

# 2835R Series

Standard 2835 package to address retrofit applications



2835R Series is a complementary portfolio with optimized performance and bin construction for the retrofit space. With an industry standard footprint, it provides the perfect balance between performance and cost efficiency for a variety of applications.

## **FEATURES AND BENEFITS**

Flexible voltage configurations to comply with various different system solutions

Industry standard footprint for drop-in replacement designs

High maximum drive current to allow for reduction of LED count

# Part Number Nomenclature

Part numbers for the 2835R Series follow the convention below:

L 1 2 8 – **A A B B R C 3 5 0 0 D D D**

Where:

A A - designates nominal CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K)

B B - designates nominal CRI (70=70CRI, 75=75CRI, 80=80CRI and 90=90CRI)

C - designates voltage (A=3V, B=6V, C=9V, D=18V, E=36V, F=54V)

D D D - designates Lumileds internal code (0A1, 0B1, 0C1, etc.=shares the same base part)

Therefore, the following part number is used for a 2835R 3000K, 80CRI, 36V LED:

L 1 2 8 – **3 0 8 0 R E 3 5 0 0 0 A 1**

## Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long- term performance of this product.

## Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. The 2835R Series is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

## Mass Production List of 2835R Series

| Product  | Product Number     | CCT  | Ra<br>Min | Φ(lm)<br>Min | Φ(lm)<br>Typ | Test conditions |
|----------|--------------------|------|-----------|--------------|--------------|-----------------|
| 2835R 3V | L128-2790RA35000W1 | 2700 | 90        | 22           | 23           | 25°C, IF=60mA   |
|          | L128-3090RA35000W1 | 3000 | 90        | 24           | 25           |                 |
|          | L128-3590RA35000W1 | 3500 | 90        | 25           | 26           |                 |
|          | L128-4090RA35000W1 | 4000 | 90        | 26           | 27           |                 |
|          | L128-5090RA35000W1 | 5000 | 90        | 26           | 27           |                 |
|          | L128-5790RA35000W1 | 5700 | 90        | 26           | 27           |                 |
|          | L128-6590RA35000W1 | 6500 | 90        | 26           | 27           |                 |

### Notes:

- 1.Tolerance of Color Rendering Index:  $\pm 2$ .
- 2.Tolerance of Luminous flux:  $\pm 5\%$ .

## Absolute maximum ratings(Ta=25°C)

| Parameter                          | Symbol | Value     | Unit |
|------------------------------------|--------|-----------|------|
| <b>Power dissipation</b>           | Pd     | 496       | mW   |
| <b>Forward current</b>             | IF     | 150       | mA   |
| <b>Reverse voltage</b>             | VR     | 5         | V    |
| <b>Operating temperature range</b> | Top    | -40 ~+105 | °C   |
| <b>Storage temperature range</b>   | Tstg   | -40 ~+105 | °C   |
| <b>Heatresistance</b>              | Rth    | 35        | °C   |
| <b>Junction temperature</b>        | Tj     | 125       | °C   |
| <b>Electrostatic Discharge</b>     | ESD    | 2000      | V    |

## Electro-optical characteristics(Ta=25°C)

| Parameter              | Symbol         | Min | Typ | Max | Unit | Test Condition       |
|------------------------|----------------|-----|-----|-----|------|----------------------|
| <b>Forward voltage</b> | V <sub>f</sub> | 2.7 | -   | 3.0 | V    | I <sub>F</sub> =60mA |
| <b>Luminous flux</b>   | Φ              | 22  | -   | -   | lm   | I <sub>F</sub> =60mA |
| <b>Viewing Angle</b>   | 2 θ 1/2        | -   | 120 | -   | Deg  | I <sub>F</sub> =60mA |
| <b>Reverse current</b> | I <sub>R</sub> | -   | -   | 10  | μA   | V <sub>r</sub> =5V   |
| <b>Color Index</b>     | R <sub>a</sub> | 90  | -   | -   | -    | I <sub>F</sub> =60mA |

### NOTES:

- \* The measurement of forward voltage maintains a tolerance of  $\pm 0.05V$ , flux maintains a tolerance of  $\pm 5\%$ .
- \* R<sub>a</sub> measurement tolerance is  $\pm 2$ .
- \* R<sub>th j-sp</sub> is the thermal resistance from LED junction to solder point on MCPCB with electrical power.

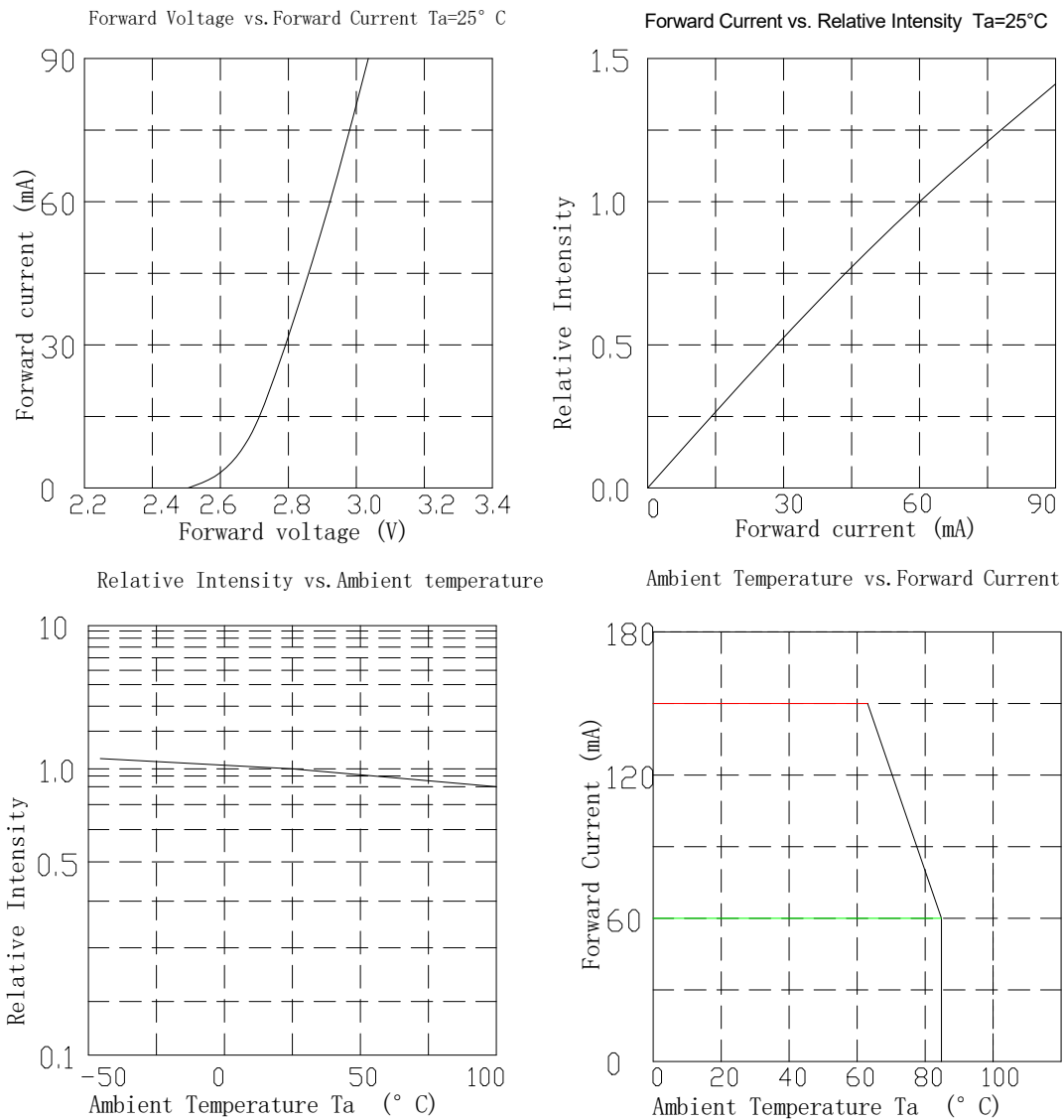
## Reliability Test Items And Conditions

| Test Items                               | Test condition                              | Time      | Quantity | Ac/Re |
|--|---|-----------|----------|-------|
| Reflow Soldering                         | Temp. :260°C/10sec.                         | 6Min.     | 22pcs    | 0/22  |
| Thermal Shock                            | -40~125C,<br>15min dwell,<br>10sec transfer | 100Cycles | 22pcs    | 0/22  |
| High Temperature High Humidity life Test | 85°C,85%RH,<br>IF=60mA                      | 1000Hrs.  | 10pcs    | 0/10  |
| Low Temperature Storage                  | Ta=-40°C                                    | 1000Hrs.  | 10pcs    | 0/10  |
| High Temperature Storage                 | Ta=105°C                                    | 1000Hrs.  | 10pcs    | 0/10  |
| High Temperature Operation Life Test     | Ta=85°C,<br>IF =60mA.                       | 1000Hrs.  | 10pcs    | 0/10  |

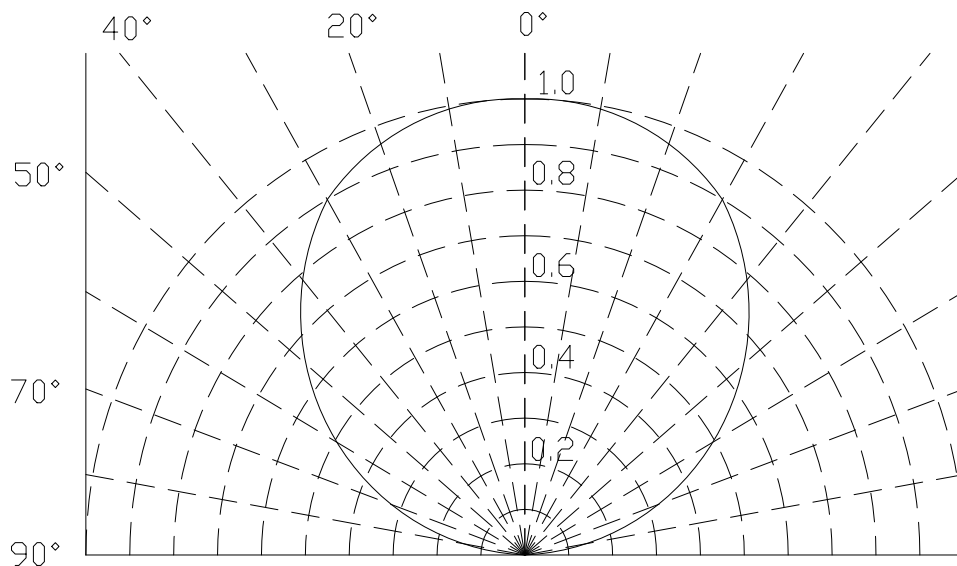
## Failure Criteria

| Item            | Symbol         | Failure Criteria |
|-----------------|----------------|------------------|
| Luminous Flux   | Lm             | $\geq 70\%$      |
| Forward voltage | VF             | $\pm 10\%$       |
| Colour          | CIE_X<br>CIE_y | $\pm 0.01$       |

## Typical optical characteristics curves

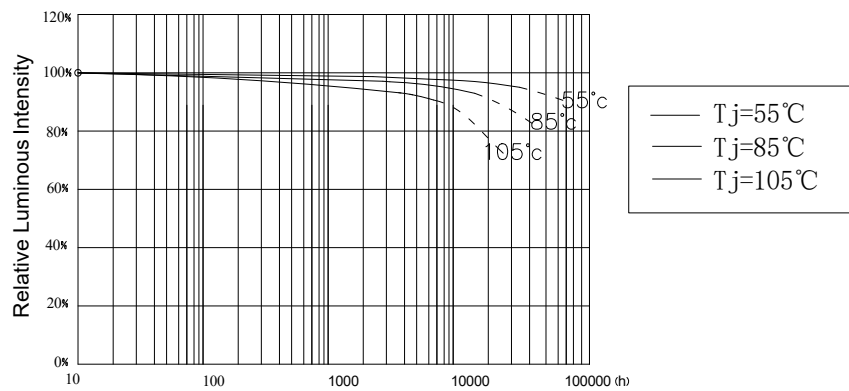


## Curves of beam angle and relative brightness

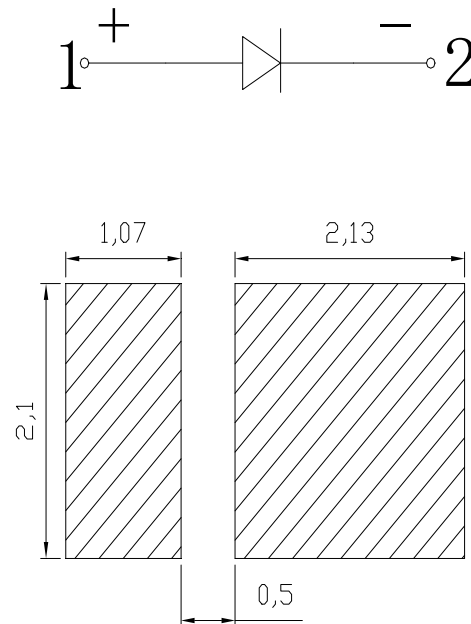
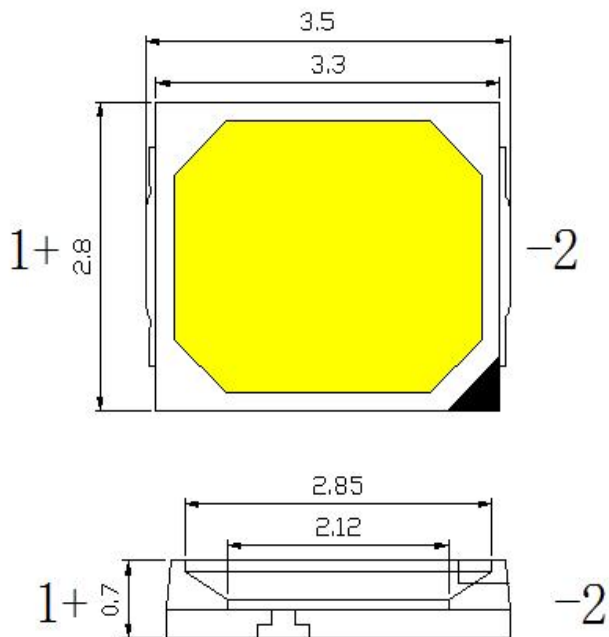


## life test:

Affect of Tj on Luminous Maintenance  
(If=60mA)  
(Dot line: Expected Life)



## Mechanical Dimensions: Unit (mm)



**For reflow soldering**

# Product Bin and Labeling Definitions

## Decoding Product Bin Labeling

In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheet. For this reason, Lumileds bins LED components for luminous flux or radiometric power, color point, peak or dominant wavelength and forward voltage.

2835R Series LEDs are labeled using a 5-digit alphanumeric CAT code following the format below

Where:

**A B C D E**

**A** - designates luminous flux bin (example: B=95 to 100 lumens, G=140 to 150 lumens)

**B C D** - designates correlated color bin (example: A27, A30, A35, A40, A50, A57, A65)

**E** - designates forward voltage bin (example: B=34.5 to 35.0V, J=38.0 to 38.5V)

Therefore, a 2835R LED with a lumen range of 95 to 100, color bin of A35 and a forward voltage range of 38.0 to 38.5V has the following CAT code:

**B A 3 5 J**



## Luminous Flux Bins

**Luminous flux bin definitions for 2835R Series at rated current, Ta=25°C .**

| Product Number     | Bin | Min | Max |
|--------------------|-----|-----|-----|
| L128-XX90RA35000W1 | U   | 20  | 23  |
|                    | T   | 23  | 26  |
|                    | S   | 26  | 29  |
|                    | R   | 29  | 32  |

### Notes

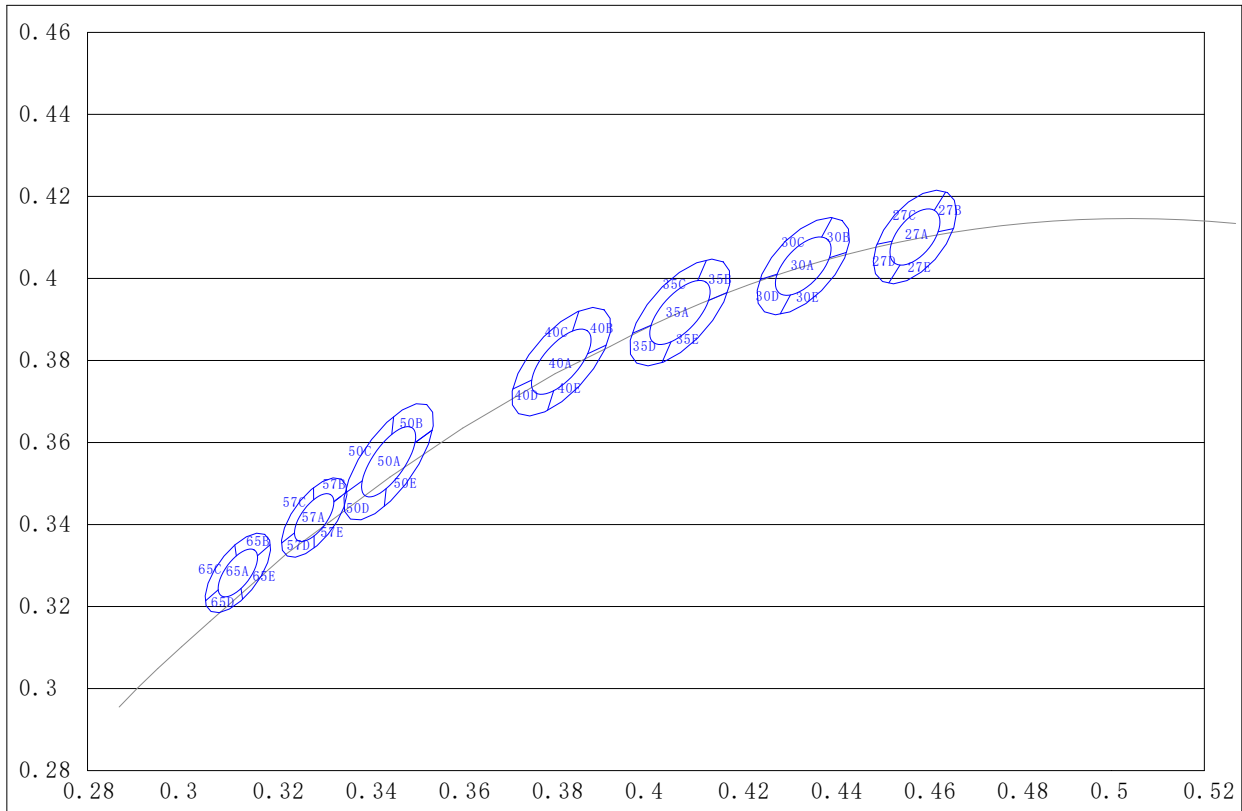
**Lumileds Maintains a tolerance of  $\pm 5\%$  on luminous flux measurements**

## Forward Voltage Bins

**Forward voltage bin definitions for 2835R Series at rated current, Ta=25°C .**

| Product Number     | Bin | Min | Max |
|--------------------|-----|-----|-----|
| L128-XX90RA35000W1 | Y   | 2.7 | 2.8 |
|                    | X   | 2.8 | 2.9 |
|                    | W   | 2.9 | 3.0 |

## Color Bin Definition



### Correlated color temperature bin definitions for 2835R Series at rated current, Ta=25°C

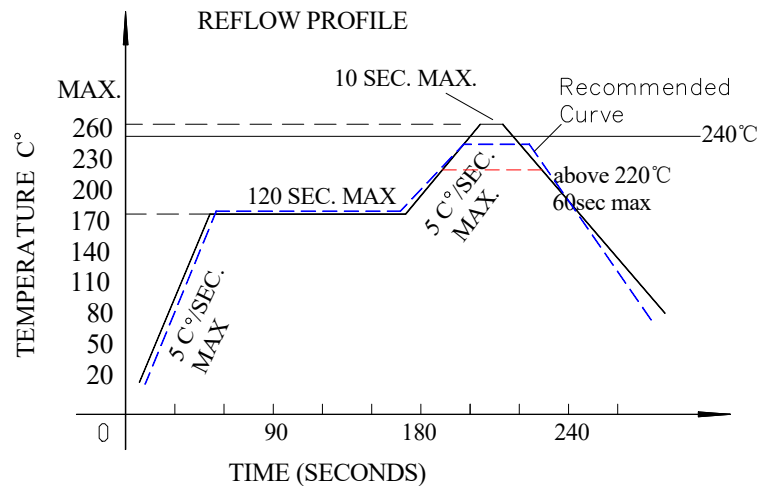
| bin Colde | 27A/B/C/D/E |        | 30A/B/C/D/E |        | 35A/B/C/D/E |        | 40A/B/C/D/E |        |
|-----------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|
| CCT       | 2700K       |        | 3000K       |        | 3500K       |        | 4000K       |        |
| #         | x           | y      | x           | y      | x           | y      | x           | y      |
| 1         | 0.4813      | 0.4319 | 0.4562      | 0.426  | 0.4299      | 0.4165 | 0.4005      | 0.4044 |
| 2         | 0.4688      | 0.429  | 0.4431      | 0.4213 | 0.4148      | 0.409  | 0.3866      | 0.3955 |
| 3         | 0.4562      | 0.426  | 0.4299      | 0.4165 | 0.3996      | 0.4015 | 0.3726      | 0.3866 |
| 4         | 0.4468      | 0.4077 | 0.4223      | 0.399  | 0.3943      | 0.3853 | 0.3693      | 0.3719 |
| 5         | 0.4373      | 0.3893 | 0.4147      | 0.3814 | 0.3889      | 0.369  | 0.366       | 0.3572 |
| 6         | 0.4483      | 0.3919 | 0.426       | 0.3854 | 0.4018      | 0.3752 | 0.3779      | 0.3644 |
| 7         | 0.4593      | 0.3944 | 0.4373      | 0.3893 | 0.4147      | 0.3814 | 0.3897      | 0.3716 |
| 8         | 0.4703      | 0.4132 | 0.4468      | 0.4077 | 0.4223      | 0.399  | 0.3943      | 0.3853 |
| bin Colde | 50A/B/C/D/E |        | 57A/B/C/D/E |        | 65A/B/C/D/E |        |             |        |
| CCT       | 5000K       |        | 5700K       |        | 6500K       |        |             |        |
| #         | x           | y      | x           | y      | x           | y      |             |        |
| 1         | 0.3587      | 0.3792 | 0.3377      | 0.3617 | 0.3206      | 0.3482 |             |        |
| 2         | 0.346       | 0.3687 | 0.3285      | 0.3533 | 0.3112      | 0.3388 |             |        |
| 3         | 0.3333      | 0.3583 | 0.3194      | 0.345  | 0.3018      | 0.3294 |             |        |
| 4         | 0.3331      | 0.3458 | 0.3201      | 0.334  | 0.3038      | 0.3199 |             |        |
| 5         | 0.3329      | 0.3333 | 0.3208      | 0.3231 | 0.3059      | 0.3104 |             |        |
| 6         | 0.3435      | 0.3416 | 0.3287      | 0.33   | 0.3138      | 0.3181 |             |        |
| 7         | 0.3541      | 0.35   | 0.3367      | 0.337  | 0.3221      | 0.3261 |             |        |
| 8         | 0.3564      | 0.365  | 0.3372      | 0.3493 | 0.3213      | 0.3371 |             |        |

| CCT   | Color space | Center X | Center Y | a        | b        | Rotation Angle |
|-------|-------------|----------|----------|----------|----------|----------------|
| 2700K | 3-Step      | 0.4578   | 0.4101   | 0.007700 | 0.004000 | 57.28          |
|       | 5-Step      | 0.4578   | 0.4101   | 0.012900 | 0.006700 | 57.28          |
| 3000K | 3-Step      | 0.4338   | 0.403    | 0.008346 | 0.004098 | 53.16          |
|       | 5-Step      | 0.4338   | 0.403    | 0.013910 | 0.006831 | 53.16          |
| 3500K | 3-Step      | 0.4073   | 0.3917   | 0.009271 | 0.004139 | 52.96          |
|       | 5-Step      | 0.4073   | 0.3917   | 0.015452 | 0.006899 | 52.96          |
| 4000K | 3-Step      | 0.3818   | 0.3797   | 0.009386 | 0.004035 | 54             |
|       | 5-Step      | 0.3818   | 0.3797   | 0.015644 | 0.006725 | 54             |
| 5000K | 3-Step      | 0.3447   | 0.3553   | 0.009710 | 0.003600 | 59.62          |
|       | 5-Step      | 0.3447   | 0.3553   | 0.016183 | 0.006000 | 59.62          |
| 5700K | 3-Step      | 0.3287   | 0.3417   | 0.006617 | 0.002855 | 58.38          |
|       | 5-Step      | 0.3287   | 0.3417   | 0.011029 | 0.004758 | 58.38          |
| 6500K | 3-Step      | 0.3123   | 0.3282   | 0.006617 | 0.002855 | 58.38          |
|       | 5-Step      | 0.3123   | 0.3282   | 0.011029 | 0.004758 | 58.38          |

#### Notes

Tester tolerance:  $\pm 0.01$  in x and y coordinates

## Requirements for application and reflow soldering :



(Product is highest resistant to 260°C reflow but suggested the highest temperature of 240°C within)

### ■ Notes for reflow soldering :

1. No more than twice for reflow soldering.
2. To ensure the quality of our LEDs, we encapsulate them with silica gels. So please do not put pressure on the LEDs.
3. Please choose the right nozzle(try to learn from the plastic products parts) to avoid the damage to products due to the pressure.
4. Please put on the antistatic hand loop during the use. The worktable should be with antistatic finish. The equipments must be contacted with ground.

### ■ Handwork soldering:

1. During the soldering, the electronic soldering iron must be kept under the temperature of 300°C and the soldering time must not be beyond 3 seconds. No touch between the electronic soldering iron and colloid.
2. Handwork soldering is only allowed once. We won't take responsibility for more than that.
3. Avoid using sharp objects to compress products Colloidal Part directly.
4. Please put on the antistatic hand loop during the use. The worktable should be with antistatic finish. The equipments must be contacted with ground.