

# Z-POWER LED Series

## Technical Datasheet for W33180



Z-Power series is designed for high current operation and high flux output applications. Furthermore, its thermal management characteristic is better than other LED solutions by package SMD design and good thermal emission material.

According to these advantages, it enables to apply various lighting applications and design solution, automotive lighting, and large size LCD backlight etc.

This application note provides binning and labeling

information of Z-Power LED series.

It includes the Z-Power LED bins for luminous flux, wavelength (or x,y coordinates), correlated color temperature

(CCT) for white and forward voltage

### Features

- Super high flux output and high luminance
- Designed for high current operation
- Low thermal resistance
- SMT solderability
- Lead free product
- RoHS compliant

### Applications

- Mobile phone flash
- Automotive interior / Exterior lighting
- Automotive signal lighting
- Automotive forward lighting
- Torch
- Architectural lighting
- LCD TV / Monitor backlight
- Projector light source
- Traffic signals
- Task lighting
- Decorative / Pathway lighting
- Remote / Solar powered lighting
- Household appliances

## Full Code of Z-Power LED Series

Full code form :  $X_1 X_2 X_3 X_4 X_5 X_6 - X_7 X_8 - X_9 X_{10} X_{11} X_{12} X_{13}$

### 1. Part Number

- $X_1$  : Color
- $X_2$  : Z-Power LED series number
- $X_3$  : LENS type
- $X_4$  : Chip quantity (or Power Dissipation)
- $X_5$  : Package outline size
- $X_6$  : Type of PCB

### 2. Internal Number






- $X_7$
- $X_8$

### 3. Code Labeling

- $X_9$  : Luminous flux (or Radiant flux for royal blue)
- $X_{10} X_{11} X_{12}$  : Dominant wavelength (or x,y coordinates rank code)
- $X_{13}$  : Forward voltage

### 4. Sticker Diagram on Reel & Aluminum Vinyl Bag

PART NO. :  $X_1 X_2 X_3 X_4 X_5 X_6 - X_7 X_8$   
QUANTITY : ###  
LOT NUMBER : #####  
BIN CODE :  $X_9 X_{10} X_{11} X_{12} X_{13}$



For more information about binning and labeling, refer to the Application Note -1

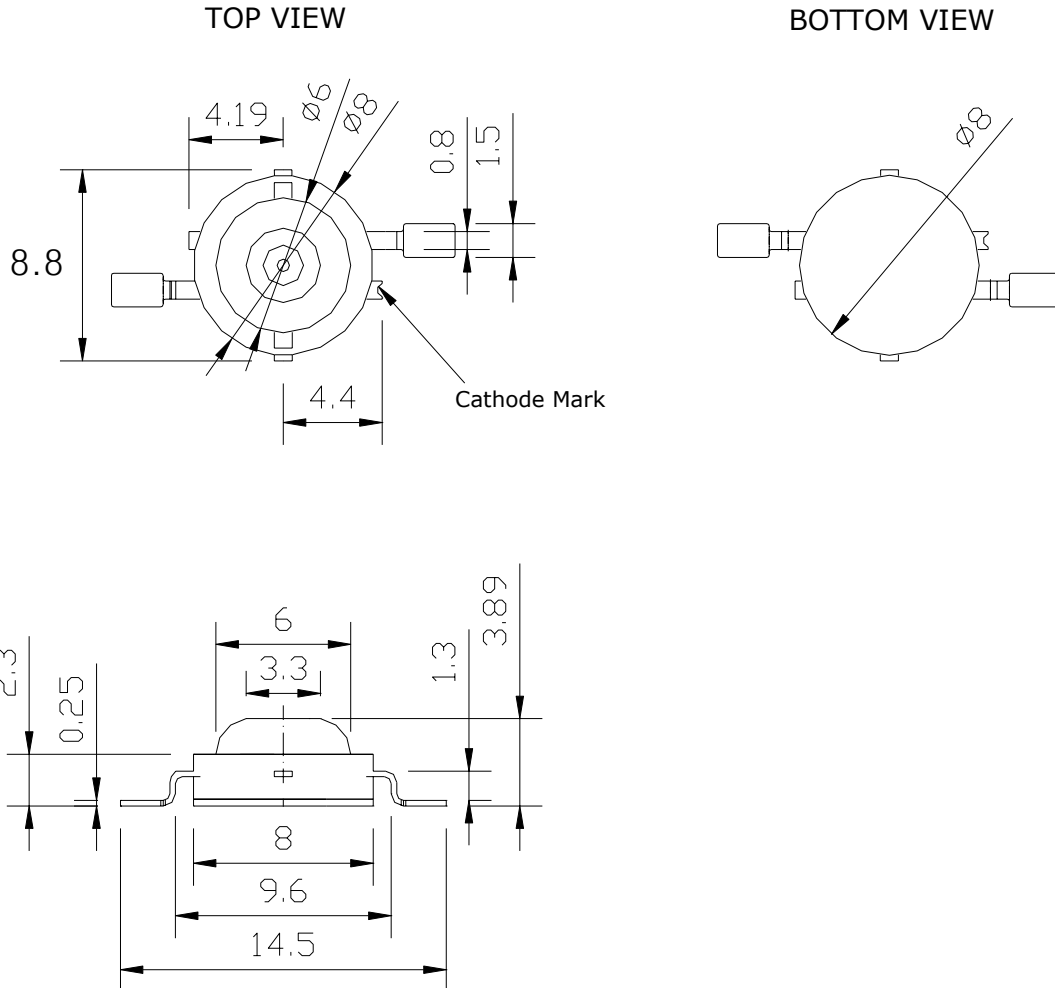


SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

[www.zpowerled.com](http://www.zpowerled.com)

## Side emitter



### Notes :

1. All dimensions are in millimeters. (tolerance :  $\pm 0.2$  )
2. Scale : none
3. Slug of package is connected to anode.

\*The appearance and specifications of the product may be changed for improvement without notice.



SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

[www.zpowerled.com](http://www.zpowerled.com)

## Characteristics for Side type Z-Power LED

### Pure White

1-1 Electro-Optical characteristics at  $I_F=350\text{mA}$ ,  $T_A=25^\circ\text{C}$

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux <sup>[1]</sup>	$\Phi_V$ <sup>[2]</sup>	-	32	-	lm
Correlated Color Temperature <sup>[3]</sup>	CCT	-	6500	-	K
CRI	$R_a$	65	70	-	-
Forward Voltage <sup>[4]</sup>	$V_F$	3.0	3.5	4.0	V
Thermal resistance <sup>[7]</sup>	$R_\theta$	9			$^\circ\text{C} / \text{W}$

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	0.4	A
Power Dissipation	$P_D$	1.6	W
Junction Temperature	$T_j$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30 ~ +85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +120	$^\circ\text{C}$
ESD Sensitivity <sup>[6]</sup>	-	$\pm 20,000\text{V}$ HBM	-

\*Notes :

- [1] SSC maintains a tolerance of  $\pm 10\%$  on flux and power measurements.
- [2]  $\Phi_V$  is the total luminous flux output as measured with an integrated sphere.
- [3] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.  
CCT  $\pm 5\%$  tester tolerance
- [4] A tolerance of  $\pm 0.06\text{V}$  on forward voltage measurements
- [5]  $R_{\theta_{j-B}}$  is measured with a SSC metal core pcb. ( $25^\circ\text{C} \leq T_j \leq 110^\circ\text{C}$ )  
Break voltage of Metal PCB is 6.5kVAC
- [6] It is included the zener chip to protect the product from ESD.

#### -----Caution-----

1. Please do not drive at rated current more than 5 sec. without proper heat sink
2. The chromaticity coordinate of the LEDs can be shift as temperature of junction.



SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

www.zpowerled.com

- Pure white bin structure

Bin	CHR_X	CHR_Y	CCT(K)	Bin	CHR_X	CHR_Y	CCT(K)
SYP	0.293	0.305	9000	SWP	0.329	0.331	6050
	0.283	0.284			0.317	0.320	
	0.290	0.270			0.318	0.310	
	0.300	0.285			0.329	0.320	
SYN	0.304	0.327	7500	SVM	0.329	0.325	5350
	0.293	0.305			0.348	0.385	
	0.300	0.285			0.329	0.369	
	0.310	0.300			0.329	0.362	
	0.308	0.311			0.329	0.357	
SXN	0.305	0.322	6700	SVN	0.347	0.372	5350
	0.315	0.344			0.329	0.357	
	0.304	0.327			0.329	0.345	
	0.305	0.322			0.346	0.359	
SX0	0.316	0.333	6700	SV0	0.346	0.359	5350
	0.305	0.322			0.329	0.345	
	0.308	0.311			0.329	0.331	
	0.317	0.32			0.329	0.325	
SXP	0.317	0.320	6700	SUM	0.344	0.344	4800
	0.308	0.311			0.345	0.351	
	0.310	0.300			0.367	0.400	
	0.318	0.310			0.348	0.385	
SWN	0.329	0.362	6050	SUN	0.347	0.372	4800
	0.315	0.344			0.364	0.383	
	0.316	0.333			0.364	0.383	
	0.329	0.345			0.347	0.372	
	0.329	0.357			0.346	0.359	
SW0	0.329	0.345	6050		0.345	0.351	
	0.316	0.333			0.362	0.372	
	0.317	0.320					
	0.329	0.331					

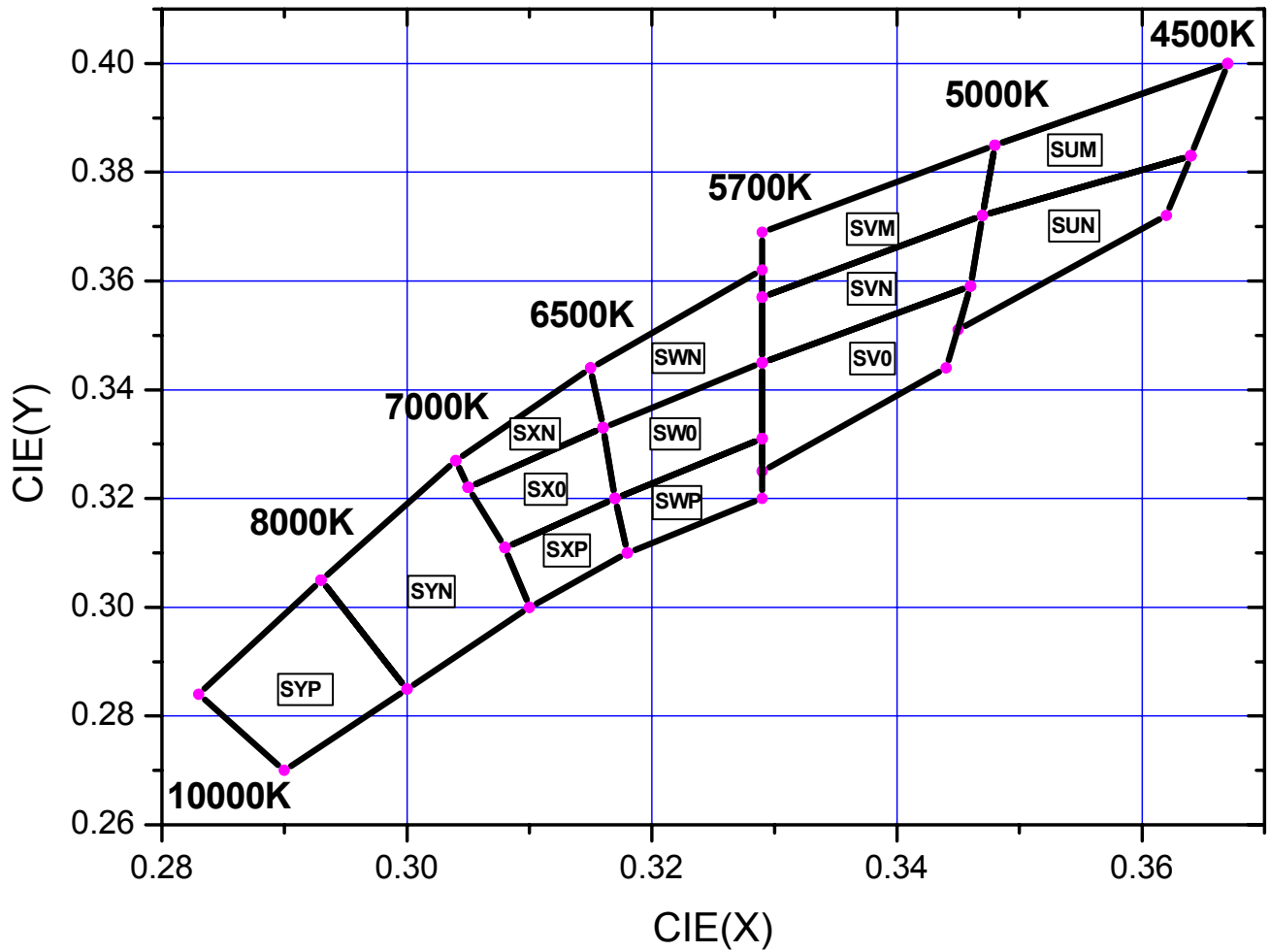


SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

www.zpowerled.com

Pure white binning structure graphical representation



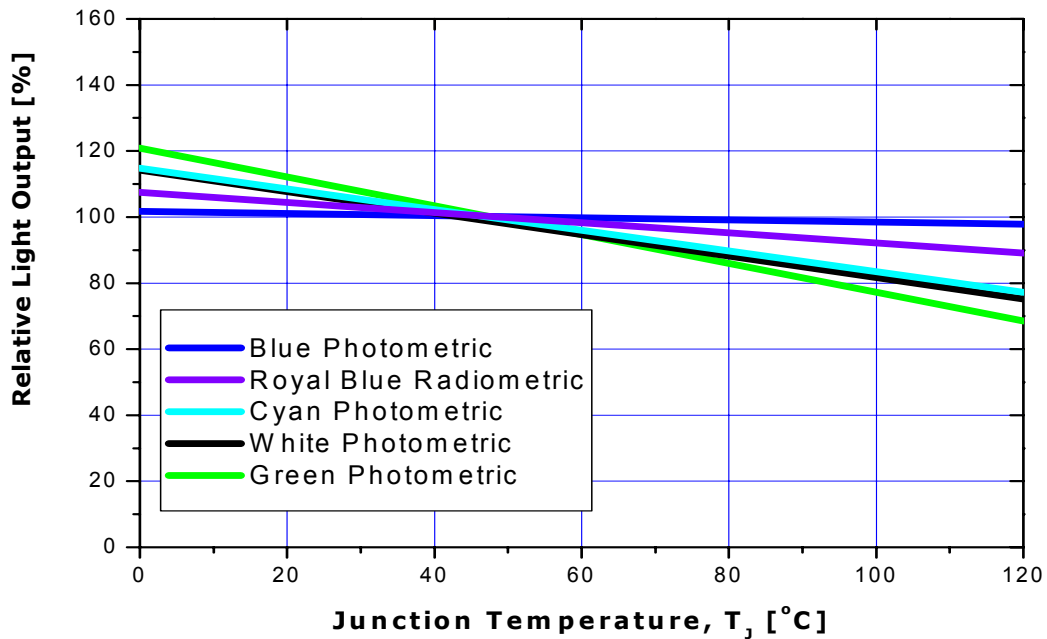
SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

www.zpowerled.com

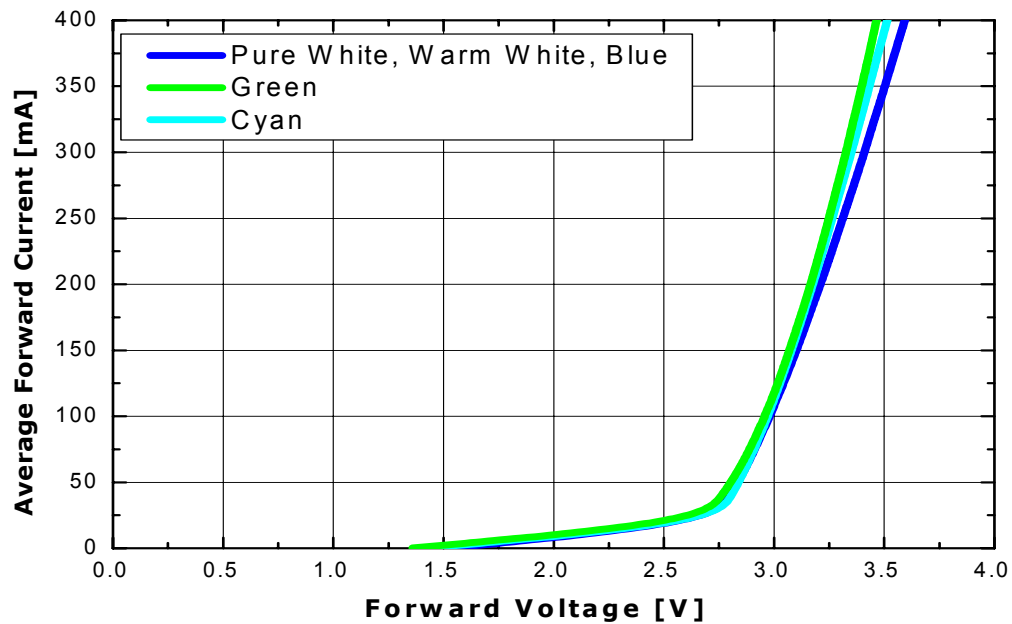
## Light Output Characteristics

- Relative Light Output vs. Junction Temperature at  $I_F=350\text{mA}$ ,  $T_A=25^\circ\text{C}$



## Forward Current Characteristics

- Forward Voltage vs. Forward Current,  $T_A=25^\circ\text{C}$



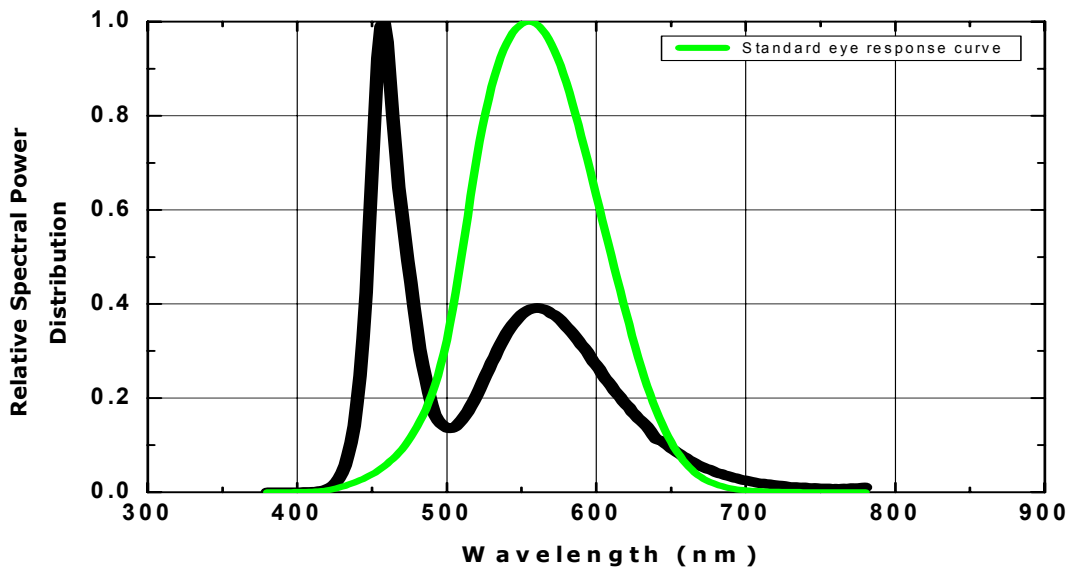
SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 - 2007 / 02

[www.zpowerled.com](http://www.zpowerled.com)

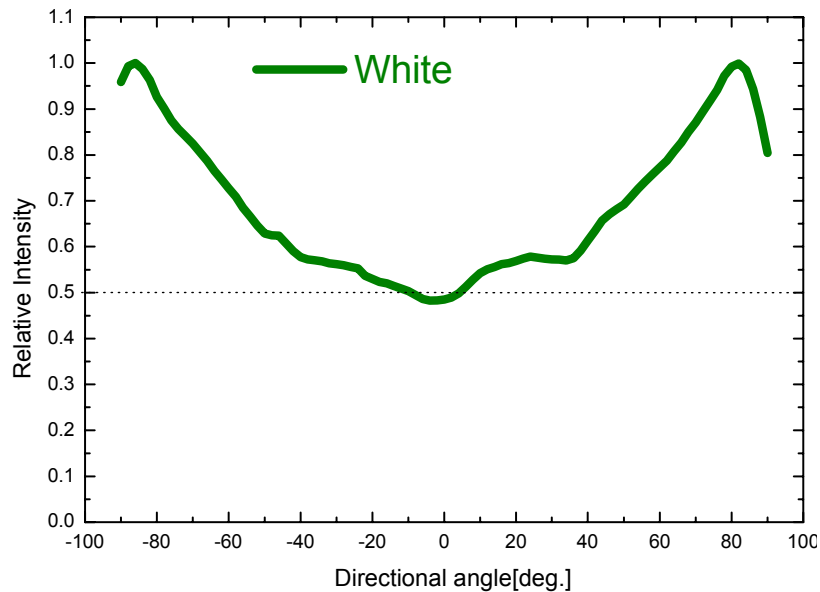
## Color spectrum, $T_A=25^\circ\text{C}$

### . Pure White



## Typical Side Type Radiation pattern

### . Pure White



SEOUL SEMICONDUCTOR CO., LTD.

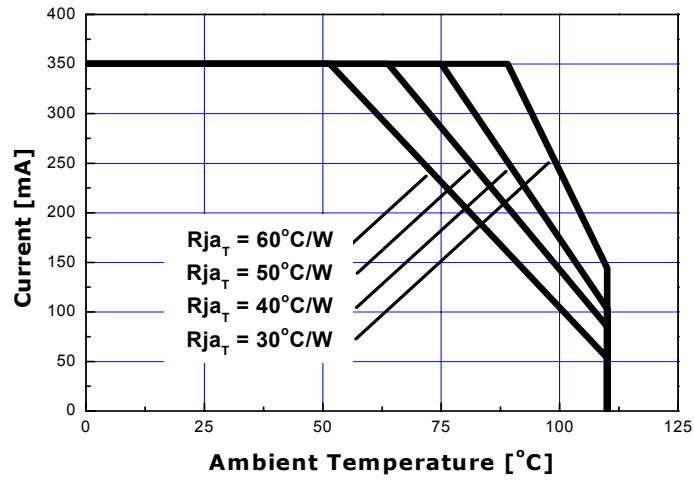
Rev 01 – 2007 / 02

[www.zpowerled.com](http://www.zpowerled.com)



## Ambient Temperature vs Allowable Forward Current

Pure White, Warm White, Royal Blue, Blue, Cyan, Green ( $T_{JMAX} = 125\text{ }^{\circ}\text{C}$ )



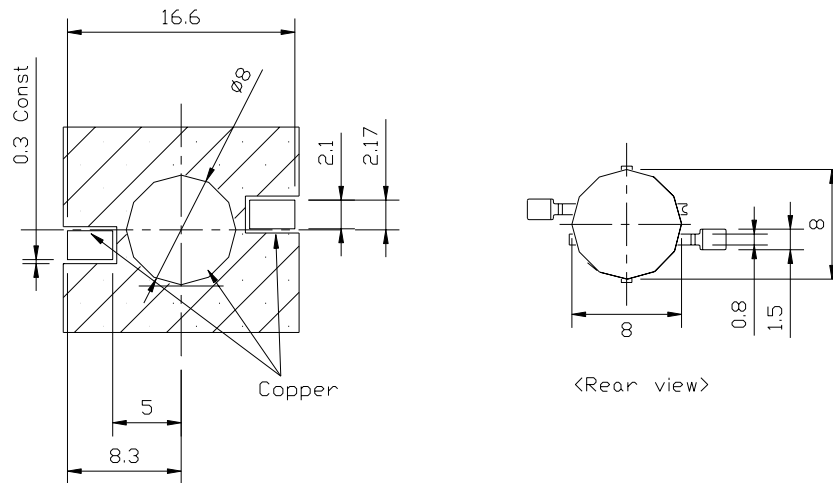
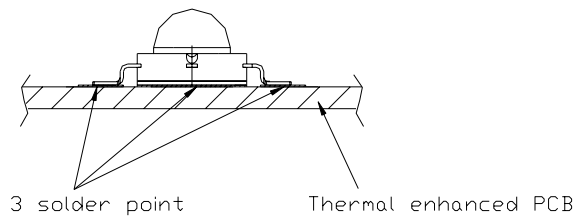
SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

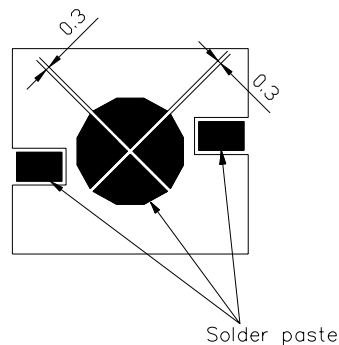
[www.zpowerled.com](http://www.zpowerled.com)

## Recommended Soldering

### 1. Solder pad



### 2. Solder paste pattern



1. Paste thickness : 0.2mm

#### Note

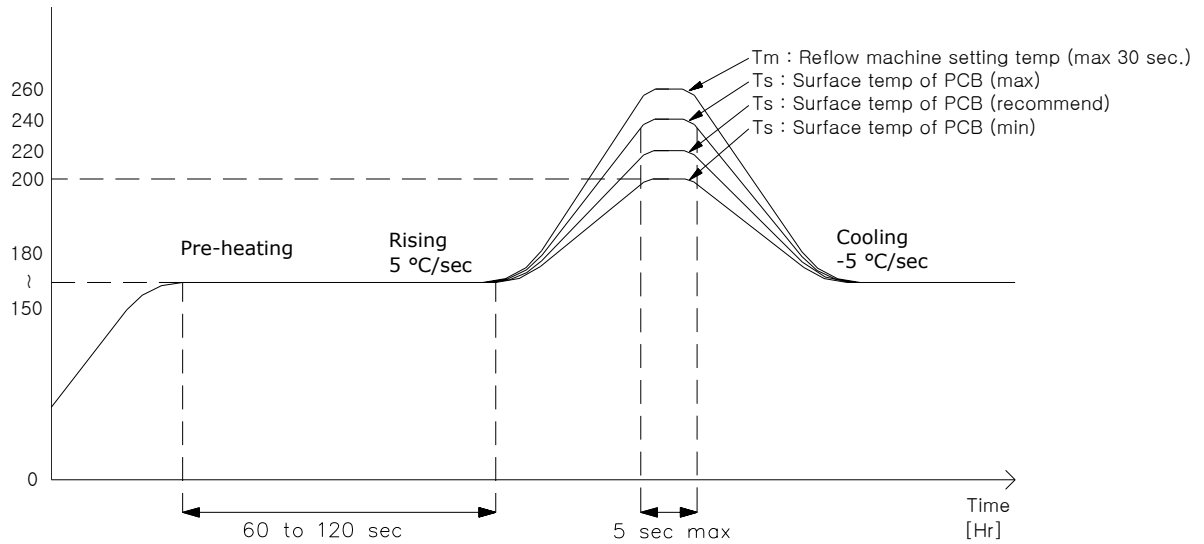
1. All dimensions are in millimeters (tolerance :  $\pm 0.2$  )
2. Scale none

\*The appearance and specifications of the product may be changed for improvement without notice.



## Soldering profile, $T_A=25^\circ\text{C}$

### 1. Reflow Soldering Conditions / Profile



### 2. Hand Soldering conditions

Lead : Not more than 3 seconds @MAX280°C

Slug : Use a thermal-adhesives

#### \* Caution

1. Reflow soldering should not be done more than one time.
2. Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, suitable tools have to be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LEDs during heating.
5. After soldering, do not warp the circuit board.

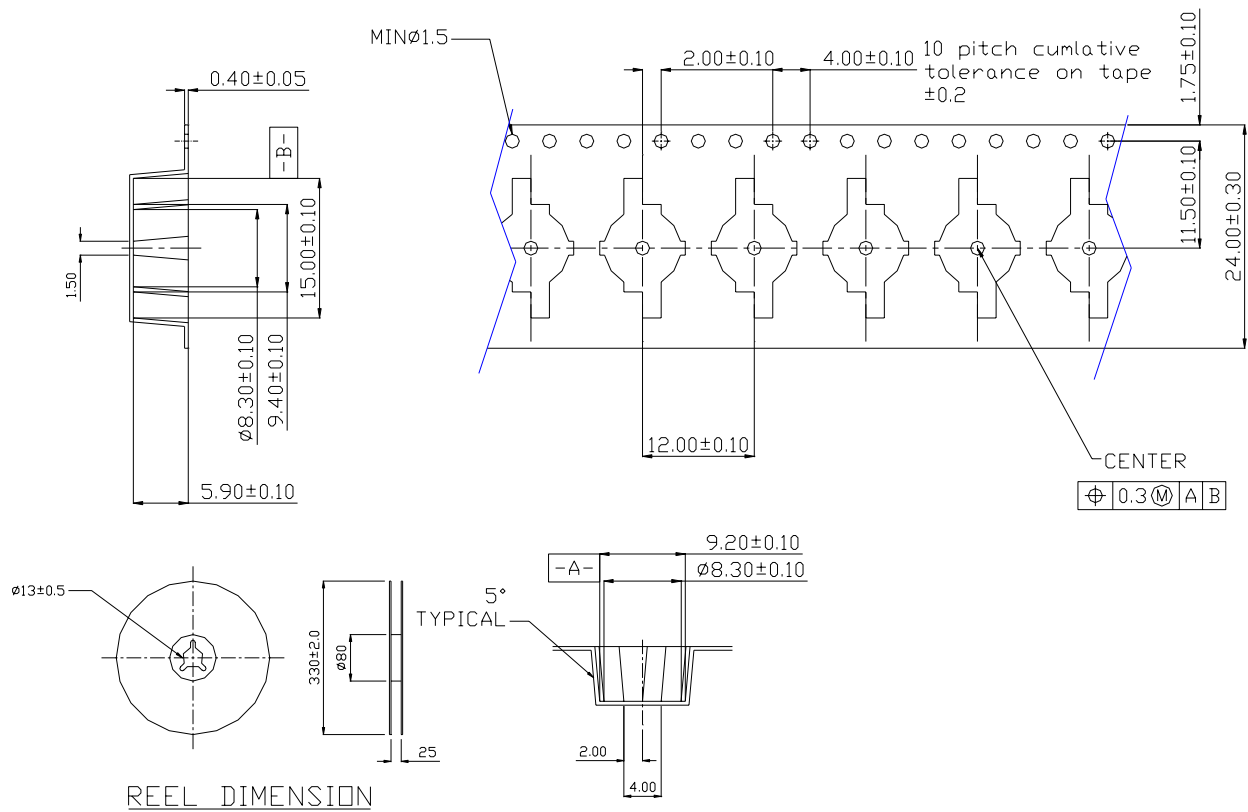


SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

[www.zpowerled.com](http://www.zpowerled.com)

## Emitter Reel Packaging



### Note :

1. The number of loaded products in the reel is 250ea
2. All dimensions are in millimeters
3. Scale none
4. This drawing without tolerances are for reference only



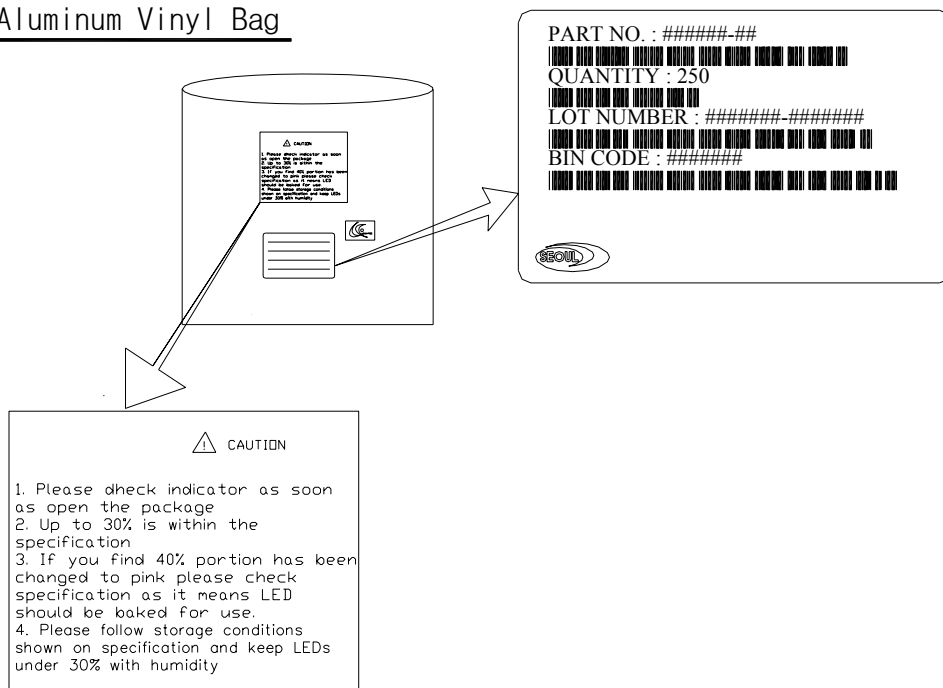
SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

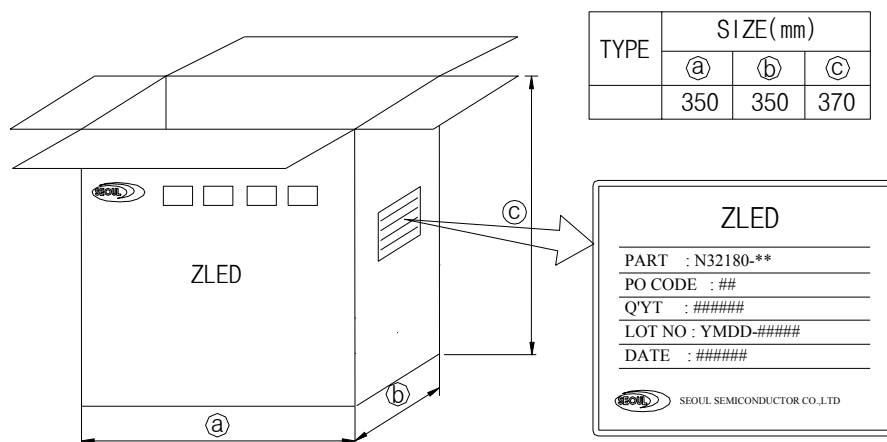
[www.zpowerled.com](http://www.zpowerled.com)

## Packaging Structure

### Aluminum Vinyl Bag



### Outer Box



#### Note :

1. 6~10 reels are loaded in box
2. Scale none
3. This drawing without tolerances are for reference only
4. For more information about binning and labeling, refer to the Application Note - 1



SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

www.zpowerled.com

## Precaution for use

- Storage

In order to avoid the absorption of moisture, it is recommended to store in the dry box (or desiccator) with a desiccant . Otherwise, to store them in the following environment is recommended. Temperature : 5℃~30℃ Humidity : 60%HR max.

- Attention after opened

However LED is correspond SMD, when LED be soldered dip, interfacial separation may affect the light transmission efficiency, causing the light intensity to drop. Attention in followed.

a. After opened and mounted, the soldering shall be quickly.

b. Keeping of a fraction

Temperature : 5 ~ 40℃ Humidity : less than 50%

- In case of more than 1 week passed after opening or change color of indicator on desiccant components shall be dried 10-12hr. at 60±5℃.
- Any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temp. after soldering.
- Quick cooling shall avoid.
- Components shall not be mounted on warped direction of PCB.
- Anti radioactive ray design is not considered for the products listed here in.
- Gallium arsenide is used in some of the products listed in this publication. These products are dangerous if they are burned or smashed in the process of disposal. It is also dangerous to drink the liquid or inhale the gas generated by such products when chemically disposed.
- This device should not be used in any type of fluid such as water, oil, organic solvent and etc. When washing is required, IPA should be used.
- When the LEDs are illuminating, operating current should be decided after considering the package maximum temperature.
- LEDs must be stored to maintain a clean atmosphere. If the LEDs are stored for 3 months or more after being shipped from SSC, a sealed container with a nitrogen atmosphere should be used for storage.
- The LEDs must be soldered within seven days after opening the moisture-proof packing.
- Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.
- The appearance and specifications of the product may be modified for improvement without notice.
- Long time exposure of sunlight or UV occasions discolorment of package



SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

[www.zpowerled.com](http://www.zpowerled.com)

---

## Handling of Silicone resin LEDs

Z-Power LED is encapsulated by silicone resin for the highest flux efficiency.

Notes for handling of Silicone resin Z-Power LEDs

- Avoid touching silicone resin parts especially by sharp tools such as Pincette(Tweezers)
- Avoid leaving fingerprints on silicone resin parts.
- Dust sensitivity silicone resin need containers having cover for storage.
- When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevent. This is assured by choosing a pick and place nozzle which is larger than the LEDs silicone resin area
- Please do not force over 2000 gf impact or pressure diagonally on the silicon lens.  
It will cause fatal damage of this product
- Please do not cover the silicone resin of the LEDs with other resin (epoxy, urethane, etc)



SEOUL SEMICONDUCTOR CO., LTD.

Rev 01 – 2007 / 02

[www.zpowerled.com](http://www.zpowerled.com)