深圳市锐硕光电有限公司

Shenzhen Ruishuo Optoelectronic Co.,Ltd

# SPECIFICATIONS FOR COB SERIES

# WHITE LED

## Model： Metal COB SERIES

## Part No： TMN1-16-xxxx-5802AA0

DATE: 2018/11/05

REV. No.: VERSION A00

RUI SHUO

# 深圳市锐硕光电有限公司

## Shenzhen Ruishuo Optoelectronic Co.,Ltd

**Features:**

* Compact high flux density light source
* Uniform, high quality illumination
* Minimum 80, and 90 CRI options
* StreaCLined thermal path
* ENERGY STAR/ ANSI compliant color binning structure with 3 and 5 SDCM standard
*More energy efficient than incandescent, halogen and fluorescent lamps
* RoHS and REACH certification

**Applications**

* Spotlights/Track Lights
* Downlights
* Shop Lighting
* Hospitality Lighting
* Architectural and Specialty
* Street Lighting
* Parking Lot and Area Lighting
* Tunnel Lighting

**Electro Optical Characteristics, IF = 240mA**

| CCT | Color Rendering | Luminous Flux | | | |
|---|---|---|---|---|---|
| | | Ta=25℃ | | Ta=85℃ | |
| | Min. | Typ. | Min. | Typ. |
| 2700K | 80 | 5615 | 5053 | 5025 |
| | 90 | 4715 | 4243 | 4220 |
| 3000K | 80 | 5830 | 5157 | 5128 |
| | 90 | 4985 | 4486 | 4461 |
| 3500K | 80 | 5841 | 5310 | 5281 |
| | 90 | 5075 | 4567 | 4542 |
| 4000K | 80 | 5850 | 5265 | 5235 |
| | 90 | 4919 | 4472 | 4447 |
| 5000K | 80 | 5910 | 5265 | 5235 |
| 5700K | 80 | 5910 | 5265 | 5235 |
| 6500K | 80 | 5910 | 5265 | 5235 |

* Tolerance of measurements of the Luminous Flux is ±7%.

* Ra measurement tolerance is ±2.

* Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.

* The lumen table at 85℃ is only for reference.

**Part Numbering System**

T □ □ □ -□□-□□ □□ - □□ □□-□ □ □

X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11

| Item Number Code | Description | Content |
|---|---|---|
| X1 | Base material | M: Mirror aluminum<br>C: ceramic<br>F:PCB |
| X2 | Bit code | N:standart<br>E: economy |
| X3 | Version Code | \ |
| X4 | Light Emitting Surface | 16=Φ16mm |
| X5 | Nominal CCT | 30=3000K |
| X6 | Minimum CRI | 80=80CRI |
| X7 | Die Count In Series | \ |
| X8 | Die Count In Parallel | \ |
| X9 | version | \ |
| X10 | ANSI | \ |
| X11 | Bom Version | \ |

**Absolute Maximum Ratings at Ta=25℃**

| Item | Symbol | Absolute Maximum Rating | Unit |
|---|---|---|---|
| Forward current | IF | 400 | mA |
| Power Dissipation | PD | 72 | W |
| Operating Temperature | Topr | -40～+105 | ℃ |
| Storage Temperature | Tstg | -40～+120 | ℃ |
| Junction Temperature | Tj | 125 | ℃ |

* Condition for Ifp are pulse of with 1/10 duty and 0.8msec width (120Hz)
* LED's properties might be different from suggested values like above and below tables if operation condition will be exceeded our parameter range. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.
* All measurements were made under the standardized environment of Lightning LED.

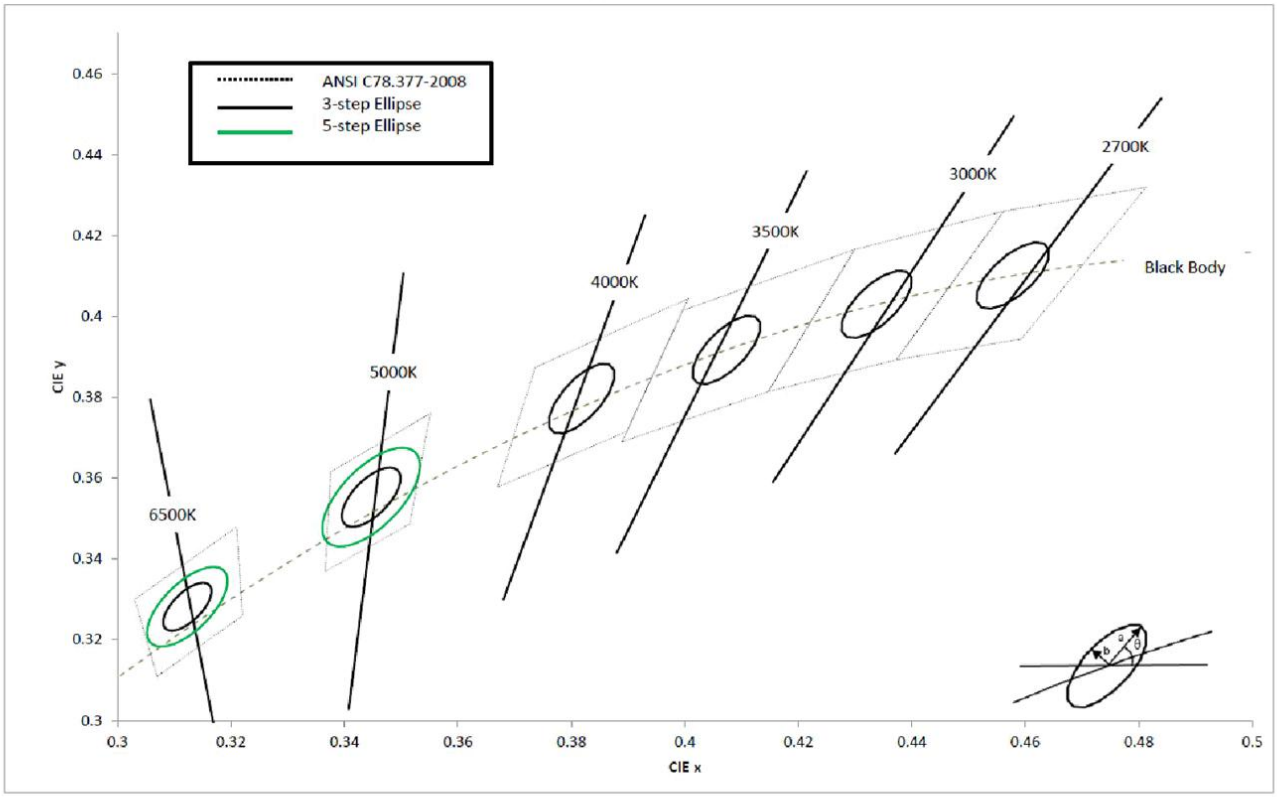
**Electrical/Optical Characteristics at Ta=25℃**

| Item | Symbol | Min | Typ | Max | Unit | Condition |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | 166 | 170 | | V | IF=240mA |
| Luminous Flux | ΦV | | 5850 | | lm | |
| View Angle | $2\theta_{1/2}$ | - | 120 | - | ° | |
| Correlated Color Temperature | CCT | 2700 | 4000 | 6500 | K | |
| Color Rendering Index | Ra | 80 | | | - | |
| Color Rendering Index | R9 | - | - | - | - | |
| Characteristics Coordinates | X | - | 0.4338 | - | - | |
| | y | - | 0.4030 | - | - | |
| Thermal resistance | ($R_{th\ j\text{-}sp}$) | - | 1.5 | - | ℃/W | |

* Tolerance of measurements of the Forward Voltage is ±3%.
* Tolerance of measurements of the Luminous Flux is ±7%.
* 2θ1/2 is the off-axis where the luminous intensity is 1/2 of the peak intensity.
* Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.
* Ra measurement tolerance is ±2.
* R9 measurement tolerance is ±2.
* Tolerance of measurements of the chromaticity Coordinate is ±0.005.
* Rth j-sp is the thermal resistance from LED junction to solder point on MCPCB with electrical power.

## Chromaticity Bin Structure

Chromaticity Bins: 1931 CIE Curve

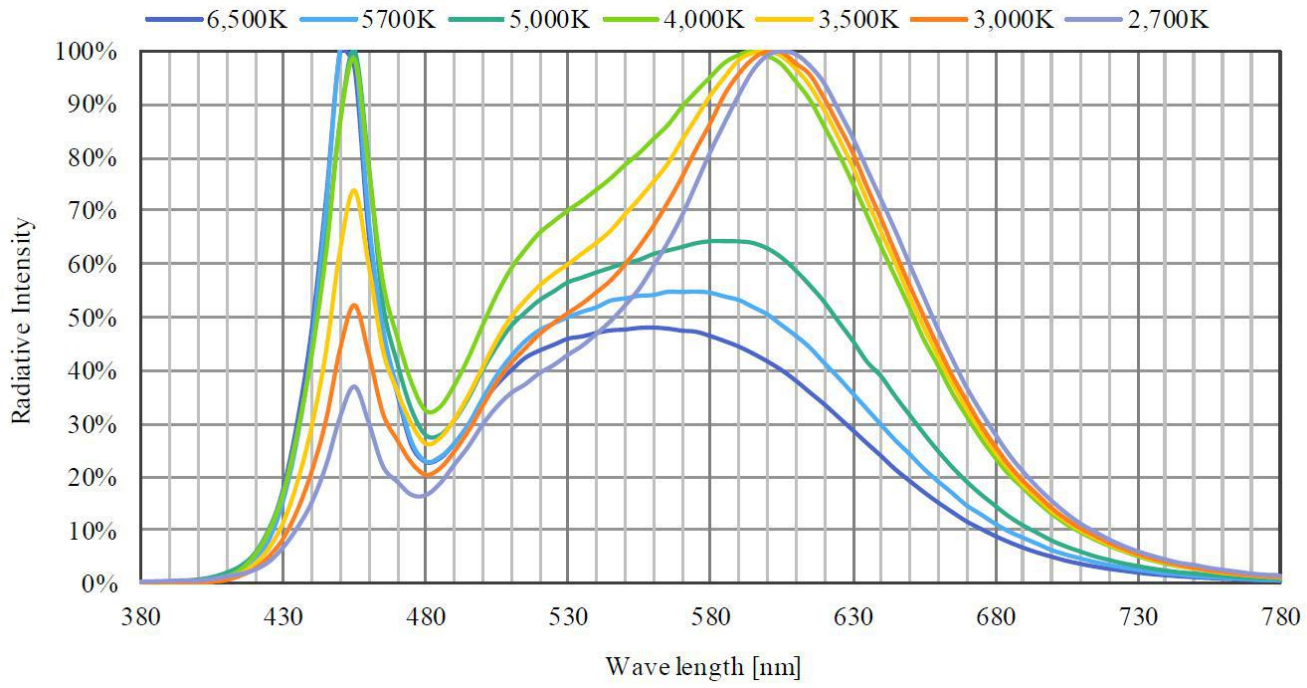



**The color ranks have chromaticity ranges within 3-step&5-step MacAdam ellipse**

| CCT | Center Point | | 3-step Bin | | 5-step Bin | | Angle(deg) |
|---|---|---|---|---|---|---|---|
| | x | y | a | b | a | b | Φ |
| 2700 | 0.4578 | 0.4101 | 0.0081 | 0.0042 | 0.0135 | 0.007 | 53.70 |
| 3000 | 0.4338 | 0.4030 | 0.00834 | 0.00408 | 0.0139 | 0.0068 | 53.20 |
| 3500 | 0.4073 | 0.3917 | 0.00927 | 0.00414 | 0.01545 | 0.0069 | 54.00 |
| 4000 | 0.3818 | 0.3797 | 0.00939 | 0.00402 | 0.01565 | 0.0067 | 53.72 |
| 5000 | 0.3447 | 0.3553 | 0.00822 | 0.00354 | 0.0137 | 0.0059 | 59.60 |
| 5700 | 0.3287 | 0.3417 | 0.00746 | 0.0032 | 0.01243 | 0.00533 | 59.09 |
| 6500 | 0.3123 | 0.3282 | 0.00669 | 0.00285 | 0.01115 | 0.00475 | 58.57 |

* Energy Star binning applied to all 2700~6500K(2700~4000K 3-step,5000~6500K 5-step).
* Tolerance of measurements of the chromaticity Coordinate is ±0.005.

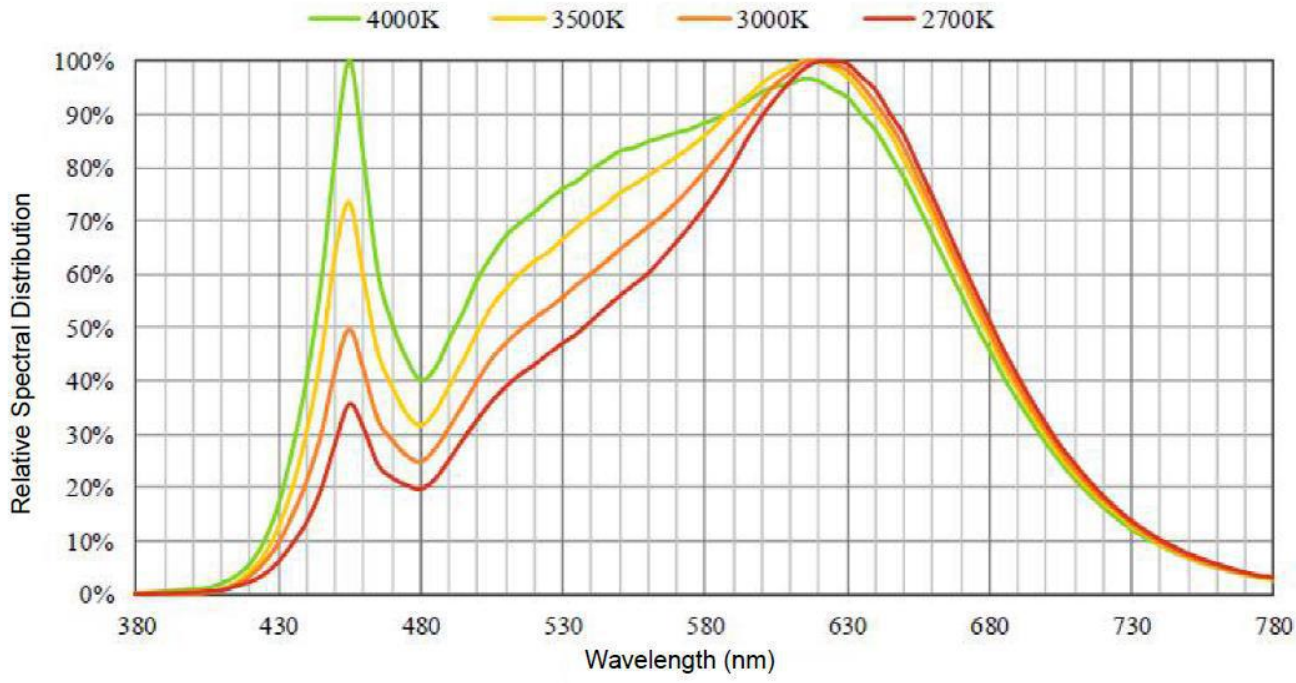
**Fig 1. Typical Color Spectrum for 80CRI, Ta = 25℃**




*Color spectra measured at nominal current for Tj = 25° C

*Color spectra shown is 2700K 、3000K、3500K、4000K、5000K、5700K、6500K and 80 CRI.

**Fig 2. Typical Color Spectrum for 90CRI, Ta = 25℃**




*Color spectra measured at nominal current for Tj = 25° C

*Color spectra shown is 2700K 、3000K、3500K、4000K and 90 CRI.

**Fig 3. Typical Spatial Radiation Pattern, Ta = 25℃**

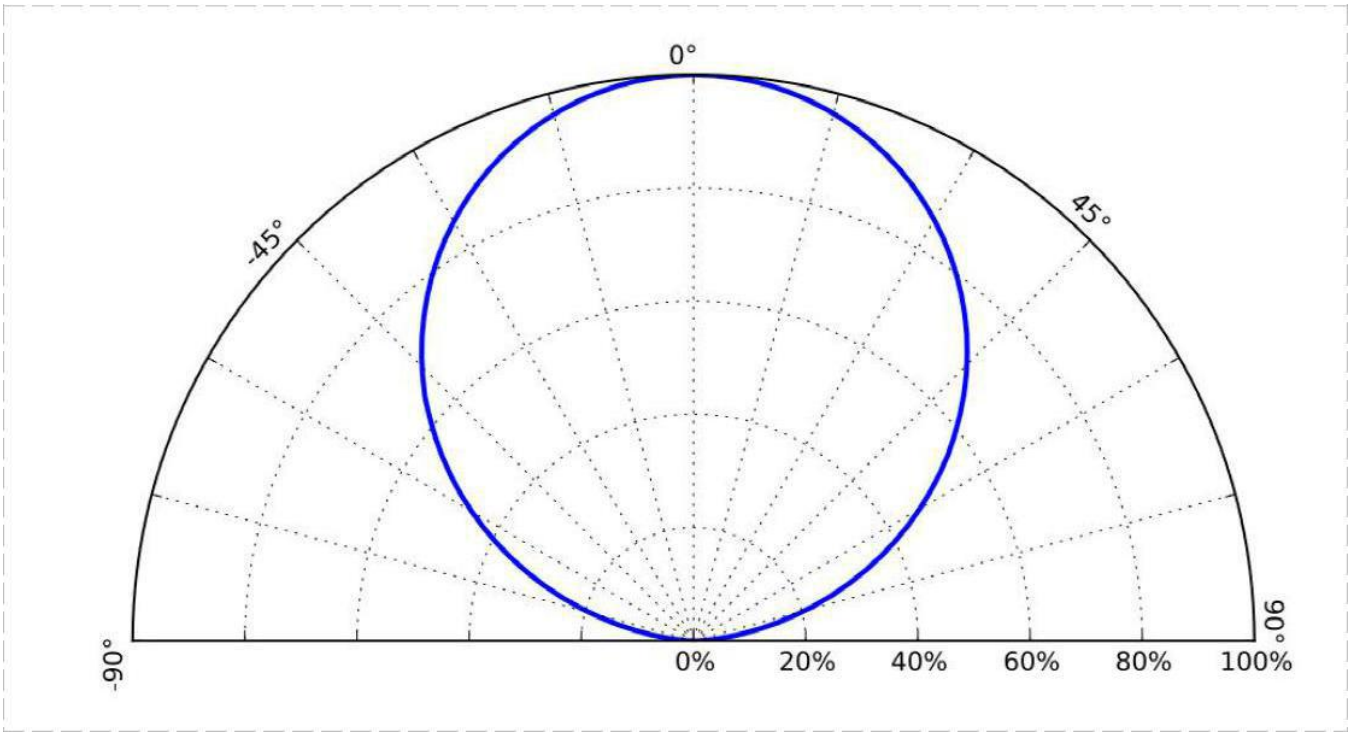
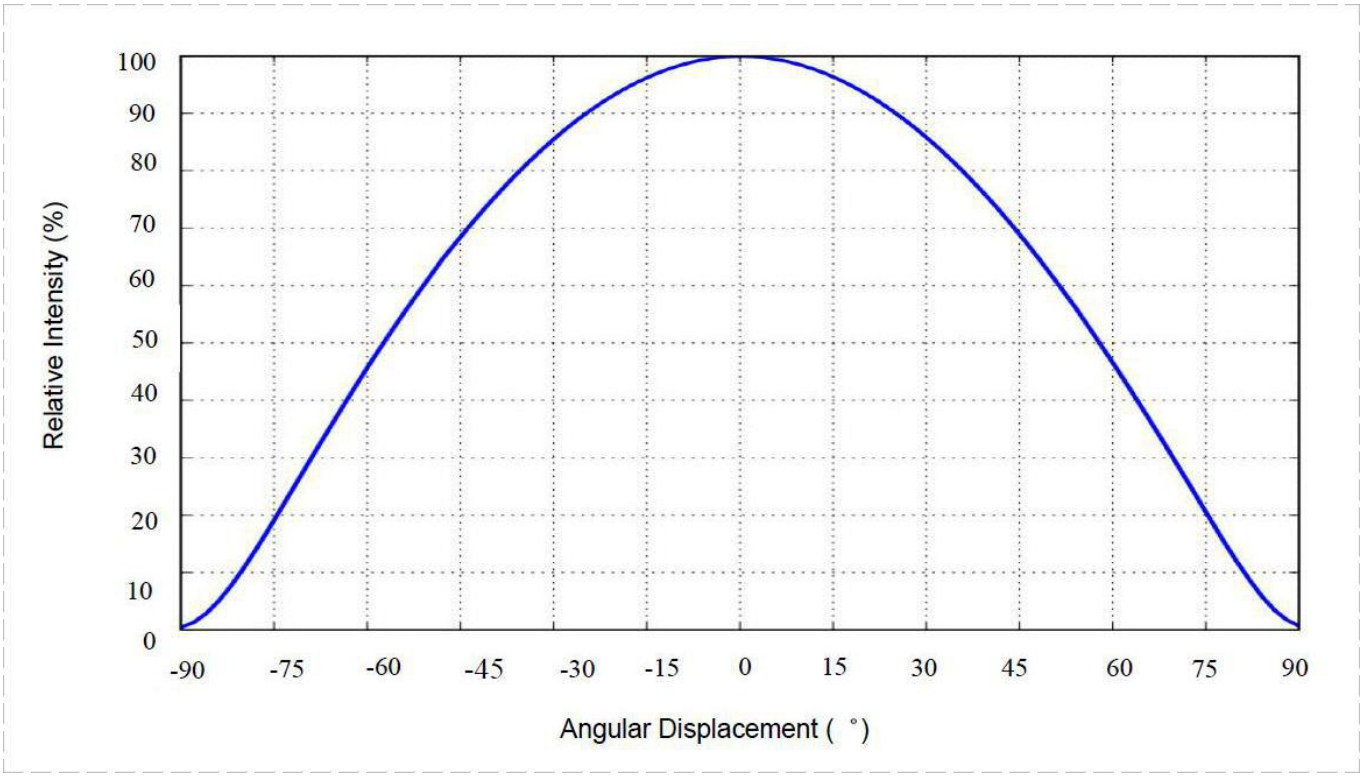



**Fig 4. Typical Polar Radiation Pattern, Ta = 25℃**




***Typical viewing angle is 120° .**

***The viewing angle is defined as the off axis angle from the center line where intensity is ½ of the peak value**

**Fig 5. Forward Current vs. Relative Intensity, Ta = 25℃**

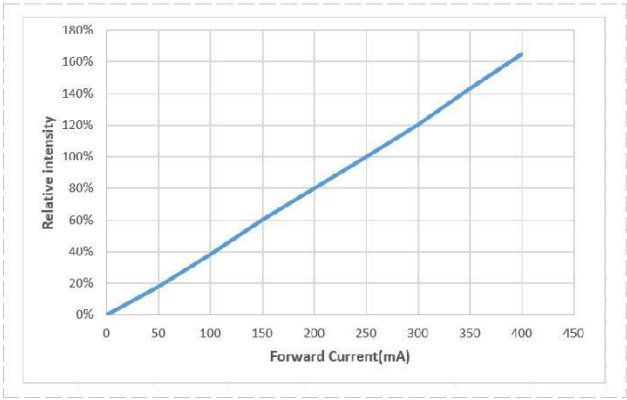



**Fig 6.Forward Current vs. Forward Voltage, Ta = 25**

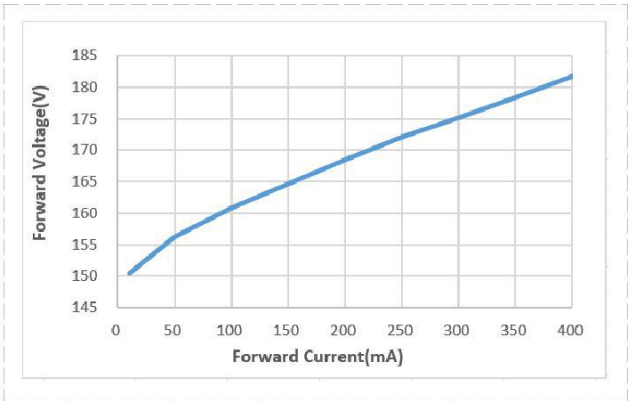



**Fig 7. Ambient Temperature vs. Relative Luminous flux (IF=240mA)**

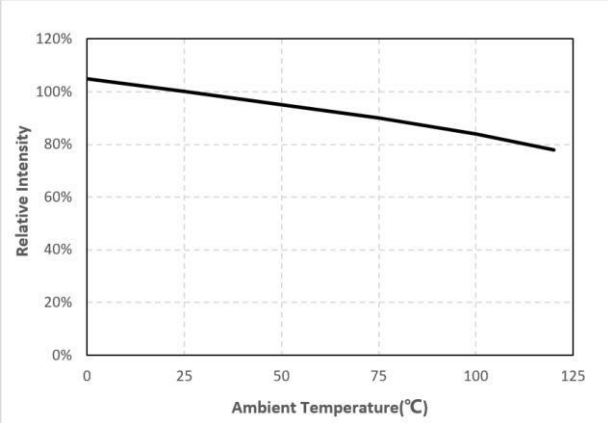
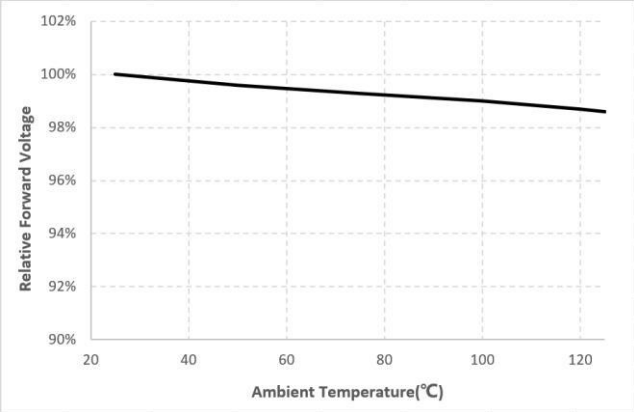
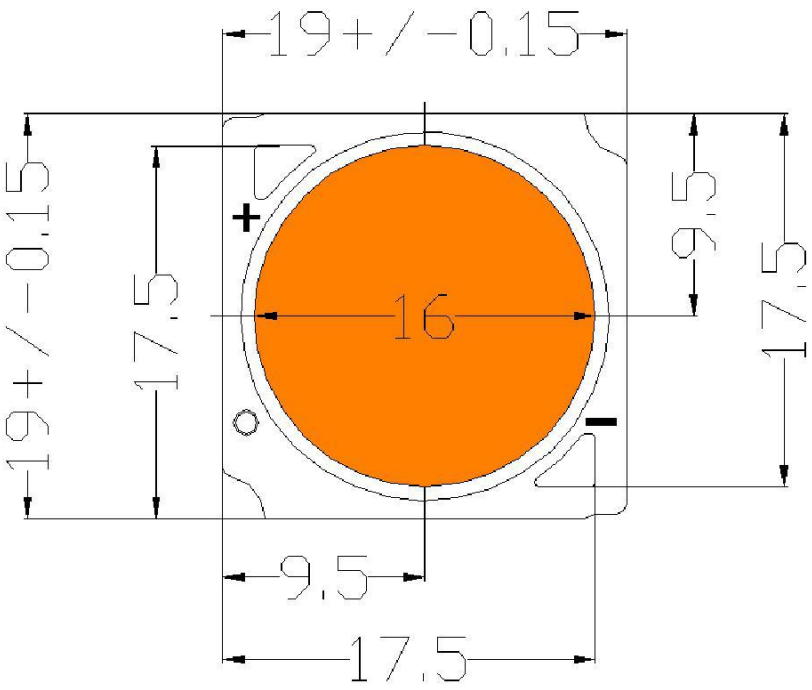



**Fig 8.Ambient Temperature vs. Relative Forward Voltage (IF=240mA)**



**Package Dimensions**




Anode — LED device — Cathode

58 S 2 P

* The tolerance unless mentioned is ±0.1mm, unit = mm

## Package Dimensions of Tray

Note: 45 pcs per tray and 5 trays are stacked together to be sealed in an anti-static bag.

Note: The anti-static bag is boxed for easier storage, 225pcs per box.

## Reliability Test Items And Conditions

| Test Items | Ref. Standard | Test Conditions | Test time | Failure Quantity |
|---|---|---|---|---|
| Thermal Shock | JESD22-A106 | -40℃(15min)~125℃(15min) | 200cycle | 0 |
| High Temperature Storage | JESD22-A103 | Ta=105℃ | 1000H | 0 |
| Low Temperature Storage | JESD22-A119 | Ta=-40℃ | 1000H | 0 |
| High Temperature High Humidity Life Test | JESD22-A101 | Ta=85℃, RH>=85%, | 1000H | 0 |
| High-Temperature Life Test | JESD22-A108 | Ta=105℃, IF=240mA@1 serie | 1000H | 0 |
| Low-Temperature Life Test | JESD22-A108 | Ta=-40℃, IF=240mA@1 serie | 1000H | 0 |

**Precaution for use**

**1. Handing**

1) During processing, please avoid the silicone area from being pressed.
2) Avoid fingerprints leave on silicone surface, no any organic solution applied on the silicone.

**2. Static electricity**

LEDs can be damaged by electrostatic discharge (ESD).Please make some protective measures to avoid ESD damage when handling or storage.

**3. Thermal Management**

1) Thermal management is a key to affect life of LEDs. The life of LEDs will reduce with the increase of junction temperature. Please make sure that the temperature of Tj is lower than 125℃ during application.

2) The silicone begin to degradation at 180℃, and shall be crake in a few days. Please avoid silicone surface temperature higher than 180.

**4. Chemical Corrosion**

1) LEDs is packaging with soft silicone. Its design is NOT water proof, thus please do NOT dip the COB into water directly.
2) Please avoid silicone contact with sulfur dioxide, sulfuric acid, concentrated hydrochloric acid.
3) Please keep dry and sealed during storage.

**4. Eye Protection**

Please avoid directly viewing a LED when it is driven at a high current.

## Revision record

| Version | Page | Chapter | Content of change | Date record |
|---|---|---|---|---|
| A00 | 14 | | Preliminary Document | 2018-11-05 |
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