# Power LED TECHNICAL DATA

W11490

N11490

B11490

G11490

R11490

C11490

A11490



148-29, Kasan-Dong, Keumchun-Gu, Seoul, Korea TEL: 82-2-3281-6269 FAX: 82-2-857-5430

# **SPECIFICATIONS**

#### - Features

- Super high flux output and high luminance
- Designed for high current operation
- Low thermal resistance
- RoHS Compliant

#### - Applications

- General Illumination
  - Outdoor & Indoor architectural lighting
  - Decorative lighting
  - Torch lighting
  - Portable lighting (Flash and lamp) and Reading lighting
  - Traffic signaling

#### - Description

- Z-Power series is designed for high current operation and high flux output applications.
- Z-Power LED's thermal management perform exceeds other power LED solutions.

It incorporates state of the art SMD design and Thermal emission material.

Z Power LED is ideal light sources for general illumination applications, custom designed solutions, automotive large LCD backlights.



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#### Full Code explanation 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<sub>2</sub>: Z-Power LED series number
- X<sub>3</sub>: LENS type
- X<sub>4</sub>: Chip Quantity
- X<sub>5</sub>: Package outline size
- X<sub>6</sub>: Type of PCB

#### 2. Internal Number

- $-X_7$
- X<sub>8</sub>

#### 3. Code Labeling

- X<sub>9</sub>: Luminous Flux (or Radiant Flux for Royal)
- $X_{10}X_{11}X_{12}$ : Dominant Wavelength (or x,y coordinates rank code)
- X<sub>13</sub>: Forward Voltage

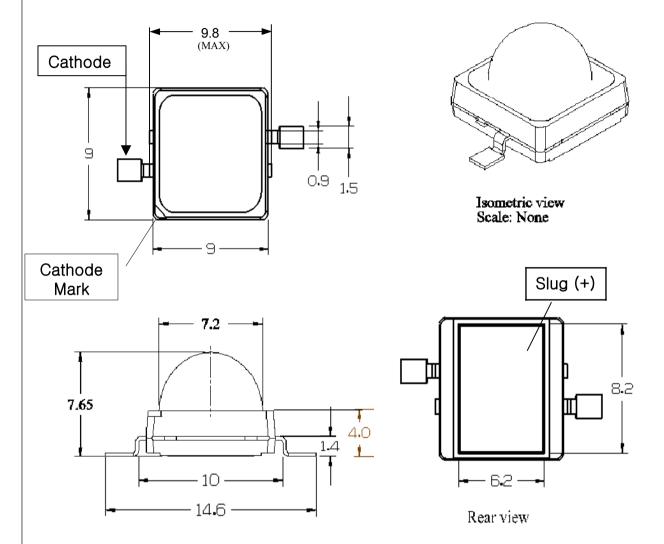
For more information about binning and labeling, refer to the Application Note -1



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# 1. Outline Dimensions



Notes: 1. All dimensions are in millimeters.

- 2. Scale: none
- 3. This drawing is reference only for engineering
- 4. Slug of package is connected to anode.



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# Pure white Power LED

# 2. Electro-Optical Characteristics (at I<sub>F</sub>=1.4A, T<sub>A</sub>=25°C)

Parameter	Symbol	Value			Unit
1 at affect	Symbol	Min	Тур	Max	Cint
Luminous Flux [1]	$\Phi_{V}^{[2]}$	154	178	-	lm
Correlated Color Temperature [3]	ССТ	-	6500	-	K
CRI	$R_a$	-	70	-	-
Forward Voltage [4]	$V_{\scriptscriptstyle F}$	3.0	3.5	4.0	V
View Angle	2⊖ 1/2		70		deg.
Thermal resistance [5]	$R\Theta_{J-B}$		4		°C/W

# 3. Absolute Maximum Ratings (at T<sub>A</sub>=25°C)

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	1.6	A
Power Dissipation	$P_{D}$	6.4	W
Junction Temperature	$T_{j}$	125	°C
Operating Temperature	$T_{opr}$	<b>-</b> 30 ∼ +85	°C
Storage Temperature	$T_{ m stg}$	-40 ~ +120	°C
ESD Sensitivity [6]	-	±20,000V 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  $\pm 0.06$ V on forward voltage measurements
- [5]  $R\Theta_{J-B}$  is measured with a SSC metal core pcb.(25 °C  $\leq$ T<sub>J</sub>  $\leq$  110 °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 shift approximately x=0.02, y=0.03 in the direction of blue 1000 hours later



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# Warm white Power LED

# 2. Electro-Optical Characteristics (at I<sub>F</sub>=1.4A, T<sub>A</sub>=25°C)

Parameter	Symbol		Value		Unit
T at affects	Symbol	Min	Тур	Max	Cint
Luminous Flux [1]	$\Phi_{V}^{[2]}$	91.0	120	-	lm
Correlated Color Temperature [3]	ССТ	-	3000	-	K
CRI	$R_a$	-	80	-	-
Forward Voltage [4]	$V_{\scriptscriptstyle F}$	3.0	3.5	4.0	V
View Angle	2⊖ 1/2		70		deg.
Thermal resistance [5]	$R\Theta_{J-B}$		4		°C/W

# 3. Absolute Maximum Ratings (at T<sub>A</sub>=25°C)

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	1.6	A
Power Dissipation	$P_{\mathrm{D}}$	6.4	W
Junction Temperature	$T_{j}$	125	°C
Operating Temperature	$T_{opr}$	<b>-</b> 30 ∼ +85	°C
Storage Temperature	$T_{ m stg}$	-40 ~ +120	°C
ESD Sensitivity [6]	-	±20,000V 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  $\pm 0.06$ V on forward voltage measurements
- [5]  $R\Theta_{J-B}$  is measured with a SSC metal core pcb.(25 °C  $\leq$ T<sub>J</sub>  $\leq$  110 °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 shift approximately x=0.02, y=0.03 in the direction of blue 1000 hours later



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# Blue Power LED

#### 2. Electro-Optical Characteristics (at I<sub>F</sub>=1.4A, T<sub>A</sub>=25°C)

Parameter	Symbol	Value			Unit
T at attect	Symbol	Min	Тур	Max	
Luminous Flux [1]	$\Phi_{ m V}$ [2]	24.5	30	-	lm
Dominant Wavelength [3]	$\lambda_{\scriptscriptstyle \mathrm{D}}$	455	460	475	nm
Forward Voltage [4]	$V_{\scriptscriptstyle F}$	3.0	3.5	4.0	V
View Angle	2⊖ 1/2		40		deg.
Thermal Resistance [5]	$R\Theta_{J-B}$		4		°C /W

## 3. Absolute Maximum Ratings (at T<sub>A</sub>=25°C)

Parameter	Symbol	Value	Unit
Forward Current	$I_{F}$	1.6	A
Power Dissipation	$P_{\mathrm{D}}$	6.4	W
Junction Temperature	$T_{j}$	125	°C
Operating Temperature	$T_{opr}$	<b>-</b> 30 ∼ +85	°C
Storage Temperature	$T_{ m stg}$	-40 ~ +120	°C
ESD Sensitivity [6]	-	±20,000V 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] Dominant wavelength is derived from the CIE 1931 Chromaticity diagram. A tolerance of  $\pm 0.5$ nm for dominant wavelength
- [4] A tolerance of  $\pm 0.06$ V on forward voltage measurements
- [5]  $R\Theta_{J-B}$  is measured with a SSC metal core pcb.(25 °C  $\leq$ T<sub>J</sub>  $\leq$  110 °C) Break voltage of Metal PCB is 6.5kVAC
- [6] It is included the zener chip to protect the product from ESD.

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

Please do not drive at rated current more than 5 sec. without proper heat sink



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# Green Power LED

#### 2. Electro-Optical Characteristics (at I<sub>E</sub>=1.4A, T<sub>A</sub>=25°C)

Parameter	Symbol	Value			Unit
T at ameter	Symbol	Min	Тур	Max	
Luminous Flux [1]	$\Phi_{ m V}^{~[2]}$	118.5	189	-	lm
Dominant Wavelength [3]	$\lambda_{\scriptscriptstyle \mathrm{D}}$	520	527	535	nm
Forward Voltage [4]	$V_{\scriptscriptstyle F}$	3.0	3.5	4.0	V
View Angle	2⊖ 1/2		40		deg.
Thermal Resistance [5]	$R\Theta_{J-B}$		4		°C /W

#### 3. Absolute Maximum Ratings (at T<sub>A</sub>=25°C)

Parameter	Symbol	Value	Unit
Forward Current	$I_{F}$	1.6	A
Power Dissipation	$P_{D}$	6.4	W
Junction Temperature	$T_{j}$	125	°C
Operating Temperature	$T_{opr}$	<b>-</b> 30 ∼ +85	°C
Storage Temperature	$T_{ m stg}$	-40 ~ +120	°C
ESD Sensitivity [6]	-	±20,000V 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] Dominant wavelength is derived from the CIE 1931 Chromaticity diagram. A tolerance of  $\pm 0.5$ nm for dominant wavelength
- [4] A tolerance of  $\pm 0.06$ V on forward voltage measurements
- [5]  $R\Theta_{J-B}$  is measured with a SSC metal core pcb.(25 °C  $\leq$ T<sub>J</sub>  $\leq$  110 °C) Break voltage of Metal PCB is 6.5kVAC
- [6] It is included the zener chip to protect the product from ESD.

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

Please do not drive at rated current more than 5 sec. without proper heat sink



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# Red Power LED

## 2. Electro-Optical Characteristics (at I<sub>F</sub>=1.4A, T<sub>A</sub>=25°C)

Parameter	Symbol	Value			Unit
T at a meter	Symbol	Min	Тур	Max	
Luminous Flux [1]	$\Phi_{ m V}$ [2]	91.0	114	-	lm
Dominant Wavelength [3]	$\lambda_{\scriptscriptstyle \mathrm{D}}$	618	625	632	nm
Forward Voltage [4]	$V_{\scriptscriptstyle F}$	2.0	2.5	3.0	V
View Angle	2⊖ 1/2		40		deg.
Thermal Resistance [5]	$R\Theta_{J-B}$		6		°C /W

## 3. Absolute Maximum Ratings (at T<sub>A</sub>=25°C)

Parameter	Symbol	Value	Unit
Forward Current	$I_{\mathrm{F}}$	1.6	A
Power Dissipation	$P_{\mathrm{D}}$	4.8	W
Junction Temperature	$T_{j}$	100	°C
Operating Temperature	$T_{opr}$	<b>-</b> 30 ∼ +85	°C
Storage Temperature	$T_{\rm stg}$	-40 ~ +120	°C
ESD Sensitivity [6]	-	±20,000V 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] Dominant wavelength is derived from the CIE 1931 Chromaticity diagram. A tolerance of  $\pm 0.5$ nm for dominant wavelength
- [4] A tolerance of  $\pm 0.06$ V on forward voltage measurements
- [5]  $R\Theta_{J-B}$  is measured with a SSC metal core pcb.(25 °C  $\leq$ T<sub>J</sub>  $\leq$  110 °C) Break voltage of Metal PCB is 6.5kVAC
- [6] It is included the zener chip to protect the product from ESD.

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

Please do not drive at rated current more than 5 sec. without proper heat sink



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# Cyan Power LED

## 2. Electro-Optical Characteristics (at I<sub>F</sub>=1.4A, T<sub>A</sub>=25°C)

Parameter	Symbol	Value			Unit
1 ai ainetei	Symbol	Min	Тур	Max	
Luminous Flux [1]	$\Phi_{ m V}^{\ [2]}$	118.5	150	-	lm
Dominant Wavelength [3]	$\lambda_{\scriptscriptstyle \mathrm{D}}$	500	505	510	nm
Forward Voltage [4]	$V_{\rm F}$	3.0	3.5	4.0	V
View Angle	2⊖ 1/2		40		deg.
Thermal Resistance [5]	$R\Theta_{J-B}$		4		°C /W

#### 3. Absolute Maximum Ratings (at T<sub>A</sub>=25°C)

Parameter	Symbol	Value	Unit
Forward Current	$I_{\mathrm{F}}$	1.6	A
Power Dissipation	$P_{D}$	6.4	W
Junction Temperature	$T_{j}$	125	°C
Operating Temperature	$T_{opr}$	<b>-</b> 30 ∼ +85	°C
Storage Temperature	$T_{\rm stg}$	-40 ~ +120	°C
ESD Sensitivity [6]	-	±20,000V 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] Dominant wavelength is derived from the CIE 1931 Chromaticity diagram. A tolerance of  $\pm 0.5$ nm for dominant wavelength
- [4] A tolerance of  $\pm 0.06$ V on forward voltage measurements
- [5]  $R\Theta_{J-B}$  is measured with a SSC metal core pcb.(25 °C  $\leq$ T<sub>J</sub>  $\leq$  110 °C) Break voltage of Metal PCB is 6.5kVAC
- [6] It is included the zener chip to protect the product from ESD.

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

Please do not drive at rated current more than 5 sec. without proper heat sink



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# Amber Power LED

## 2. Electro-Optical Characteristics (at I<sub>F</sub>=1.4A, T<sub>A</sub>=25°C)

Parameter	Symbol	Value			Unit
		Min	Тур	Max	Cint
Luminous Flux [1]	$\Phi_{ m V}$ [2]	118.5	144	-	lm
Dominant Wavelength [3]	$\lambda_{\scriptscriptstyle \mathrm{D}}$	585	590	595	nm
Forward Voltage [4]	$V_{\scriptscriptstyle F}$	2.0	2.5	3.0	V
View Angle	2⊖ 1/2		40		deg.
Thermal Resistance [5]	$R\Theta_{J-B}$		6		°C /W

## 3. Absolute Maximum Ratings (at T<sub>A</sub>=25°C)

Parameter	Symbol	Value	Unit
Forward Current	$I_{F}$	1.6	A
Power Dissipation	$P_{D}$	4.8	W
Junction Temperature	$T_{j}$	100	°C
Operating Temperature	$T_{opr}$	<b>-</b> 30 ∼ +85	°C
Storage Temperature	$T_{ m stg}$	-40 ~ +120	°C
ESD Sensitivity [6]	-	±20,000V 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] Dominant wavelength is derived from the CIE 1931 Chromaticity diagram. A tolerance of  $\pm 0.5$ nm for dominant wavelength
- [4] A tolerance of  $\pm 0.06$ V on forward voltage measurements
- [5]  $R\Theta_{J-B}$  is measured with a SSC metal core pcb.(25 °C  $\leq$ T<sub>J</sub>  $\leq$  110 °C) Break voltage of Metal PCB is 6.5kVAC
- [6] It is included the zener chip to protect the product from ESD.

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

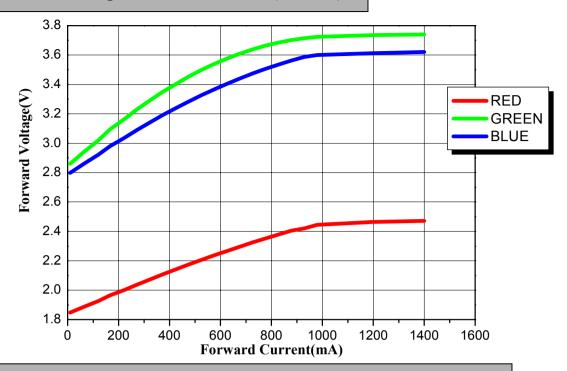
Please do not drive at rated current more than 5 sec. without proper heat sink



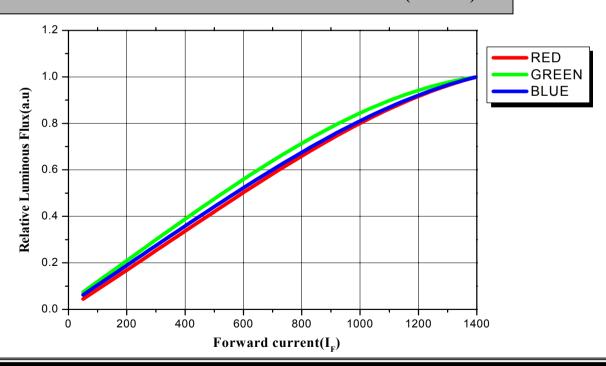
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# 4. Forward Voltage vs. Forward Current (Ta=25℃)



# 5. Forward Current vs. Normalized Relative Luminous Flux (Ta=25°C)

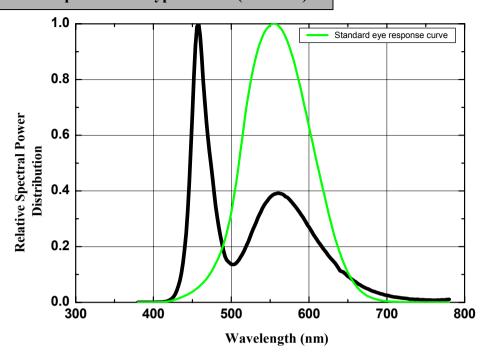




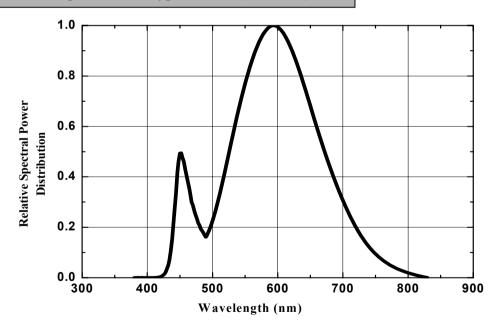
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# 6. White Color spectrum of Typical CCT (Ta=25°C)



# 7. Warm White spectrum of Typical CCT (Ta=25°C)

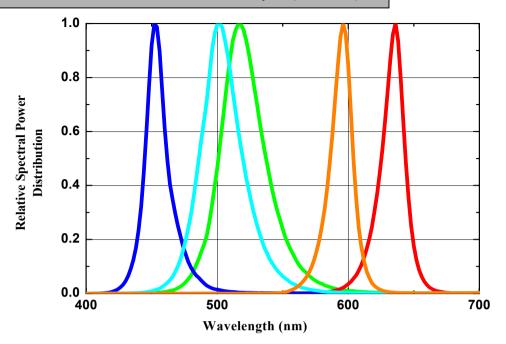




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# 8. Spectrum for Red, Green, Blue, Amber, Cyan (Ta=25°C)





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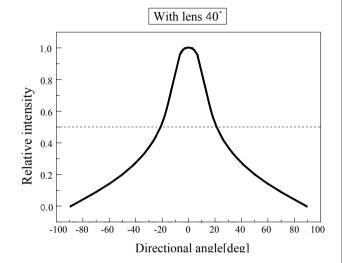
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# 9. Radiation pattern

White

#### With lens 70° 1.0 0.8 Relative intensity 0.6 0.4 0.2 0.0 -100 -80 -60 -40 -20 20 40 60 80 100 Directional angle[deg]

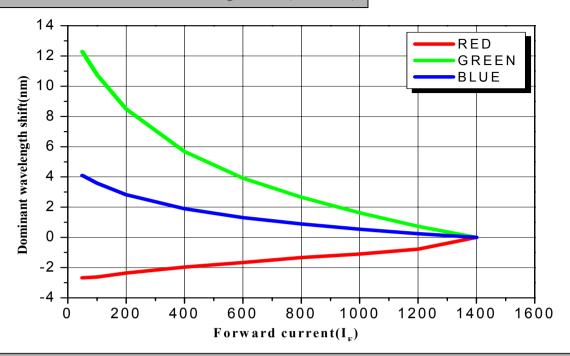
Blue, Green, Red, Cyan, Amber



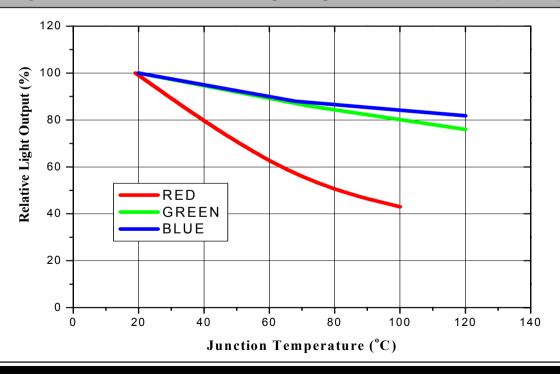


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# 10. Forward Current Vs Wavelength shift (Ta=25°C)



# 11. Temperature of Junction vs. Relative Light Output for Blue, Green, Red (Ta=25°C)

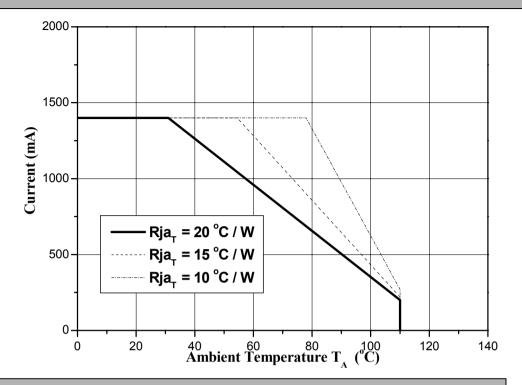




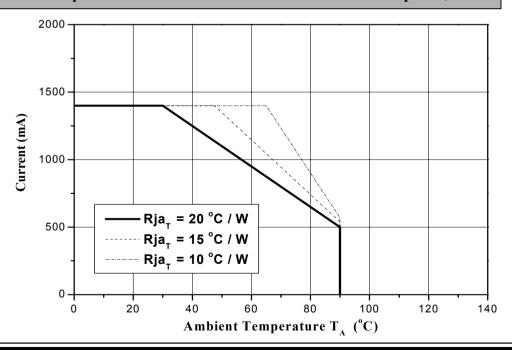
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# 12. Ambient Temperature vs Allowable Forward Current for 4 chip White, Blue, Green, Cyan



## 13. Ambient Temperature vs Allowable Forward Current for 4chip Red, Amber

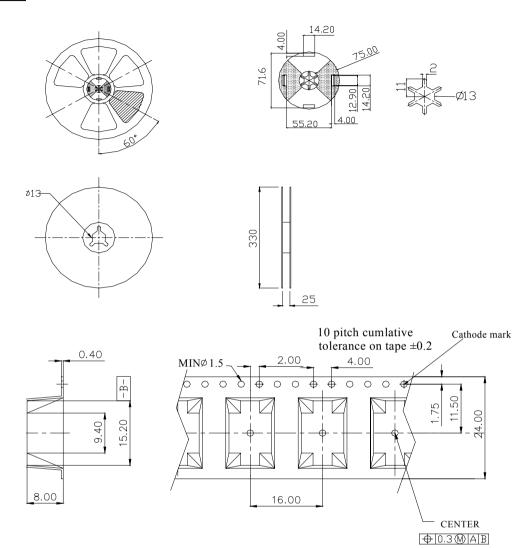


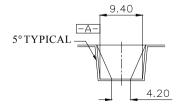


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# 14. Reel Packaging Dimensions(Rectangular type)





Note: 1. Pocket r

2. All dime3. Scale : n

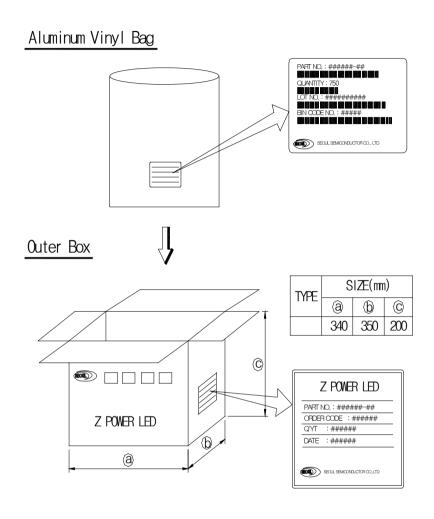
4. This drawing is reference only engineering



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#### 15. Packaging structure



Note: 1.5 reels are loaded in box

- 2. Scale none
- 3. This drawing is reference only engineering
- 4. For more information about binning and labeling, refer to the Application Note 1



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#### 16. Precaution for use

(1) Storage

Avoid the absorption of moisture, we recommended to store Z Power LEDs in a dry box (or desiccator) with a desiccant. Otherwise, store them in the following environment: Temperature:  $5 \, ^{\circ} \sim 30 \, ^{\circ}$  Humidity: 50 % max.

(2) Precaution after opening packaging

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. Soldering should be done right after opening the package (within 24Hrs).
- b. Keeping of a fraction
  - Sealing
  - Temperature :  $5 \sim 40^{\circ}$ C Humidity : less than 30%
- c. If the package has been opened more than 1week or the color of desiccant changes, components should be dried for 10-12hr at  $60\pm5$  °C.
- (3) Any mechanical force or any excess vibration shall not be applied to apply during cooling process to normal temp after soldering.
- (4) Avoid quick cooling
- (5) Components should not be mounted on warped direction of PCB.
- (6) Anti radioactive ray design is not considered for the products listed here in.
- (7) 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.
- (8) This device should not be used in any type of fluid such as water, oil, organic solvent and etc. When washing is required, IPA (Isopropyl Alcohol) should be used.
- (9) When the LEDs are illuminating, operating current should be decided after considering the package maximum temperature.
- (10) 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.
- (11) The LEDs must be soldered within seven days after opening the moisture-proof packing.
- (12) Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.
- (13) The appearance and specifications of the product may be modified for improvement without notice.
- (14) The package with lens can NOT be solder reflowed. It will damage the lens.
- (15) Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.
- (16) Slug polarity is anode.



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#### 17. 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** 

- 1) Avoid touching silicone resin parts especially by sharp tools such as Pincette(Tweezers)
- 2) Avoid leaving fingerprints on silicone resin parts.
- 3) Dust sensitivity silicone resin need containers having cover for storage.
- 4) 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.
- 5) Please do not force over 3000 gf impact or pressure diagonally on the silicon lens. It will cause fatal damage of this product
- 6) Please do not recommend to cover the silicone resin of the LEDs with other resin (epoxy, urethane, etc)



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