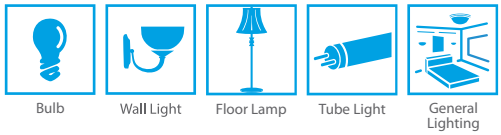
# PLCC Series

# 3014 0.2W CRI98

# Full Spectrum

# Datasheet




## Introduction :

PLCC 3014 Full spectrum Series features High Color Quality with Ra Min.98 and compact package size which increase the exibility in lamp design and expand the range of applications. With the outperforming efficiency, PLCC 3014 Full spectrum Series is optimized to be used in high-end LED market such as boutique and luxury apparel store.

## Description :

- Best luminous and color uniformity
- Enables halogen and CDM replacement
- The article itself presents the actual color.

## Feature and Benefits :

- High Color Quality with CRI 98
- R1-R15 min.95 with full color
- Suitable for all SMT assembly methods
- IR reflow process compatible
- Environmental friendly; RoHS compliance

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# General Information

## Ordering Code Format

| 2 | T | 01 | X2 | xx | A | 98 | 03 | xxx |
|---|---|---|---|---|---|---|---|---|
| X1 | X2 | X3-X4 | X5-X6 | X7-X8 | X9 | X10-X11 | X12-X13 | X14-X16 |

| X1 | | X2 | | X3-X4 | | X5-X6 | | X7-X8 | |
|---|---|---|---|---|---|---|---|---|---|
| Type | | Component | | Series | | Wattage | | Color/CCT | |
| 2 | Emitter | T | PLCC | 01 | 3014 | X2 | 0.2W | 27 | 2700K |
| | | | | | | | | 30 | 3000K |
| | | | | | | | | 40 | 4000K |

| X9 | | X10-X11 | | X12-X13 | | X14-X16 | |
|---|---|---|---|---|---|---|---|
| BIN | | CRI (Ra) | | Voltage | | Serial Number | |
| A | Ansi | 98 | CRI(Ra)98 | 03 | 3V | - | - |

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## Absolute Maximum Ratings

Absolute maximum ratings ($T_a$=25°C)

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Forward Current | $I_F$ | 90 | mA |
| Pulse Forward Current (tp<=100μs, Duty cycle=0.25) | $I_{pulse}$ | 120 | mA |
| Reverse Current | $I_R$ | 10 | uA |
| Reverse Voltage | $V_R$ | 5 | V |
| LED Junction Temperature | $T_J$ | 125 | °C |
| Operating Temperature | - | -40 ~ +85 | °C |
| Storage Temperature | - | -40 ~ +125 | °C |
| ESD Sensitivity (HBM) | $V_B$ | 2,000 | V |
| Soldering Temperature | $T_s$ | Reflow Soldering : 255~260°C/10~30sec<br>Manual Soldering : 350°C/3sec | |

Notes:
1. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
2. LEDs are not designed to be driven in reverse bias.

## Characteristics

| Parameter | | Symbol | Value | Units |
|---|---|---|---|---|
| Viewing Angle | (Typ.) | $2\Theta_{1/2}$ | 120 | Degree |
| Forward voltage | (Typ.) | $V_F$ | 3.2 | V |
| Thermal resistance | | - | 30 | °C/W |
| CRI (Ra) | | - | 98 | - |
| R1-R15 | | - | 95 | - |
| CCT | (Cool White)<br>(Neutral White)<br>(Warm White) | - | 2,700<br>3,000<br>4,000 | K |
| JEDEC Moisture Sensitivity | | - | Level 3<br>**Floor Life**<br>Conditions: ≤30°C / 60% RH<br>**Soak Requirements(Standard)**<br>Time (hours): 40+1/-0<br>Conditions: 60°C / 60% RH | - |

Notes:
1. $2\theta_{1/2}$ is the off-axis angle where the luminous intensity is half of the axial luminous intensity.
2. Color rendering index CRI Tolerance: ±2.
3.R1-R15 Tolerance: ±5.
4. CIE_x/y tolerance: ±0.005.

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## Luminous Flux Characteristic

Luminous Flux Characteristics, $I_F$=60mA and $T_J$=25˚C

| Color | Group | Min. Luminous Flux(lm) | Max. Luminous Flux(lm) | Forward Current(mA) | Order Code |
|---|---|---|---|---|---|
| 2700K | 14 | 14 | 16 | 60 | 2T01X227A9803001 |
| | 16 | 16 | 18 | | |
| 3000K | 16 | 16 | 18 | | 2T01X230A9803001 |
| | 18 | 18 | 20 | | |
| 4000K | 16 | 16 | 18 | | 2T01X240A9803001 |
| | 18 | 18 | 20 | | |

Note:
The luminous flux performance is guaranteed within published operating conditions. Edison Opto maintains a tolerance of ±10% on flux measurements.

## Voltage Bin Structure

| Group | Min. Voltage (V) | Max. Voltage (V) |
|---|---|---|
| VA1 | 2.8 | 2.9 |
| VB1 | 2.9 | 3.0 |
| VC1 | 3.0 | 3.1 |
| VA2 | 3.1 | 3.2 |
| VB2 | 3.2 | 3.3 |

Note:
Forward voltage measurement allowance is ± 0.06V.

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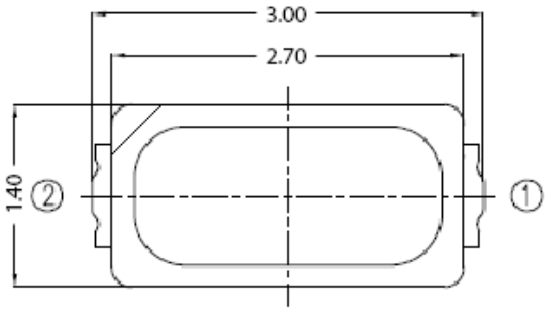
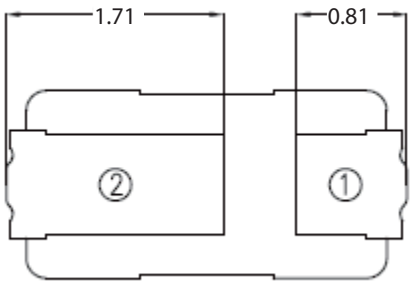
## Mechanical Dimensions

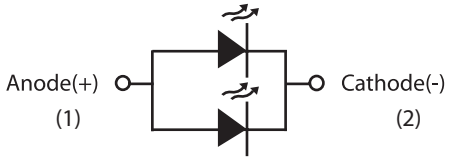
### Emitter Type Dimension



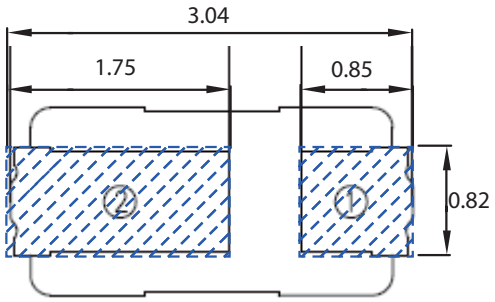





### Circuit




### Solder Pad




Notes:
1. All dimensions are measured in mm.
2. Tolerance : ± 0.20 mm

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## Color BIN code

Color region stay within Macadam "3-Step/5-step" ellipse from the chromaticity center.
The chromaticity center refers to ANSI C78.377:2008.
Please refer to ANSI C78.377 for the chromaticity center.

| CCT | Steps | Cx | Cy | a | b | theta |
|---|---|---|---|---|---|---|
| 2700K | 5 | 0.4578 | 0.4101 | 0.01350 | 0.00700 | 53.70 |
| 3000K | 5 | 0.4338 | 0.4030 | 0.01390 | 0.00680 | 53.22 |
| 4000K | 5 | 0.3818 | 0.3797 | 0.01565 | 0.00670 | 53.72 |

| CCT | Steps | Cx | Cy | a | b | theta |
|---|---|---|---|---|---|---|
| 2700K | 3 | 0.4578 | 0.4101 | 0.00810 | 0.00420 | 53.70 |
| 3000K | 3 | 0.4338 | 0.4030 | 0.00834 | 0.00408 | 53.22 |
| 4000K | 3 | 0.3818 | 0.3797 | 0.00939 | 0.00402 | 53.72 |

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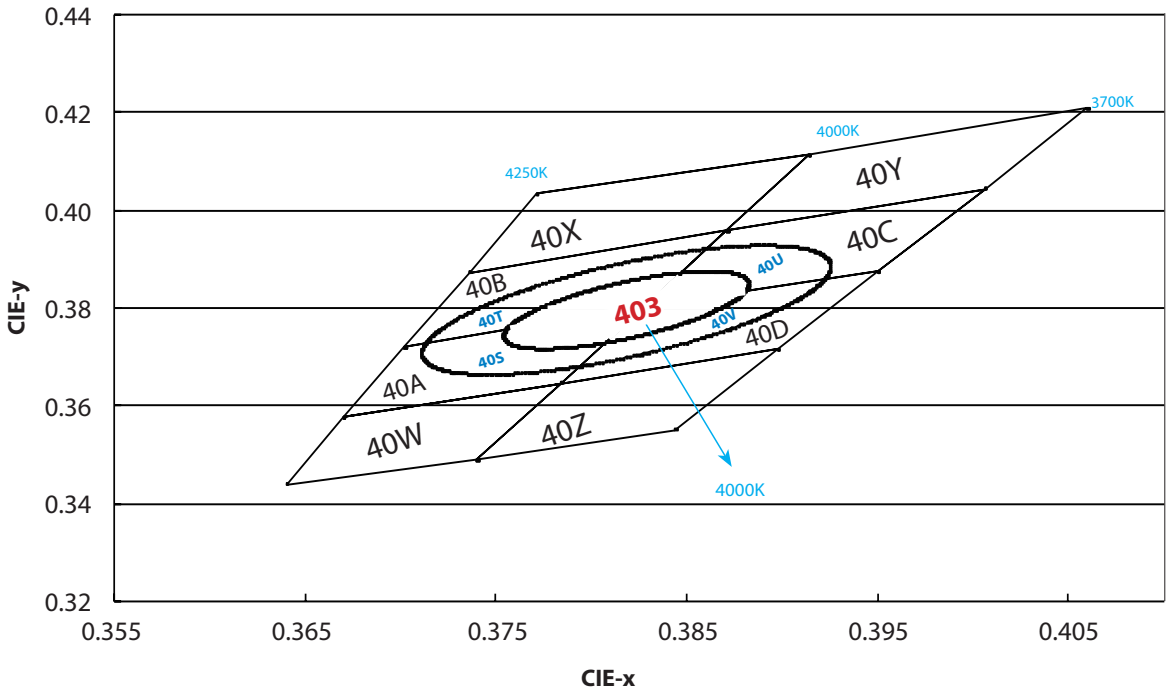
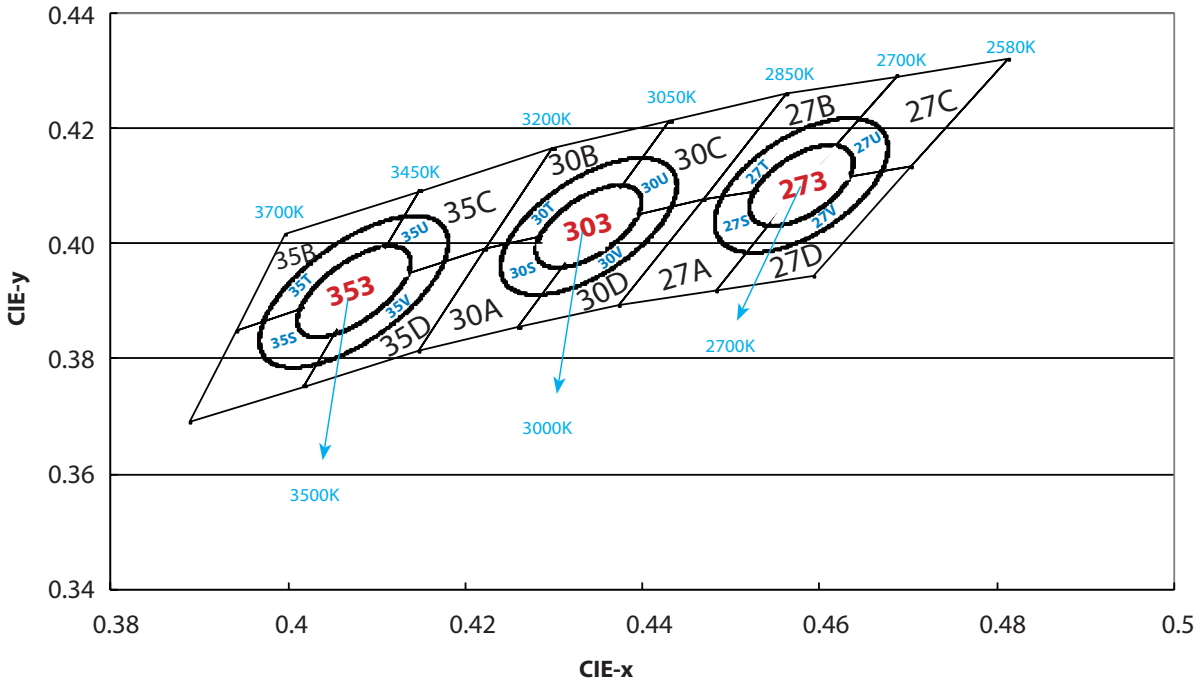
## Neutral White




## Warm White



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## 4000K

| 40X | | 40B | | 40A | | 40W | |
|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y |
| 0.3771 | 0.4034 | 0.3871 | 0.3959 | 0.3828 | 0.3803 | 0.3670 | 0.3578 |
| 0.3736 | 0.3874 | 0.3736 | 0.3874 | 0.3702 | 0.3722 | 0.3640 | 0.3440 |
| 0.3871 | 0.3959 | 0.3702 | 0.3722 | 0.3670 | 0.3578 | 0.3740 | 0.3491 |
| 0.3914 | 0.4115 | 0.3828 | 0.3803 | 0.3784 | 0.3647 | 0.3784 | 0.3647 |

| 40Y | | 40C | | 40D | | 40Z | |
|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y |
| 0.3914 | 0.4115 | 0.4006 | 0.4044 | 0.3950 | 0.3875 | 0.3784 | 0.3647 |
| 0.3871 | 0.3959 | 0.3871 | 0.3959 | 0.3828 | 0.3803 | 0.3740 | 0.3491 |
| 0.4006 | 0.4044 | 0.3828 | 0.3803 | 0.3784 | 0.3647 | 0.3844 | 0.3552 |
| 0.4060 | 0.4208 | 0.3950 | 0.3875 | 0.3898 | 0.3716 | 0.3898 | 0.3716 |

## 3500K

| 35A | | 35B | | 35C | | 35D | |
|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y |
| 0.4083 | 0.3921 | 0.4148 | 0.4090 | 0.4299 | 0.4165 | 0.4223 | 0.399 |
| 0.3941 | 0.3848 | 0.3996 | 0.4015 | 0.4148 | 0.4090 | 0.4083 | 0.3921 |
| 0.3889 | 0.3690 | 0.3941 | 0.3848 | 0.4083 | 0.3921 | 0.4018 | 0.3752 |
| 0.4018 | 0.3752 | 0.4083 | 0.3921 | 0.4223 | 0.399 | 0.4147 | 0.3814 |

## 3000K

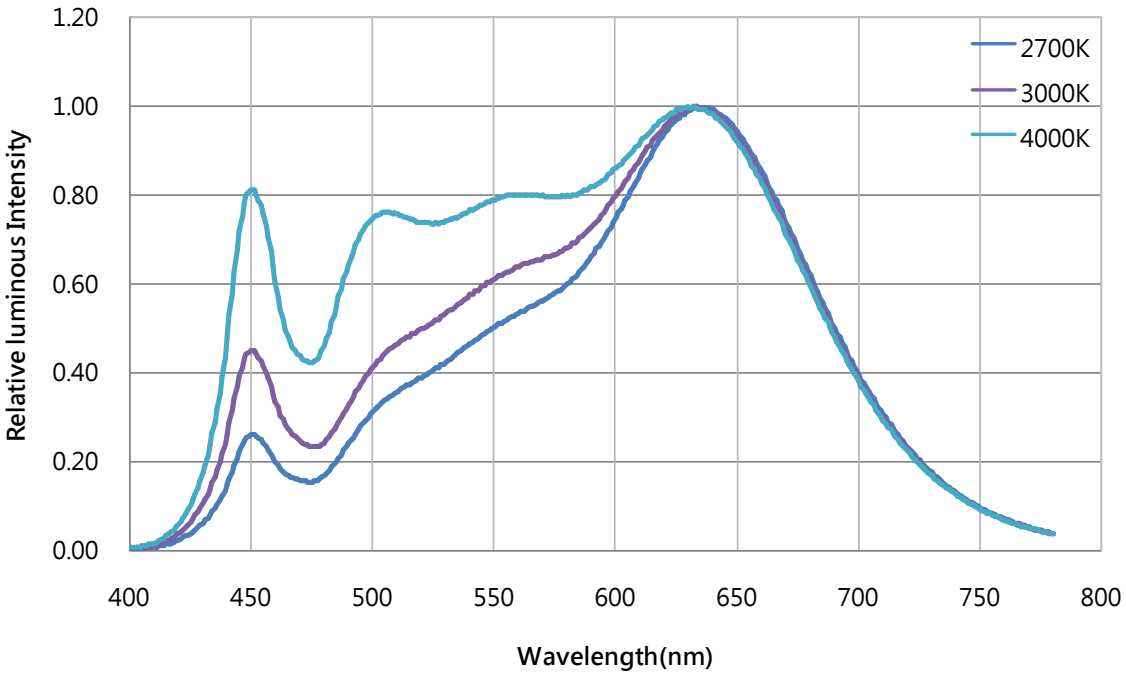
| 30A | | 30B | | 30C | | 30D | |
|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y |
| 0.4345 | 0.4033 | 0.4431 | 0.4213 | 0.4562 | 0.4260 | 0.4468 | 0.4077 |
| 0.4223 | 0.3990 | 0.4299 | 0.4165 | 0.4431 | 0.4213 | 0.4345 | 0.4033 |
| 0.4147 | 0.3814 | 0.4223 | 0.3990 | 0.4345 | 0.4033 | 0.4260 | 0.3854 |
| 0.4260 | 0.3854 | 0.4345 | 0.4033 | 0.4468 | 0.4077 | 0.4373 | 0.3893 |

## 2700K

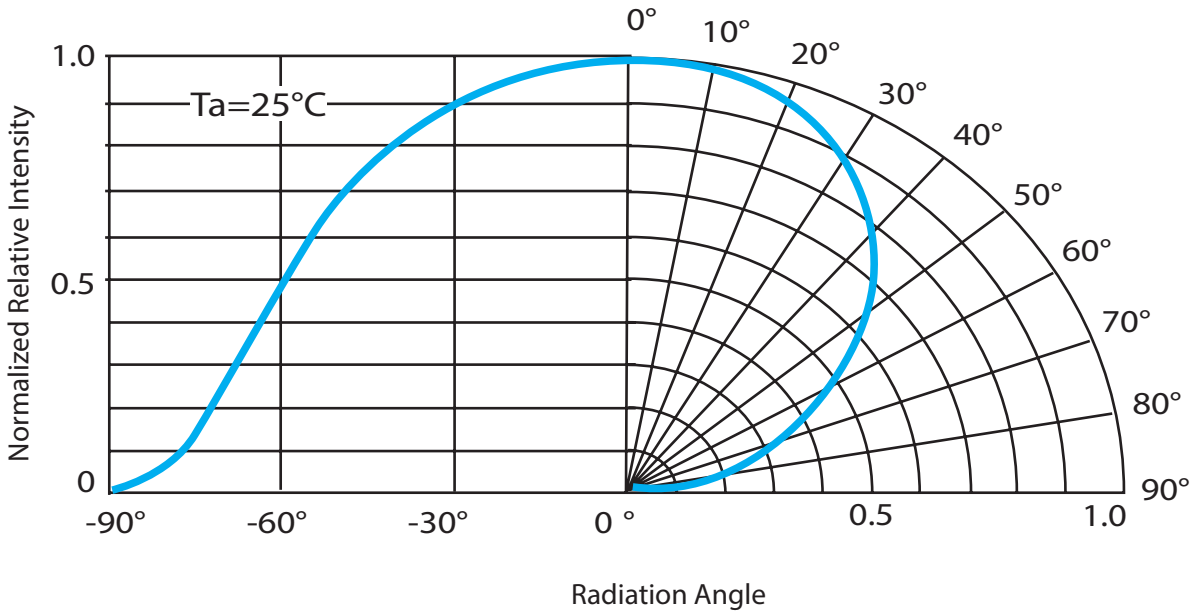
| 27A | | 27B | | 27C | | 27D | |
|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y |
| 0.4578 | 0.4101 | 0.4687 | 0.4289 | 0.4813 | 0.4319 | 0.4703 | 0.4132 |
| 0.4468 | 0.4077 | 0.4562 | 0.4260 | 0.4687 | 0.4289 | 0.4578 | 0.4101 |
| 0.4373 | 0.3893 | 0.4468 | 0.4077 | 0.4578 | 0.4101 | 0.4483 | 0.3919 |
| 0.4483 | 0.3919 | 0.4578 | 0.4101 | 0.4703 | 0.4132 | 0.4593 | 0.3944 |

## Characteristic Curve

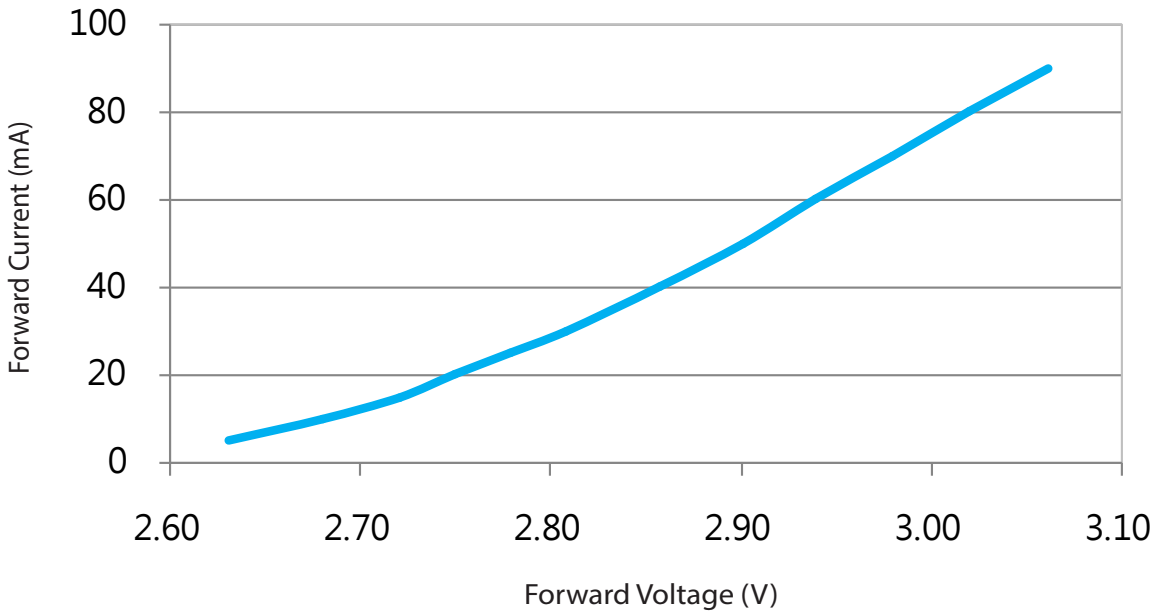
### Color Spectrum



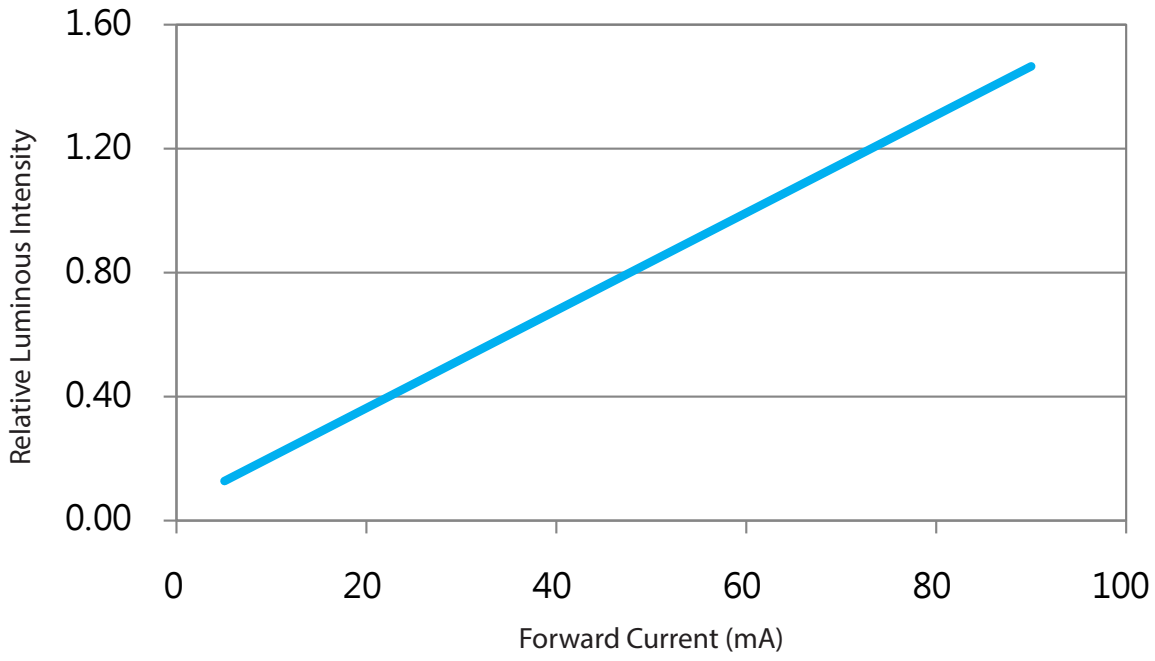

### Beam Pattern



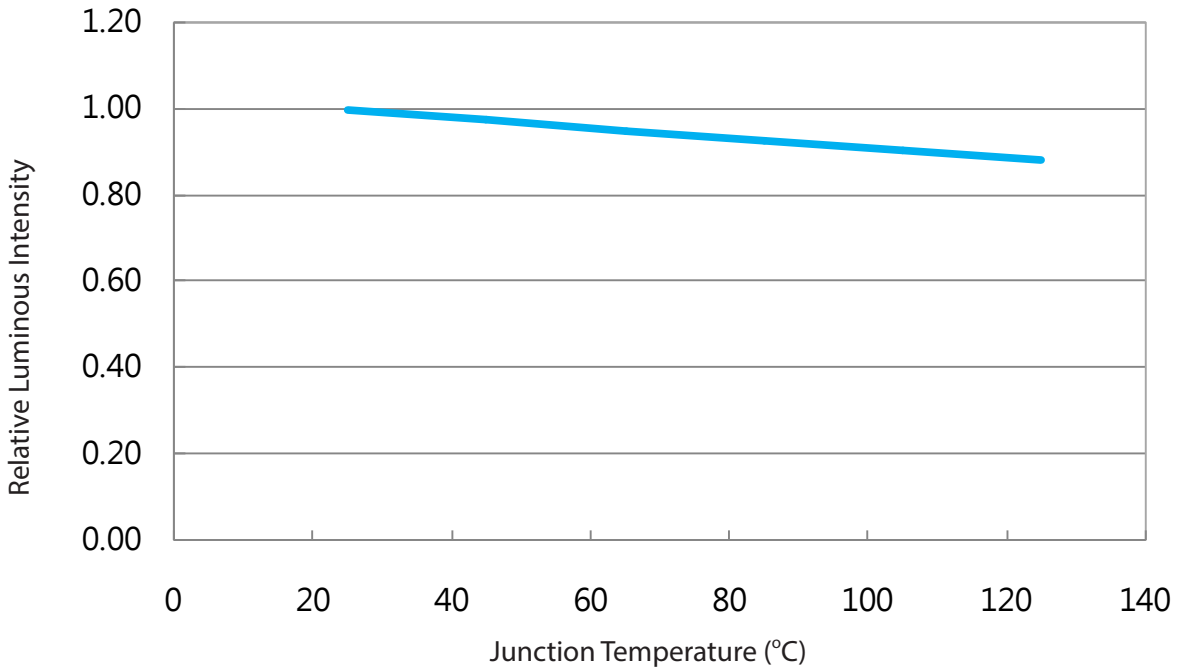
**Forward Current vs. ForwardVoltage**



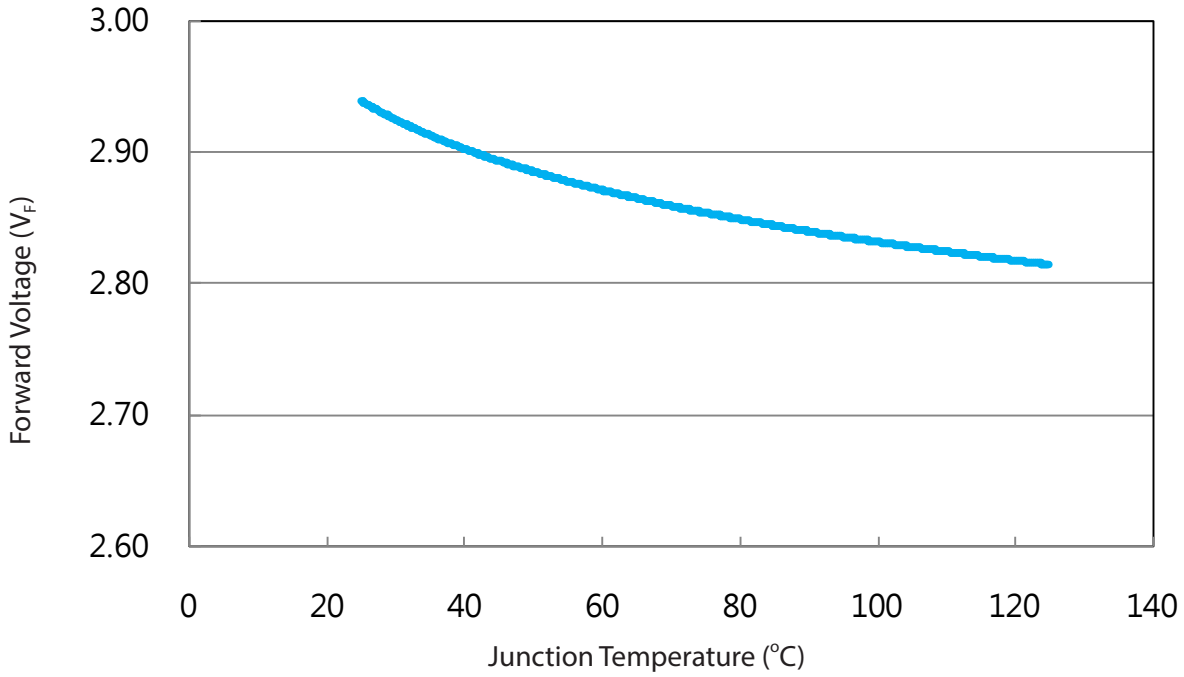

**Relative Luminous Intensity vs. Forward Current**



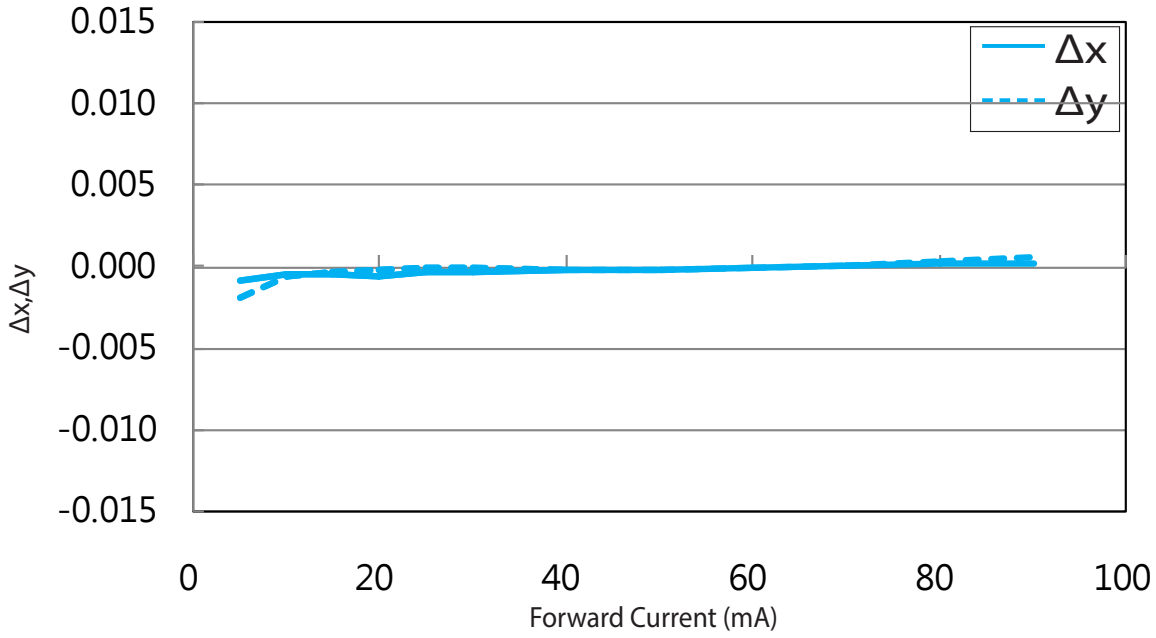
**Relative Luminous Intensity vs. Junction Temperature**



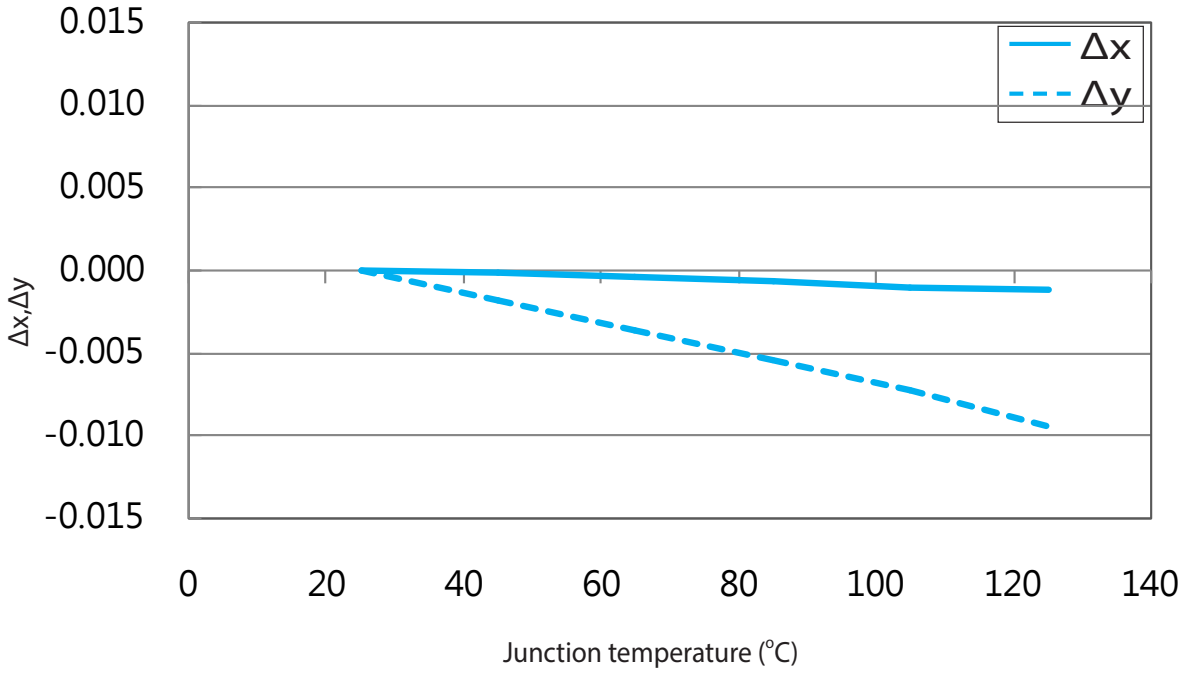

**Forward Voltage vs. Junction Temperature**



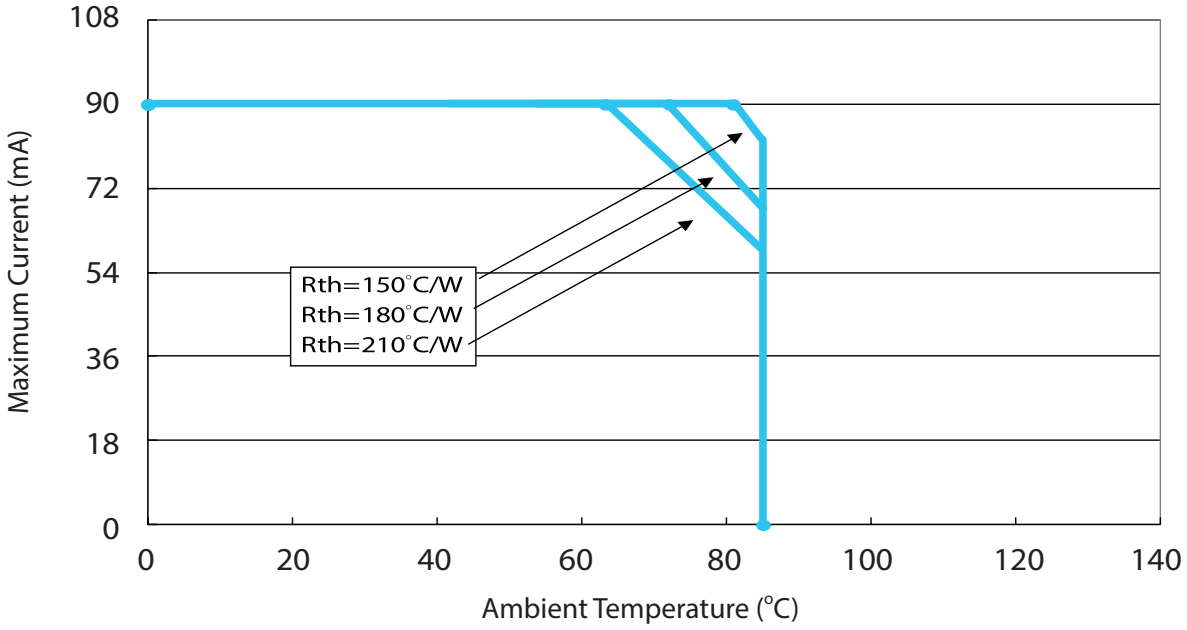
**Δx,Δy vs. Forward Current**




**Δx,Δy vs. Junction Temperature**



**Maximum Current vs. Ambient Temperature**



## Reliability

| NO . | Test Item | Test Condition | Remark |
|---|---|---|---|
| 1 | Temperature Cycle | -40°C~100°C<br>30, 30, mins | 100 Cycle |
| 2 | Thermal Shock | -40°C~100°C<br>15, 15 mins ≦10 sec | 100 Cycle |
| 3 | Resistance to Soldering Heat | $T_{SOL}$=260°C, 30 sec | 3 times |
| 4 | Moisture Resistance | 25°C~65°C 90% RH<br>24 hrs / 1 cycle | 10 Cycle |
| 5 | High-Temperature Storage | $T_A$=100°C | 1,000 hrs |
| 6 | Humidity Heat Storage | $T_A$=85°C<br>RH=85% | 1,000 hrs |
| 7 | Low-Temperature Storage | $T_A$=-40°C | 1,000 hrs |
| 8 | Operation Life test | 25°C | 1,000 hrs |
| 9 | High Temperature<br>Operation Life test | 85°C | 1,000 hrs |
| 10 | High Humidity Heat Life Test | 85°C, 85%RH | 1,000 hrs |
| 11 | ON/OFF Test | 30 sec ON, 30 sec OFF | 1.5W times |

### Failure Criteria

| Item | Criteria for Judgment | |
|---|---|---|
| | Min. | Max. |
| Lumen Maintenance | 85% | - |
| Δu'v' | - | 0.006 |
| Forward Voltage | - | Initial Data x 1.1 |
| Reverse Current | - | 10 μA |
| Resistance to Soldering Heat | No dead lamps or visual damage | |

### Cautions

LED avoids being stored and lighted in the environment containing sulfur. Some materials, such as seals, printing ink, enclosure and adhesives, may contain sulfur, avoiding the exposure in acid or halogen environment.

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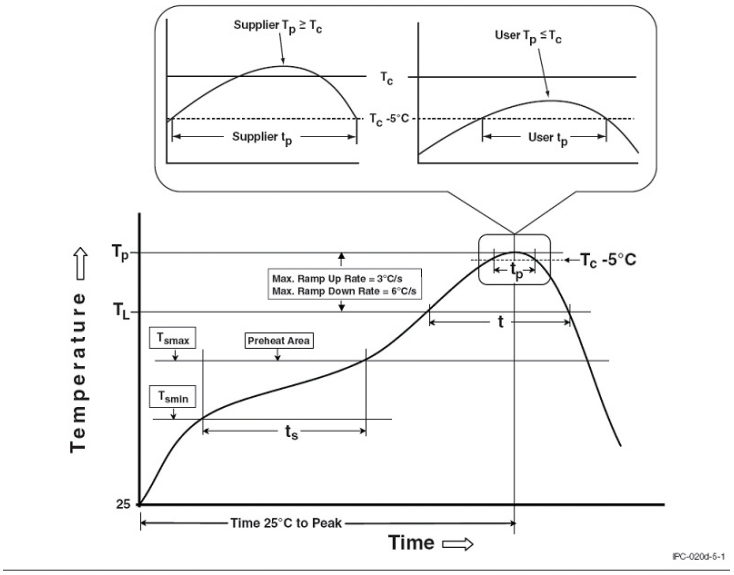
## Reflow Profile

The following reflow profile is from IPC/JEDEC J-STD-020D which provided here for reference.



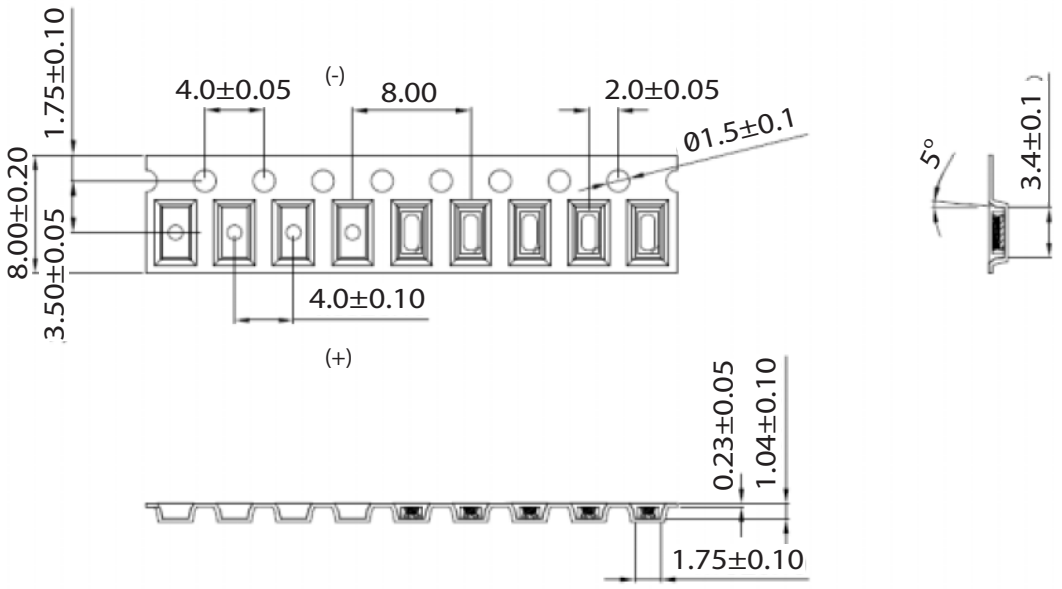

Reflow Profiles

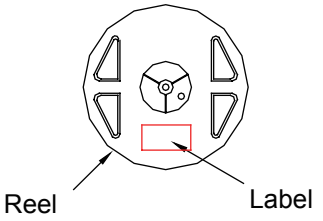
### Classification Reflow Profiles

| Profile Feature | Pb-Free Assembly |
|---|---|
| Preheat & Soak<br>Temperature min (Tsmin)<br>Temperature max (Tsmax)<br>Time (Tsmin to Tsmax) (ts) | 150 °C<br>200 °C<br>60-120 seconds |
| Average ramp-up rate<br>(Tsmax to Tp) | 3 °C/second max. |
| Liquidous temperature (TL)<br>Time at liquidous (tL) | 217 °C<br>60-150 seconds |
| Peak package body temperature (Tp)* | 255 °C ~260 °C * |
| Classification temperature (Tc) | 260 °C |
| Time (tp)** within 5 °C of the specified classification temperature (Tc) | 30** seconds |
| Average ramp-down rate (Tp to Tsmax) | 6°C/second max. |
| Time 25°C to peak temperature | 8 minutes max. |

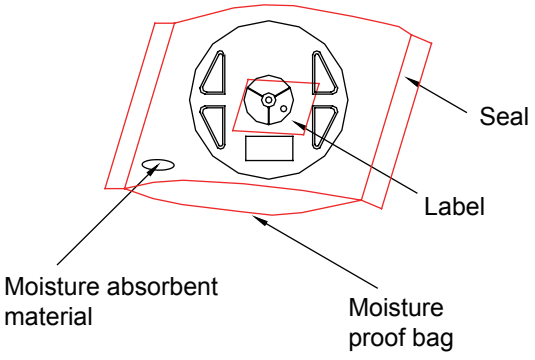
Notes:
1. * Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.
2. ** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum.

## Product Packaging Information




Taping reel dimensions




Package & label

| Item | Quantity | Total | Dimensions(mm) |
|---|---|---|---|
| Reel | 4,000pcs | 4,000pcs | R=178 |
| Carton | 25 reels | 100,000pcs | 353*254*256 |
| Starting with 50pcs empty,and 50pcs empty at the last | | | |

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## Revision History

| Versions | Description | Release Date |
|---|---|---|
| 1 | Establish a Datasheet | 2023/01/05 |

## About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at www.edison-opto.com



www.edison-opto.com

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