

# SPECIFICATION

Product : Topview 3528 RGB SMD LED

Part No. : IWS-L3516-RGB-K5

Date : 2012. 01. 19 Ver. 3.0

Proposed By	Checked By	Checked By	Checked By	Approval
결재완료				

Comment

ITSWELL 

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# Topview 3528 SMD LED

## IWS-L3516-RGB-K5



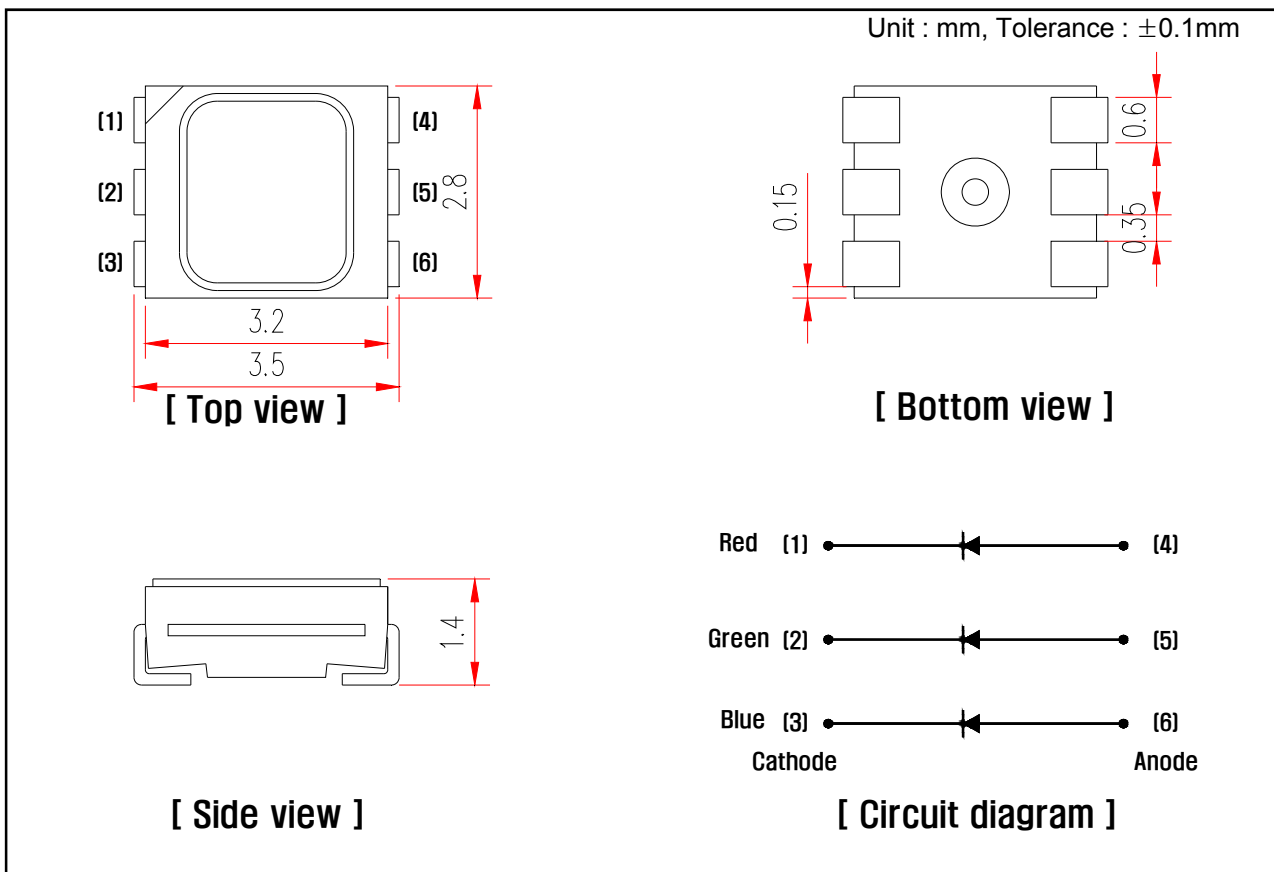
### 1. Features

- 3 Chip High-Luminosity SMD LED
- 3.5 x 2.8 x 1.4 mm (L x W x H), 6-Pin, 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

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

Parameter	Symbol	Value			Unit
		Red	Green	Blue	
Power Dissipation	$P_d$	78	108	108	mW
Continuous Forward Current	$I_F$	30	30	30	mA
Peak Forward Current <sup>*1</sup>	$I_{FP}$	100	100	100	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*2	$V_F$	$I_F = 20\text{mA}$	Red	1.8	-	2.6	V
			Green	2.8	-	3.4	V
			Blue	2.8	-	3.4	V
Reverse Current	$I_R$	$V_R = 5\text{V}$	Red	-	-	10	$\mu\text{A}$
			Green	-	-	10	$\mu\text{A}$
			Blue	-	-	10	$\mu\text{A}$
Dominant Wavelength*3	$W_D$	$I_F = 20\text{mA}$	Red	618	-	628	nm
			Green	520	-	530	nm
			Blue	455	-	465	nm
Luminous Intensity*4	$I_v$	$I_F = 20\text{mA}$	Red	400	-	700	mcd
			Green	900	-	1500	mcd
			Blue	180	-	300	mcd
View angle*5	$2\theta_{1/2}$	$I_F = 20\text{mA}$	-	-	120	-	deg

\*2 Forward Voltage has an accuracy of  $\pm 0.1\text{V}$

\*3 Luminous Intensity is tested by a tester calibrated by CAS 140B(CIE LED\_B) and has an accuracy of 10%

\*4 Dominant Wavelength has an accuracy of  $\pm 2\text{nm}$

\*5 Viewing Angle is the angle until 50% of brightness measured from the front part of LED.

### 5.1 Luminous intensity Rank( mcd, $I_F = 20\text{mA}$ )

RANK	RED	GREEN	BLUE
J			180 - 300
L	400 - 700		
K1		900 - 1200	
L1		1200 - 1500	

### 5.2 Dominant Wavelength Combination Rank( nm, $I_F = 20\text{mA}$ )

RANK	RED	GREEN	BLUE
A	618 - 628	520 - 530	455 - 465

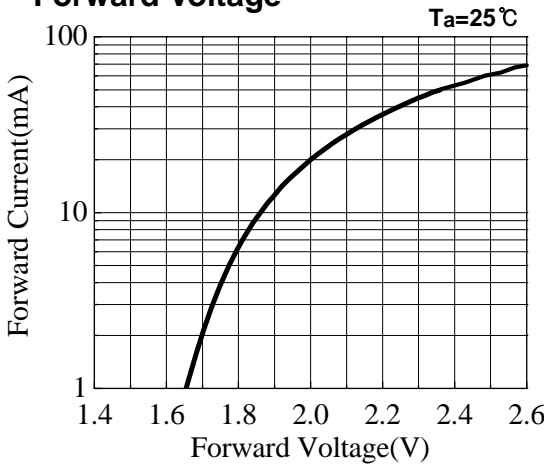
### 5.3 Forward Voltage Rank( V, $I_F = 20\text{mA}$ )

RANK	RED	GREEN	BLUE
D		2.8 - 3.0	2.8 - 3.0
A	1.8 - 2.2	3.0 - 3.2	3.0 - 3.2
B	2.2 - 2.6	3.2 - 3.4	3.2 - 3.4

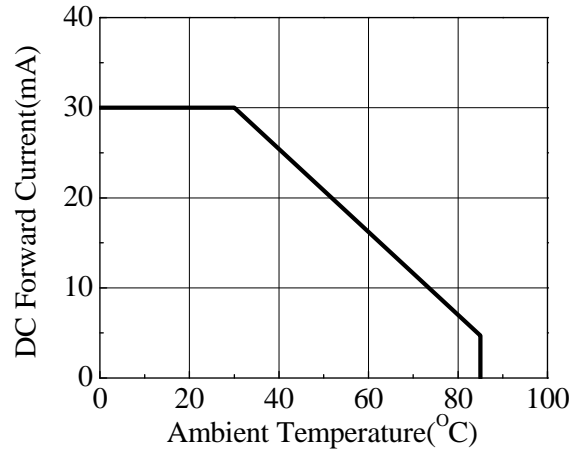
### 6. Typical Characteristics Curves

#### 6.1 Red

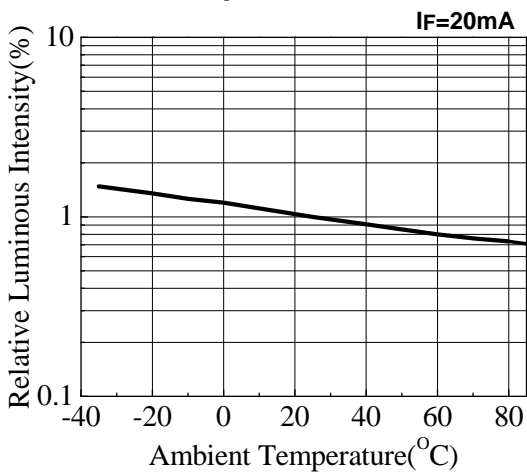
**Forward Current vs. Forward Voltage**



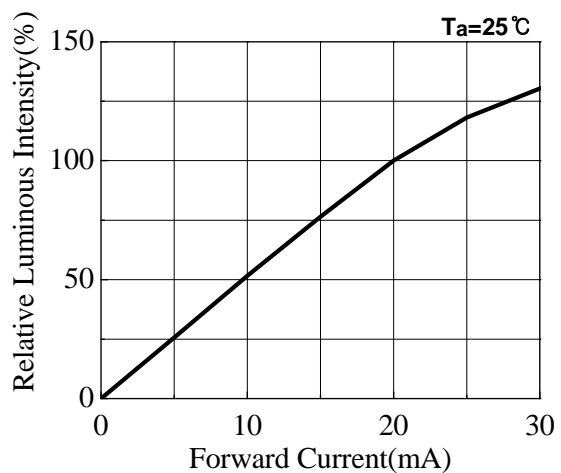
**Forward Current vs. Ambient Temperature**



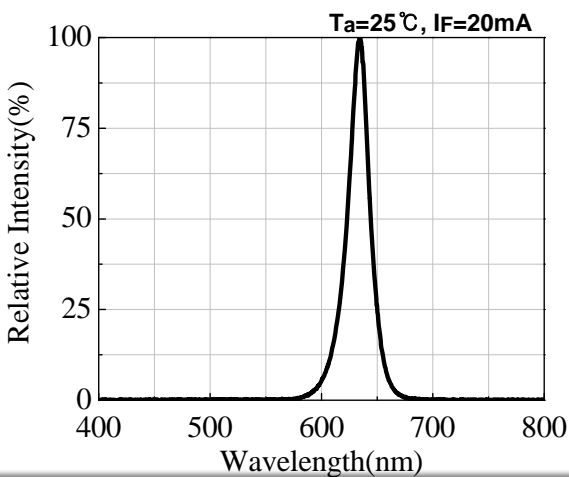
**Relative Luminous Intensity vs. Ambient Temperature**



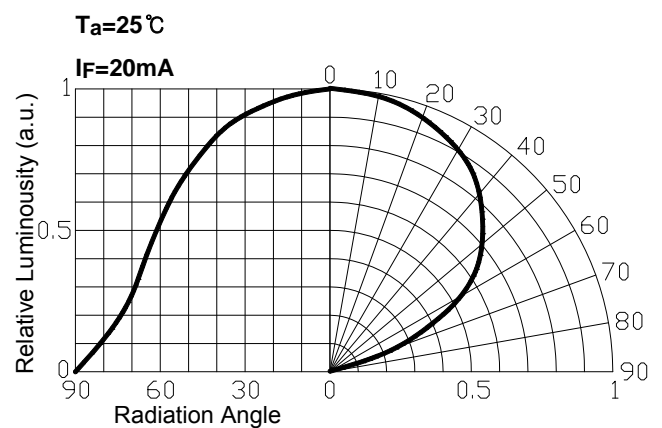
**Relative Luminous Intensity vs. Forward Current**



**Relative Intensity vs. Wavelength**



**Radiation Diagram**

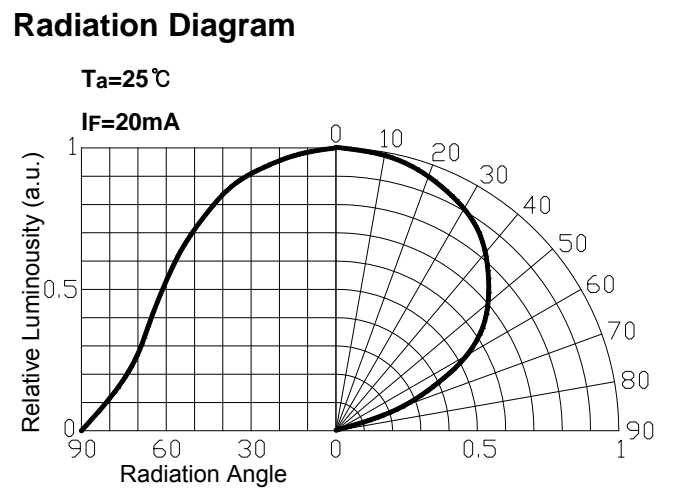
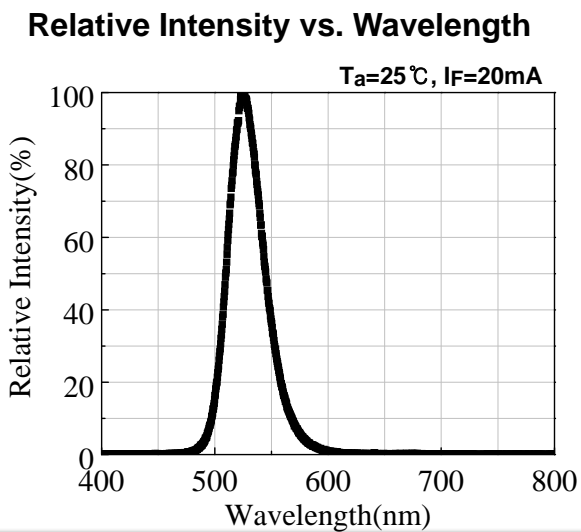
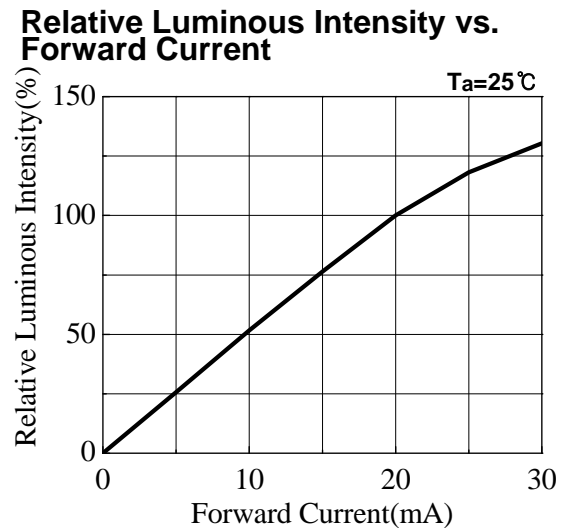
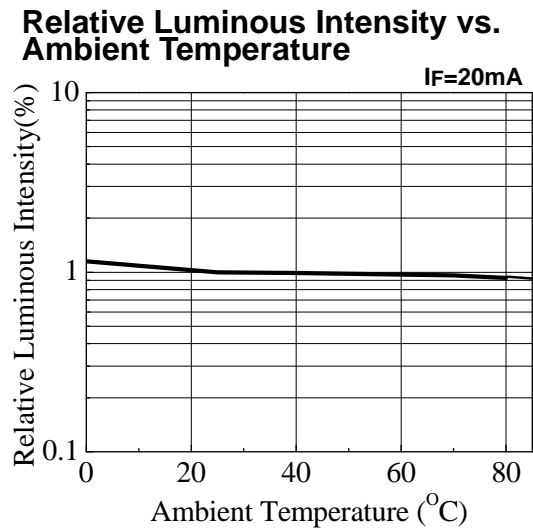
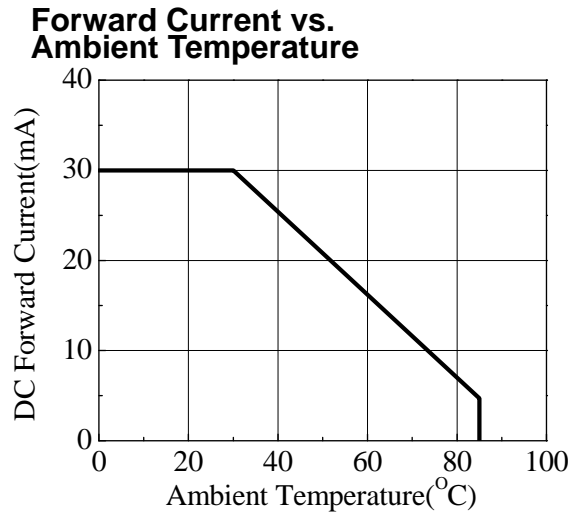
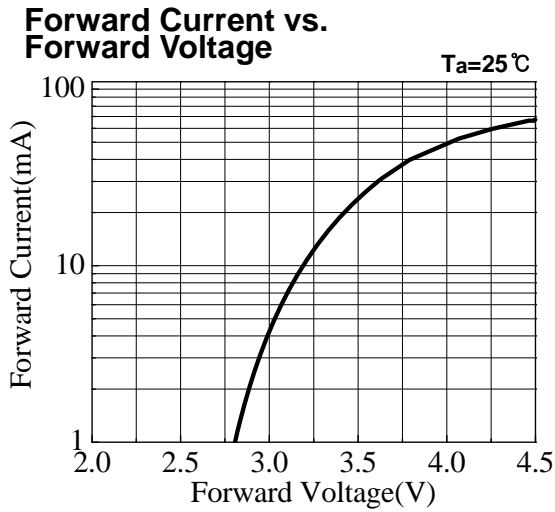


# Topview 3528 SMD LED

## IWS-L3516-RGB-K5



### 6.2 Green



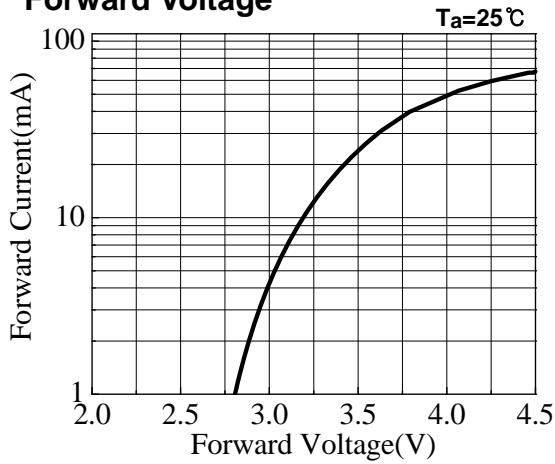
# Topview 3528 SMD LED

## IWS-L3516-RGB-K5

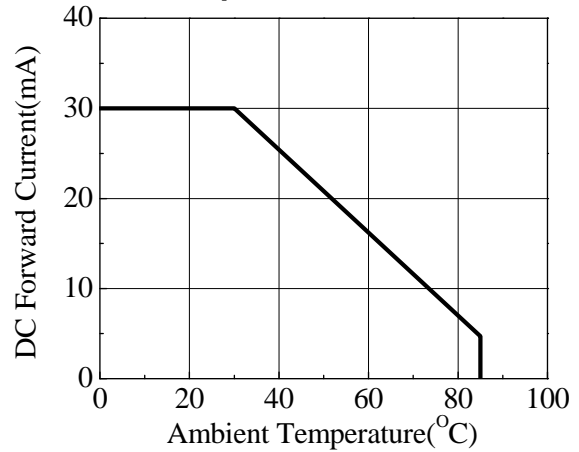


### 6.3 Blue

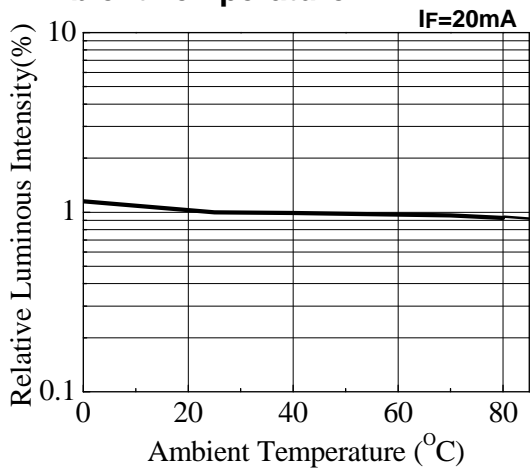
**Forward Current vs. Forward Voltage**



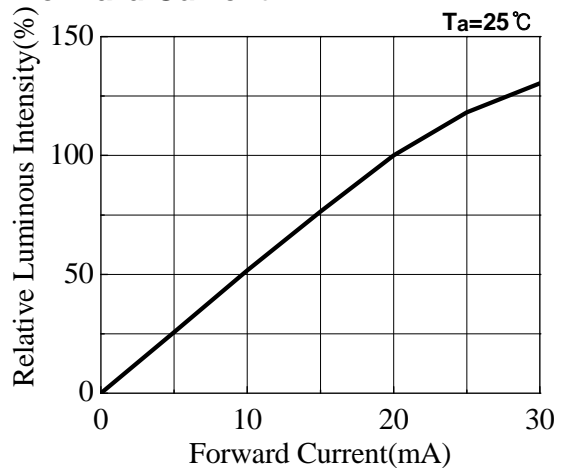
**Forward Current vs. Ambient Temperature**



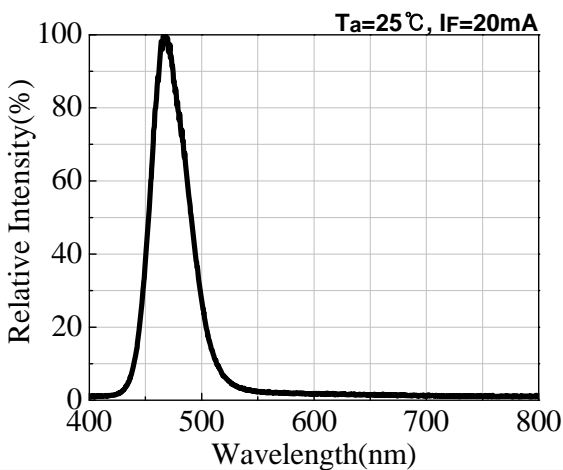
**Relative Luminous Intensity vs. Ambient Temperature**



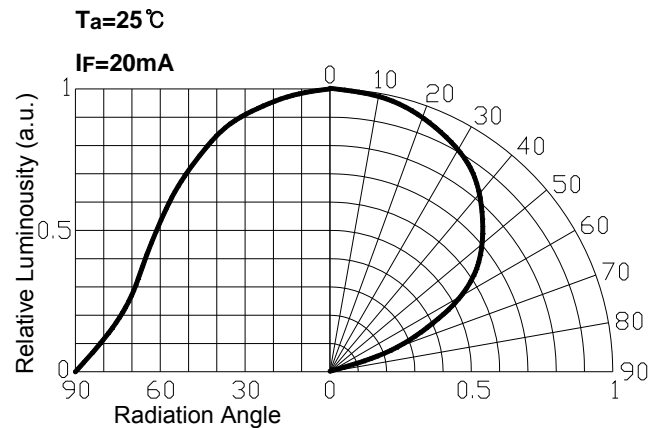
**Relative Luminous Intensity vs. Forward Current**



**Relative Intensity vs. Wavelength**



**Radiation Diagram**

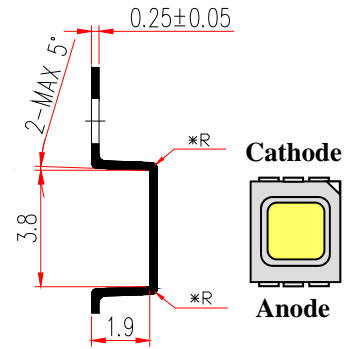
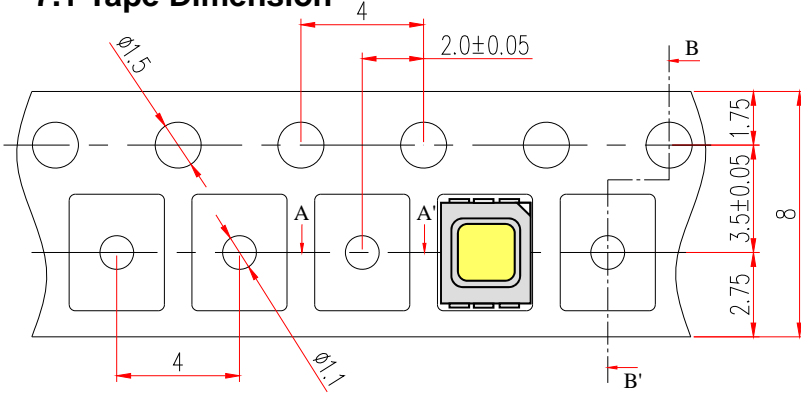


# Topview 3528 SMD LED IWS-L3516-RGB-K5

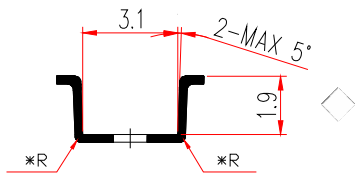


## 7. Dimension of Tape / Reel

### 7.1 Tape Dimension



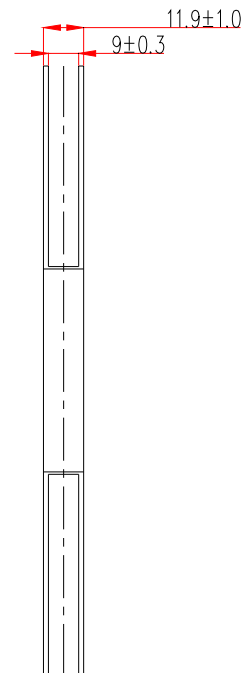
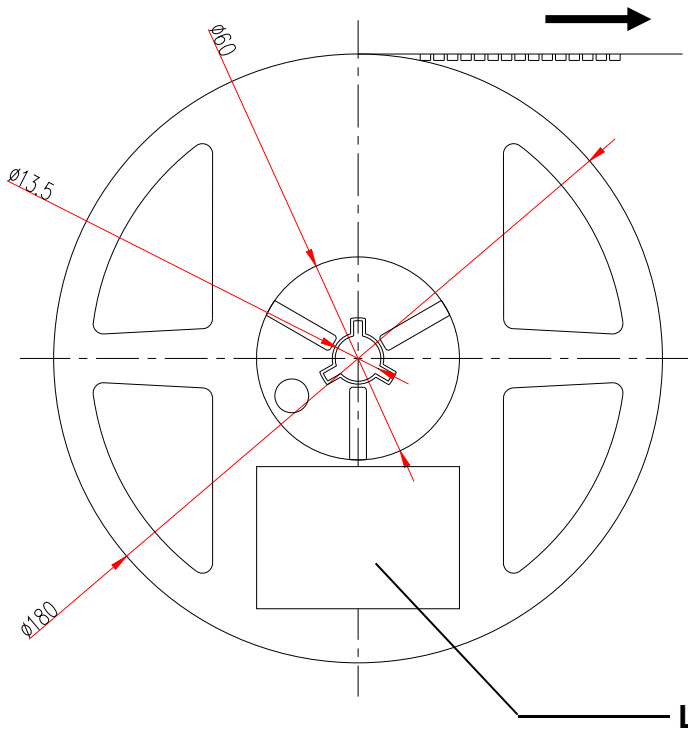
< SECTION B-B >



Tolerance  $\pm 0.1$ , Unit: mm

< SECTION A-A >

### 7.2 Reel Dimension





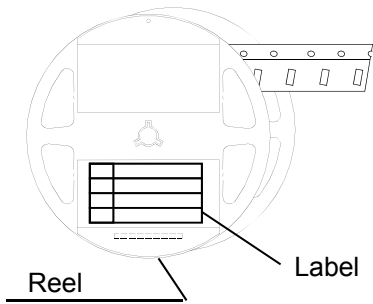
# Topview 3528 SMD LED IWS-L3516-RGB-K5



## 8. Packing Dimension

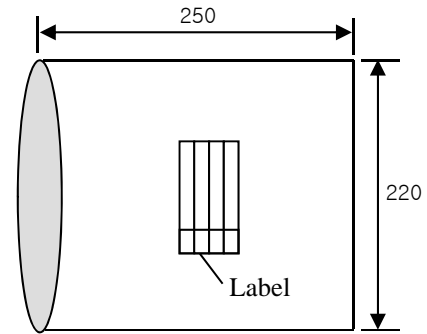
Unit :mm

**Reel**



Bake: 60°C, 48hrs

**Aluminum Shield Bag**



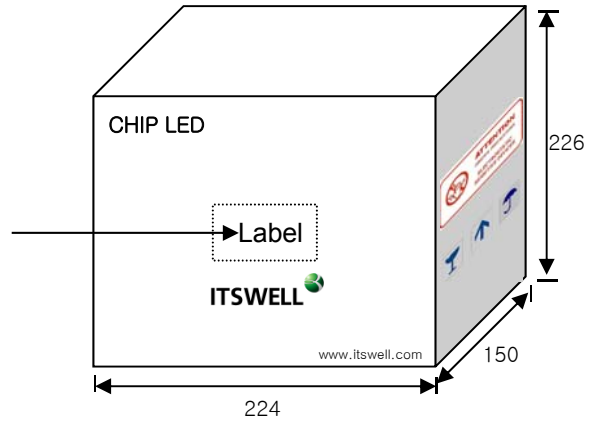
Including Silica gel in a bag

**Al Pack Label, Reel Label**

(70 × 37)

<b>ITSWELL</b>				
Lot :	IWS-L3516-RGB-K5			
	MIN	AVG	MAX	STD
V <sub>F</sub> [volt]				
I <sub>v</sub> [mcd]				
W <sub>D</sub> [nm]				
Q'ty :	yyyy/mm/dd			

**Card Board Box**



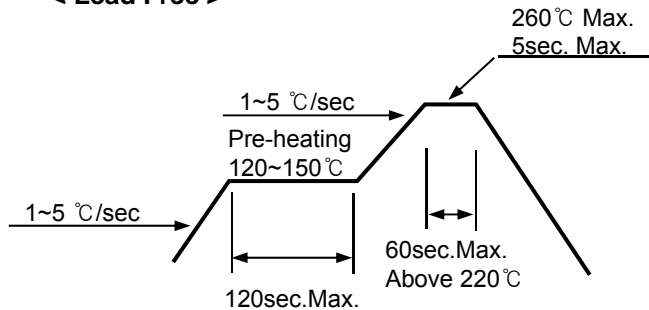
	Dimensions (mm)	Reel / Box	Q'ty / Box(pcs)
Reel	Φ180mm, 12mm Width	-	2,000 Max
Al Shield Bag	250x220	-	2,000 Max
Card Board Box	224x150x226	10 Max	20,000 Max

## 9. Precaution in use

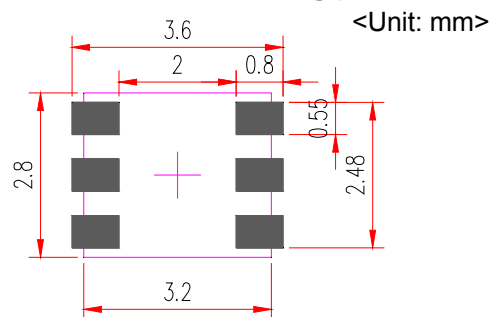
### 9.1 Soldering Conditions

- 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 120~150 °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.
- After opening the package, the LEDs should be kept at 30 °C or less and 30%RH or less.
- 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 48 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

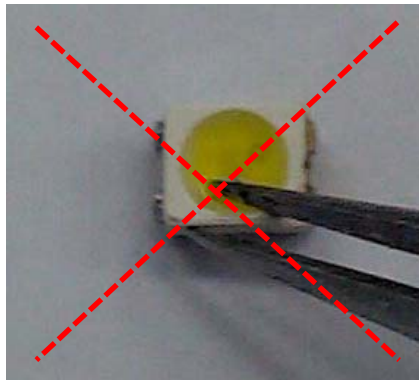
- Isopropyl Alcohol or Ethylene Alcohol is recommended in 5 minutes at room temperature.  
Don't use unspecified chemical may cause crack or haze on the surface of the epoxy resin.
- Before cleaning, a pre-test should be done to confirm whether any damage to the LED will occur.
- Freon solvents should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

### 9.5 Heat Generation

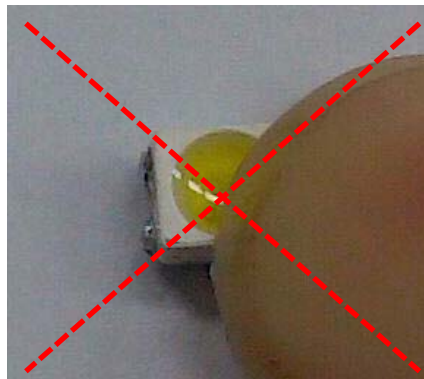
- When the LEDs are illuminating, operating current should be decided after being considering the ambient maximum temperature.
- Please consider the heat generation of the LED when it is designed the PCB.

### 9.6 Handling LED

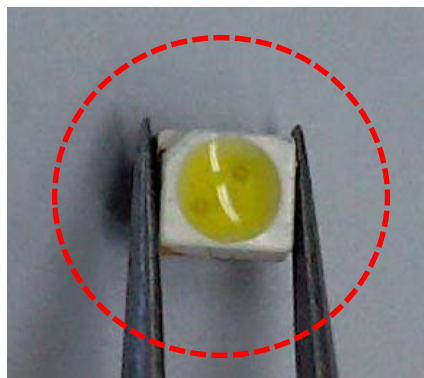
- When handling the LED with tools like Tweezer or Nipper, do not apply Mechanical Forces directly on LED's Surface.



- Do not touch with hand LED surface directly . It may contaminate the surface and affect on optical characteristics.



- LED should be handled from side because LED's molding material may be damaged with scratching on surface, piercing molding material and broking wire.



# Topview 3528 SMD LED IWS-L3516-RGB-K5



## 10. Aluminum Zipper Bag

<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">   <b>CAUTION</b> </div> <div style="text-align: center;">   <b>ATTENTION</b>  <small>OBSERVE PRECAUTIONS ELECTROSTATIC SENSITIVE DEVICES</small> </div> <div style="text-align: center;"> <b>LEVEL</b>  <span style="border: 1px solid black; padding: 2px;">3</span>  <small>If blank, see adjacent bar code label</small> </div> </div> <p style="text-align: center;">This bag contains <b>MOISTURE and E.S.D SENSITIVE DEVICE</b></p> <ol style="list-style-type: none"> <li>Before opening the package, the LEDs should be kept at 5°C~30°C and less 70% RH or less.</li> <li>After opening please check if RH indicator does something wrong. If its color is not Pink at RH 10% or Blue at 20%, LEDs should be backed for min. <b>(Baking 48hrs at 60°C)</b></li> <li>Please keep the remained LEDS to your desiccators on condition of under 10% RH.             <ol style="list-style-type: none"> <li>Best method is to desiccate LEDs as Reel condition with RH indicator after baking min. 48hrs at 60°C and store them up in Al bag.</li> <li>Always use LEDS after checking RH indicator when you reuse them. (Please use them after baking if RH indicator is not Pink at RH 10% or Blue at 20%)</li> </ol> </li> <li>Please work LED mounting last during SMT.</li> <li>LEDs must be used within <b>12hrs</b> after opening. (Please use them ASAP during extremely humid condition such as rainy season.)</li> </ol>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">   <b>경고</b> </div> <div style="text-align: center;">   <b>ATTENTION</b>  <small>OBSERVE PRECAUTIONS ELECTROSTATIC SENSITIVE DEVICES</small> </div> <div style="text-align: center;"> <b>LEVEL</b>  <span style="border: 1px solid black; padding: 2px;">3</span>  <small>If blank, see adjacent bar code label</small> </div> </div> <p style="text-align: center;"><b>본 알루미늄 백은 습기와 E.S.D에 민감한 소자를 담고 있습니다.</b></p> <ol style="list-style-type: none"> <li>미 개봉 보관 시 온도 5°C~30°C, 습도 70% RH이하에서 보관하세요.</li> <li>개봉시 습도지시카드의 변색 유/무를 확인 후 사용하세요. 습도 지시카드 10%에서 Pink 이거나 20%에서 Blue가 아닐 경우 Baking후 사용. <b>( Baking 조건 : 60°C , 48 hr ↑ )</b></li> <li>사용 후 남은 잔량은 제습 보관함(데시케이터)에 10% RH 이하로 보관하세요.             <ol style="list-style-type: none"> <li>Reel 상태로 60°C, 48 hr ↑ Baking 실시 후 습도지시카드와 같이 Al Bag에 넣어 밀봉 보관하는 것이 가장 좋은 방법임.</li> <li>재 사용시 습도지시카드 변색 유/무를 확인 후 사용. (10%에서 Pink 이거나 20%에서 Blue가 아닐 경우 Baking후 사용)</li> </ol> </li> <li>SMT 작업 시 LED 실장은 맨 마지막에 작업하세요.</li> <li>개봉한 제품은 반드시 <b>12시간</b> 이내에 실장하세요. (특히 습기가 많은 우기 시 최단 시간에 사용 바랍니다.)</li> </ol>
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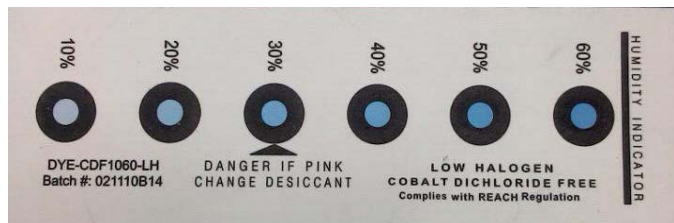
**■ Important**

This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products, please ensure the zip-lock is completely sealed with the dry pack left inside.

**■ 주의사항**

본 알루미늄 지퍼백은 습기와 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 본 알루미늄 지퍼백을 개봉 후에 즉시 솔더 작업을 실시하여야 합니다. 습기와 정전기로부터 제품을 보호하기 위해서 개봉 후 사용하지 않는 제품은 반드시 본 백에 넣어서 보관하여야 합니다. 사용하지 않는 제품을 본 백에 넣을 때는 반드시 동봉된 제습제와 함께 넣고 지퍼부분을 완전히 닫아 밀봉하여야 합니다.

### 10.1 Aluminum Zipper Bag and Humidity Indicator



## 11. Reliability

### 11.1 Reliability Test Item

Test Items	Test Conditions	Notes
High Temperature Storage	100℃, 1,000hr.	0/25
Low Temperature Storage	-40℃, 1,000hr.	0/25
Temp. Humidity Storage	60℃, 90% RH, 1,000hr.	0/25
Steady State Operating life	25℃, 72mA, 1,000hr.	0/25
High Temperature Operating Life	85℃, 30mA, 1,000hr	0/25
Low Temperature Operating Life	-30℃, 60mA, 1,000hr.	0/25
Steady State Operating life Of High Humidity Heat	60℃, 90% RH, 45mA, 1,000hr.	0/25
Thermal Shock	-40℃(30min)↔100℃(30min.), 100 cycle	0/20
ESD	HBM, 100 pF, 1.5 kohm, 3 times	0/20

### 11.2 Criteria for Judging the Damage

Parameters	Test Conditions	Criteria for judgment
Forward Voltage ( $V_F$ )	$I_F = 20 \text{ mA}$ (1 Chip)	Less than 110% of U
Luminous Intensity ( $I_v$ )	$I_F = 20 \text{ mA}$ (1 Chip)	> 70% of S

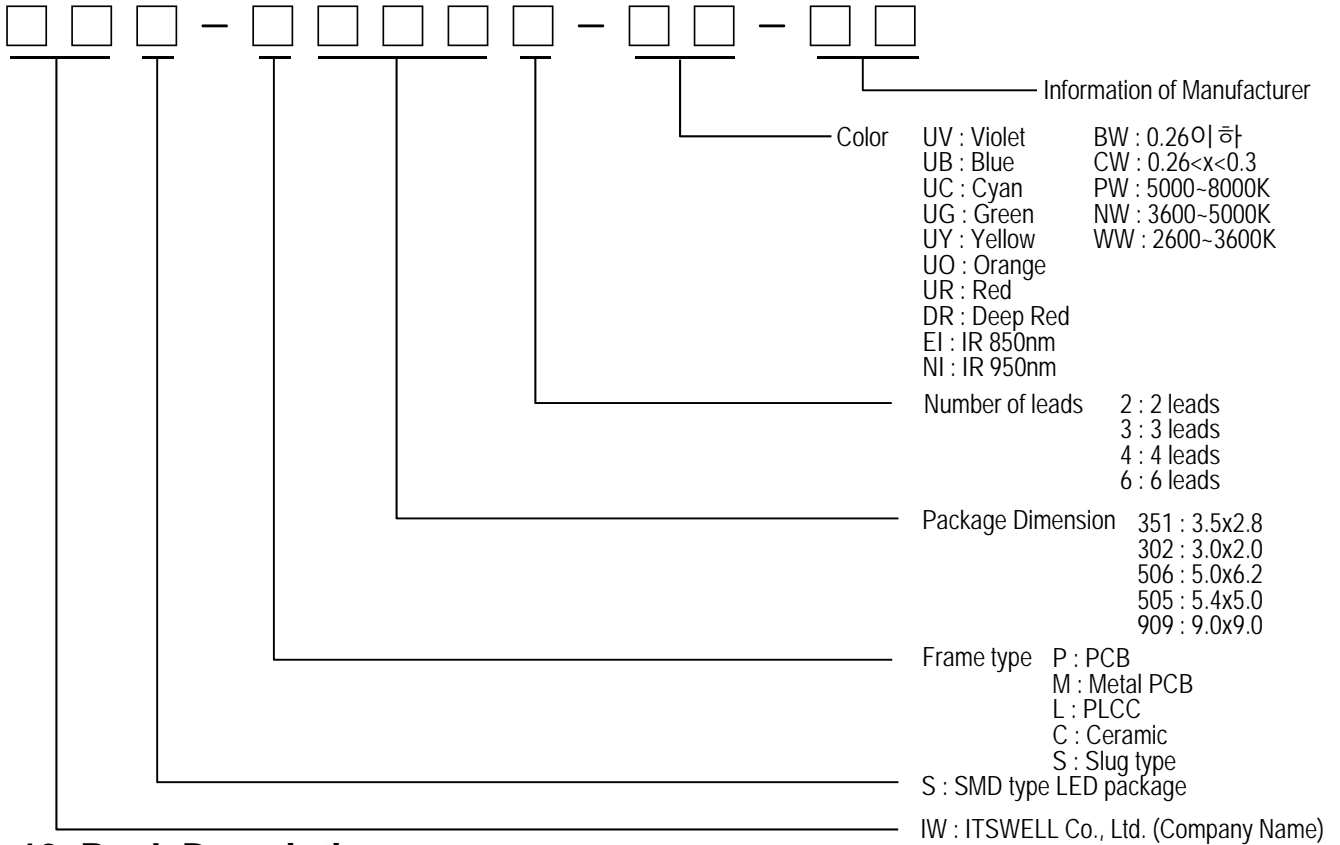
\* U means the upper limit of specified characteristics, S means initial value.

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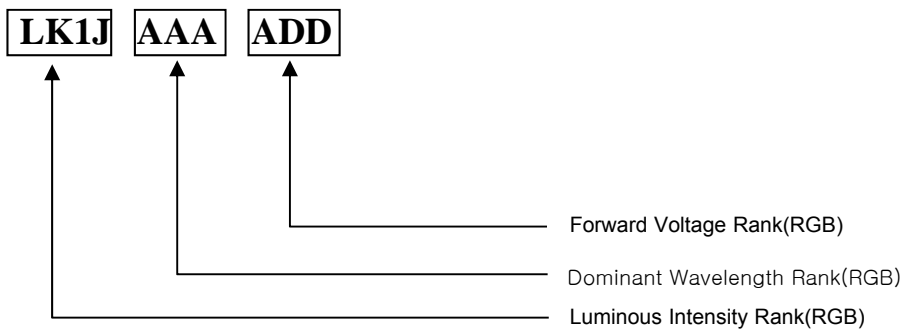
## IWS-L3516-RGB-K5



### 12. Part Name Description



### 13. Rank Description



### 14. 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.

