

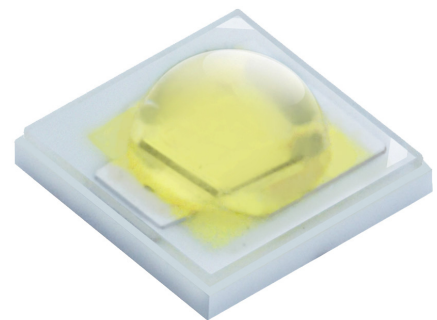
Shwo 1W Series



“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
- ◆ 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 ^[1]

D = color ^[2]

E = power consumption ^[3]

F = reserved for future product offerings

G = Internal code

H = packaging type ^[4]

IJ = internal code

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 |
|--------|---------------|---------------------------|
| R | Red | 620~630nm |
| O | Orange | 610~620nm |
| Y | Amber | 585~595nm |
| G | Green | 520~535nm |
| B | Blue | 460~470nm |
| C | Cool-White | 4745~7050K |
| N | Neutral-White | 3710~4745K |
| M | Warm-White | 2580~3710K |

3. Table of power consumptions:

| Symbol | Description |
|--------|-------------|
| 1 | 1W |

4. Table of packaging types:

| Symbol | Description |
|--------|-------------|
| P | Tape |
| B | Tube |

Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|------------------------------|-------------|---------------------------------|--------|
| Max. DC Forward Current (mA) | I_F | 400 ^[1] | mA |
| Max. Peak Pulse Current (mA) | I_{Pulse} | 1000 | mA |
| Max. ESD Resistance | V_B | 8000 | V |
| Reverse Voltage | V_R | Note 2 | V |
| Thermal Resistance | R_{th} | 10 ~ 12 ^[3] | °C/W |
| Max. Junction Temperature | T_J | 125/115 ^[4] | °C |
| Operating Temperature | T_{Opr} | -40 ~ +110/100 ^[5,6] | °C |
| Storage Temperature | T_{Stg} | -40 ~ +100 | °C |
| Max. Soldering Temperature | T_{Sol} | 260 | °C |
| Max. Allowable Reflow Cycles | n/a | 3 | cycles |

Notes:

1. Maximum forward current for 1W is 400mA ($T_{Thermal Pad}=25^{\circ}C$).
2. The Shwo series LEDs are not designed for reverse bias operation.
3. Thermal Resistance is 10°C/W for Blue, Green, and White LEDs and 12°C/W for Red, Orange, and Amber LEDs.
4. Maximum T_j is 125°C for Blue, Green, and White LEDs and 115°C for Red, Orange, and Amber LEDs.
5. Maximum Operating Temperature (Thermal Pad) is 110°C for Blue, Green, and White LEDs and 100°C for Red, Orange, and Amber LEDs.
6. Avoid operating Shwo LEDs at maximum operating temperature exceeding 1 hour.

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 | 1W | |
|---------------|---------------|---|-----------------------|
| | | Minimum Luminous Flux(lm) or Radiometric Power(mW) _[1] | Drive Current (mA) |
| Cool White | *ELSW – F81CX | 80 | 350 |
| | ELSW – F91CX | 90 | 350 |
| | *ELSW – J11CX | 100 | 350 |
| Neutral White | *ELSW – F71NX | 70 | 350 |
| | *ELSW – F81NX | 80 | 350 |
| | *ELSW – F91NX | 90 | 350 |
| Warm White | *ELSW – F61MX | 60 | 350 |
| | ELSW – F71MX | 70 | 350 |
| | *ELSW – F81MX | 80 | 350 |
| Red | ELSW – F51RX | 52 | 350 |
| | *ELSW – F61RX | 60 | 350 |
| Orange | *ELSW – F51OX | 52 | 350 |
| | *ELSW – F61OX | 60 | 350 |
| Amber | ELSW – F51YX | 52 | 350 |
| | *ELSW – F61YX | 60 | 350 |
| Green | *ELSW – F71GX | 70 | 350 |
| | ELSW – F81GX | 80 | 350 |
| Blue | *ELSW – E61BX | 13 | 350 |
| | ELSW – E71BX | 17 | 350 |

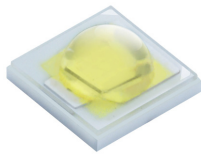
Notes:

1. Luminous flux measurement tolerance: ±10%.
2. The data of luminous flux measured at thermal pad=25°C
3. Typical luminous flux or light output performance is operated within the condition guided by this datasheet.
4. Please contact sales for timing and availability of P/N's marked with an asterisk "**".

PN of the Shwo series: White LEDs

The table below is a list of part numbers for the Everlight Shwo 1W series White LED. All parts listed match ANSI binning standards. Bin offerings of 6500K, 5700K, and 3000K are listed and currently available. CRI is also listed with a typical 75. 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-F81C1-0LPGS-C5700**, you will be specifying:



| Color | Radiation Pattern | CRI | CCT | Forward Voltage (V) | Minimum Luminous Flux (lm) |
|------------|-------------------|-----|-------------------------------------|---|----------------------------|
| Cool White | Lambertian | 75 | 57K-1 ~ 57K-2 ~ 57K-3 ~ 57K-4 | 2.95~3.25(V1) 3.25~3.55(V2) 3.55~3.85(V3) | 80 |

White, Shwo series LEDs at 350mA are listed below

| Color | Order Code of ELSW | Minimum Luminous Flux (lm) | CCT (K) Wavelength (nm) | Forward Voltage (V) | CRI (Typical) |
|-----------------|-------------------------|----------------------------|-------------------------|---------------------|---------------|
| Cool White 6500 | *ELSW-F81C1-0LPGS-C6500 | 80 | 6500-1~6500-4 | 2.95~3.85 | 75 |
| | ELSW-F91C1-0LPGS-C6500 | 90 | 6500-1~6500-4 | 2.95~3.85 | 75 |
| | *ELSW-J11C1-0LPGS-C6500 | 100 | 6500-1~6500-4 | 2.95~3.85 | 75 |
| Cool White 5700 | *ELSW-F81C1-0LPGS-C5700 | 80 | 5700-1~5700-4 | 2.95~3.85 | 75 |
| | ELSW-F91C1-0LPGS-C5700 | 90 | 5700-1~5700-4 | 2.95~3.85 | 75 |
| | *ELSW-J11C1-0LPGS-C5700 | 100 | 5700-1~5700-4 | 2.95~3.85 | 75 |
| Warm White 3000 | *ELSW-F61M1-0LPGS-C3000 | 60 | 3000-1~3000-4 | 2.95~3.85 | 80 |
| | ELSW-F71M1-0LPGS-C3000 | 70 | 3000-1~3000-4 | 2.95~3.85 | 80 |
| | *ELSW-F81M1-0LPGS-C3000 | 80 | 3000-1~3000-4 | 2.95~3.85 | 80 |

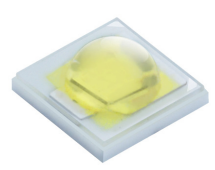
Note: 1. CRI measurement tolerance: ± 5 .

2. Please contact sales for timing and availability of P/N's marked with an asterisk "*"."

PN of the Shwo series: Color LEDs

The table below is a list of the binning options for the Everlight Shwo 1W series Color LED. Standard Everlight color bins are listed according to wavelength and represent the standard primary colors of the spectrum. These clearly listed binning options allow for proper design and implementation into lighting applications. The Order Codes below are currently available Color Shwo LEDs.

For Example: If you order product using P/N **ELSW-F51R1-0LPNM-AR5R6**, you will be specifying:



| Color Variant | Radiation Pattern | Dominant Wavelength (nm) | Forward Voltage (V) | Minimum Luminous Flux (lm) |
|---------------|-------------------|----------------------------|---|----------------------------|
| Red | Lambertian | 620~625(R5) 625~630(R6) | 1.75~2.05(U1) 2.05~2.35(U2) 2.35~2.65(U3) | 52 |

Color, Shwo series LEDs at 350mA are listed below.

| Color | Order Code of ELSW | Minimum Luminous Flux (lm) | Wavelength (nm) | Forward Voltage(V) |
|---------------|-------------------------|----------------------------|-----------------|--------------------|
| Red | ELSW-F51R1-0LPNM-AR5R6 | 52 | 620~630 | 1.75~2.65 |
| | *ELSW-F61R1-0LPNM-AR5R6 | 60 | 620~630 | 1.75~2.65 |
| Orange | *ELSW-F51O1-0LPNM-AR3R4 | 52 | 610~620 | 1.75~2.65 |
| | *ELSW-F61O1-0LPNM-AR3R4 | 60 | 610~620 | 1.75~2.65 |
| Amber | ELSW-F51Y1-0LPNM-AA3A5 | 52 | 585~592.5 | 1.75~2.65 |
| | *ELSW-F61Y1-0LPNM-AA3A5 | 60 | 585~592.5 | 1.75~2.65 |
| Green | *ELSW-F71G1-0LPNM-CG1G2 | 70 | 520~530 | 2.95~3.85 |
| | ELSW-F81G1-0LPNM-CG1G2 | 80 | 520~530 | 2.95~3.85 |
| | *ELSW-F71G1-0LPNM-CG2G3 | 70 | 525~535 | 2.95~3.85 |
| | *ELSW-F81G1-0LPNM-CG2G3 | 80 | 525~535 | 2.95~3.85 |
| Blue | *ELSW-E61B1-0LPNM-CB7B8 | 13 | 460~470 | 2.95~3.85 |
| | ELSW-E71B1-0LPNM-CB7B8 | 17 | 460~470 | 2.95~3.85 |

Note : Please contact sales for timing and availability of P/N's marked with an asterisk "*"".

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 |

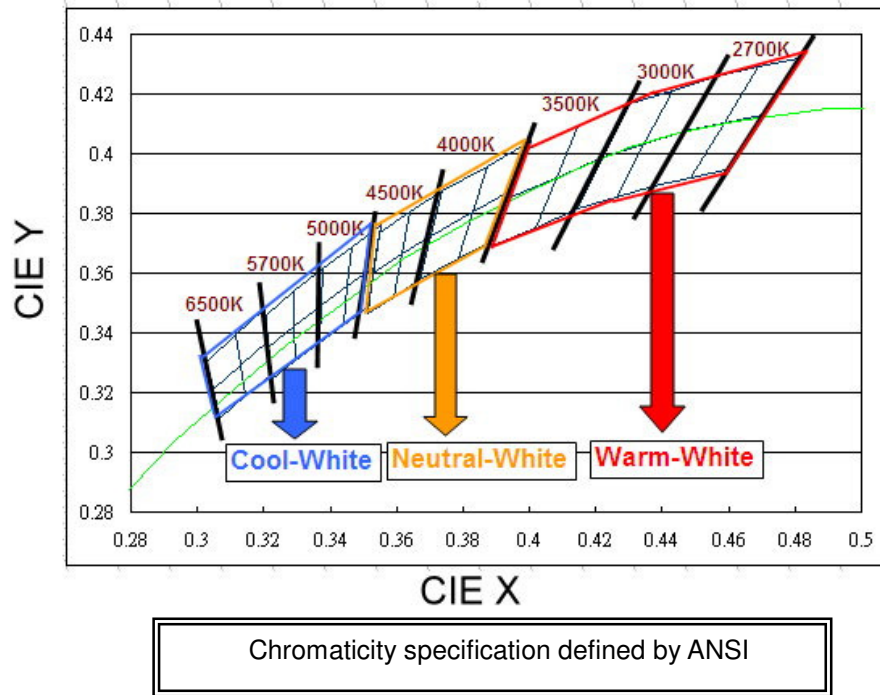
Note: Currently available brightness bins for White LEDs are highlighted and bolded.

Radiometric Power Bins

| Group | Bin | Minimum Radiometric Power(mW) | Maximum Radiometric Power(mW) |
|-------|-----|-------------------------------|-------------------------------|
| Q | 1 | 0 | 25 |
| | 2 | 25 | 50 |
| | 3 | 50 | 75 |
| | 4 | 75 | 100 |
| | 5 | 100 | 125 |
| | 6 | 125 | 175 |
| | 7 | 175 | 225 |
| | 8 | 225 | 275 |
| | 9 | 275 | 350 |

| Group | Bin | Minimum Radiometric Power(mW) | Maximum Radiometric Power(mW) |
|-------|-----|-------------------------------|-------------------------------|
| R | 1 | 350 | 425 |
| | 2 | 425 | 500 |
| | 3 | 500 | 600 |
| | 4 | 600 | 700 |
| | 5 | 700 | 800 |
| | 6 | 800 | 900 |
| | 7 | 900 | 1000 |
| | 8 | 1000 | 1300 |
| | 9 | 1300 | 1600 |

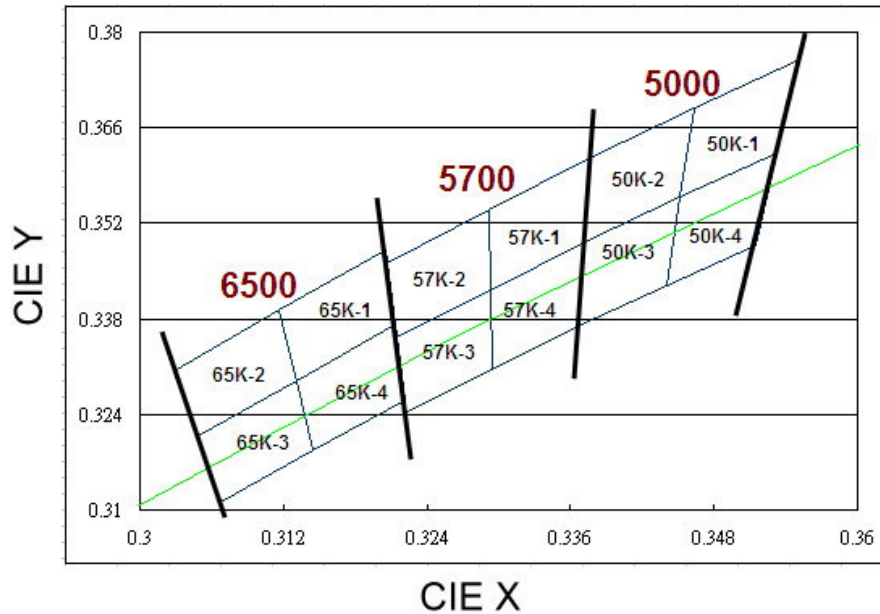
White Bin Structure



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 : ± 0.01
5. Color bins are defined at $I_f=350\text{mA}$ 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

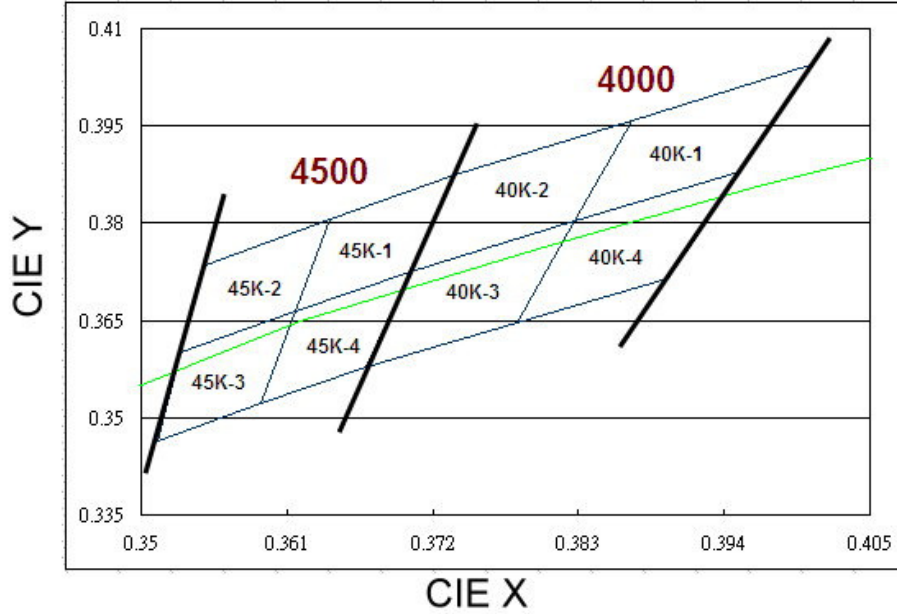
| Bin | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 65K-1 | 0.312 | 0.339 |
| | 0.313 | 0.329 |
| | 0.321 | 0.337 |
| | 0.321 | 0.348 |
| Reference Range: 6020~6500K | | |

| 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 |
| | 0.314 | 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 |
| | 0.314 | 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

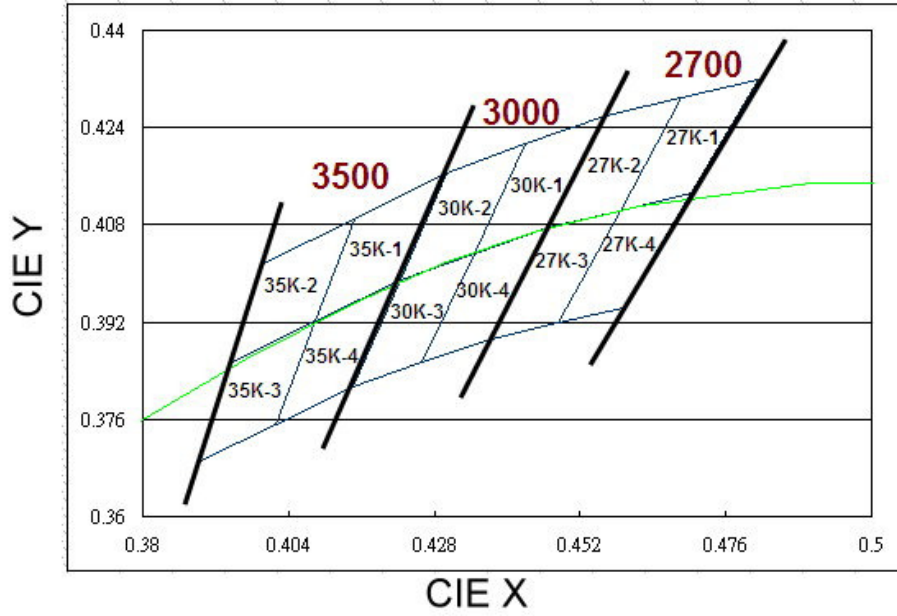
| Bin | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 45K-1 | 0.364 | 0.381 |
| | 0.362 | 0.366 |
| | 0.370 | 0.373 |
| | 0.374 | 0.387 |
| Reference Range: 4260~4500K | | |

| 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 |
| B | U2+U3+U4 |
| C | V1+V2+V3 |
| D | V2+V3+V4 |
| E | V3+V4+V5 |
| F | V1+V2 |
| G | V1 |
| H | 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 |
| V5 | 4.15 | 4.45 |

Notes:

1. Forward voltage measurement tolerance: $\pm 0.1V$.
2. Forward voltage bins are defined at $I_f=350mA$ operation.
3. Currently available Forward Voltage bins for White LEDs are highlighted and bolded.
4. Other Forward Voltage bins for White LEDs available upon request. Please contact your local Everlight sales office.

Color Bins

| Group | Bin | Minimum Dominant Wavelength (nm) | Maximum Dominant Wavelength (nm) |
|---------------------|-----|----------------------------------|----------------------------------|
| B (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 |
| G (Green) | 1 | 520 | 525 |
| | 2 | 525 | 530 |
| | 3 | 530 | 535 |
| | 4 | 535 | 540 |
| | 5 | 540 | 545 |
| | 6 | 545 | 550 |
| A (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 |
| R (Red) | 3 | 610 | 615 |
| | 4 | 615 | 620 |
| | 5 | 620 | 625 |
| | 6 | 625 | 630 |

Notes:

1. Dominant wavelength measurement tolerance: $\pm 0.5\text{nm}$.
2. Dominant wavelength bins are defined at $I_f=350\text{mA}$ operation.

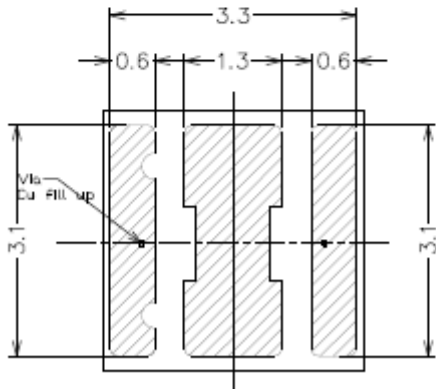
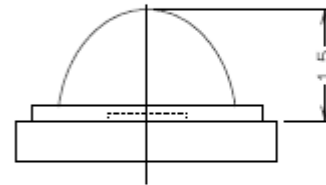
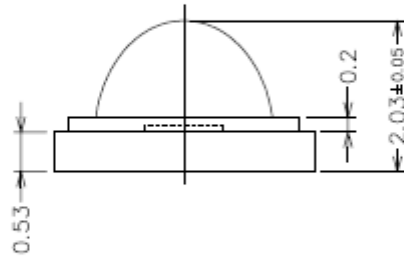
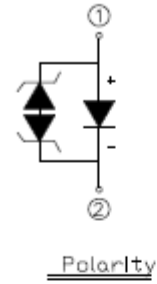
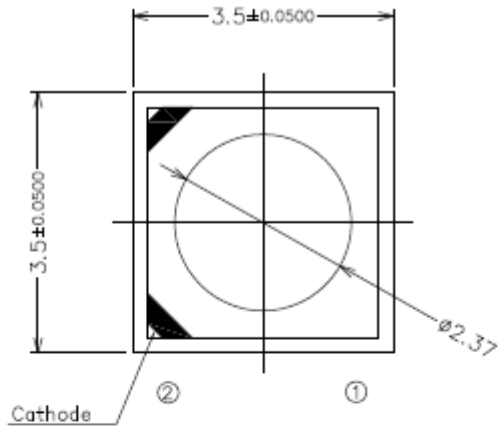
Optical Characteristics

| Color | Part Number | Dominant Wavelength λ_D Peak Wavelength λ_P Color Temperature CCT | | | Typical Temperature Coefficient of Dominant Wavelength (nm/°C)-($\Delta\lambda_D/\Delta T_J$) | Typical Viewing Angle (degrees) $2\theta_{1/2}$ |
|---------------|--------------|---|-------|-------|--|--|
| | | Min. | Typ. | Max. | | |
| Cool-White | ELSW – XX1CX | 4745K | 5700K | 7050K | --- | 115 |
| Neutral-White | ELSW – XX1NX | 3710K | 4260K | 4745K | --- | 115 |
| Warm-White | ELSW – XX1MX | 2580K | 3000K | 3710K | --- | 115 |
| Red | ELSW – XX1RX | 620nm | --- | 630nm | 0.05 | 115 |
| Orange | ELSW – XX1OX | 610nm | --- | 620nm | 0.08 | 115 |
| Amber | ELSW – XX1YX | 585nm | --- | 595nm | 0.1 | 115 |
| Green | ELSW – XX1GX | 520nm | --- | 535nm | 0.05 | 115 |
| Blue | ELSW – XX1BX | 460nm | --- | 470nm | 0.05 | 115 |

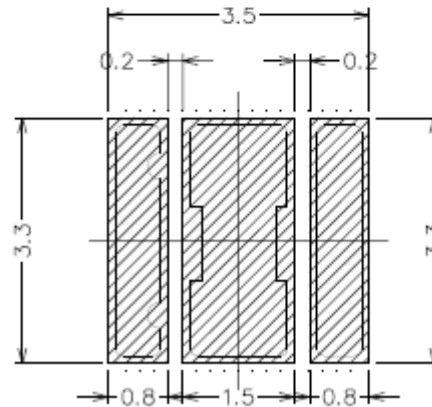
Notes:

1. The test tolerance of Everlight is $\pm 0.5\text{nm}$ for dominant wavelength, $\pm 5\%$ for CCT.
2. Viewing angle is the width of half the light output intensity in all directions of 180° .
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).

Mechanical Dimension



Solder pad design

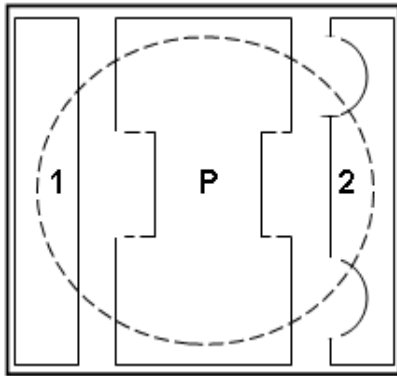


Soldering patterns

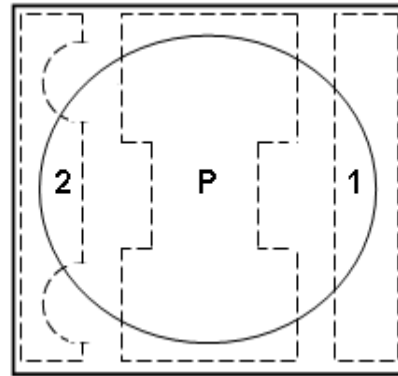
Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 0.1 mm.
3. Do not handle the device by the lens. Incorrect force applied to the lens may lead to the failure of devices.
4. The thermal pad is electrically isolated from the Anode and Cathode contact pads.

Pad Configuration



BOTTOM VIEW



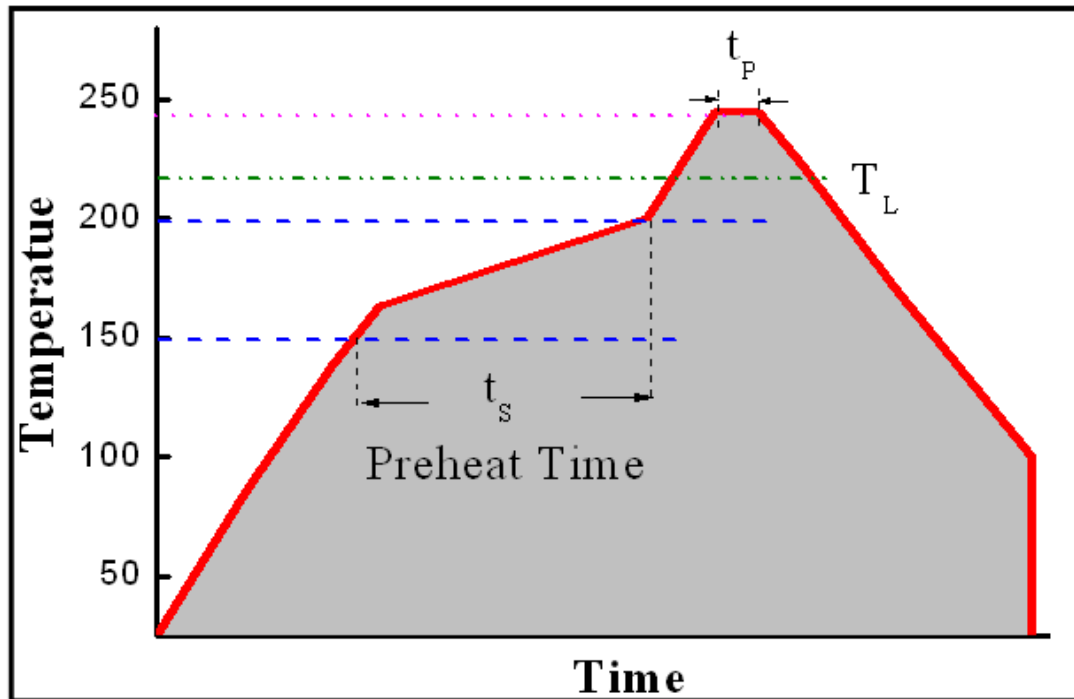
TOP VIEW

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

Reflow Soldering Characteristics

For Reflow Process

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

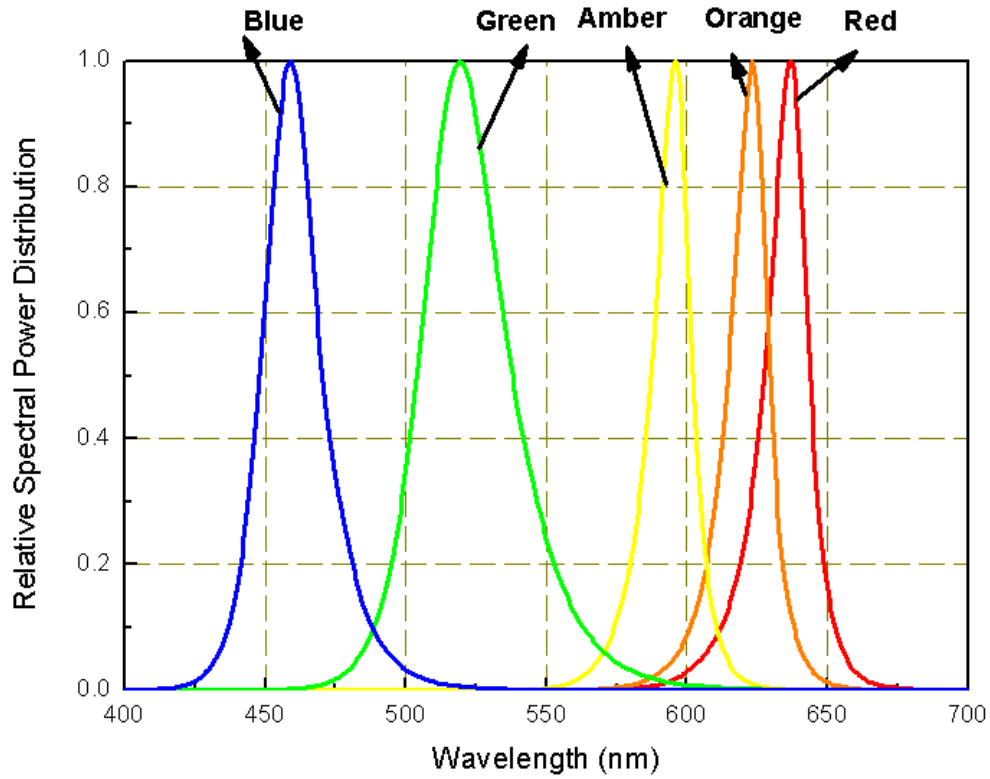


| Profile Feature | Lead Free Assembly |
|------------------------------|--------------------|
| Ramp-Up Rate | 2-3 °C/S |
| Preheat Temperature | 150-200 °C |
| Preheat Time (t_s) | 60-120 S |
| Liquid Temperature (T_L) | 217 °C |
| Time maintained above T_L | 60-90 S |
| Peak Temperature (T_p) | 240±5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

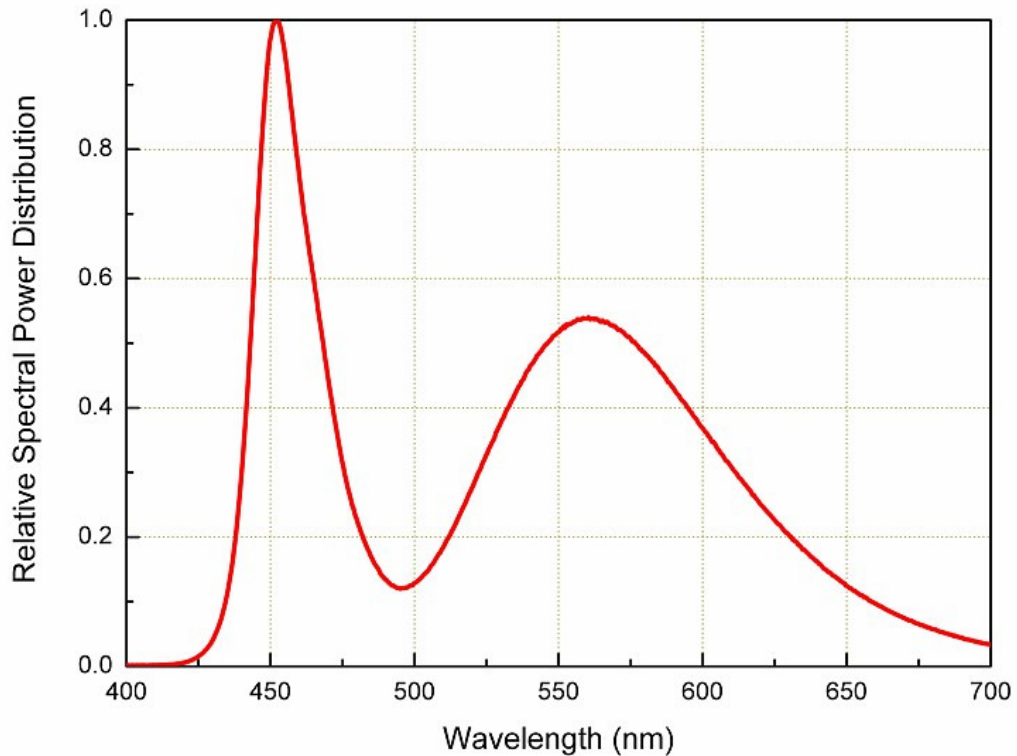
- c. Reflow soldering should not be done more than twice.
- d. In soldering process, stress on the LEDs during heating should be avoided.
- e. After soldering, do not bend the circuit board.

Wavelength Characteristics

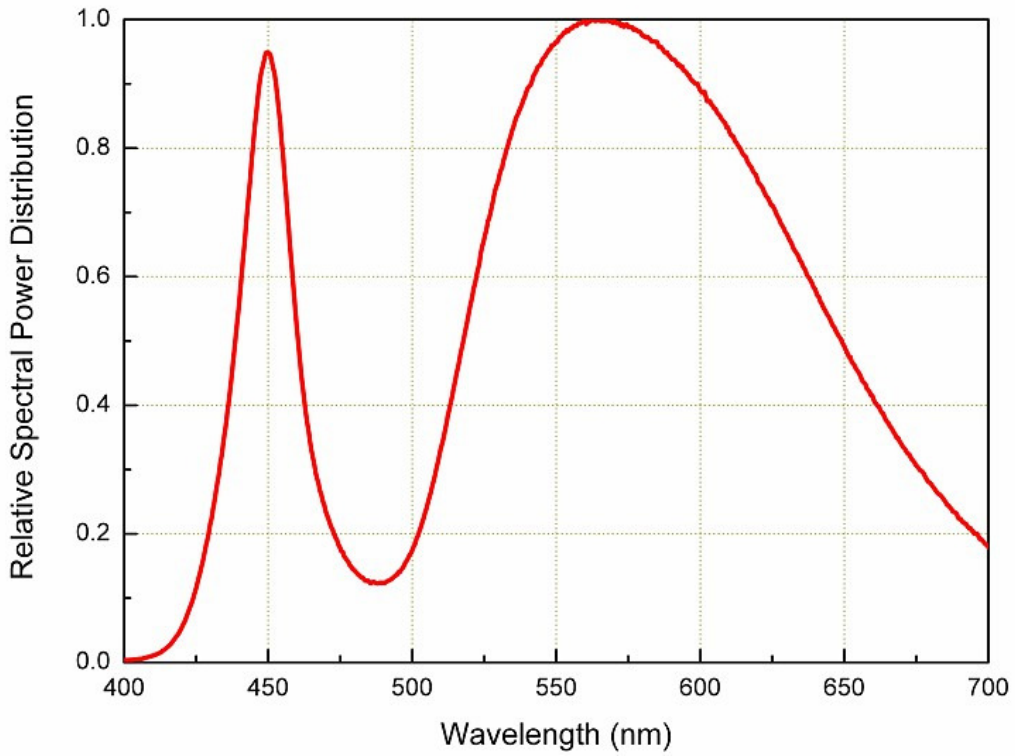
For Red, Amber, Yellow, Green, Blue
@ Thermal Pad Temperature = 25°C



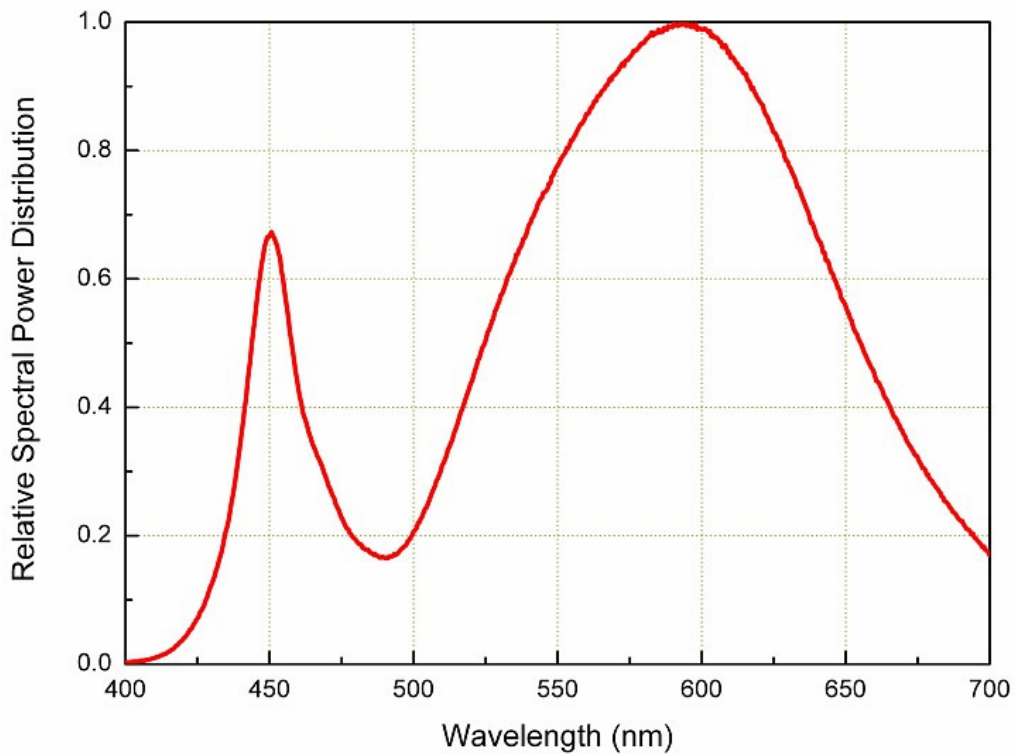
For Cool-White, @ Thermal Pad Temperature = 25°C



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

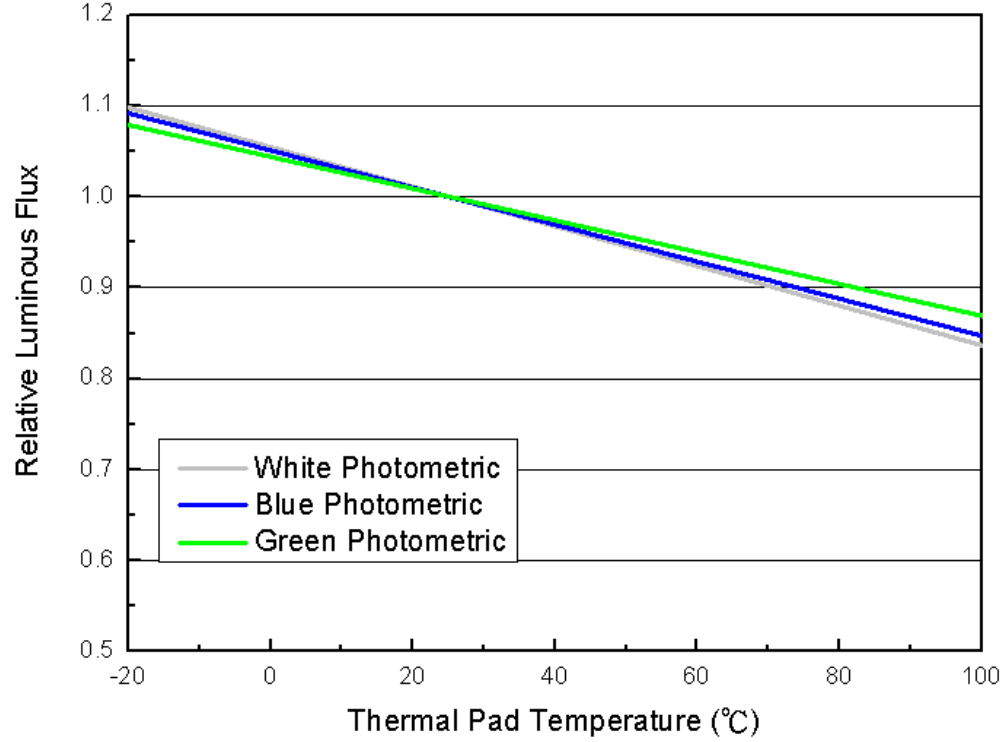


For Warm-White, @ Thermal Pad Temperature = 25°C

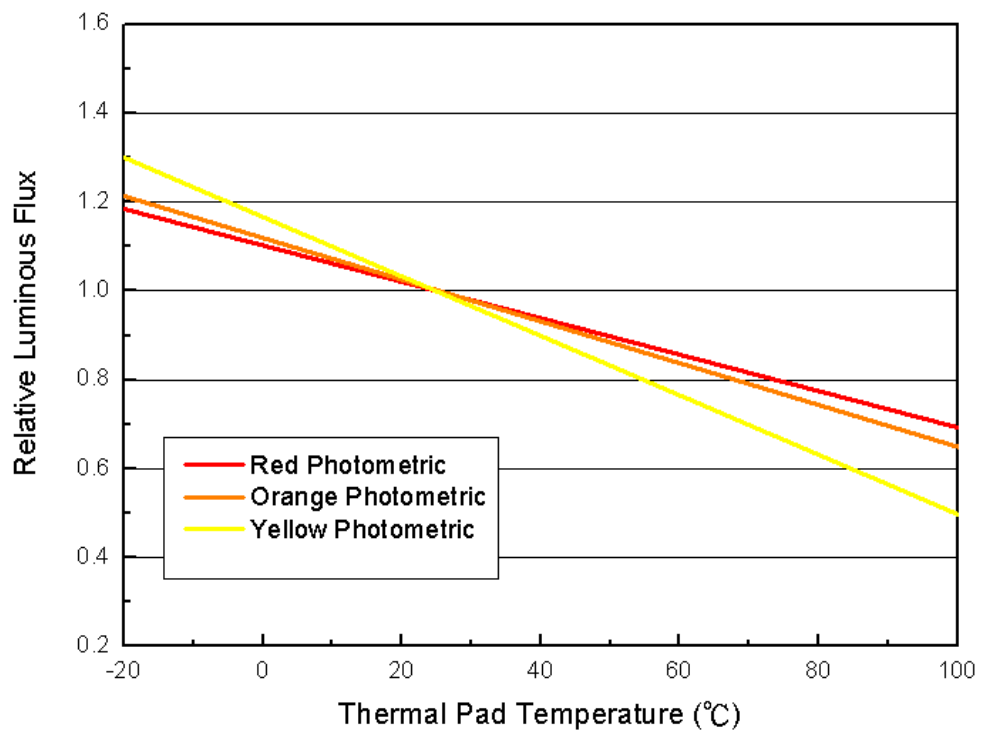


Typical Light Output Characteristic vs. Thermal Pad Temperature

Cool-White, Neutral-White, Warm-White, Green, Blue for 350mA Drive Current

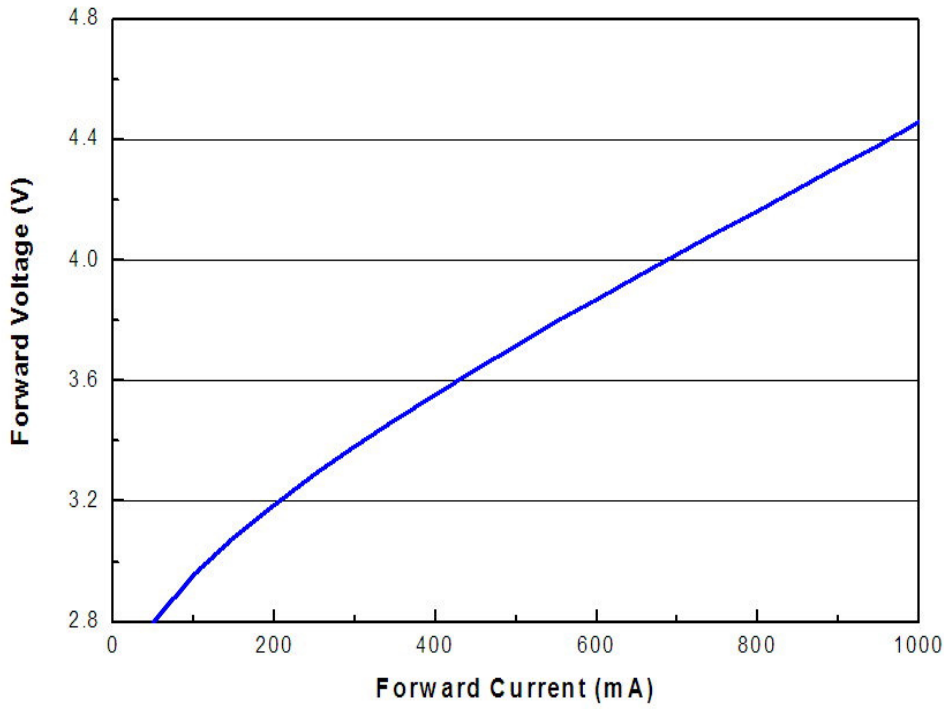


Red, Orange, Amber for 350mA Drive Current

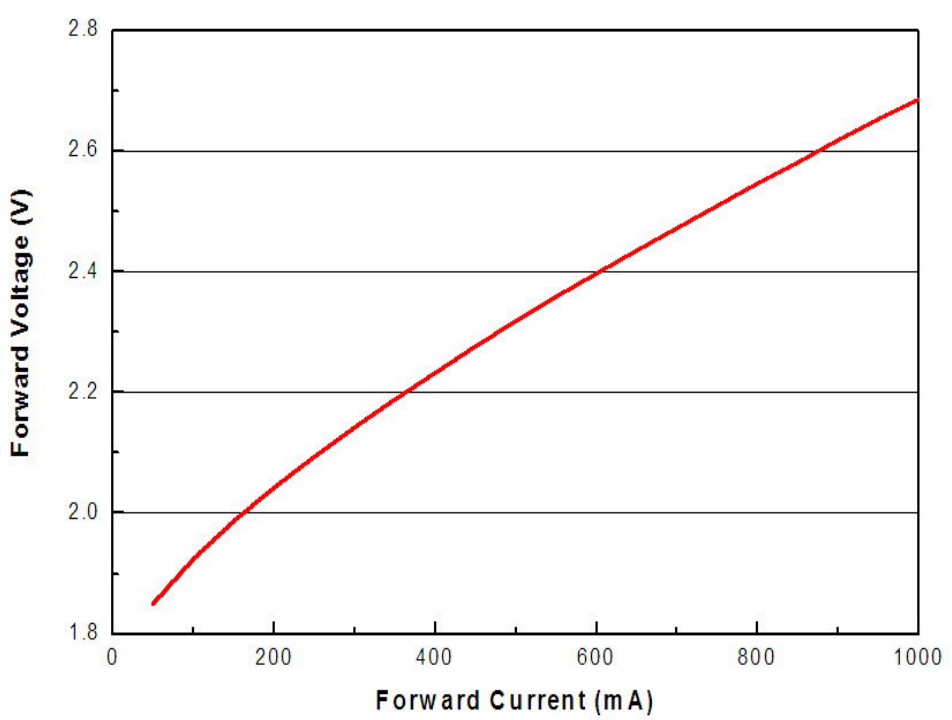


Typical Electrical Characteristics

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

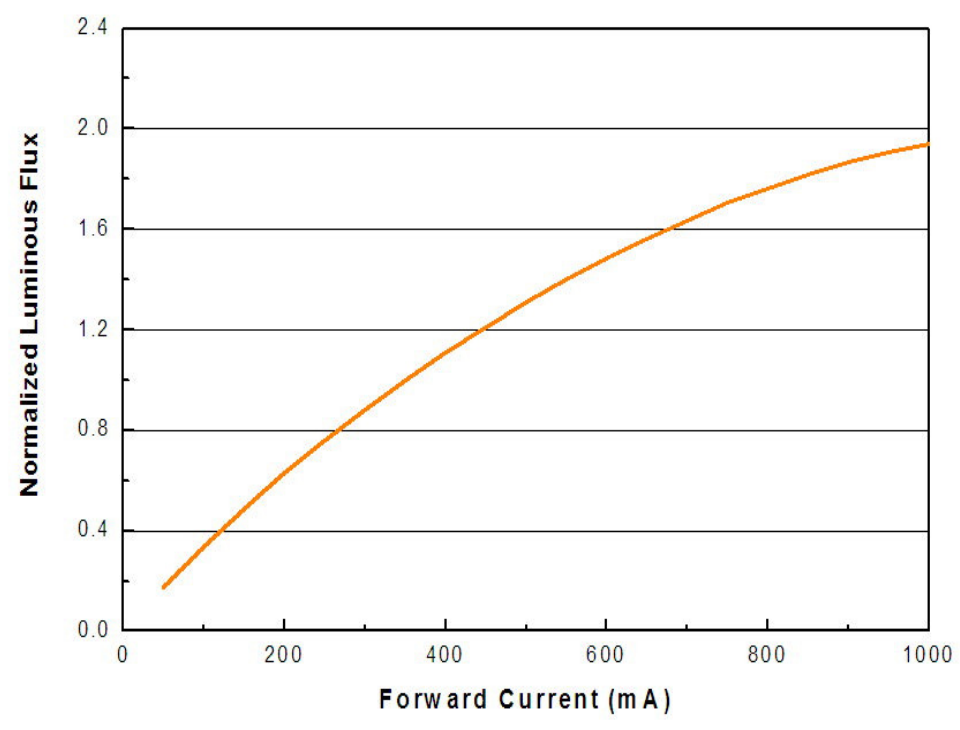


For Red, Orange, Amber,
@ Thermal Pad Temperature = 25°C

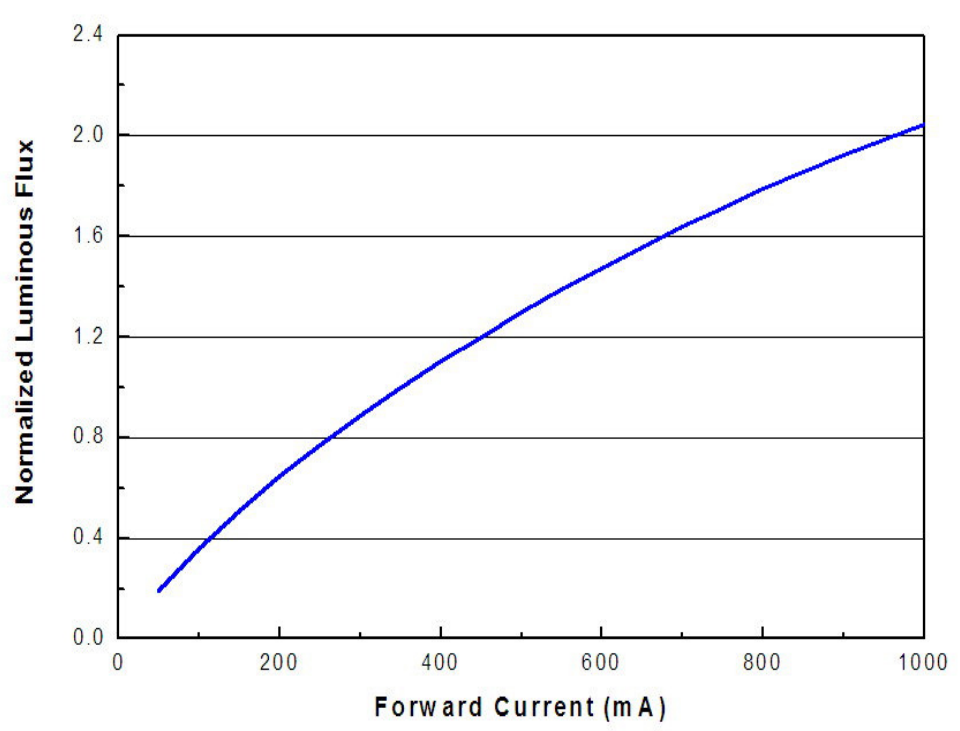


Typical Relative Luminous Flux vs. Forward Current

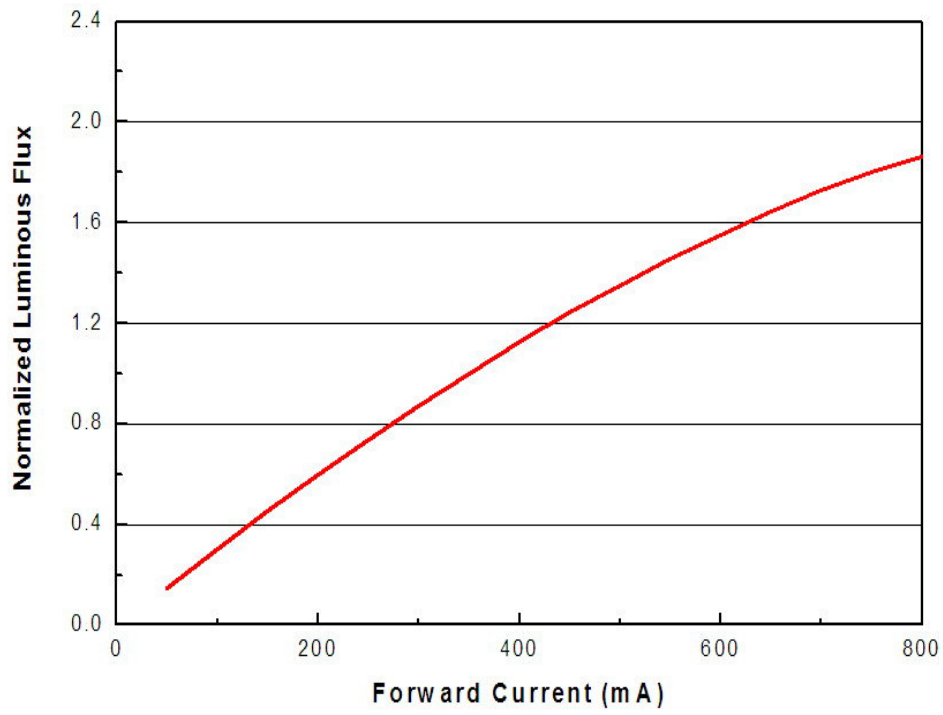
For Cool-White, Neutral-White, Warm-White
@ Thermal Pad Temperature = 25°C



For Green, Blue, @ Thermal Pad Temperature = 25°C

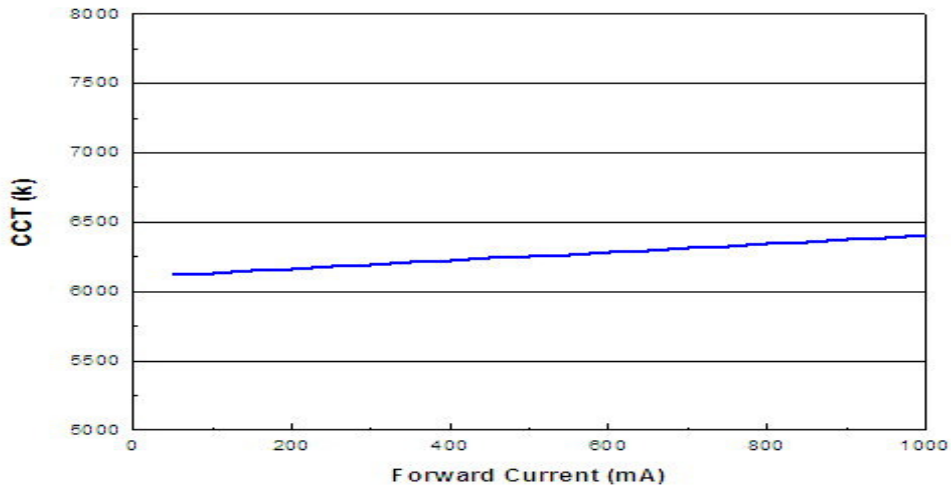


For Red, Orange, Amber,
@ Thermal Pad Temperature = 25°C

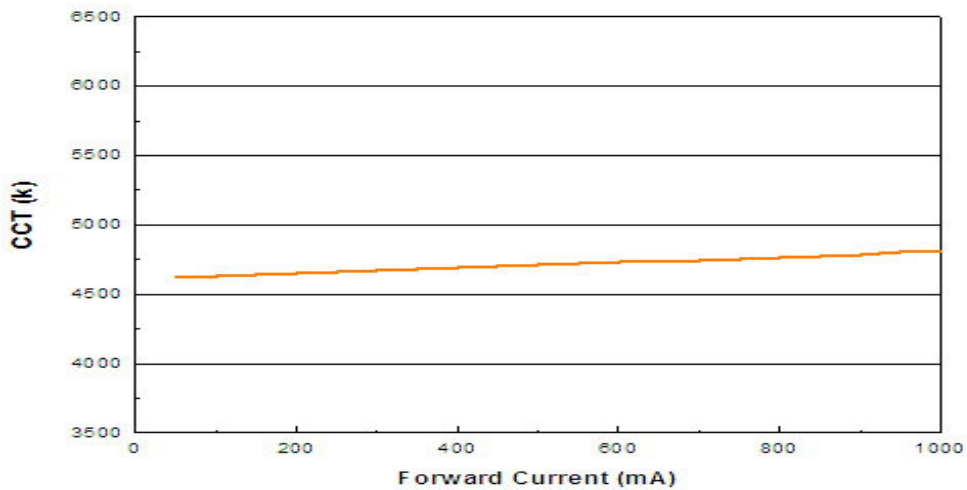


Typical Wavelength & CCT Shift Characteristics vs. Forward Current

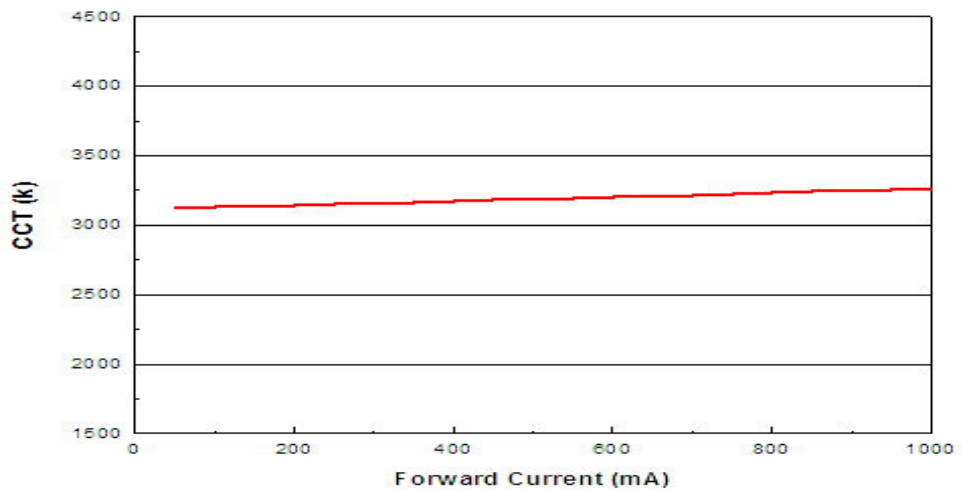
For Cool-White @ Thermal Pad Temperature = 25°C



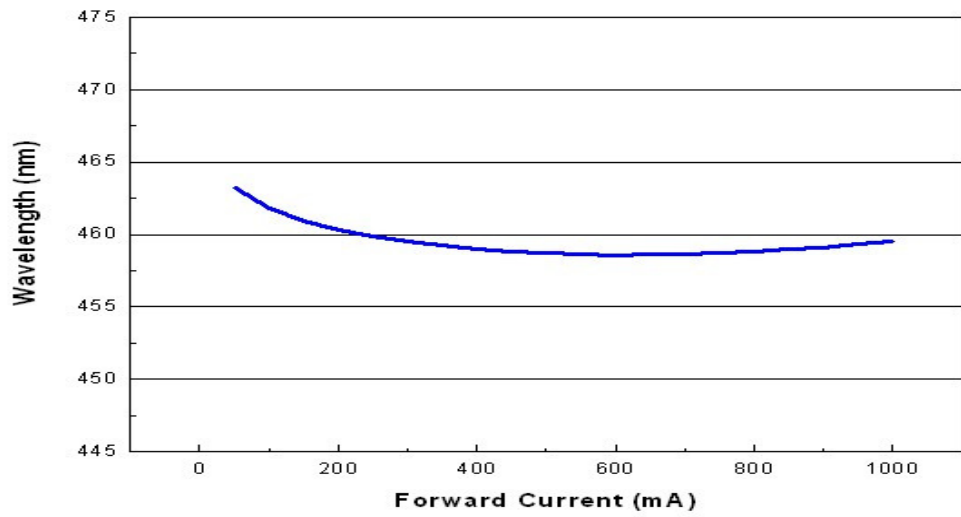
For Neutral-White @ Thermal Pad Temperature = 25°C



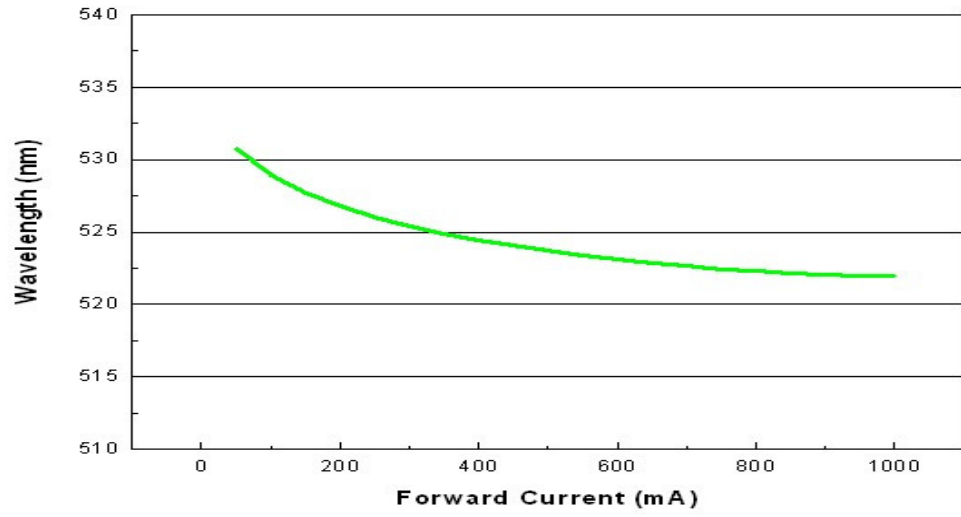
For Warm-White @ Thermal Pad Temperature = 25°C



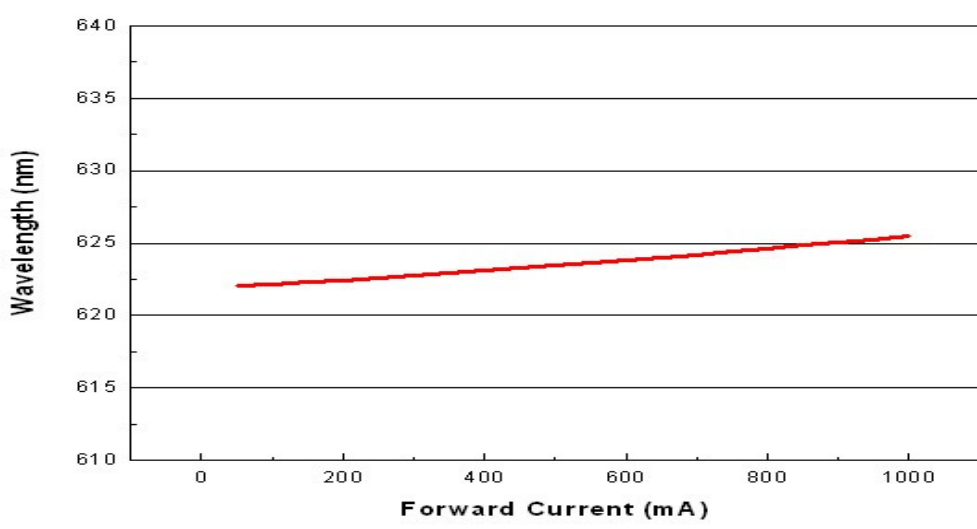
For Blue @ Thermal Pad Temperature = 25°C



For Green @ Thermal Pad Temperature = 25°C

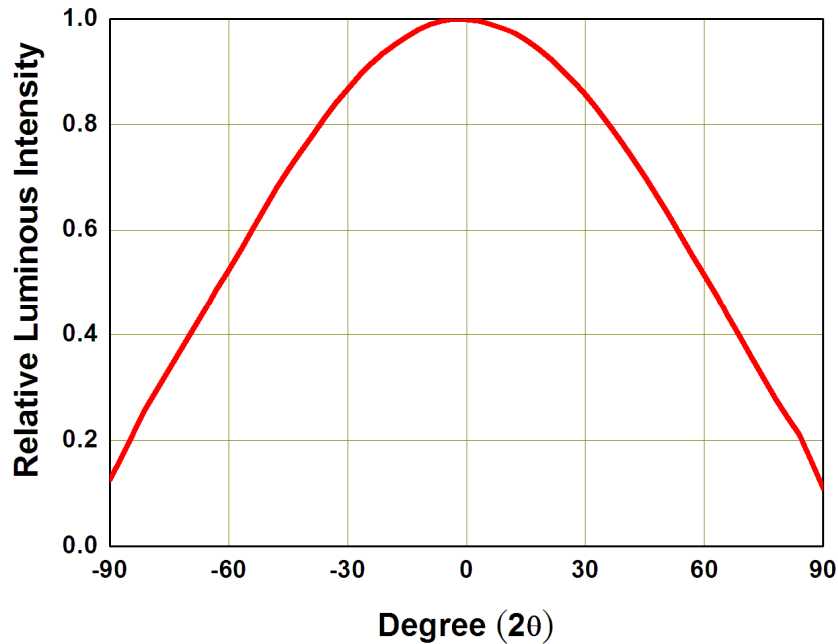


For Red @ Thermal Pad Temperature = 25°C



Typical Radiation Patterns

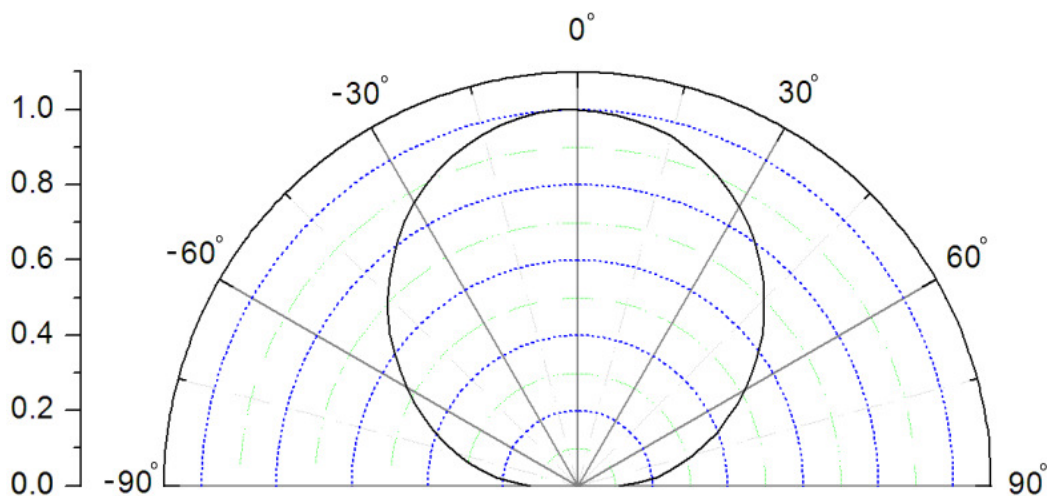
Typical Spatial Radiation Pattern for Cool-White, Neutral-White, Warm-White Lambertian



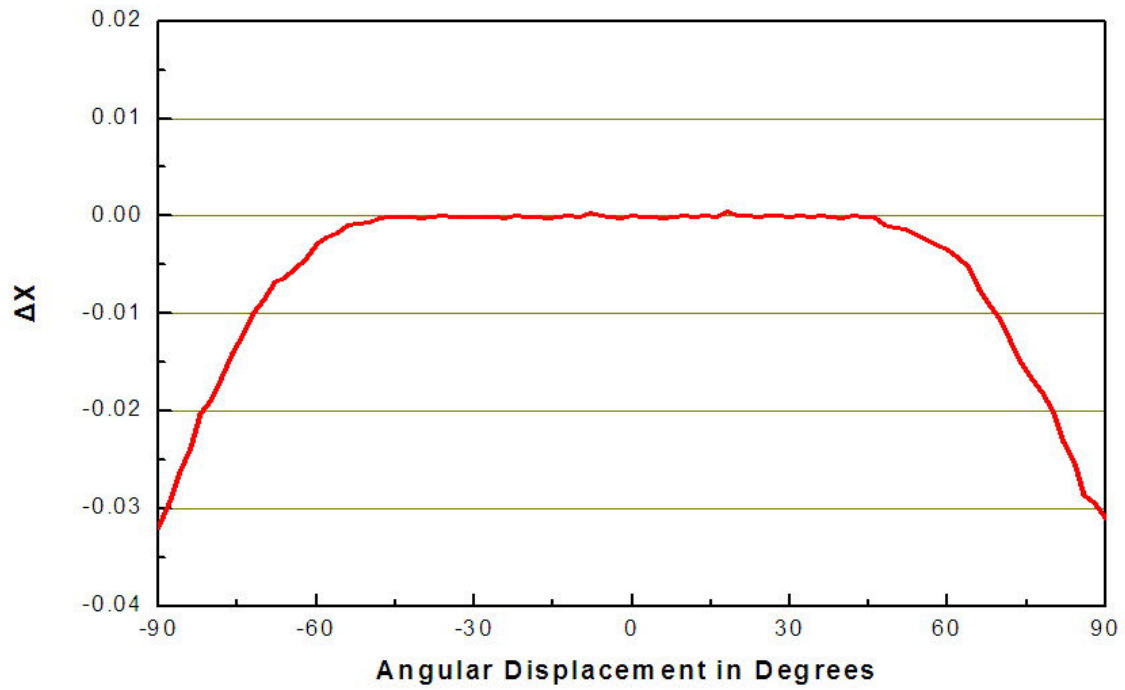
Notes:

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 $\pm 5^\circ$.

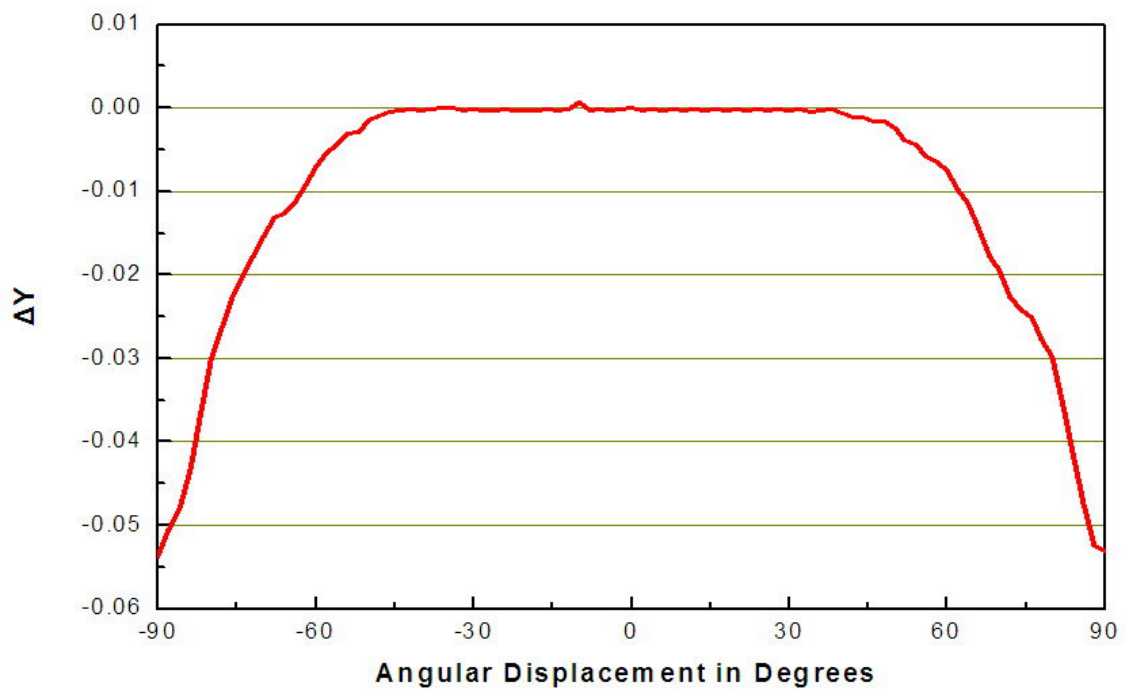
Typical Polar Radiation Pattern for Cool-White, Neutral-White, Warm-White Lambertian



Typical Difference of CIE X of Cool-White vs. Angle

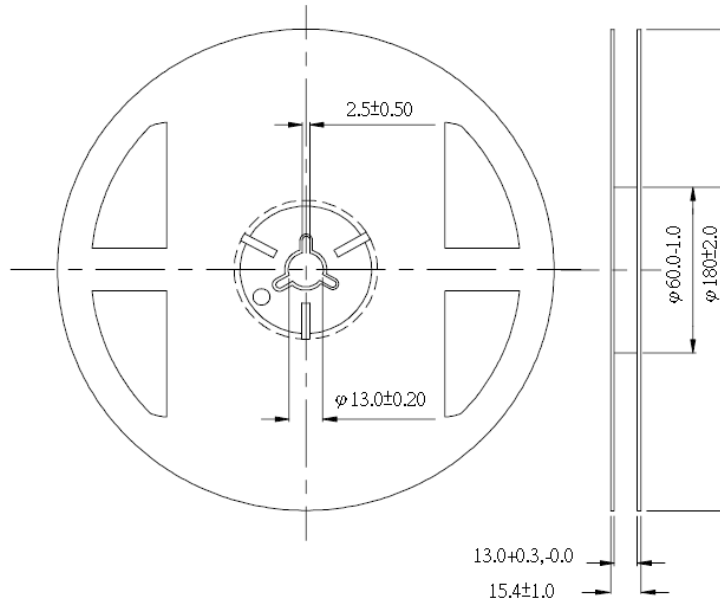


Typical Difference of CIE Y of Cool-White vs. Angle



Emitter Reel Packaging

Reel Dimensions



Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 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



Revision History

Current version: **2010/08/26**

Previous version: **N/A**

Device No: DHE-0001156

Rev. Ver. 3

| Page | Subjects (major change in previous version) | Date of change |
|------|---|----------------|
| 6 | Change the PN brightness level. | 2010/06/14 |
| 15 | Change the viewing angle. | 2010/06/14 |
| 16 | In the mechanical dimension, the polarity is changed. | 2010/06/14 |
| 17 | In the pad configuration, the polarity is changed. | 2010/06/14 |
| 3 | Change the Product Nomenclature. | 2010/08/26 |
| 4 | Change the Absolute Ratings | 2010.08.26 |
| 6-7 | Change the PN brightness level. | 2010/08/26 |
| | | |