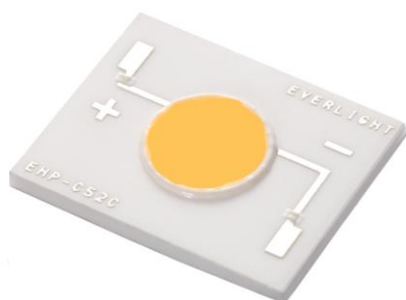


# ELJU(9) Series

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## Introduction

Everlight's JU(9) series is a ceramic substrate based COB LED achieving high efficiency at Energy Star / ANSI color temperature ranges.

## Features

- ◆ High power DC COB & high efficiency
- ◆ Multi-Chip Solution
- ◆ Dimension: 15mm\*12mm\*1.25mm
- ◆ Main Parameters: Luminous Flux, Forward Voltage, Chromaticity and Color Rendering Index
- ◆ ESD protection
- ◆ RoHS compliant
- ◆ Energy Star / ANSI Compliant Binning Structure
- ◆ Reliability testing conforms to IESNA LM80 Lumen maintenance test method

## Applications

- ◆ Indoor General Lighting
- ◆ Replacement Bulb
- ◆ Recessed Can
- ◆ Typical Viewing Angle 150°

## Table of Contents

|   |    |
|---|----|
| Table of Contents .....                             | 2  |
| Product Nomenclature.....                           | 3  |
| Absolute Maximum Ratings .....                      | 4  |
| Typical Electro-Optical Characteristic Table .....  | 4  |
| PN of the ELJU(9) series:White LEDs .....           | 5  |
| Product Binning:Luminous Flux Bins .....            | 6  |
| Product Binning:White Bin Structure .....           | 7  |
| Product Binning:Warm White Bin Structure .....      | 8  |
| Product Binning:Warm White Bin Coordinates .....    | 8  |
| Product Binning:Neutral White Bin Structure .....   | 9  |
| Product Binning:Neutral White Bin Coordinates ..... | 9  |
| Product Binning:Cool White Bin Structure .....      | 10 |
| Product Binning:Cool White Bin Coordinates .....    | 10 |
| Product Binning:Forward Voltage Bins .....          | 12 |
| Mechanical Dimension .....                          | 13 |
| Typical Electro-Optical Characteristic Curve .....  | 14 |
| Product Labeling .....                              | 18 |
| Carrier Tray Specification.....                     | 18 |
| Recommended Installation Screw Pitch .....          | 19 |
| Precautions of Use.....                             | 20 |
| Revision History .....                              | 22 |

## Product Nomenclature

The product name is designated as below:

### ELJU(9) – ABCDE – FGHIJ – V1234

Family name

(9) = for customers identification voltage [1]

Designation:

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

C = radiation pattern [2]

D = color [3]

E = power consumption [4]

F = reserved for future product offerings

G = Internal code

H = packaging type [5]

IJ = internal code

V = forward voltage bin

1234 = color bin or CCT bin

#### Notes

1. Table of for customers identification voltage

| Symbol | Description |
|--------|-------------|
| (9)    | 9 V         |

2. Table of radiation patterns

| Symbol | Description |
|--------|-------------|
| 0      | No Lens     |

3. 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                |

4. Table of power consumptions:

| Symbol | Description |
|--------|-------------|
| 3      | 3~3.9W      |

5. Table of packaging types:

| Symbol | Description |
|--------|-------------|
| T      | Tray        |

## Absolute Maximum Ratings

| Parameter                    | Symbol      | Ratings            | Unit |
|------------------------------|-------------|--------------------|------|
| Max. DC Forward Current (mA) | $I_F$       | 700 <sub>[1]</sub> | mA   |
| Max. Peak Pulse Current (mA) | $I_{Pulse}$ | 720 <sub>[2]</sub> | mA   |
| Power Dissipation            | $P_d$       | 3.7                | W    |
| Thermal Resistance           | $R_{th}$    | 2.4                | K/W  |
| Max. Junction Temperature    | $T_J$       | 115                | °C   |
| Operating Temperature        | $T_{Opr}$   | -40 ~ +85          | °C   |
| Storage Temperature          | $T_{Stg}$   | -40 ~ +85          | °C   |

**Notes:**

1. For optimal performance, Everlight recommends 400mA operation.
2. Duty cycle = 1/10@1KHZ
3. The ELJU(9) series LEDs are not designed for reverse bias use.

## Typical Over Drive Electro-Optical Characteristic Table

| Parameter/Forward Current                   | 400mA | 530mA | 700mA | Unit |
|---|-------|-------|-------|------|
| Power Consumption                           | 3.7   | 5.1   | 7     | W    |
| Luminous Flux <sub>[1]</sub>                | 350   | 470   | 595   | lm   |
| Forward Voltage <sub>[1]</sub>              | 9.2   | 9.5   | 9.9   | VF   |
| Correlated Color Temperature <sub>[1]</sub> | 3000  |       |       | K    |
| Color Rendering Index <sub>[1]</sub>        | 80    |       |       |      |

**Notes:**

1. All values shown on this table are over drive references only.

## PN of the ELJU(9) series: White LEDs



| Color              | Order Code of ELJU(9)     | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | CCT (K)     | Forward Voltage (V) | Forward Current (mA) | CRI [1] (min.) |
|--------------------|---------------------------|----------------------------|----------------------------|-------------|---------------------|----------------------|----------------|
| Warm White 2700    | ELJU(9)-K40M3-0LTHE-R2700 | 300                        | 327                        | 27K-1~27K-4 | 8.4~10.2            | 400                  | 80             |
| Warm White 3000    | ELJU(9)-K40M3-0LTHE-R3000 | 300                        | 350                        | 30K-1~30K-4 | 8.4~10.2            | 400                  | 80             |
| Neutral White 4000 | ELJU(9)-K40M3-0LTHE-R4000 | 300                        | 359                        | 40K-1~40K-4 | 8.4~10.2            | 400                  | 80             |
| Cool White 5000    | ELJU(9)-K60C3-0LTGE-R5000 | 350                        | 398                        | 50K-1~50K-4 | 8.4~10.2            | 400                  | 70             |
| Cool White 5700    | ELJU(9)-K60C3-0LTGE-R5700 | 350                        | 417                        | 57K-1~57K-4 | 8.4~10.2            | 400                  | 70             |
| Cool White 6500    | ELJU(9)-K60C3-0LTEE-R6500 | 350                        | 407                        | 65K-1~65K-4 | 8.4~10.2            | 400                  | 70             |

**Notes:**

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

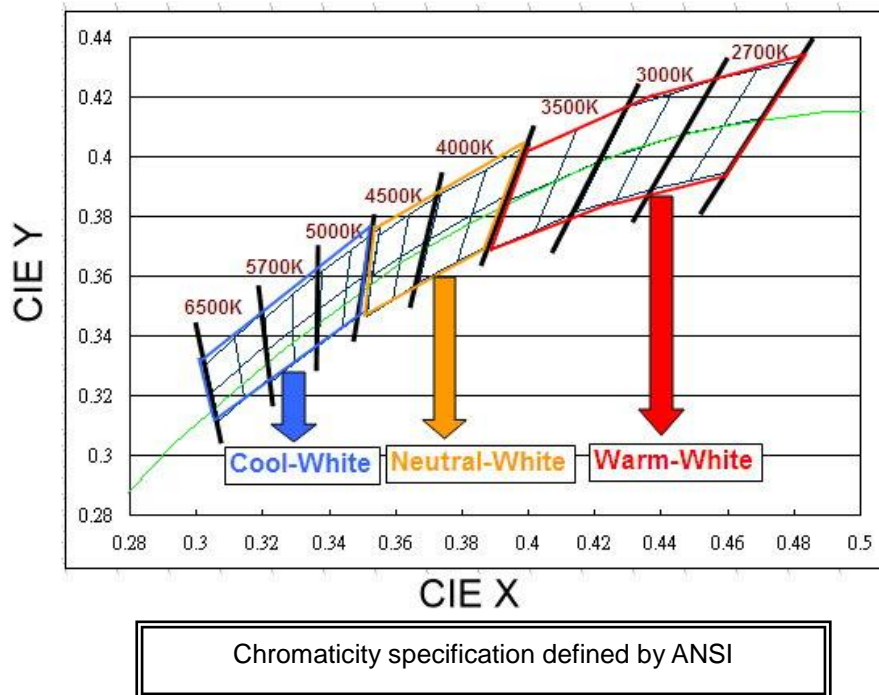
## Product Binning

### 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                           |

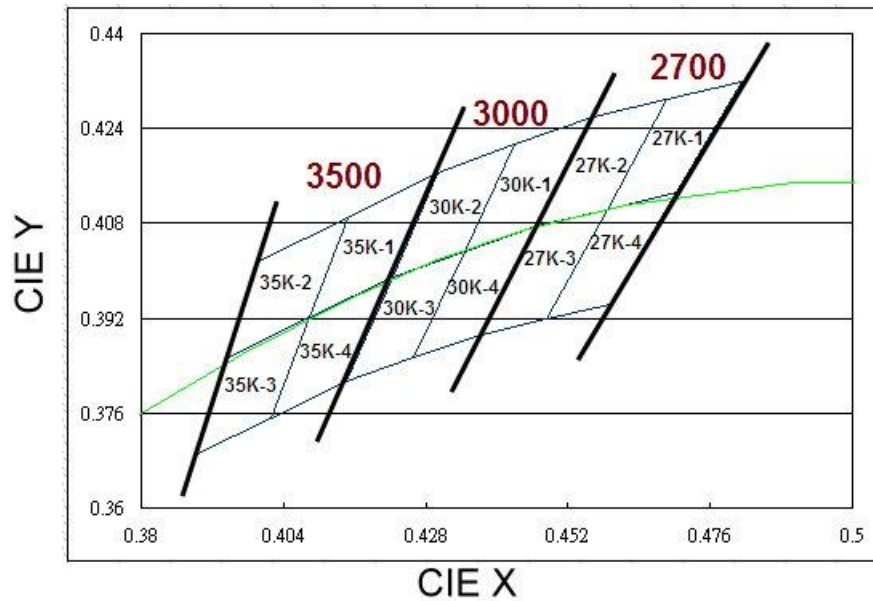
### White Bin Structure



**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  $I_f=400\text{mA}$  operation

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 |       |       |

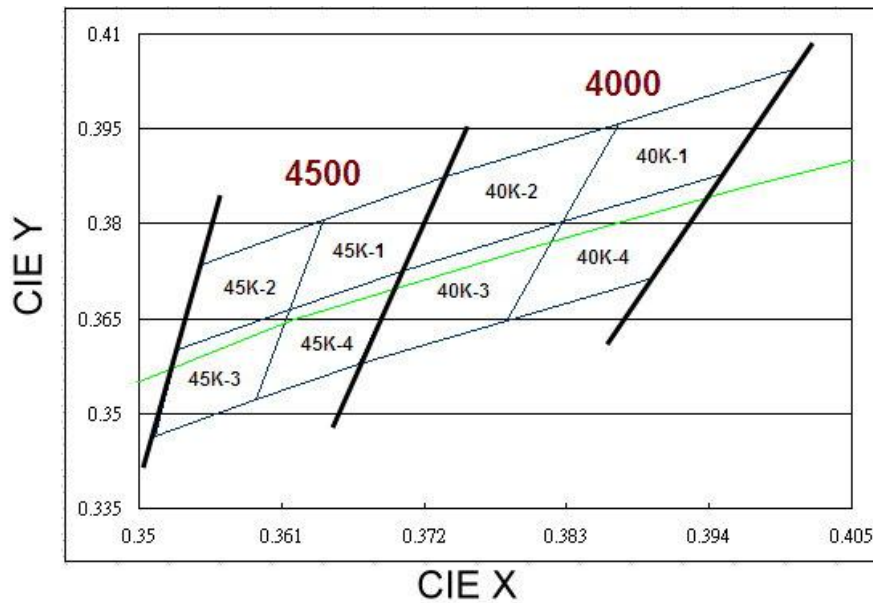
| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 30K-3                       | 0.422 | 0.399 |
|                             | 0.415 | 0.381 |
|                             | 0.426 | 0.385 |
|                             | 0.435 | 0.403 |
| Reference Range: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

Notes:

1. Color coordinates measurement allowance :  $\pm 0.01$ .



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 |       |       |

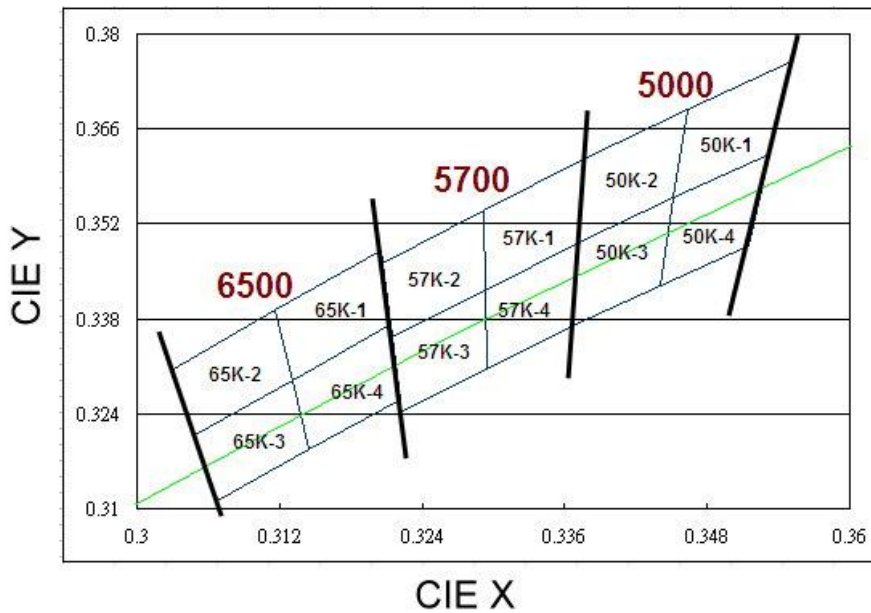
| Bin                         | CIE X | CIE Y |
|-----------------------------|-------|-------|
| 40K-4                       | 0.383 | 0.380 |
|                             | 0.378 | 0.365 |
|                             | 0.390 | 0.372 |
|                             | 0.395 | 0.388 |
| Reference Range: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

Notes:

1. Color coordinates measurement allowance :  $\pm 0.01$ .

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 |
|                             | 0.322 | 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                       | 0.322 | 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 |       |       |

**Notes:**

1. Color coordinates measurement allowance :  $\pm 0.01$ .

### Forward Voltage Bins

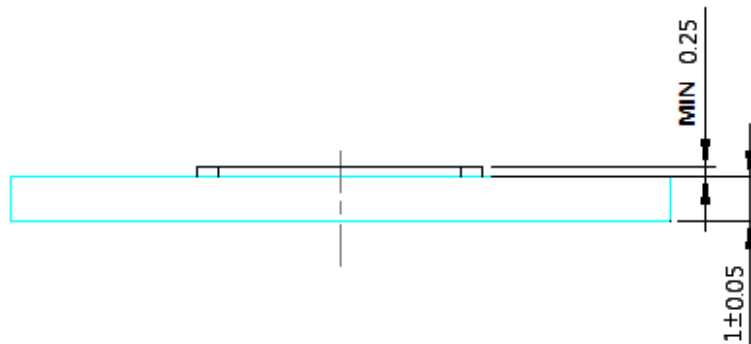
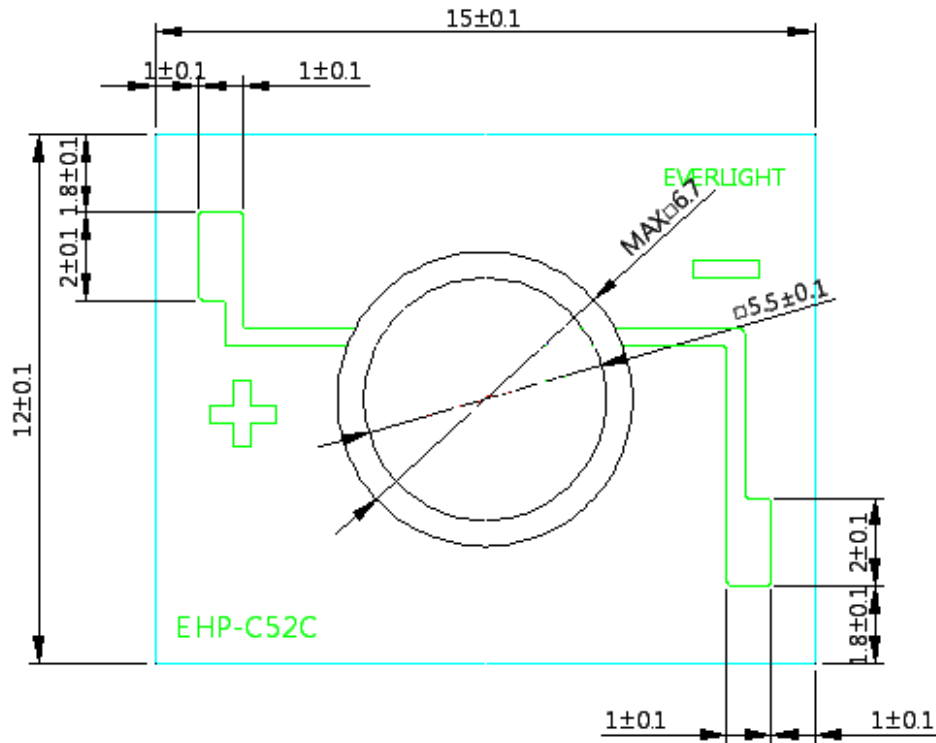
| Group Name | Bins     |
|------------|----------|
| R          | R1+R2+R3 |

| Bin | Minimum Forward Voltage (V) | Maximum Forward Voltage (V) |
|-----|-----------------------------|-----------------------------|
| R1  | 8.0                         | 9.0                         |
| R2  | 9.0                         | 10.0                        |
| R3  | 10.0                        | 11.0                        |

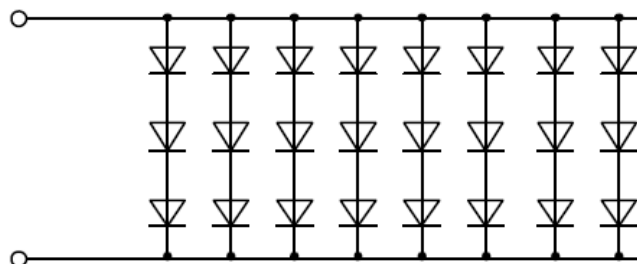
**Notes:**

1. Forward voltage measurement tolerance:  $\pm 0.2V$ .
2. Forward voltage bins are defined at  $I_f=400mA$  operation.
3. Other Forward Voltage bins for White LEDs available upon request. Please contact your local Everlight sales office.

### Mechanical Dimension



### Chip Configuration

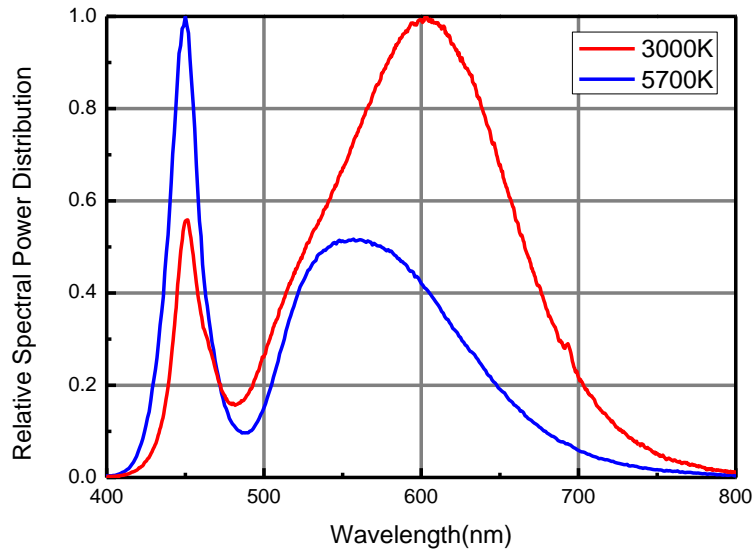


**Notes:**

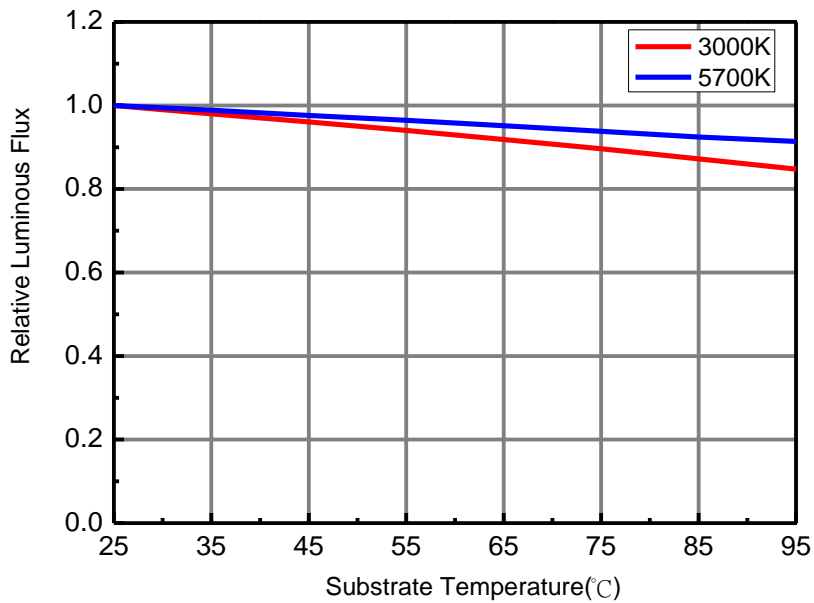
- 1. Dimensions are in millimeters.
- 2. Tolerances unless mentioned are  $\pm 0.05\text{mm}$

## Typical Electro-Optical Characteristic Curve

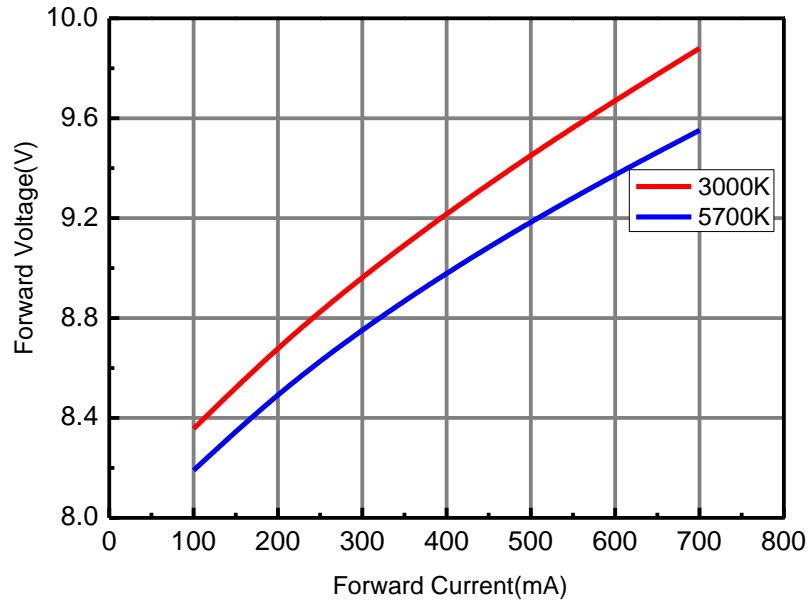
Relative Spectral Power Distribution  
@ Substrate Temperature = 25°C



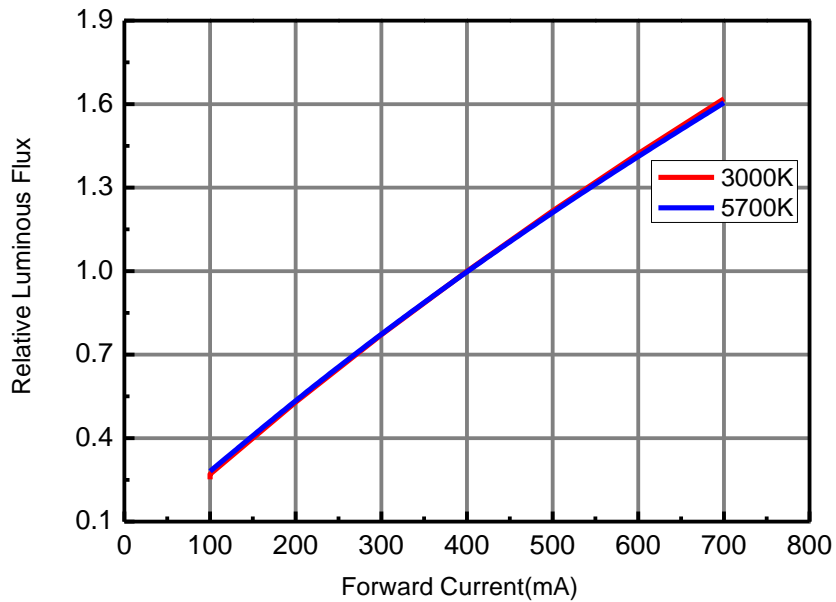
Relative Luminous Flux vs. Substrate Temperature  
@Forward Current = 400mA



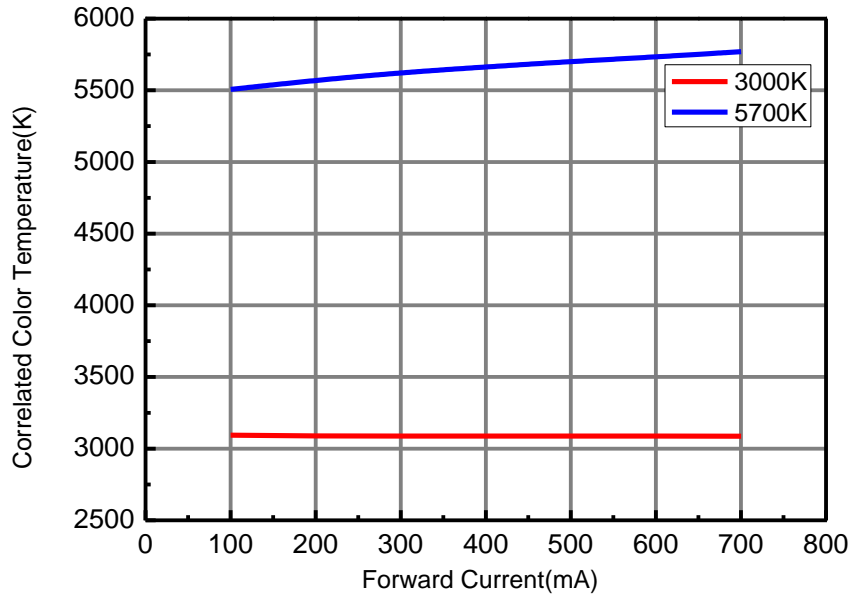
### Forward Voltage vs. Forward Current @ Substrate Temperature = 25°C



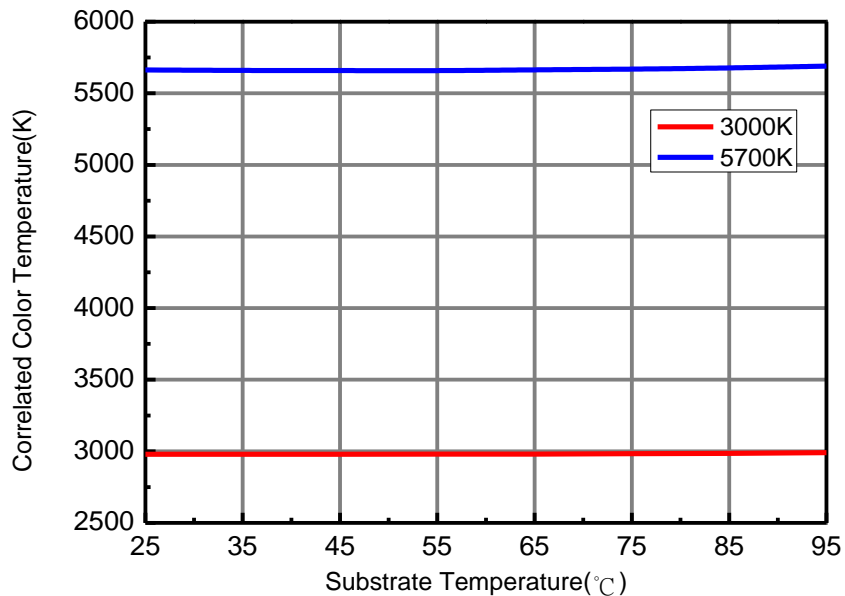
### Relative Luminous Flux vs. Forward Current @ Substrate Temperature = 25°C



### Correlated Color Temperature vs. Forward Current @ Substrate Temperature = 25°C

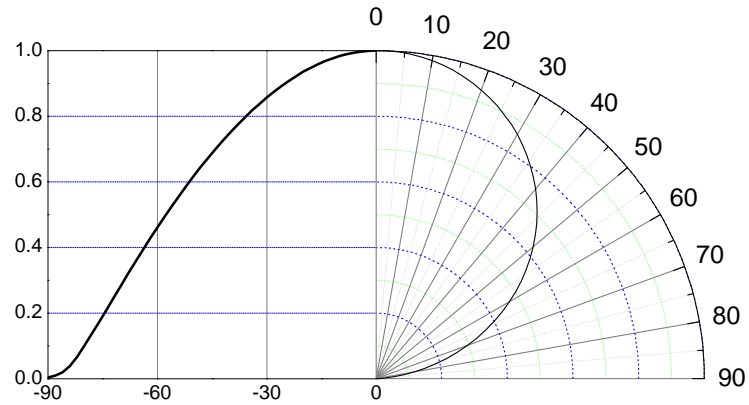


### Correlated Color Temperature vs. Substrate Temperature @ Forward Current = 400mA





## Typical Diagram Characteristics of Radiation Patterns



**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  $\pm 5^\circ$  .

## 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

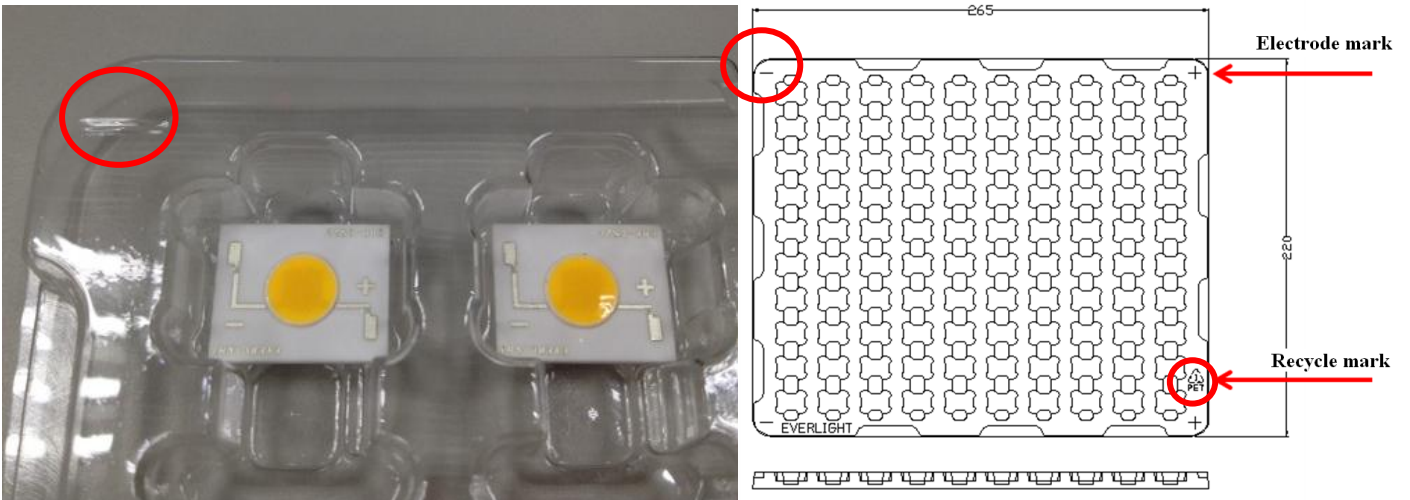
LOT No: Lot Number

MADE IN TAIWAN: Production Place



## Carrier Tray Specification

Loaded Quantity: 100 PCS Per Tray



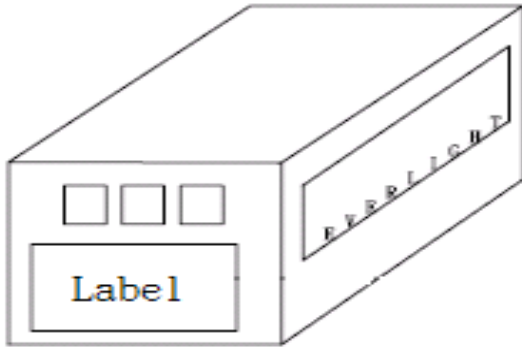
Notes:

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

### LED Direction

- The **Recycle mark** on the LEDs will be toward the **Anode mark** on the carrier tray.

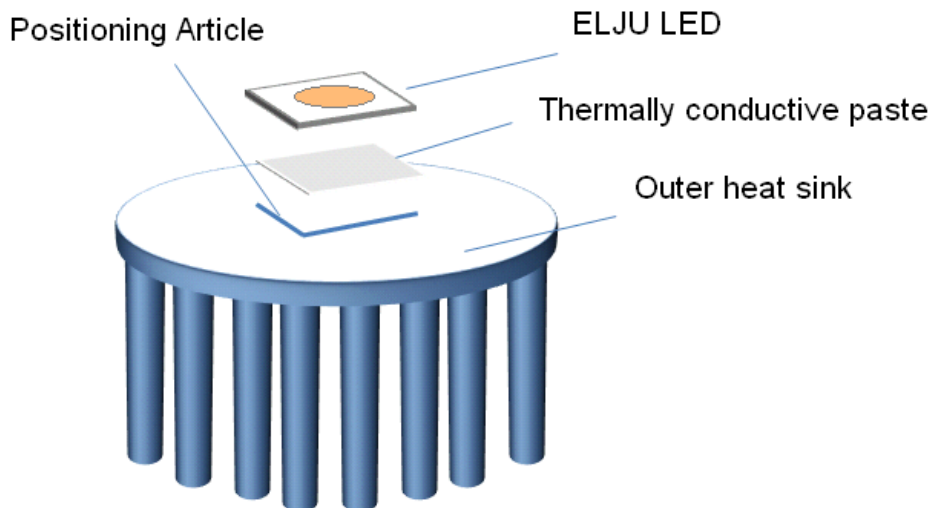
### Outside Carton



### Packaging Quantity

- 100 PCS Per Tray
- 10 Trays Per Outside Carton

### Recommended Installation Screw Pitch



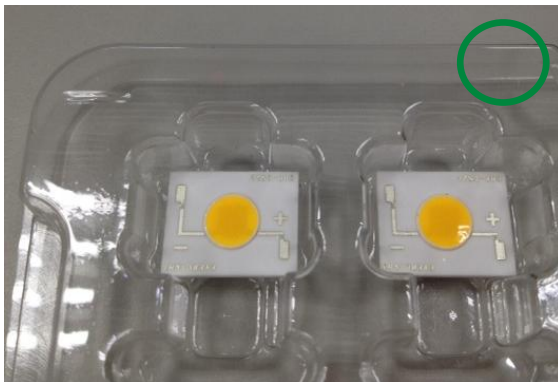
## Precautions of Use

### Over-Current-Proof

- Though the ELJU(9) has a conducted ESD protection mechanism, customers must not use the device in reverse and should apply resistors for extra protection. Otherwise slight voltage shift may cause significant current changes and burn out failure may happen.

### Storage Conditions

- Before the package is opened: The LEDs should be stored at 30°C or less and 50%RH or less after being shipped from Everlight and the storage life limit is 6 months. If the LEDs are stored for 6 months or more, they should be stored in a sealed container with a nitrogen atmosphere and moisture absorbent material.
- After opening the package: The LED should be stored under 30°C or less and 30%RH or less. The LED should be used within 168hrs (7days) after opening the package. If unused LEDs remain, it should be stored in moisture proof packages.
- Do not stack assemblies.

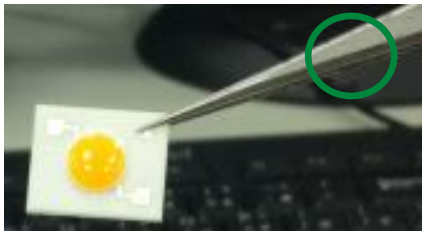


## Handling

- Do not put mechanical stress on the LED.
- Never touch the optical surface with finger or sharp object. The LED surface could be soiled or damaged, which could affect the optical performance of the LED.
- In low-humidity work environment, please keep handling the LEDs with appropriate ESD grounding.
- It is recommended to handle the LED with powder-less latex gloves.

## Manual Handling

- When handling the product, do not apply direct pressure on the optical surface.
- Do not touch the resin with tweezers to avoid scratching or other damage.



## Thermal Management

- Sufficient thermal management must be implemented. Substrate of the positive in temperature must be kept under 105°C at the driving current of 400mA. Otherwise, the junction temperature of die may exceed the limit at high current driving conditions and the LEDs' lifetime may be decrease dramatically.

## Revision History

Current version: **2012/05/24**

Previous version: **N/A**

Device No. DHE-0001857

Rev. Ver. 2

| Page | Subjects (major change in previous version) | Date of change |
|------|---|----------------|
|      | Create new - Neutral-White& Cool White      | 2012/06/18     |
|      |   |                |
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