

# SPECIFICATION

**Product : White Top-View SMD LED (3528)**

**Part No. : IWS-P351-UW-J**

**Date : 2008. 10. 27 Ver. 1.0**

Proposed By	Checked By	Checked By	Checked By	Approval

**Comment**



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# Topview 3528 SMD LED

## IWS-P351-UW-J



### 1. Features

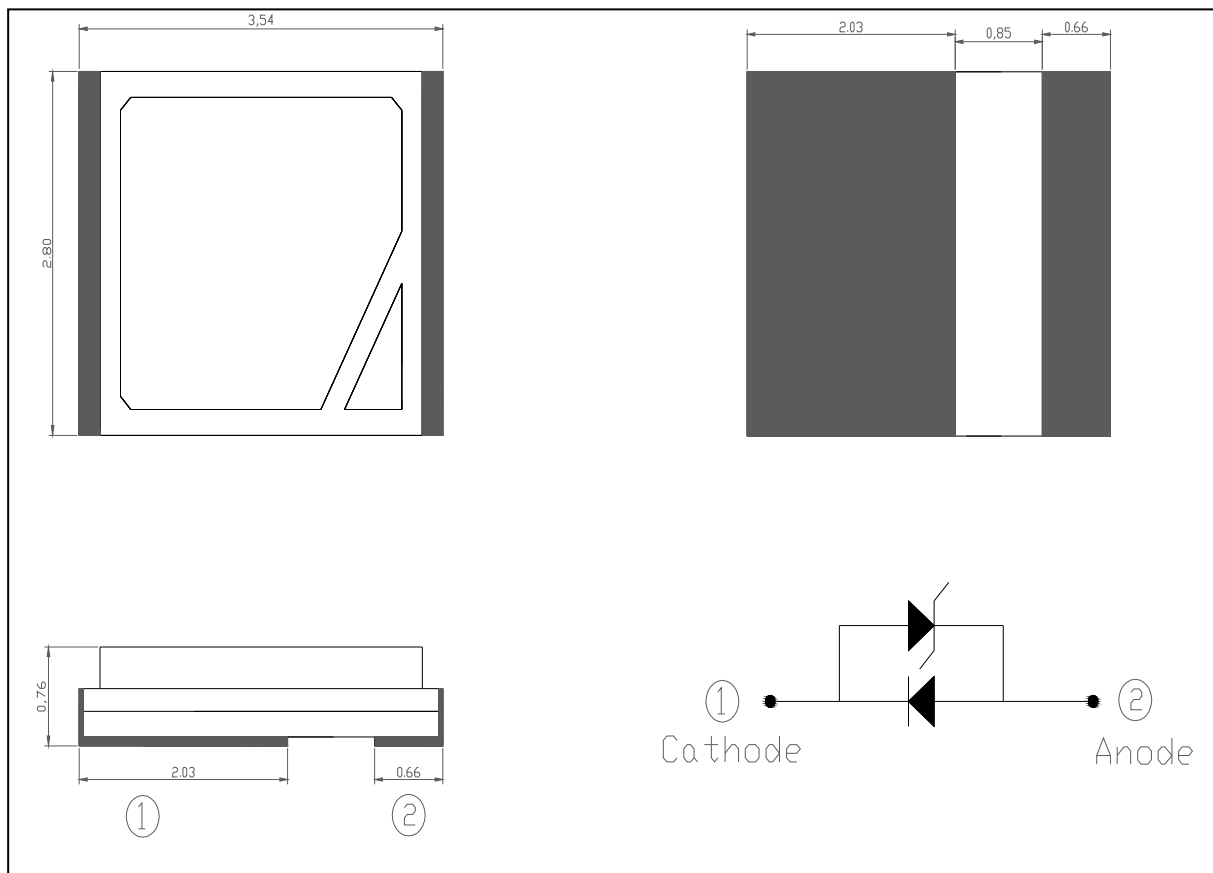
- 1chip High-Luminosity Chip LED
- 3.5 mm x 2.8 mm x 0.76 mm (L x W x H) small size surface mount type
- Wide Viewing angle
- Long operating life

### 2. Applications

- Automotive: Backlight in dashboard and switch
- Lighting device: Indicator, lighting
- Camera flash, Hand Carrier Flash
- General use

### 3. Outline Drawing and Dimension

Unit : mm  
Tolerance :  $\pm 0.1$



#### Note

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

### 4. Absolute Maximum Ratings ( Ta = 25 °C )

Parameter	Symbol	Value	Unit
Power Dissipation per chip	$P_d$	360	mW
Continuous Forward Current	$I_F$	100	mA
Peak Forward Current <sup>※1</sup>	$I_{FP}$	200	mA
Operating Temperature	$T_{opr}$	-30 ~ +85	°C
Storage Temperature	$T_{stg}$	-40 ~ +100	°C
Soldering Temperature	$T_{sol}$	260 (5sec)	°C

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

### 5. Electrical & Optical Characteristics ( Ta : 25°C )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit.
Forward Voltage	$V_F$	$I_F = 100\text{mA}$	2.9	3.3	3.6	V
Color Coordinates	CIE x CIE y	$I_F = 100\text{ mA}$	-	CIE x=0.282 CIE y=0.267	-	
Luminous Intensity <sup>※2</sup>	$I_V$	$I_F = 100\text{mA}$	4,000	-	9,000	mcd
Luminous Flux <sup>※3</sup>	$\Phi_V$	$I_F = 100\text{mA}$	17	-	53	lm
View angle <sup>※4</sup>	$2\theta_{1/2}$	$I_F = 100\text{ mA}$	-	140	-	deg

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

※3 Luminous Flux is measured with an integrating sphere and has an accuracy of 10%.

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

#### 5.1 Luminous Intensity Rank (IF=100mA)

Rank	Luminous Intensity (mcd)
Q	4,000 ~ 5,000
R	5,000 ~ 6,000
S	6,000 ~ 7,000
T	7,000 ~ 8,000
U	8,000 ~ 9,000

#### 5.2 Luminous Flux Rank (IF=100mA)

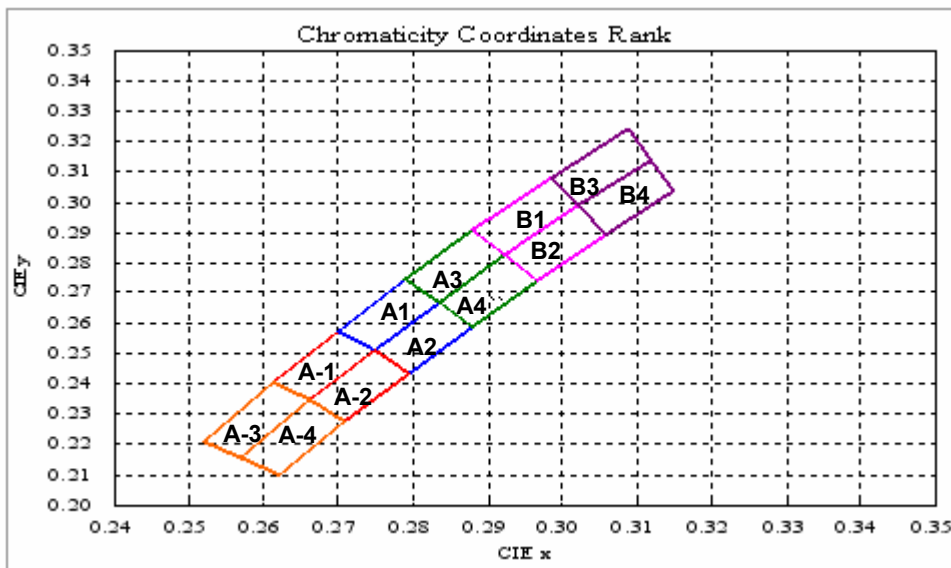
Rank	Luminous Flux (lm)
4	17~22
5	22~29
6	29~45
7	45~53

### 5.3 Forward Voltage Rank

Rank	Forward Voltage(V)
A	2.9 ~ 3.0
B	3.0 ~ 3.1
C	3.1 ~ 3.2
D	3.2 ~ 3.3
E	3.3 ~ 3.4
F	3.4 ~ 3.5
G	3.5 ~ 3.6

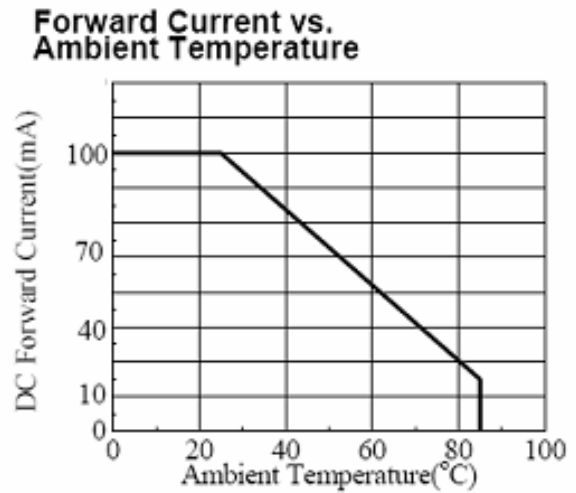
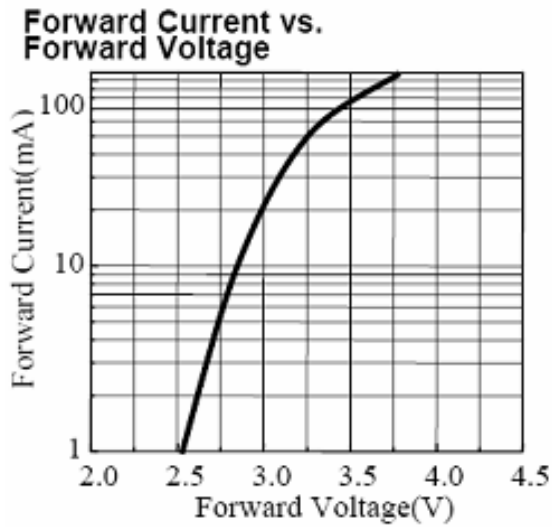
### 5.4 Color coordinates Rank ( IF = 100 mA, Ta = 25 °C )

Rank A-3		Rank A-1		Rank A1		Rank A2		Rank A3		Rank A4	
CIE x	CIE y	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y
0.2570	0.2160	0.2661	0.2350	0.2748	0.2510	0.2795	0.2435	0.2835	0.2667	0.2880	0.2588
0.2520	0.2210	0.2748	0.2510	0.2700	0.2575	0.2748	0.2510	0.2790	0.2745	0.2835	0.2667
0.2613	0.2405	0.2700	0.2575	0.2790	0.2745	0.2835	0.2667	0.2880	0.2910	0.2923	0.2825
0.2661	0.2350	0.2613	0.2405	0.2835	0.2667	0.2880	0.2588	0.2923	0.2825	0.2965	0.2739
Rank A-4		Rank A-2		Rank B1		Rank B2		Rank B3		Rank B4	
CIE x	CIE y	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y
0.2620	0.2100	0.2708	0.2275	0.2923	0.2825	0.2965	0.2739	0.3022	0.2988	0.3058	0.2895
0.2570	0.2160	0.2795	0.2435	0.2880	0.2910	0.2923	0.2825	0.2985	0.3080	0.3022	0.2988
0.2661	0.2350	0.2748	0.2510	0.2985	0.3080	0.3022	0.2988	0.3090	0.3240	0.3120	0.3138
0.2708	0.2275	0.2661	0.2350	0.3022	0.2988	0.3058	0.2895	0.3120	0.3138	0.3150	0.3035

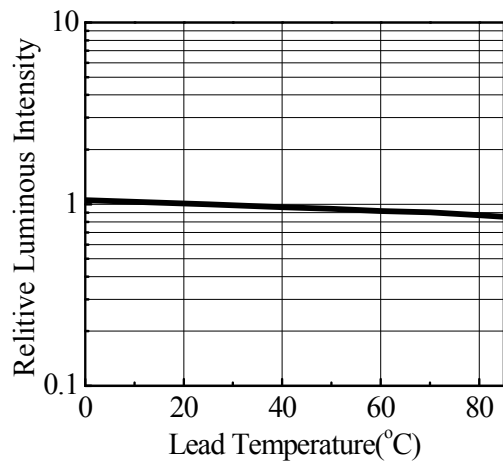


- \* The CIE(1931) standard colorimetric system
- \* Chromaticity coordinates Measured : 0.01sr(CIE. LED\_B)
- \* Measurement Uncertainty of the Color Coordinates :  $\pm 0.01$

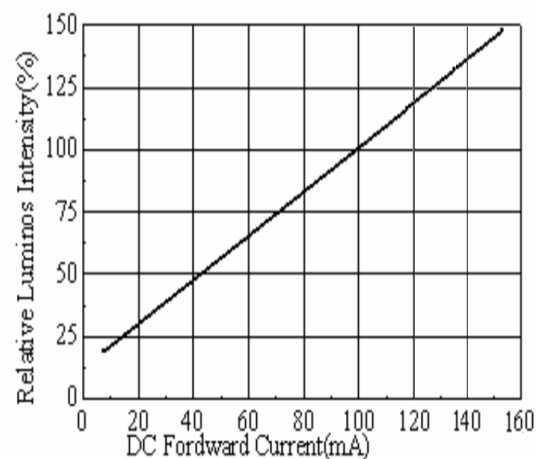
### 6. Typical Characteristic Curve



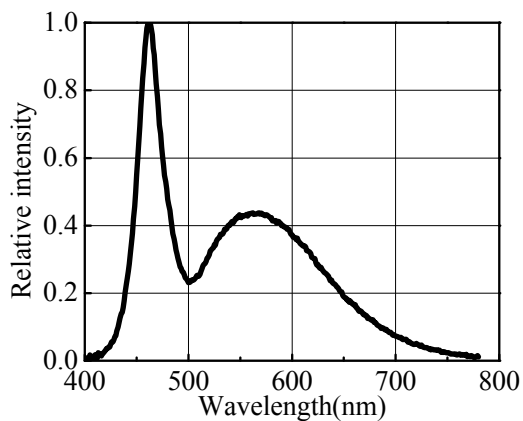
**Relative Luminous Intensity vs. Ambient Temperature**



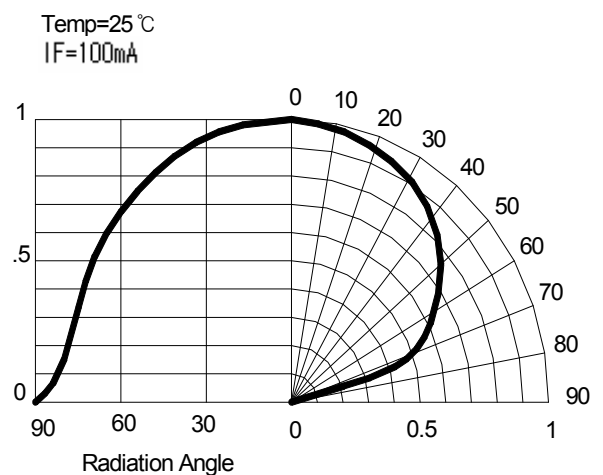
**Relative Luminous Intensity vs. Forward Current**



**Relative Luminous Intensity vs. Wavelength**



**Radiation Diagram**



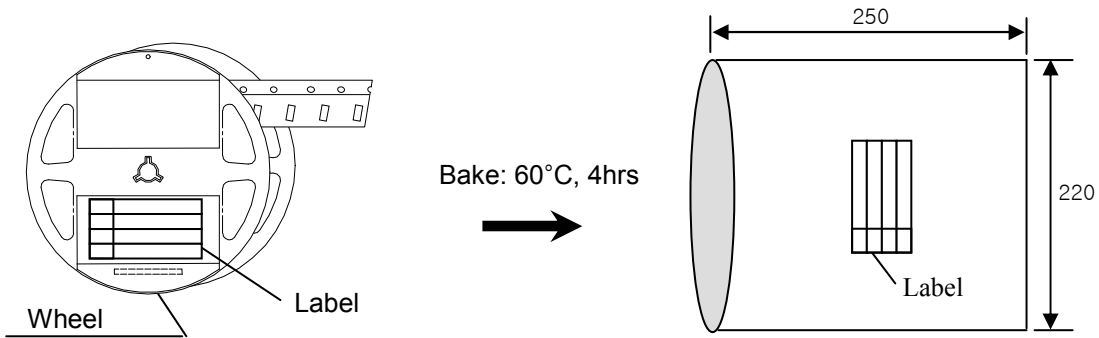


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## 8. Packing Dimension

Unit :mm

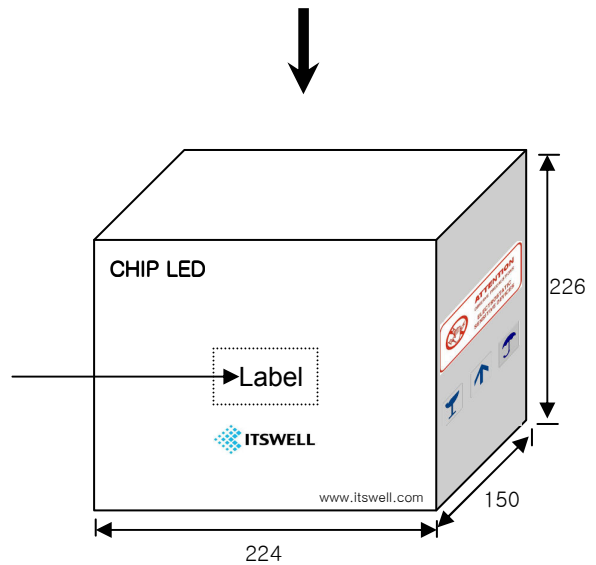


Diameter : 180 mm  
Width : 12 mm  
3528 ⇒ 3,000 pcs/Reel

Shield Bag(Polyester/Al/LDPE)  
1 Reel/Bag ( T = 0.1 mm ) with Silica gel

### Al Pack Label, Reel Label (70 × 37)

Lot :		IWS-P351-UW-J		
	MIN	AVG	MAX	STD
VF[volt]				
IV[mcd]				
CIE[x,y]				
Q'ty :		yyyy/mm/dd		



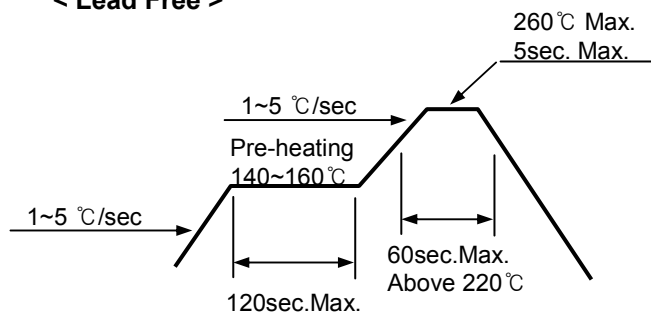
Maximum 10 Bags / 1Inner Box  
3528 ⇒ 30,000 pcs / 1 Inner Box

## 9. Precaution in use

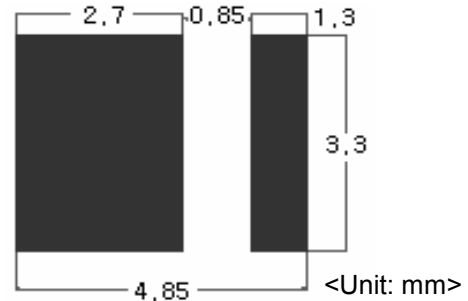
### 9.1 Soldering Conditions

- 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

- Use within 7 days after opening packing. Store in 10 to 30 °C. Power SMD lead frames are plated silver. The silver surface may be affected by environment which contains corrosive gases and so on. Please avoid conditions which may cause the Power SMD to corrode, tarnish or discolor.

### 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 chemicals; they may cause cracks 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 considering the ambient maximum temperature.
- Please consider the heat generation of the LED when it is designed on the PCB.
- The LEDs must be mounted on MCPCB or heat sink or applied thermal pad.

### 10. Reliability

#### 10.1 Reliability Test Item

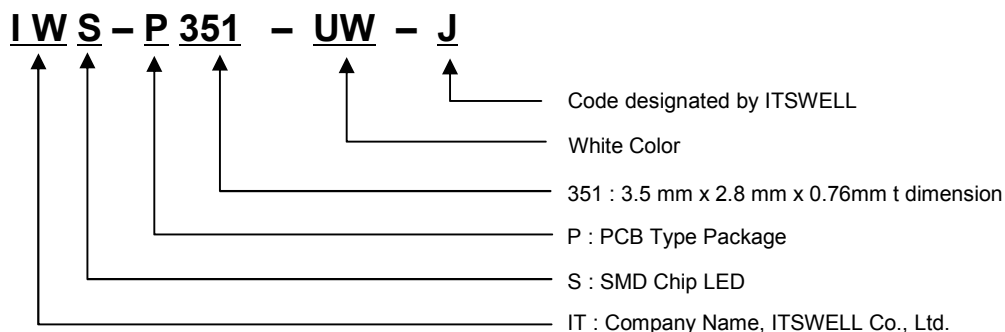
Test Items	Test Conditions	Notes
High Temperature Storage	100 °C, 1,000hr.	0/25
Low Temperature Storage	-40 °C, 1,000hr.	0/25
Temp. Humidity Storage	60 °C, 90% RH, 1,000hr.	0/25
Steady State Operating life	25 °C, 100mA/chip , 1,000hr.	0/25
High Temperature Operating Life	85 °C, 25mA, 1,000hr	0/25
Low Temperature Operating Life	-30 °C, 100mA, 1,000hr.	0/25
Steady State Operating life Of High Humidity Heat	60 °C, 90% RH, 75mA, 1,000hr.	0/25
Temperature Cycle	-40 °C(30min)→100 °C(30min.), 100 cycle	0/25
ESD	HBM, 100 pF, 1.5 kohm, 3 times	0/25

#### 10.2 Criteria for Judging the Damage

Items	Test Conditions	Criteria for judgment
Luminous Intensity ( IV )	$I_F = 100\text{mA}$	> 70% of S
Forward Voltage ( VF )	$I_F = 100\text{mA}$	Less than 110% of U

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

### 11. Part Name Description



### 12. Rank Description

