS-001)		

Notes :

- Operating the LED beyond the listed maximum ratings may affect device reliability and cause permanent damage. These or any other conditions beyond those indicated under recommended operating conditions are not implied. The exposure to the absolute maximum rated conditions may affect device reliability.
- The LEDs are not designed to be driven in reverse bias.

Rev0.0, 30th, March, 2021

Data Sheet

Photon Wave UV LED SOLUTION

5. Electro-Optical Characteristics ($I_F = 100 \text{ mA}$, $T_a = 25 \text{ °C}$) ^{Note 1}

Parameters	Symbol	Spec			Unit
		Min	Typ	Max	
Forward Voltage	V_f	5.0	6.0	7.0	V
Radiant Flux	P_o	-	13.0	-	mW
Peak Wavelength	λ_p	250	255	260	nm
Spectrum Half Width	$\Delta\lambda$	-	11	-	nm
Viewing Angle	$2\Theta_{1/2}$	-	120	-	deg
Thermal Resistance ^{Note 2} (Junction to Solder point)	R_{thJ-S}	-	25	-	°C/W

Notes :

- Measured by optical spectrum analyzer of Photon Wave, some values may vary depending on the conditions of the test equipment.
 - Forward Voltage (V_f) : $\pm 0.1V$
 - Peak Wavelength (λ_p) : $\pm 3nm$
 - Radiant Flux (P_o) : $\pm 10\%$
- Thermal resistance can be increased substantially depending on the heat sink design/operating condition, and the maximum possible driving current will decrease accordingly.

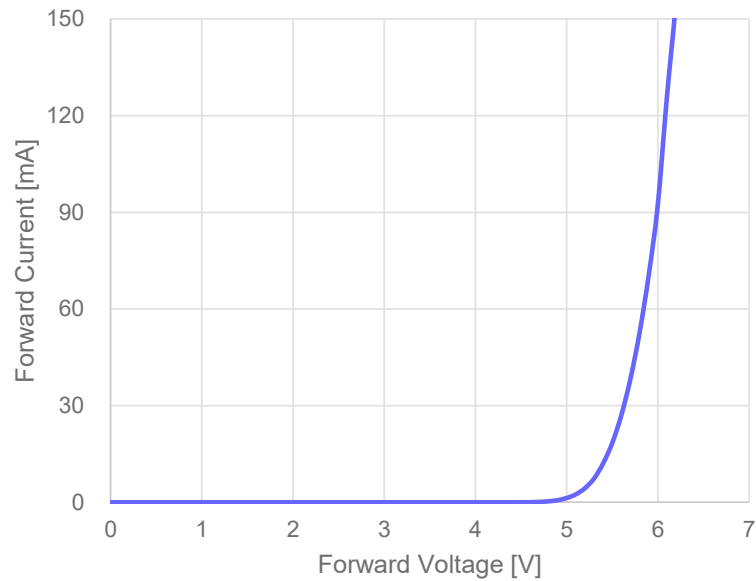
Rev0.0, 30th, March, 2021

Data Sheet

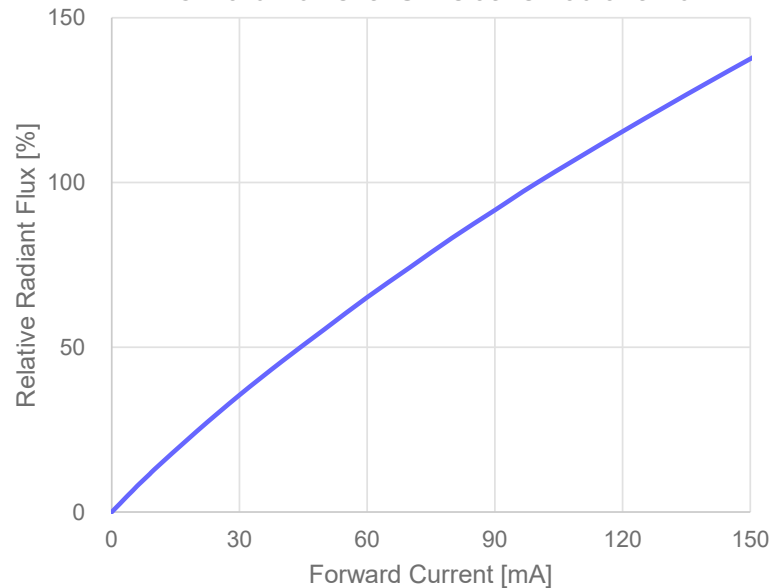
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6. Characteristic Curves ($T_a = 25\text{ °C}$)

< Forward Voltage vs. Forward Current >



< Forward Current vs. Relative Radiant Flux >



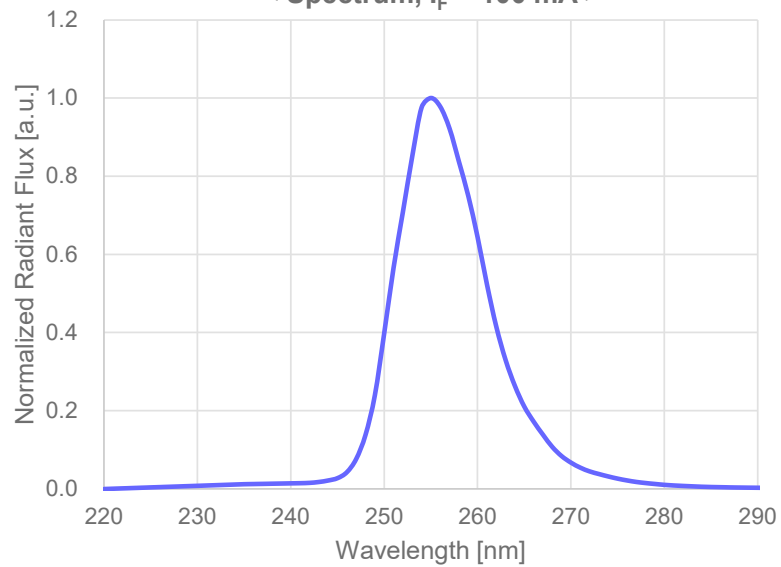
Rev0.0, 30th, March, 2021

Data Sheet

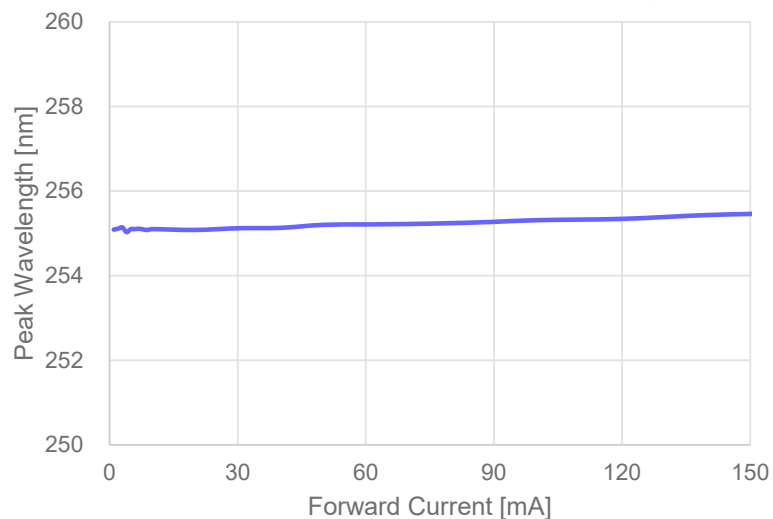
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6. Characteristic Curves ($T_a = 25\text{ }^\circ\text{C}$)

< Spectrum, $I_F = 100\text{ mA}$ >



< Forward Current vs. Peak Wavelength >



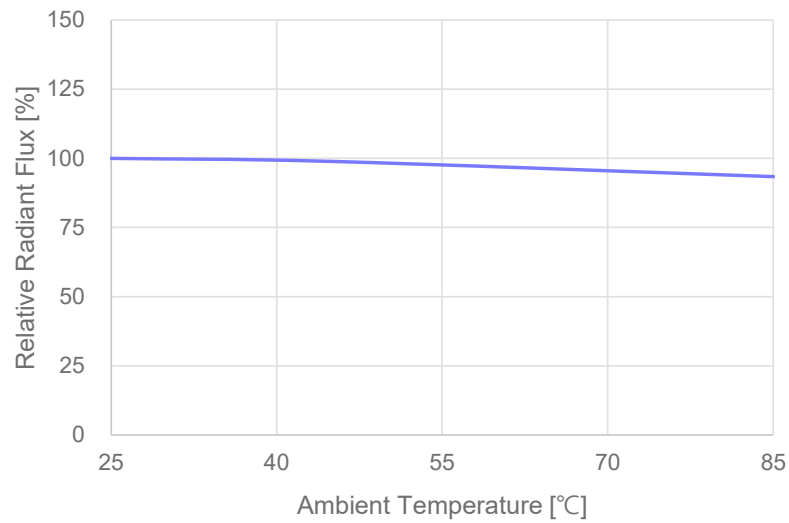
Rev0.0, 30th, March, 2021

Data Sheet

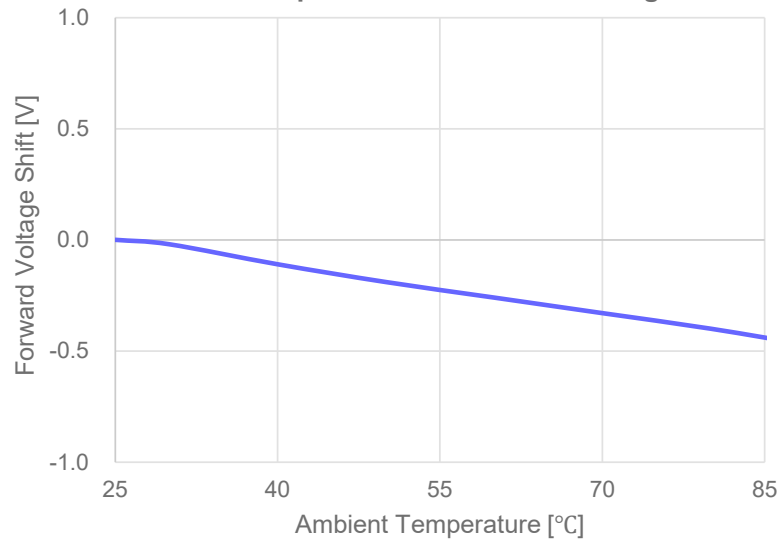
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6. Characteristic Curves ($I_F = 100 \text{ mA}$)

< Ambient Temperature vs. Relative Radiant flux >



< Ambient Temperature vs. Forward Voltage Shift >

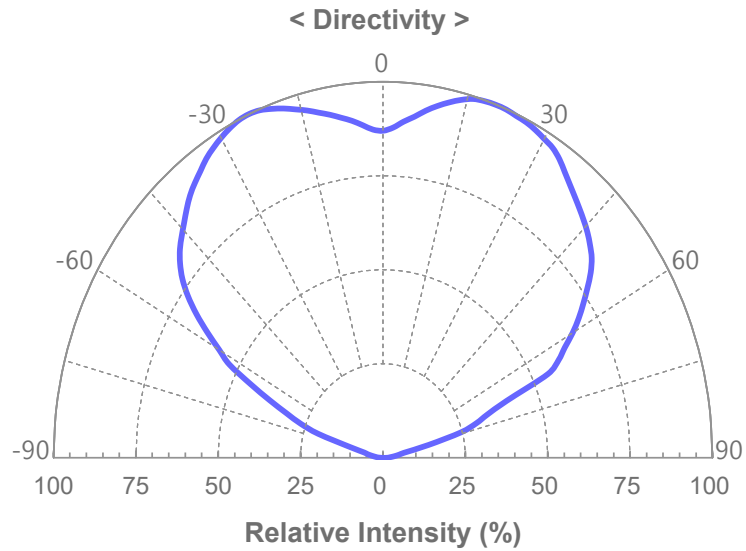


Rev0.0, 30th, March, 2021

Data Sheet

Photon Wave UV LED SOLUTION

6. Characteristic Curves ($I_F = 100 \text{ mA}$, $T_a = 25 \text{ }^\circ\text{C}$)



Rev0.0, 30th, March, 2021

Data Sheet

Photon Wave UV LED SOLUTION

7. Reliability Test Items and Conditions

7-1. Failure Criteria

Items	Symbols	Test Conditions	Criteria	
			Min.	Max.
Forward Voltage	V _f	IF = 100mA	-	Initial Value X 1.1
Radiant Flux	Φ _e	IF = 100mA	Initial Value X 0.7	-

7-2. Reliability Tests

No	Items	Test Conditions	Test Hours / Cycles	# Failed / Tested
1	Room Temp. Operating Life [RTOL]	T _a = 25°C, I _f = 100mA	1000 Hours	0 / 5
2	Wet High Temp. Operating Life [WHTOL]	T _a = 60°C, 90% RH, I _f = 100mA	1000 Hours	0 / 5
3	High Temp. Storage Life [HTSL]	T _a = 100°C	1000 Hours	0 / 5
4	Low Temp. Storage Life [LTSL]	T _a = -40°C	1000 Hours	0 / 5
5	Thermal Shock	T _a max = 125°C, T _a min = -45°C each 15min	100 cycles	0 / 10
6	Resistance to Solder Heat	(Pre-store @ 60°C, 90±5% RH for 168hrs) Temp = 260±5°C, Time ; 10±1 sec	2 times	0 / 10
7	Vibration variable frequency	0.06 inch displacement, 20 to 100 Hz 50 g, 100 Hz to 2kHz	X, Y, Z axis total 2hours	0 / 10
8	ESD	R = 1.5kΩ, C = 100pF Voltage level = 2kV	± 3 times	0 / 22

Notes :

- All samples are tested using Photon Wave Standard Metal PCB(25X25X1.6mm(LxWxH)) except non-operating tests.
- All samples must pass each test item and all test items must be satisfied.

Rev0.0, 30th, March, 2021

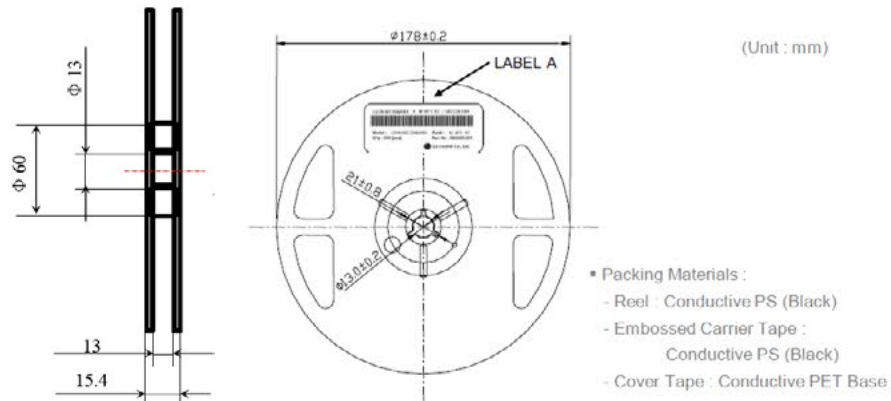
Data Sheet

Photon Wave UV LED SOLUTION

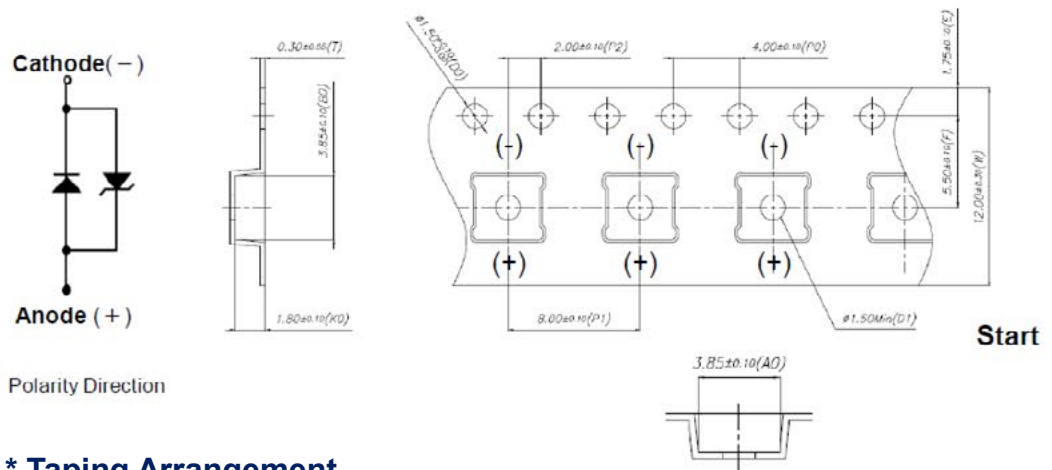
8. Packing and Labelling of Product

8-1. Taping Outline Dimensions

* Reel



* Tape



* Taping Arrangement



Rev0.0, 30th, March, 2021

Data Sheet

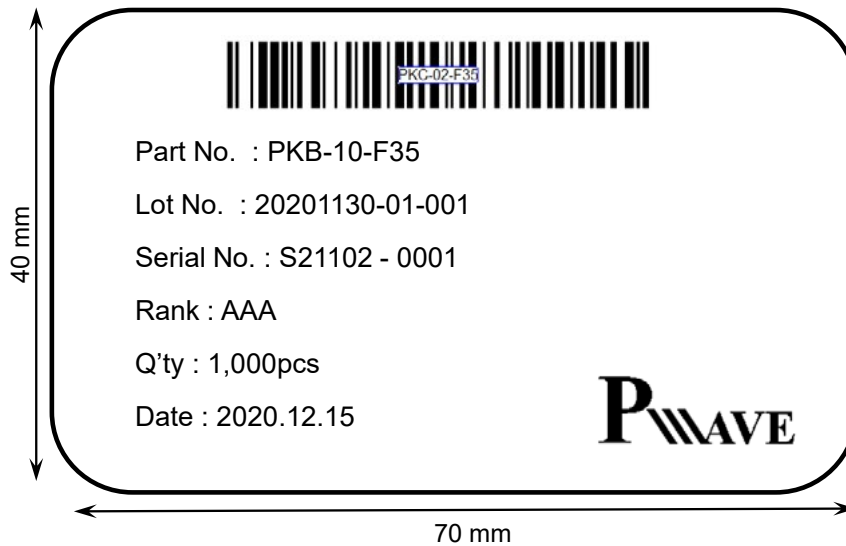
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8. Packing and Labelling of Product

8-2. Package and Label Structure

* Label A

Specifying Model Name, Rank, Rack, Quantity and Run number



* Lot No. Indication

Lot No. : 20201130 - 01 - 001
 year/month/day Bin No. Reel no.

Rank : $\frac{A}{Pw}$ $\frac{A}{Power}$ $\frac{A}{VF}$

Rev0.0, 30th, March, 2021

Data Sheet

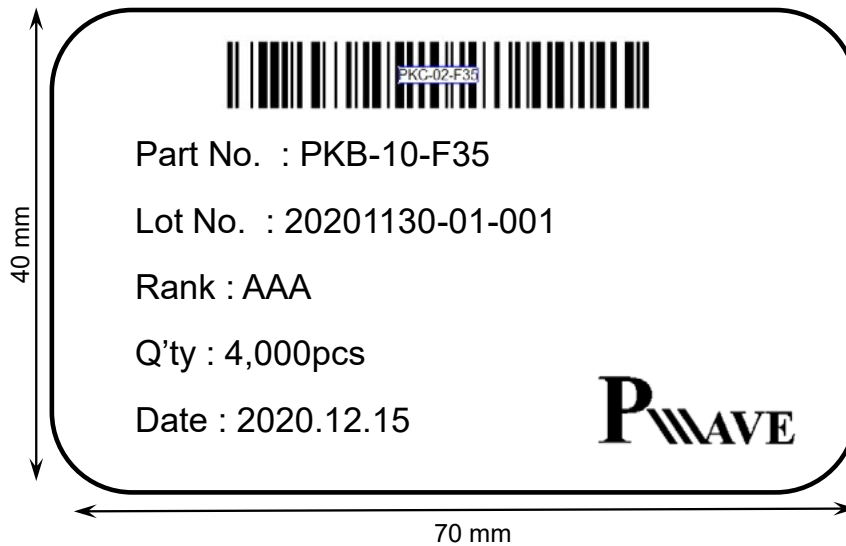
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8. Packing and Labelling of Product

8-2. Package and Label Structure

* Label B

Specifying Customer, Date, Model Name, Quantity, Customer Part Number, Outbox ID, Rank/Rank Quantity



* Lot No. Indication

Lot No. : 20201130 - 01 - 001
 year/month/day Bin No. Reel no.

Rank : $\frac{A}{Pw}$ $\frac{A}{Power}$ $\frac{A}{VF}$

Rev0.0, 30th, March, 2021

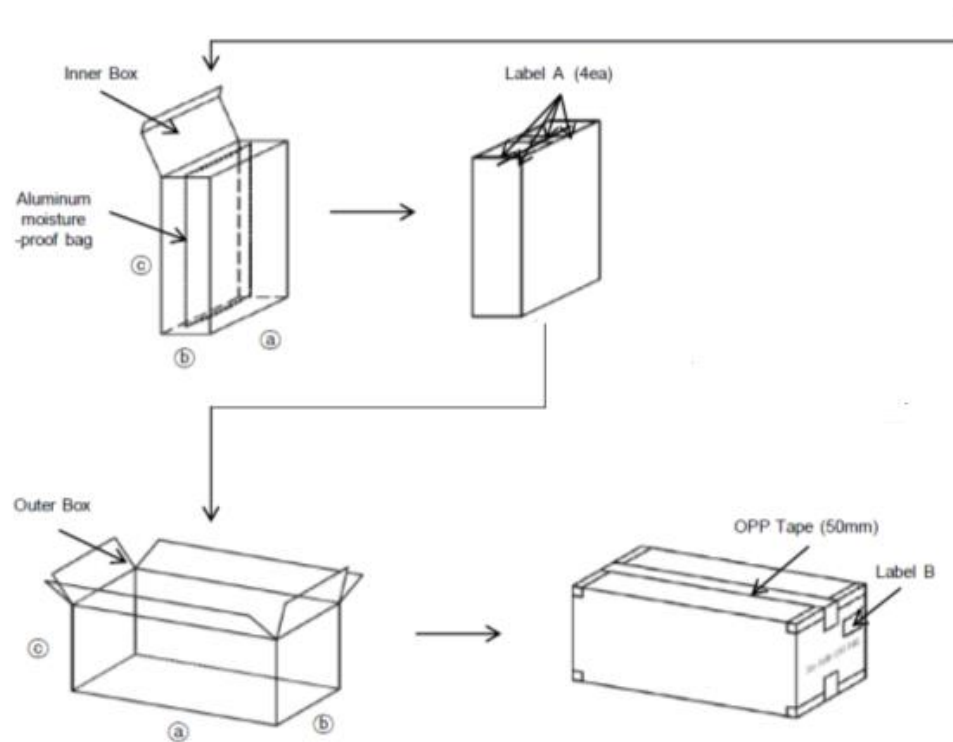
Data Sheet

Photon Wave UV LED SOLUTION

8. Packing and Labelling of Product

8-3. Packing Specifications

Reeled products(Numbers of products are Max.1,000pcs) packed in a sealed-off and moisture-proof aluminum bag with desiccants(Silica Gel). A Maximum four aluminum bags are packed in an inner box and six inner boxes are packed in an outer box. (Total Max. number of products are 24,000pcs)



Notes:

- Reeled products (number of products is max 1,000pcs) packed in a sealed aluminum bag.
- A maximum 4 bags are packed in an inner box. (Total max number of products is 4,000pcs)
- A maximum 4 inner boxes are packed in an outer box. (Total max number of products is 24,000pcs)

Types	Sizes (mm)		
	a	b	c
Inner Box	227	82	258
Outer Box	530	240	280

Rev0.0, 30th, March, 2021

Data Sheet

Photon Wave UV LED SOLUTION

9. Guide for User

9-1. Soldering Condition

- Reflow Soldering is the recommended method for assembling LEDs on a circuit board.
- Photon Wave does not guarantee the performance of the LEDs assembled by the dip soldering method.
- Recommended Soldering Profile(According to JEDEC J-STD-020D)
- Reflow or hand soldering at the lowest possible temperature is desirable for the LEDs although the recommended soldering conditions are specified in the below diagrams.
- A rapid-rate process is not recommended for cooling the LEDs down from the peak temperature.
- Occasionally there is a brightness decrease caused by the influence of heat of ambient atmosphere during air reflow. It is recommended that the customer use the nitrogen reflow method.
- Glass plate is hermetic sealed on the LEDs. Therefore, the LEDs have a soft and very fragile surface on the top of the package.
- The pressure to the surface will be influence to the reliability of the LEDs. Precautions should be taken to avoid strong pressure on the silicone resin when leveraging the pick and place machines.
- Reflow soldering should not be done more than two times.
- Soldering Iron
 - The recommended condition is less than 5 sec at 260 °C.
 - The time must be shorter for higher temperatures(+10 °C → -1 sec).
 - The power dissipation of the soldering iron should be lower than 15 W and the surface temperature of the device should be controlled at or under 230 °C.

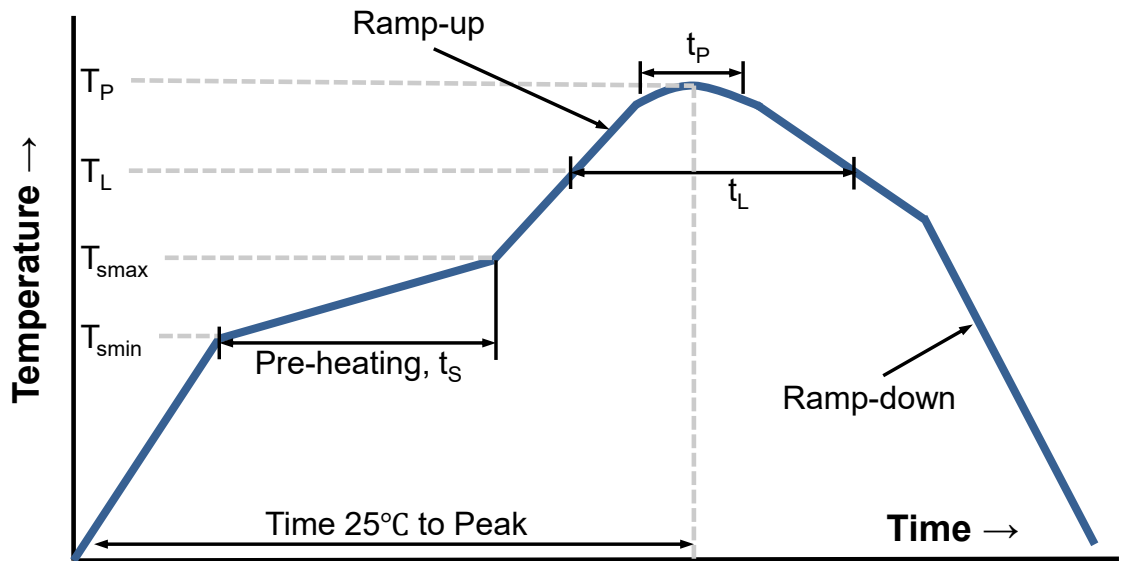
Rev0.0, 30th, March, 2021

Data Sheet

Photon Wave UV LED SOLUTION

9. Guide for User

9-1. Soldering Condition



Profile Feature	Lead Free Assembly
Average Ramp-up Rate (T_{smax} to T_P)	3 °C / sec Max
Preheating Temperature Min (T_{smin})	150 °C
Preheating Temperature Max (T_{smax})	200 °C
Preheating Time (T_s , T_{smin} to T_{smax})	60 ~ 180 sec
Time Maintained Above Temperature (T_L)	217 °C
Time Maintained Above Time (t_L)	60 ~ 150 sec
Peak / Classification Temperature (T_P)	260 °C
Time Within 5°C of Actual Peak Temperature (t_p)	5 sec
Ramp-down Rate	6 °C / sec Max
Time 25°C to Peak Temperature	8 min Max

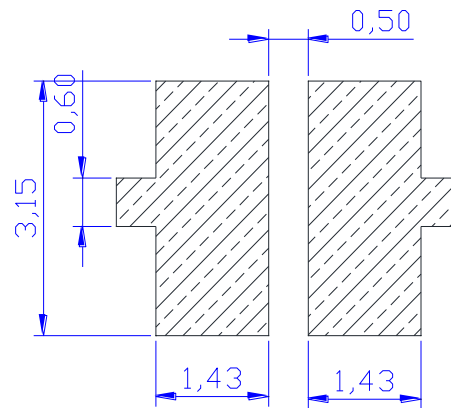
Rev0.0, 30th, March, 2021

Data Sheet

Photon Wave UV LED SOLUTION

9. Guide for User

9-2. Recommended Solder Pattern



Notes:

1. All dimensions are in millimeter and tolerance is $\pm 0.2\text{mm}$ unless otherwise noted.
2. Photon Wave does not guarantee the performance of the LEDs which have been already assembled using the dip soldering method.
3. There is a radiant flux decrease caused by the influence of heat of ambient atmosphere under air reflow condition. We recommend to use the nitrogen reflow method.
4. Reflow soldering should not be done more than two times.

Rev0.0, 30th, March, 2021