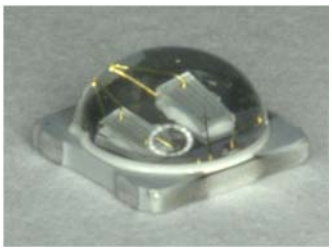
Specification for UV LED



SA 3535 UV

- ✧ **1.5W maximum power capability**
- ✧ **High heat resistance substrate**
- ✧ **Dimension : 3.85 x 3.5 x 1.9 mm**
- ✧ **Lead-free reflow soldering application**
- ✧ **RoHS compliant**

Vendor		Customer
Written	Approval	Approval

Lumens CO., LTD.
12, Wongomae-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Korea
http://www.lumens.co.kr

Table of Contents

1. Product description

(1) Description

- The UV series LED is designed for the high power operation to get the high flux output applications.
- It incorporates the state of the art SMD design and high reliable material.
- It is ideal for the light source for general illumination applications, custom designed solutions.

(2) Features

- Maximum drive current up to 350mA
- Low thermal resistance as low as 14℃/W
- Wide viewing angle of 120 degrees
- RoHS compliant

(3) Applications

- Curing system, Inspection system

2. Absolute maximum ratings

Parameters	Symbol	Value	Unit
Power dissipated	Pd	1.5	W
Rated forward current	If	350	mA
Allowable peak forward current(1)	Ip	350	mA
Maximum junction temperature capability(2)	Tj	105	℃
Electrostatic discharge threshold	ESD	≤ 2K	V
Operating temperature	Top	-20~85	℃
Storage temperature	Tst	-30~85	℃
Soldering temperature (Reflow)	Tsor	260℃, 10s	℃, s
Soldering temperature (Hand)	Tsoh	300℃, 3s	℃, s

(1) Ip measured at 1/10 duty cycle, 0.1ms pulse width.

(2) Proper current derating must be observed to maintain junction temperature below the maximum.

3. Electro-optical characteristics (Ta=25℃)

Parameters	Symbol	Condition	Typ.	Unit
Radiant Power Output	Φe	If=350mA	240	mW
Peak wavelength	λp	If=350mA	375	nm
Forward voltage	Vf	If=350mA	3.7	V
Viewing angle	2θ1/2	If=350mA	150	degree
Thermal resistance junction to solder pad	Rthj-s	If=350mA	14	K/W
Thermal resistance junction to air	Rthj-a	If=350mA	30	K/W

- Parameters are measured by CAS-140 of Instrument System CO.,LTD.
- Lumens maintains a tolerance of ±10% on radiant power measurements.
- Lumens maintains a tolerance of ±3nm on wavelength measurements.

4. Electro-optical chart (Ta=25℃)

Wp(nm)	If(mA)	Vf(V)	Pd(W)	Φv(lm)	mW/W
370-380	350	3.70	1.295	240	185.3
	400	3.85	1.540	280	181.8
	450	3.93	1.769	310	175.3
	500	4.08	2.040	320	156.9

- Parameters are measured by CAS-140 of Instrument System CO.,LTD.
- Lumens maintains a tolerance of ±10% on radiant power measurements.
- Lumens maintains a tolerance of ±0.1V on forward voltage measurements.
- Lumens maintains a tolerance of ±3nm on wavelength measurements.

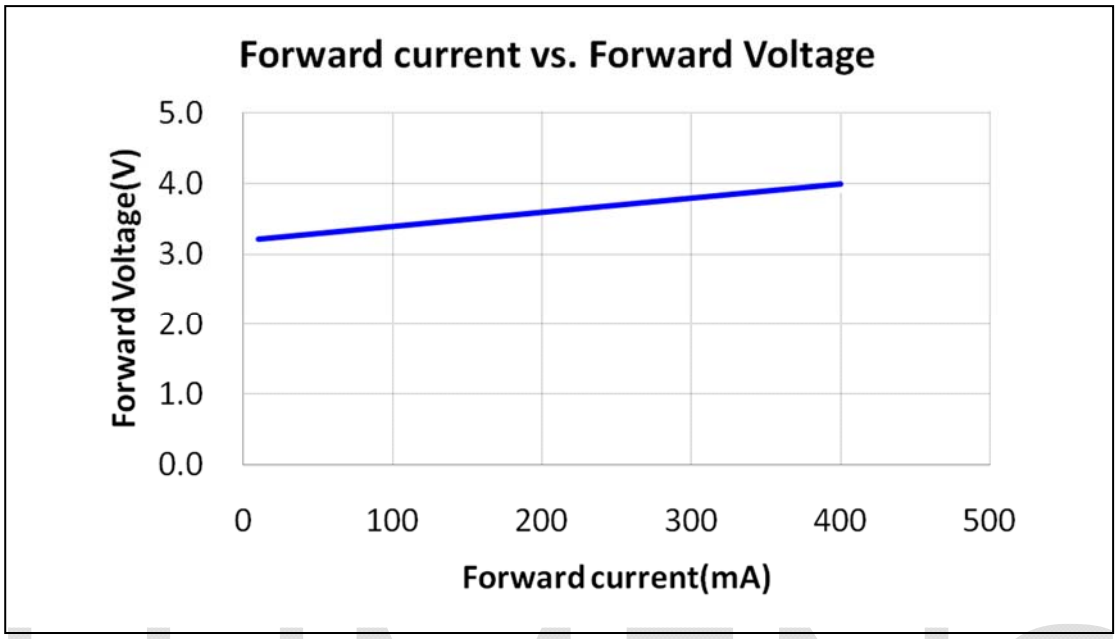
5. Ranks

Item	Symbol	Rank	Min.	Typ.	Max.	Unit	Condition
Radiant Power	Φe	A	180	-	200	mW	350mA
		B	200	-	220		
		C	220	-	240		
		D	240	-	260		
		E	260	-	280		
		F	280	-	300		
		G	300	-	320		
Forward Voltage	Vf	1	3.5	-	3.6	V	
		2	3.6	-	3.7		
		3	3.7	-	3.8		
		4	3.8	-	3.9		
		5	3.9	-	4.0		
		6	4.0	-	4.1		
Peak Wavelength	λp	ALL	370	-	380	nm	

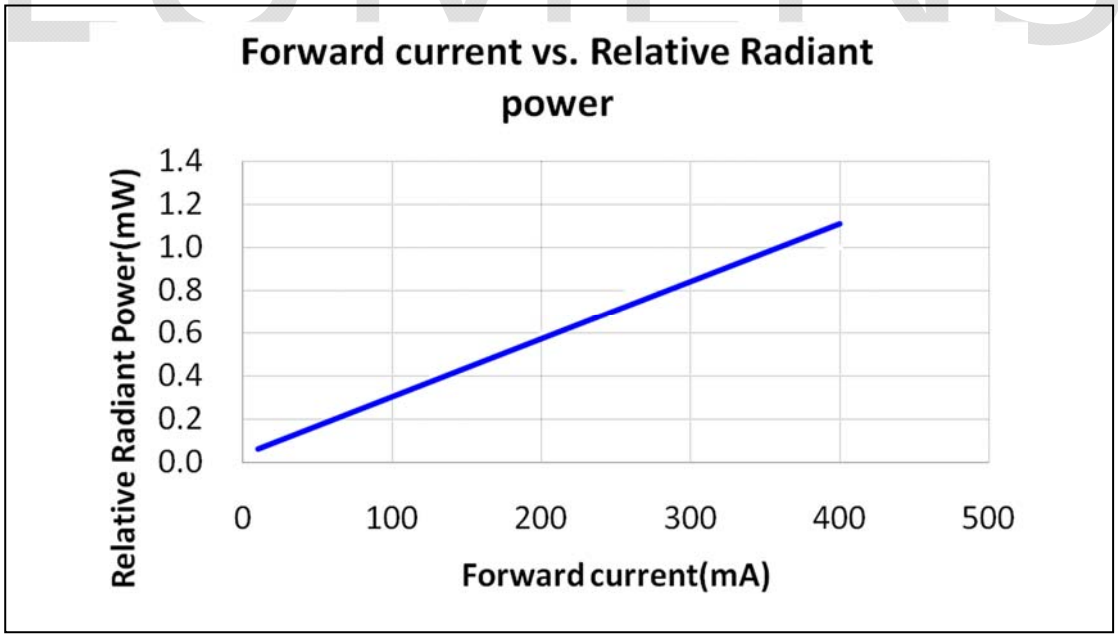
- Parameters are measured by CAS-140 of Instrument System CO.,LTD.
- Lumens maintains a tolerance of ±7% on radiant power measurements.
- Lumens maintains a tolerance of ±0.1V on forward voltage measurements.
- Lumens maintains a tolerance of ±3nm on wavelength measurements.

6. Characteristic Graphs(Ta=25℃)

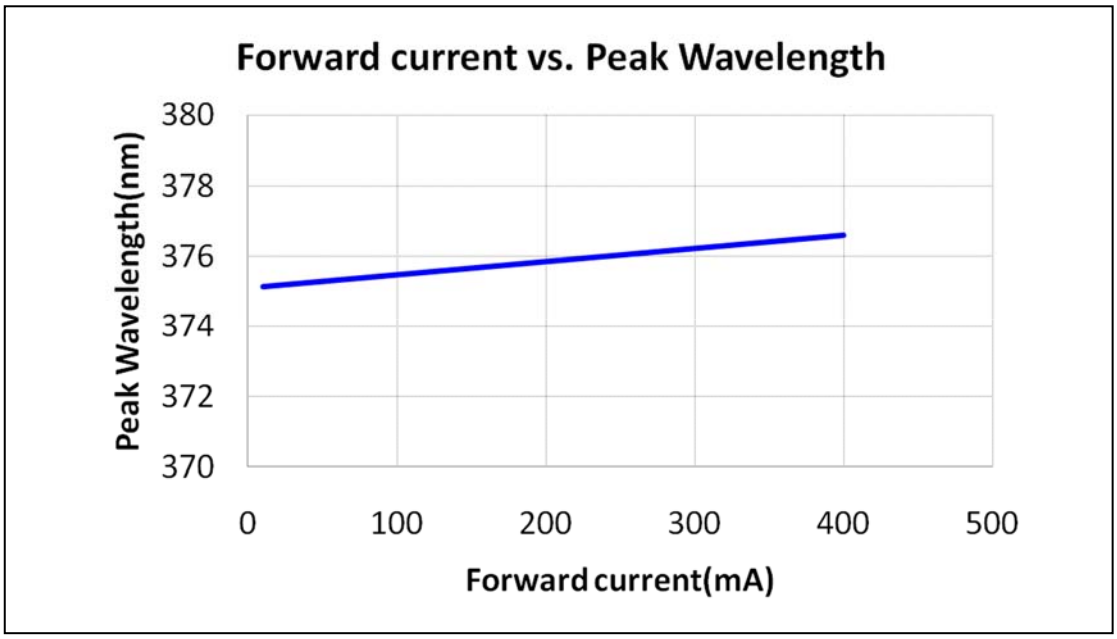
(1) Typical Forward Current vs. Forward Voltage



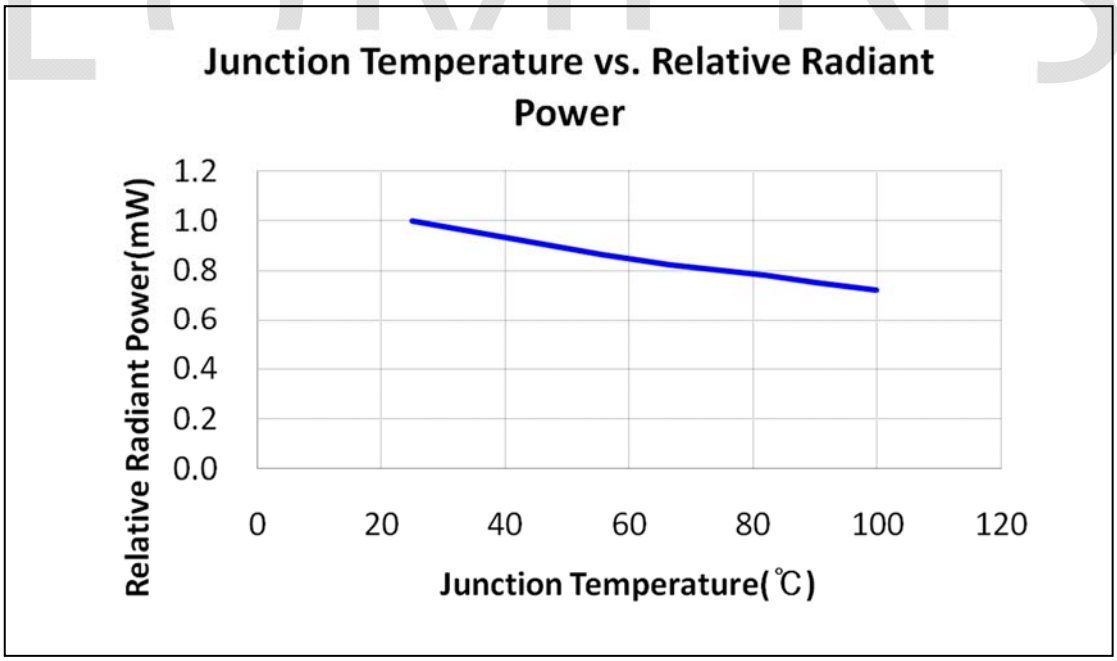
(2) Typical Forward Current vs. Relative Radiant power



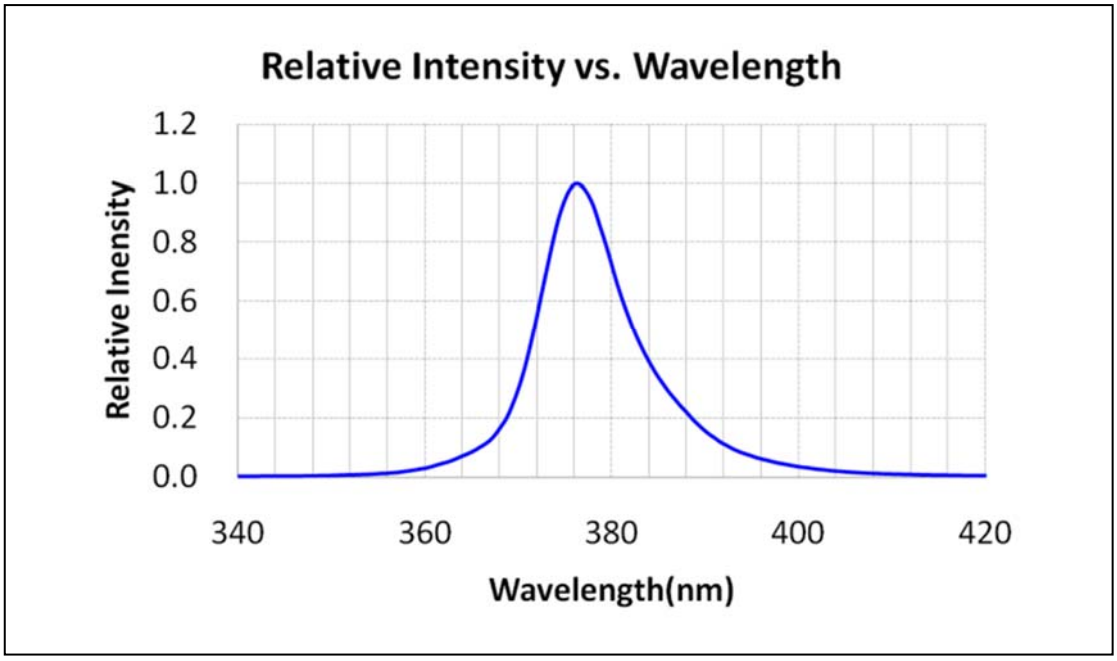
(3) Typical Forward Current vs. Peak Wavelength



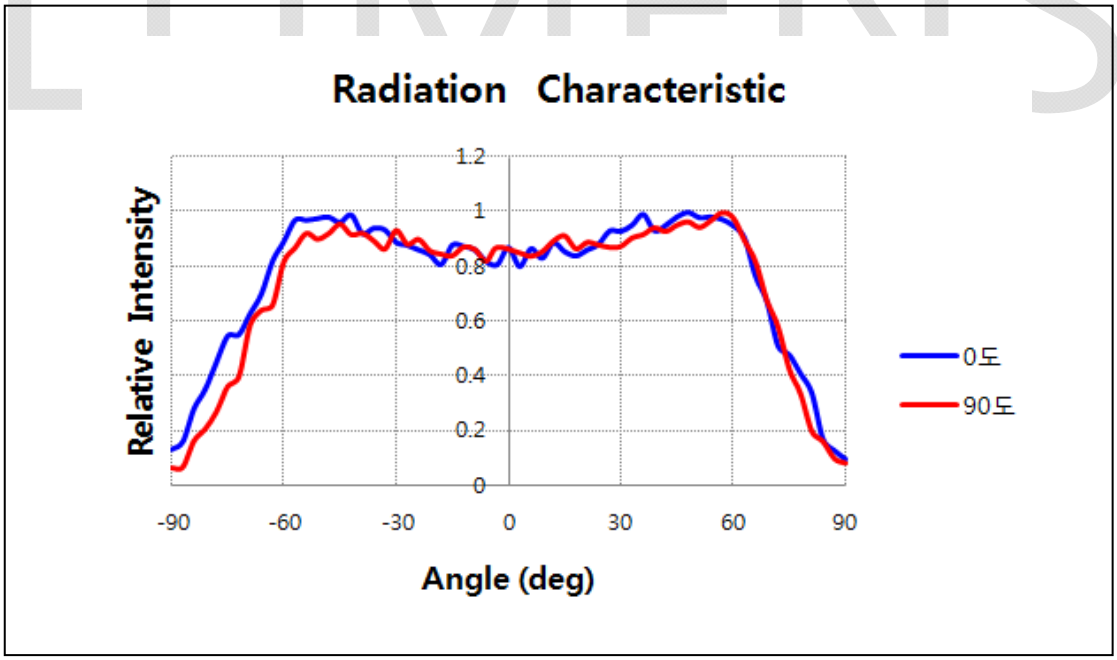
(4) Typical Spatial Radiation Characteristic



(5) Typical Relative Intensity vs. Wavelength



(6) Typical Spatial Radiation Characteristic

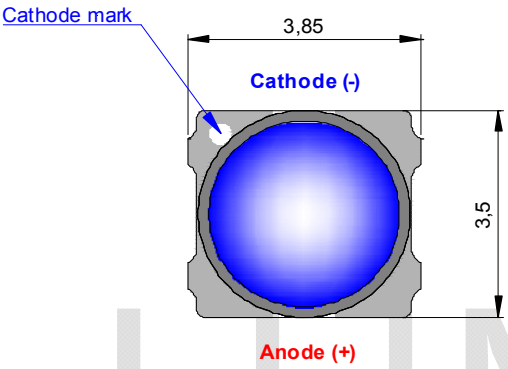


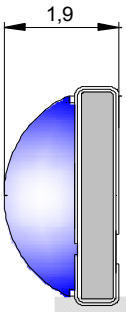
7. Outline Dimensions

- Package outline (Width x Length x Height) of 3.85 x 3.5 x 1.9mm
- Undefined tollerance is ± 0.15 mm

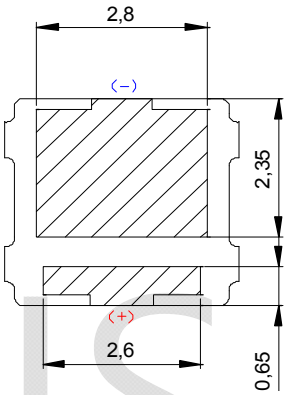
(Unit : mm)

[Top view]

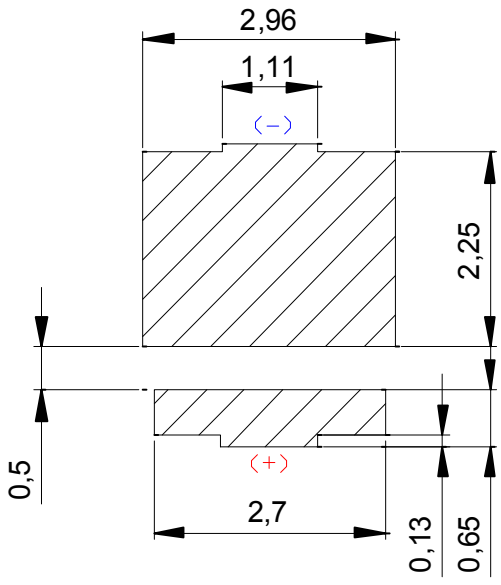




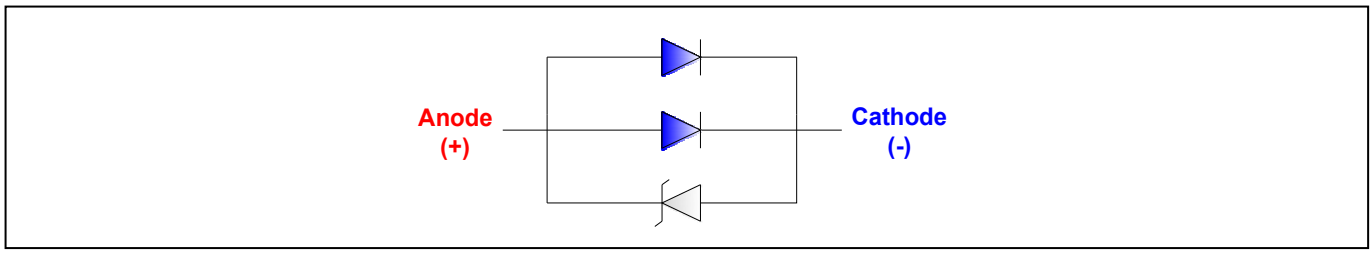
[Bottom view]



- Recommended Solder Pad



8. Circuit Design



9. Reliability test items and conditions

Item	Reference	Test Conditions	Duration Cycle	Number of Damaged
Thermal Shock	EIAJ ED-4701	Ta =-40℃ (30min) ~ 100℃ (30min)	150 Cycle	0/15
Operating Endurance Test	Internal Reference	Ta =25℃, IF = 350mA	1000 Hours	0/15
High Temperature Life Test	Internal Reference	Ta =70℃, IF = 350mA	500 Hours	0/15
High Temperature Life Test	Internal Reference	Ta =85℃, IF = 350mA	500 Hours	0/15
High Temperature High Humidity Life Test	Internal Reference	Ta =60℃, RH=90%, IF = 350mA	500 Hours	0/15
High Temperature High Humidity Life Test	Internal Reference	Ta =85℃, RH=85%, IF = 180mA	500 Hours	0/15
ESD	-	Up to 4KV	3 Time	0/15
Reflow	Tsor	240℃< 10sec, Reflow Soldering	3 Time	0/15

(1) Criteria for judging the damage

Item	Symbol	Condition	Criteria for Judgment	
			MIN	MAX
Forward Voltage	Vf	If =350mA	-	USL (1) × 1.1
Radiant Power	Iv	If =350mA	LSL (2) × 0.7	-

- USL : Upper Standard Level
- LSL : Lower Standard Level

10. Recommended soldering temperature – time profile for reflow soldering

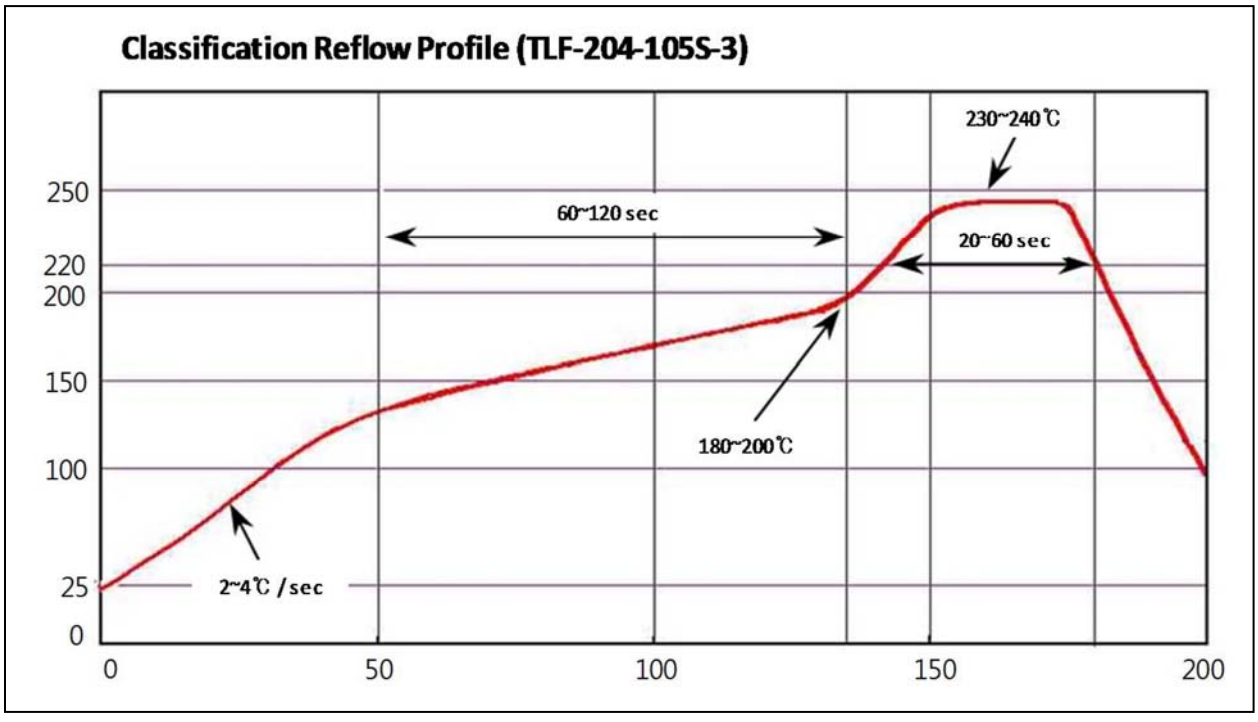
(1) Reflow Conditions (Pb Free)

In case of soldering LED product, interface detachment can take place depending on moisture absorption status of the resin.

It is well-known that vaporization expansion of the absorbed moisture due to sudden heat change causes this detachment. By this detachment, the optical characteristics of the product are changed, or the reliability of the product can be declined, and thus, special cautions are required.

- UV PKG pad size is smaller than that of generalized PKG.
- Recommend to use solder ball of 25um below.
- Recommend to use stencil thickness of 80um more.
- Recommend to use more than 2-pads.
- UV PKG foot print is also smaller than generalized. That's why MCPCB selection is very important.
- Recommend to use MCPCB's Cu thick > 2oz. more. (> 3oz. Is better)
- Recommend to use MCPCB's insulator thermal conductivity > 2W/mK more.(> 4W/mK is better)
- Do not impose a stress to the resin at high temperature.
- In mounting the product on board (substrate) or transporting the product, it must not be contacted with other components.
- In reflow soldering, it is required that reflow process should be taken within the scope of below "Suggested Reflow Temperature Profile."
- Flow soldering should be prohibited.

(2) Recommended Reflow Profile.



11. Cautions

(1) Moisture-Proof Package

1.1 When moisture is absorbed into the LED package it may vaporize and expand products during soldering. There is a possibility that this may cause exfoliation of the contacts and damage to the optical characteristics of the LEDs. For this reason, the moisture-proof package is used to keep moisture to a minimum in the package.

1.2 A package of a moisture-absorbent material (silica gel) is inserted into the shielding bag. The silica gel changes its color from blue to pink as it absorbs moisture.

(2) Current limiting

A resistor should be used to limit current spikes that can be caused by voltage fluctuations.
Otherwise damage could occur.

(3) Iron Soldering

3.1 Hand soldering is not recommended for regular production. These guidelines are for rework only.

3.2 Soldering iron tip should contact each terminal no more than 3 sec at 350℃, using soldering iron with nominal power less than 25W. Allow min. 2 sec. between soldering intervals.

(4) Storage Conditions

4.1 Before opening the package: The LEDs should be kept at 30℃ or less and 90%RH or less. The LEDs should be used within a year. When storing the LEDs, moisture-proof packaging with moisture-absorbent material (silica gel) is recommended.

4.2 After opening the package: The LEDs should be kept at 30℃ or less and 70%RH or less. The LEDs should be soldered within 168 hours (7 days) after opening the package. If unused LEDs remain, they should be stored in moisture-proof packages, such as sealed containers with packages of moisture-absorbent material (silica gel). It is also recommended to return the LEDs to the original moisture-proof bag and to reseal the moisture-proof bag again.

4.3 If the moisture-absorbent material (silica gel) has faded away or the LEDs have exceeded the recommended storage time, baking treatment should be performed using the following conditions.
Baking treatment: more than 24 hours at 65±5℃

4.4 Lumens LED electrode sections are comprised of a silver-plated copper alloy. The silver surface may be affected by environments which contain corrosive gases and so on. Please avoid condition which may cause difficulty environments during soldering operations. It is recommended that the user uses the LEDs as soon as possible.

4.5 Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

(5) Handling of Silicone (Lens) LEDs

5.1 Avoid silicone resin parts especially with sharp tools such as tweezers.

5.2 Avoid leaving fingerprints on silicone lens part.

5.3 Do not apply the silicone lens part with pressure especially in SMT production. So use a proper nozzle not to press the lens part of the LED to pick and place.

(6) Usage

6.1 Do not exceed the values given in this specification.

NOTE :

All the information published is considered to be reliable. However, Lumens does not assume any liability arising out of the application or use of any product described herein.

Lumens reserves the right to make changes at any time without notice to any products in order to improve reliability, function or design.

Lumens products are not authorized for use as critical components in life support devices or systems without the express written approval from the managing director of Lumens.