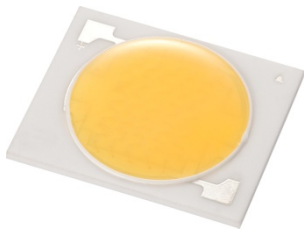


JU2024

炬

30V/15W/EU Series



Introduction

Everlight's JU2024 30V/15W/EU Series is a ceramic substrate based LED achieving high efficiency while maintaining high CRI at Energy Star / ANSI color temperature ranges.

Features

- ◆ LM-80 Certified
- ◆ High Power COB & High CRI LED
- ◆ Multi-Chip Solution
- ◆ Dimension: 20 mm x 24 mm x 1.6 mm
- ◆ Main Parameters: Luminous Flux, Forward Voltage, Chromaticity and Color Rendering Index
- ◆ ESD Protection
- ◆ RoHS compliant
- ◆ Energy Star / ANSI Compliant Binning Structure
- ◆ Typical Viewing Angle: 120°

Applications

- ◆ Replacement Bulb
- ◆ Indoor General Lighting
- ◆ Recessed Can Lighting

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Product Nomenclature

The product name is designated as below:

JU2024- CDEFGHJ-KLMNP-QRST

Family name

JU2024

Designation:

CD = lighting color and wavelength^[1]

EF = color bin or CCT bin

G = internal code

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

KL = forward voltage bin^[2]

M = internal code

NP = power consumption^[3]

Q= internal code

R= Dam Diameter^[4]

S= internal code

T=Type of Package^[5]

Notes

1. Table of lighting color and wavelength

| Symbol | Color | CCT range | Color Rendering Index |
|--------|---------------|-------------|-----------------------|
| GT | Cool-White | 4745~7050K | >65 |
| KT | Cool-White | 4745~7050K | >80 |
| LM | Warm-White | 2580~3710K | >70 |
| | Neutral-White | 3710K-4745K | |
| KM | Warm White | 2580~3710K | >80 |
| | Neutral-White | 3710K-4745K | |

2. Table of forward voltage bin:

| Symbol | Description |
|--------|-------------------|
| 30 | 30V Input Voltage |

3. Power consumption:

| Symbol | Description |
|--------|-------------|
| 15 | 15W |

4. Dam Diameter:

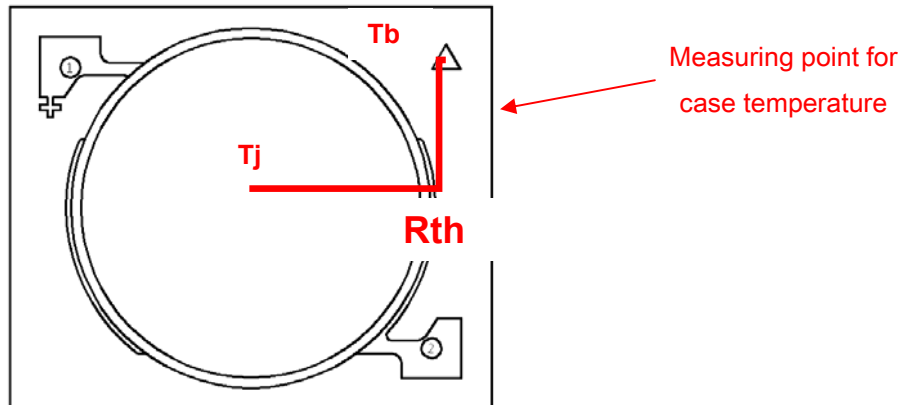
| Symbol | Description |
|--------|-------------|
| G | 16.0~16.9mm |

5. Table of packaging types:

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

Absolute Maximum Ratings

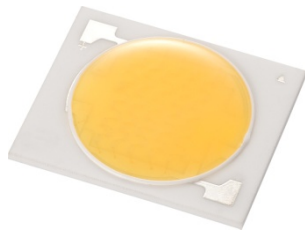
| Parameter | Symbol | Ratings | Unit |
|------------------------------|-------------|--------------------|------|
| Max. DC Forward Current (mA) | I_F | 550 _[1] | mA |
| Max. Peak Pulse Current (mA) | I_{Pulse} | 800 _[2] | mA |
| Power Dissipation | P_d | 16.5 | W |
| Thermal Resistance | R_{th} | 2.4 | °C/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 500mA operation.
2. $t_p \leq 100ms$, Duty cycle = 25%
3. The JU2024 30V/15W/EU series LEDs are not designed for reverse bias use.

PN of the JU2024 Series : White LEDs



| Order Code of JU2024 | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | CCT (K) | Forward Voltage (V) | Forward Current (mA) | CRI (min.) |
|------------------------------|----------------------------|----------------------------|-------------|---------------------|----------------------|------------|
| JU2024-KM277P5-30515-0G0T/EU | 1425 | 1580 | 27K-1~27K-4 | 27.0~33.0 | 500 | 80 |
| JU2024-KM307P6-30515-0G0T/EU | 1500 | 1650 | 30K-1~30K-4 | 27.0~33.0 | 500 | 80 |
| JU2024-KM357P6-30515-0G0T/EU | 1500 | 1700 | 35K-1~35K-4 | 27.0~33.0 | 500 | 80 |
| JU2024-KM407P6-30515-0G0T/EU | 1575 | 1750 | 40K-1~40K-4 | 27.0~33.0 | 500 | 80 |
| JU2024-KM457P7-30515-0G0T/EU | 1650 | 1780 | 45K-1~45K-4 | 27.0~33.0 | 500 | 80 |
| JU2024-KT507P7-30515-0G0T/EU | 1650 | 1800 | 50K-1~50K-4 | 27.0~33.0 | 500 | 80 |
| JU2024-KT577P7-30515-0G0T/EU | 1725 | 1850 | 57K-1~57K-4 | 27.0~33.0 | 500 | 80 |
| JU2024-KT657P7-30515-0G0T/EU | 1725 | 1850 | 65K-1~65K-4 | 27.0~33.0 | 500 | 80 |

Notes:

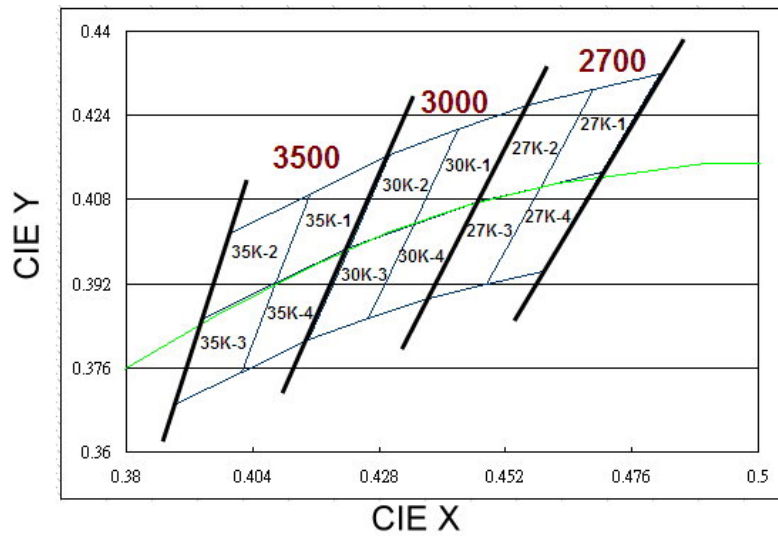
1. CRI measurement tolerance: ± 2 .
2. Luminous flux measurement tolerance: $\pm 10\%$.
3. The data of luminous flux measured at thermal pad=25°C
4. Typical luminous flux or light output performance is operated within the condition guided by this datasheet.

Product Binning

Luminous Flux Bins

| Group | Bin | Minimum Photometric Flux (lm) | Maximum Photometric Flux (lm) |
|-------|-----|-------------------------------|-------------------------------|
| P | 1 | 900 | 1000 |
| | 2 | 1000 | 1100 |
| | 3 | 1100 | 1200 |
| | 4 | 1200 | 1350 |
| | 5 | 1350 | 1500 |
| | 6 | 1500 | 1650 |
| | 7 | 1650 | 1800 |
| | 8 | 1800 | 2000 |
| | 9 | 2000 | 2200 |

Warm White Bin Structure



Warm White Bin Coordinates

2700K

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 27K-1 | 0.4582 | 0.4099 |
| | 0.4687 | 0.4289 |
| | 0.4813 | 0.4319 |
| | 0.4700 | 0.4126 |
| Reference Range: 2580~2700K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 27K-2 | 0.4465 | 0.4071 |
| | 0.4562 | 0.4260 |
| | 0.4687 | 0.4289 |
| | 0.4582 | 0.4099 |
| Reference Range: 2700~2870K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 27K-4 | 0.4483 | 0.3919 |
| | 0.4582 | 0.4099 |
| | 0.4700 | 0.4126 |
| | 0.4593 | 0.3944 |
| Reference Range: 2580~2700K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 27K-3 | 0.4373 | 0.3893 |
| | 0.4465 | 0.4071 |
| | 0.4582 | 0.4099 |
| | 0.4483 | 0.3919 |
| Reference Range: 2700~2870K | | |

3000K

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 30K-1 | 0.4342 | 0.4028 |
| | 0.4430 | 0.4212 |
| | 0.4562 | 0.4260 |
| | 0.4465 | 0.4071 |
| Reference Range: 2870~3000K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 30K-2 | 0.4221 | 0.3984 |
| | 0.4299 | 0.4165 |
| | 0.4430 | 0.4212 |
| | 0.4342 | 0.4028 |
| Reference Range: 3000~3170K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 30K-4 | 0.4259 | 0.3853 |
| | 0.4342 | 0.4028 |
| | 0.4465 | 0.4071 |
| | 0.4373 | 0.3893 |
| Reference Range: 2870~3000K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 30K-3 | 0.4147 | 0.3814 |
| | 0.4221 | 0.3984 |
| | 0.4342 | 0.4028 |
| | 0.4259 | 0.3853 |
| Reference Range: 3000~3170K | | |

3500K

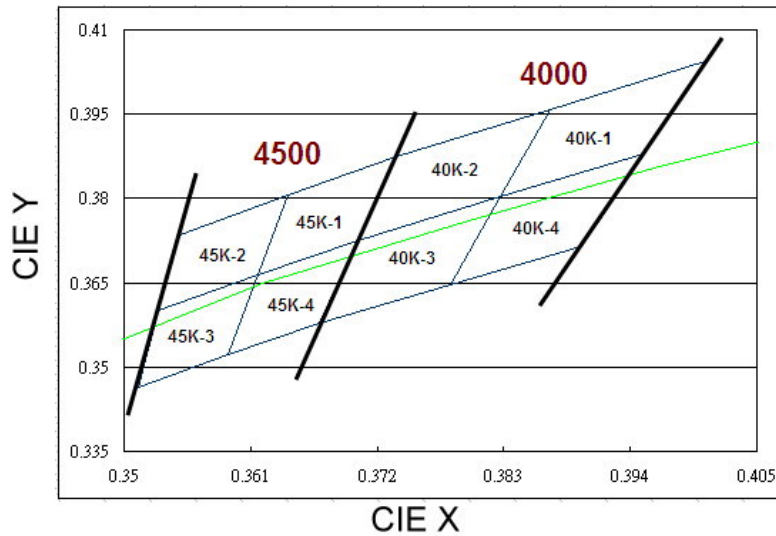
| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 35K-1 | 0.4080 | 0.3916 |
| | 0.4146 | 0.4089 |
| | 0.4299 | 0.4165 |
| | 0.4221 | 0.3984 |
| Reference Range: 3220~3500K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 35K-2 | 0.3941 | 0.3848 |
| | 0.3996 | 0.4015 |
| | 0.4146 | 0.4089 |
| | 0.4080 | 0.3916 |
| Reference Range: 3500~3710K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 35K-4 | 0.4017 | 0.3751 |
| | 0.4080 | 0.3916 |
| | 0.4221 | 0.3984 |
| | 0.4147 | 0.3814 |
| Reference Range: 3220~3500K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 35K-3 | 0.3889 | 0.3690 |
| | 0.3941 | 0.3848 |
| | 0.4080 | 0.3916 |
| | 0.4017 | 0.3751 |
| Reference Range: 3500~3710K | | |

Neutral-White Bin Structure



Neutral-White Bin Coordinates

4000K

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 40K-1 | 0.3825 | 0.3798 |
| | 0.3869 | 0.3958 |
| | 0.4006 | 0.4044 |
| | 0.3950 | 0.3875 |
| Reference Range: 3710~4000K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 40K-2 | 0.3702 | 0.3722 |
| | 0.3736 | 0.3874 |
| | 0.3869 | 0.3958 |
| | 0.3825 | 0.3798 |
| Reference Range: 4000~4260K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 40K-4 | 0.3783 | 0.3646 |
| | 0.3825 | 0.3798 |
| | 0.3950 | 0.3875 |
| | 0.3898 | 0.3716 |
| Reference Range: 3710~4000K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 40K-3 | 0.3670 | 0.3578 |
| | 0.3702 | 0.3722 |
| | 0.3825 | 0.3798 |
| | 0.3783 | 0.3646 |
| Reference Range: 4000~4260K | | |

4500K

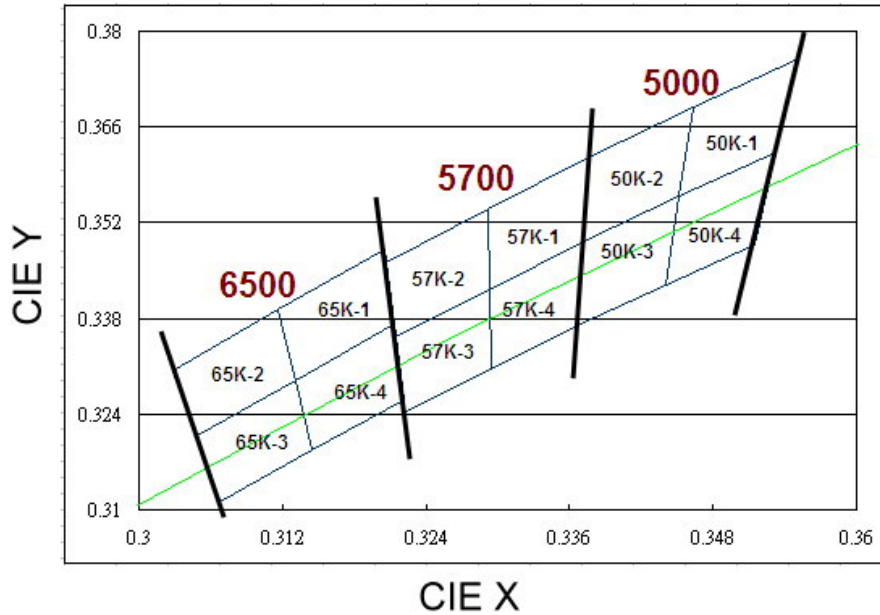
| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 45K-1 | 0.3641 | 0.3804 |
| | 0.3736 | 0.3874 |
| | 0.3702 | 0.3722 |
| | 0.3615 | 0.3659 |
| Reference Range: 4260~4500K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 45K-2 | 0.3548 | 0.3736 |
| | 0.3641 | 0.3804 |
| | 0.3615 | 0.3659 |
| | 0.3530 | 0.3597 |
| Reference Range: 4500~4745K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 45K-4 | 0.3615 | 0.3659 |
| | 0.3702 | 0.3722 |
| | 0.3670 | 0.3578 |
| | 0.3590 | 0.3521 |
| Reference Range: 4260~4500K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 45K-3 | 0.3530 | 0.3597 |
| | 0.3615 | 0.3659 |
| | 0.3590 | 0.3521 |
| | 0.3512 | 0.3465 |
| Reference Range: 4500~4745K | | |

Cool-White Bin Structure



Cool-White Bin Coordinates

5000K

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 50K-1 | 0.3463 | 0.3687 |
| | 0.3551 | 0.3760 |
| | 0.3533 | 0.3620 |
| | 0.3451 | 0.3554 |
| Reference Range: 4745~5000K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 50K-2 | 0.3376 | 0.3616 |
| | 0.3463 | 0.3687 |
| | 0.3451 | 0.3554 |
| | 0.3371 | 0.3490 |
| Reference Range: 5000~5310K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 50K-4 | 0.3451 | 0.3554 |
| | 0.3533 | 0.3620 |
| | 0.3515 | 0.3487 |
| | 0.3440 | 0.3427 |
| Reference Range: 4745~5000K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 50K-3 | 0.3371 | 0.3490 |
| | 0.3451 | 0.3554 |
| | 0.3440 | 0.3427 |
| | 0.3366 | 0.3369 |
| Reference Range: 5000~5310K | | |

5700K

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 57K-1 | 0.3290 | 0.3538 |
| | 0.3376 | 0.3616 |
| | 0.3371 | 0.3490 |
| | 0.3290 | 0.3417 |
| Reference Range: 5310~5700K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 57K-2 | 0.3207 | 0.3462 |
| | 0.3290 | 0.3538 |
| | 0.3290 | 0.3417 |
| | 0.3215 | 0.3350 |
| Reference Range: 5700~6020K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 57K-4 | 0.3290 | 0.3417 |
| | 0.3371 | 0.3490 |
| | 0.3366 | 0.3369 |
| | 0.3290 | 0.3300 |
| Reference Range: 5310~5700K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 57K-3 | 0.3215 | 0.3350 |
| | 0.3290 | 0.3417 |
| | 0.3290 | 0.3300 |
| | 0.3222 | 0.3243 |
| Reference Range: 5700~6020K | | |

6500K

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 65K-1 | 0.3115 | 0.3391 |
| | 0.3205 | 0.3481 |
| | 0.3213 | 0.3373 |
| | 0.3130 | 0.3290 |
| Reference Range: 6020~6500K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 65K-2 | 0.3028 | 0.3304 |
| | 0.3115 | 0.3391 |
| | 0.3130 | 0.3290 |
| | 0.3048 | 0.3207 |
| Reference Range: 6500~7050K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 65K-4 | 0.3130 | 0.3290 |
| | 0.3213 | 0.3373 |
| | 0.3221 | 0.3261 |
| | 0.3144 | 0.3186 |
| Reference Range: 6020~6500K | | |

| Bin | CIE X | CIE Y |
|-----------------------------|--------|--------|
| 65K-3 | 0.3048 | 0.3207 |
| | 0.3130 | 0.3290 |
| | 0.3144 | 0.3186 |
| | 0.3068 | 0.3113 |
| Reference Range: 6500~7050K | | |

Notes:

1. Color coordinates measurement allowance : ± 0.01 .

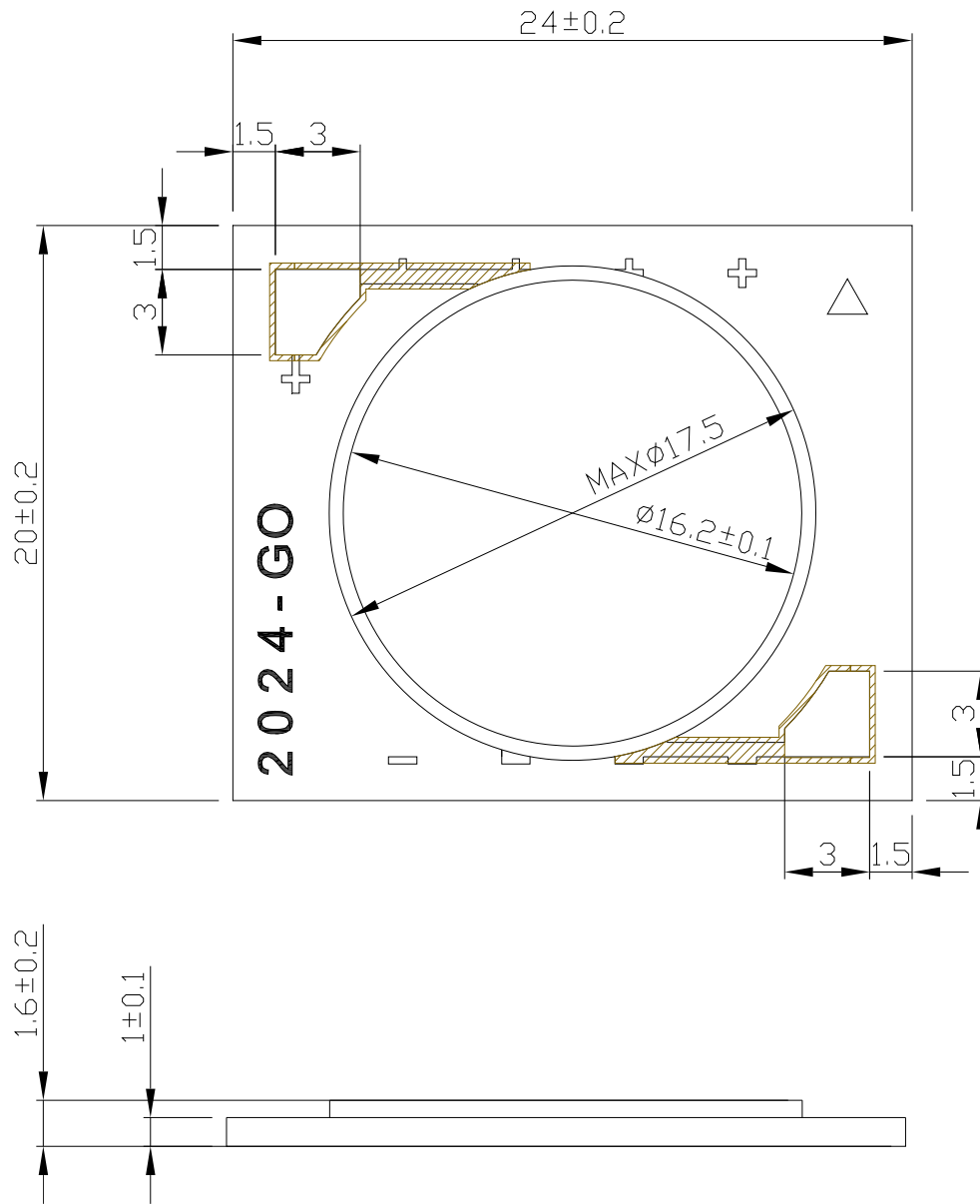
Forward Voltage Bins

| Bin | Minimum Forward Voltage (V) | Maximum Forward Voltage (V) |
|-----|-----------------------------|-----------------------------|
| W1 | 27 | 29 |
| W2 | 29 | 31 |
| W3 | 31 | 33 |

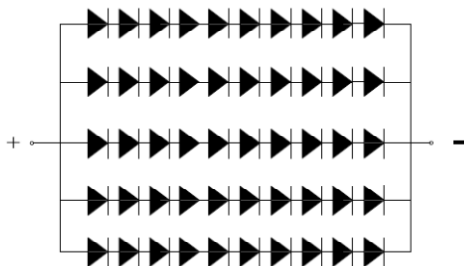
Notes:

1. Forward voltage measurement tolerance: $\pm 2\%$.
2. Forward voltage bins are defined at $I_f=500\text{mA}$ operation.
3. Other Forward Voltage bins for White LEDs available upon request. Please contact your local Everlight sales office.

Mechanical Dimension



Chip Configuration

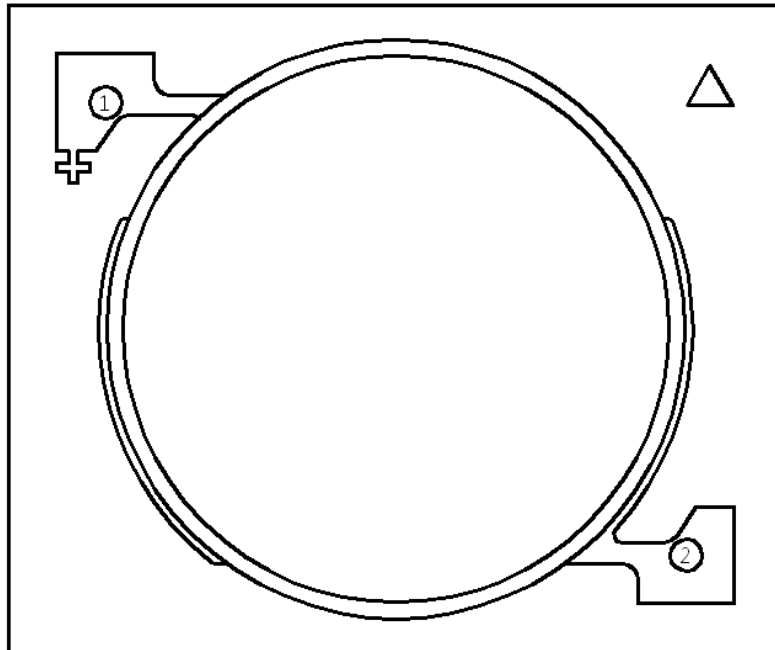


10series × 5parallel = 50 pcs of LEDs

Note:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ±0.25mm.

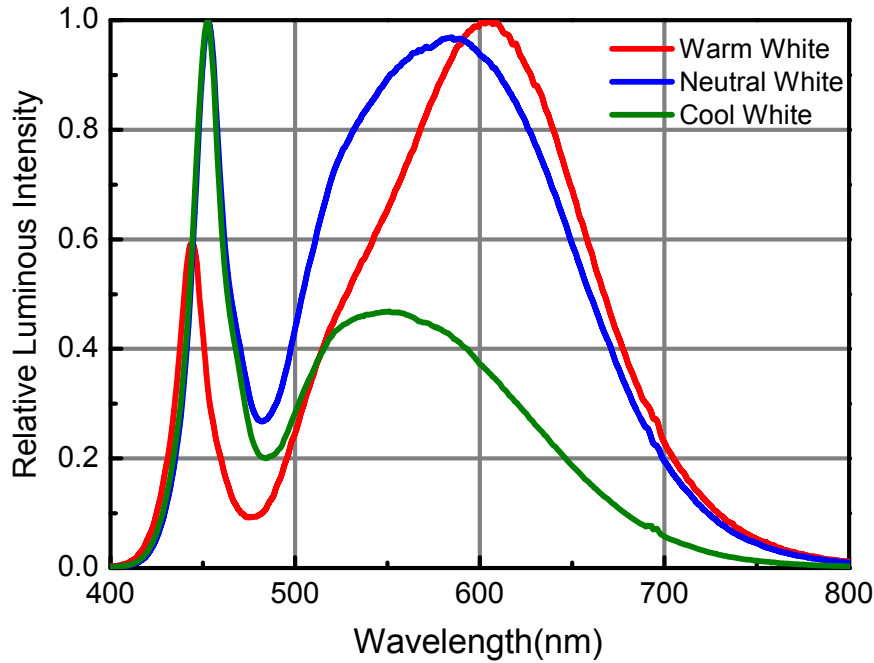
Pad Configuration



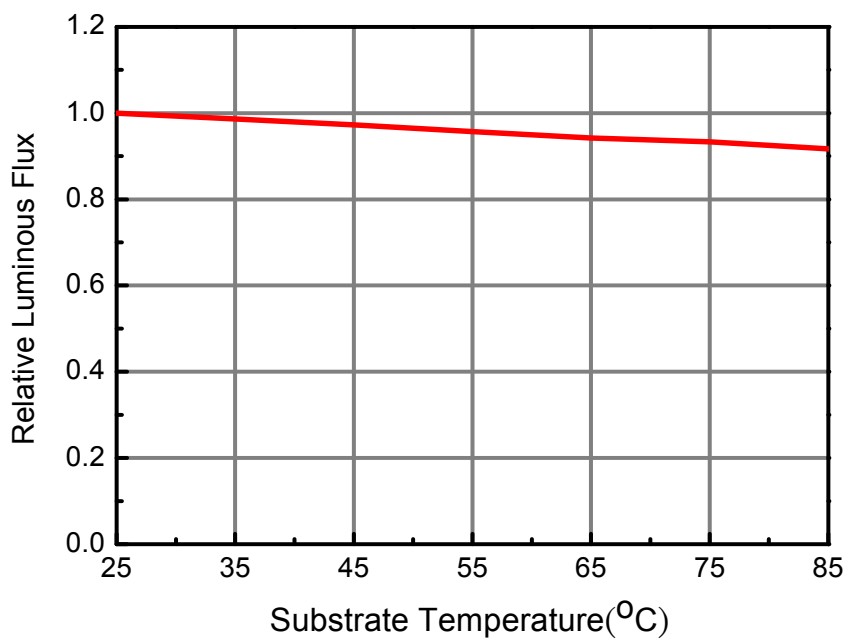
| PAD | FUNCTION |
|-----|----------|
| 1 | ANODE |
| 2 | CATHODE |

15W COB Series Typical Electro-Optical Characteristic Curve

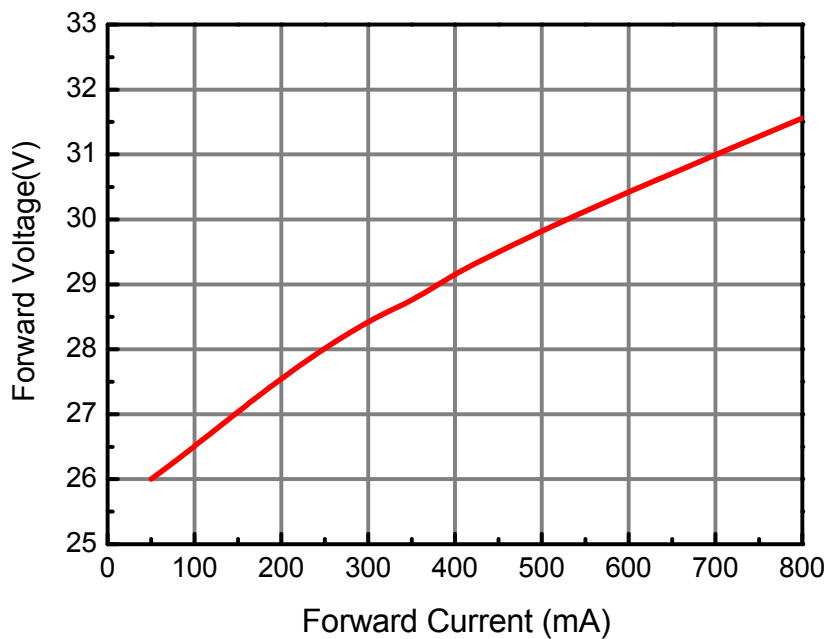
Relative Spectral Distribution
@ Substrate Temperature = 25°C



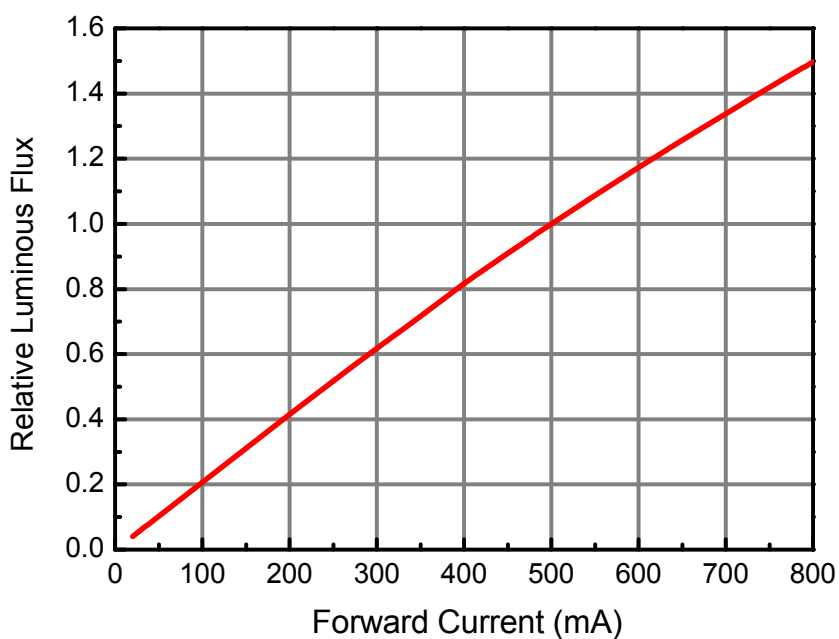
Relative Luminous Flux vs. Substrate Temperature
@Forward Current = 500mA



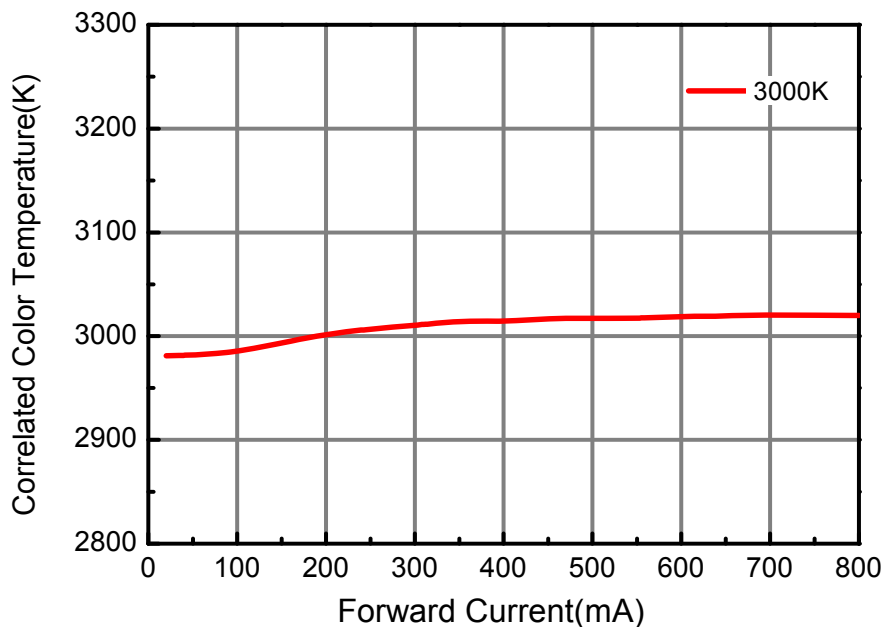
Forward Voltage vs. Forward Current
@ Substrate Temperature = 25°C



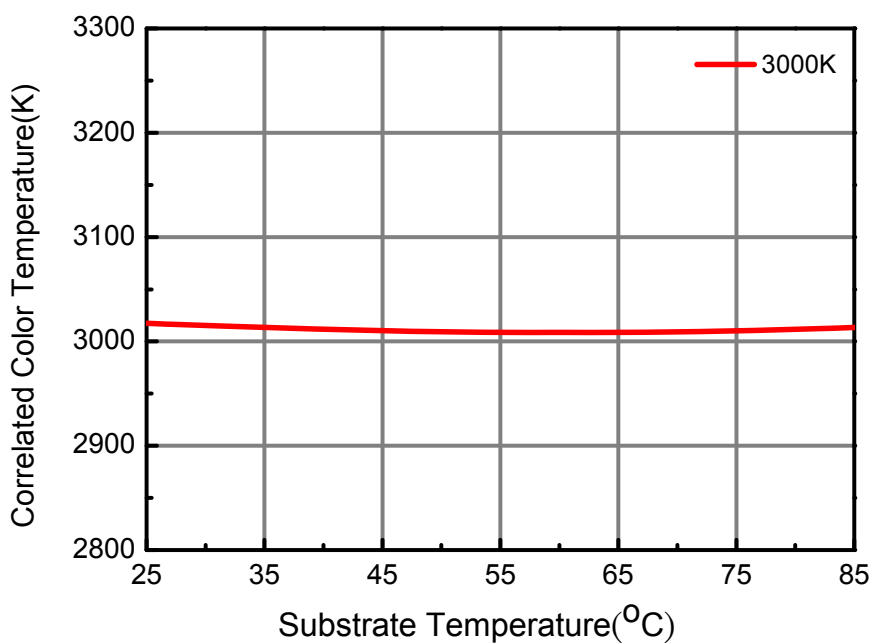
Relative Luminous Flux vs. Forward Current
@ Substrate Temperature = 25°C



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

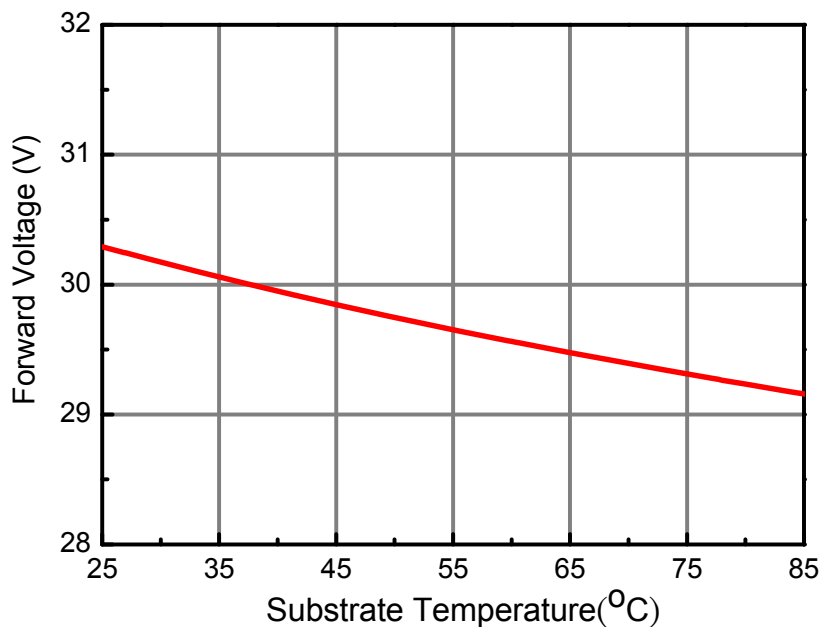


Correlated Color Temperature vs. Substrate Temperature
@ Forward Current = 500mA



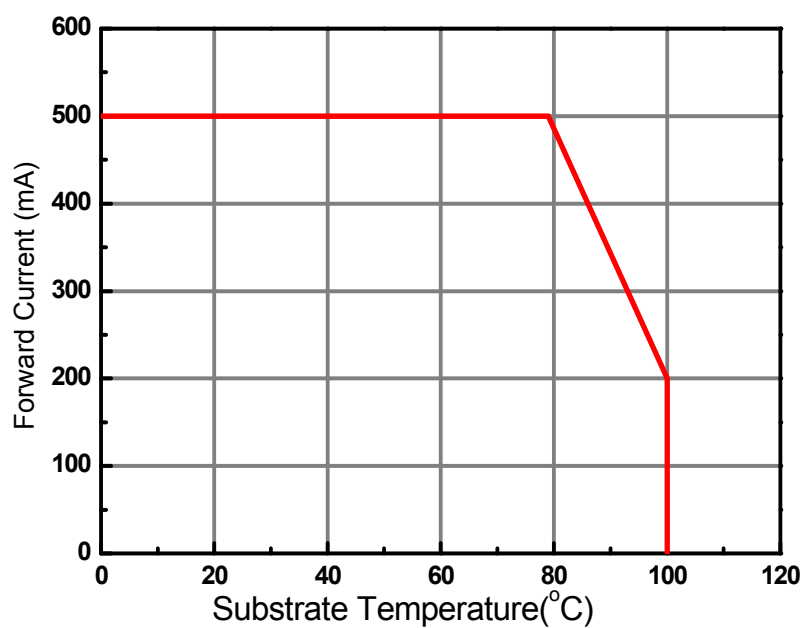
Forward Voltage vs. Substrate Temperature

@ Forward Current = 500mA

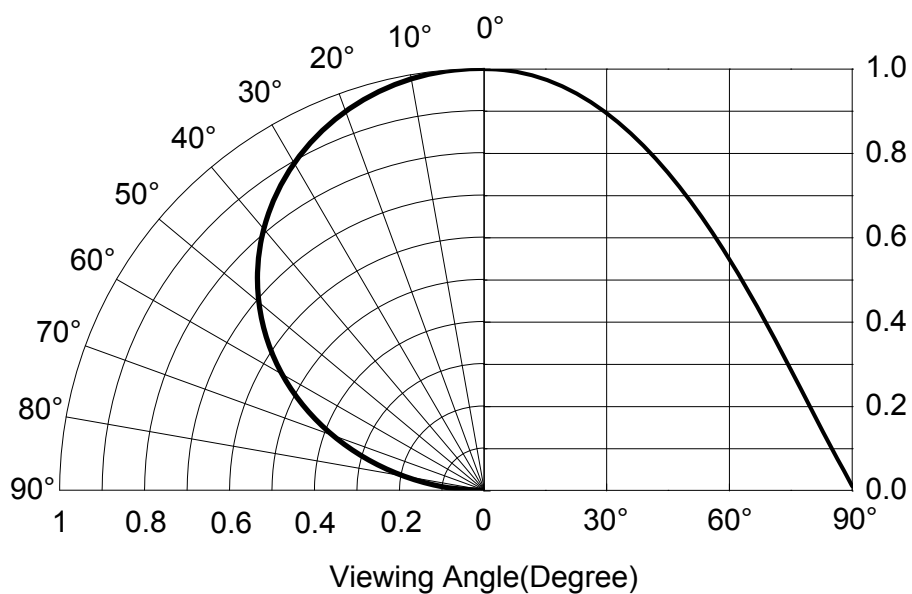


Forward Current Derating Curve

@ Junction Temperature <115°C



Typical Diagram Characteristics of Radiation Patterns



Notes:

1. 2θ_{1/2} is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. Viewing angle tolerance is ± 5° .

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

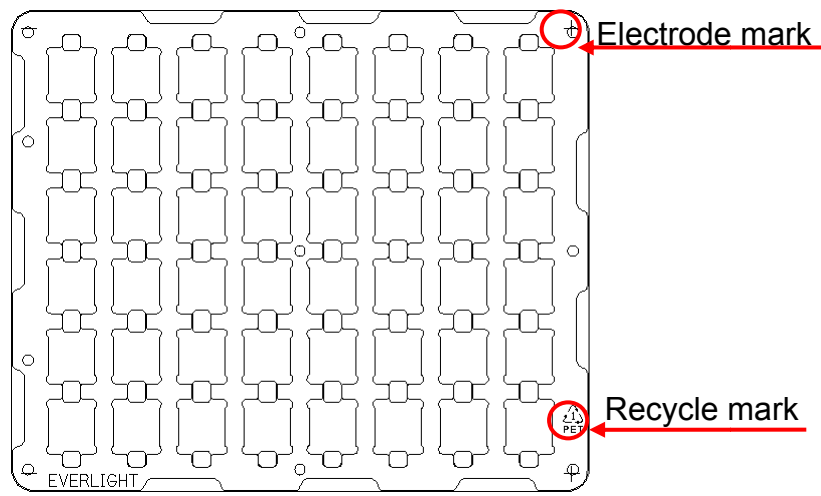
LOT No: Lot Number

MADE IN TAIWAN: Production Place



Carrier Tray Specification

Loaded Quantity:48 PCS Per Tray



Notes:

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

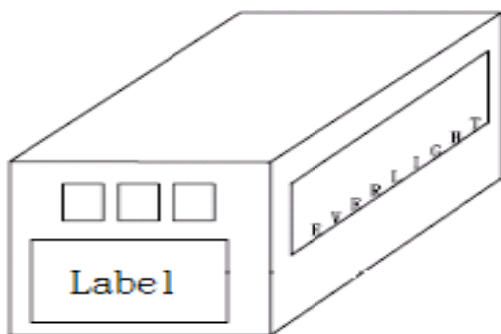
LED Direction

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

Moisture Resistant Packaging



Outside Carton



RoHS (Pb) EVERLIGHT 5

CPN: XXXXXXXXXXXXXXXXXXXX 測試區
XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX
P/N: XXXXXXXXXXXX
XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX
LOT NO: Y150716XXX-XXXXXXXXXX-XXXXXXXXXX
QTY: 0123456789 HUE: XXXXXXXXXXXX
CAT: XXXXXXXXXXXX REF: XXXXXXXXXXXX
REFERENCE: BTPYMMDDXXXXX
MADE IN TAIWAN



Packaging Quantity

- 48 PCS Per Tray
- 20 Trays Per Outside Carton

Precautions of Use

Over-Current-Proof

- Thought the JU2024 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 bum out failure may happen.

Storage

- 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 limits are 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's should be stored under 30°C or less and 60%RH or less. The LED should be used with 168hrs (7days) after opening the package. If unused LEDs remain, it should be stored in moisture proof packages.
- Do not stack assemblies..



Handling

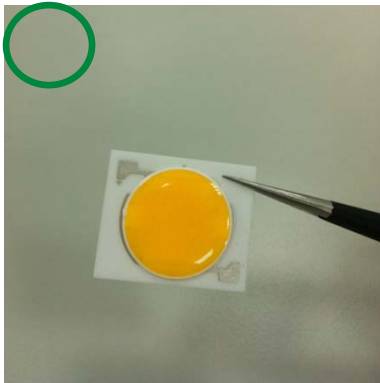
- Don not putting mechanical stress on the LED.
- Never touch the optical surface with finger or sharp object. The LED surface could be soiled or damaged, which could affect the optical performance of the LED.
- In low-humidity work environment, please keep handling the LEDs with appropriate ESD grounding.
- 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. The substrate temperature must be kept under 85°C at the driving current 500mA. Otherwise, the junction temperature of die may exceed over the limit at high current driving conditions and the LEDs' lifetime may be decrease dramatically.



Report No.: OA-2012-90026

Page 1 of 40

Issued: Jun. 25, 2013

TEST REPORT

The following tested product(s) were submitted and identified by the vendor as:

Applicant : EVERLIGHT ELECTRONICS CO., LTD.
Address of Applicant : No.8-8, Zhonghua Rd., Shulin Dist, New Taipei City
23860, Taiwan, R.O.C.
Testing Laboratory : SGS Taiwan Ltd., Optics Laboratory
Laboratory Address : 33, Wu Chyuan Rd., New Taipei Industrial Park, New
Taipei City, Taiwan 24886
Product Name : LED Component JU 2024 30 V / 15 W COB series
Model / Serial Number : JU2024-KM307P6-30515-0G0T
Manufacturer : EVERLIGHT ELECTRONICS CO., LTD.
Rating : DC 500 mA, 27 V to 33 V
Tested Condition : DC 600 mA (Constant Current)
Test Standard/Method : IES LM-80-08 Approved Method: Measuring Lumen
Maintenance of LED Light Sources
Date of Issue : Jun. 25, 2013

The submitted products have been tested as requested and the following results were obtained, and the report, not applicable for lawsuit, refers only to the unit(s) submitted for test.

Test Results : -PLEASE SEE ATTACHED SHEETS-

Signed for and on behalf of
SGS TAIWAN Ltd.

Calvin Tzou
Technical Manager

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1 SAMPLING DESCRIPTION

No sampling action and method employed

2 DATE OF RECEIPT OF SAMPLES

Sep. 24, 2012

3 DATE(S) OF PERFORMANCE OF THE TEST

Sep. 24, 2012 ~ Jun 18, 2013

4 IDENTITY OF SAMPLES

| Quantity | Model | Serial Number |
|----------|---------------------------|-----------------------|
| 25 | JU2024-KM307P6-30S15-DG0T | # A01 - # A25 (55 °C) |
| 25 | JU2024-KM307P6-30S15-DG0T | # B01 - # B25 (85 °C) |
| 25 | JU2024-KM307P6-30S15-DG0T | # C01 - # C25 (95 °C) |

5 TEST ITEMS

5.1 Data Summary of Lumen and Color Maintenance

Test results were concluded by different Case Temperatures (Ts).

5.2 Lumen Maintenance and Color Maintenance Test

Testing specifications by different case temperatures according to IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources and client's requirements were implemented per the following items.

5.2.1 Total Luminous Flux (Φ_v)

The test results of total luminous flux were implemented referring to Clause 2 PROPERTIES OF LEDS & Clause 6 MEASUREMENT OF LUMINOUS FLUX of CIE 127: 2007 2nd edition MEASUREMENT OF LEDS and IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources, when the UUTs were powered with constant current of I.

5.2.2 Correlated Color Temperature (CCT), CIE Color Coordinate (CIEx, CIEy) & Chromaticity Shift ($\Delta u'v'$)

The test results of correlated color temperature were implemented referring to CIE 127:2007 2nd edition MEASUREMENT OF LEDS, CIE 15: 2004 COLORIMETRY.

The test results of color coordinate were implemented referring to CIE 127: 2007 2nd edition MEASUREMENT OF LEDS, CIE 15:2004 COLORIMETRY.

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6 TEST CONDITIONS

Main Test Equipment:

| Name | Brand | Model | S/N | Traceability |
|---|-----------|--------------------|-------------------|--------------|
| Standard Light Source / Spectroradiometer | Labsphere | SCL-600 / CDS 2100 | D112 / 0811118355 | NIST |
| Source Meter | Kethley | 2400 | 1321218 | NMI |
| Handheld Digital Multimeter | Agilent | U1242A | MY48490144 | NMI |

Environmental Conditions:

Temperature: (25 ± 1) °C

Relative Humidity: < 65 % RH

LUUT Conditions:

LED Light source: LED Package

Drive Current: DC 600 mA (Over spec., Define by Client)

Forward Voltage: DC 30 V (Typical)

Power Consumption: 15 W

CCT: 3000 K

Package Dimension: L 20 mm x W 24 mm x H 1.6 mm

Prior operation: 0 hour

Total Operation Duration: 6000 hours

Target CCT: 3000 K

Sample Size: 75 pcs (25 pcs for each temperature)

Failed Quantity: 0 pcs

Measurement Conditions:

Interval Time: 0, 1000, 2000, 3000, 4000, 5000, 6000 hours

Warm up Time: < 1 minute (Initial)

Relative measurement uncertainty: 2.8 % (95 % Confidence Level)

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7 TEST RESULTS

7.1 Data Summary of Lumen and Color Maintenance

| Temp. | Initial (0 hr) | | Luminous Maintenance (%) | | | | | |
|-----------|----------------|--------------------|--------------------------|----------|----------|----------|----------|----------|
| | TLF(lm) | V _F (V) | 1000 hrs | 2000 hrs | 3000 hrs | 4000 hrs | 5000 hrs | 6000 hrs |
| 55°C Avg. | 1968.84 | 31.49 | 99.8 % | 99.8 % | 99.1 % | 98.0 % | 96.8 % | 94.7 % |
| 85°C Avg. | 1964.24 | 31.41 | 99.7 % | 99.7 % | 98.9 % | 97.7 % | 96.5 % | 94.1 % |
| 95°C Avg. | 1957.60 | 31.44 | 99.5 % | 99.2 % | 98.5 % | 97.3 % | 95.7 % | 93.1 % |

| Temp. | Initial (0 hr) | | | Chromaticity Shift ($\Delta u'v'$) | | | | | |
|-----------|----------------|--------|--------|--------------------------------------|----------|----------|----------|----------|----------|
| | CIEx | CIEy | CCT | 1000 hrs | 2000 hrs | 3000 hrs | 4000 hrs | 5000 hrs | 6000 hrs |
| 55°C Avg. | 0.4290 | 0.4050 | 3143.4 | 0.0002 | 0.0006 | 0.0005 | 0.0005 | 0.0007 | 0.0012 |
| 85°C Avg. | 0.4294 | 0.4053 | 3138.0 | 0.0003 | 0.0006 | 0.0006 | 0.0007 | 0.0007 | 0.0011 |
| 95°C Avg. | 0.4283 | 0.4050 | 3155.5 | 0.0002 | 0.0004 | 0.0003 | 0.0004 | 0.0004 | 0.0007 |

Lumen maintenance life projection

| Table 1: Report at each LM-80 Test Condition | | | | | |
|--|---------------|--|---------------|--|---------------|
| Description of LED Light Source Tested (manufacturer, model, catalog number) | | | | | |
| Test Condition 1 - 55°C Case Temp | | Test Condition 2 - 85°C Case Temp | | Test Condition 3 - 95°C Case Temp | |
| Sample size | 25 | Sample size | 25 | Sample size | 25 |
| Number of failures | 0 | Number of failures | 0 | Number of failures | 0 |
| DUT drive current used in the test (mA) | 600 | DUT drive current used in the test (mA) | 600 | DUT drive current used in the test (mA) | 600 |
| Test duration (hours) | 6,000 | Test duration (hours) | 6,000 | Test duration (hours) | 6,000 |
| Test duration used for projection (hour to hour) | 1,000 - 6,000 | Test duration used for projection (hour to hour) | 1,000 - 6,000 | Test duration used for projection (hour to hour) | 1,000 - 6,000 |
| Tested case temperature (°C) | 55 | Tested case temperature (°C) | 85 | Tested case temperature (°C) | 95 |
| α | 1.043E-05 | α | 1.140E-05 | α | 1.293E-05 |
| B | 1.017 | B | 1.017 | B | 1.017 |
| Calculated L70(6k) (hours) | 36,000 | Calculated L70(6k) (hours) | 33,000 | Calculated L70(6k) (hours) | 29,000 |
| Reported L70(6k) (hours) | >36000 | Reported L70(6k) (hours) | 33,000 | Reported L70(6k) (hours) | 29,000 |

Revision History

Current version: **2016.08.26**

Issue No: DHE-0003138

Version: 2

| Page | Subjects (major change in previous version) | Date of change |
|------|---|----------------|
| 9 | Change CIE Spec. | 2016.09.07 |
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