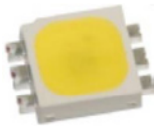
Lighting Design Manufacturing Service

www.edison-opto.com.tw

PLCC Series

# ET-5050W-BF1W Datasheet

High power PLCC is a surface mount, compact, high brightness LED that is built for various illumination needs. A single Neutral White high power PLCC can deliver typical luminous flux of 95 lm while driving at 350mA suitable for any kind of lighting sources, including general illumination, flashlights, streetlights, spotlights, residential lighting, tube light source, freezer lighting, industrial and commercial lightings. The small physical dimension can free customers from any constrains or limitations in these fields of applications. Furthermore, the reflow-solderable nature of high power PLCC provides an easy path towards the optimum thermal management to achieve a promising reliability.



## Features :

- High luminous Intensity and high efficiency
- Based on InGaN / GaN technology
- Wide viewing angle : 120°
- Excellent performance and visibility
- Suitable for all SMT assembly methods
- IR reflow process compatible
- Environmental friendly; RoHS compliance

## Typical Applications

- Signal and symbol luminaire
- Indoor and outdoor displays
- Backlighting (illuminated advertising, general lighting)
- Interior automotive lighting
- Emergency lighting

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## Table of Contents

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## Product Nomenclature

The following table describes the available color, power, and lens type. For more flux and forward voltage information, please consult the Bin Group document.

E T - 5050 W - B F 1 W

X1 X2 X3 X4 X5 X6 X7

| X1 LED Item | | X2 Package Type | | X3 Emitting Color | | X4 Chip Quantity | | X5~X6 Serial No. | X7 Feature | |
|---|---|---|---|---|---|---|---|---|---|---|
| Code | Type | Code | Type | Code | Type | Code | Type | | Code | Type |
| ET | Edison Top LED | 5050 | 5.0x5.0mm | W | Cool White | A | 0.5W | | W | White surface |
| | | | | H | Neutral White | B | 1W | | | |
| | | | | X | Warm White | | | | | |
| | | | | R | Red | | | | | |
| | | | | A | Amber(590nm) | | | | | |
| | | | | T | True Green | | | | | |
| | | | | B | Blue | | | | | |
| | | | | RTB | RGB 3chips | | | | | |

Figure 1. PLCC 5050 series Nomenclature

## Environmental Compliance

PLCC 5050 series are compliant to the Restriction of Hazardous Substances Directive or RoHS. The restricted materials including lead, mercury cadmium hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE) are not used in PLCC 5050 series to provide an environmentally friendly product to the customers.

## LED Package Dimension and Polarity

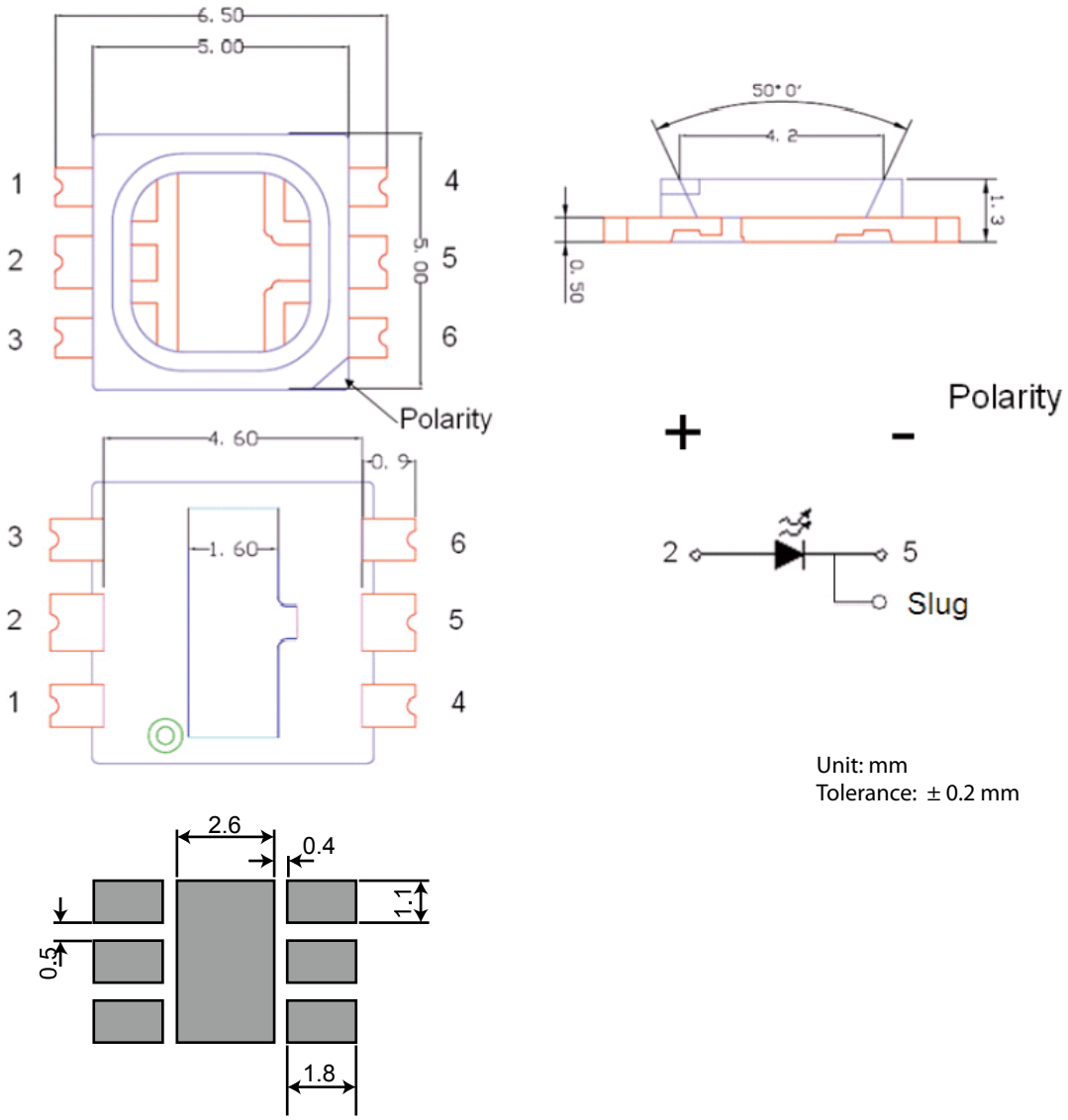



Figure 2. 5050W PLCC Dimension, circuit diagram and recommended soldering pad

Notes:
1. 1W PLCC slug has polarity as cathode.
2. It is important that the slug cannot contact aluminum surface, it is strongly recommended that there should coat a uniform electrically isolated heat dissipation film on the aluminum surface.

## Absolute Maximum Ratings

The following table describe absolute maximum ratings of PLCC 5050 series.

Table 1. Absolute maximum ratings for PLCC 5050 series

| Parameter | Rating | Units | Symbol |
|---|---|---|---|
| Forward Current | 350 | mA | $I_F$ |
| Pulse Forward Current | 1000 | mA | $I_{pulse}$ |
| Reverse Voltage | 5 | V | $V_R$ |
| LED Junction Temperature | 125 | °C | $T_J$ |
| Operating Temperature | -30 ~ +85 | °C | |
| Storage Temperature | -40 ~ +120 | °C | |
| ESD Sensitivity | 2,000 | V | |
| Soldering Temperature | Reflow Soldering : 255~260°C /10~30sec<br>Manual Soldering : 350°C /3sec | | |

Notes:
1. The values are based on 1-die performance.
2. $I_{pulse}$ condition: pulse width ≤0.1msec and duty ≤1/10.

## Electro-Optical Characteristics

Table 2. PLCC Electro-optical characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | $I_F$=350mA/die | 2.8 | - | 3.8 | V |
| Reverse Current | $I_R$ | $V_R$=5V | - | - | 10 | μA |
| Viewing Angle | $2\theta_{1/2}$* | $I_F$=350mA/die | - | 120 | - | deg. |

Note:
$2\theta_{1/2}$ is the off-axis angle where the luminous intensity is half of the axial luminous intensity.

## Luminous Flux Characteristics

The following table describes luminous flux characteristics of PLCC 5050 series.

Table 3. Luminous Flux characteristics.at $I_F$=350mA for PLCC 5050 series

| Power Consumption | Part Name | Color | Flux | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| 1W | ET-5050W-BF1W | Cool White | -- | 95 | -- | lm |

## Color Temperature or Dominant/Peak Wavelength Characteristics

The following table describes forward voltage of PLCC 5050 series.

Table 4. PLCC color temperature or dominant/peak wavelength characteristics.

| Power Consumption | Part Name | Color | CCT/Wavelength | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| 1W | ET-5050W-BF1W | Cool White | 5,000 | -- | 10,000 | K |

## Color Temperature Characteristic

The following table describes forward voltage of PLCC 5050 series

Table 5. Color Rendering Index Characteristics at $T_J$=25 for PLCC 5050 series

| Part Name | Color | CRI |
|---|---|---|
| | | Typ. |
| ET-5050W-BF1W | Cool White | 68 |

Note:
CRI is measured with an accuracy of ± 5

## $V_F$ Rank

Table 6. PLCC forward voltage rank

| $V_F$ (V) | | | |
|---|---|---|---|
| V01 | 2.8-3.1 | V04 | 3.7-4.0 |
| V02 | 3.1-3.4 | V05 | 4.0-4.3 |
| V03 | 3.4-3.7 | V06 | 4.3-4.6 |

Note:
* Forward voltage measurement allowance is ± 0.1V.

## Luminous Intensity Rank

Table 7. Luminous intensity rank $T_a$=25°C

| Group | Min. | Max. |
|---|---|---|
| G | 3.7 | 4.8 |
| H | 4.8 | 6.3 |
| J | 6.3 | 8.2 |
| K | 8.2 | 10.6 |
| L | 10.6 | 13.8 |
| M | 13.8 | 17.9 |
| N | 17.9 | 23.3 |
| P | 23.3 | 30.3 |
| Q | 30.3 | 39.4 |
| R | 39.4 | 51.2 |
| S1 | 51.2 | 58.8 |
| S2 | 58.8 | 66.5 |
| T1 | 66.5 | 70 |
| T2 | 70 | 80 |
| T3 | 80 | 86.5 |
| U1 | 86.5 | 90 |
| U2 | 90 | 100 |
| U3 | 100 | 112.5 |
| V | 112.5 | 146.2 |
| W | 146.2 | 190 |
| X | 190 | 247.1 |
| Y | 247.1 | 321.2 |
| Z | 321.2 | 417.5 |

Note:
Luminous Intensity Measurement Allowance is ± 10%.

## Color Bin

Table 8. Color Bin V0-Y4, $I_F$=350mA/die ,Ta=25°C

| | | |
|---|---|---|
| V0 | 0.3434 | 0.3320 |
| | 0.3425 | 0.3208 |
| | 0.3295 | 0.3105 |
| | 0.3294 | 0.3200 |
| V1 | 0.3292 | 0.3313 |
| | 0.3444 | 0.3442 |
| | 0.3434 | 0.3320 |
| | 0.3294 | 0.3200 |
| V2 | 0.3292 | 0.3313 |
| | 0.3290 | 0.3451 |
| | 0.3458 | 0.3592 |
| | 0.3444 | 0.3442 |
| V3 | 0.3290 | 0.3451 |
| | 0.3288 | 0.3569 |
| | 0.3469 | 0.3717 |
| | 0.3458 | 0.3592 |
| V4 | 0.3288 | 0.3569 |
| | 0.3286 | 0.3690 |
| | 0.3481 | 0.3856 |
| | 0.3469 | 0.3717 |

| | | |
|---|---|---|
| W1 | 0.3294 | 0.3202 |
| | 0.3295 | 0.3105 |
| | 0.3196 | 0.3013 |
| | 0.3186 | 0.3102 |
| W2 | 0.3292 | 0.3313 |
| | 0.3294 | 0.3202 |
| | 0.3186 | 0.3102 |
| | 0.3175 | 0.3204 |
| W3 | 0.3290 | 0.3451 |
| | 0.3292 | 0.3313 |
| | 0.3175 | 0.3204 |
| | 0.3160 | 0.3332 |
| W4 | 0.3290 | 0.3451 |
| | 0.3160 | 0.3332 |
| | 0.3148 | 0.3444 |
| | 0.3288 | 0.3569 |
| W5 | 0.3148 | 0.3444 |
| | 0.3136 | 0.3550 |
| | 0.3286 | 0.3690 |
| | 0.3288 | 0.3569 |

| | | |
|---|---|---|
| X1 | 0.3076 | 0.3108 |
| | 0.3174 | 0.3204 |
| | 0.3196 | 0.3013 |
| | 0.3112 | 0.2932 |
| X2 | 0.3076 | 0.3108 |
| | 0.3052 | 0.3224 |
| | 0.3160 | 0.3332 |
| | 0.3175 | 0.3204 |
| X3 | 0.3052 | 0.3224 |
| | 0.3031 | 0.3327 |
| | 0.3148 | 0.3444 |
| | 0.3160 | 0.3332 |
| X4 | 0.3031 | 0.3327 |
| | 0.3011 | 0.3422 |
| | 0.3136 | 0.3550 |
| | 0.3148 | 0.3444 |

| | | |
|---|---|---|
| Y1 | 0.3040 | 0.2850 |
| | 0.2990 | 0.3010 |
| | 0.3076 | 0.3108 |
| | 0.3112 | 0.2932 |
| Y2 | 0.2990 | 0.3010 |
| | 0.2920 | 0.3210 |
| | 0.3031 | 0.3327 |
| | 0.3076 | 0.3108 |
| Y3 | 0.3040 | 0.2850 |
| | 0.2899 | 0.2703 |
| | 0.2830 | 0.2838 |
| | 0.2990 | 0.3010 |
| Y4 | 0.2990 | 0.3010 |
| | 0.2830 | 0.2838 |
| | 0.2742 | 0.3007 |
| | 0.2920 | 0.3210 |

Note:
Color coordinates measurement allowance is ± 0.01

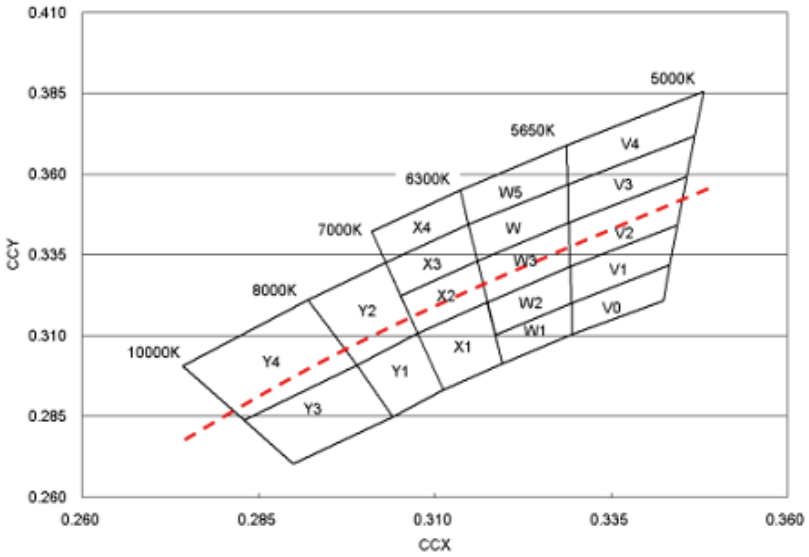



Figure 3. PLCC Chromaticity diagram

Table 9. Color Bin M0-R4, $I_F$=350mA/die ,$T_a$=25°C

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **M0** | 0.4370 | 0.3840 | **N0** | 0.4356 | 0.3837 | **P0** | 0.4220 | 0.3790 | **Q0** | 0.4100 | 0.3740 | **R0** | 0.3966 | 0.3673 |
| | 0.4490 | 0.3875 | | 0.4280 | 0.3700 | | 0.4150 | 0.3635 | | 0.4035 | 0.3580 | | 0.3917 | 0.3530 |
| | 0.4420 | 0.3750 | | 0.4150 | 0.3635 | | 0.4035 | 0.3580 | | 0.3917 | 0.3530 | | 0.3785 | 0.3460 |
| | 0.4280 | 0.3700 | | 0.4220 | 0.3790 | | 0.4100 | 0.3740 | | 0.3966 | 0.3673 | | 0.3826 | 0.3595 |
| **M1** | 0.4436 | 0.3991 | **N1** | 0.4294 | 0.3943 | **P1** | 0.4294 | 0.3943 | **Q1** | 0.4165 | 0.3890 | **R1** | 0.3871 | 0.3739 |
| | 0.4577 | 0.4029 | | 0.4436 | 0.3991 | | 0.4221 | 0.3790 | | 0.4100 | 0.3738 | | 0.4021 | 0.3822 |
| | 0.4490 | 0.3875 | | 0.4356 | 0.3837 | | 0.4100 | 0.3738 | | 0.4100 | 0.3738 | | 0.3966 | 0.3673 |
| | 0.4356 | 0.3837 | | 0.4221 | 0.3790 | | 0.4165 | 0.3890 | | 0.3966 | 0.3673 | | 0.3826 | 0.3595 |
| **M2** | 0.4525 | 0.4162 | **N2** | 0.4525 | 0.4162 | **P2** | 0.4240 | 0.4065 | **Q2** | 0.4086 | 0.3995 | **R2** | 0.4086 | 0.3995 |
| | 0.4671 | 0.4196 | | 0.4436 | 0.3991 | | 0.4376 | 0.4116 | | 0.4240 | 0.4065 | | 0.4021 | 0.3822 |
| | 0.4577 | 0.4029 | | 0.4294 | 0.3943 | | 0.4294 | 0.3943 | | 0.4165 | 0.3890 | | 0.3871 | 0.3739 |
| | 0.4436 | 0.3991 | | 0.4376 | 0.4116 | | 0.4165 | 0.3890 | | 0.4021 | 0.3822 | | 0.3924 | 0.3909 |
| **M3** | 0.4614 | 0.4333 | **N3** | 0.4614 | 0.4333 | **P3** | 0.4312 | 0.4234 | **Q3** | 0.4086 | 0.3995 | **R3** | 0.4086 | 0.3995 |
| | 0.4767 | 0.4366 | | 0.4525 | 0.4162 | | 0.4456 | 0.4287 | | 0.4148 | 0.4161 | | 0.3924 | 0.3909 |
| | 0.4671 | 0.4196 | | 0.4376 | 0.4116 | | 0.4376 | 0.4116 | | 0.4312 | 0.4234 | | 0.3963 | 0.4035 |
| | 0.4525 | 0.4162 | | 0.4456 | 0.4287 | | 0.4240 | 0.4065 | | 0.4240 | 0.4065 | | 0.4148 | 0.4161 |
| **M4** | 0.4705 | 0.4508 | **N4** | 0.4538 | 0.4460 | **P4** | 0.4385 | 0.4404 | **Q4** | 0.4385 | 0.4404 | **R4** | 0.4023 | 0.4228 |
| | 0.4866 | 0.4542 | | 0.4705 | 0.4508 | | 0.4538 | 0.4460 | | 0.4312 | 0.4234 | | 0.4209 | 0.4326 |
| | 0.4767 | 0.4366 | | 0.4614 | 0.4333 | | 0.4456 | 0.4287 | | 0.4148 | 0.4161 | | 0.4148 | 0.4161 |
| | 0.4614 | 0.4333 | | 0.4456 | 0.4287 | | 0.4312 | 0.4234 | | 0.4209 | 0.4326 | | 0.3963 | 0.4035 |

Note:
Color coordinates measurement allowance is ± 0.01

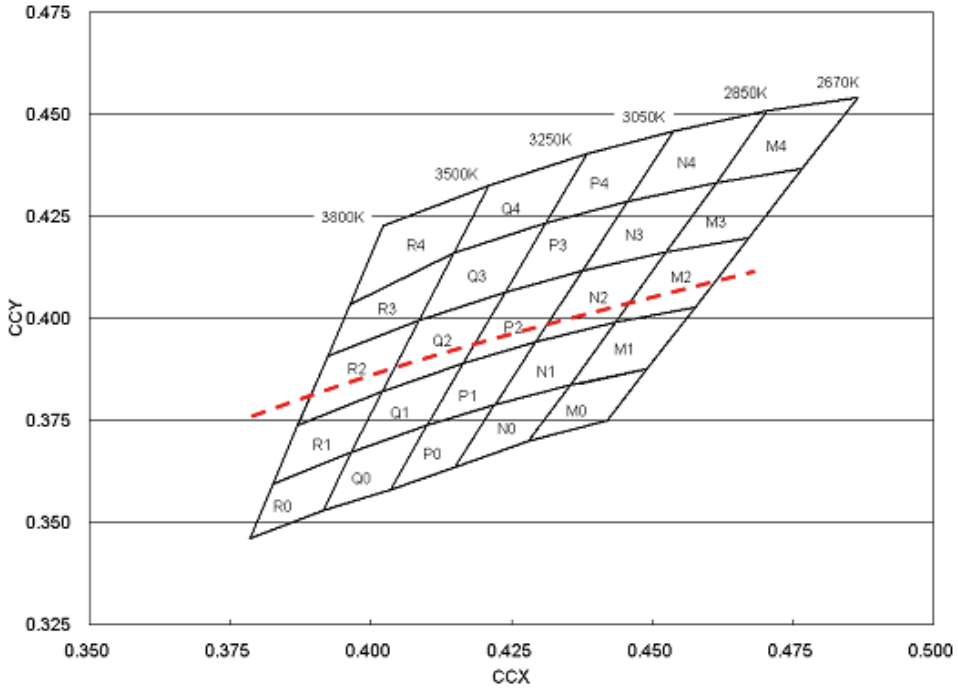



Figure 4. PLCC Chromaticity diagram

Table 10. Color Bin S0-U4, $I_F$=350mA/die ,$T_a$=25°C

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S0** | 0.3826 | 0.3595 | **T0** | 0.3706 | 0.3520 | **U0** | 0.3571 | 0.3426 |
| | 0.3785 | 0.3460 | | 0.3670 | 0.3377 | | 0.3548 | 0.3290 |
| | 0.3670 | 0.3377 | | 0.3548 | 0.3290 | | 0.3425 | 0.3208 |
| | 0.3706 | 0.3520 | | 0.3571 | 0.3426 | | 0.3434 | 0.3320 |
| **S1** | 0.3741 | 0.3658 | **T1** | 0.3741 | 0.3658 | **U1** | 0.3594 | 0.3557 |
| | 0.3871 | 0.3739 | | 0.3706 | 0.3520 | | 0.3571 | 0.3426 |
| | 0.3826 | 0.3595 | | 0.3571 | 0.3426 | | 0.3434 | 0.3320 |
| | 0.3706 | 0.3520 | | 0.3594 | 0.3557 | | 0.3444 | 0.3442 |
| **S2** | 0.3783 | 0.3825 | **T2** | 0.3622 | 0.3716 | **U2** | 0.3622 | 0.3716 |
| | 0.3924 | 0.3909 | | 0.3783 | 0.3825 | | 0.3594 | 0.3557 |
| | 0.3871 | 0.3739 | | 0.3741 | 0.3658 | | 0.3444 | 0.3442 |
| | 0.3741 | 0.3658 | | 0.3594 | 0.3557 | | 0.3458 | 0.3592 |
| **S3** | 0.3783 | 0.3825 | **T3** | 0.3642 | 0.3829 | **U3** | 0.3642 | 0.3829 |
| | 0.3811 | 0.3937 | | 0.3811 | 0.3937 | | 0.3622 | 0.3716 |
| | 0.3963 | 0.4035 | | 0.3783 | 0.3825 | | 0.3458 | 0.3592 |
| | 0.3924 | 0.3909 | | 0.3622 | 0.3716 | | 0.3469 | 0.3717 |
| **S4** | 0.3860 | 0.4130 | **T4** | 0.3673 | 0.4003 | **U4** | 0.3469 | 0.3717 |
| | 0.4023 | 0.4228 | | 0.3860 | 0.4130 | | 0.3481 | 0.3856 |
| | 0.3963 | 0.4035 | | 0.3811 | 0.3937 | | 0.3673 | 0.4003 |
| | 0.3811 | 0.3937 | | 0.3642 | 0.3829 | | 0.3642 | 0.3829 |

Note:
Color coordinates measurement allowance is ± 0.01

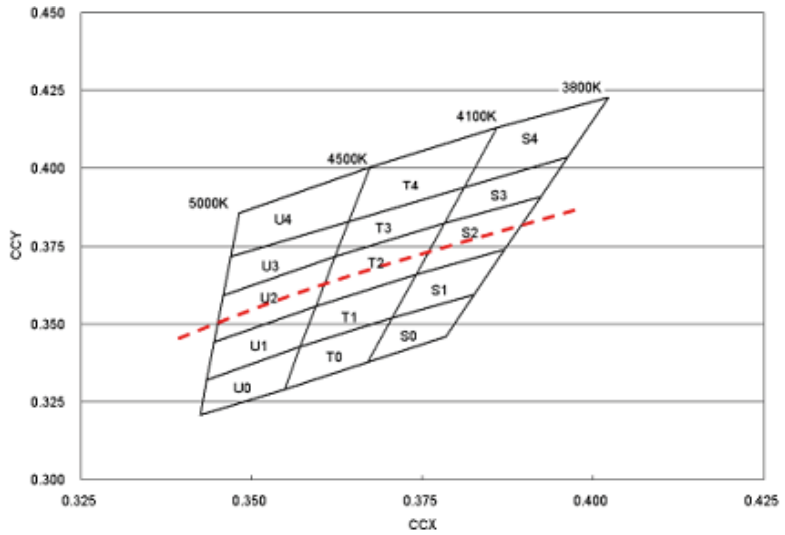



Figure 5. PLCC Chromaticity diagram

## Characteristic Curves

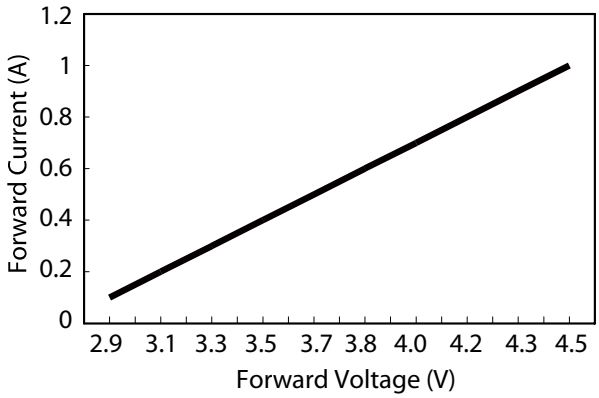



Figure 6. Forward current & forward voltage for 1W PLCC

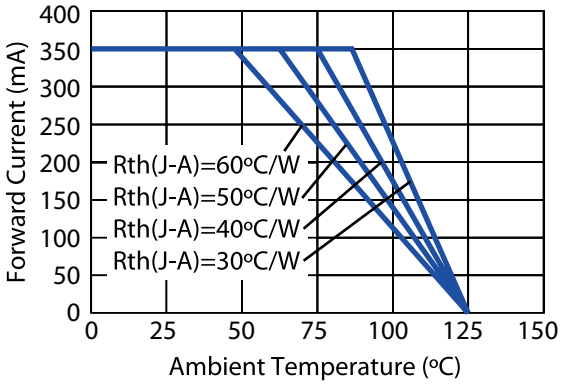



Figure 7. Operating current & ambient temperature for 1W PLCC

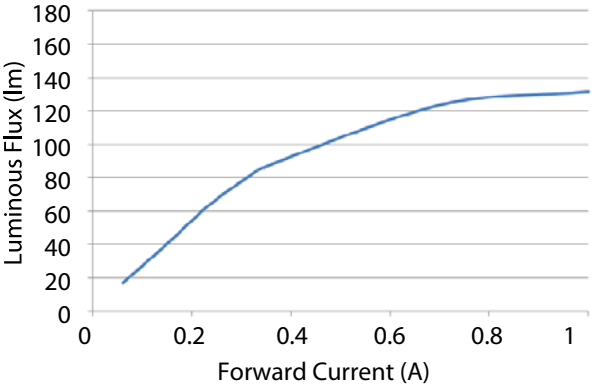



Figure 8. Forward current & relative luminous at $T_a$=25°C for 1W PLCC

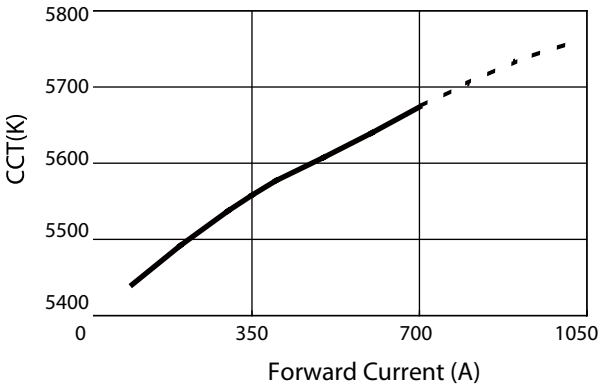



Figure 9. .Forward current & CCT at Ta =25°C for 1W PLCC Neutral White

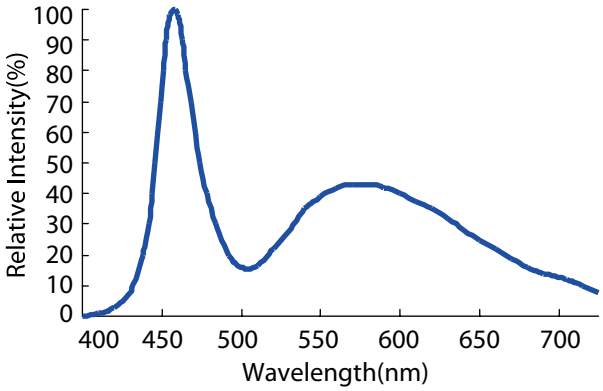



Figure 10. Color Spectrum for Cool White at a typical CCT

## Thermal Resistance

Table 11. Thermal Resistance

| Thermal Resistance from Junction to Thermal Pad | Unit |
|---|---|
| 10 | °C/W |

## Reliability Test Items

The following table describes operating life, mechanical, and environmental tests performed on PLCC 5050 series.

Table 12. Reliability Test 2

| Stress Test | Stress Conditions | Stress Duration | Failure Criteria |
|---|---|---|---|
| IR reflow | Peak temp.=255~260°C 10sec<br>(Pre treatment 60°C/60%RH,168hrs) | 3 times | No catastrophics |
| Room Temperature Operating Life | 25 °C, IF =DC max[1] | 1000 hours | Note 2 |
| High Temperature High Humidity Operating Life | 85 °C / 85%RH, $I_F$ = 150mA | 1000 hours | Note 2 |
| High Temperature Operating Life | 85 °C, $I_F$ =150mA | 1000 hours | Note 2 |
| Low Temperature Operating Life | -40 °C, $I_F$ =DC max[1] | 1000 hours | Note 2 |
| High Temperature Storage Life | 150 °C | 1000 hours | Note 2 |
| Low Temperature Storage Life | -40 °C | 1000 hours | Note 2 |
| Non-Operating Thermal Shock | -40 °C/ 125°C, 20 min dwell °C<br><10 sec transfer | 300 cycles | No catastrophics |

Notes:
1. DC max is defined to be 350mA for 1W PLCC.
2. Failure Criteria:
 - Electrical failures: $V_F$ shifts >= 10%
 - Light Output Degradation: Percentage level shift >= 50% at 1,000hrs or 500cycle
 - Visual failures: Broken or damaged package on lens or substrate
3. The IR reflow test can pass through JEDEC level 2a criterion.

## Reflow Profile

The following reflow soldering profiles are provided for reference. It is recommended that users follow the recommended soldering profile provided by the manufacturer of the solder paste used

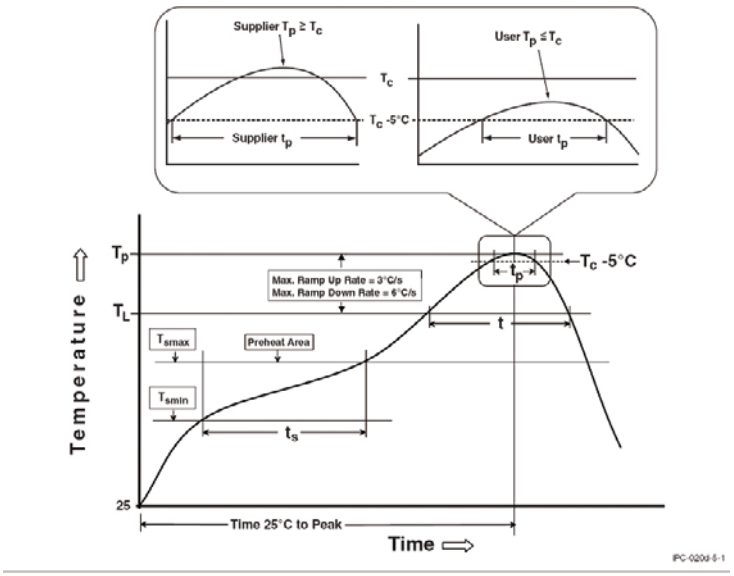



Figure 11. Reflow Profiles

Table 13. Table of Classification Reflow Profiles

| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|---|---|
| Preheat & Soak<br>Temperature min (Tsmin)<br>Temperature max (Tsmax)<br>Time (Tsmin to Tsmax) (ts) | 100°C<br>150°C<br>60-120 seconds | 150 °C<br>200 °C<br>60-120 seconds |
| Average ramp-up rate (Tsmax to Tp) | 3°C/second max. | 3 °C/second max. |
| Liquidous temperature (TL)<br>Time at liquidous (tL) | 183 °C<br>60-150 seconds | 217 °C<br>60-150 seconds |
| Peak package body temperature (Tp)* | 230 °C ~235°C * | 255 °C ~260 °C * |
| Classification temperature (Tc) | 235°C | 260 °C |
| Time (tp)** within 5 °C of the specified classification temperature (Tc) | 20** seconds | 30** seconds |
| Average ramp-down rate (Tp to Tsmax) | 6°C/ second max. | 6°C/second max. |
| Time 25°C to peak temperature | 6 minutes max. | 8 minutes max. |

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

**1. Soldering conditions**

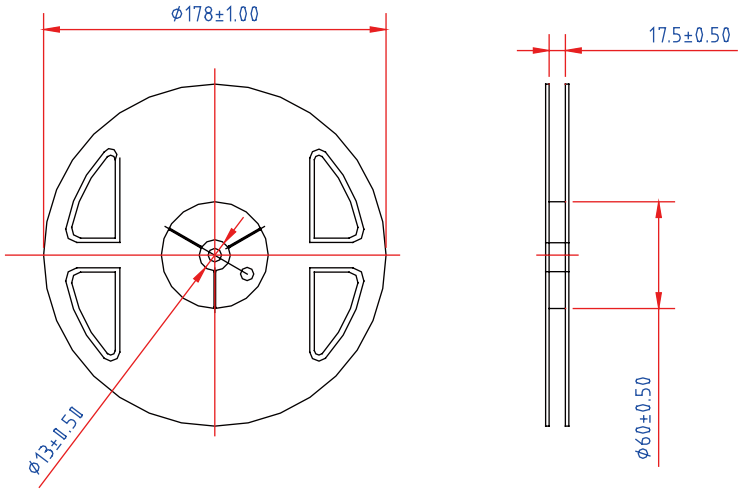
• Reflow soldering should not be done more than twice.
• When soldering, do not put stress on the LEDs during heating.
• After soldering, do not warp the circuit board.
• Repair should not be done after the LEDs have been soldered. When repair is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will be damaged by repairing or not.
• The encapsulated material of the LEDs is silicone. Therefore precautions should be taken to avoid the strong pressure on the encapsulated part.

**2. Cleaning**

• It is recommended to use isopropyl alcohol as a solvent to clean the LEDs. When using other solvents, it should be confirmed beforehand whether the solvents will dissolve the package and the resin or not.

## Product Packaging Information

### Taping Reel




**1. Common dimensions.**

| Item | Specification | Tol. (+/-) |
|---|---|---|
| W | 16.00 | ± 0.30 |
| E | 1.75 | ± 0.10 |
| F | 7.50 | ± 0.10 |
| D0 | 1.50 | ± 0.10 |
| D1 | 1.50 | ± 0.10 |
| P0 | 4.00 | ± 0.10 |
| P1 | 8.00 | ± 0.10 |
| P2 | 2.00 | ± 0.10 |
| P0 x10 | 40.00 | ± 0.20 |

**2. Pocket & other dimensions.**

| Item | Specification | Tol. (+/-) |
|---|---|---|
| t | 0.30 | ± 0.05 |
| A0 | 5.30 | ± 0.10 |
| B0 | 7.50 | ± 0.10 |
| K0 | 1.60 | ± 0.10 |

**3. Drawing.** ( Conform to EIA-481 standard )

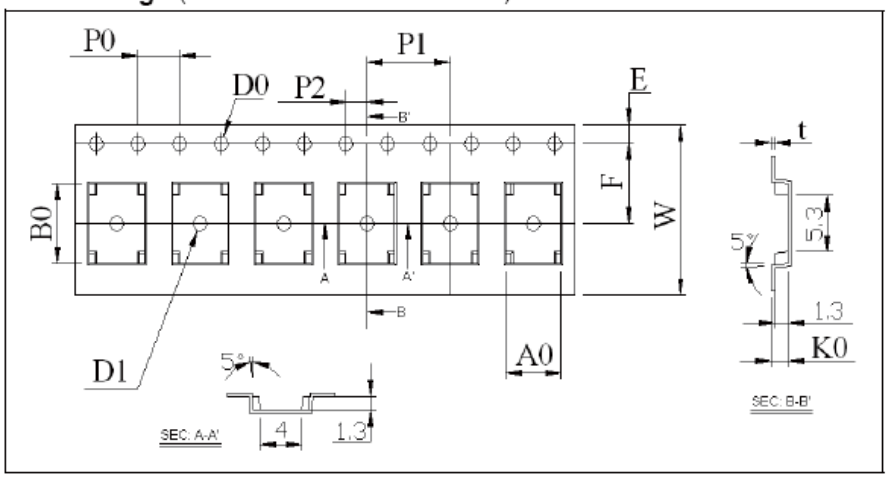



Figure 12. Taping reel dimensions

## Packaging

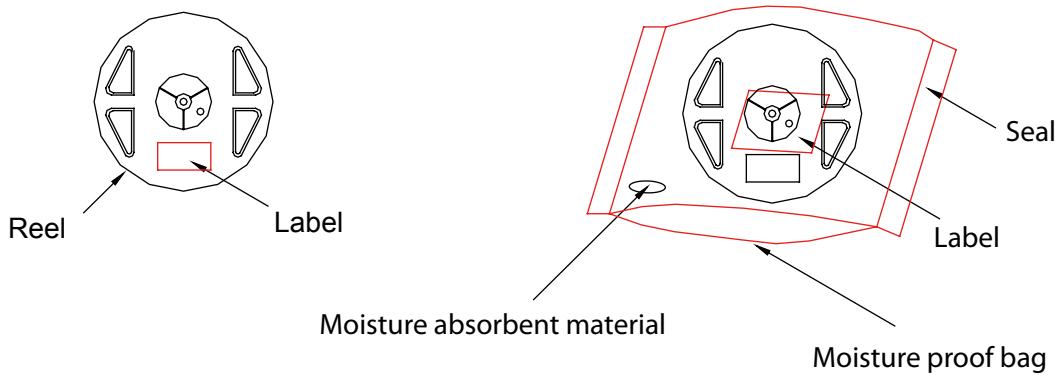



Figure 13. Packaging diagram

## Package Label

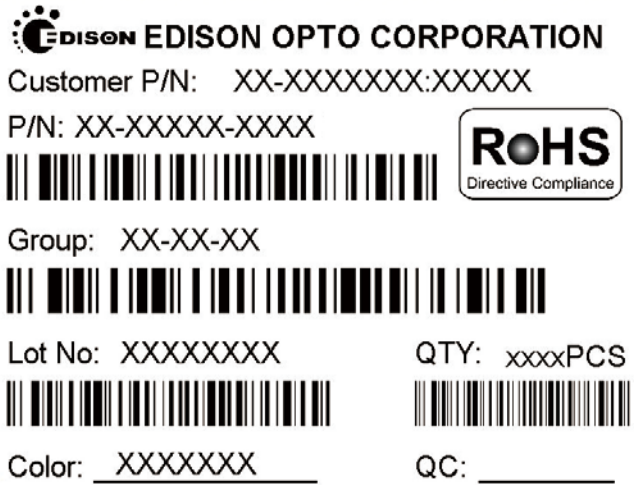



Figure 14. Package label

Table 14. Package dimensions and quantity

| Item | Quantity | Total | Dimensions(mm) |
|---|---|---|---|
| Reel | 1,000pcs | 1,000pcs | Diameter=178 |
| Box | 3 reels | 3,000pcs | 240*235*67 |
| Carton | 10 boxes | 30,000pcs | 500*260*355 |

## Precaution for Use

Storage

1.1 Before opening the package

The LEDs should be kept at <40°C & <90%RH. The LEDs should be used within a year. When storing the LEDs, moisture proof package with absorbent material (silica gel) is recommended.

1.2 After opening the package

The LEDs should be kept at ≤30°C & ≤60%RH. The LEDs should be soldered within 4 weeks after opening the moisture proof package.

If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with moisture proof package within absorbent material (silica gel).It is also recommended to return the unused LEDs to the original moisture proof package and to seal the moisture proof package again.

If the moisture absorbent material (silica gel) vapors or expires the expiration date, baking treatment should be performed by using the following conditions : 60°C for 20 hours.

The LEDs electrode and leadframe comprise a silver plated copper alloy. The silver surface may be affected by environments. Please avoid conditions which may cause the LEDs being corroded or discolored. The corrosion or discoloration might lower solderability or affect optical characteristics.

Please avoid rapid transition in ambient temperature, especially in high humidity environments where condensation can occur.

Static electricity

The products are sensitive to static electricity and highly taken care when handling them.

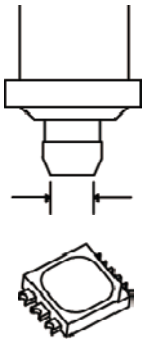
Static electricity or surge voltage will damage the LEDs. It is recommended to wear an anti-electrostatic wristband or an anti-electrostatic glove when handling the LEDs.

All devices, equipments and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

Pick and Place

Recommended conditions: Outer nozzle>ψ 4.2mm

*Avoid direct contact to the encapsulant with picking up nozzle. Failure to comply might result in pick and place processes or damage to encapsulant. In the worst cases, catastrophic failure of the LEDs due to wire deformation and/or breakage.



Notes:

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