

# Xpower LED 1W Series

Model No: ZL-X□□□1□-□□□

Spec No: ZZ-GY-S0265



**Xpower** LED series is designed for higher current operation and super high flux output applications. It's easy and free to design applications by package SMD design and its special color management. For high volume applications, custom Xpower designs are available upon request, to meet specific needs.

## Features

1. Highest luminous flux output
2. Long operating lifetime (up to 100,000 hours)
3. More energy efficient than incandescent and most halogen lamps
4. Low forward voltage operated
5. Instant light (Less than 100ns)
6. No UV
7. Superior ESD protection
8. Available in Pure White, Warm White, Green, Blue, Royal Blue, Red and Amber
9. SMT design

## Typical Applications

1. Portable flashlight
  2. Automotive lights
  3. Reading lights
  4. LCD TV / Monitor backlight
  5. Indoor and Outdoor Commercial lighting
  6. Decorative/Entertainment lighting
  7. General lighting
- ...

*Xpower* LED

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## Part Number of Xpower LED Series

Code form : ZL-X<sub>1</sub>X<sub>2</sub>X<sub>3</sub>X<sub>4</sub>X<sub>5</sub>X<sub>6</sub>-X<sub>7</sub>

-X1 : Power LED type

- Xi, Xpower SMT high power LED series
- Gi, Gpower PCB high power LED series
- Ti, Topview high power LED series
- Hi, Hpower MVPCB & no lens high power LED series

-X2 : Xpower series heatsink type

- E, Xpower emitter series (no heatsink)
- H, Hexagon Star heatsink type series
- Q, Quadrangle Star heatsink type series
- R, Round heatsink type series

-X3 : Lens Type

- B, Batwing type ( $120^\circ$  Angle  $2\theta_{1/2}$ )
- L, Lambertian type ( $140^\circ$  Angle  $2\theta_{1/2}$ )
- S, Side emitting type ( $80^\circ$  Angle  $\theta_{peak}$ )
- N, No lens type ( $120^\circ$  Angle  $2\theta_{1/2}$ )

-X4 : Chip quantity

- 01, one chips
- 02, two chips
- ...
- 06, six chips
- ...

-X5 : Power

- H, 0.5W power LED, half of 1W power
- 1, 1W power LED
- 3, 3W power LED

-X6 : Color

- W, Pure white color (CCT 4500-10000K)
- L, Warm white color (CCT 3000-4500K)
- R, Red color (620-630nm)
- A, Amber color (585-595nm)
- B, Blue color (455-475nm)
- G, Green color (520-535nm)
- T, Full color

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-X7 : Chip size

...

24, 24mil

30, 30mil

40, 40mil

...

FC, flip chip

-X8: Package Type

T, Taping package type

B, Box package type

-X9: Current

A, 350mA

B, 700m

**Part Number group for Xpower 1W Series**

<b>Emitter</b>	<b>Lens Type</b>	<b>Pure White</b>	<b>Warm White</b>	<b>Red</b>	<b>Green</b>
	Lambertian	ZL-XEL011W-*BA	ZL-XEL011L-*BA	ZL-XEL011R-*BA	ZL-XEL011G-*BA
	Batwing	ZL-XEB011W-*BA	ZL-XEB011L-*BA	ZL-XEB011R-*BA	ZL-XEB011G-*BA
	<b>Lens Type</b>	<b>Blue</b>	<b>Amber</b>		
	Lambertian	ZL-XEL011B-*BA	ZL-XEL011A-*BA		
	Batwing	ZL-XEB011B-*BA	ZL-XEB011A-*BA		
<b>Star (Hexagon)</b>	<b>Lens Type</b>	<b>Pure White</b>	<b>Warm White</b>	<b>Red</b>	<b>Green</b>
	Lambertian	ZL-XHL011W-*BA	ZL-XHL011L-*BA	ZL-XHL011R-*BA	ZL-XHL011G-*BA
	Batwing	ZL-XHB011W-*BA	ZL-XHB011L-*BA	ZL-XHB011R-*BA	ZL-XHB011G-*BA
	<b>Lens Type</b>	<b>Blue</b>	<b>Amber</b>		
	Lambertian	ZL-XHL011B-*BA	ZL-XHL011A-*BA		
	Batwing	ZL-XHB011B-*BA	ZL-XHB011A-*BA		

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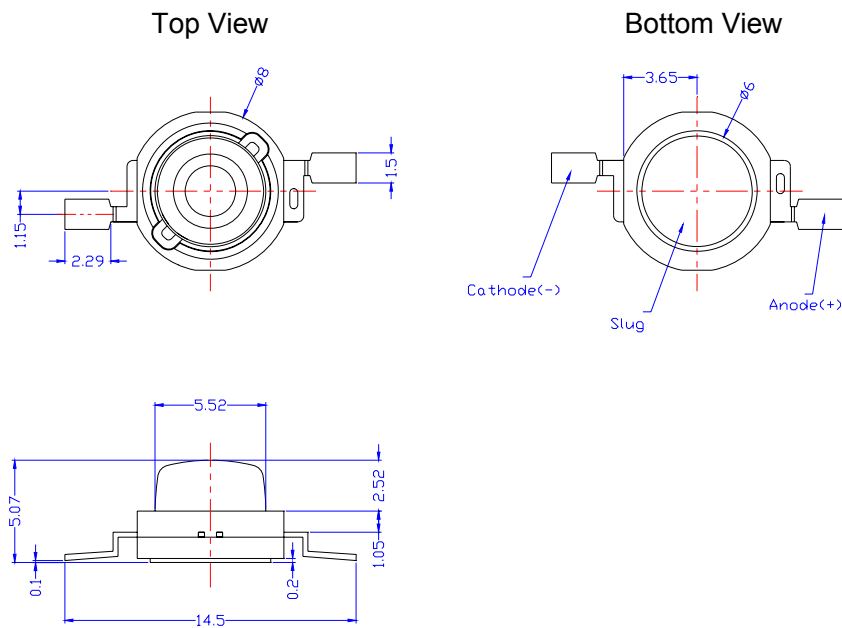
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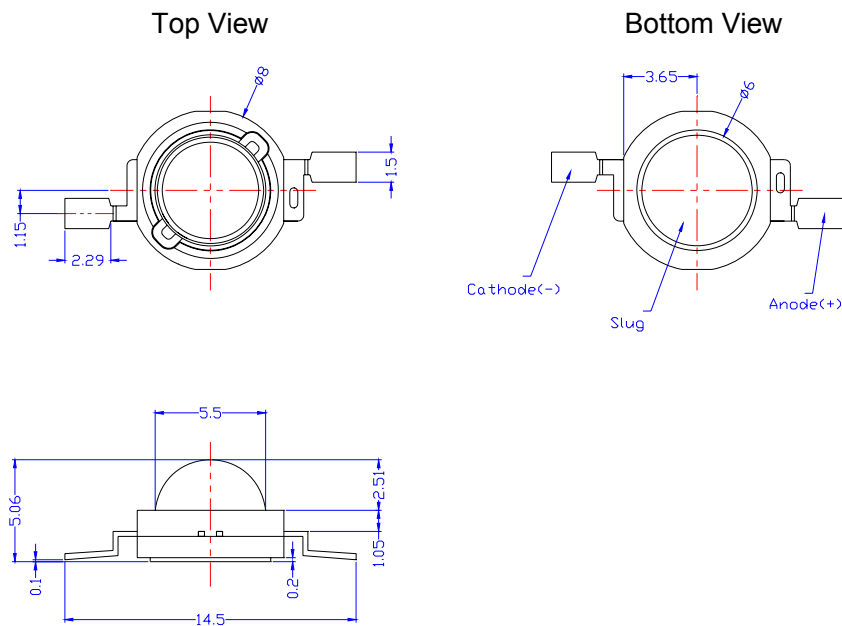
**Fax No:**

## Mechanical Dimensions for Xpower Emitter series

### Batwing



### Lambertian



#### Notes:

1. All dimensions are in millimeters.
2. All dimensions without tolerances are for reference only.
3. The package material of the body is heat-resistance polymer, and the plating material of the lead frame is Ag.

**Xpower LED**

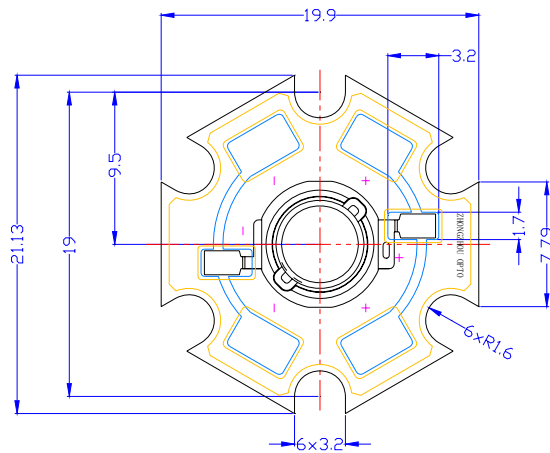
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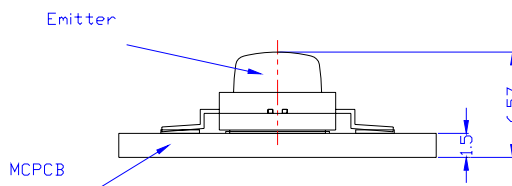
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## Mechanical Dimensions for Xpower Crux series

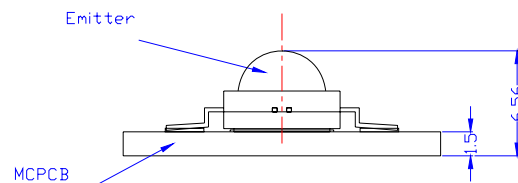
### Xpower Star



### Batwing



### Lambertian



#### Notes:

1. All dimensions are in millimeters. All dimensions without tolerances are for reference only.
2. No scale.
3. Electrical interconnection pads labeled on the MCPCB with "+" and "-" to denote positive and negative, respectively.
4. Recommended heat sink provider:  
ERM/www.heatsink.com; ALPHA/www.alphanovatech.com; AAVID/www.aavid.com

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## Characteristics for Xpower 1W series

### Pure White

#### 1. Typical Electrical & Optical Characteristics at $I_F=350\text{mA}$ , $T_A = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Luminous Flux	$\Phi_V$	50	60	-	lm
Correlated Color Temperature	CCT	-	6000	-	K
CRI	Ra	-	80	-	-
Forward Voltage	$V_F$	-	3.3	-	V
View Angle	$2\Theta$ 1/2	Lambertian		140	deg.
		Batwing		120	
Thermal resistance	$R_{J-B}$	18			$^\circ\text{C}/\text{W}$

#### 2. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	400	mA
Power Dissipation	$P_D$	1.6	W
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30~80	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~85	$^\circ\text{C}$
ESD Sensitivity	-	1000	V HBM

#### Notes:

- The measured value is tested by an integrator system.
- Tolerance of measurement of luminous flux  $\pm 15\%$
- Tolerance of measurement of CCT  $\pm 5\%$
- Tolerance of measurement of forward voltage  $\pm 0.05\text{V}$
- R is measured with an Xpower Star PCB.
- Do not drive at rated current more than 5 sec. without heatsink for Xpower emitter series.

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## Characteristics for Xpower 1W series

### Warm White

#### 1. Typical Electrical & Optical Characteristics at $I_F=350\text{mA}$ , $T_A = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Luminous Flux	$\Phi_V$	40	50	-	lm
Correlated Color Temperature	CCT	-	3500	-	K
CRI	Ra	-	80	-	-
Forward Voltage	$V_F$	-	3.3	-	V
View Angle	$2\Theta$ 1/2	Lambertian		140	deg.
		Batwing		120	
Thermal resistance	$R_{J-B}$	18			$^\circ\text{C}/\text{W}$

#### 2. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	400	mA
Power Dissipation	$P_D$	1.6	W
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30~80	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~85	$^\circ\text{C}$
ESD Sensitivity	-	1000	V HBM

#### Notes:

- The measured value is tested by an integrator system.
- Tolerance of measurement of luminous flux  $\pm 15\%$
- Tolerance of measurement of CCT  $\pm 5\%$
- Tolerance of measurement of forward voltage  $\pm 0.05\text{V}$
- R is measured with an Xpower Star PCB.
- Do not drive at rated current more than 5 sec. without heatsink for Xpower emitter series.

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## Characteristics for Xpower 1W series

### Blue

#### 1. Typical Electrical & Optical Characteristics at $I_F=350\text{mA}$ , $T_A = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Luminous Flux	$\Phi_V$	10	11	-	lm
Dominant Wavelength	$\lambda_D$	-	465	-	nm
Forward Voltage	$V_F$	-	3.3	-	V
View Angle	$2\Theta$ 1/2	Lambertian		140	deg.
		Batwing		120	
Thermal resistance	$R_{J-B}$	18			$^\circ\text{C}/\text{W}$

#### 2. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	400	mA
Power Dissipation	$P_D$	1.6	W
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30~80	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~85	$^\circ\text{C}$
ESD Sensitivity	-	1000	V HBM

#### Notes:

- The measured value is tested by an integrator system.
- Tolerance of measurement of luminous flux  $\pm 15\%$
- Tolerance of measurement of dominant wavelength  $\pm 1\text{nm}$
- Tolerance of measurement of forward voltage  $\pm 0.05\text{V}$
- R is measured with an Xpower Star PCB.
- Do not drive at rated current more than 5 sec. without heatsink for Xpower emitter series.

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## Characteristics for Xpower 1W series

### Green

#### 1. Typical Electrical & Optical Characteristics at $I_F=350\text{mA}$ , $T_A = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Luminous Flux	$\Phi_V$	-	60	-	lm
Dominant Wavelength	$\lambda_D$	515	525	535	nm
Forward Voltage	$V_F$	-	3.3	-	V
View Angle	$2\Theta$ 1/2	Lambertian		140	deg.
		Batwing		120	
Thermal resistance	$R_{J-B}$	18			$^\circ\text{C}/\text{W}$

#### 2. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	400	mA
Power Dissipation	$P_D$	1.6	W
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30~80	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~85	$^\circ\text{C}$
ESD Sensitivity	-	1000	V HBM

#### Notes:

1. The measured value is tested by an integrator system.
2. Tolerance of measurement of luminous flux  $\pm 15\%$
3. Tolerance of measurement of dominant wavelength  $\pm 1\text{nm}$
4. Tolerance of measurement of forward voltage  $\pm 0.05\text{V}$
5. R is measured with an Xpower Star PCB.
6. Do not drive at rated current more than 5 sec. without heatsink for Xpower emitter series.

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## Characteristics for Xpower 1W series

### Red

#### 1. Typical Electrical & Optical Characteristics at $I_F=350\text{mA}$ , $T_A = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Luminous Flux	$\Phi_V$	35	40	-	lm
Dominant Wavelength	$\lambda_D$	620	625	632	nm
Forward Voltage	$V_F$	2.0	2.5	3.0	V
View Angle	$2\Theta$ 1/2	Lambertian		140	deg.
		Batwing		120	
Thermal resistance	$R_{J-B}$	18			$^\circ\text{C}/\text{W}$

#### 2. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	400	mA
Power Dissipation	$P_D$	1.2	W
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30~80	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~85	$^\circ\text{C}$
ESD Sensitivity	-	1000	V HBM

#### Notes:

- The measured value is tested by an integrator system.
- Tolerance of measurement of luminous flux  $\pm 15\%$
- Tolerance of measurement of dominant wavelength  $\pm 1\text{nm}$
- Tolerance of measurement of forward voltage  $\pm 0.05\text{V}$
- R is measured with an Xpower Star PCB.
- Do not drive at rated current more than 5 sec. without heatsink for Xpower emitter series.

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## Characteristics for Xpower 1W series

### Amber

#### 1. Typical Electrical & Optical Characteristics at $I_F=350\text{mA}$ , $T_A = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Luminous Flux	$\Phi_V$	30	40	-	lm
Dominant Wavelength	$\lambda_D$	585	590	595	nm
Forward Voltage	$V_F$	2.0	2.5	3.0	V
View Angle	$2\Theta$ 1/2	Lambertian		140	deg.
		Batwing		120	
Thermal resistance	$R_{J-B}$	18			$^\circ\text{C}/\text{W}$

#### 2. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	$I_F$	400	mA
Power Dissipation	$P_D$	1.2	W
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{opr}$	-30~80	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40~85	$^\circ\text{C}$
ESD Sensitivity	-	1000	V HBM

#### Notes:

- The measured value is tested by an integrator system.
- Tolerance of measurement of luminous flux  $\pm 15\%$
- Tolerance of measurement of dominant wavelength  $\pm 1\text{nm}$
- Tolerance of measurement of forward voltage  $\pm 0.05\text{V}$
- R is measured with an Xpower Star PCB.
- Do not drive at rated current more than 5 sec. without heatsink for Xpower emitter series.

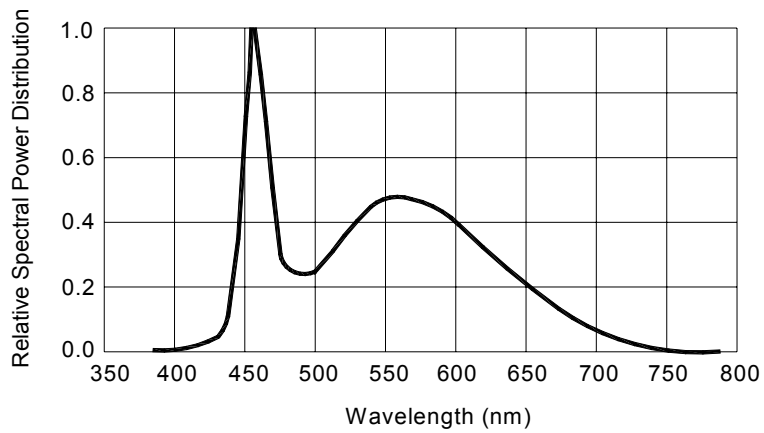
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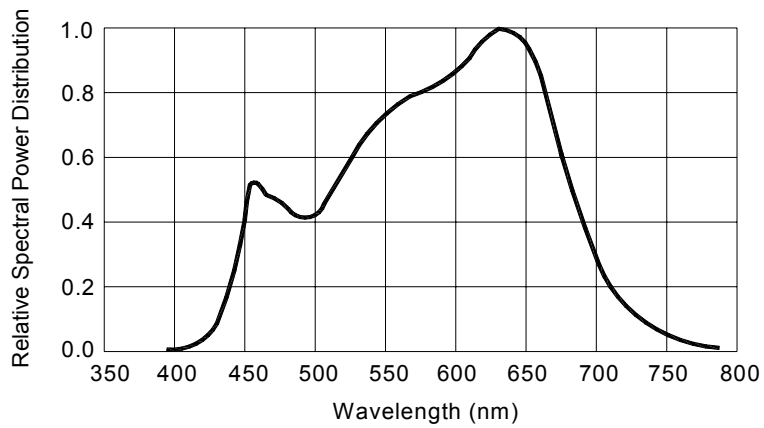
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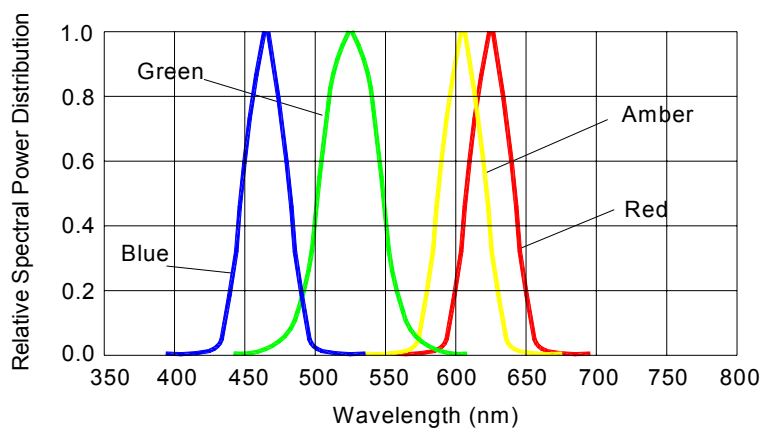
## Wavelength Characteristics, $T_A=25^{\circ}\text{C}$



**Pure White Color Spectrum of Typical 6000K Part**

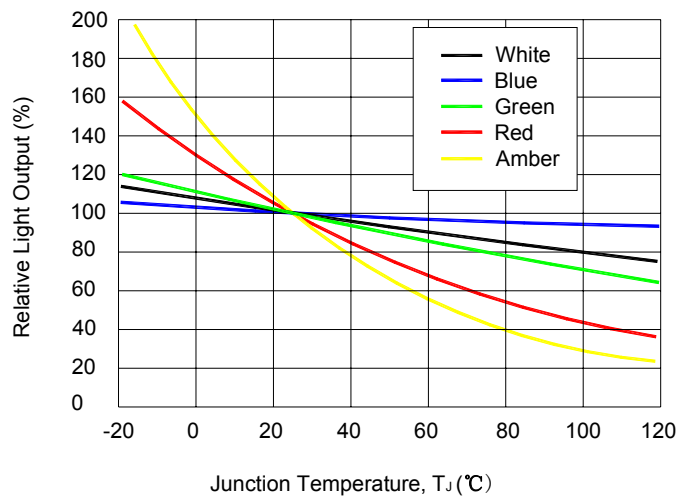


**Warm White Color Spectrum of Typical 3500K Part**

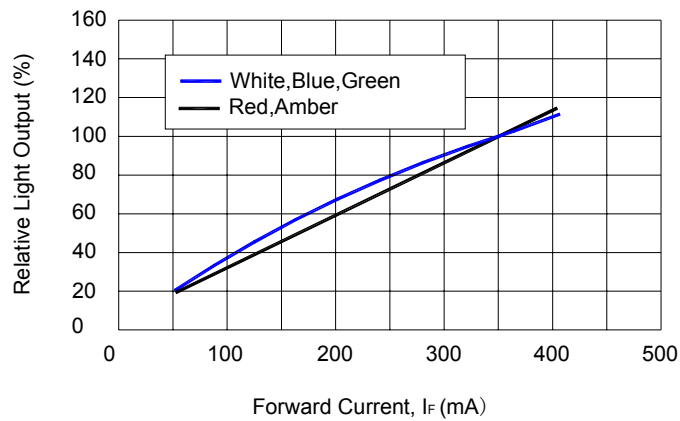


**Color Spectrum of Blue, Green, Red, Amber Part**

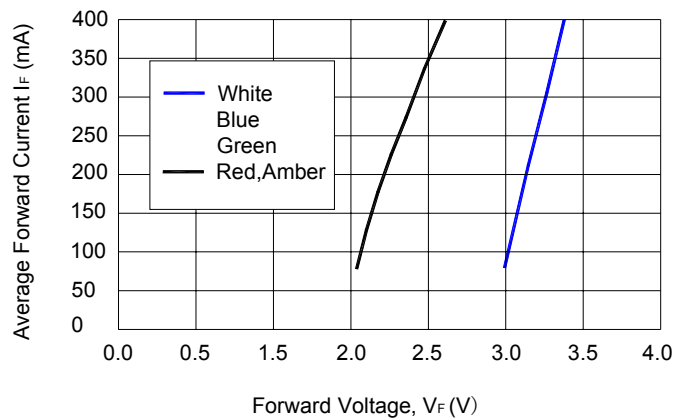
## Light Output, Forward Current Characteristics, $T_A=25^\circ\text{C}$



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



**Forward Current vs. Relative Light Output,  $T_A=25^\circ\text{C}$**



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

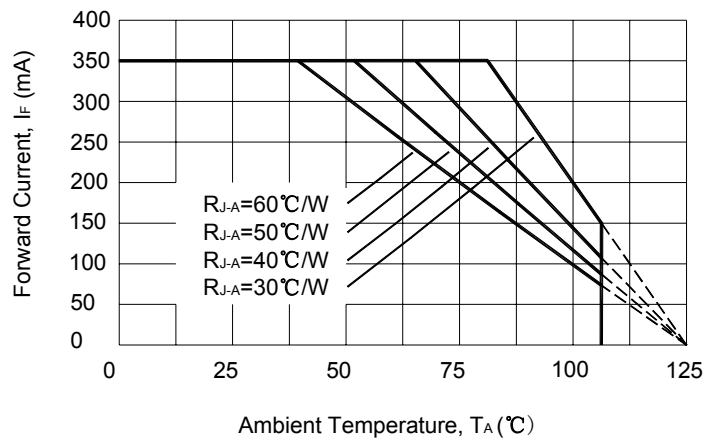
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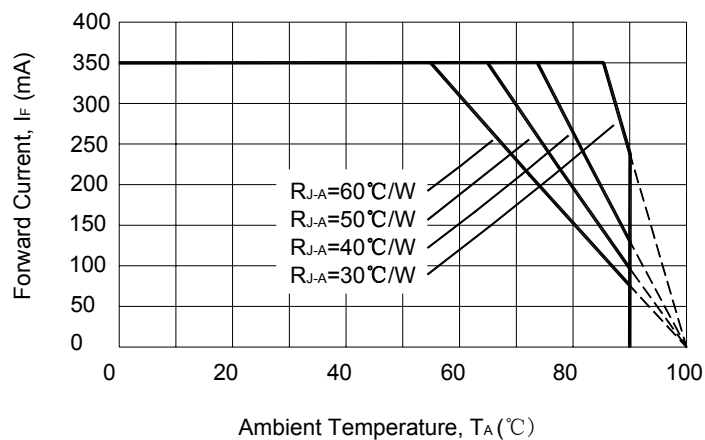
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## Ambient Temperature vs. Allowed Forward Current



**Ambient Temperature vs. Forward Current Derating based on  $T_{JMAX}=125^{\circ}\text{C}$  for Pure White, Warm White, Blue, Green.**



**Ambient Temperature vs. Forward Current Derating based on  $T_{JMAX}=100^{\circ}\text{C}$  for Red, Amber.**

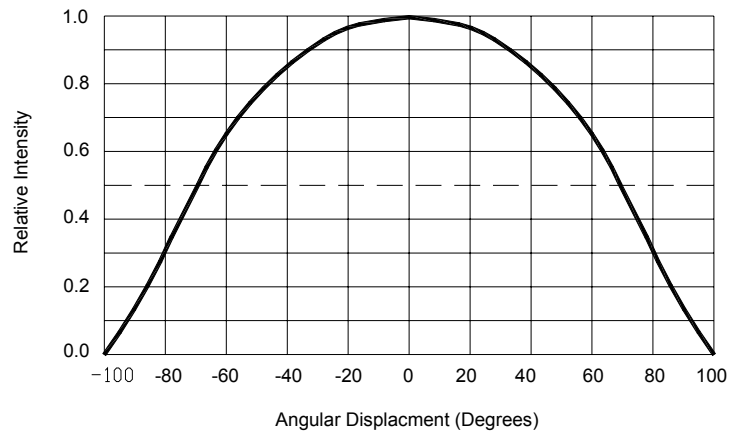
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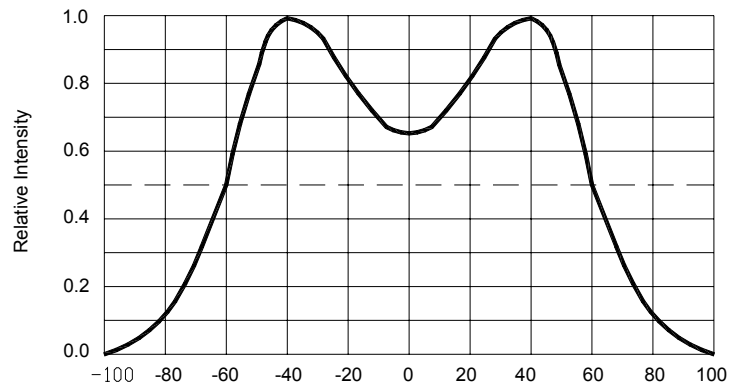
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## Typical Lens Type Radiation Pattern



Typical Radiation Pattern for Xpower Lambertian



**NOTE:**

- 1) The LED shall be used under allowed conditions. Z-light cannot take any responsibility for any troubles that are caused by using the LEDs at conditions exceeding our specifications.
- 2) The LED must be used as soon as tore open, otherwise the plank will be oxygenated.
- 3) The Blue 、 Green 、 White products shall be care of the static electricity.
- 4) 2mm from body for 6 seconds below 260°C .

Please avoid the soldered LEDs from clashing or librating before the lens' temperature cool down.

- 5) The circuit shall be designed according to certain current or relative operating voltage.
- 6) These LEDs are designed and manufactured for standard applications such as electric home appliances, communication equipment, office equipment, electronic instrumentation and so on.  
It is recommended to consult with Z-light. In advance if user's application requires any particular quality or reliability that concerns human life. Examples would be medical equipment, aerospace applications, traffic signals, safety system equipment and so on.
- 7) We reserve the right to make technical changes without prior notice.
- 8) All the content interpretation reserved to Z-Light.

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