SPECIFICATION

ITEM	WHITE TOP VIEW LED
MODEL	PCL-C41WCZ11SA
CUSTOMER	
ISSUED DATE	

C U S T O M E R		
Approved by	Approved by	Approved by
/	/	/

S U P P L I E R		
Drawn by	Checked by	Approved by
/	/	/

POWERLIGHTEC Co., LTD.
110-1 Galgot - ri, Jinwy - myun, Pyeongtaek-si, Kyunggi – do, Korea
Tel : +82-31-379-5400 Fax : +82-31-378-9759
http : //www.powerlightec.com

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1. Revision history

Title	Specification for Approval
Doc. No.	KQSP-LL-2100

Rev. No.	Date	Summary of revision	Remarks
00	2009.02.	New establishment	

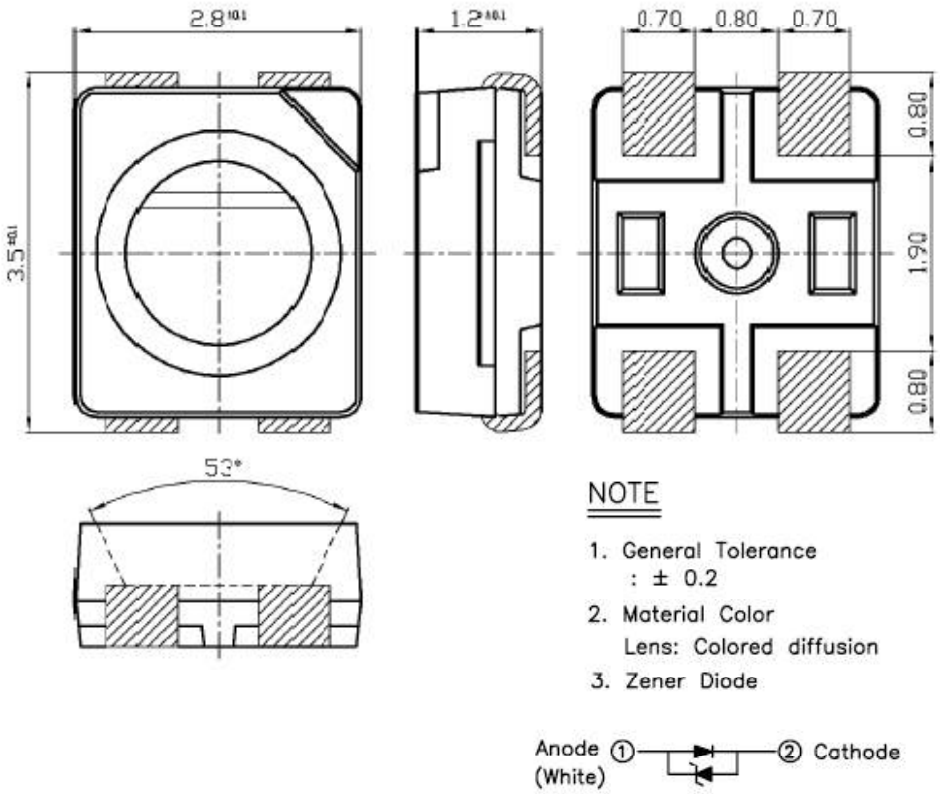
2. General Description

(1) Features

- Package Size : 3.5 × 2.8 × 1.2 mm
- SMD (Top View) type
- Very wide viewing angle
- Diffusion lens type
- Chip material based on InGaN
- High luminous Intensity
- Long life time
- ESD protection (Level 2 under 2KV)

(2) Outline Dimensions

UNIT : mm



3. Electro-Optical Characteristics

(1) Absolute Maximum Rating

(Ta=25℃)

Parameter	Symbol	Value	Unit
Forward Current	I_F	30	mA
Peak Forward Current ◆	I_{FP}	100	mA
Reverse Voltage	V_R	5	V
Power Dissipation	P_D	108	mW
Operating Temperature	Topr	-40 to +85	℃
Storage Temperature	Tstg	-40 to +100	℃
Soldering temperature	Tsol	Reflow soldering : 260℃, 10 sec Hand Soldering : 300℃, 3 sec	

◆ Duty Ratio ≤ 1/10, Pulse Width ≤ 10 msec

(2) Electrical / Optical Characteristics

(Ta=25℃)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	V_F	I_F=20mA	2.8	-	3.6	V
Reverse Current	I_R	V_R=5V	-	-	10	μA
Luminous Intensity ■	I_V	I_F=20mA	1,200	-	2200	mcd
Viewing Angle ★	$2\theta_{1/2}$	I_F=20mA	100	120	140	deg.
Chromaticity coordinates	-	I_F=20mA	-	X : 0.28 Y : 0.29		-

■ Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve. Please refer to rank table.

★ θ1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

4. Ranks

(1) Luminous Intensity Ranks

(Ta=25℃)

Iv Rank	Condition	Min	Typ	Max	Unit
A	I_F = 20mA	1,200	-	1,400	mcd
B		1,400	-	1,600	
C		1,600	-	1,800	
D		1,800	-	2,000	
E		2,000	-	2,200	

※ Measurement Uncertainty of the Luminous Intensity : ± 10%

(2) Forward Voltage Ranks

(Ta=25℃)

V_F Rank	Condition	Min	Typ	Max	Unit
A	I_F = 20mA	2.8	-	3.0	V
B		3.0	-	3.2	
C		3.2	-	3.4	
D		3.4	-	3.6	

※ Measurement Uncertainty of the Forward Voltage : ± 0.07V

4. Ranks

(3) Chromaticity Coordinates ranks : IF = 20mA

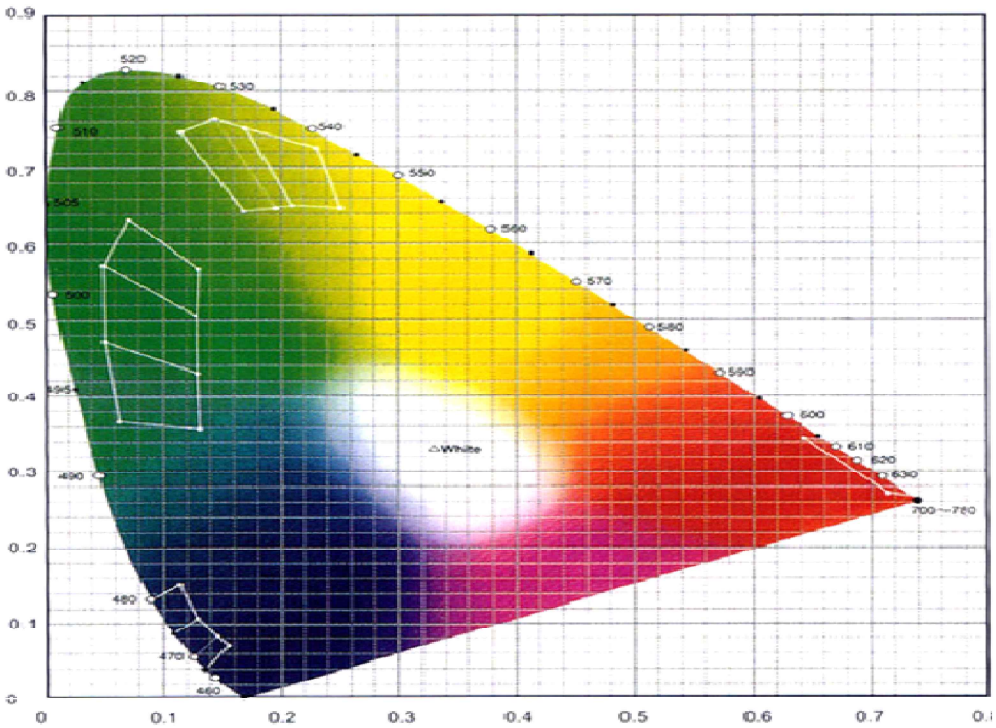
(Ta=25℃)

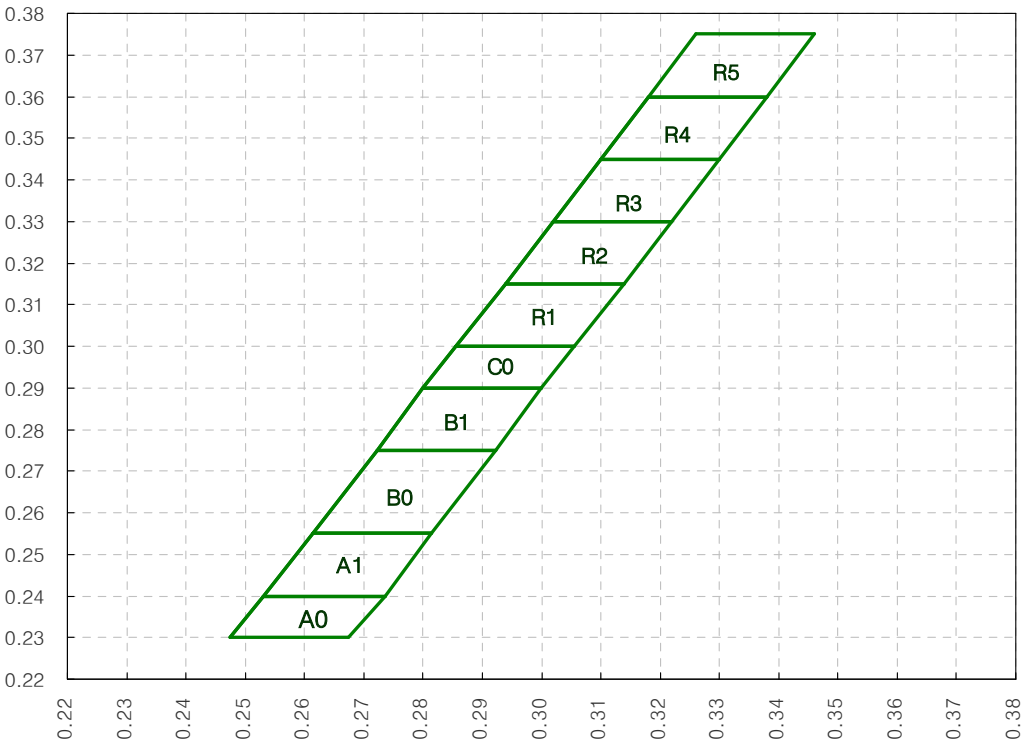
Rank	X	Y	Rank	X	Y
A0	0.2475	0.2300	R1	0.2855	0.3000
	0.2675	0.2300		0.3055	0.3000
	0.2735	0.2400		0.3140	0.3150
	0.2530	0.2400		0.2940	0.3150
A1	0.2530	0.2400	R2	0.2940	0.3150
	0.2735	0.2400		0.3140	0.3150
	0.2815	0.2550		0.3220	0.3300
	0.2615	0.2550		0.3020	0.3300
B0	0.2615	0.2550	R3	0.3020	0.3300
	0.2815	0.2550		0.3220	0.3300
	0.2922	0.2750		0.3300	0.3450
	0.2722	0.2750		0.3100	0.3450
B1	0.2722	0.2750	R4	0.3100	0.3450
	0.2922	0.2750		0.3300	0.3450
	0.3000	0.2900		0.3380	0.3600
	0.2800	0.2900		0.3180	0.3600
C0	0.2800	0.2900	R5	0.3180	0.3600
	0.3000	0.2900		0.3380	0.3600
	0.3055	0.3000		0.3460	0.3750
	0.2855	0.3000		0.3260	0.3750

※ Measurement Uncertainty of the Color Coordinates : ± 0.01

4. Ranks

(4) Chromaticity Coordinates Graph : IF = 20mA

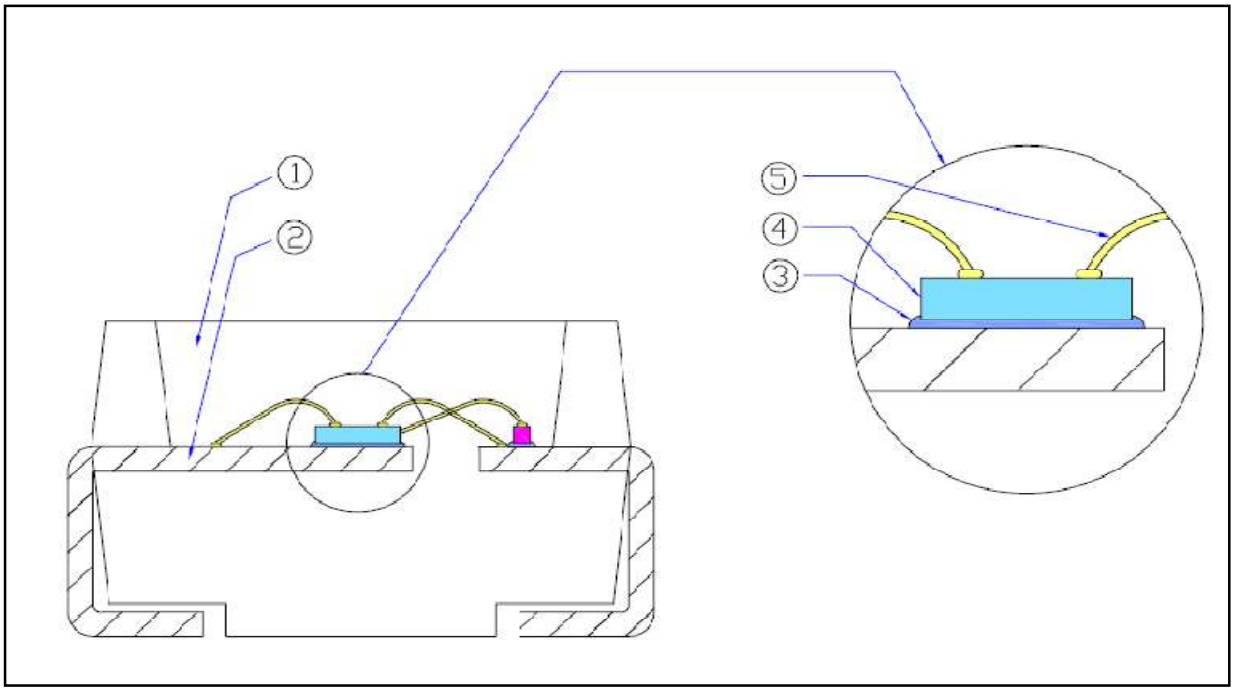




※ Measurement Uncertainty of the Color Coordinates : ± 0.01

5. Composition of Package

(1) Composition of Package



(2) Component material

Number	Item	Material
1	Mold Resin	Silicone
2	Electrodes	Ag Plating Cu Alloy
3	Die adhesive	Ag Epoxy or Silicone
4	LED Chip	InGaN
5	Au Wire	1.0~1.2mil

6. Environmental pollution free

(1) Testing institute

: Korea Environment & Merchandise Testing Institute

(2) Test material

: LED-PCB ▶ ① Resin, ② Metal

① Resin Test

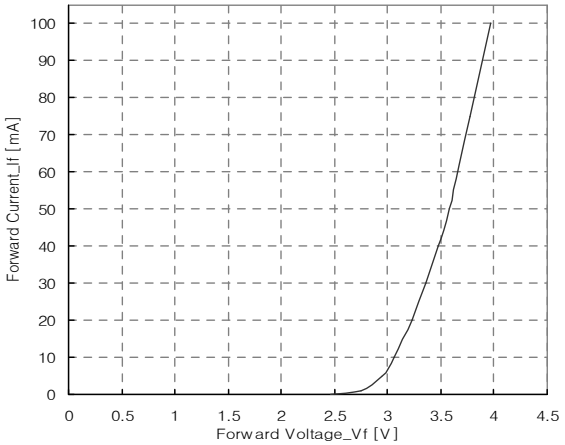
Test item	Unit	Result	Test method
Pb	mg/kg	No detection	ISO 6101-2 (AAS) EN 1122 (ICP) ISO 3856/7 (AAS) ISO 3856/5 UV-Vis. Spectrophotometer
Cd	mg/kg	No detection	
Hg	mg/kg	No detection	
Cr^{+6}	mg/kg	No detection	

② Metal Test

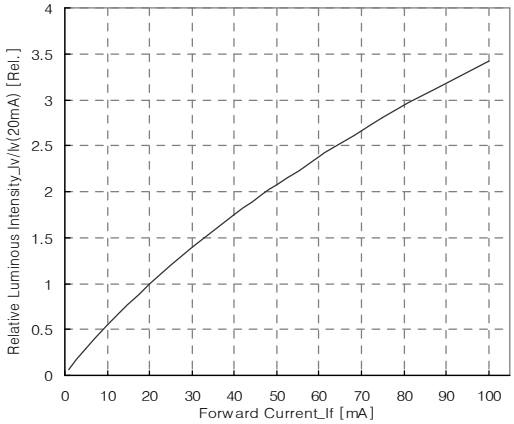
Test item	Unit	Result	Test method
Pb	mg/kg	No detection	ISO 4749-98 ISO 5960-84 JIS H 1066-93 ICP analysis method ISO 3613:2000(E)
Cd	mg/kg	No detection	
Hg	mg/kg	No detection	
Cr^{+6}	μg/kg	No detection	

7. Typical Electrical / Optical Characteristics Curves

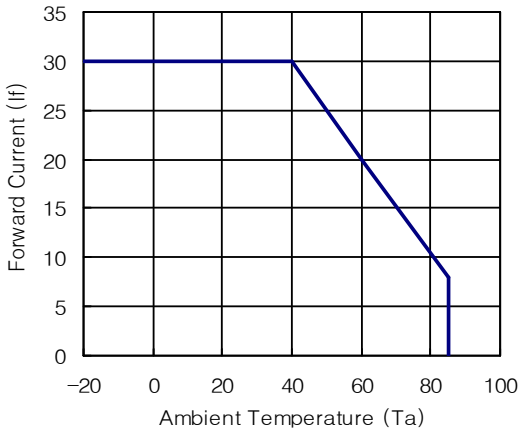
■ **Forward Voltage Vs. Forward Current**



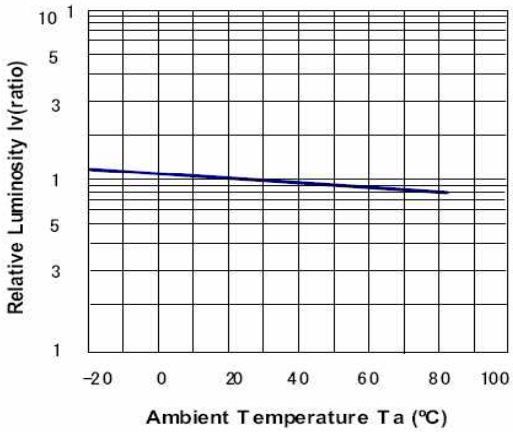
■ **Forward Current Vs. Relative Luminosity**



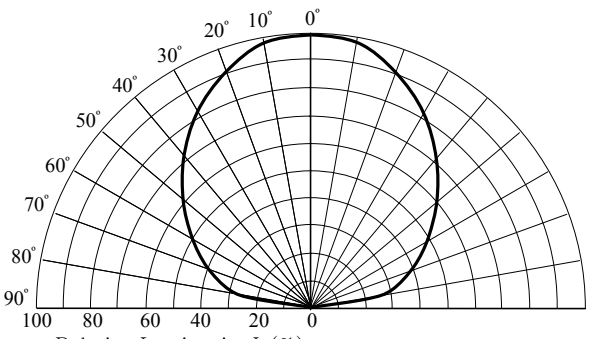
■ **Forward Current Derating Curve**



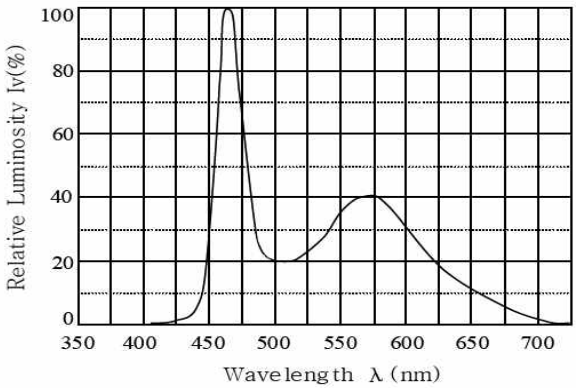
■ **Relative Luminosity Vs. Ambient Temperature**



■ **Directivity**



■ **Relative Luminous intensity vs. Wavelength**



25℃ Ambient Temperature Unless Otherwise Noted

8. Classification by name

PART NO. : PCL - □XX X□ □ □ □ □ □ □

(1) (2) (3) (4) (5) (6) (7) (8) (9)

(1) POWERLIGHTEC Lamp

(2) PACKAGE TYPE

C0	P	1608 C/LED Package, T=0.3mm
C1	P	1608 C/LED Package, T=0.4mm
C2	P	1608 C/LED Package, T=0.55mm
C3	P	4014 Side View LED, T=0.8mm
C31	P	4014 Side View LED, T=0.6mm
C32	P	4014 Side View LED, T=0.48mm
C4	P	3528 Top View LED, T=1.9mm
C41	P	3528 TOP LED Transfer T=1.2mm
C42	P	3528 TOP LED Transfer T=0.9mm
C5	P	3020 Top View LED, T=1.3mm
C6	P	5450 Flash LED Package T=1.6mm
C61	P	5450 Flash LED Package T=0.9mm
C7	P	1615 Seven Color Package
C71	P	1612 Dual Color Package
C8	P	Power LED Package (HB)
P1	P	1608 C/LED PCB Package T=0.4mm

S11	D	3810 Side View LED, T=0.8mm
S12	D	3810 Side View LED, T=0.6mm
S21	N	4011 Side View LED, T=0.8mm
S22	N	4011 Side View LED, T=0.6mm
S31	D	5508 Side View LED, T=0.8mm
S32	D	5506 Side View LED, T=0.6mm
T2	D	5450 Flat Type LED, T=0.9mm
T3	D	5450 Flat Type LED, T=1.3mm
T4	D	5450 Flat Type LED, T=1.3mm (2nd Ver.)
PM80	D	8080 Metal Power Package
PD13	D	1314 Dragon EYE Power Package

N : New Product
P : Product
D : Develop Product

(3) EMITION COLOR

B	C	SB	G	Y	O	A	R
Blue	Cyan	Sky Blue	Green	Yellow	Orange	Amber	Red
CW	**WW**	**PW**	**YG**	**D**	**RGB**	**I**	
Cool White	Warm White	Pink White	Y-Green	Dual	R, G, B	Infrared	

(4) LENS COLOR

A	Colored Transparency	C	Colored Diffusion
B	Colorless Transparency	D	Milky Diffusion

(5) ESD PROTECTION (Zener Diode: Z / Varistor: V / No Protection: N)
(6) NUMBER OF CHIP (1Chip: 1 / 2Chip: 2 / 3Chip: 3 / 4Chip: 4 / 5Chip: 5)
(7) NUMBER OF ZENER (No Zener: 0 / 1Zener: 1 / 2Zener : 2 / 3Zener : 3)
(8) MOLD RESIN (Epoxy: E / Silicone: S)
(9) POLARITY MARK (Anode: A / Cathode: C)

9. Reliability

(1) Test items and results

Test Item	Standard Test Method	Test Conditions	Note	Number of Damaged
Resistance to Soldering Heat (Reflow Soldering)	MIL-STD-105D	Tsol=260℃, 10sec. (Pre treatment 30℃, 70%, 168hrs.)	2 times	0/20
Solderability (Reflow Soldering)	MIL-STD-105D	Tsol=215±5℃, 3sec.	1 time over 95%	0/20
Temperature Cycle	MIL-STD-105D	-40℃ ~ 25℃ ~ 100℃ ~ 25℃ 30min. 5min. 30min. 5min.	100 cycles	0/20
High Temperature Storage	MIL-STD-105D	Ta=100℃	1000 hrs.	0/20
Humidity Heat Load	MIL-STD-105D	Ta=60℃, RH=90%	1000 hrs.	0/20
Low Temperature Storage	MIL-STD-105D	Ta=-40℃	1000 hrs.	0/20
Life Test Condition 1	MIL-STD-105D	Ta=25℃, IF=20mA	1000 hrs.	0/20
Life Test Condition 2	MIL-STD-105D	Ta=25℃, IF=40mA	500 hrs.	0/20
High Temperature Life Test		Ta=85℃, IF=10mA	1000 hrs.	0/20
High Humidity Heat Life Test		60℃, RH=90%, IF=15mA	500 hrs.	0/20
Low Temperature Life Test		Ta=-40℃, IF=20mA	1000 hrs.	0/20

(2) Criteria for judging the damage

Item	Symbol	Test Conditions	Criteria for Judgment	
			Min.	Max.
Forward Voltage	VF	IF=20mA	-	U.S.L.*) × 1.1
Reverse Current	IR	VR=5V	-	U.S.L.*) × 2.0
Luminous Intensity	IV	IF=20mA	L.S.L.**) × 0.7	-

*) U.S.L. : Upper Standard Level **) L.S.L. : Lower Standard Level

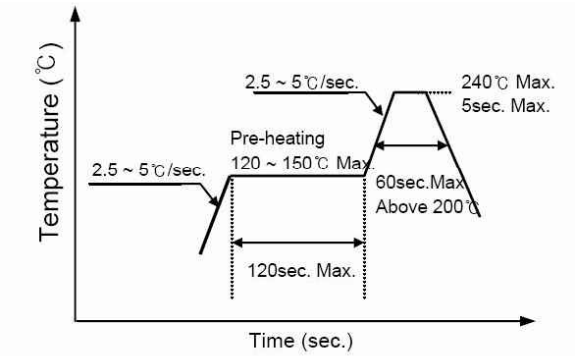
10. Soldering Condition

(1) Soldering condition

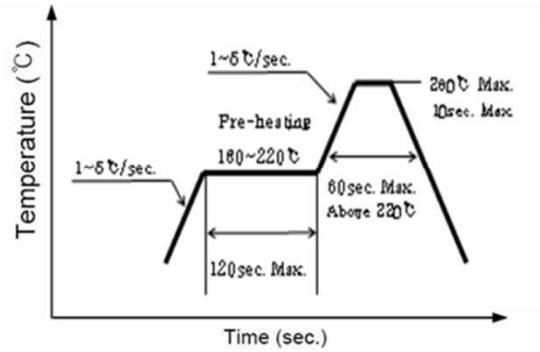
Reflow soldering			Hand soldering	
Step	Lead solder	Lead free Solder	Condition	Spec.
Pre heating	120~150 ℃	180~220 ℃	Soldering Temp.	Max 300℃
Pre heating time	Max 120 sec.	Max 120 sec.		
Peak temp.	Max 240 ℃	Max 260 ℃	Soldering Time	Max 3sec.
Soldering time	Max 10 sec.	Max 10 sec.		

(2) Recommended Reflow Soldering profile

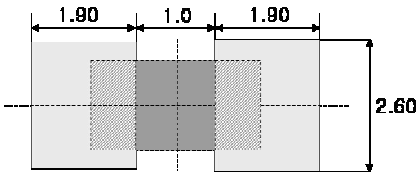
◈ **Lead Solder**



◈ **Lead Free Solder**



(3) Recommended Soldering pattern

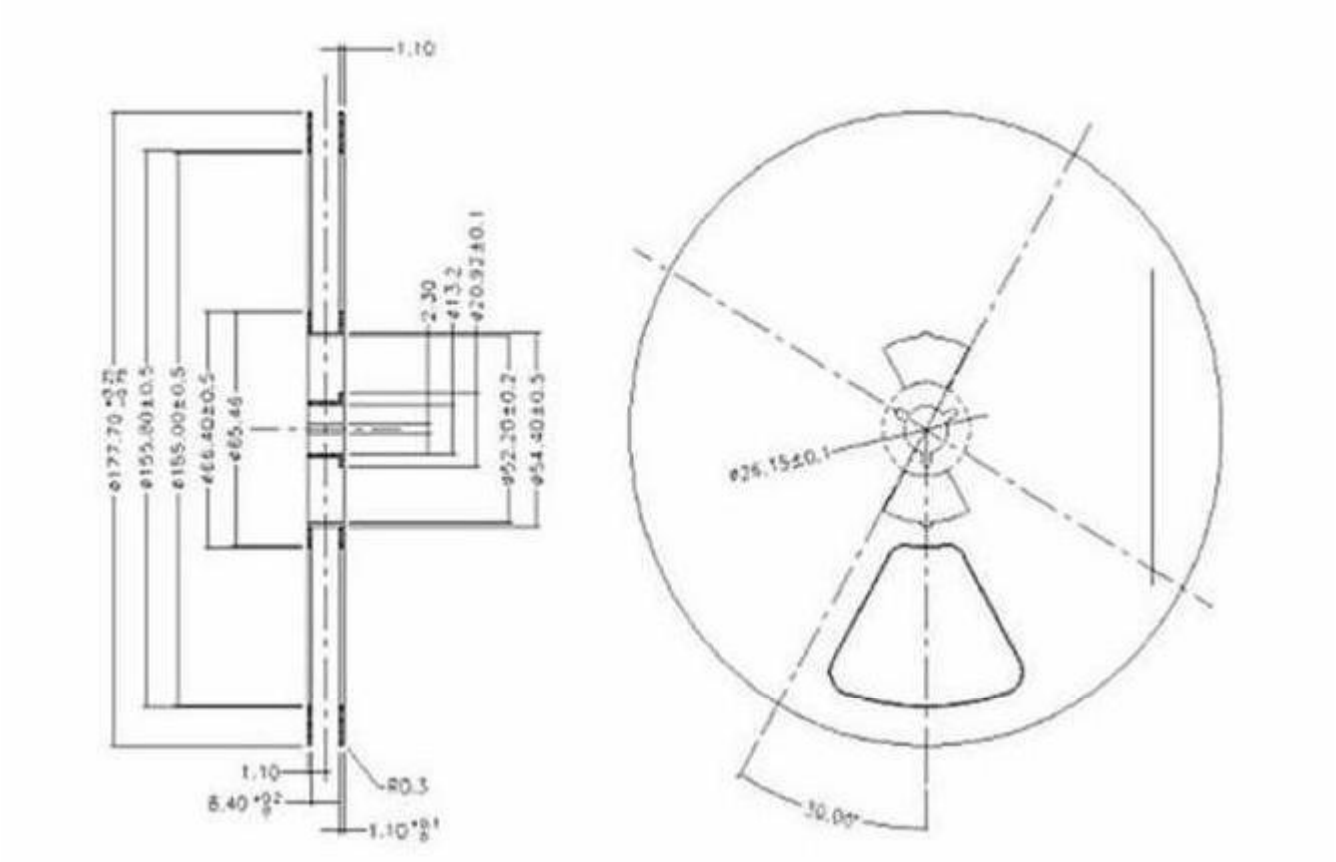


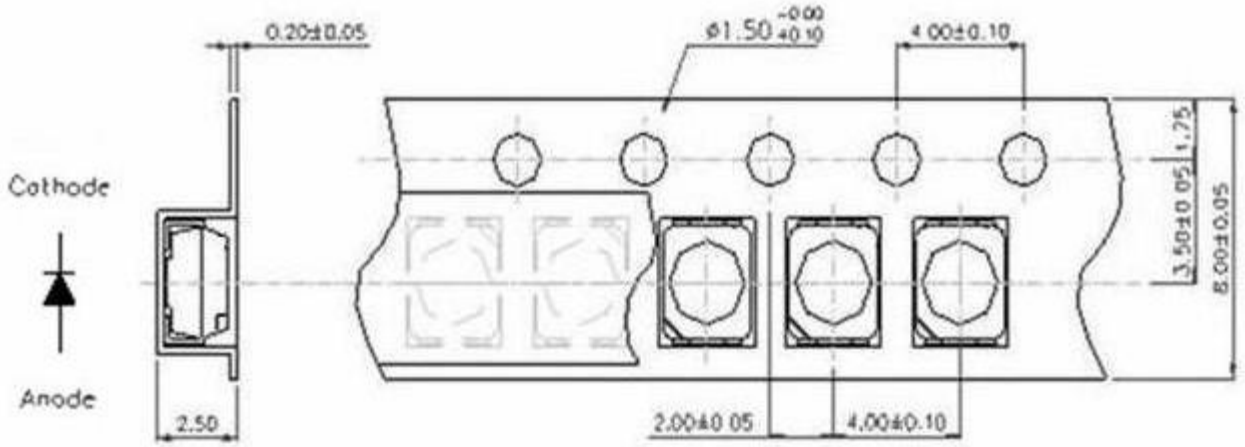
(4) Soldering Cautions

- Modifications should not be done after the LEDs have been soldered.
- If modifications cannot be avoided, a double-head soldering iron should be used after checking whether the characteristics of the LEDs will not be damaged by modification after soldering.
- Reflow soldering, do not apply force to the package during heating.
- After soldering, do not warp the circuit board.

11. Reel Packing Structure

(1) Carrier tape & Reel dimensions

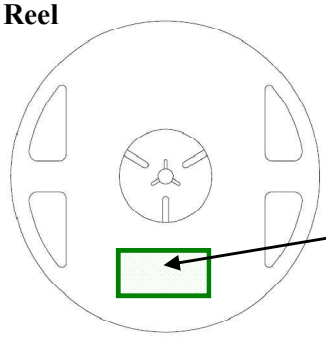




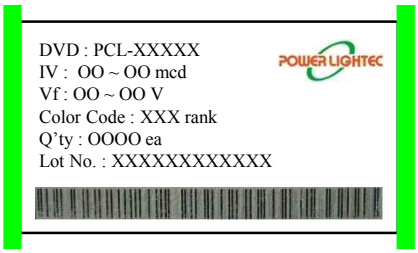
11. Reel Packing Structure

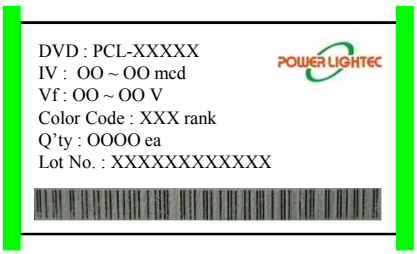
(2) Packing & Packaging

- **Reel**

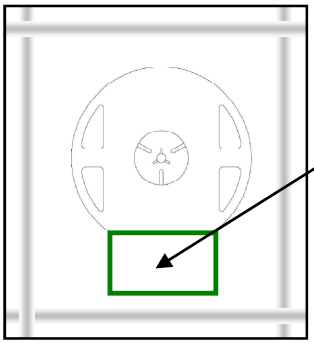


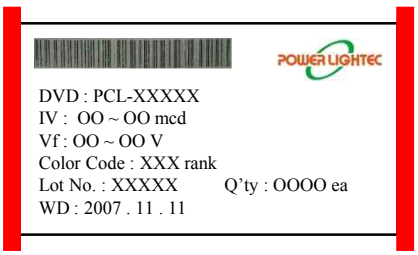
- **Label**



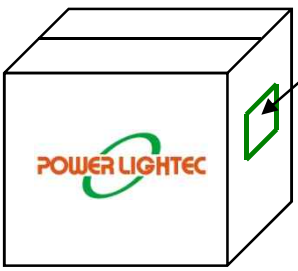


- **Aluminum bag (in a Reel)**

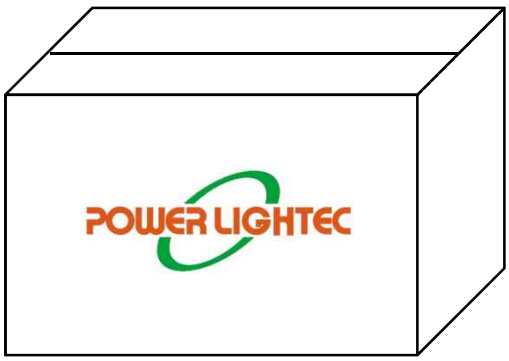




- **Inner Box**



- **Outer Box (in 8ea inner boxes)**



12. Precaution for Use

(4) Cleaning

- Use Isopropyl Alcohol as a solvent for cleaning the LEDs. Using other solvents may dissolve the LED package and the epoxy. Caution is needed.
  Ultrasonic cleaning of the LEDs should not be done.

(4) Others

- Care must be taken to ensure that the reverse voltage will not exceed the absolute maximum rating when using LEDs with matrix drive.
- The electrode sections are plated with silver. Those will become discolored by contact with corroded gas etc. Precautions must be taken to maintain a clean storing atmosphere.
- The LEDs light output is strong enough to injure human eyes. Precautions must be taken to prevent looking directly at the LEDs with unaided eyes for more than a few seconds.
- These LEDs described in this brochure are intended to be used for ordinary electronic equipment (such as office equipment, communications equipment, measurement instruments and household appliance). Consult POWERLIGHTEC's sales staff in advance for information on the applications in which exceptional quality and reliability are required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health.
  (such as airplanes, aerospace, automobiles, traffic control equipment, life support systems and safety devices)
- User shall not reverse engineer by disassembling or analysis of the LEDs without having the prior written consent of POWERLIGHTEC. When defective LEDs are found, User shall inform to POWERLIGHTEC directly before disassembling or analysis.
- The formal specifications must be exchanged and signed by both parties before large volume purchase begins.
- The appearance and specifications of the product may be modified for improvement without notice.