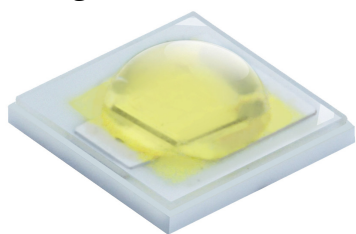


# Shwo 3W Series

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***“Shwo [Shuo] is the English translation for the Chinese word meaning Twinkle and is often used as a description of stars or other bright, celestial objects as seen from Earth. This word is a relevant description for this bright, compact Everlight LED package.”***



## Introduction

The Shwo series is a surface-mount high-power device featuring high brightness combined with a compact size that is suitable for all kinds of lighting applications such as general illumination, flash, spot, signal, industrial and commercial lighting. The thermal pad of this device is electrically isolated providing convenience in thermal and electrical design. The Shwo series is one of the most promising devices in Everlight's high power product offering and is ready to face the challenges of today's Solid-State Lighting requirements.

## Features

- ◆ Small package with high efficiency
- ◆ ESD protection up to 8KV
- ◆ Soldering method: SMT
- ◆ Binning Parameters: Brightness, Forward Voltage, Wavelength and Chromaticity
- ◆ Moisture Sensitivity Level: 1
- ◆ RoHS compliant
- ◆ Matches ANSI binning
- ◆ Reliability testing conforms to IESNA LM80 Lumen maintenance test method

## Applications

- ◆ General Lighting
- ◆ Decorative and Entertainment Lighting
- ◆ Signal and Symbol Luminaries for orientation marker lights (e.g. steps, exit ways, etc.)
- ◆ Exterior and Interior Automotive Illumination

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## Product Nomenclature

The product name is designated as below:

### ELSW – ABCDE – FGHIJ – V1234

Designation:

AB = min. luminous flux (lm) or radiation power (mW) performance

C = radiation pattern <sup>[1]</sup>

D = color <sup>[2]</sup>

E = power consumption <sup>[3]</sup>

F = reserved for future product offerings

G = internal coding

H = packaging type <sup>[4]</sup>

IJ = internal coding

V = forward voltage bin

1234 = color bin or CCT bin

#### Notes

1. Table of radiation patterns

| Symbol | Description |
|--------|-------------|
| 1      | Lambertian  |

2. Table of color offerings:

| Symbol | Color         | Dominant wavelength range/Peak wavelength/CCT |
|--------|---------------|-----------------------------------------------|
| R      | Red           | 620~635nm                                     |
| Y      | Amber         | 580~595nm                                     |
| G      | Green         | 520~550nm                                     |
| B      | Blue          | 450~470nm                                     |
| C      | Cool-White    | 4745~7050K                                    |
| N      | Neutral-White | 3710~4745K                                    |
| M      | Warm-White    | 2580~3710K                                    |

3. Table of power consumptions:

| Symbol | Description |
|--------|-------------|
| 3      | 3W          |

4. Table of packaging types:

| Symbol | Description |
|--------|-------------|
| P      | Tape        |

## Absolute Maximum Ratings

| Parameter                    | Symbol      | Ratings                   | Unit   |
|------------------------------|-------------|---------------------------|--------|
| Max. DC Forward Current (mA) | $I_F$       | 750 <sub>[1]</sub>        | mA     |
| Max. Peak Pulse Current (mA) | $I_{Pulse}$ | 1000 <sub>[2]</sub>       | mA     |
| Max. ESD Resistance          | $V_B$       | 8000                      | V      |
| Reverse Voltage              | $V_R$       | Note 3                    | V      |
| Thermal Resistance           | $R_{th}$    | 6~8 <sub>[4]</sub>        | °C/W   |
| Max. Junction Temperature    | $T_J$       | 125 <sub>[5]</sub>        | °C     |
| Operating Temperature        | $T_{Opr}$   | -40 ~ +100 <sub>[6]</sub> | °C     |
| Storage Temperature          | $T_{Stg}$   | -40 ~ +100                | °C     |
| Max. Soldering Temperature   | $T_{Sol}$   | 260                       | °C     |
| Allowable Reflow Cycles      | n/a         | 2                         | cycles |

### Notes:

- Maximum forward current for 3W is 750mA ( $T_{Thermal Pad}=25^{\circ}C$ ),
- Duty cycle = 1/10@1KHZ
- The Shwo series LEDs are not designed for reverse bias used.
- Thermal Resistance is 6°C/W for Blue, Green, Cool-White, Neutral-White, and Warm-White LEDs and 8°C/W for Red, and Amber LEDs.
- Maximum junction temperature of Cool-White, Neutral-White, Warm-White, Blue, Green, Red, and Amber LEDs is 125°C.
- Maximum Operating Temperature (Thermal Pad) of Cool-White, Neutral-White, Warm-White, Blue, Green, Red, and Amber LEDs is 100°C.

## JEDEC Moisture Sensitivity

| Level | Floor Life   |                              | Soak Requirements Standard |               |
|-------|--------------|------------------------------|----------------------------|---------------|
|       | Time (hours) | Conditions                   | Time (hours)               | Conditions    |
| 1     | unlimited    | $\leq 30^{\circ}C / 85\% RH$ | 168 (+5/-0)                | 85°C / 85% RH |

## Luminous Flux Characteristics for the Shwo series

| Color         | Part Number  | 3W                                                                      |                       |
|---------------|--------------|-------------------------------------------------------------------------|-----------------------|
|               |              | Minimum Luminous Flux(lm)<br>or<br>Radiometric Power(mW) <sub>[1]</sub> | Drive Current<br>(mA) |
| Cool White    | ELSW – J51CX | 140                                                                     | 700                   |
|               | ELSW – J61CX | 150                                                                     | 700                   |
|               | ELSW – J71CX | 160                                                                     | 700                   |
|               | ELSW – J81CX | 180                                                                     | 700                   |
| Neutral White | ELSW – J31NX | 120                                                                     | 700                   |
|               | ELSW – J41NX | 130                                                                     | 700                   |
|               | ELSW – J51NX | 140                                                                     | 700                   |
|               | ELSW – J61NX | 150                                                                     | 700                   |
| Warm White    | ELSW – J21MX | 110                                                                     | 700                   |
|               | ELSW – J31MX | 120                                                                     | 700                   |
|               | ELSW – J41MX | 130                                                                     | 700                   |
|               | ELSW – J51MX | 140                                                                     | 700                   |
| Red           | ELSW – F81RX | 80                                                                      | 700                   |
|               | ELSW – F91RX | 90                                                                      | 700                   |
| Amber         | ELSW – F81YX | 80                                                                      | 700                   |
|               | ELSW – F91YX | 90                                                                      | 700                   |
| Green         | ELSW – F91GX | 90                                                                      | 700                   |
|               | ELSW – J11GX | 100                                                                     | 700                   |
| Blue          | ELSW – E81BX | 20                                                                      | 700                   |
|               | ELSW – E91BX | 23                                                                      | 700                   |

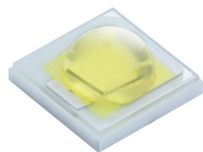
### Notes:

1. Luminous flux measurement tolerance:  $\pm 10\%$ .
2. The data of luminous flux measured at thermal pad=25℃
3. Typical luminous flux or light output performance is operated within the condition guided by this datasheet.

## PN of the Shwo series: White LEDs

The table below is a list of part numbers for the Everlight Shwo 3W series White LED. All parts listed match ANSI binning standards. Bin offerings of 2700K to 6500K are listed and currently available. CRI is also listed with min 70 to 75. Typical view angle is 120°. These clearly listed binning options allow for proper design and implementation into lighting applications. The Order Codes below are currently available White Shwo LEDs.

For Example: If you order product using P/N **ELSW-J61C3-0LPGS-D5700**, you will get



| Color Variant | Radiation Pattern | CRI | CCT                                 | Forward Voltage (V)                             | Minimum Luminous Flux (lm) |
|---------------|-------------------|-----|-------------------------------------|-------------------------------------------------|----------------------------|
| Cool White    | Lambertian        | 75  | 57K-1 ~ 57K-2<br>~<br>57K-3 ~ 57K-4 | 3.25~3.55(V2)<br>3.55~3.85(V3)<br>3.85~4.15(V4) | 150                        |

White, Shwo series LEDs at 700mA are listed below.

| Color              | Order Code of ELSW     | Minimum Luminous Flux (lm) | CCT (K)<br>Wavelength (nm) | Forward Voltage (V) | CRI (min)[1] |
|--------------------|------------------------|----------------------------|----------------------------|---------------------|--------------|
| Cool White 6500    | ELSW-J61C3-0LPGS-D6500 | 150                        | 65K-1~65K-4                | 3.25~4.15           | 70           |
| Cool White 5700    | ELSW-J61C3-0LPGS-D5700 | 150                        | 57K-1~57K-4                | 3.25~4.15           | 70           |
| Cool White 5000    | ELSW-J51C3-0LPGS-D5000 | 140                        | 50K-1~50K-4                | 3.25~4.15           | 70           |
| Neutral White 4500 | ELSW-J41N3-0LPGS-D4500 | 130                        | 45K-1~45K-4                | 3.25~4.15           | 75           |
| Neutral White 4000 | ELSW-J31N3-0LPGS-D4000 | 120                        | 40K-1~40K-4                | 3.25~4.15           | 75           |
| Warm White 3500    | ELSW-J21M3-0LPGS-D3500 | 110                        | 35K-1~35K-4                | 3.25~4.15           | 75           |
| Warm White 3000    | ELSW-J21M3-0LPGS-D3000 | 110                        | 30K-1~30K-4                | 3.25~4.15           | 75           |
| Warm White 2700    | ELSW-J21M3-0LPGS-D2700 | 110                        | 27K-1~27K-4                | 3.25~4.15           | 75           |

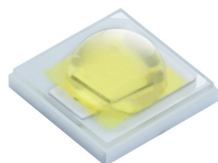
### Notes:

1. CRI measurement tolerance:  $\pm 2$ .
2. Each 3W white PN is based on the min. bin, and includes four adjacent bins.

## PN of the Shwo High Luminous Series: White LEDs

The table below is a list of part numbers for the Everlight Shwo 3W high luminous series White LED. All parts listed match ANSI binning standards. Bin offerings of 2700K to 6500K are listed and currently available. CRI is also listed with min 70 to 80. Typical view angle is 100°. These clearly listed binning options allow for proper design and implementation into lighting applications. The Order Codes below are currently available White Shwo LEDs.

For Example: If you order product using P/N **ELSW-J71C3-0CPGS-D5700**, you will get



| Color Variant | Radiation Pattern | CRI | CCT                                 | Forward Voltage (V)                             | Minimum Luminous Flux (lm) |
|---------------|-------------------|-----|-------------------------------------|-------------------------------------------------|----------------------------|
| Cool White    | Lambertian        | 75  | 57K-1 ~ 57K-2<br>~<br>57K-3 ~ 57K-4 | 2.95~3.25(V1)<br>3.25~3.55(V2)<br>3.55~3.85(V3) | 160                        |

White ,Shwo series LEDs at 700mA are listed below.

| Color              | Order Code of ELSW     | Minimum Luminous Flux (lm) | CCT (K)<br>Wavelength (nm) | Forward Voltage (V) | CRI (min) |
|--------------------|------------------------|----------------------------|----------------------------|---------------------|-----------|
| Cool White 6500    | ELSW-J71C3-0CPGS-D6500 | 160                        | 65K-1~65K-4                | 2.95~3.85           | 70        |
|                    | ELSW-J81C3-0CPGS-D6500 | 180                        | 65K-1~65K-4                | 2.95~3.85           | 70        |
|                    | ELSW-J71C3-0CPHS-D6500 | 160                        | 65K-1~65K-4                | 2.95~3.85           | 80        |
| Cool White 5700    | ELSW-J71C3-0CPGS-D5700 | 160                        | 57K-1~57K-4                | 2.95~3.85           | 70        |
|                    | ELSW-J81C3-0CPGS-D5700 | 180                        | 57K-1~57K-4                | 2.95~3.85           | 70        |
|                    | ELSW-J71C3-0CPHS-D5700 | 160                        | 57K-1~57K-4                | 2.95~3.85           | 80        |
| Cool White 5000    | ELSW-J61C3-0CPGS-D5000 | 150                        | 50K-1~50K-4                | 2.95~3.85           | 70        |
|                    | ELSW-J71C3-0CPGS-D5000 | 160                        | 50K-1~50K-4                | 2.95~3.85           | 70        |
|                    | ELSW-J61C3-0CPHS-D5000 | 150                        | 50K-1~50K-4                | 2.95~3.85           | 80        |
| Neutral White 4500 | ELSW-J51N3-0CPGS-D4500 | 140                        | 45K-1~45K-4                | 2.95~3.85           | 75        |
|                    | ELSW-J61N3-0CPGS-D4500 | 150                        | 45K-1~45K-4                | 2.95~3.85           | 75        |
|                    | ELSW-J51N3-0CPHS-D4500 | 140                        | 45K-1~45K-4                | 2.95~3.85           | 80        |
| Neutral White 4000 | ELSW-J41N3-0CPGS-D4000 | 130                        | 40K-1~40K-4                | 2.95~3.85           | 75        |
|                    | ELSW-J61N3-0CPGS-D4000 | 150                        | 40K-1~40K-4                | 2.95~3.85           | 75        |
|                    | ELSH-J51N3-0CPHS-D4000 | 140                        | 40K-1~40K-4                | 2.95~3.85           | 80        |
| Warm White 3500    | ELSW-J31M3-0CPGS-D3500 | 120                        | 35K-1~35K-4                | 2.95~3.85           | 75        |
|                    | ELSW-J51M3-0CPGS-D3500 | 140                        | 35K-1~35K-4                | 2.95~3.85           | 75        |
|                    | ELSW-J41M3-0CPHS-D3500 | 130                        | 35K-1~35K-4                | 2.95~3.85           | 80        |

| Color           | Order Code of ELSW     | Minimum Luminous Flux (lm) | CCT (K)<br>Wavelength (nm) | Forward Voltage (V) | CRI (min) |
|-----------------|------------------------|----------------------------|----------------------------|---------------------|-----------|
| Warm White 3000 | ELSW-J31M3-0CPGS-D3000 | 120                        | 30K-1~30K-4                | 2.95~3.85           | 75        |
|                 | ELSW-J51M3-0CPGS-D3000 | 140                        | 30K-1~30K-4                | 2.95~3.85           | 75        |
|                 | ELSW-J21M3-0CPHS-D3000 | 110                        | 30K-1~30K-4                | 2.95~3.85           | 80        |
|                 | ELSW-J41M3-0CPHS-D3000 | 130                        | 30K-1~30K-4                | 2.95~3.85           | 80        |
| Warm White 2700 | ELSW-J31M3-0CPGS-D2700 | 120                        | 27K-1~27K-4                | 2.95~3.85           | 75        |
|                 | ELSW-J51M3-0CPGS-D2700 | 140                        | 27K-1~27K-4                | 2.95~3.85           | 75        |
|                 | ELSW-J21M3-0CPHS-D2700 | 110                        | 27K-1~27K-4                | 2.95~3.85           | 80        |
|                 | ELSW-J41M3-0CPHS-D2700 | 130                        | 27K-1~27K-4                | 2.95~3.85           | 80        |

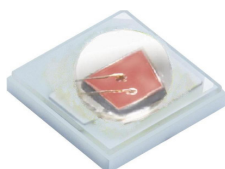
**Notes:**

1. CRI measurement tolerance:  $\pm 2$ .
2. Each 3W white PN is based on the min. bin, and includes four adjacent bins

## PN of the Shwo series: Color LEDs

The table below is a list of part numbers for the Everlight Shwo series Color LED. Standard Everlight color bins are listed according to wavelength and represent the standard primary colors of the spectrum. Typical view angle is 120°. These clearly listed binning options allow for proper design and implementation into lighting applications.

For Example: If you order product using P/N **ELSW-F81R3-0LPNM-BR4R6**, you will get



| Color Variant | Radiation Pattern | Dominant Wavelength (nm)                  | Forward Voltage (V)                                              | Minimum Luminous Flux (lm) |
|---------------|-------------------|-------------------------------------------|------------------------------------------------------------------|----------------------------|
| Red           | Lambertian        | 615~620(R4)<br>620~625(R5)<br>625~630(R6) | 2.05~2.35(U2)<br>2.35~2.65(U3)<br>2.65~2.95(U4)<br>2.95~3.25(V1) | 80                         |

Color, Shwo series LEDs at 700mA are listed below.

| Color | Order Code of ELSW      | Minimum Luminous Flux (lm) | Dominant Wavelength (nm) | Forward Voltage(V) |
|-------|-------------------------|----------------------------|--------------------------|--------------------|
| Red   | ELSW-F81R3-0LPNM-BR4R6  | 80                         | 615~630                  | 2.05~3.25          |
|       | ELSW-F91R3-0LPNM-BR4R6  | 90                         | 615~630                  | 2.05~3.25          |
| Amber | ELSW-F81Y3-0LPNM-BA3A5  | 80                         | 585~592.5                | 2.05~3.25          |
|       | ELSW-F91Y3-0LPNM-BA3A5  | 90                         | 585~592.5                | 2.05~3.25          |
| Green | *ELSW-F91G3-0LPNM-DG1G3 | 90                         | 520~535                  | 3.25~4.15          |
|       | *ELSW-J11G3-0LPNM-DG1G3 | 100                        | 520~535                  | 3.25~4.15          |
| Blue  | *ELSW-E81B3-0LPNM-DB6B8 | 20                         | 455~470                  | 3.25~4.15          |
|       | *ELSW-E91B3-0LPNM-DB6B8 | 23                         | 455~470                  | 3.25~4.15          |

\*Product lead time of at least 8 weeks.

**Note:**

Each 3W direct color PN is based on the min. bin and includes four adjacent bins.

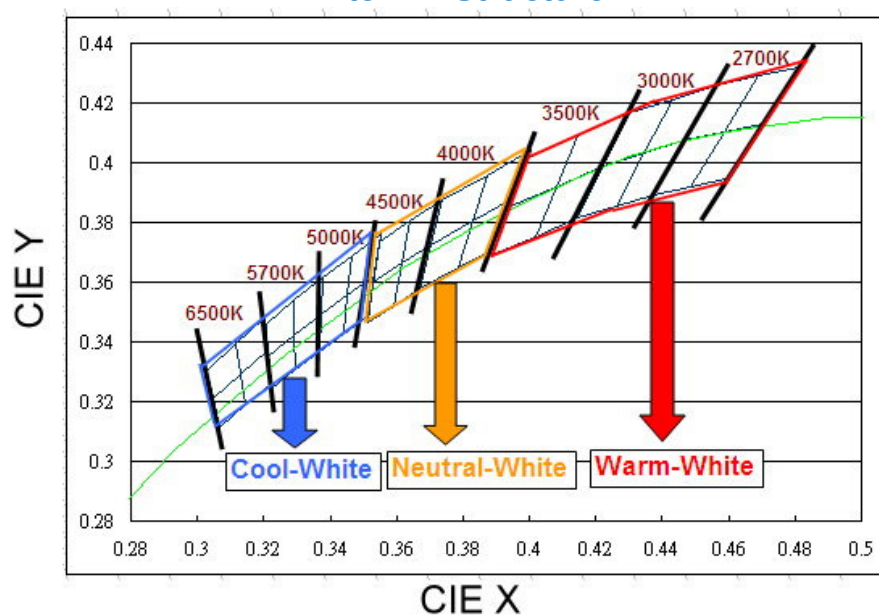
## Product Binning

### Luminous Flux Bins

| Group | Bin | Minimum Photometric Flux (lm) | Maximum Photometric Flux (lm) |
|-------|-----|-------------------------------|-------------------------------|
| E     | 1   | 4                             | 5                             |
|       | 2   | 5                             | 6                             |
|       | 3   | 6                             | 8                             |
|       | 4   | 8                             | 10                            |
|       | 5   | 10                            | 13                            |
|       | 6   | 13                            | 17                            |
|       | 7   | 17                            | 20                            |
|       | 8   | 20                            | 23                            |
|       | 9   | 23                            | 27                            |
| F     | 1   | 27                            | 33                            |
|       | 2   | 33                            | 39                            |
|       | 3   | 39                            | 45                            |
|       | 4   | 45                            | 52                            |
|       | 5   | 52                            | 60                            |
|       | 6   | 60                            | 70                            |
|       | 7   | 70                            | 80                            |
|       | 8   | 80                            | 90                            |
|       | 9   | 90                            | 100                           |

| Group | Bin | Minimum Photometric Flux (lm) | Maximum Photometric Flux (lm) |
|-------|-----|-------------------------------|-------------------------------|
| J     | 1   | 100                           | 110                           |
|       | 2   | 110                           | 120                           |
|       | 3   | 120                           | 130                           |
|       | 4   | 130                           | 140                           |
|       | 5   | 140                           | 150                           |
|       | 6   | 150                           | 160                           |
|       | 7   | 160                           | 180                           |
|       | 8   | 180                           | 200                           |
|       | 9   | 200                           | 225                           |
| K     | 1   | 225                           | 250                           |
|       | 2   | 250                           | 275                           |
|       | 3   | 275                           | 300                           |
|       | 4   | 300                           | 325                           |
|       | 5   | 325                           | 350                           |
|       | 6   | 350                           | 375                           |
|       | 7   | 375                           | 400                           |
|       | 8   | 400                           | 425                           |
|       | 9   | 425                           | 450                           |
| N     | 1   | 450                           | 475                           |
|       | 2   | 475                           | 500                           |
|       | 3   | 500                           | 525                           |
|       | 4   | 525                           | 550                           |

### White Bin Structure

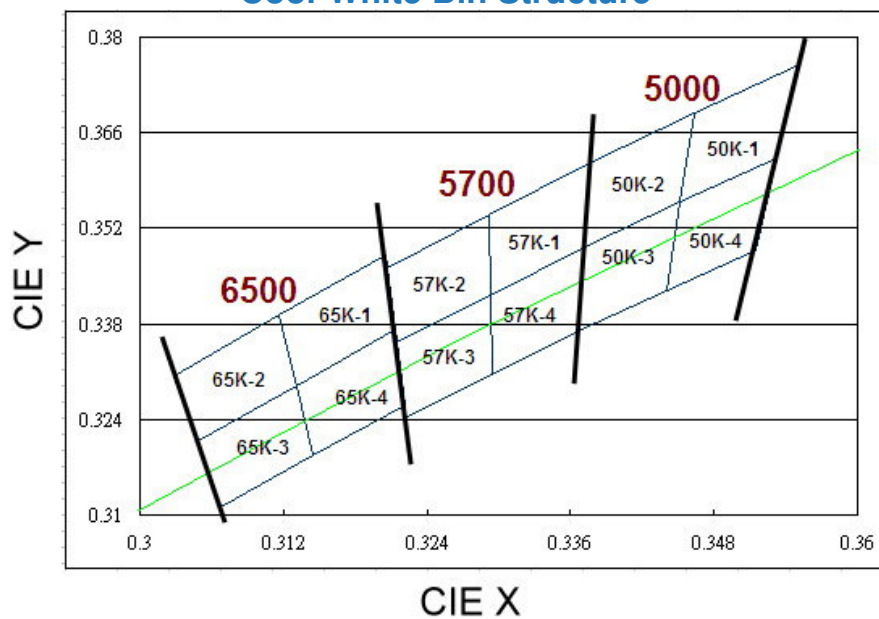


Chromaticity specification defined by ANSI

#### Notes:

1. The CCT range of Cool-White varies from 4745K to 7050K.
2. The CCT range of Neutral-White varies from 3710K to 4745K.
3. The CCT range of Warm-White varies from 2580K to 3710K
4. Color coordinates measurement allowance :  $\pm 0.01$
5. Color bins are defined at  $I_f=700\text{mA}$  operation.

### Cool-White Bin Structure



## Cool-White Bin Coordinates

### 5000K

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 50K-1                       | 0.346 | 0.369 |
|                             | 0.345 | 0.356 |
|                             | 0.353 | 0.362 |
|                             | 0.355 | 0.376 |
| Reference Range: 4745~5000K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 50K-2                       | 0.338 | 0.362 |
|                             | 0.337 | 0.349 |
|                             | 0.345 | 0.356 |
|                             | 0.346 | 0.369 |
| Reference Range: 5000~5310K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 50K-4                       | 0.345 | 0.356 |
|                             | 0.344 | 0.343 |
|                             | 0.352 | 0.349 |
|                             | 0.353 | 0.362 |
| Reference Range: 4745~5000K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 50K-3                       | 0.337 | 0.349 |
|                             | 0.337 | 0.337 |
|                             | 0.344 | 0.343 |
|                             | 0.345 | 0.356 |
| Reference Range: 5000~5310K |       |       |

### 5700K

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 57K-1                       | 0.329 | 0.354 |
|                             | 0.329 | 0.342 |
|                             | 0.337 | 0.349 |
|                             | 0.338 | 0.362 |
| Reference Range: 5310~5700K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 57K-2                       | 0.321 | 0.346 |
|                             | 0.321 | 0.335 |
|                             | 0.329 | 0.342 |
|                             | 0.329 | 0.354 |
| Reference Range: 5700~6020K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 57K-4                       | 0.329 | 0.342 |
|                             | 0.329 | 0.331 |
|                             | 0.337 | 0.337 |
|                             | 0.337 | 0.349 |
| Reference Range: 5310~5700K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 57K-3                       | 0.321 | 0.335 |
|                             | 0.322 | 0.324 |
|                             | 0.329 | 0.331 |
|                             | 0.329 | 0.342 |
| Reference Range: 5700~6020K |       |       |

### 6500K

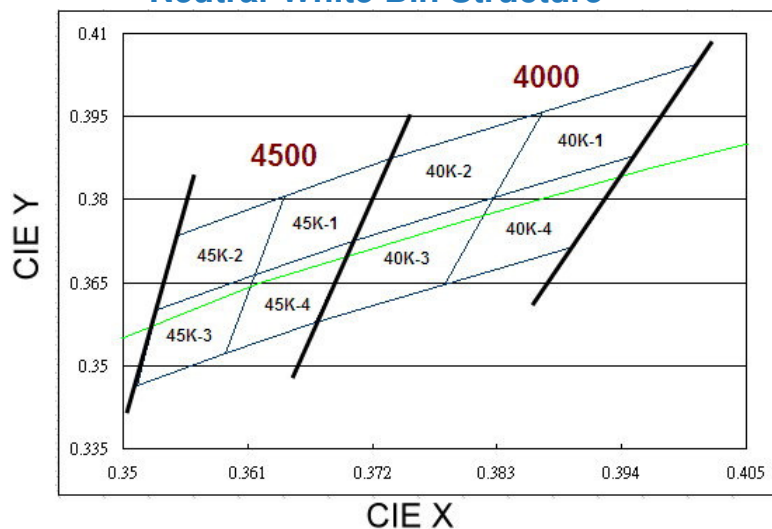
| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 65K-1                       | 0.312 | 0.339 |
|                             | 0.313 | 0.329 |
|                             | 0.321 | 0.337 |
|                             | 0.321 | 0.348 |
| Reference Range: 6020~6500K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 65K-2                       | 0.303 | 0.330 |
|                             | 0.305 | 0.321 |
|                             | 0.313 | 0.329 |
|                             | 0.312 | 0.339 |
| Reference Range: 6500~7050K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 65K-4                       | 0.313 | 0.329 |
|                             | 0.315 | 0.319 |
|                             | 0.322 | 0.326 |
|                             | 0.321 | 0.337 |
| Reference Range: 6020~6500K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 65K-3                       | 0.305 | 0.321 |
|                             | 0.307 | 0.311 |
|                             | 0.315 | 0.319 |
|                             | 0.313 | 0.329 |
| Reference Range: 6500~7050K |       |       |

### Neutral-White Bin Structure



### Neutral-White Bin Coordinates

#### 4000K

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 40K-1                       | 0.387 | 0.396 |
|                             | 0.383 | 0.380 |
|                             | 0.395 | 0.388 |
|                             | 0.401 | 0.404 |
| Reference Range: 3710~4000K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 40K-2                       | 0.374 | 0.387 |
|                             | 0.370 | 0.373 |
|                             | 0.383 | 0.380 |
|                             | 0.387 | 0.396 |
| Reference Range: 4000~4260K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 40K-4                       | 0.383 | 0.380 |
|                             | 0.378 | 0.365 |
|                             | 0.390 | 0.372 |
|                             | 0.395 | 0.388 |
| Reference Range: 3710~4000K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 40K-3                       | 0.370 | 0.373 |
|                             | 0.367 | 0.358 |
|                             | 0.378 | 0.365 |
|                             | 0.383 | 0.380 |
| Reference Range: 4000~4260K |       |       |

#### 4500K

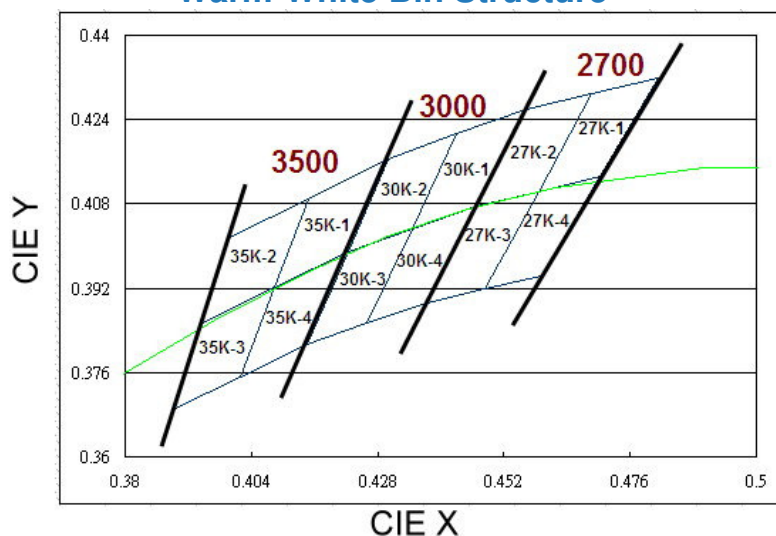
| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 45K-1                       | 0.364 | 0.381 |
|                             | 0.362 | 0.366 |
|                             | 0.370 | 0.373 |
|                             | 0.374 | 0.387 |
| Reference Range: 4260~4500K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 45K-2                       | 0.355 | 0.374 |
|                             | 0.353 | 0.360 |
|                             | 0.362 | 0.366 |
|                             | 0.364 | 0.381 |
| Reference Range: 4500~4745K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 45K-4                       | 0.362 | 0.366 |
|                             | 0.359 | 0.352 |
|                             | 0.367 | 0.358 |
|                             | 0.370 | 0.373 |
| Reference Range: 4260~4500K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 45K-3                       | 0.353 | 0.360 |
|                             | 0.351 | 0.347 |
|                             | 0.359 | 0.352 |
|                             | 0.362 | 0.366 |
| Reference Range: 4500~4745K |       |       |

### Warm-White Bin Structure



### Warm-White Bin Coordinates

#### 2700K

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 27K-1                       | 0.469 | 0.429 |
|                             | 0.459 | 0.410 |
|                             | 0.470 | 0.413 |
|                             | 0.481 | 0.432 |
| Reference Range: 2580~2700K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 27K-2                       | 0.456 | 0.426 |
|                             | 0.447 | 0.408 |
|                             | 0.459 | 0.410 |
|                             | 0.469 | 0.429 |
| Reference Range: 2700~2870K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 27K-4                       | 0.459 | 0.410 |
|                             | 0.448 | 0.392 |
|                             | 0.459 | 0.394 |
|                             | 0.470 | 0.413 |
| Reference Range: 2580~2700K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 27K-3                       | 0.447 | 0.408 |
|                             | 0.437 | 0.389 |
|                             | 0.448 | 0.392 |
|                             | 0.459 | 0.410 |
| Reference Range: 2700~2870K |       |       |

**3000K**

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 30K-1                       | 0.443 | 0.421 |
|                             | 0.435 | 0.403 |
|                             | 0.447 | 0.408 |
|                             | 0.456 | 0.426 |
| Reference Range: 2870~3000K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 30K-2                       | 0.430 | 0.417 |
|                             | 0.422 | 0.399 |
|                             | 0.435 | 0.403 |
|                             | 0.443 | 0.421 |
| Reference Range: 3000~3220K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 30K-4                       | 0.435 | 0.403 |
|                             | 0.426 | 0.385 |
|                             | 0.437 | 0.389 |
|                             | 0.447 | 0.408 |
| Reference Range: 2870~3000K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 30K-3                       | 0.422 | 0.399 |
|                             | 0.415 | 0.381 |
|                             | 0.426 | 0.385 |
|                             | 0.435 | 0.403 |
| Reference Range: 3000~3220K |       |       |

**3500K**

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 35K-1                       | 0.415 | 0.409 |
|                             | 0.408 | 0.392 |
|                             | 0.422 | 0.399 |
|                             | 0.430 | 0.417 |
| Reference Range: 3220~3500K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 35K-2                       | 0.400 | 0.402 |
|                             | 0.394 | 0.385 |
|                             | 0.408 | 0.392 |
|                             | 0.415 | 0.409 |
| Reference Range: 3500~3710K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 35K-4                       | 0.408 | 0.392 |
|                             | 0.402 | 0.375 |
|                             | 0.415 | 0.381 |
|                             | 0.422 | 0.399 |
| Reference Range: 3220~3500K |       |       |

| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 35K-3                       | 0.394 | 0.385 |
|                             | 0.389 | 0.369 |
|                             | 0.402 | 0.375 |
|                             | 0.408 | 0.392 |
| Reference Range: 3500~3710K |       |       |

**Note:** Currently available typical CCT ranges are 3000K, 5700K, and 6500K CCT.

## Forward Voltage Bins

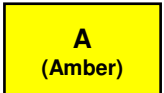
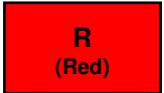
| Group Name | Bins        |
|------------|-------------|
| A          | U1+U2+U3+U4 |
| B          | U2+U3+U4+V1 |
| C          | U4+V1+V2+V3 |
| D          | V1+V2+V3+V4 |
| J          | U1+U2+U3+U4 |

| Bin | Minimum Forward Voltage (V) | Maximum Forward Voltage (V) |
|-----|-----------------------------|-----------------------------|
| U1  | 1.75                        | 2.05                        |
| U2  | 2.05                        | 2.35                        |
| U3  | 2.35                        | 2.65                        |
| U4  | 2.65                        | 2.95                        |
| V1  | 2.95                        | 3.25                        |
| V2  | 3.25                        | 3.55                        |
| V3  | 3.55                        | 3.85                        |
| V4  | 3.85                        | 4.15                        |

### Notes:

1. Forward voltage measurement tolerance:  $\pm 0.1V$ .
2. Forward voltage bins are defined at  $I_F=700\text{ mA}$  operation.
3. Other Forward Voltage bins for White LEDs available upon request. Please contact your local Everlight sales office.

## Color Bins

| Group                                                                                                      | Bin | Minimum Dominant / Peak<br>Wavelength (nm) | Maximum Dominant / Peak<br>Wavelength (nm) |
|------------------------------------------------------------------------------------------------------------|-----|--------------------------------------------|--------------------------------------------|
| <br><b>B</b><br>(Blue)    | 1   | 430                                        | 435                                        |
|                                                                                                            | 2   | 435                                        | 440                                        |
|                                                                                                            | 3   | 440                                        | 445                                        |
|                                                                                                            | 4   | 445                                        | 450                                        |
|                                                                                                            | 5   | 450                                        | 455                                        |
|                                                                                                            | 6   | 455                                        | 460                                        |
|                                                                                                            | 7   | 460                                        | 465                                        |
|                                                                                                            | 8   | 465                                        | 470                                        |
| <br><b>G</b><br>(Green)   | 1   | 520                                        | 525                                        |
|                                                                                                            | 2   | 525                                        | 530                                        |
|                                                                                                            | 3   | 530                                        | 535                                        |
|                                                                                                            | 4   | 535                                        | 540                                        |
|                                                                                                            | 5   | 540                                        | 545                                        |
|                                                                                                            | 6   | 545                                        | 550                                        |
| <br><b>A</b><br>(Amber) | 1   | 580                                        | 582.5                                      |
|                                                                                                            | 2   | 582.5                                      | 585                                        |
|                                                                                                            | 3   | 585                                        | 587.5                                      |
|                                                                                                            | 4   | 587.5                                      | 590                                        |
|                                                                                                            | 5   | 590                                        | 592.5                                      |
|                                                                                                            | 6   | 592.5                                      | 595                                        |
| <br><b>R</b><br>(Red)   | 3   | 610                                        | 615                                        |
|                                                                                                            | 4   | 615                                        | 620                                        |
|                                                                                                            | 5   | 620                                        | 625                                        |
|                                                                                                            | 6   | 625                                        | 630                                        |
|                                                                                                            | 7   | 630                                        | 635                                        |

### Notes:

1. Dominant / Peak wavelength measurement tolerance:  $\pm 1\text{nm}$ .
2. Dominant / Peak wavelength bins are defined at  $I_F=700\text{ mA}$  operation.

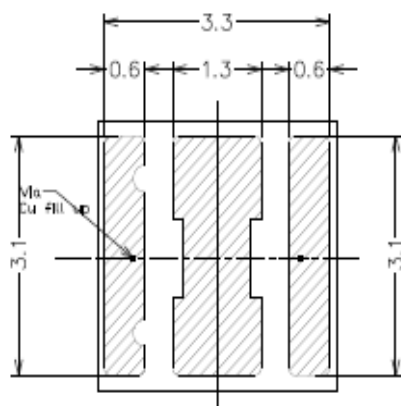
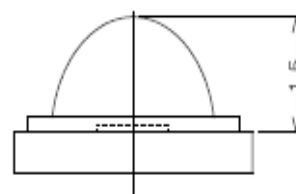
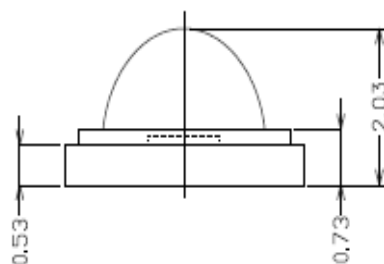
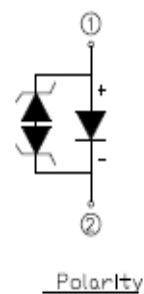
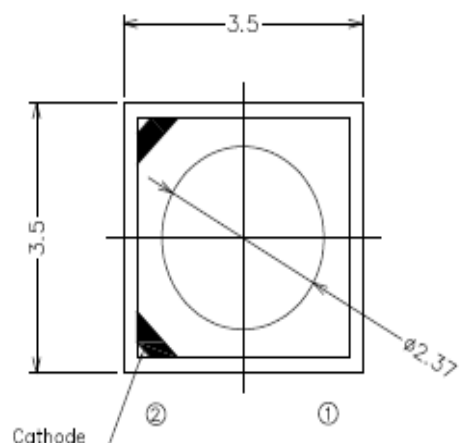
## Optical Characteristics

| Color         | Part Number  | Part Number Dominant Wavelength $\lambda_D$<br>Peak Wavelength $\lambda_P$<br>Color Temperature CCT |       |       | Typical Temperature Coefficient of Dominant Wavelength<br>(nm/°C) $-(\Delta\lambda_D/\Delta T_J)$ | Typical Viewing Angle (degrees)<br>$2\theta_{1/2}$ |
|---------------|--------------|-----------------------------------------------------------------------------------------------------|-------|-------|---------------------------------------------------------------------------------------------------|----------------------------------------------------|
|               |              | Min.                                                                                                | Typ.  | Max.  |                                                                                                   |                                                    |
| Cool-White    | ELSW – XX1CX | 4745K                                                                                               | 5700K | 7050K | ---                                                                                               | Note 5                                             |
| Neutral-White | ELSW – XX1NX | 3710K                                                                                               | 4260K | 4745K | ---                                                                                               | Note 5                                             |
| Warm-White    | ELSW – XX1MX | 2580K                                                                                               | 3000K | 3710K | ---                                                                                               | Note 5                                             |
| Red           | ELSW – XX1RX | 620nm                                                                                               | ---   | 630nm | 0.05                                                                                              | 120                                                |
| Orange        | ELSW – XX1OX | 610nm                                                                                               | ---   | 620nm | 0.08                                                                                              | 120                                                |
| Amber         | ELSW – XX1YX | 585nm                                                                                               | ---   | 595nm | 0.1                                                                                               | 120                                                |
| Green         | ELSW – XX1GX | 520nm                                                                                               | ---   | 535nm | 0.05                                                                                              | 120                                                |
| Blue          | ELSW – XX1BX | 460nm                                                                                               | ---   | 470nm | 0.05                                                                                              | 120                                                |

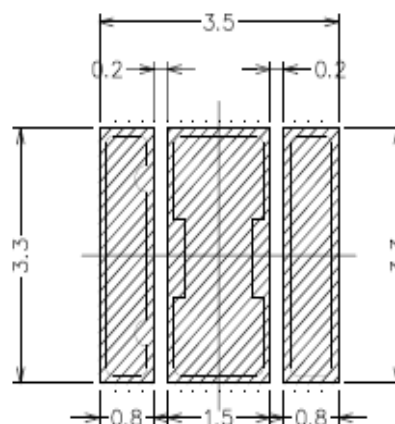
### Notes:

1. The test tolerance of Everlight is  $\pm 1\text{nm}$  for dominant wavelength,  $\pm 5\%$  for CCT.
2. Viewing angle is the width of half the light output intensity in all directions of  $180^\circ$ .
3. All Cool-White, Neutral-White, Warm-White, and dominant wavelength below 550nm LEDs are made with Indium Gallium Nitride (InGaN).
4. All LEDs with dominant wavelength exceeding 550nm are made with Aluminum Indium Gallium Phosphide (AlInGaP).
5. Typical view angle of ELSW-XX1XX-0C and ELSW-XX1XX-0V series is  $100^\circ$ . Typical view angle of ELSW-XX1XX-0L series is  $120^\circ$ .

## Mechanical Dimension



Solder pad design

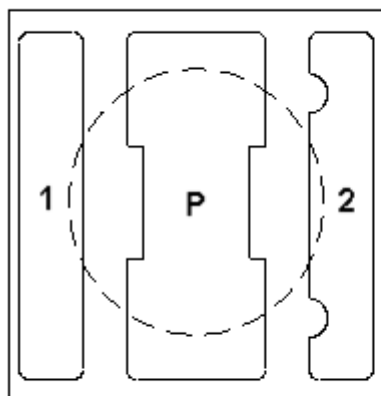


Soldering patterns

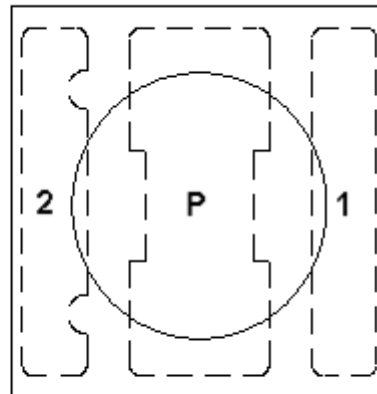
### Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are  $\pm 0.15\text{mm}$ .
3. The thermal pad is electrically isolated from the Anode and Cathode contact pads.
4. Do not handle the device by the lens. Incorrect force applied to the lens may lead to the failure of devices.

## Pad Configuration



**BOTTOM VIEW**



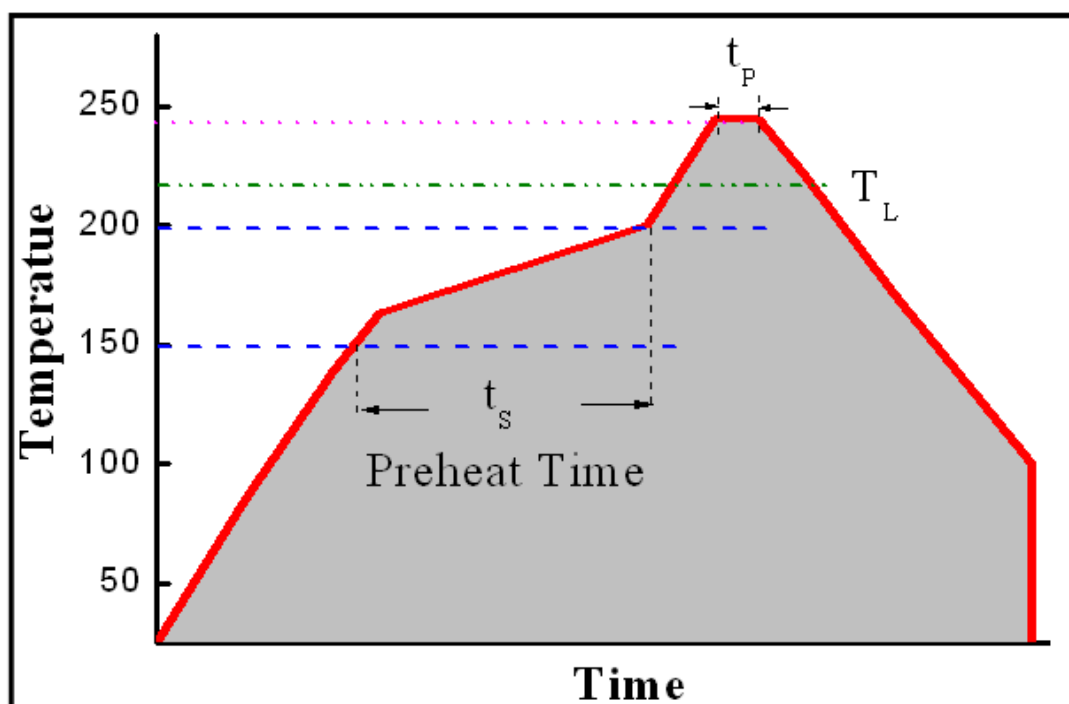
**TOP VIEW**

| PAD | FUNCTION    |
|-----|-------------|
| 1   | ANODE       |
| 2   | CATHODE     |
| P   | THERMAL PAD |

## Reflow Soldering Characteristics

### For Reflow Process

- ELSW series are suitable for SMT processes.
- Curing of glue in oven must be according to standard operation flow processes.

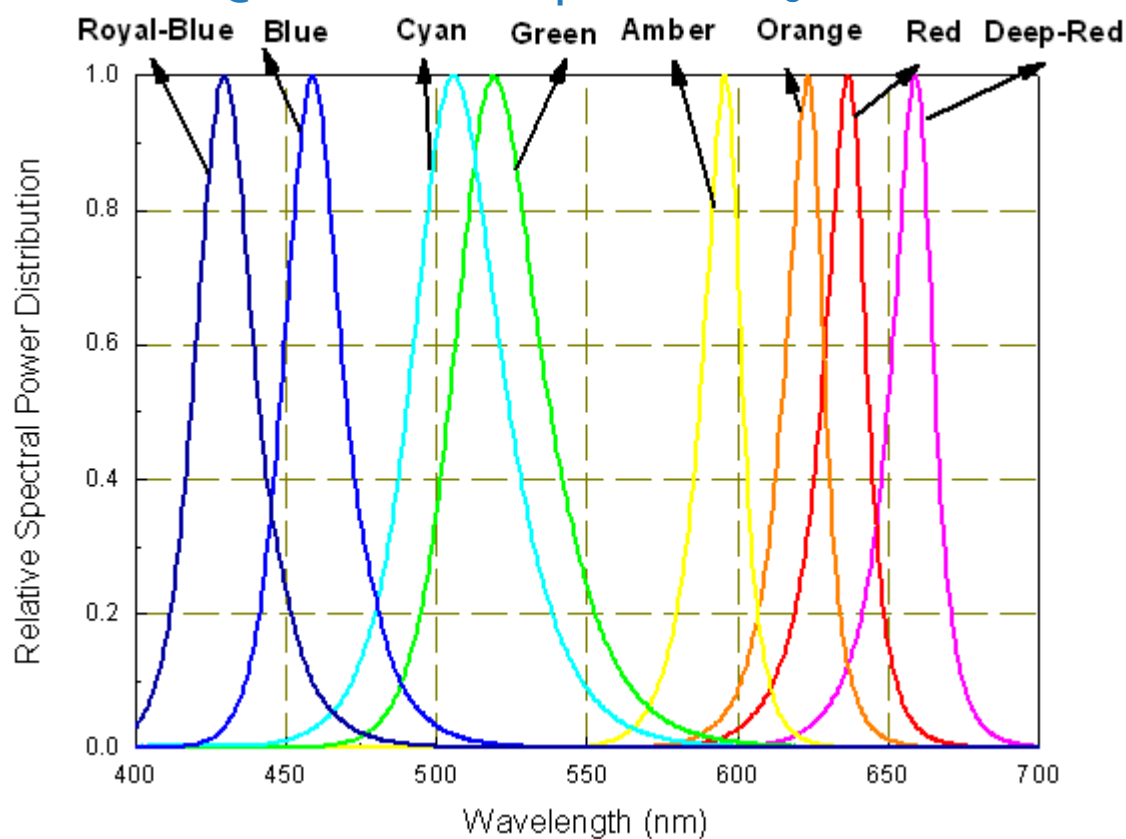


| Profile Feature              | Lead Free Assembly |
|------------------------------|--------------------|
| Ramp-Up Rate                 | 2-3 °C/S           |
| Preheat Temperature          | 150-200 °C         |
| Preheat Time ( $t_s$ )       | 60-120 S           |
| Liquid Temperature ( $T_L$ ) | 217 °C             |
| Time maintained above $T_L$  | 60-90 S            |
| Peak Temperature ( $T_P$ )   | 240±5 °C           |
| Peak Time ( $t_P$ )          | Max 20 S           |
| Ramp-Down Rate               | 3-5 °C/S           |

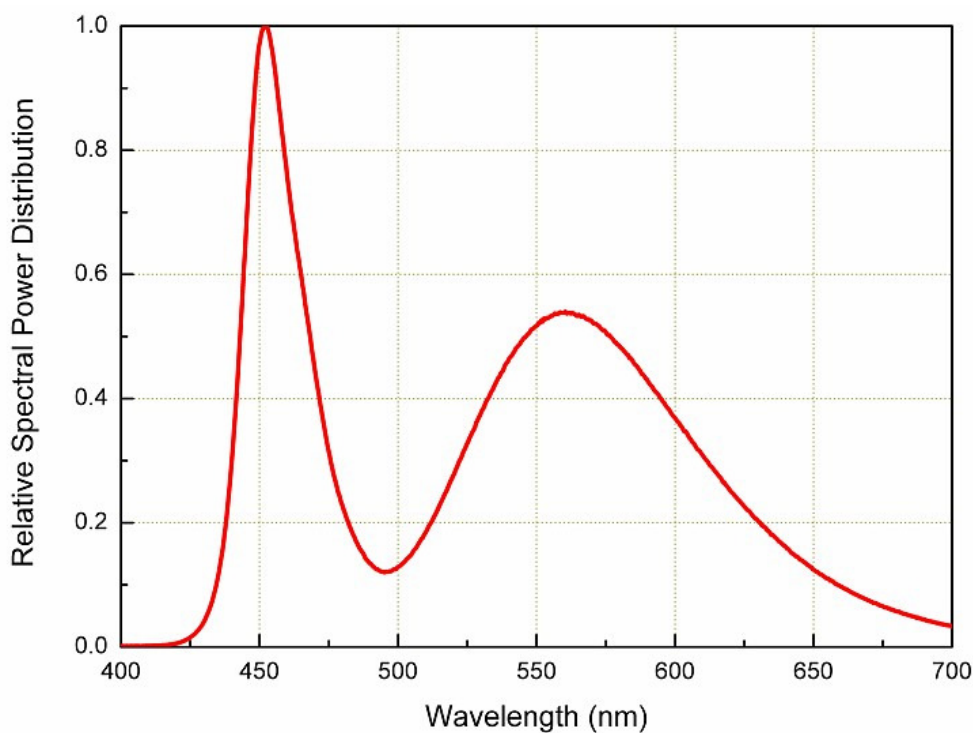
- Reflow soldering should not be done more than twice.
- In soldering process, stress on the LEDs during heating should be avoided.
- After soldering, do not bend the circuit board.

## Wavelength Characteristics

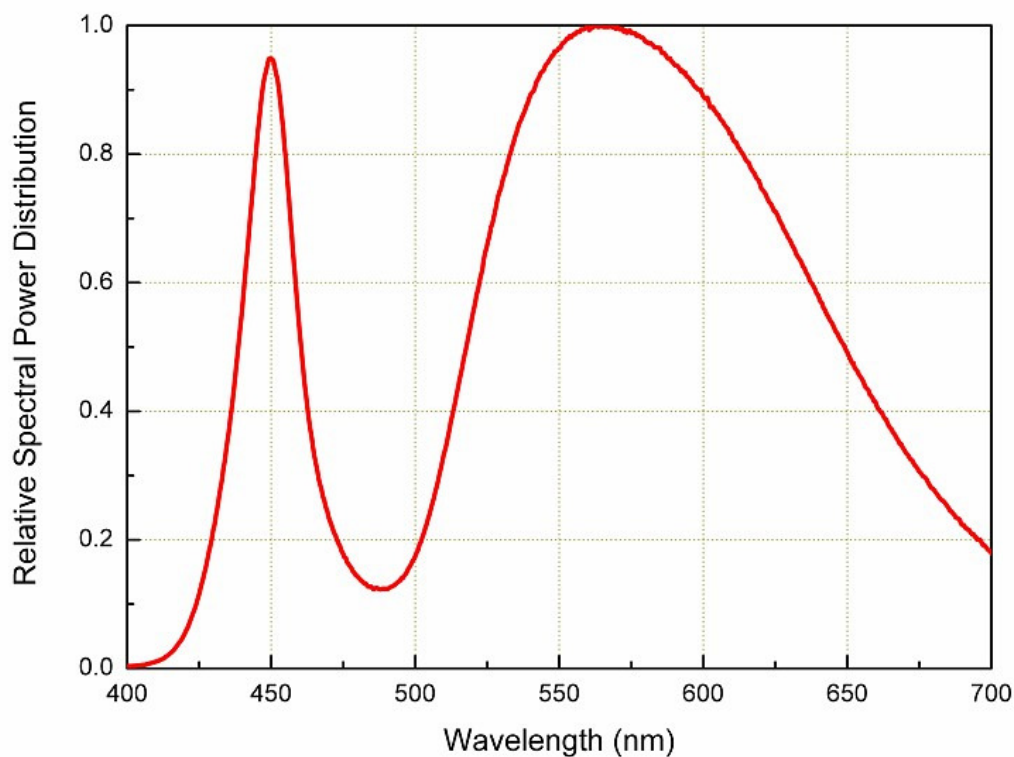
For Deep-Red, Red, Amber, Yellow, Green, Cyan, Blue, Royal-Blue  
@ Thermal Pad Temperature = 25°C



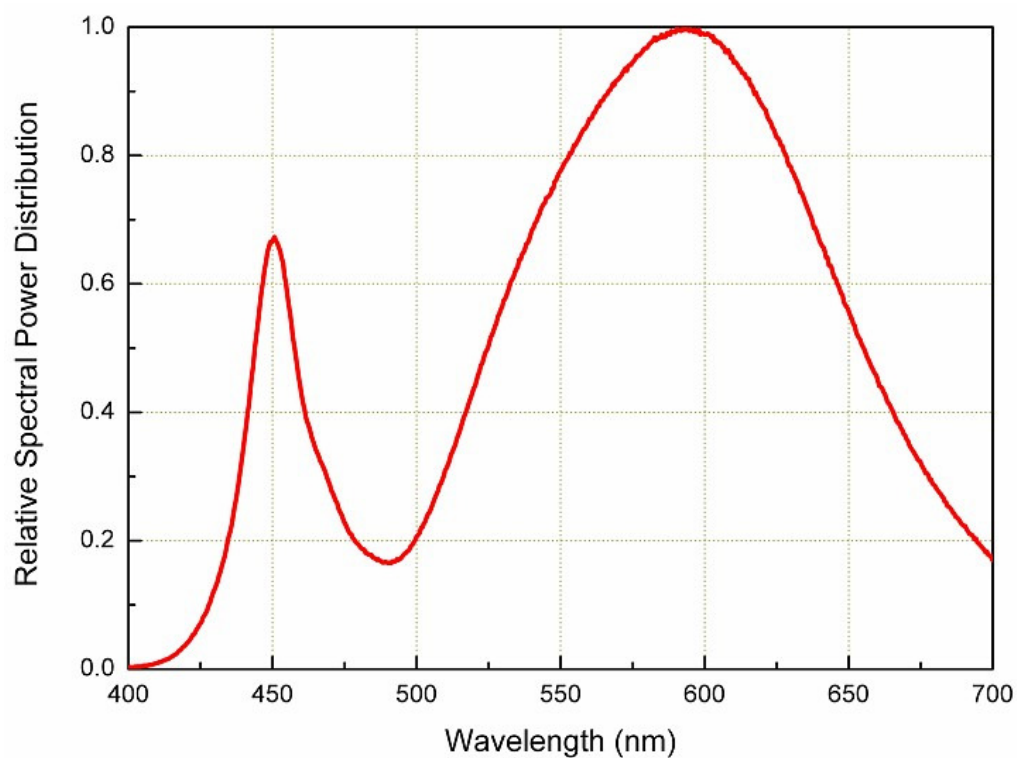
For Cool-White, @ Thermal Pad Temperature = 25°C



For Neutral-White, @ Thermal Pad Temperature = 25°C

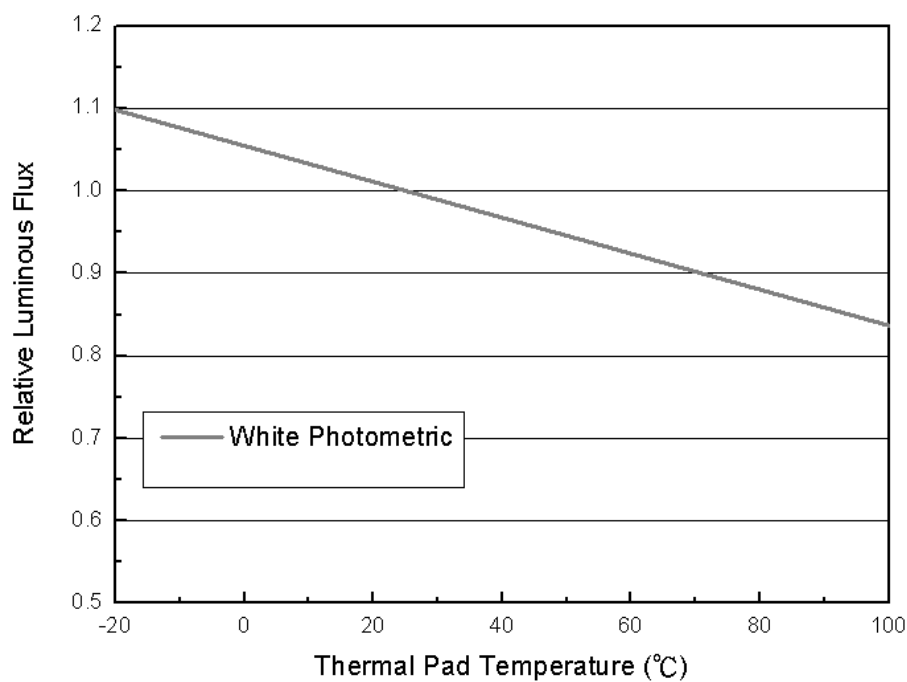


For Warm-White, @ Thermal Pad Temperature = 25°C



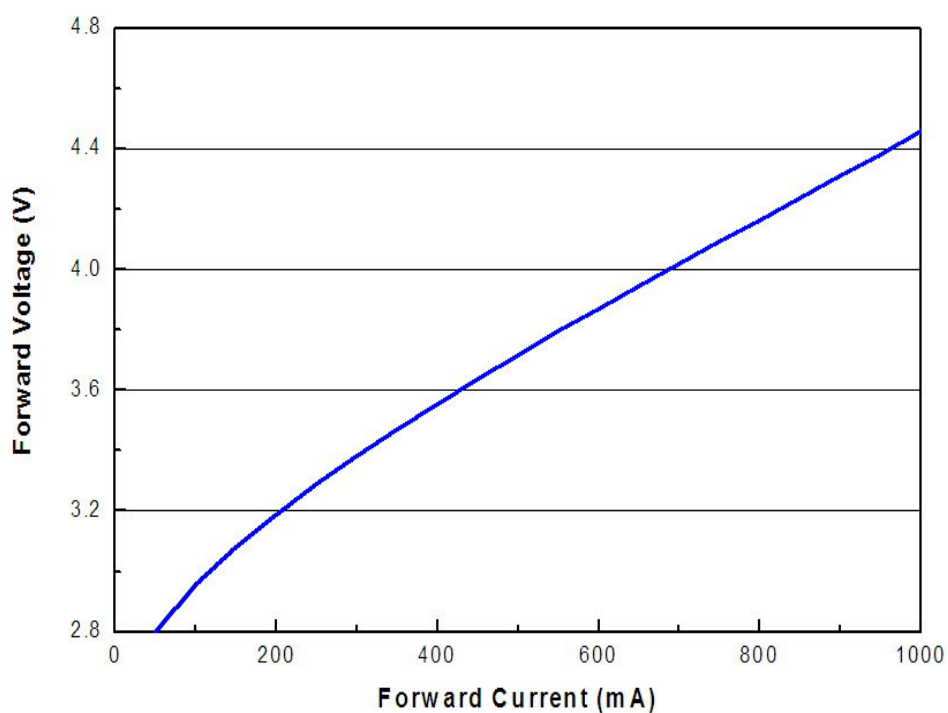
## Typical Light Output Characteristic V.S. Thermal Pad Temperature

Cool-White, Neutral-White, Warm-White, for 700mA Drive Current



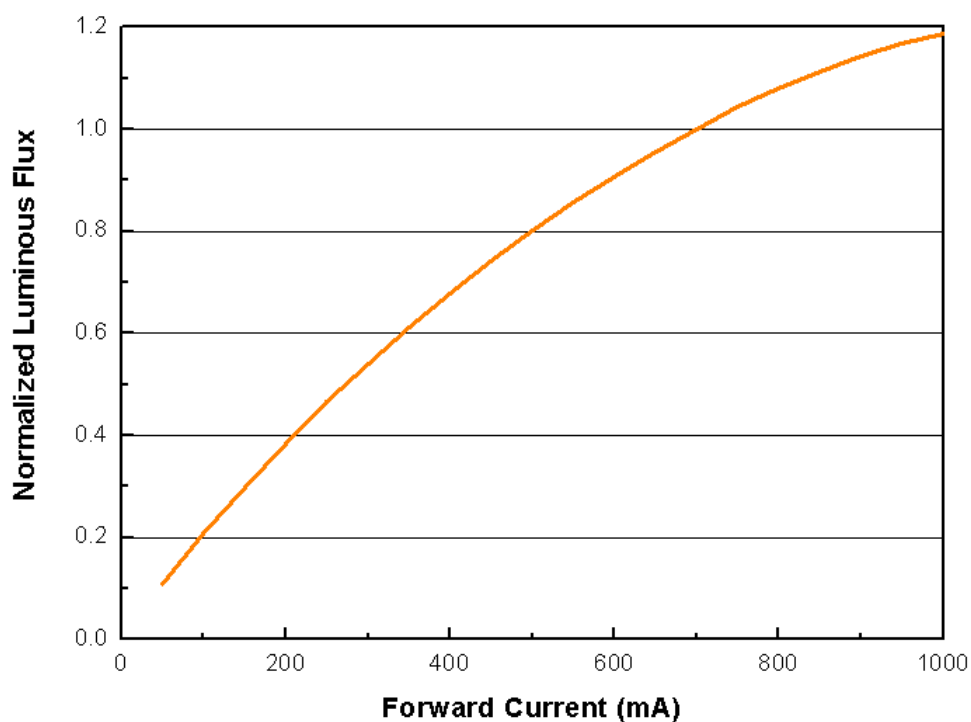
## Typical Electrical Characteristics

For Cool-White, Neutral-White, Warm-White, Green, Cyan, Blue, Royal-Blue  
@ Thermal Pad Temperature = 25°C



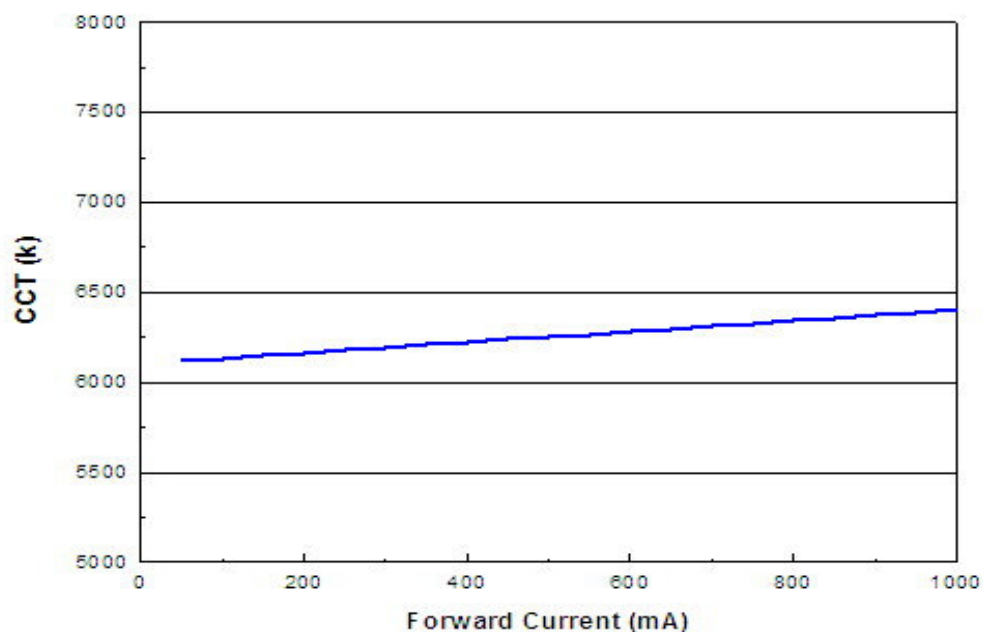
## Typical Relative Luminous Flux V.S. Forward Current

For Cool-White, Neutral-White, Warm-White  
@ Thermal Pad Temperature = 25°C

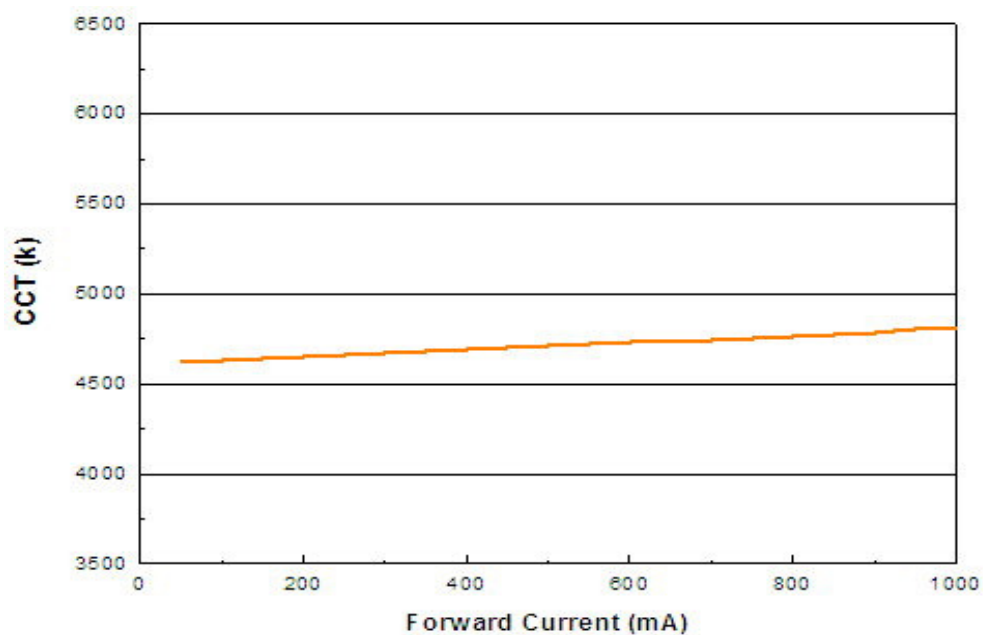


## Typical Wavelength & CCT Shift Characteristics V.S. Forward Current

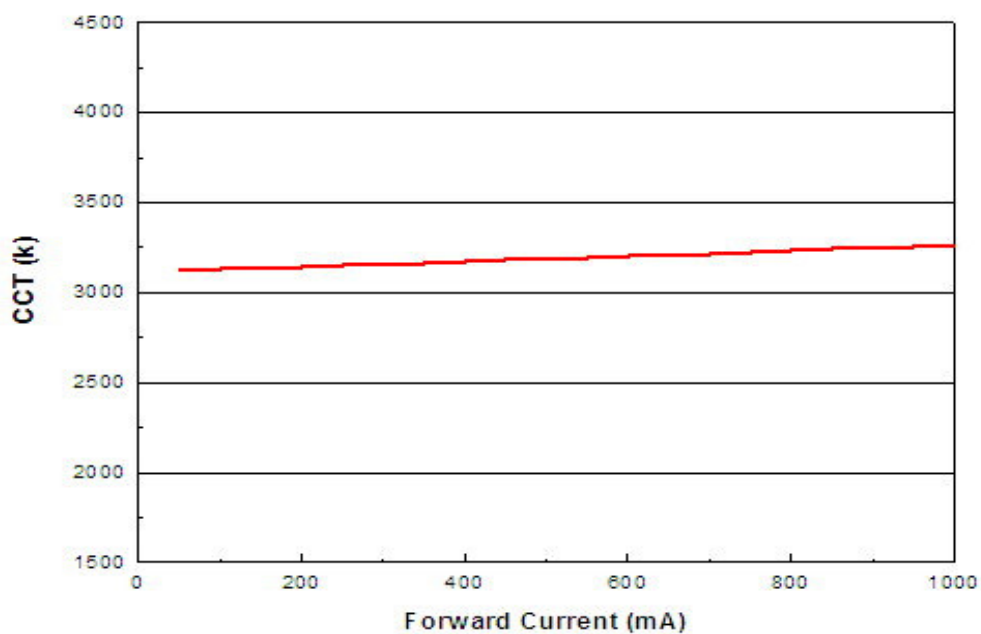
For Cool-White @ Thermal Pad Temperature = 25°C



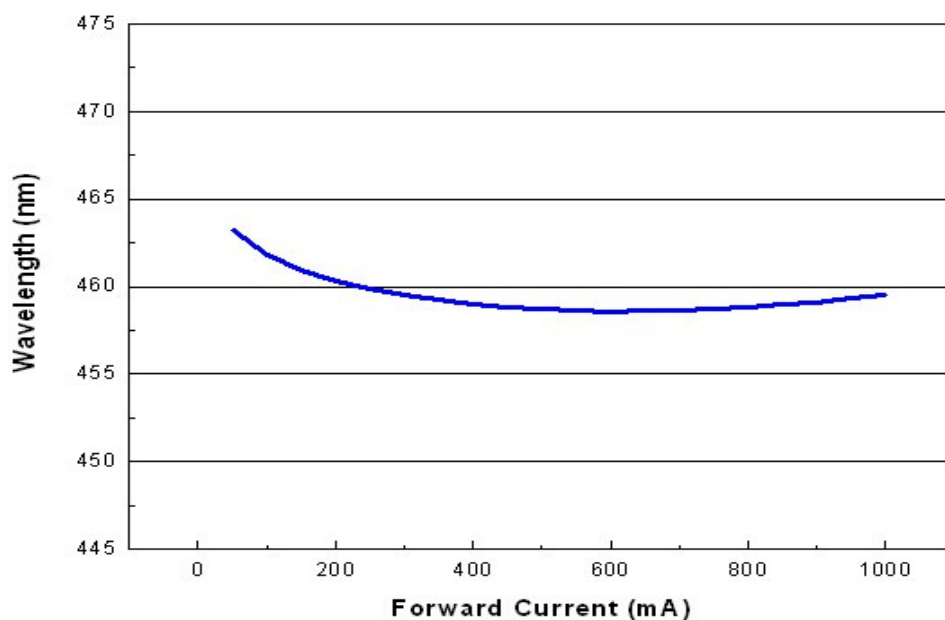
For Neutral-White @ Thermal Pad Temperature = 25°C



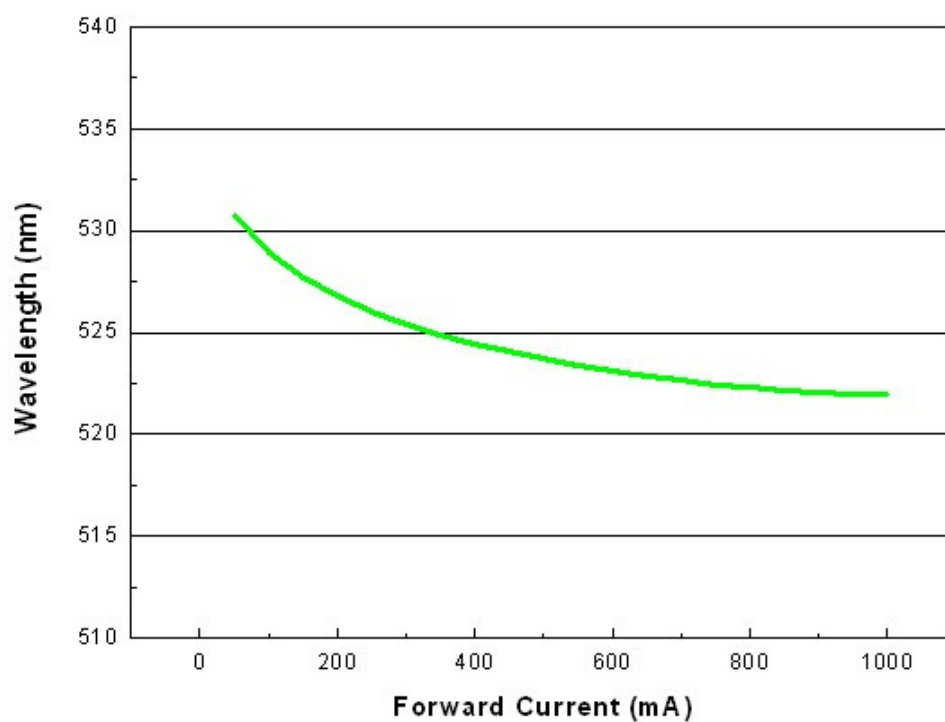
For Warm-White @ Thermal Pad Temperature = 25°C



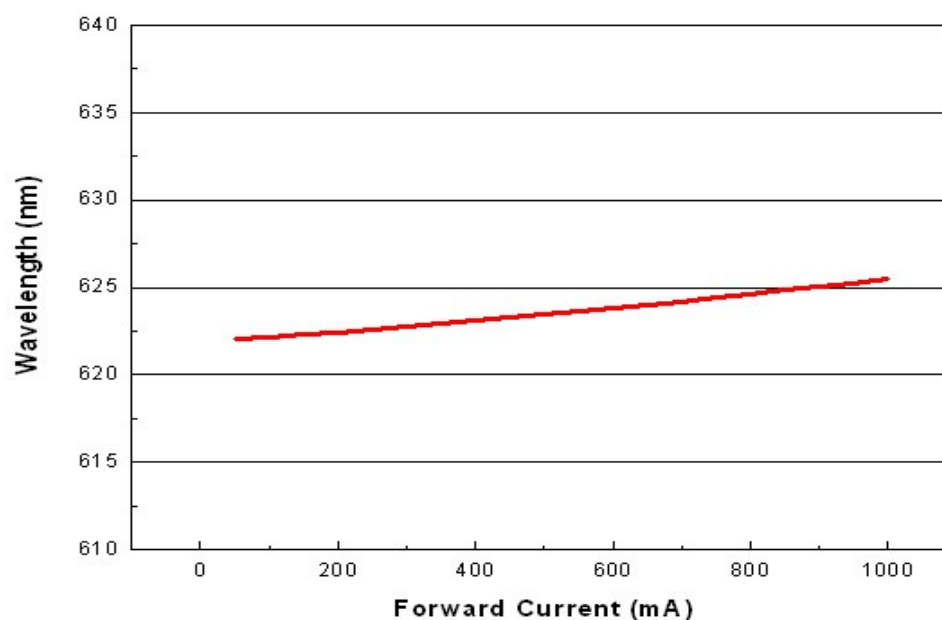
For Blue @ Thermal Pad Temperature = 25°C



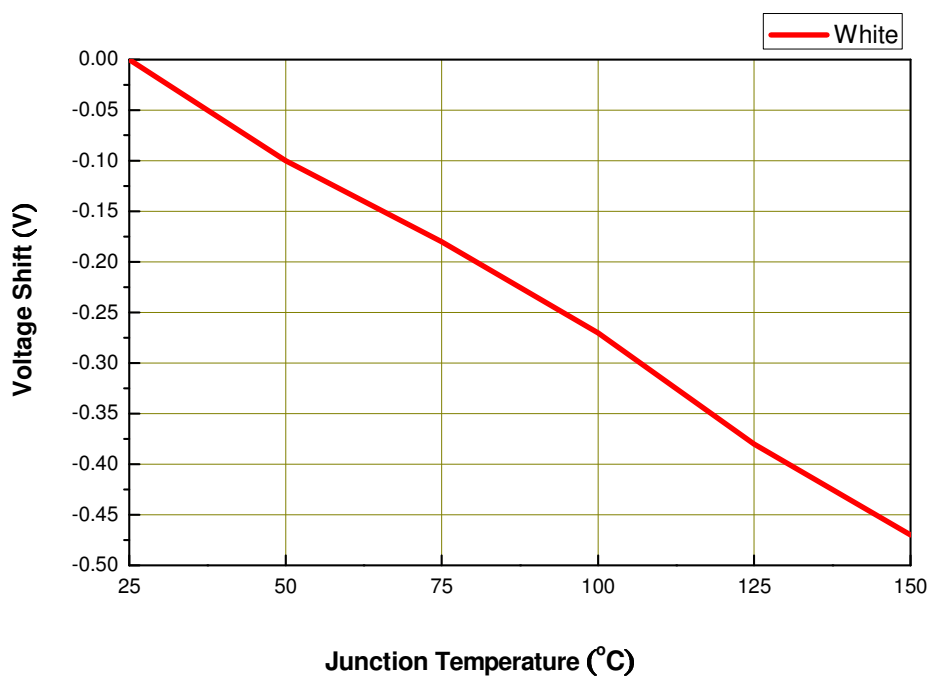
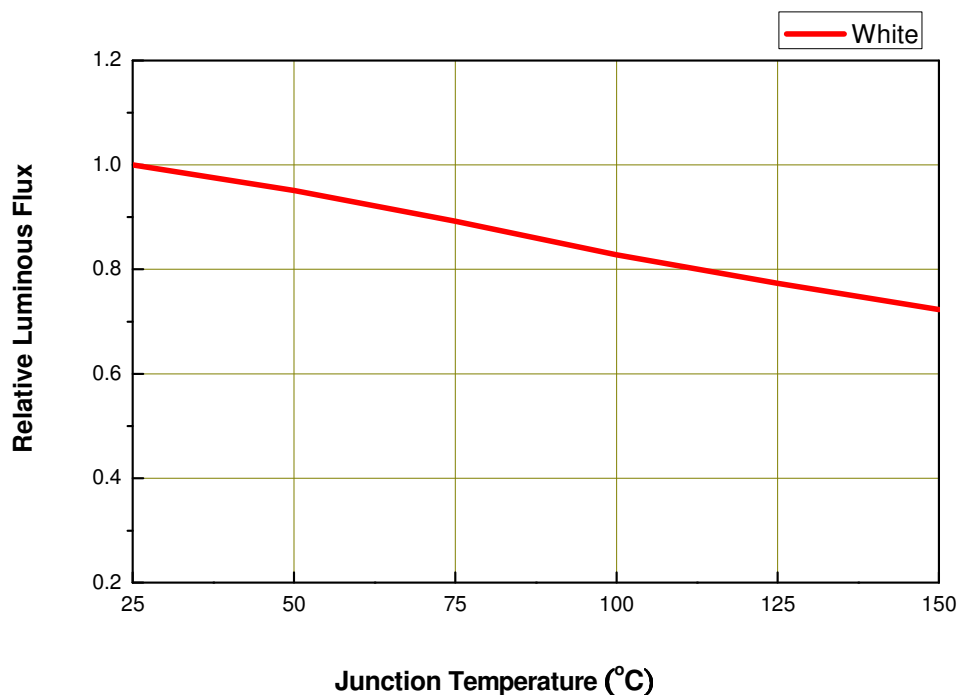
For Green @ Thermal Pad Temperature = 25°C



For Red @ Thermal Pad Temperature = 25°C



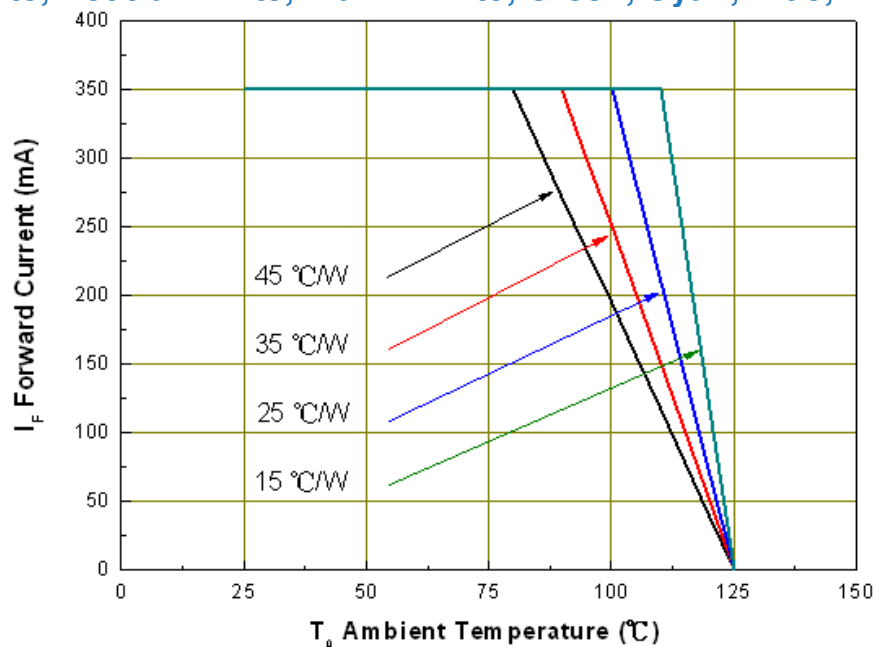
## Relative Flux and Forward Voltage V.S. Junction Temperature (IF = 350 mA)



## Current Derating Curves

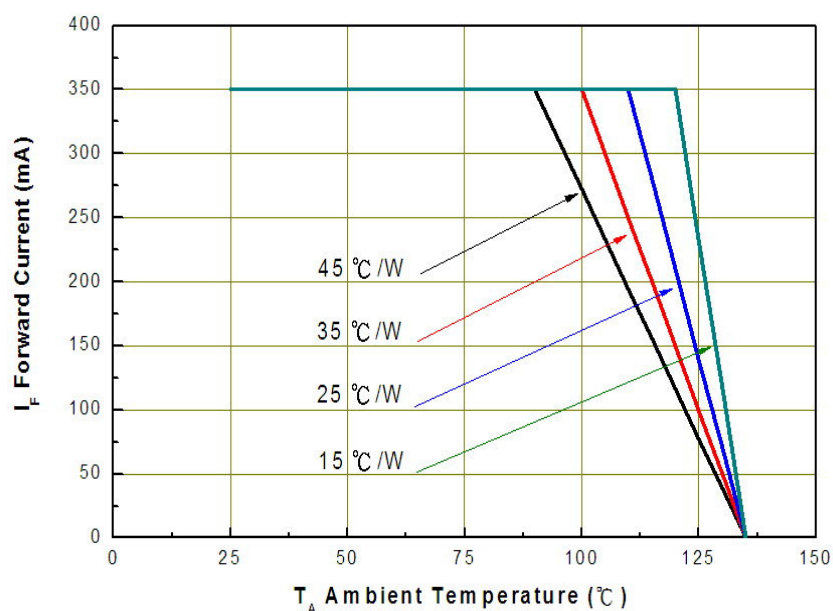
### Current Derating Curve for 700mA Drive Current

Cool-White, Neutral-White, Warm-White, Green, Cyan, Blue, Royal-Blue,



### Current Derating Curve for 700mA Drive Current

Far-Red, Deep-Red, Red, Amber, Yellow

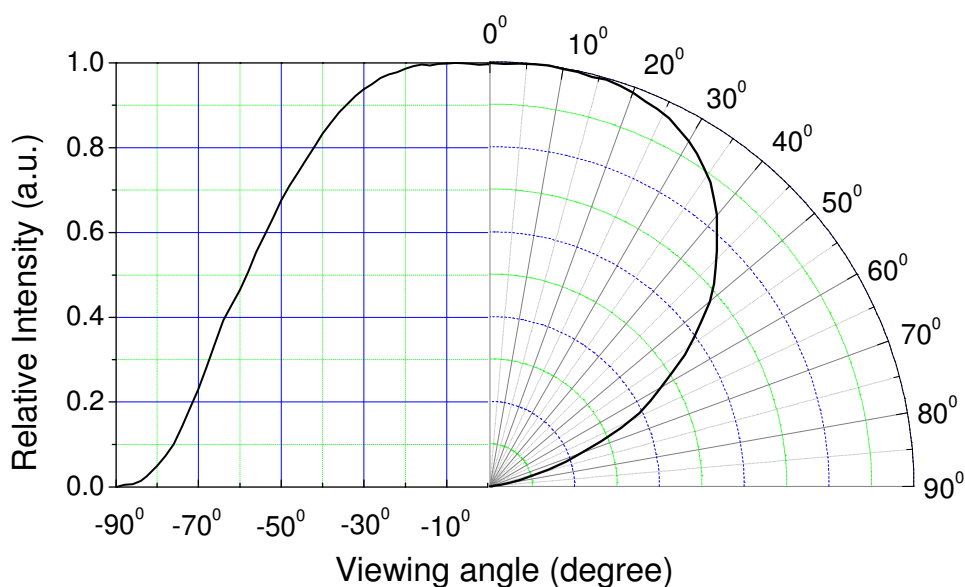


#### Note:

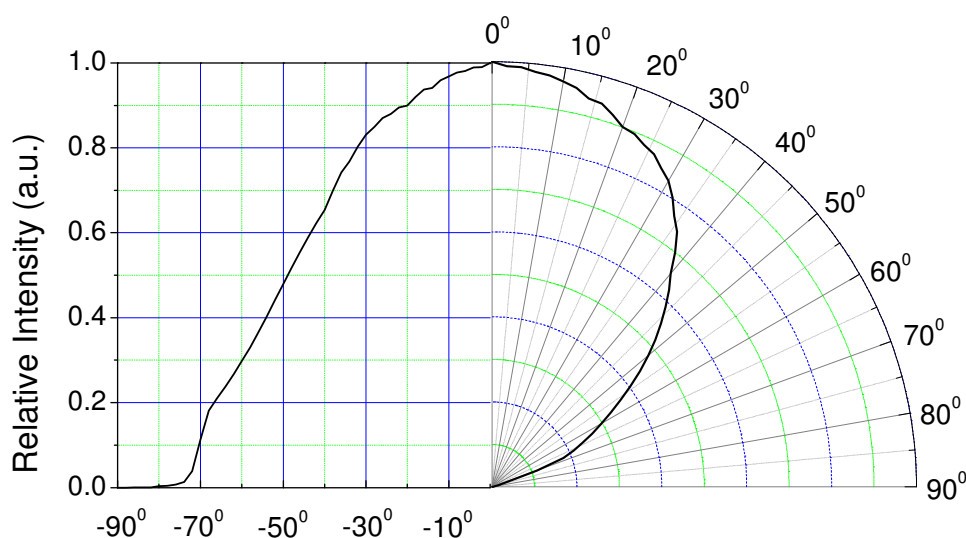
The current derating curves are depending on the thermal resistance between the junction to the soldering pad.

## Typical Radiation Patterns

### Shwo series: Typical Diagram Characteristics of Radiation for Cool-White, Neutral-White, Warm-White Lambertian



### Shwo High Luminous Series Typical Diagram Characteristics of Radiation for Cool-White, Neutral-White, Warm-White Lambertian



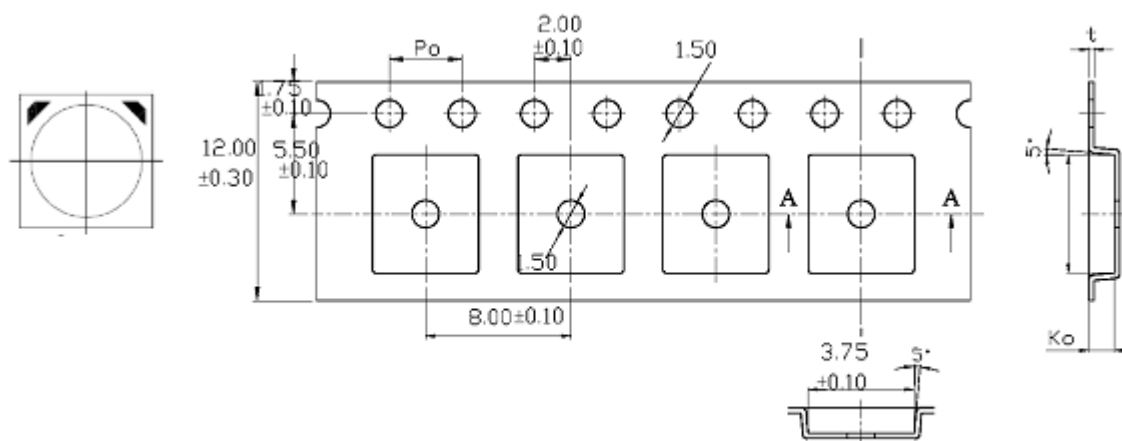
#### Notes:

1.  $2\theta_{1/2}$  is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is  $\pm 5^\circ$ .

## Emitter Tape Packaging

Carrier Tape Dimensions as the following:

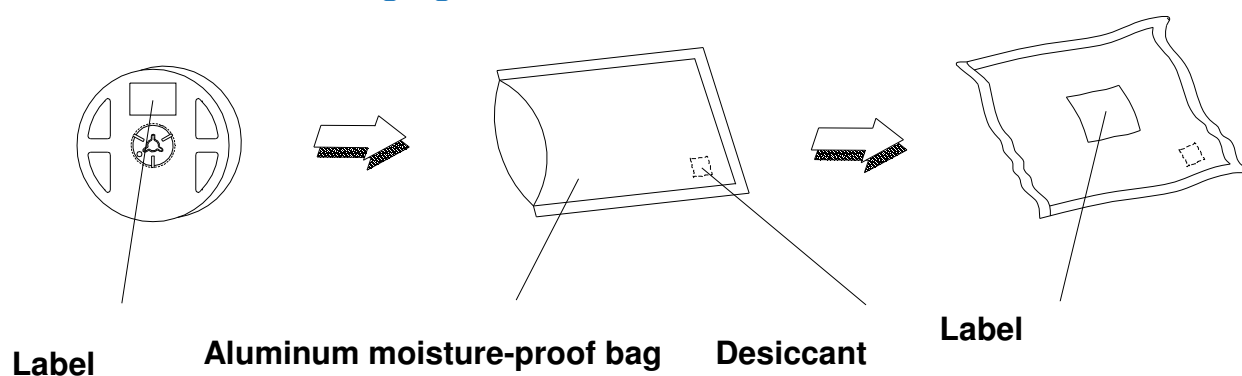
Reel: 400pcs,  $MOQ \geq 2Kpcs$  (has to be a multiple of 400pcs)



### Note:

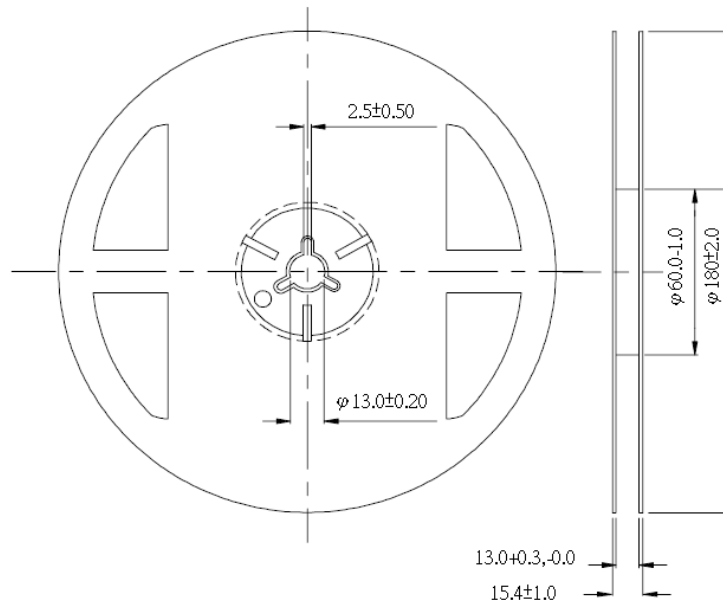
1. Dimensions are in millimeters.
2. Tolerances for fixed dimensions are  $\pm 0.1mm$ .

## Moisture Resistant Packaging



## Emitter Reel Packaging

### Reel Dimensions



#### Note :

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are  $\pm 0.1$ mm.

## Product Labeling

### Label Explanation

CPN: Customer Specification (when required)

P/N : Everlight Production Number

QTY: Packing Quantity

CAT: Luminous Flux (Brightness) Bin

HUE: Color Bin

REF: Forward Voltage Bin

LOT No: Lot Number

MADE IN TAIWAN: Production Place



## Storage Conditions

- Before the package is opened. The LEDs should be stored at 30°C or less and 85%RH or less after being shipped from Everlight and the storage life limits are 1 year. If the LEDs are stored for 1 year or more, they can be stored for 3 years in a sealed container with a nitrogen atmosphere and moisture absorbent material.
- After opening the package: The LED's floor life is 1 year under 30°C or less and 60%RH or less. The LED should be soldered with 168hrs (7days) after opening the package. If unused LEDs remain, it should be stored in moisture proof packages.
- If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: 60±5°C for 24 hours.

## Revision History

Current version: 10/28/2011

Device No. DHE-0001202

Version. 9.0

| Page                    | Subjects (major change in previous version)                                                   | Date of change |
|-------------------------|-----------------------------------------------------------------------------------------------|----------------|
| 3 、 4 、 7               | Modify Product Nomenclature 、 Absolute Maximum Ratings and remove color LEDs.                 | 08/30/10       |
| 5 、 7 、 14              | Add R,G,B,Y color LEDs.                                                                       | 10/11/10       |
| 5 、 6 、 7 、 8 、 30 、 34 | Added new PN, radiation patterns and storage conditions.                                      | 04/28/11       |
| 4                       | Modify Thermal Resistance                                                                     | 05/05/11       |
| 6 、 7 、 15 、 17         | Added new PN, Modify Forward Voltage Bins and Optical Characteristics of white LED series.    | 06/17/11       |
| 7 、 32                  | Add PN. Modify Carrier Tape Dimensions                                                        | 07/27/11       |
| 6 、 7 、 8               | Added new PN for 3-Step MacAdam (MC3) series and Modify series product Forward Voltage range. | 10/03/11       |
| 32 、 33                 | Remove MC3 & Modify the minimum amount of packaging & Modify Typical Radiation Patterns       | 10/28/11       |