



# ProLight Opto Technology Corporation

ProLight STAR/O and STAR/E with PG1C-1LxE

Technical Datasheet

Version: 1.0



STAR/O series



STAR/E series

## Features

- High Flux per LED
- Various colors
- Good color uniformity
- More energy efficient than incandescent and most halogen lamps
- Low Voltage DC operated
- Instant light (less than 100ns)
- No UV
- Superior ESD protection

## Typical Applications

- Reading lights (car, bus, aircraft)
- Portable (flashlight, bicycle)
- Uplighters/Downlighters
- Decorative/Entertainment
- Bollards/Security/Garden
- Cove/Undershef/Task
- Indoor/Outdoor Commercial and Residential Architectural
- Automotive Ext (Stop-Tail-Turn, CHMSL, Mirror Side Repeat)

ProLight

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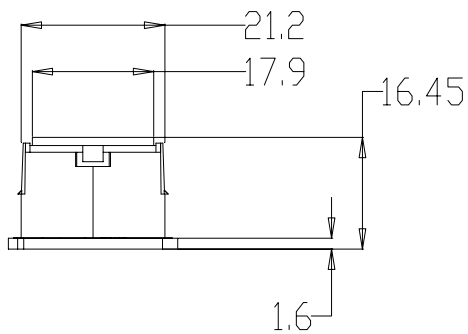
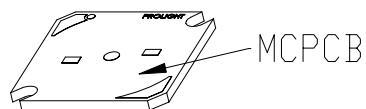
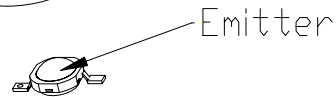
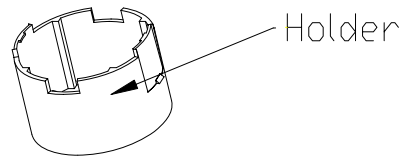
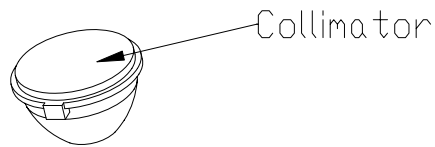
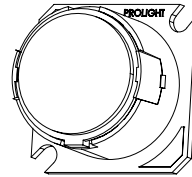
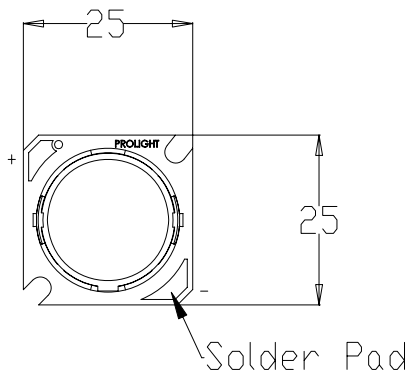
## Part Number List

Part Number	Description	LED module	MCPCB	Collimator P/N	Holder P/N
PG1C-1LxC	PG1C-1LxE Star/O 15°		Square Type	PG1N-NX15	PG1N-SO02
PG1C-1LxG	PG1C-1LxE Star/O 25°		Square Type	PG1N-NX23	PG1N-SO02
PG1C-1LxH	PG1C-1LxE Star/O 35°		Square Type	PG1C-NX36	PG1N-SO01
PG1C-1LxD	PG1C-1LxE Star/O 45°	PG1C-1LxE	Square Type	PG1N-NX43	PG1N-SO02
PG1C-1LxT	PG1C-1LxE Star/E 15°		Star Type	PG1N-NX15	PG1N-SE02
PG1C-1LxV	PG1C-1LxE Star/E 25°		Star Type	PG1N-NX23	PG1N-SE02
PG1C-1LxW	PG1C-1LxE Star/E 35°		Star Type	PG1C-NX36	PG1N-SE01
PG1C-1LxU	PG1C-1LxE Star/E 45°		Star Type	PG1N-NX43	PG1N-SE02

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# Mechanical Dimensions

Part Number : PG1C-1LxC



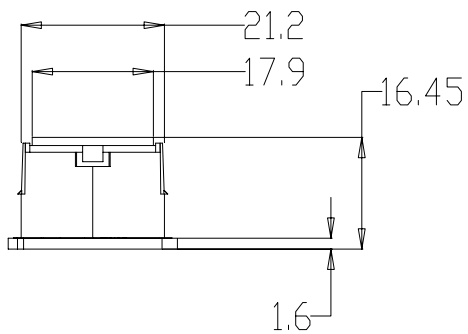
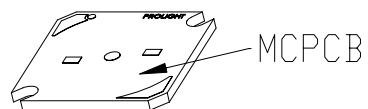
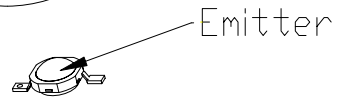
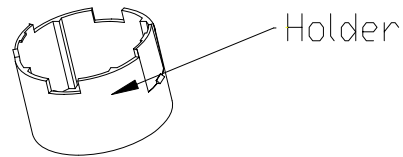
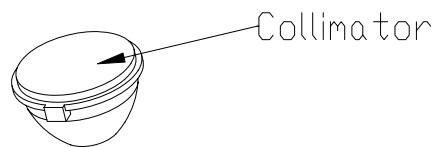
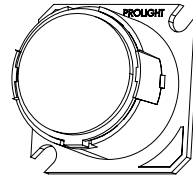
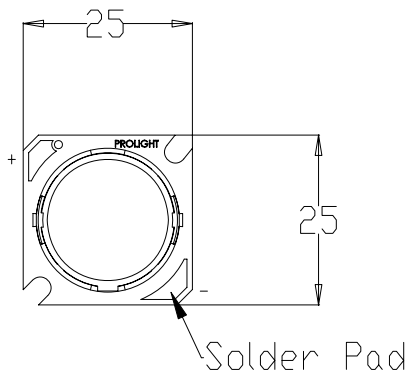
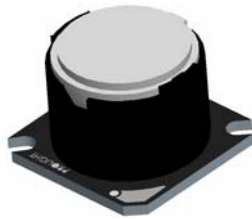
## Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.

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

# Mechanical Dimensions

Part Number : PG1C-1LxG



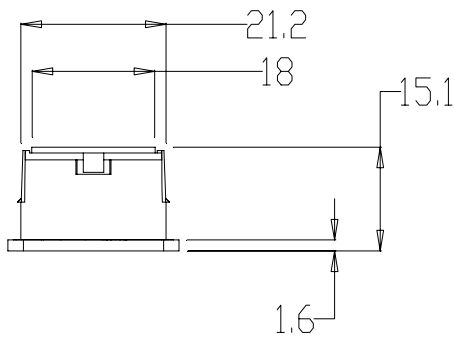
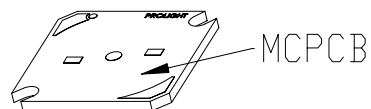
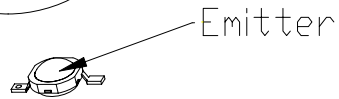
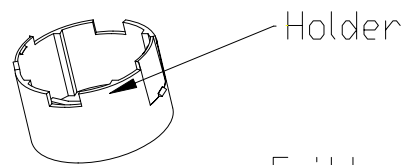
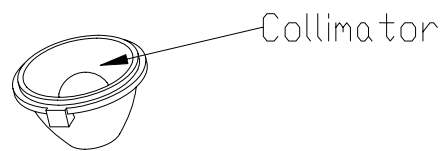
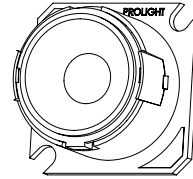
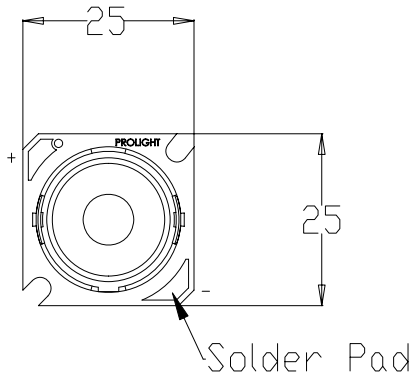
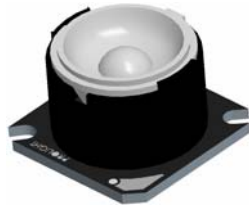
**Notes:**

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.

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# Mechanical Dimensions

Part Number : PG1C-1LxH



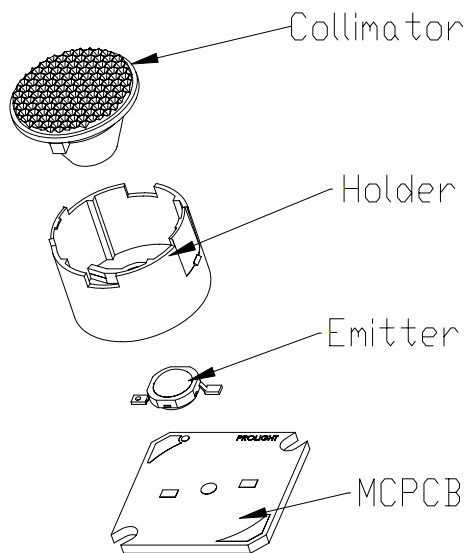
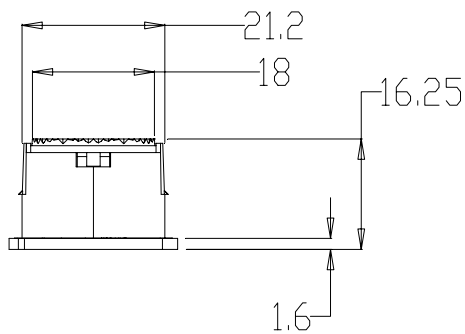
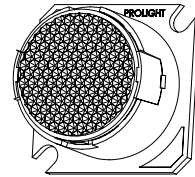
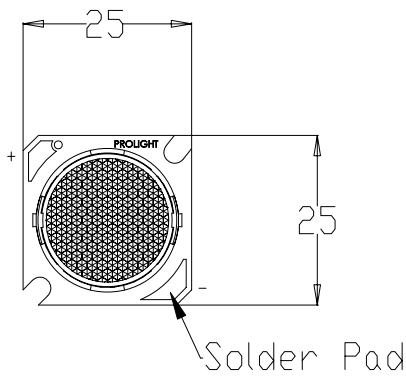
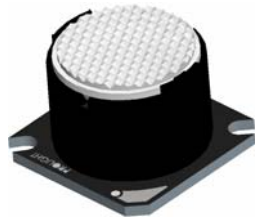
## Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
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# Mechanical Dimensions

Part Number : PG1C-1LxD



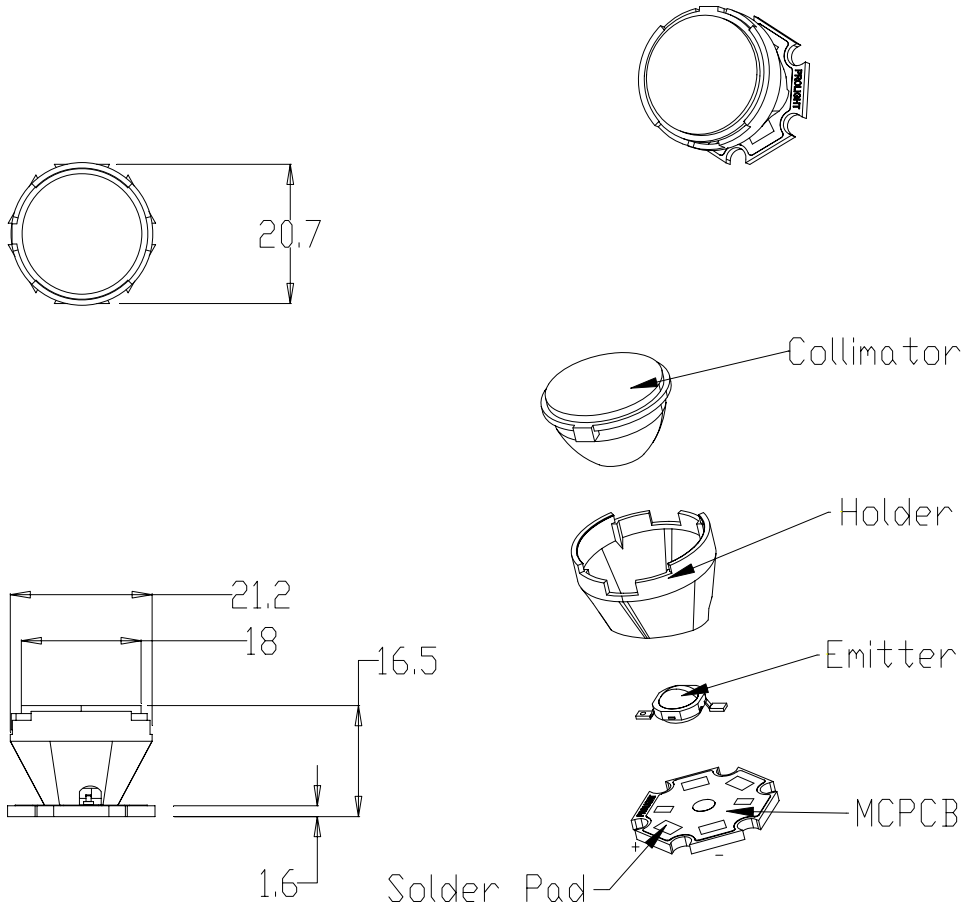
## Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.

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# Mechanical Dimensions

Part Number : PG1C-1LxT



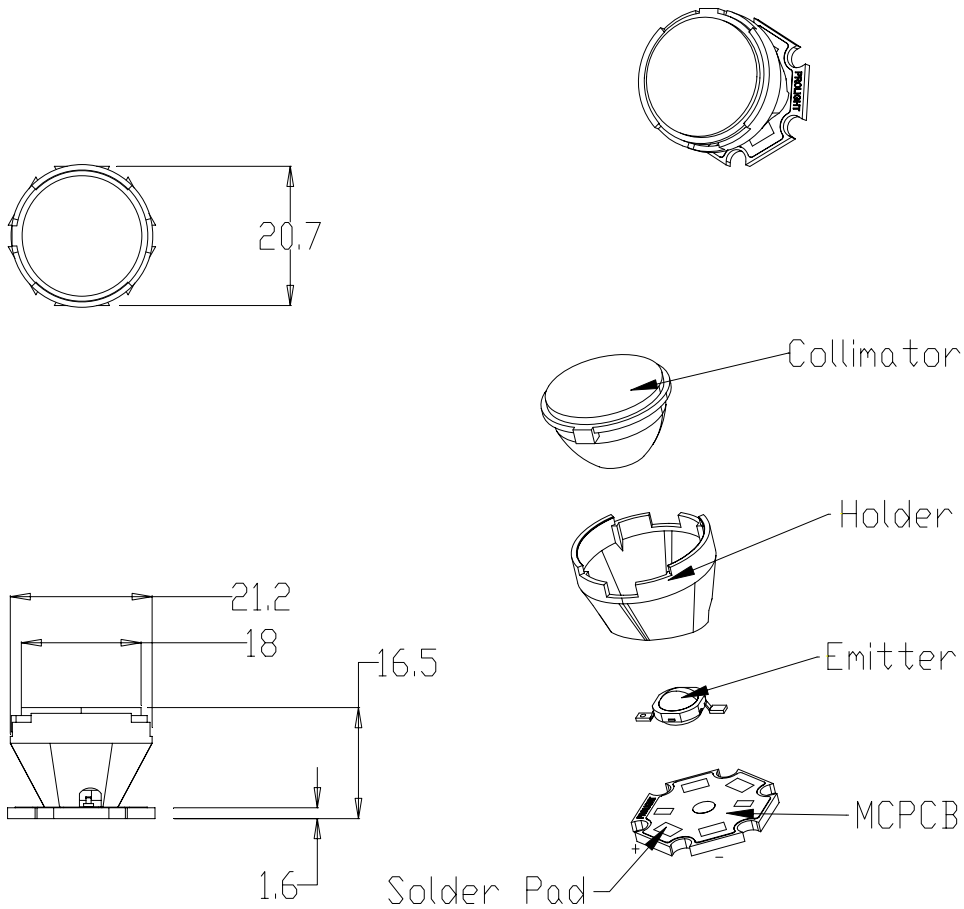
### Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.

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## Mechanical Dimensions

Part Number : PG1C-1LxV



### Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.

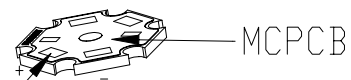
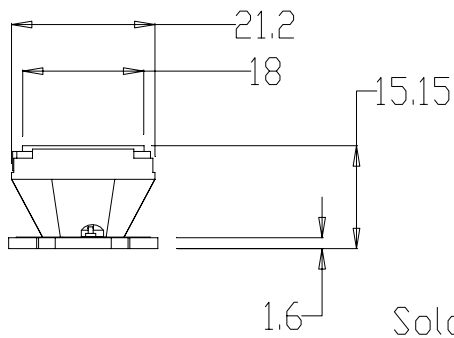
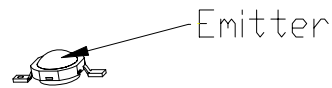
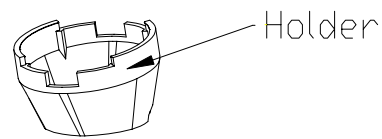
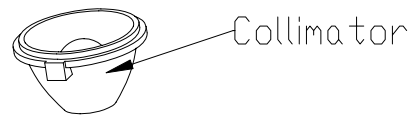
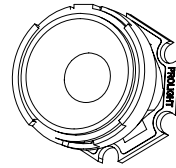
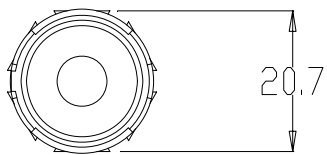
\*The appearance and specifications of the product may be modified for improvement without notice.

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# Mechanical Dimensions

Part Number : PG1C-1LxW



Solder Pad

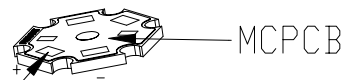
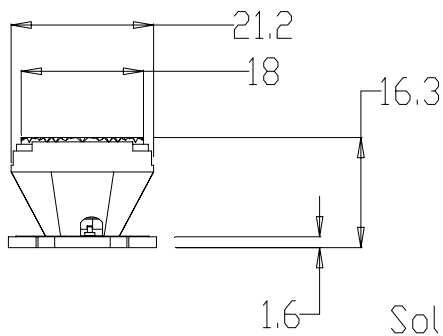
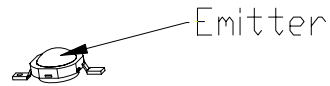
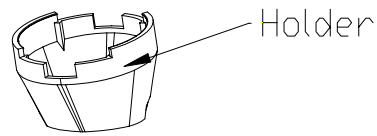
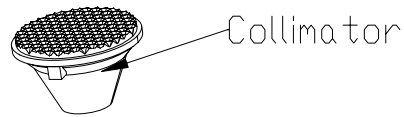
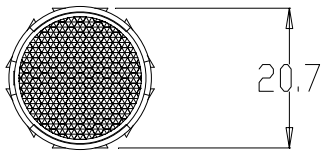
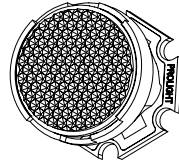
## Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.

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

# Mechanical Dimensions

Part Number : PG1C-1LxU



Solder Pad

### Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.

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

## Flux Characteristics of LED at 350mA, T<sub>J</sub> = 25°C

Radiation Pattern	Color	Part Number Module	Lumious Flux $\Phi_V$ (lm)	
			Minimum	Typical
Lambertian	White	PG1C-1LWx	51.7	76
	Warm White	PG1C-1LVx	51.7	72
	Green	PG1C-1LGx	58.9	66
	Blue	PG1C-1LBx	10.7	14
	Amber	PG1C-1LAx	30.6	42
	Red	PG1C-1LRx	30.6	40

- ProLight maintains a tolerance of  $\pm 10\%$  on flux and power measurements.
- Please do not drive at rated current more than 3 second without proper heat sink.

## Electrical Characteristics of Module at 350mA, T<sub>J</sub> = 25°C

Color	Forward Voltage V <sub>F</sub> (V)			Dynamic Resistance ( $\Omega$ )	Temperature Coefficient of V <sub>F</sub> (mV/ °C) $\Delta V_F / \Delta T_J$	Thermal Resistance Junction to Board (°C/ W)
	Min.	Typ.	Max.			
White	2.8	3.5	4.3	1.0	-2.0	15
Warm White	2.8	3.5	4.3	1.0	-2.0	15
Green	2.8	3.5	4.3	1.0	-2.0	15
Blue	2.8	3.5	4.3	1.0	-2.0	15
Amber	1.9	2.2	3.1	2.4	-2.0	15
Red	1.9	2.2	3.1	2.4	-2.0	15

## Optical Characteristics of Module at 350mA, T<sub>J</sub> = 25°C

Color	Dominant Wavelength $\lambda_D$ , or Color Temperature CCT			Spectral Half-width (nm) $\Delta\lambda_{1/2}$	Temperature Coefficient of Dominant Wavelength (nm/ °C) $\Delta\lambda_D / \Delta T_J$	PG1C-1LxC/ PG1C-1LxG/ PG1C-1LxH/ PG1C-1LxD/ PG1C-1LxT PG1C-1LxV PG1C-1LxW PG1C-1LxU											
	Min.	Typ.	Max.			VA	BA	X	VA	BA	X	VA	BA	X	VA	BA	X
White	4100 K	5500 K	10000 K	---	---	15	10	38	20	25	17	30	20	15	40	25	6
Warm White	2700 K	3300 K	4100 K	---	---	15	10	38	20	25	17	30	20	15	40	25	6
Green	515 nm	525 nm	535 nm	35	0.04	15	10	55	20	25	22	30	20	17	40	25	6
Blue	455 nm	465 nm	475 nm	25	0.04	15	10	55	20	25	22	30	20	17	40	25	6
Amber	587 nm	592 nm	597 nm	20	0.05	15	10	55	20	25	22	30	20	17	40	25	6
Red	613.5 nm	623 nm	631 nm	20	0.05	15	10	55	20	25	22	30	20	17	40	25	6

- ProLight maintains a tolerance of  $\pm 1$ nm for dominant wavelength measurements.
- ProLight maintains a tolerance of  $\pm 5\%$  for CCT measurements.
- V.A. is the value of 30% of the peak value of intensity and B.A. is the value of 50% of the peak value of intensity.
- X is the value of the measurement of the LED lux with lens divided by LED without lens at 1 meter distance.

## Absolute Maximum Ratings

Parameter	White/Warm White/ Green/Blue/Amber/Red
DC Forward Current (mA)	350
Peak Pulsed Forward Current (mA)	500
Average Forward Current (mA)	350
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	±4000V (Class III)
LED Junction Temperature (°C)	120
Aluminum-core PCB Temperature (°C)	75
Storage & Operating Temperature (°C)	-40 to +75

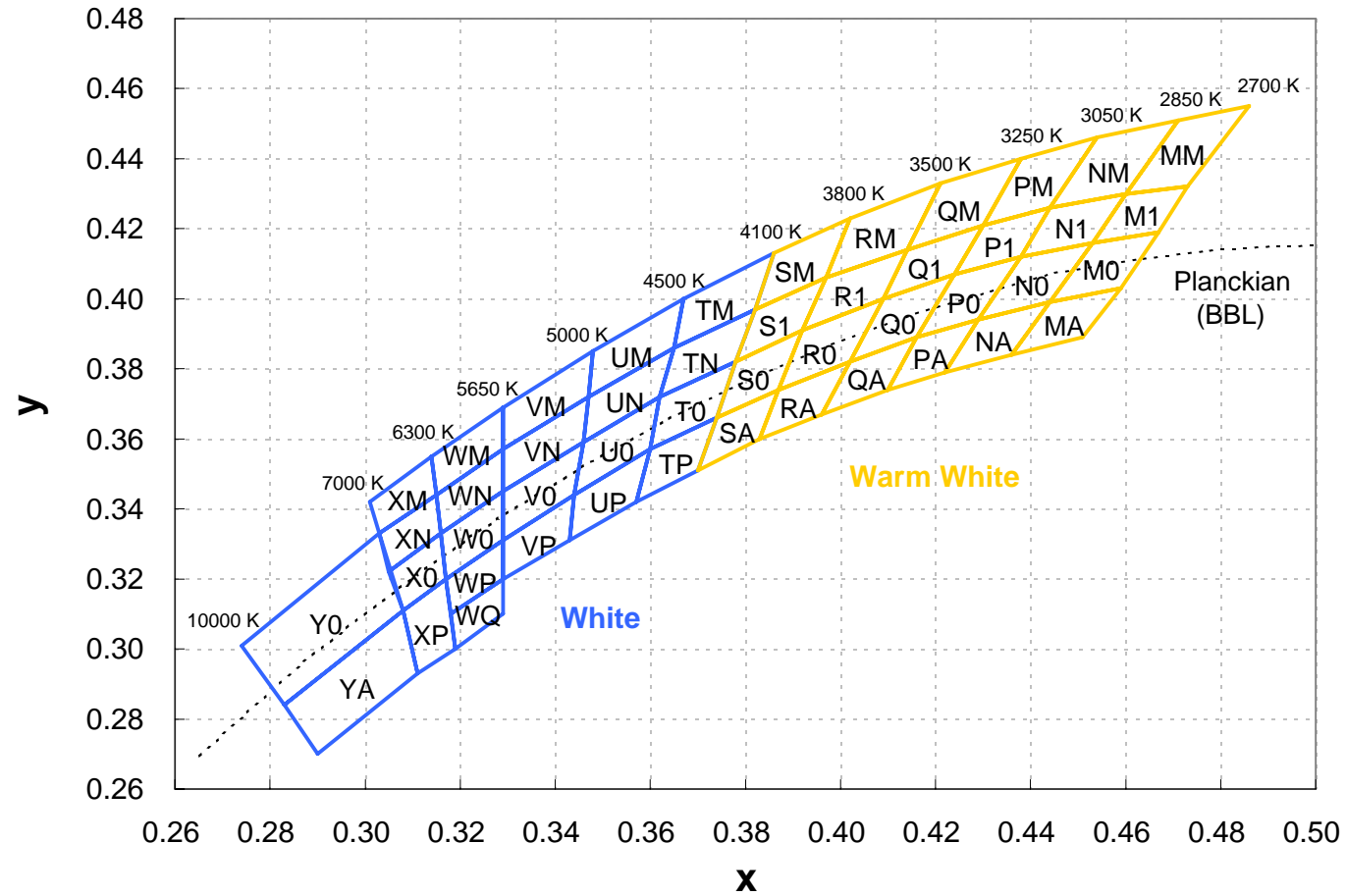
## Photometric Luminous Flux Bin Structure

Color	Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)
White	S1	51.7	58.9
	S2	58.9	67.2
	T1	67.2	76.6
	T2	76.6	87.4
Warm White	S1	51.7	58.9
	S2	58.9	67.2
	T1	67.2	76.6
	T2	76.6	87.4
*When CCT is less than 3050K, T2 bin is not available.			
Green	S2	58.9	67.2
	T1	67.2	76.6
Blue	L	10.7	13.9
	M	13.9	18.1
Amber	Q	30.6	39.8
	R	39.8	51.7
Red	Q	30.6	39.8
	R	39.8	51.7

- ProLight maintains a tolerance of ± 10% on flux and power measurements.
- The flux bin of the product may be modified for improvement without notice.

## Color Bin

### White and Warm White Binning Structure Graphical Representation



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## Color Bins

### White Bin Structure

Bin Code	x	y	Typ. CCT (K)	Bin Code	x	y	Typ. CCT (K)
T0	0.378	0.382	4300	W0	0.329	0.345	5970
	0.374	0.366			0.329	0.331	
	0.360	0.357			0.317	0.320	
	0.362	0.372			0.316	0.333	
TN	0.382	0.397	4300	WN	0.329	0.345	5970
	0.378	0.382			0.316	0.333	
	0.362	0.372			0.315	0.344	
	0.365	0.386			0.329	0.357	
TP	0.374	0.366	4300	WP	0.329	0.331	5970
	0.370	0.351			0.329	0.320	
	0.357	0.342			0.318	0.310	
	0.360	0.357			0.317	0.320	
TM	0.386	0.413	4300	WQ	0.329	0.320	5970
	0.382	0.397			0.329	0.310	
	0.365	0.386			0.319	0.300	
	0.367	0.400			0.318	0.310	
U0	0.362	0.372	4750	WM	0.329	0.369	5970
	0.360	0.357			0.329	0.357	
	0.344	0.344			0.315	0.344	
	0.346	0.359			0.314	0.355	
UN	0.365	0.386	4750	X0	0.308	0.311	6650
	0.362	0.372			0.305	0.322	
	0.346	0.359			0.316	0.333	
	0.347	0.372			0.317	0.320	
UP	0.360	0.357	4750	XN	0.305	0.322	6650
	0.357	0.342			0.303	0.333	
	0.343	0.331			0.315	0.344	
	0.344	0.344			0.316	0.333	
UM	0.365	0.386	4750	XP	0.308	0.311	6650
	0.367	0.400			0.317	0.320	
	0.348	0.385			0.319	0.300	
	0.347	0.372			0.311	0.293	
V0	0.329	0.331	5320	XM	0.301	0.342	6650
	0.329	0.345			0.314	0.355	
	0.346	0.359			0.315	0.344	
	0.344	0.344			0.303	0.333	
VN	0.329	0.345	5320	Y0	0.308	0.311	8000
	0.329	0.357			0.283	0.284	
	0.347	0.372			0.274	0.301	
	0.346	0.359			0.303	0.333	
VP	0.329	0.331	5320	YA	0.308	0.311	8000
	0.344	0.344			0.311	0.293	
	0.343	0.331			0.290	0.270	
	0.329	0.320			0.283	0.284	
VM	0.329	0.357	5320				
	0.329	0.369					
	0.348	0.385					
	0.347	0.372					

- Tolerance on each color bin (x , y) is  $\pm 0.01$

Note: Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all colors.

## Color Bins

### Warm White Bin Structure

Bin Code	x	y	Typ. CCT (K)	Bin Code	x	y	Typ. CCT (K)
M0	0.453	0.416	2770	Q0	0.409	0.400	3370
	0.444	0.399			0.402	0.382	
	0.459	0.403			0.416	0.389	
	0.467	0.419			0.424	0.407	
M1	0.460	0.430	2770	Q1	0.414	0.414	3370
	0.453	0.416			0.409	0.400	
	0.467	0.419			0.424	0.407	
	0.473	0.432			0.430	0.421	
MA	0.459	0.403	2770	QA	0.416	0.389	3370
	0.444	0.399			0.402	0.382	
	0.436	0.384			0.396	0.367	
	0.451	0.389			0.410	0.374	
MM	0.471	0.451	2770	QM	0.421	0.433	3370
	0.460	0.430			0.414	0.414	
	0.473	0.432			0.430	0.421	
	0.486	0.455			0.438	0.440	
N0	0.438	0.412	2950	R0	0.392	0.391	3650
	0.429	0.394			0.387	0.374	
	0.444	0.399			0.402	0.382	
	0.453	0.416			0.409	0.400	
N1	0.444	0.426	2950	R1	0.414	0.414	3650
	0.438	0.412			0.409	0.400	
	0.453	0.416			0.392	0.391	
	0.460	0.430			0.397	0.406	
NA	0.444	0.399	2950	RA	0.387	0.374	3650
	0.429	0.394			0.383	0.360	
	0.422	0.379			0.396	0.367	
	0.436	0.384			0.402	0.382	
NM	0.454	0.446	2950	RM	0.421	0.433	3650
	0.444	0.426			0.414	0.414	
	0.460	0.430			0.397	0.406	
	0.471	0.451			0.402	0.423	
P0	0.424	0.407	3150	S0	0.392	0.391	3950
	0.416	0.389			0.387	0.374	
	0.429	0.394			0.374	0.366	
	0.438	0.412			0.378	0.382	
P1	0.430	0.421	3150	S1	0.397	0.406	3950
	0.424	0.407			0.392	0.391	
	0.438	0.412			0.378	0.382	
	0.444	0.426			0.382	0.397	
PA	0.429	0.394	3150	SA	0.387	0.374	3950
	0.416	0.389			0.383	0.360	
	0.410	0.374			0.370	0.351	
	0.422	0.379			0.374	0.366	
PM	0.438	0.440	3150	SM	0.402	0.423	3950
	0.430	0.421			0.397	0.406	
	0.444	0.426			0.382	0.397	
	0.454	0.446			0.386	0.413	

- Tolerance on each color bin (x , y) is  $\pm 0.01$

Note: Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all colors.

## Dominant Wavelength Bin Structure

Color	Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
Green	A	515	520
	1	520	525
	2	525	530
	3	530	535
Blue	A	455	460
	1	460	465
	2	465	470
	3	470	475
Amber	2	587.0	589.5
	4	589.5	592.0
	6	592.0	594.5
	7	594.5	597.0
Red	2	613.5	620.5
	4	620.5	631.0

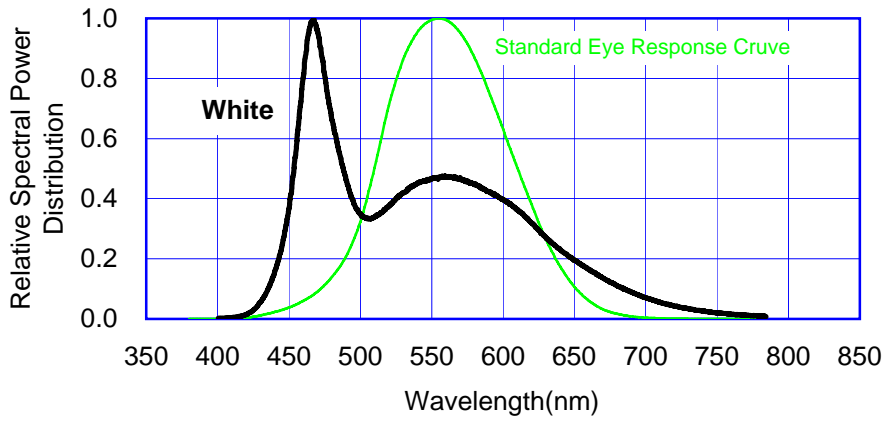
- ProLight maintains a tolerance of  $\pm 1$ nm for dominant wavelength measurements.

Note: Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all colors.

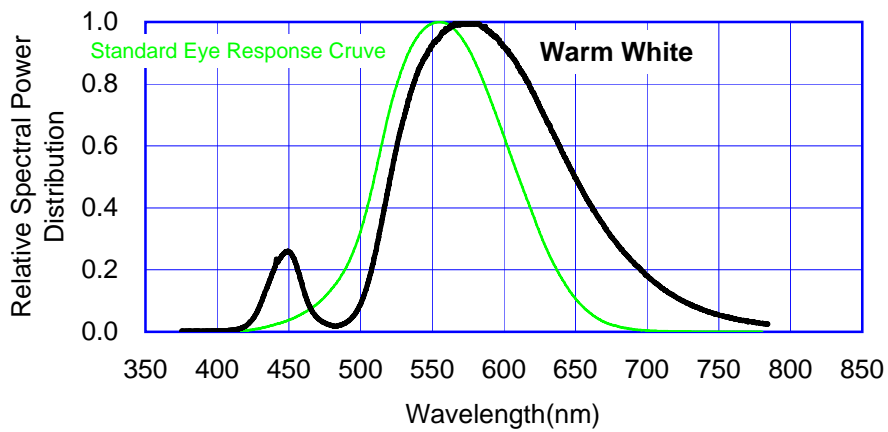


# Color Spectrum, $T_J = 25^\circ\text{C}$

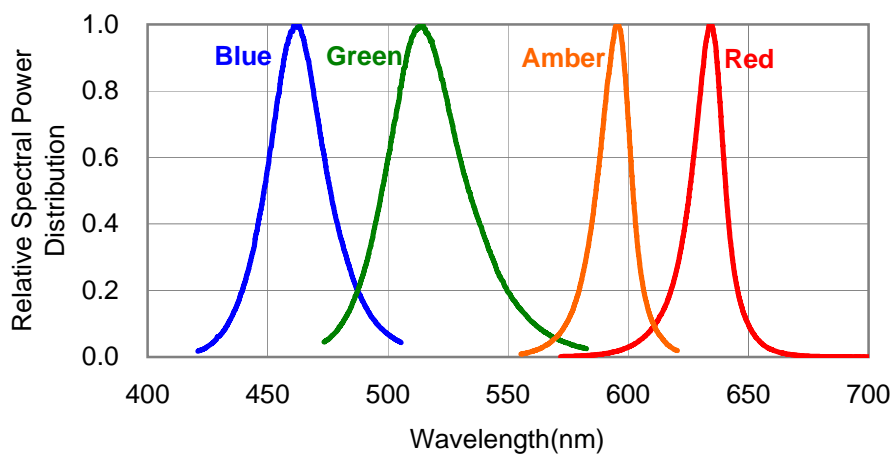
## 1. White



## 2. Warm White

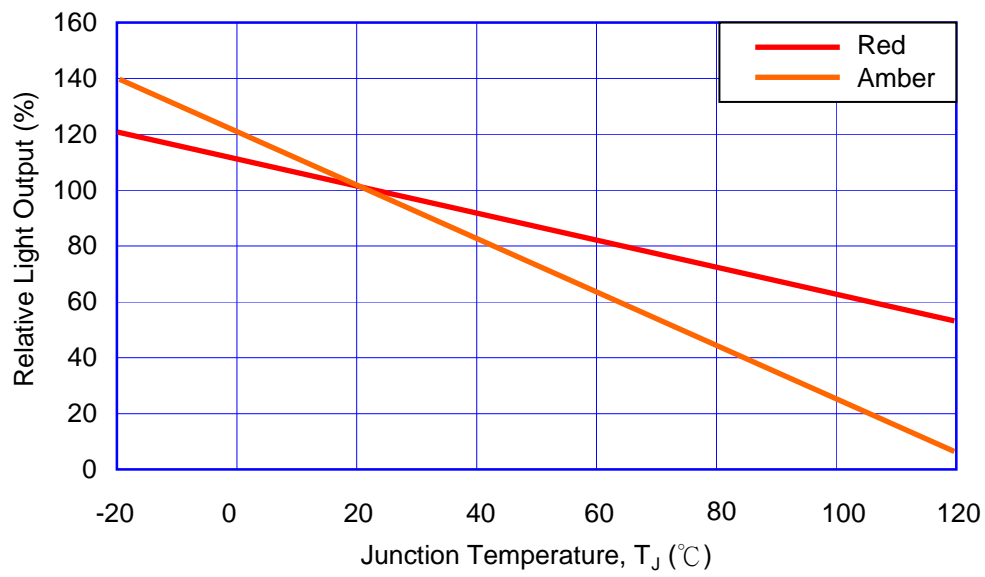
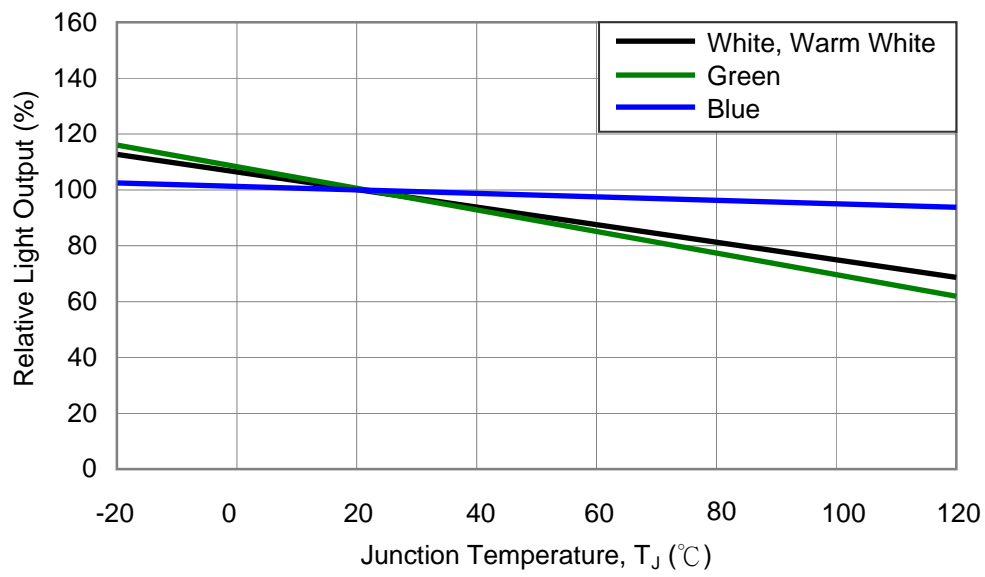


## 3. Blue 、 Green 、 Amber 、 Red



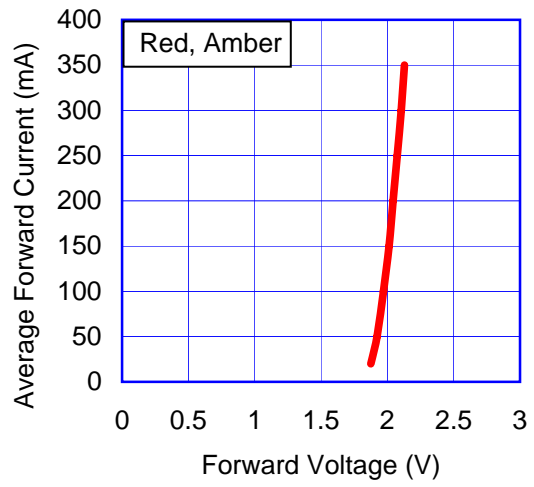
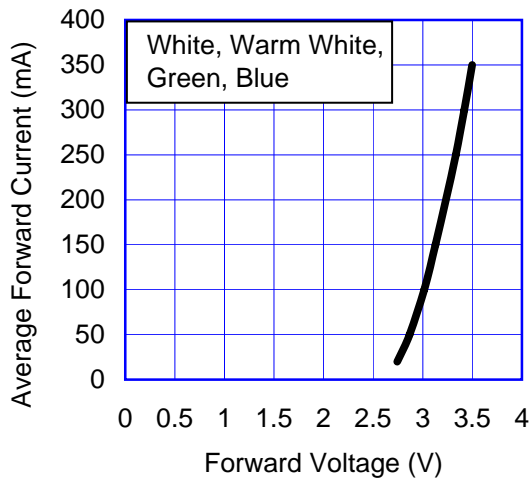
# Light Output Characteristics

## Relative Light Output vs. Junction Temperature at 350mA

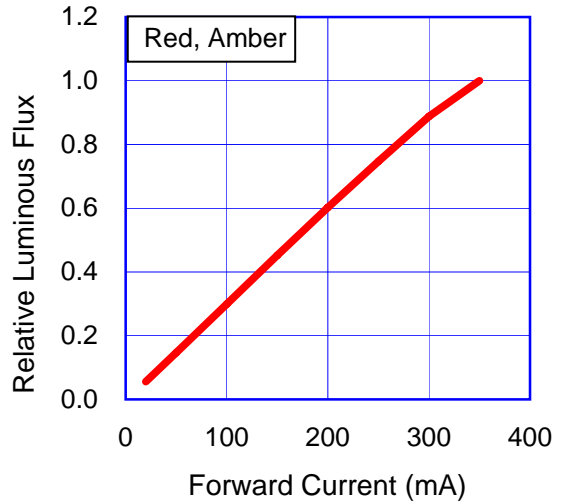
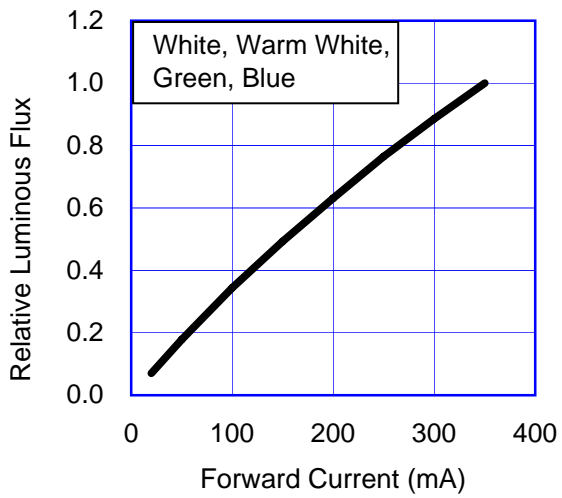


# Forward Current Characteristics, $T_J = 25^\circ\text{C}$

## 1. Forward Voltage vs. Forward Current

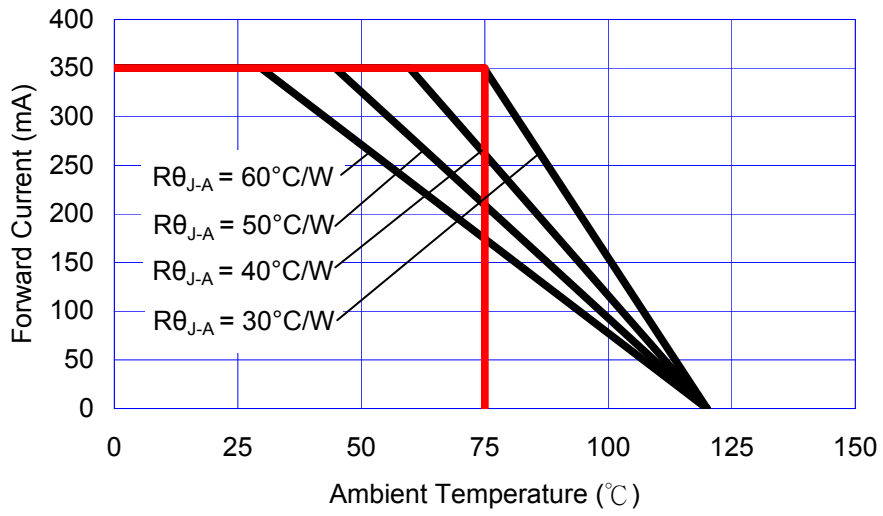


## 2. Forward Current vs. Normalized Relative Luminous Flux

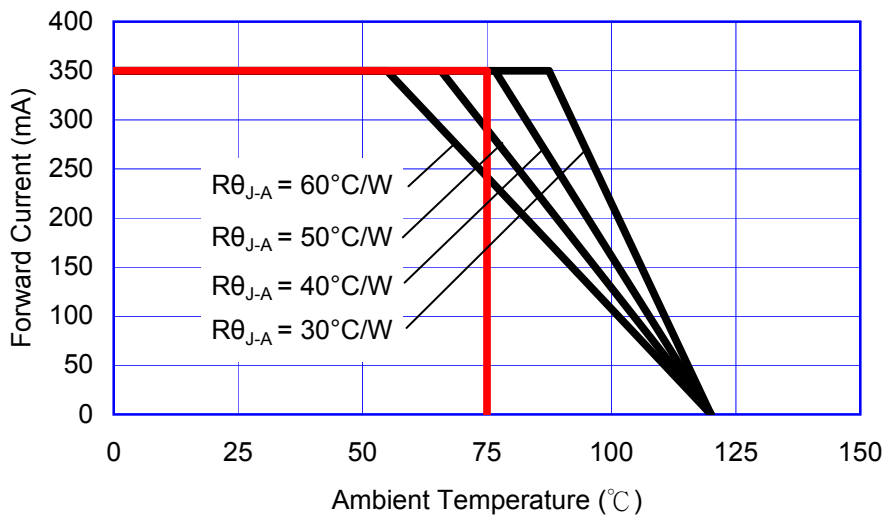


# Ambient Temperature vs. Maximum Forward Current

## 1. White, Warm White, Green, Blue ( $T_{JMAX} = 120^{\circ}C$ , $T_{Ambient} = 75^{\circ}C$ )



## 2. Red, Amber ( $T_{JMAX} = 120^{\circ}C$ , $T_{Ambient} = 75^{\circ}C$ )



# Typical Representative Spatial Radiation Pattern

## Spot Radiation Pattern

