Technical Data Sheet

Acrich
semiconductor eco lighting

SEOUL SEMICONDUCTOR

RoHS

Specification

SZFP6F0A

SSC		Customer
Drawn	**Approval**	**Approval**

SZFP6F0A

Rev. 01

July. 2012

www.seoulsemicon.com

Document No. : SSC-QP-7-07-24 (Rev.00)

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SZFP6F0A

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Description

Z-Power series is designed for high current operation andhigh 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.

Full color Z-Power LED is using 4 RGBW power chips and isolated thermal slug.

In case of the full color product used in architectural lighting or decoration, it emits diverse colors(Full, Pastel) in one package so that it can render a clear mixed color when it is mixed with other colors.

Features

- Super high Flux output and high Luminance
- Designed for high current operation
- Low thermal resistance
- SMT solderability
- Lead Free product
- RoHS compliant

Applications

- Automotive interior / exterior lighting
- Architectural lighting
- Task lighting
- Decorative / Pathway lighting
- Remote / Solar powered lighting
- Household appliances

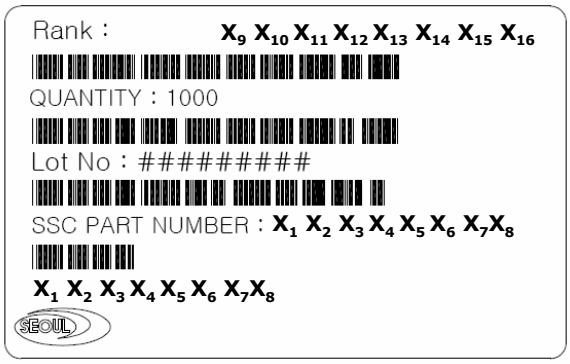
* The appearance and specifications of the product can be changed for improvement without notice.

Full code of Z6 (SZFP6A0A)

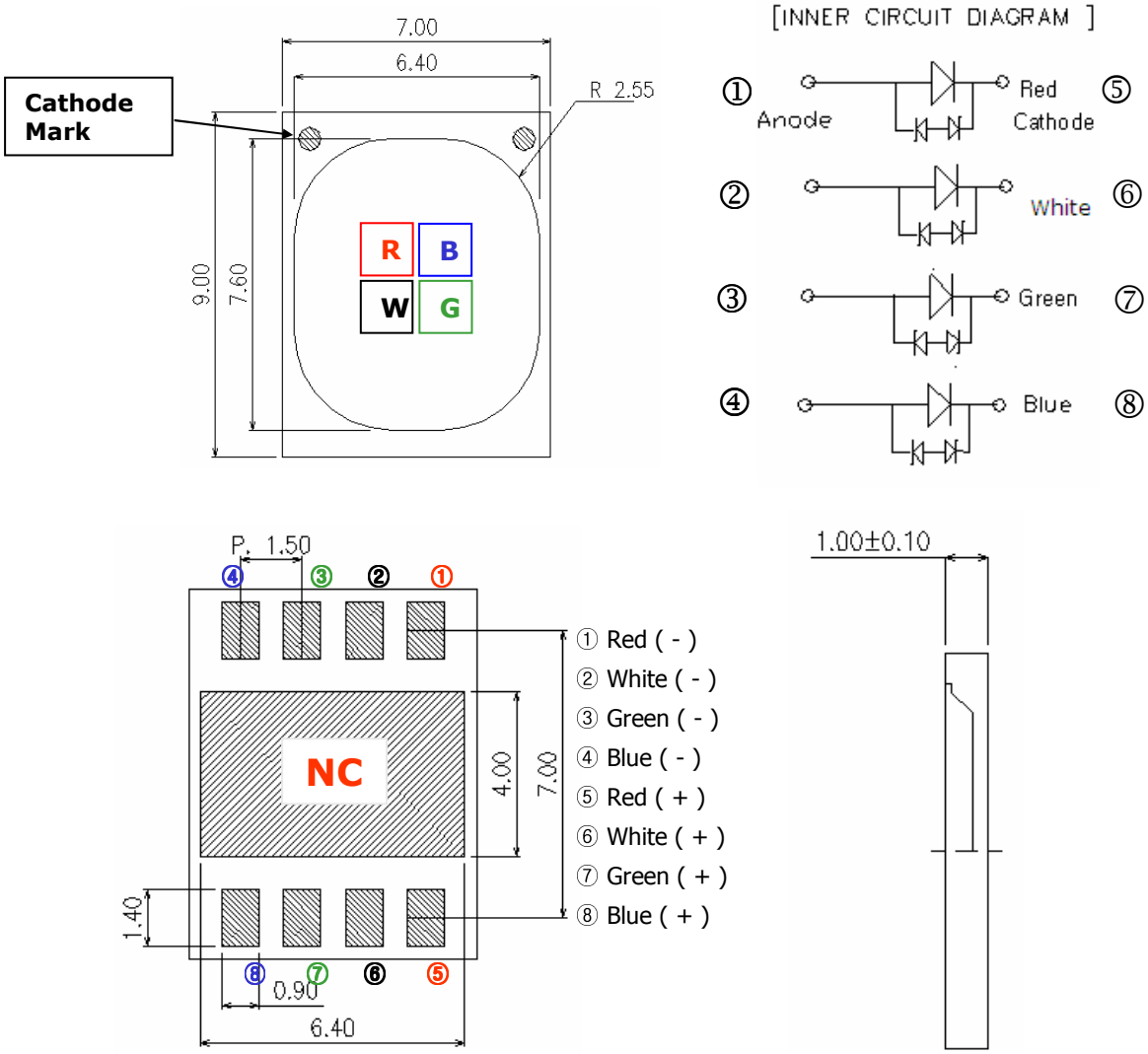
1. Part Number Form : $X_1X_2X_3X_4X_5X_6X_7X_8 - X_9X_{10}X_{11}X_{12}X_{13}X_{14}X_{15}X_{16}$

X_1	**Company**	**S**	SSC
X_2	**Package series**	**Z**	Z-Power
X_3	**Color**	**F**	Full Color Pure White
X_4		**P**	
X_5	**Z-Power series number**	**6**	Z6 series
X_6	**Lens type**	**F**	Flat White
X_7	**PCB type**	**0**	Emitter
X_8	**Revision No.**	**A**	Rev0
X_9	**Luminous flux (Red)**	**-**	-
X_{10}	**Luminous flux (Blue)**	**-**	-
X_{11}	**Luminous flux (Green)**	**-**	-
X_{12}	**Luminous flux (White)**	**-**	-
X_{13}	**Dominant Wavelength (Red)**	**-**	-
X_{14}	**Dominant Wavelength (Blue)**	**-**	-
X_{15}	**Dominant Wavelength (Green)**	**-**	-
X_{16}	**Color bin (White)**	**-**	-

2. Sticker Diagram on Reel & Aluminum Vinyl Bag



Outline Dimensions



<Rear view>

Notes :

1. Tolerance is ± 0.2mm
2. Scale : none
3. NC PAD isn't connected to anode or cathode

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

Characteristics for Z6 (SZFP6F0A)

1. White

1-1 Electro-Optical characteristics at I_F=350mA, T_A=25ºC

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	80	-	lm
Correlated Color Temperature [3]	CCT	-	5300	-	K
CRI	R_a		70	-	
Forward Voltage [4]	V_F	2.8	3.4	4.1	V
View Angle [5]	2Θ 1/2	120			deg.
Thermal Resistance [6]	$R\Theta_{J-C}$	12			ºC /W

1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	700	mA
		1000 (@1KHz, 1/10duty)	
Power Dissipation	P_d	2.66	W
Junction Temperature	T_j	145	ºC
Operating Temperature	T_{opr}	-30 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [7]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_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 ±5% tester tolerance.

[4] A tolerance of ± 0.06V on forward voltage measurements

[5] Viewing angle is the reference condition.

[6] $R\Theta_{J-C}$ is measured with each LED die. (25 ºC ≤TJ ≤ 110 ºC)

[7] It is included the zener chip to protect the product from ESD.

Characteristics for Z6 (SZFP6F0A)

2. Blue

2-1 Electro-Optical characteristics at I_F=350mA, T_A=25ºC

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	16	-	lm
Dominant Wavelength [3]	λ_D	455		465	nm
Forward Voltage [4]	V_F	3.0	3.4	4.1	V
View Angle [5]	2Θ 1/2	120			deg.
Thermal Resistance [6]	$R\Theta_{J-C}$	8			ºC /W

2-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	700	mA
		1000 (@1KHz, 1/10duty)	
Power Dissipation	P_d	2.66	W
Junction Temperature	T_j	145	ºC
Operating Temperature	T_{opr}	-30 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [7]	-	± 8,000V HBM	-

*Notes :
[1] SSC maintains a tolerance of ±10% on flux and power measurements.
[2] Φ_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 ±1.0nm for dominant wavelength
[4] A tolerance of ± 0.6V on forward voltage measurements
[5] Viewing angle is the reference condition.
[6] $R\Theta_{J-C}$ is measured with each LED die. (25 ºC ≤TJ ≤ 110 ºC)
[7] It is included the zener chip to protect the product from ESD.

Characteristics for Z6 (SZFP6F0A)

3. Green

3-1 Electro-Optical characteristics at I_F=350mA, T_A=25ºC

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	60	-	lm
Dominant Wavelength [3]	λ_D	518	525	535	nm
Forward Voltage [4]	V_F	3.0	3.4	4.2	V
View Angle [5]	2Θ 1/2	120			deg.
Thermal Resistance [6]	$R\Theta_{J-C}$	10			ºC /W

3-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	700	mA
		1000 (@1KHz, 1/10duty)	
Power Dissipation	P_d	2.56	W
Junction Temperature	T_j	145	ºC
Operating Temperature	T_{opr}	-30 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [7]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_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 ±1.0nm for dominant wavelength

[4] A tolerance of ± 0.6V on forward voltage measurements

[5] Viewing angle is the reference condition.

[6] $R\Theta_{J-C}$ is measured with each LED die. (25 ºC ≤TJ ≤ 110 ºC)

[7] It is included the zener chip to protect the product from ESD.

Characteristics for Z6 (SZFP6F0A)

4. Red

4-1 Electro-Optical characteristics at I_F=350mA, T_A=25ºC

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux [1]	Φ_V [2]	-	38	-	lm
Dominant Wavelength [3]	λ_D	618	625	632	nm
Forward Voltage [4]	V_F	2.0	2.3	3.0	V
View Angle [5]	2Θ 1/2		120		deg.
Thermal Resistance [6]	$R\Theta_{J-C}$		8		ºC /W

4-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	700	mA
		1000 (@1KHz, 1/10duty)	
Power Dissipation	P_d	1.75	W
Junction Temperature	T_j	125	ºC
Operating Temperature	T_{opr}	-30 ~ +85	ºC
Storage Temperature	T_{stg}	-40 ~ +100	ºC
ESD Sensitivity [7]	-	± 8,000V HBM	-

*Notes :

[1] SSC maintains a tolerance of ±10% on flux and power measurements.

[2] Φ_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 ±1.0nm for dominant wavelength

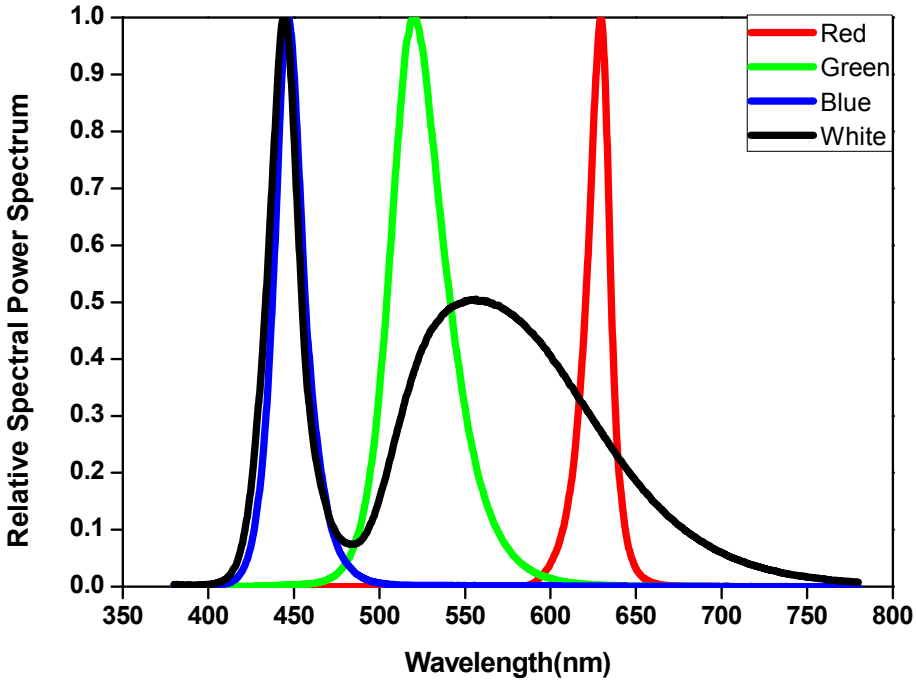
[4] A tolerance of ± 0.6V on forward voltage measurements

[5] Viewing angle is the reference condition.

[6] $R\Theta_{J-C}$ is measured with each LED die. (25 ºC ≤TJ ≤ 110 ºC)

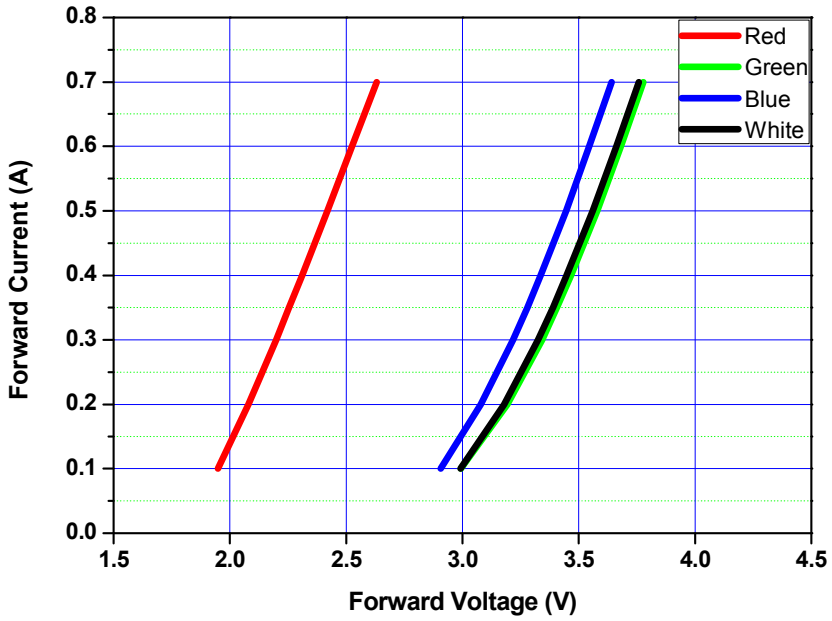
[7] It is included the zener chip to protect the product from ESD.

Color Spectrum, Ta=25℃

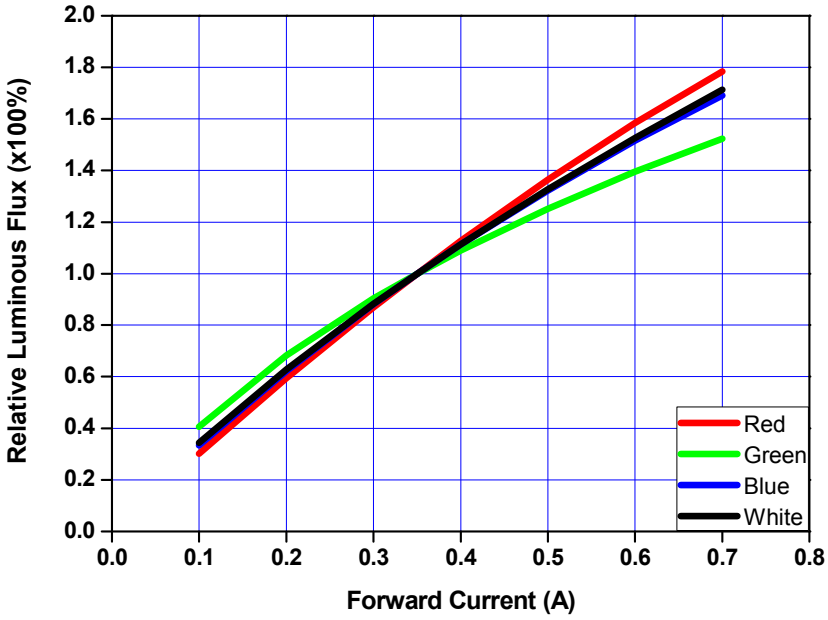


Forward Current Characteristics

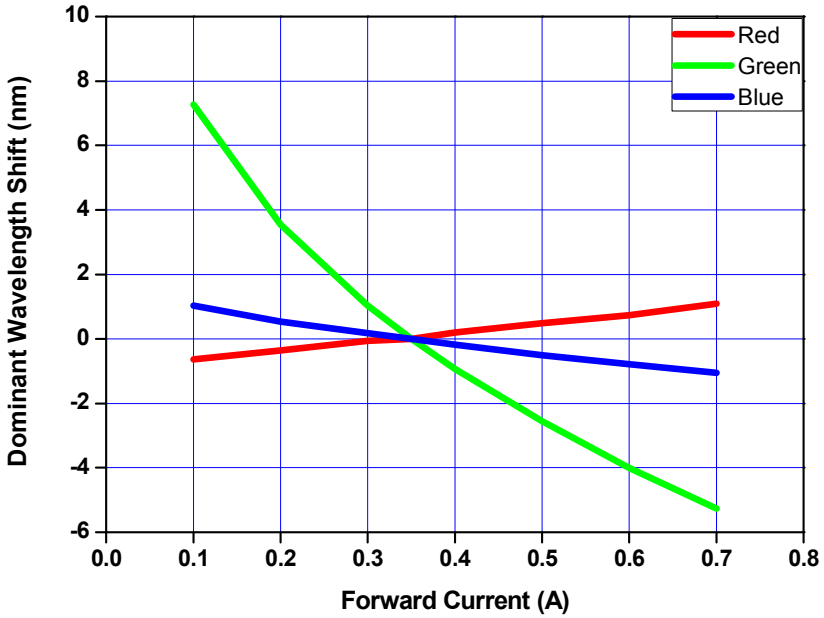
Forward Voltage vs. Forward Current , Ta=25℃



Forward Current vs. Relative Luminous Flux, Ta=25℃

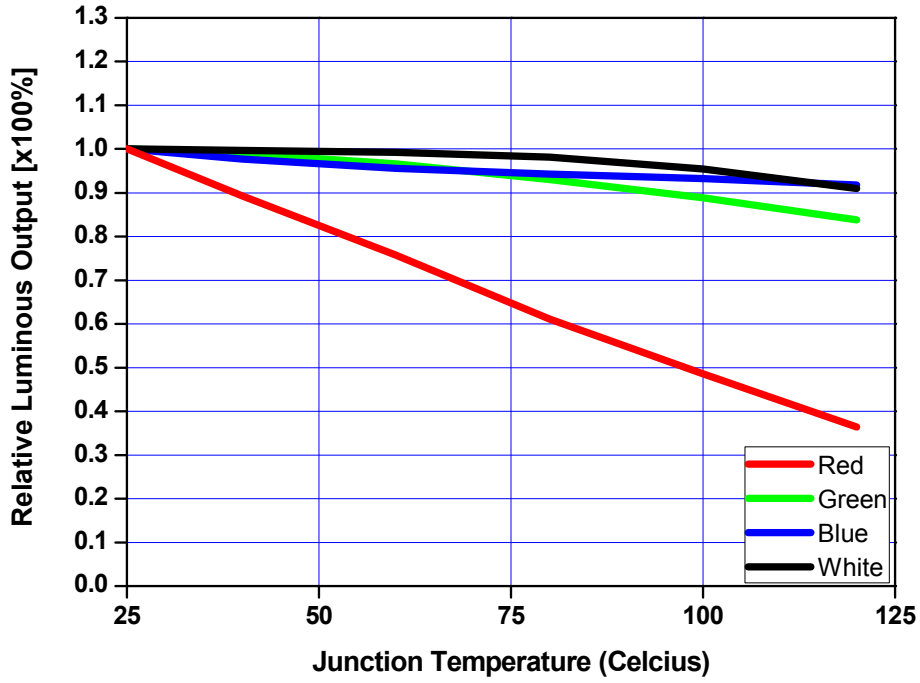


Forward Current vs. Dominant Wavelength Shift, Ta=25℃

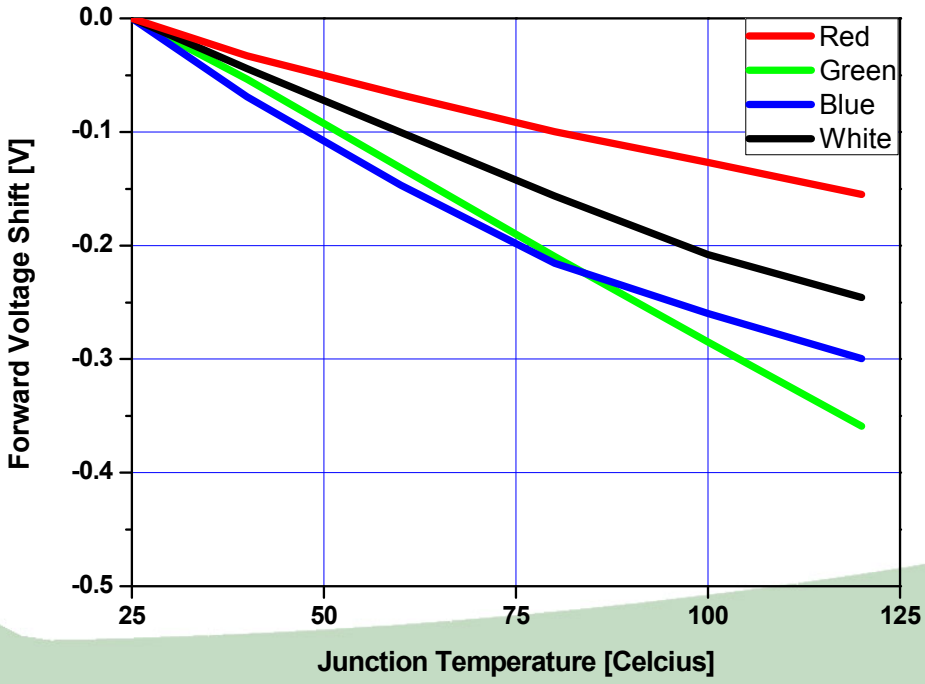


Junction Temperature Characteristics

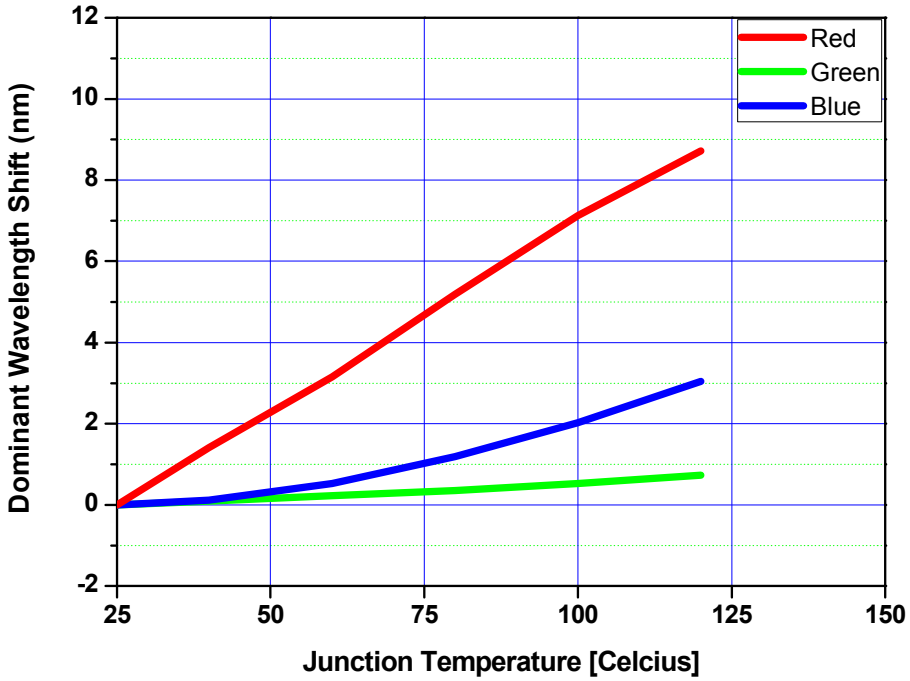
Relative Light Output vs. Junction Temperature at IF=350mA



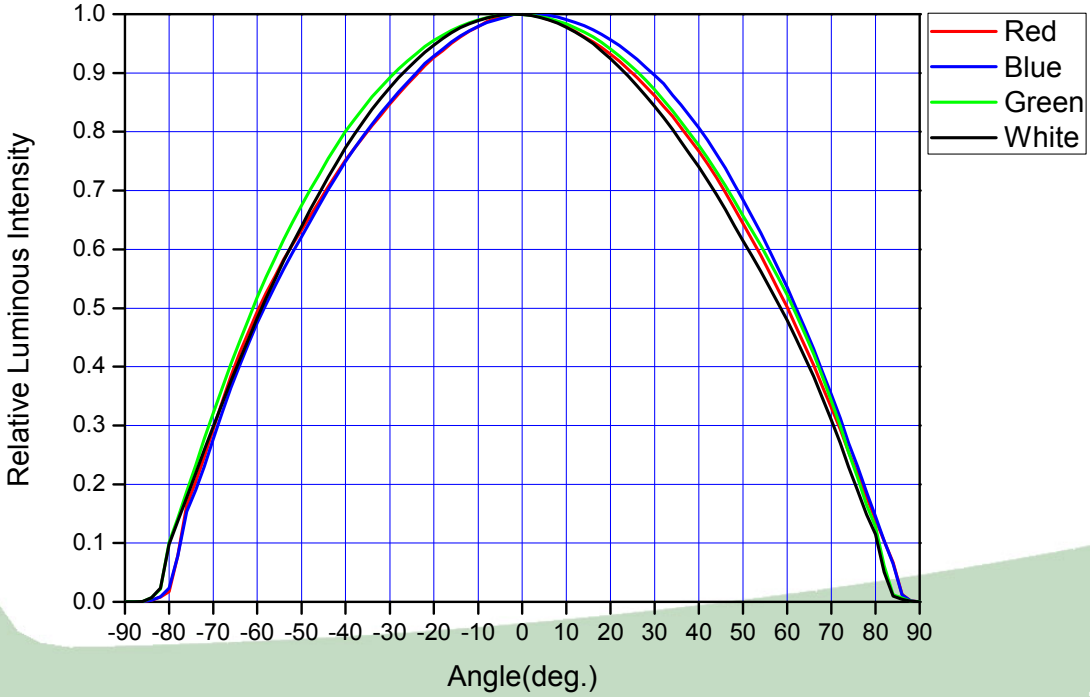
Forward Voltage Shift vs. Junction Temperature at IF=350mA



Dominant Wavelength Shift vs. Junction Temperature at IF=350mA

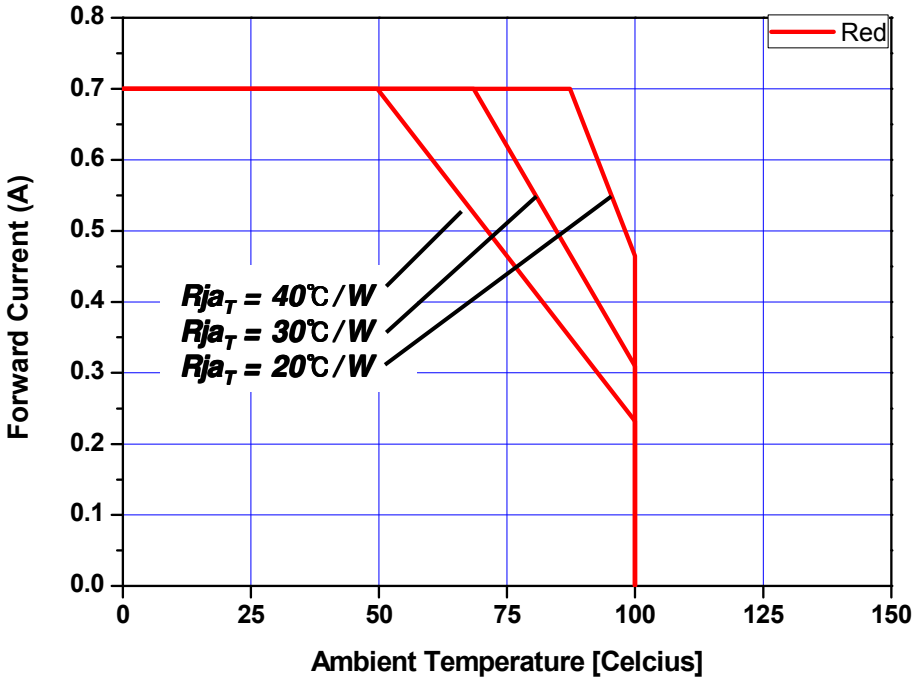


Radiation pattern at IF=350mA, Ta=25℃

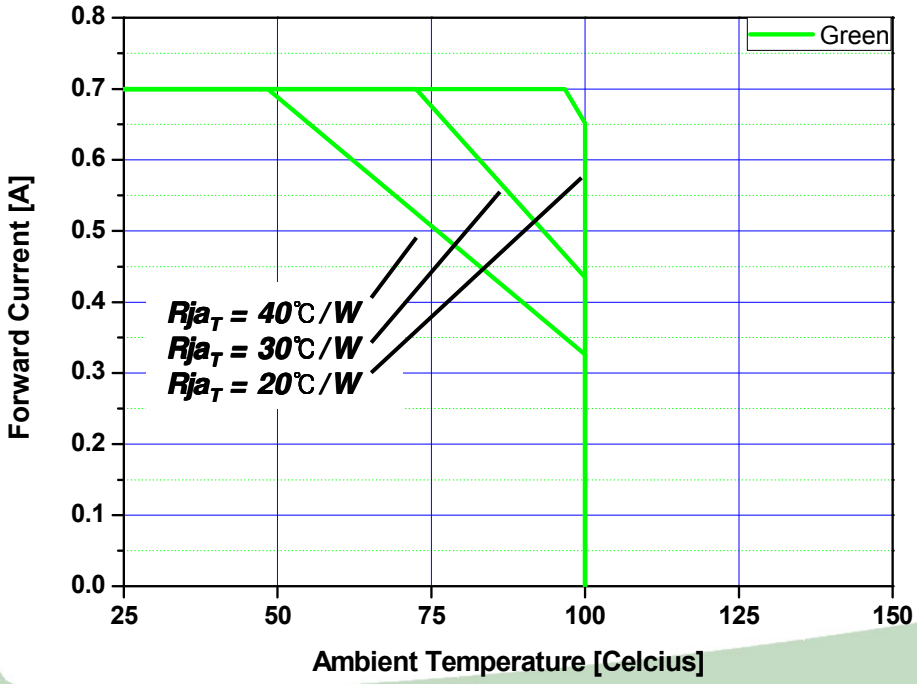


Maximum Forward Current vs. Ambient Temperature

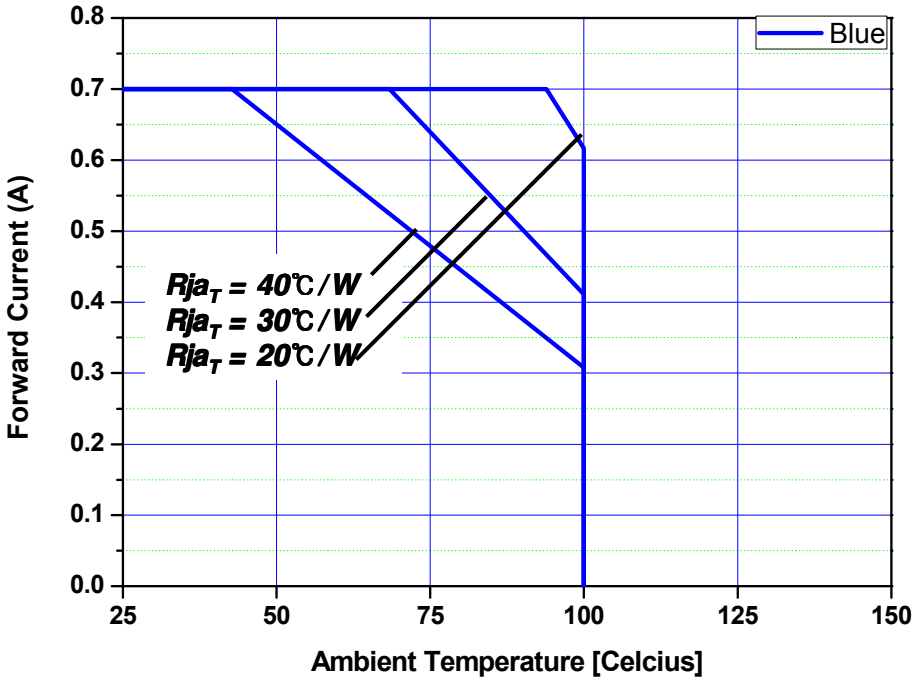
1. Red (T_{jmax} = 125℃, at 700mA)



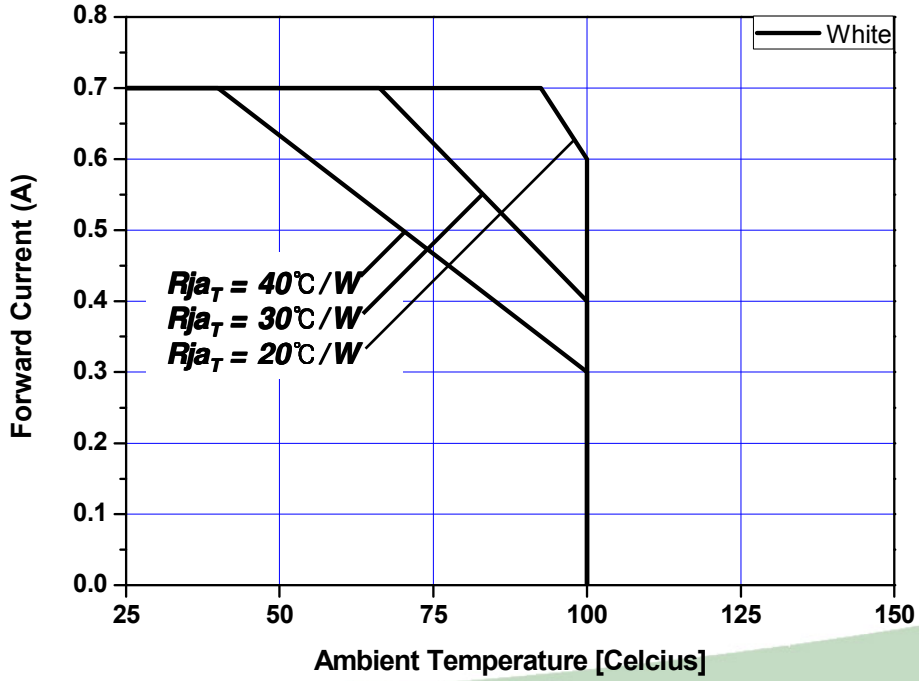
2. Green (T_{jmax} = 145℃, at 700mA)



3. Blue (T_{jmax} = 145℃, at 700mA)

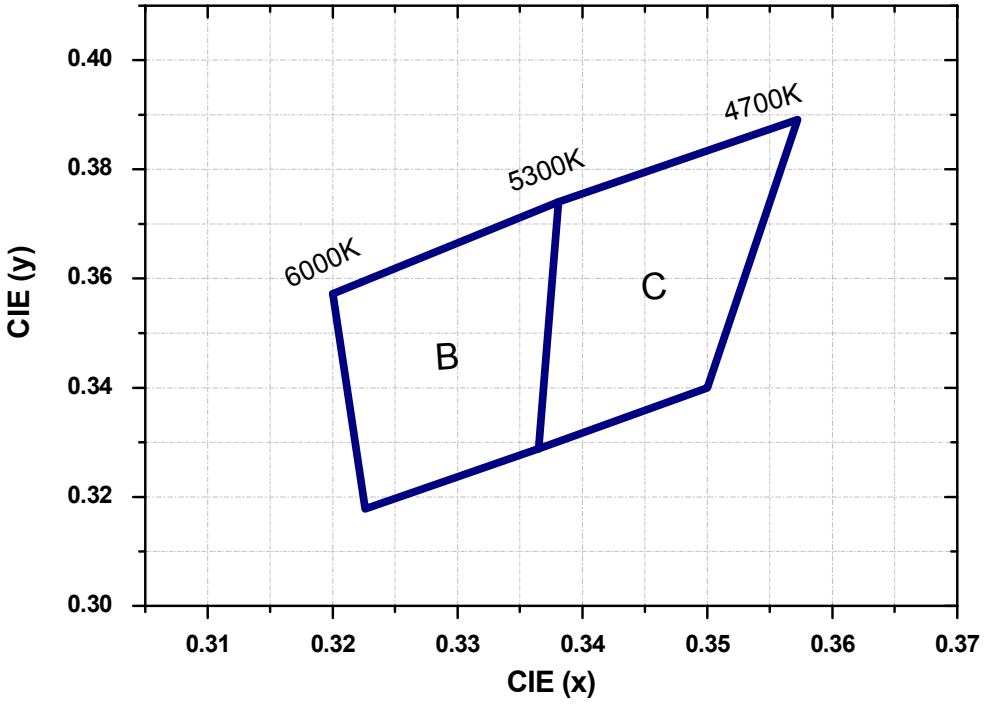


4. White (T_{jmax} = 145℃, at 700mA)



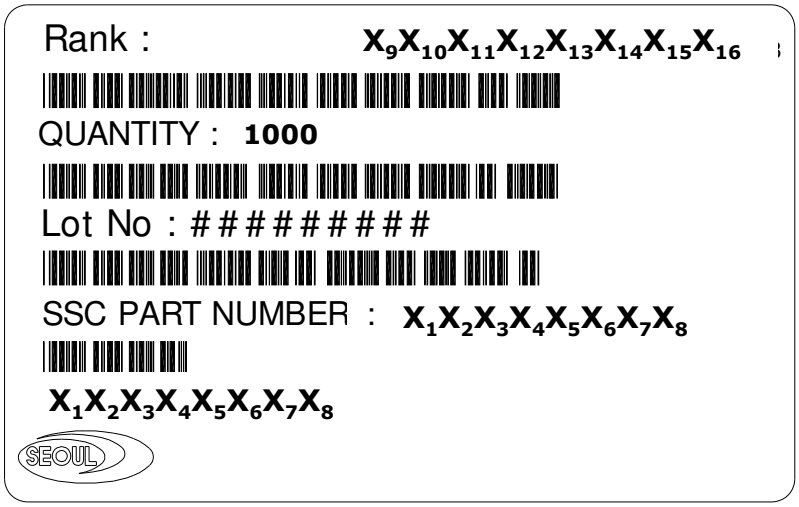
Binning Structure

IF=350mA, Ta=25℃



Bin	CIE x	CIE y
B	0.3376	0.3616
	0.3207	0.3462
	0.3222	0.3243
	0.3366	0.3369
	0.3376	0.3616
C	0.3551	0.3760
	0.3376	0.3616
	0.3366	0.3369
	0.3515	0.3487
	0.3551	0.3760

Label



Full code form :

$X_1X_2X_3X_4X_5X_6X_7X_8$

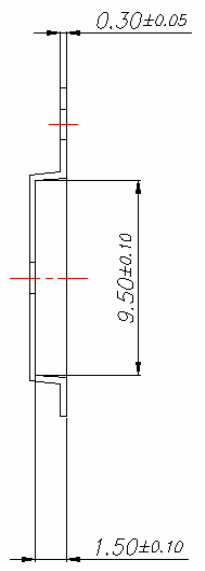
- **X_1 : Company**
- **X_2 : Z-Power LED series number**
- **X_3X_4 : Color**
- **X5 : Series number**
- **X_6 : Lens type**
- **X_7 : PCB type**
- **X_8 : Revision number**

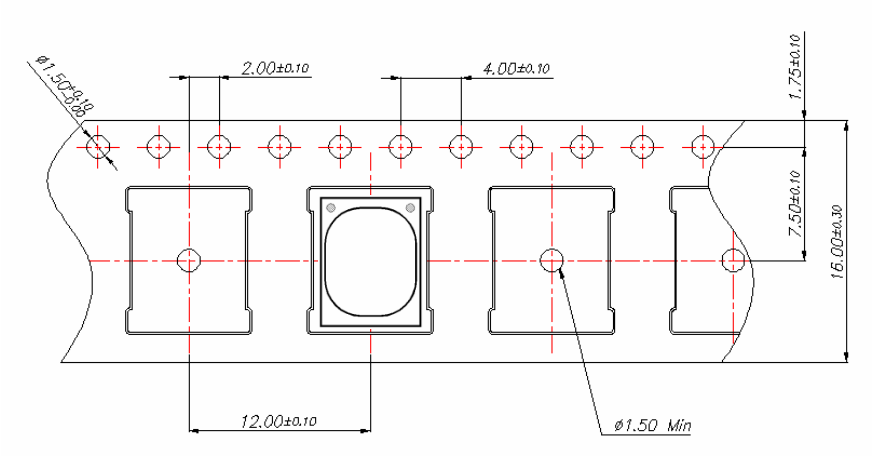
Rank

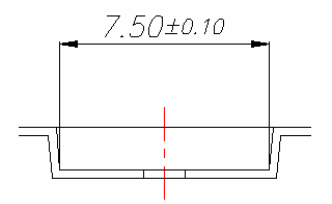
$X_9X_{10}X_{11}X_{12}X_{13}X_{14}X_{15}X_{16}$

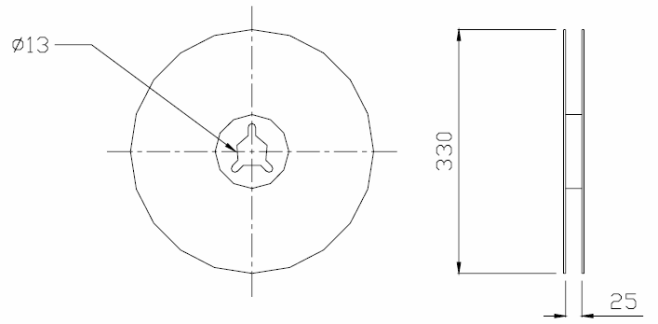
- **X_9 : Luminous Flux (Red)**
- **X_{10} : Luminous Flux (Blue)**
- **X_{11} : Luminous Flux (Green)**
- **X_{12} : Luminous Flux (White)**
- **X_{13} : Dominant Wavelength (Red)**
- **X_{14} : Dominant Wavelength (Blue)**
- **X_{15} : Dominant Wavelength (Green)**
- **X_{16} : Color bin**

Emitter Carrier & Reel Packaging









REEL DIMENSION

Notes :

[1] The number of loaded products in the reel is 500 or 1000 pcs
[2] All dimensions are in millimeters. (tolerance : ± 0.2)
[3] Scale : none

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

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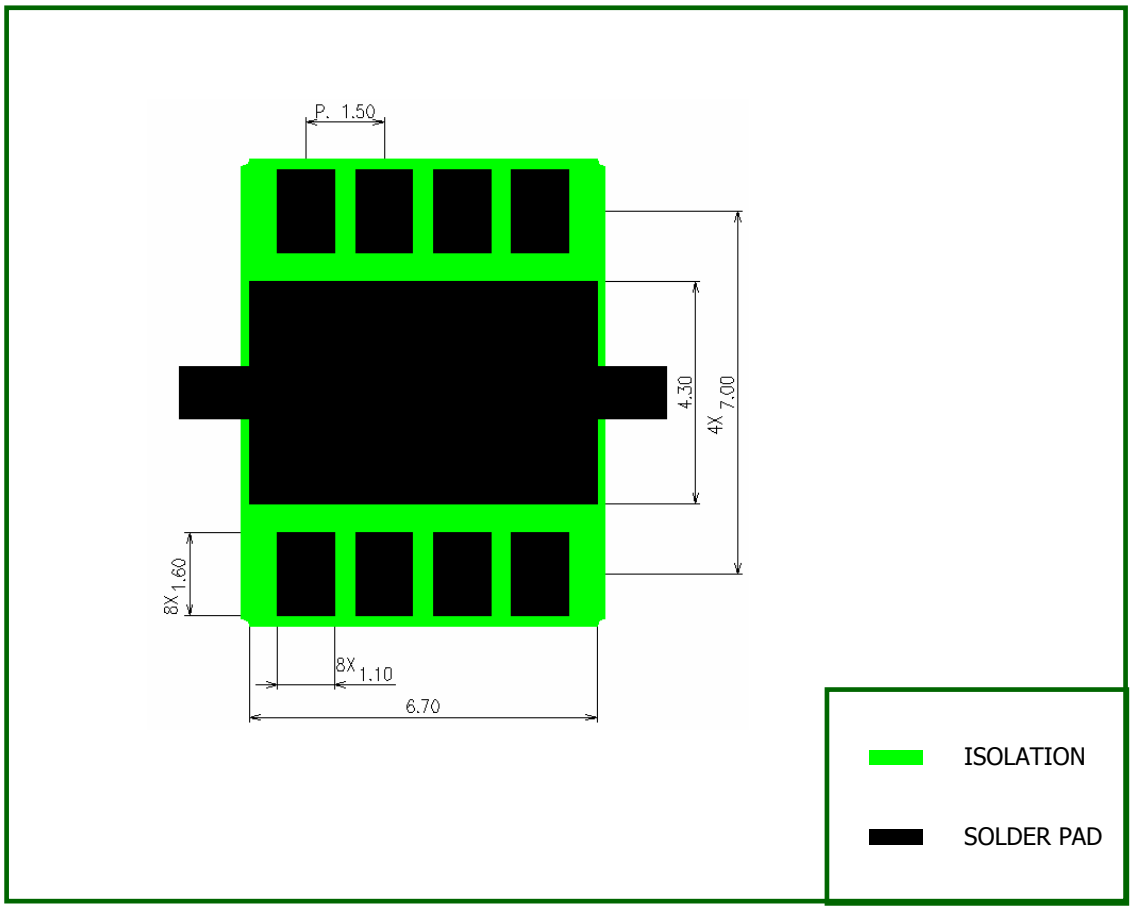
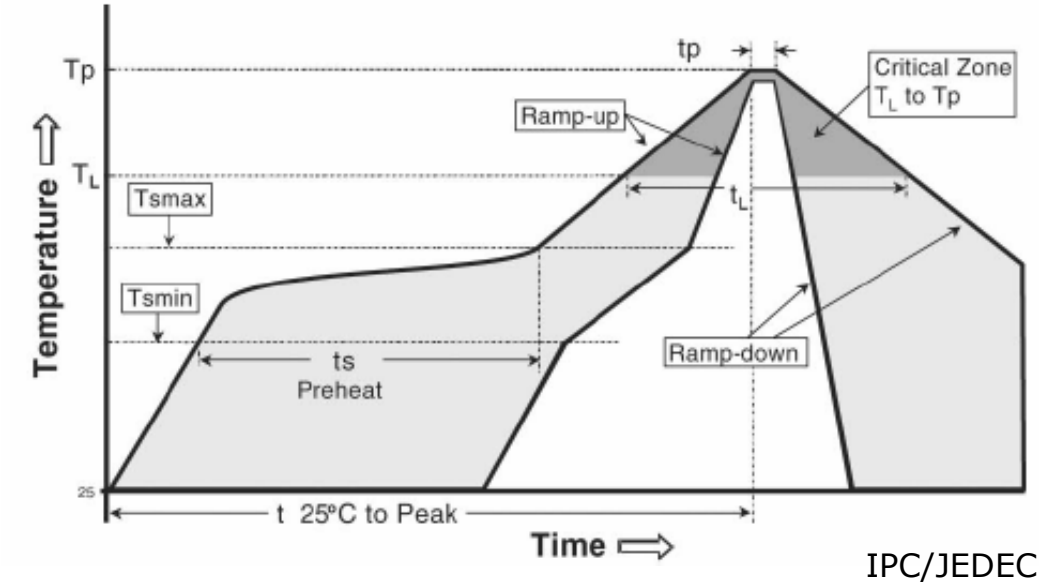
Recommended solder pad



Notes :

[1] All dimensions are in millimeters.
[2] Scale : none
[3] This drawing without tolerances are for reference only

Reflow Soldering Conditions / Profile



IPC/JEDEC J-STD-020C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3° C/second max.	3° C/second max.
Preheat - Temperature Min (Tsmin) - Temperature Max (Tsmax) - Time (Tsmin to Tsmax) (ts)	 100 ℃ 150 ℃ 60-120 seconds	 150 ℃ 200 ℃ 60-180 seconds
Time maintained above: - Temperature (TL) - Time (tL)	 183 ℃ 60-150 seconds	 217 ℃ 60-150 seconds
Peak Temperature (Tp)	215℃	260℃
Time within 5℃ of actual Peak Temperature (tp)2	10-30 seconds	20-40 seconds
Ramp-down Rate	6 ℃/second max.	6 ℃/second max.
Time 25℃ to Peak Temperature	6 minutes max.	8 minutes max.

* Caution
1. Reflow soldering should not be done more than one time.
2. Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must 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.
6. Recommend to use a convection type reflow machine with 7 ~ 8 zones.

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Precaution for use

• Storage

To avoid the moisture penetration, we recommend storing Z Power LEDs in a dry box with a desiccant . The recommended storage temperature range is 5C to 30C and a maximum humidity of 50%.

• Use Precaution after Opening the Packaging

Use proper SMD techniques when the LED is to be soldered dipped as separation of the lens may affect the light output efficiency.

Pay attention to the following:

a. Soldering should be done immediately after opening the package (within 24Hrs).

b. Required conditions after opening the package

- Sealing
- Temperature : 5 ~ 40℃ Humidity : less than 30%

c. If the package has been opened more than 1 week or the color of the desiccant changes, components should be dried for 10-12hr at 60±5℃

• Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.

• Do not rapidly cool device after soldering.

• Components should not be mounted on warped (non coplanar) portion of PCB.

• Radioactive exposure 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 shredded in the process of disposal. It is also dangerous to drink the liquid or inhale the gas generated by such products when chemically disposed of.

• 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.

• When the LEDs are in operation the maximum current should be decided after measuring the package temperature.

• LEDs must be stored properly to maintain the device. 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 appearance and specifications of the product may be modified for improvement without notice.

• Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.

• The slug is isolated from anode electrically.
Therefore, we recommend that you don't isolate the heat sink.

• Attaching LEDs, do not use adhesives that outgas organic vapor.

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Handling of Silicone resin LEDs

The Z-Power LED is encapsulated with a silicone resin for the highest flux efficiency.
Notes for handling:

- Avoid touching silicone resin parts especially with sharp tools such as Pincette (Tweezers)
- Avoid leaving fingerprints on silicone resin parts.
- Silicone resin will attract dust so use covered containers for storage.
- When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that excessive mechanical pressure on the surface of the resin must be prevented.
- It is not recommend to cover the silicone resin of the LEDs with other resin (epoxy, urethane, etc)

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