

# **SPECIFICATION**

**Product : Topview 3528 White SMD LED**

**Part No. : IWS-L3514-CW-K2**

**Date : 2010. 04. 19 Ver. 2.0**

| Proposed By | Checked By | Checked By | Checked By | Approval |
|-------------|------------|------------|------------|----------|
|             |            |            |            |          |

**Comment**



ITSWELL Co., Ltd  
58B-4L, 626-3 Gojan-dong, Namdong-gu, Incheon 405-817 KOREA  
TEL:+82-32-813-1801, FAX:+82+32-816-1900  
URL: <http://www.itswell.com>,

# Topview 3528 SMD LED

## IWS-L3514-CW-K2

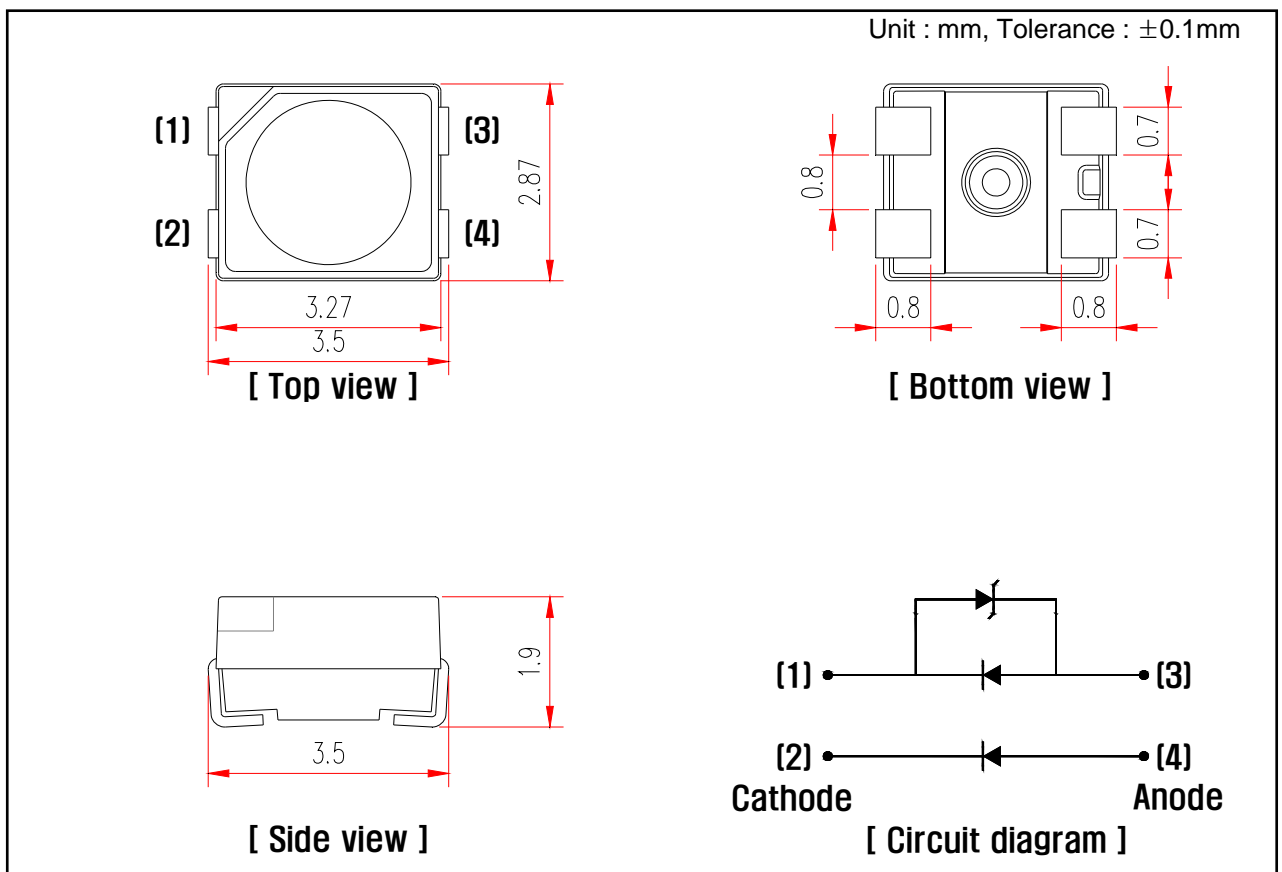
### 1. Features

- 2 Chip High-Luminosity SMD LED
- 3.5 x 2.8 x 1.9 mm (L x W x H), Small Size Surface Mount Type
- Wide Viewing Angle
- Long Operating Life

### 2. Applications

- Automotive: Backlight in Dashboard and Switch
- Lighting Device: Indicator, General Lighting
- Camera Flash, Hand Carrier Flash
- General Use

### 3. Outline Drawing and Dimension



#### Note

1. All dimensions are in millimeters
2. All dimensions without tolerances are for reference only

### 4. Absolute Maximum Ratings( $T_a = 25\text{ }^\circ\text{C}$ )

| Parameter                          | Symbol    | Value      | Unit             |
|------------------------------------|-----------|------------|------------------|
| Power Dissipation                  | $P_d$     | 216        | mW               |
| Continuous Forward Current         | $I_F$     | 60         | mA               |
| Peak Forward Current <sup>※1</sup> | $I_{FP}$  | 200        | mA               |
| Operating Temperature              | $T_{opr}$ | -30 ~ 85   | $^\circ\text{C}$ |
| Storage Temperature                | $T_{stg}$ | -40 ~100   | $^\circ\text{C}$ |
| Soldering Temperature              | $T_{sol}$ | 260 (5sec) | $^\circ\text{C}$ |

※1 Duty ratio = 1/10, Pulse width = 0.1ms

### 5. Electro-optical Characteristics( $T_a = 25\text{ }^\circ\text{C}$ )

| Parameter                        | Symbol          | Conditions           | Min.                            | Typ. | Max. | Unit.    |
|----------------------------------|-----------------|----------------------|---------------------------------|------|------|----------|
| Forward Voltage (per chip)       | $V_F$           | $I_F = 40\text{ mA}$ | 2.8                             | 3.2  | 3.6  | V        |
| Reverse Voltage (per chip)       | $V_R$           | $I_R = 5\text{ mA}$  | 0.7                             | 0.8  | 1.5  | V        |
| Luminous Intensity <sup>※2</sup> | $I_v$           | $I_F = 40\text{ mA}$ | 2100                            | -    | 4500 | mcd      |
| Color Coordinates <sup>※3</sup>  | CIE x<br>CIE y  | $I_F = 40\text{ mA}$ | Refer to Color Coordinates Rank |      |      |          |
| Viewing Angle <sup>※4</sup>      | $2\theta_{1/2}$ | $I_F = 40\text{ mA}$ | -                               | 120  | -    | $^\circ$ |

※2 Luminous Intensity is tested by a tester calibrated by CAS 140B(CIE LED\_B) and has an accuracy of 10%

※3 Color Coordinates has an accuracy of  $\pm 0.01$ .

※4 Viewing Angle is the angle until 50% of brightness measured from the front part of LED.

#### 5.1 Luminous Intensity Rank

| Rank | Luminous Intensity (mcd) |
|------|--------------------------|
| N    | 2100 – 2700              |
| P    | 2700 – 3500              |
| Q    | 3500 – 4500              |

#### 5.2 Forward Voltage Rank

| Rank | Forward Voltage (V) |
|------|---------------------|
| 0    | 2.8 ~ 3.0           |
| 2    | 3.0 ~ 3.2           |
| 4    | 3.2 ~ 3.4           |
| 6    | 3.4 ~ 3.6           |

### 5.3 Color Coordinates Rank ( $I_F = 40 \text{ mA}$ , $T_a = 25 \text{ }^\circ\text{C}$ )

| BW     |        |        |        | CW     |        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Z1     |        | Z2     |        | A1     |        | A2     |        | B1     |        | B2     |        |
| x      | y      | x      | y      | x      | y      | x      | y      | x      | y      | x      | y      |
| 0.2400 | 0.2000 | 0.2500 | 0.2100 | 0.2600 | 0.2200 | 0.2700 | 0.2300 | 0.2800 | 0.2400 | 0.2900 | 0.2500 |
| 0.2400 | 0.2600 | 0.2500 | 0.2700 | 0.2600 | 0.2800 | 0.2700 | 0.2900 | 0.2800 | 0.3000 | 0.2900 | 0.3100 |
| 0.2500 | 0.2700 | 0.2600 | 0.2800 | 0.2700 | 0.2900 | 0.2800 | 0.3000 | 0.2900 | 0.3100 | 0.3000 | 0.3200 |
| 0.2500 | 0.2100 | 0.2600 | 0.2200 | 0.2700 | 0.2300 | 0.2800 | 0.2400 | 0.2900 | 0.2500 | 0.3000 | 0.2600 |

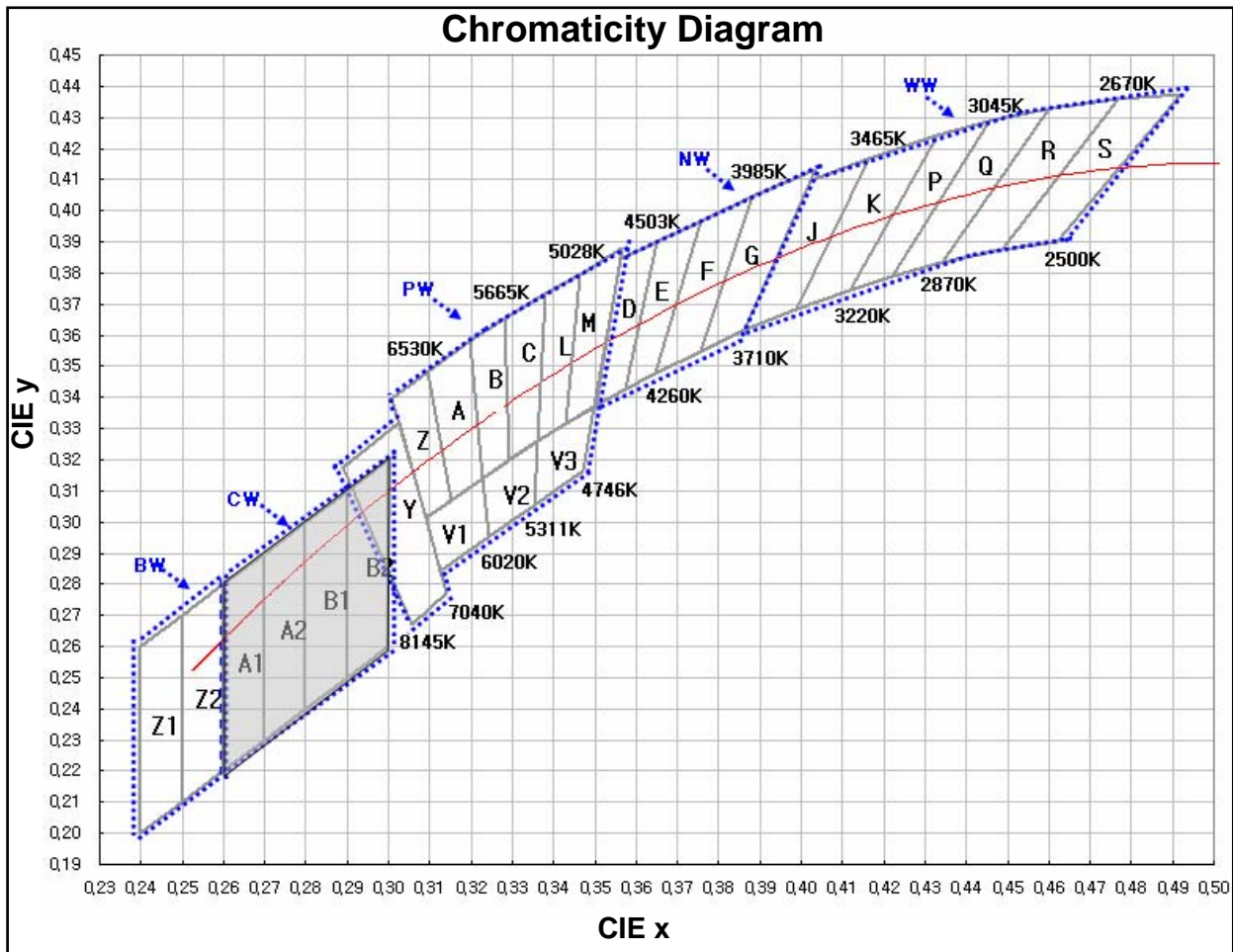
| PW         |        |             |        |             |        |             |        |             |        |             |        |             |        |
|------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|
| 7500K      |        | 7040K-4746K |        |             |        | 6500K       |        |             |        | 5700K       |        |             |        |
| 8145-7040K |        | 7040K-6020K |        | 6020K-5331K |        | 5331K-4746K |        | 7040K-6530K |        | 6530K-6020K |        | 6020K-5665K |        |
| Y          |        | V1          |        | V2          |        | V3          |        | Z           |        | A           |        | B           |        |
| x          | y      | x           | y      | x           | y      | x           | y      | x           | y      | x           | y      | x           | y      |
| 0.3057     | 0.2671 | 0.3125      | 0.2842 | 0.3243      | 0.2951 | 0.3353      | 0.3053 | 0.3089      | 0.3012 | 0.3152      | 0.3070 | 0.3229      | 0.3142 |
| 0.2891     | 0.3175 | 0.3089      | 0.3012 | 0.3229      | 0.3142 | 0.3362      | 0.3259 | 0.3008      | 0.3399 | 0.3095      | 0.3484 | 0.3198      | 0.3585 |
| 0.3025     | 0.3321 | 0.3229      | 0.3142 | 0.3362      | 0.3259 | 0.3500      | 0.3371 | 0.3095      | 0.3484 | 0.3198      | 0.3585 | 0.3282      | 0.3652 |
| 0.3140     | 0.2770 | 0.3243      | 0.2951 | 0.3353      | 0.3053 | 0.3472      | 0.3164 | 0.3152      | 0.3070 | 0.3229      | 0.3142 | 0.3292      | 0.3200 |

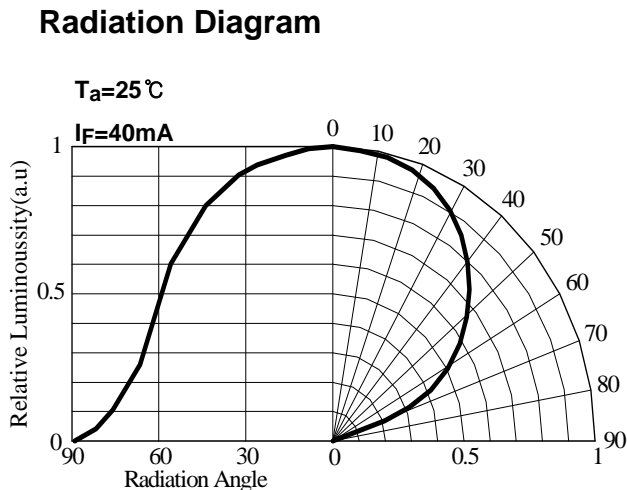
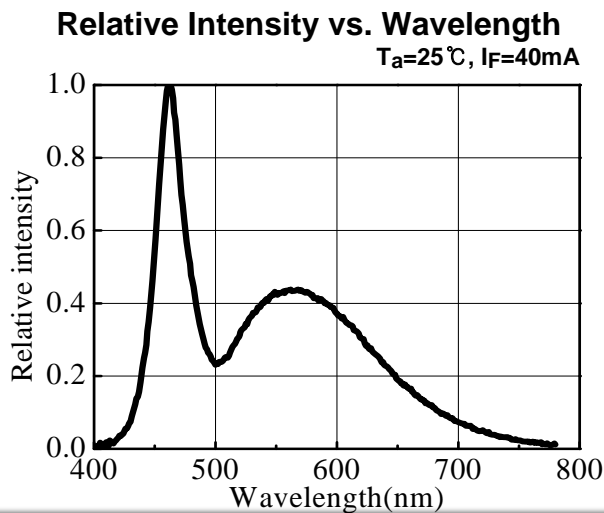
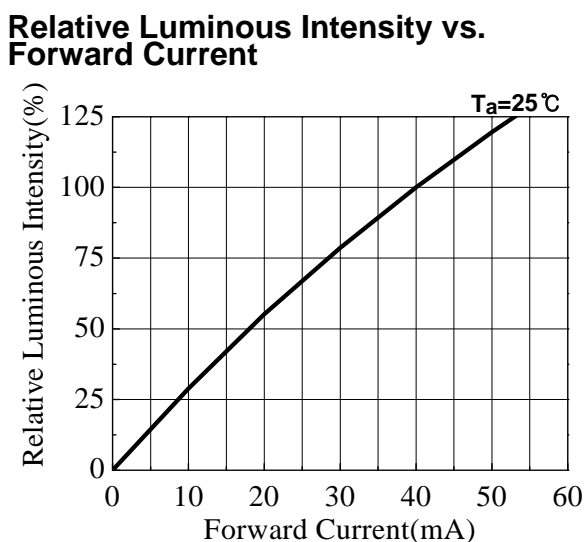
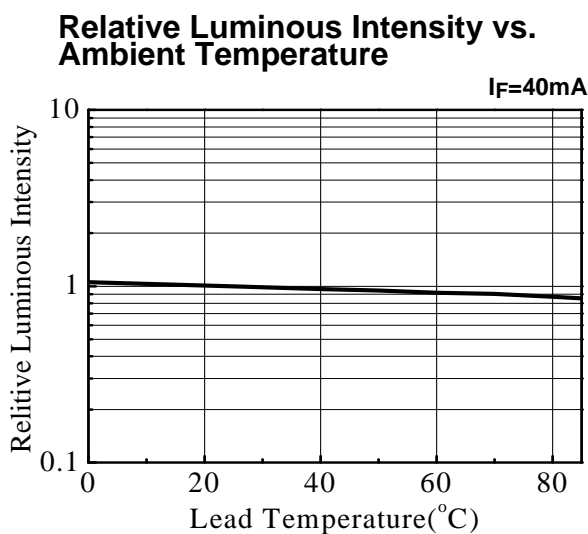
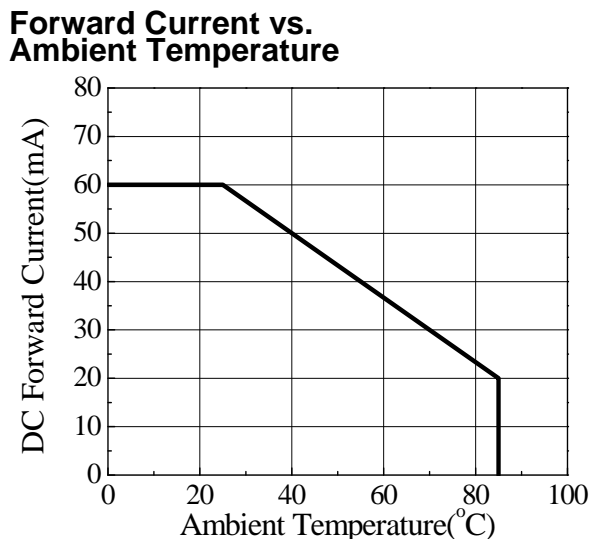
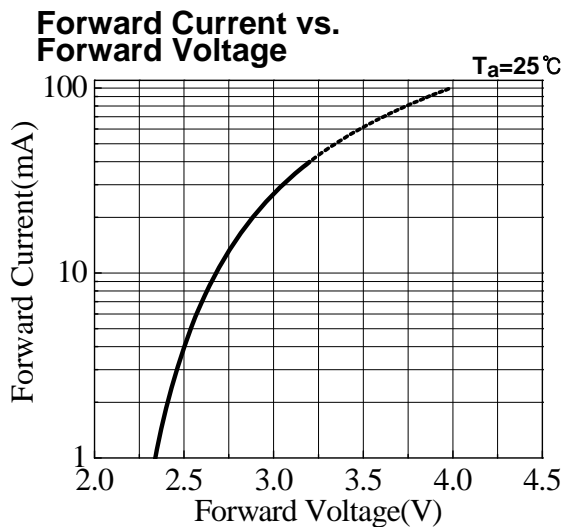
| PW          |        |             |        |             |        | NW          |        |             |        |             |        |             |        |
|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|
| 5700K       |        | 5000K       |        |             |        | 4500K       |        |             |        |             |        |             |        |
| 5665K-5311K |        | 5311K-5028K |        | 5028K-4746K |        | 4746K-4503K |        | 4503K-4260K |        | 4260K-3985K |        | 3985K-3710K |        |
| C           |        | L           |        | M           |        | D           |        | E           |        | F           |        | G           |        |
| x           | y      | x           | y      | x           | y      | x           | y      | x           | y      | x           | y      | x           | y      |
| 0.3292      | 0.3200 | 0.3362      | 0.3259 | 0.3429      | 0.3317 | 0.3500      | 0.3371 | 0.3574      | 0.3428 | 0.3648      | 0.3479 | 0.3755      | 0.3550 |
| 0.3282      | 0.3652 | 0.3381      | 0.3732 | 0.3465      | 0.3797 | 0.3562      | 0.3843 | 0.3650      | 0.3899 | 0.3756      | 0.3966 | 0.3882      | 0.4044 |
| 0.3381      | 0.3732 | 0.3465      | 0.3797 | 0.3567      | 0.3881 | 0.3650      | 0.3899 | 0.3756      | 0.3966 | 0.3882      | 0.4044 | 0.4035      | 0.4134 |
| 0.3362      | 0.3259 | 0.3429      | 0.3317 | 0.3500      | 0.3371 | 0.3574      | 0.3428 | 0.3648      | 0.3479 | 0.3755      | 0.3550 | 0.3865      | 0.3617 |

| WW          |        |             |        |             |        |             |        |             |        |             |        |
|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|
| 3500K       |        |             |        | 3000K       |        |             |        | 2700K       |        |             |        |
| 3710K-3465K |        | 3465K-3220K |        | 3220K-3045K |        | 3045K-2870K |        | 2870K-2670K |        | 2670K-2500K |        |
| J           |        | K           |        | P           |        | Q           |        | R           |        | S           |        |
| x           | y      | x           | y      | x           | y      | x           | y      | x           | y      | x           | y      |
| 0.3865      | 0.3617 | 0.3988      | 0.3684 | 0.4117      | 0.3745 | 0.4221      | 0.3790 | 0.4599      | 0.4329 | 0.4767      | 0.4360 |
| 0.4022      | 0.4094 | 0.4165      | 0.4169 | 0.4332      | 0.4241 | 0.4456      | 0.4287 | 0.4767      | 0.4360 | 0.4921      | 0.4374 |
| 0.4165      | 0.4169 | 0.4332      | 0.4241 | 0.4456      | 0.4287 | 0.4599      | 0.4329 | 0.4486      | 0.3875 | 0.4621      | 0.3902 |
| 0.3988      | 0.3684 | 0.4117      | 0.3745 | 0.4221      | 0.3790 | 0.4344      | 0.3833 | 0.4344      | 0.3833 | 0.4486      | 0.3875 |

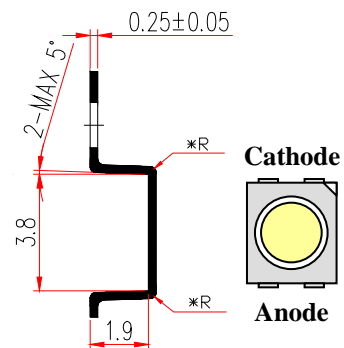
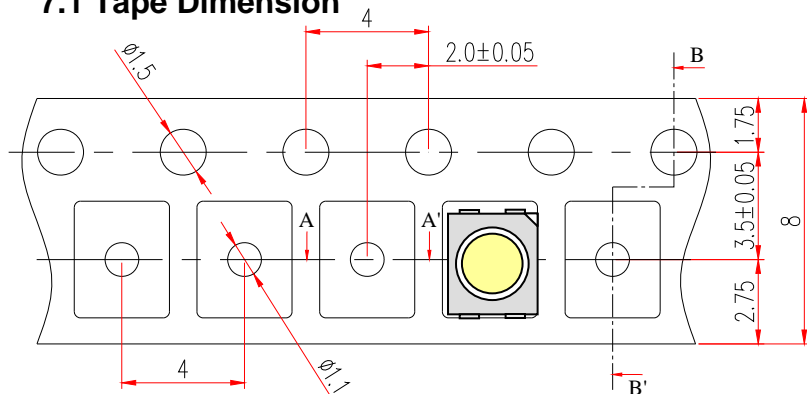


### 6. Typical Characteristics Curves

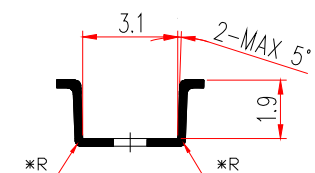


## 7. Dimension of Tape / Reel

### 7.1 Tape Dimension



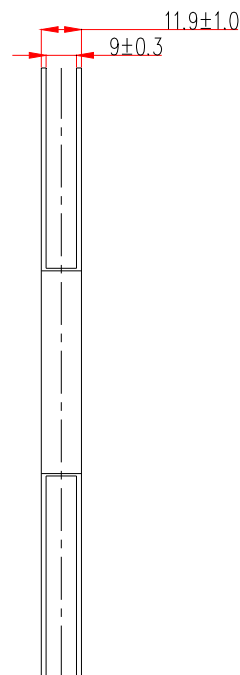
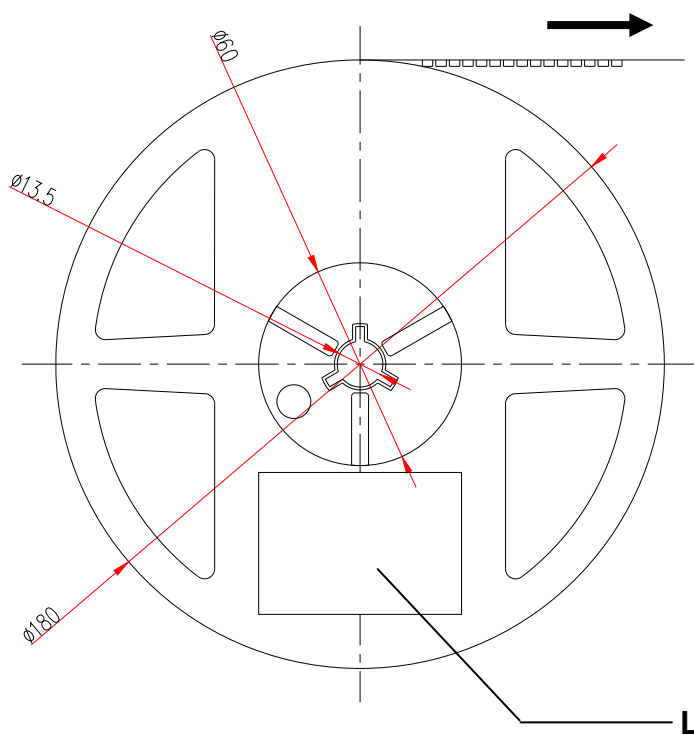
< SECTION B-B' >



< SECTION A-A' >

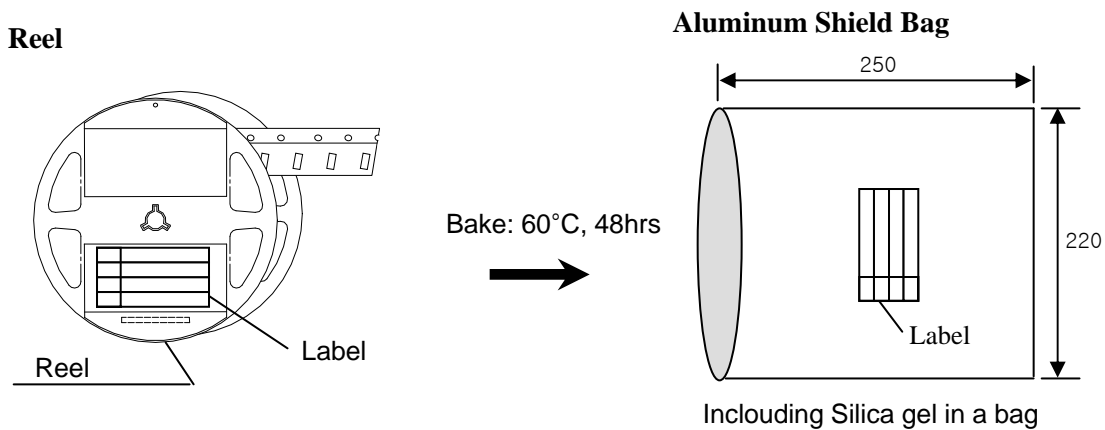
Tolerance ±0.1 , Unit: mm

### 7.2 Reel Dimension



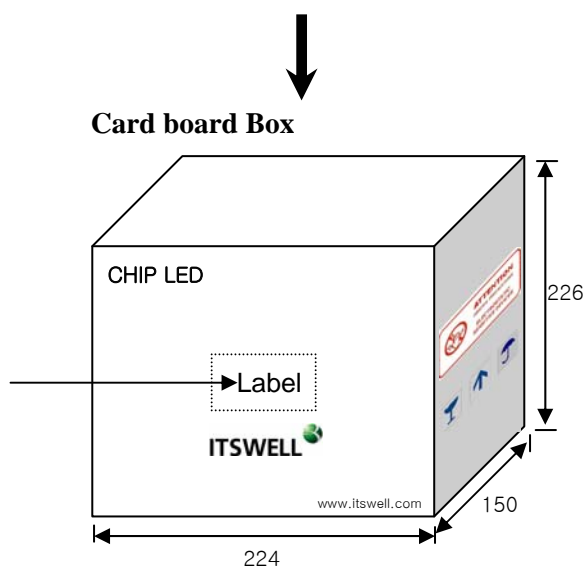
### 8. Packing Dimension

Unit :mm



**AI Pack Label, Reel Label** (70 × 37)

|                       |                 |     |     |     |
|-----------------------|-----------------|-----|-----|-----|
| <b>ITSWELL</b>        |                 |     |     |     |
| Lot :                 | IWS-L3514-CW-K2 |     |     |     |
|                       | MIN             | AVG | MAX | STD |
| V <sub>f</sub> [volt] |                 |     |     |     |
| I <sub>v</sub> [mcd]  |                 |     |     |     |
| CCT[K]                |                 |     |     |     |
| Q'ty :                | yyyy/mm/dd      |     |     |     |



|                | Dimensions (mm)       | Reel / Box | Q'ty / Box(pcs) |
|----------------|-----------------------|------------|-----------------|
| Reel           | Φ180mm,<br>12mm Width | -          | 2,000 Max       |
| Al Shield Bag  | 250x220               | -          | 2,000 Max       |
| Card board Box | 224x150x226           | 10 Max     | 20,000 Max      |

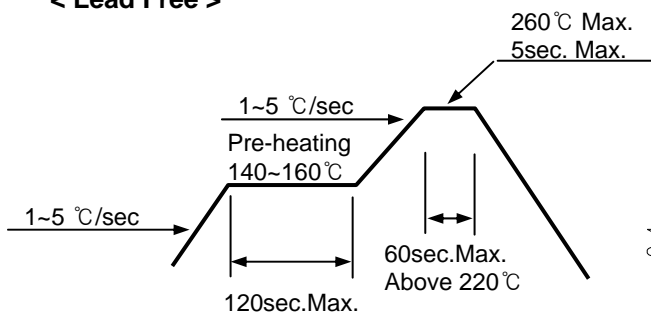


## 9. Precaution in use

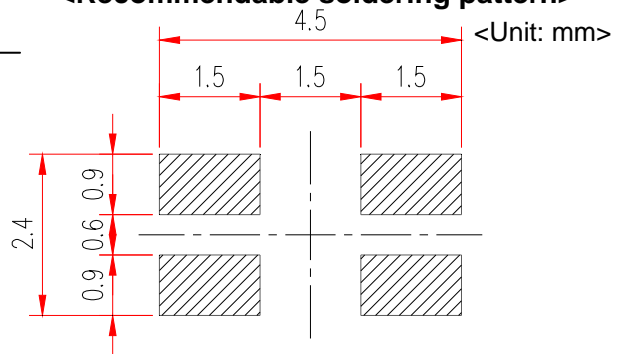
### 9.1 Soldering Conditions

- When soldering Power SMD, Heat may affect the electrical and optical characteristics of the LEDs.
- In soldering, do not stress the lead frame and the resin part under the high temperature.
- The silicone part should be protected from mechanical stress or vibration until the Power SMD return to room temperature after soldering.
- Preliminary heating to be at 160 °C max. for 120 Seconds max.
- Soldering heat to be at 260 °C max. for 5 sec. Max.
- For manual Soldering is Not more than 3 sec @MAX 350 °C, under soldering iron

#### < Lead Free >



#### <Recommendable soldering pattern>



### 9.2 Storage

- Before opening the package, the LEDs should be kept at 30 °C or less and 70%RH or less.
- The LEDs should be used within a year.
- After opening the package, the LEDs should be kept at 30 °C or less and 30%RH or less.
- The LEDs should be used within 168 hours (7 day) after opening the package.
- If the moisture absorbent material (silicagel) has faded away or the LED have exceeded the storage time, baking treatment should be performed using the following conditions.  
Baking treatment: 60 °C ±5 for 72 hours.

### 9.3 Static Electricity

- Static electricity or surge voltage damages the Power SMD . It is recommended that a wrist band or an anti-electrostatic glove be used when handling the LEDs.
- A tip soldering iron is requested to be grounded. An ionizer should also be installed where risk of static.
- All devices, equipment and machinery must be properly grounded (via 1MΩ). It is recommended that measures be taken against surge voltage to the equipment that mounts the Power SMD.

### 9.4 Cleaning

- Isopropyl Alcohol or Ethylene Alcohol is recommended in 5 minutes at room temperature.  
Don't use unspecified chemical may cause crack or haze on the surface of the epoxy resin.
- Before cleaning, a pre-test should be done to confirm whether any damage to the LED will occur.
- Freon solvents should not be used to clean the LEDs because of worldwide regulations.

### 9.5 Heat Generation

- When the LEDs are illuminating, operating current should be decided after being considering the ambient maximum temperature.
- Please consider the heat generation of the LED when it is designed the PCB.

## 10. Reliability

### 10.1 Reliability Test Item

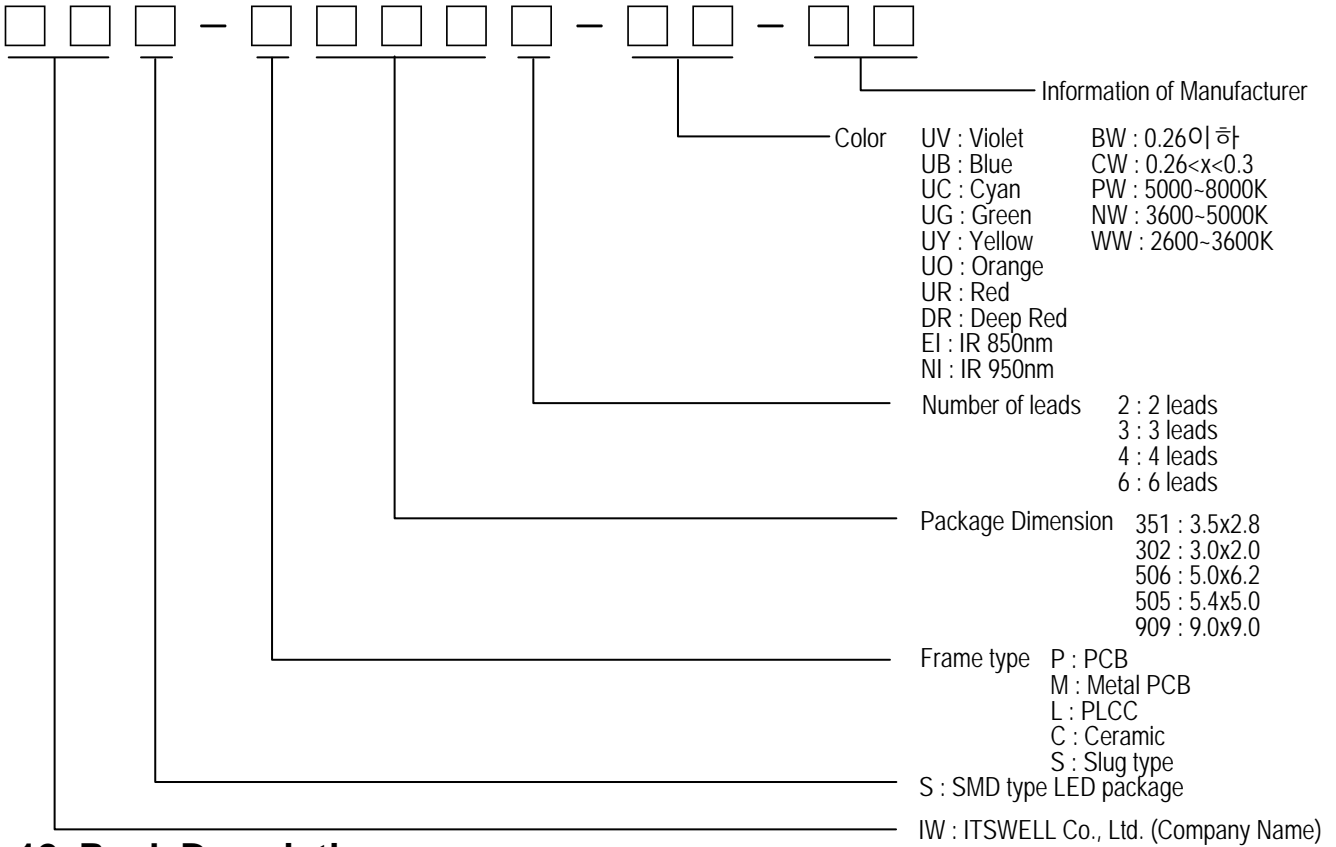
| Test Items  | Test Conditions                         | Notes |
|---|---|-------|
| High Temperature Storage                          | 100°C, 1,000hr.                         | 0/25  |
| Low Temperature Storage                           | -40°C, 1,000hr.                         | 0/25  |
| Temp. Humidity Storage                            | 60°C, 90% RH, 1,000hr.                  | 0/25  |
| Steady State Operating life                       | 25°C, 48mA, 1,000hr.                    | 0/25  |
| High Temperature Operating Life                   | 85°C, 20mA, 1,000hr                     | 0/25  |
| Low Temperature Operating Life                    | -30°C, 40mA, 1,000hr.                   | 0/25  |
| Steady State Operating life Of High Humidity Heat | 60°C, 90% RH, 30mA, 1,000hr.            | 0/25  |
| Thermal Shock                                     | -40°C (30min)↔100°C (30min.), 100 cycle | 0/20  |
| ESD   | HBM, 100 pF, 1.5 kohm, 3 times          | 0/20  |

### 10.2 Criteria for Judging the Damage

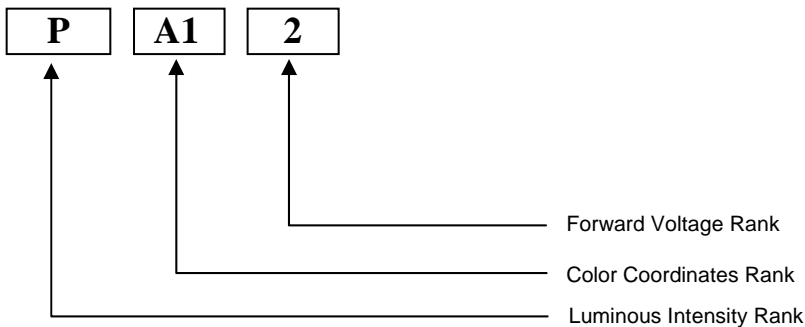
| Parameters                   | Test Conditions       | Criteria for judgment |
|------------------------------|-----------------------|-----------------------|
| Forward Voltage ( $V_F$ )    | $I_F = 40 \text{ mA}$ | Less than 110% of U   |
| Luminous Intensity ( $I_V$ ) | $I_F = 40 \text{ mA}$ | > 70% of S            |

\* U means the upper limit of specified characteristics, S means initial value.

### 11. Part Name Description



### 12. Rank Description



### 13. Attention : Electric Static Discharge (ESD) Protection



The symbol shown on the page herein to introduce 'Electro-Optical Characteristics'. ESD protection for GaP and AlGaAs based chips is still Necessary even though they are safe in low static-electric discharge. Material in AlInGaP, GaP, or/and InGaN based chips are STATIC SENSITIVE devices. ESD protection has to considered and taken in the initial design stage. If manual work/process is needed, please ensure the device is well protective From ESD during all the process.

