

# **SPECIFICATION**

**Product : Topview 3528 Red SMD LED**

**Part No. : IWS-L3512-UR-K1**

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

Proposed By	Checked By	Checked By	Checked By	Approval

**Comment**



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# Topview 3528 SMD LED

## IWS-L3512-UR-K1

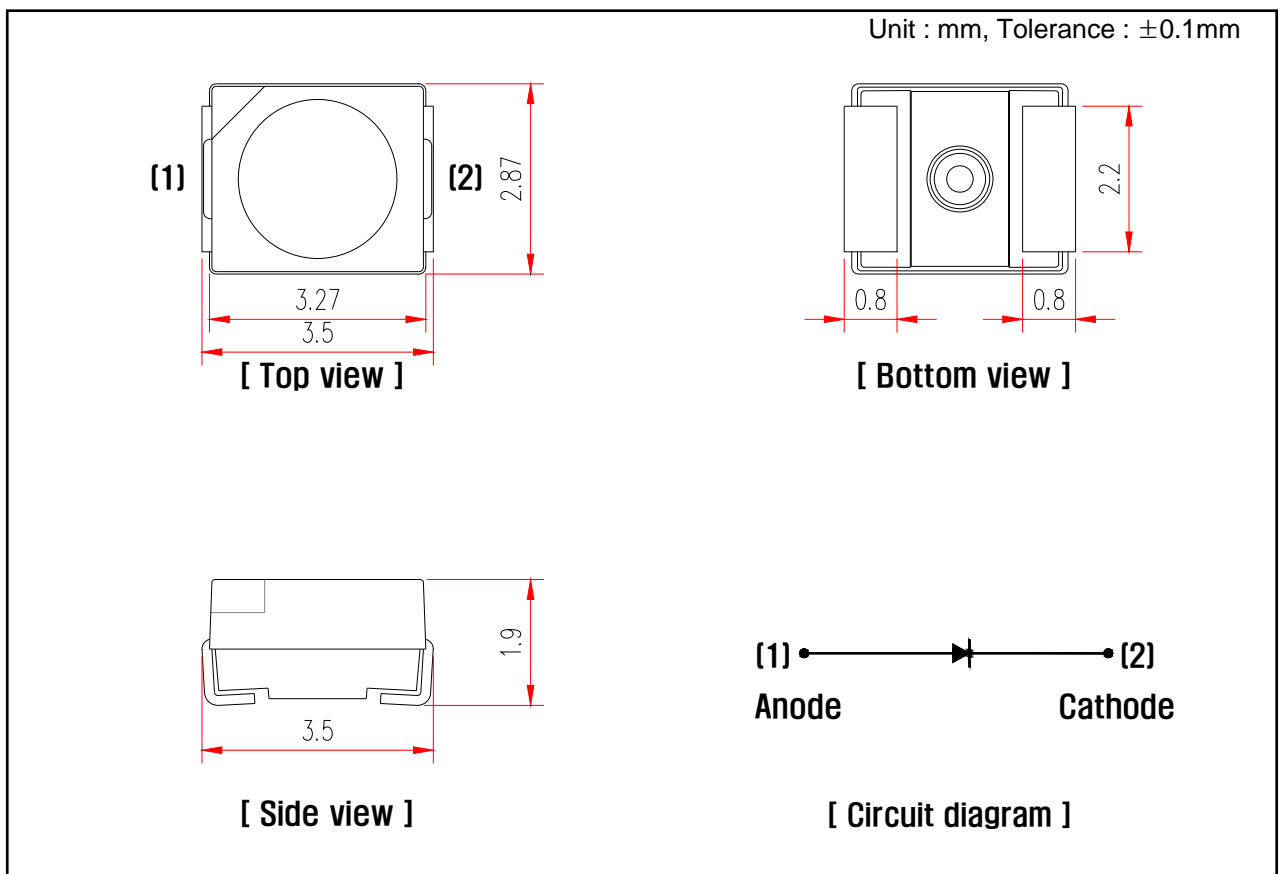
### 1. Features

- 1 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	$P_d$	72	mW
Continuous Forward Current	$I_F$	30	mA
Peak Forward Current <sup>※1</sup>	$I_{FP}$	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	$V_F$	$I_F = 20\text{ mA}$	1.8	2.1	2.4	V
Reverse Current	$I_R$	$V_R = 5\text{ V}$	-	-	10	$\mu\text{A}$
Luminous Intensity <sup>※2</sup>	$I_v$	$I_F = 20\text{ mA}$	325	-	1200	mcd
Dominant Wavelength <sup>※3</sup>	$W_D$	$I_F = 20\text{ mA}$	618	-	635	nm
Viewing Angle <sup>※4</sup>	$2\theta_{1/2}$	$I_F = 20\text{ mA}$	-	120	-	$^\circ$

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

※3 Dominant Wavelength has an accuracy of  $\pm 2\text{ nm}$

※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)
F	325~425
G	425~555
H	555~720
J	720~935
K	935~1200

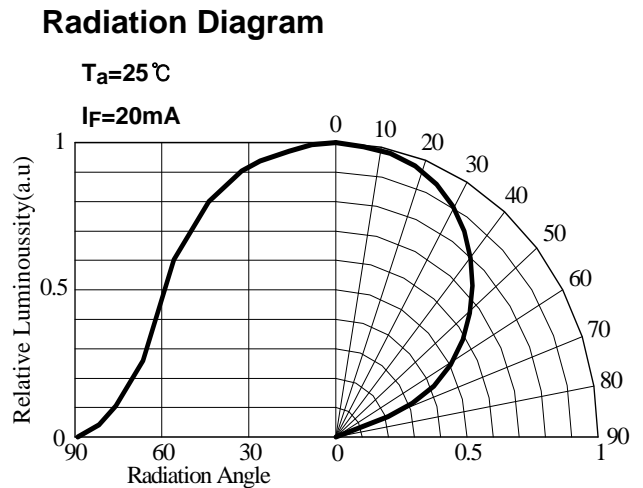
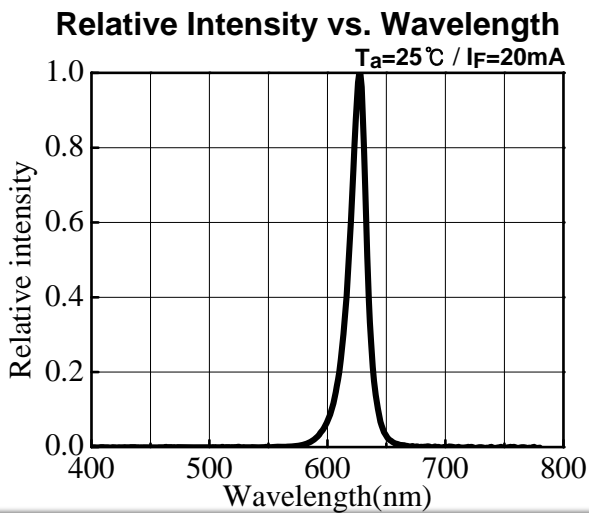
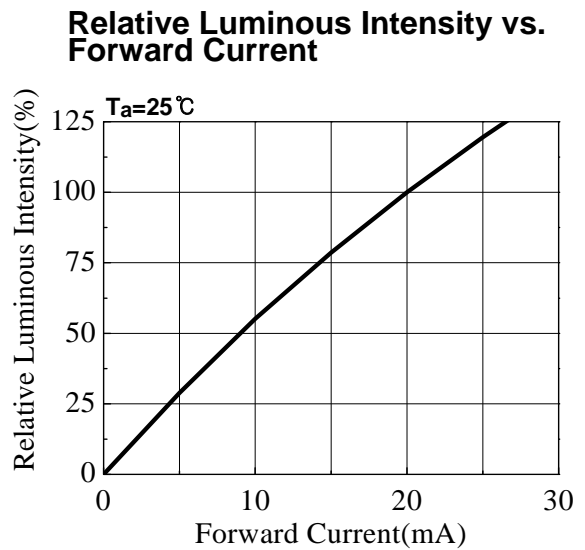
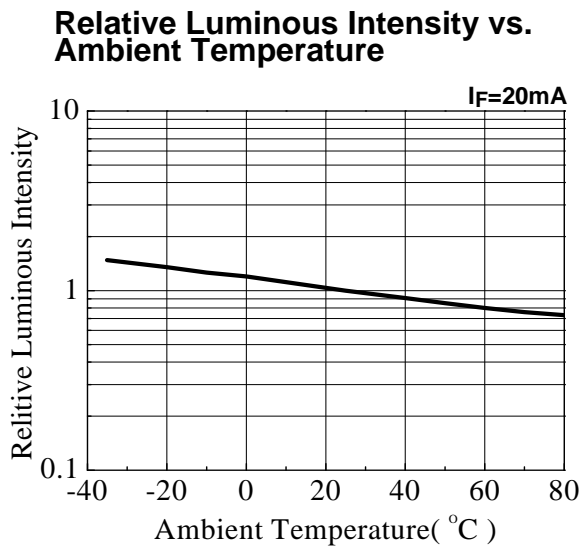
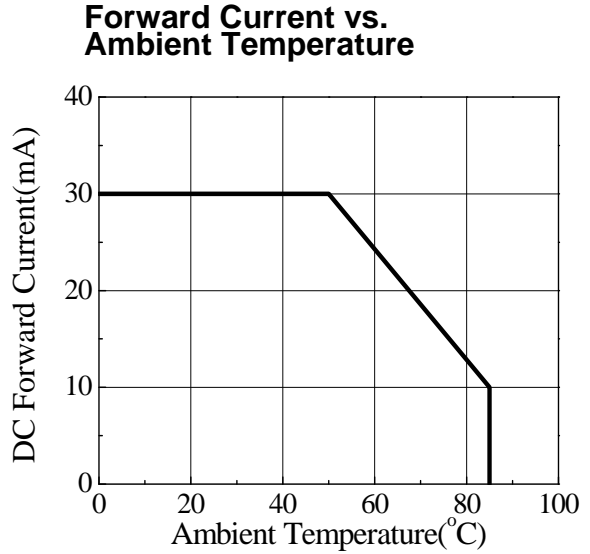
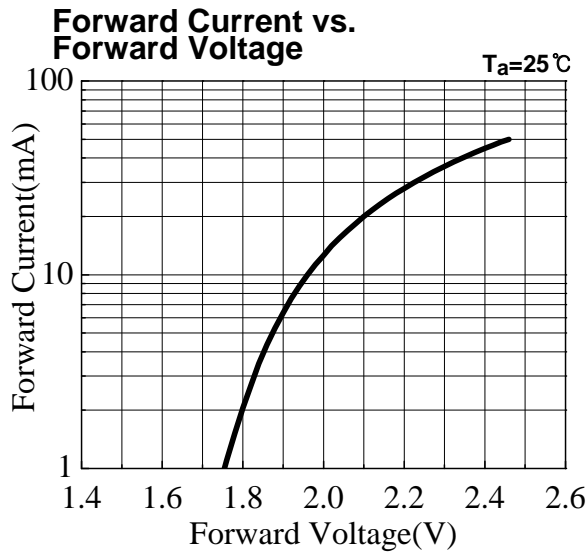
#### 5.2 Forward Voltage Rank

Rank	Forward Voltage (V)
1	1.8 ~ 2.4

#### 5.3 Dominant Wavelength Rank

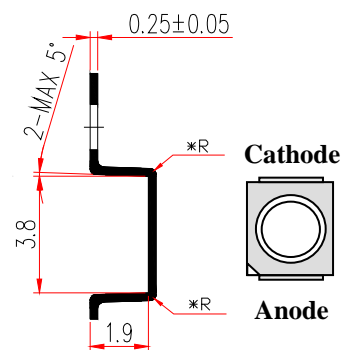
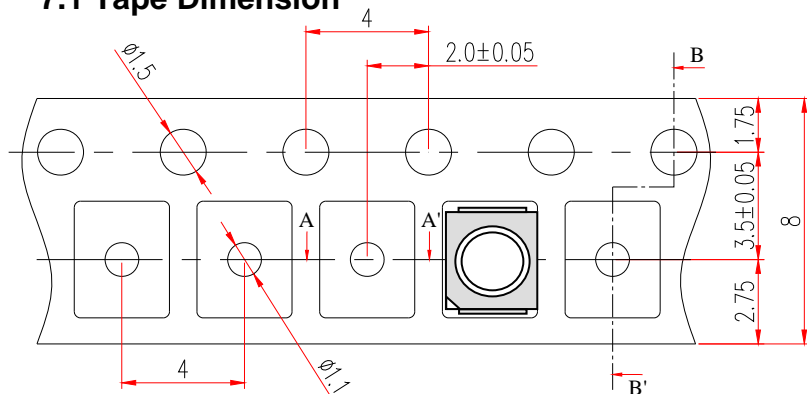
Rank	Dominant Wavelength (nm)
a	618 ~ 635

## 6. Typical Characteristics Curves

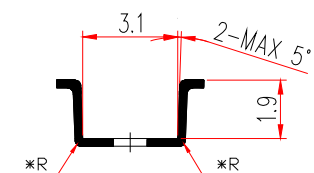


## 7. Dimension of Tape / Reel

### 7.1 Tape Dimension



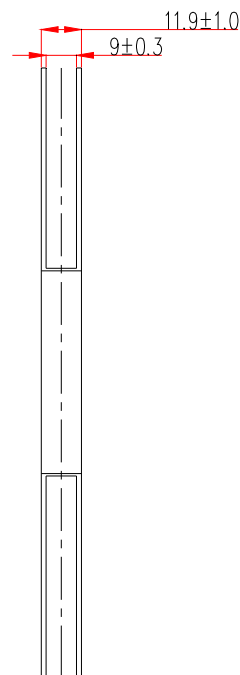
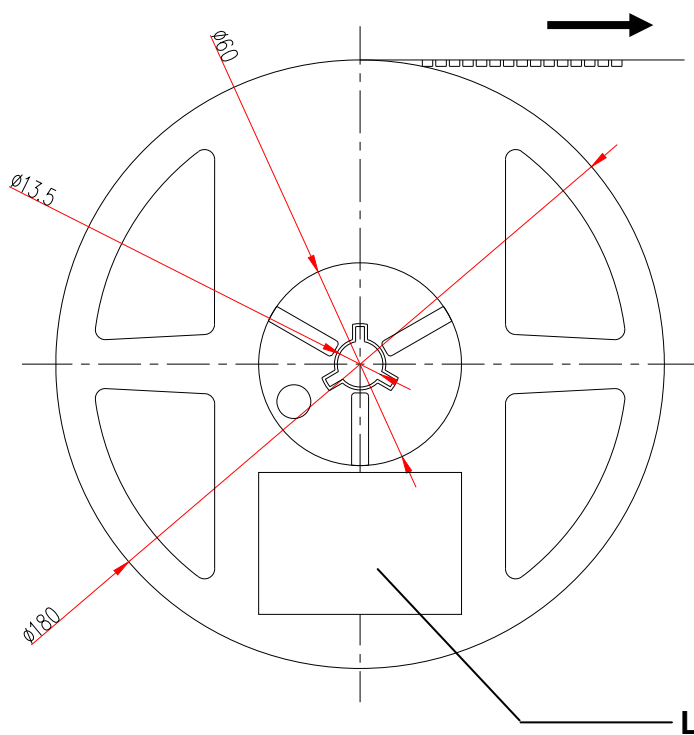
< SECTION B-B' >



< SECTION A-A' >

Tolerance ±0.1 , Unit: mm

### 7.2 Reel Dimension

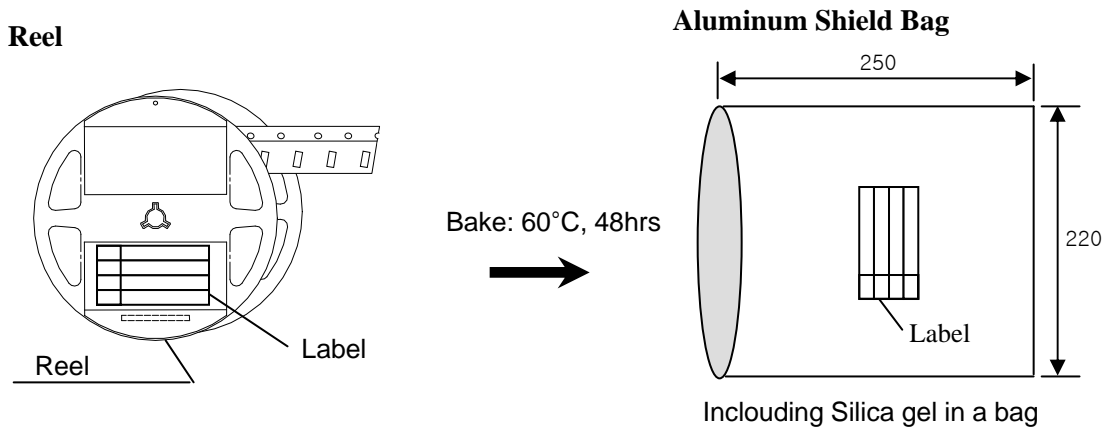


Label

# Topview 3528 SMD LED IWS-L3512-UR-K1

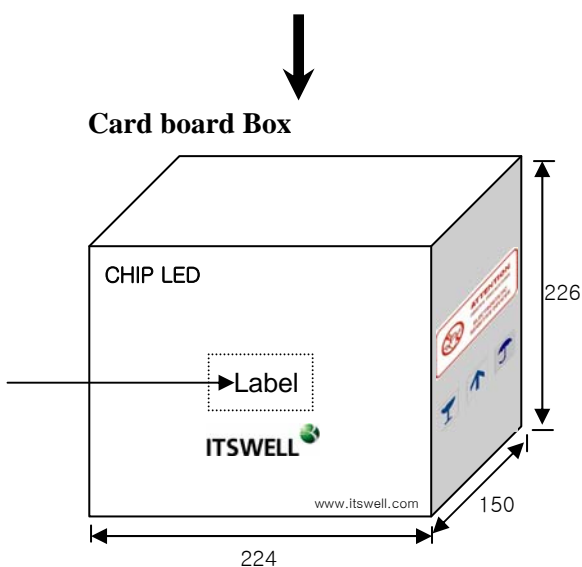
## 8. Packing Dimension

Unit :mm



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

<b>ITSWELL</b>				
Lot :	IWS-L3512-UR-K1			
	MIN	AVG	MAX	STD
V <sub>f</sub> [volt]				
I <sub>v</sub> [mcd]				
CCT[K]				
Q'ty :	yyyy/mm/dd			



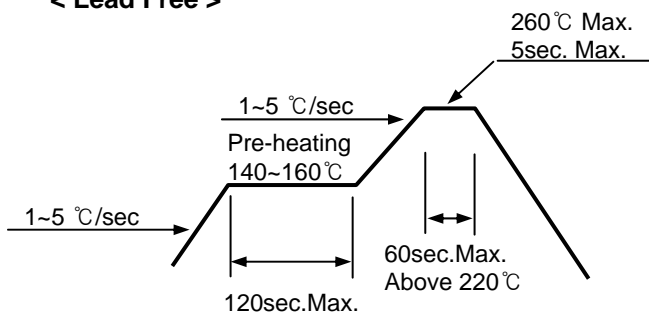
	Dimensions (mm)	Reel / Box	Q'ty / Box(pcs)
Reel	Φ180mm, 12mm Width	–	2,000 Max
Al Shield Bag	250x220	–	2,000 Max
Card board Box	224x150x226	10 Max	20,000 Max

## 9. Precaution in use

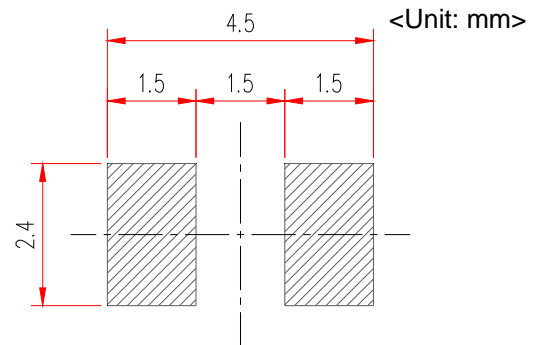
### 9.1 Soldering Conditions

- 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, 30mA, 1,000hr.	0/25
High Temperature Operating Life	85°C, 10mA, 1,000hr	0/25
Low Temperature Operating Life	-30°C, 20mA, 1,000hr.	0/25
Steady State Operating life Of High Humidity Heat	60°C, 90% RH, 15mA, 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

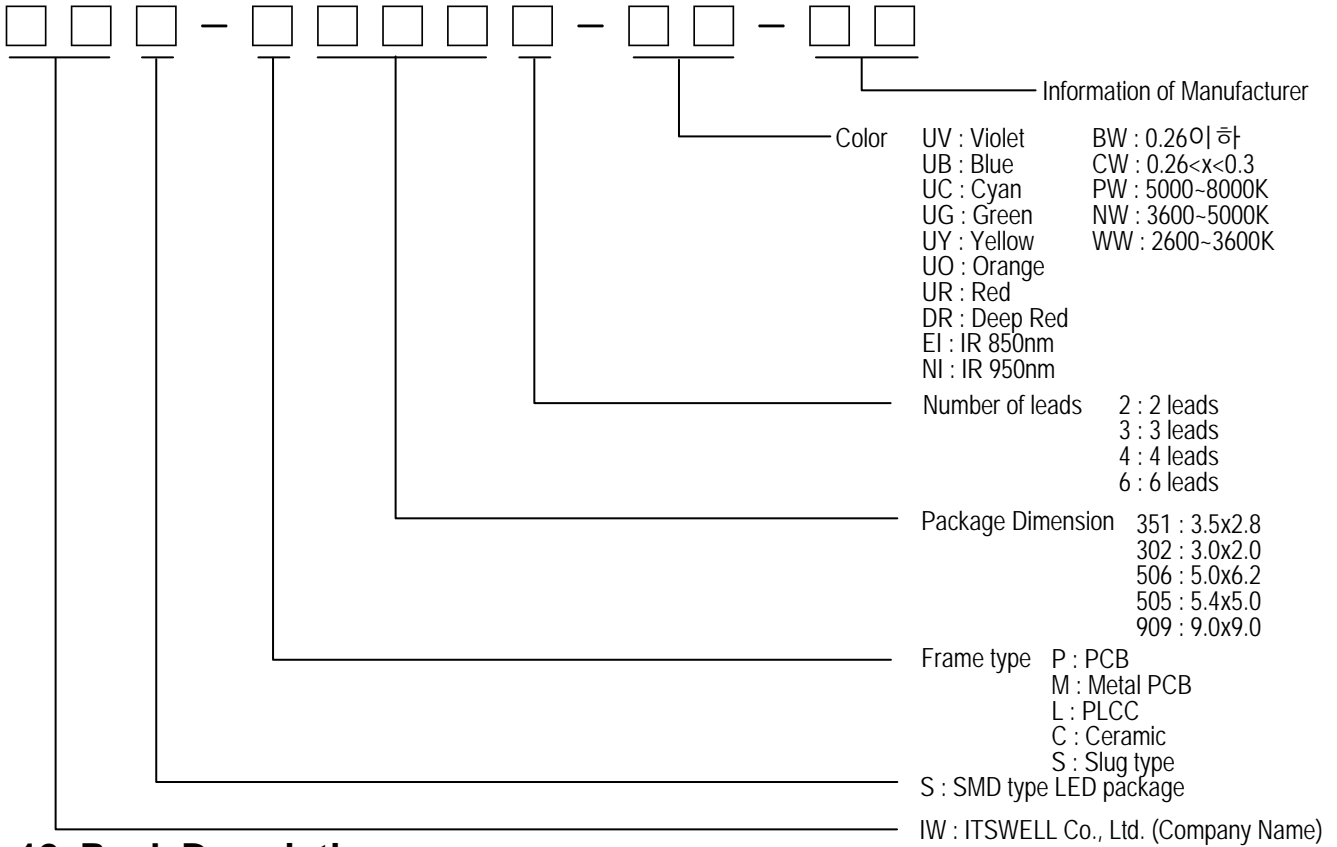
### 10.2 Criteria for Judging the Damage

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

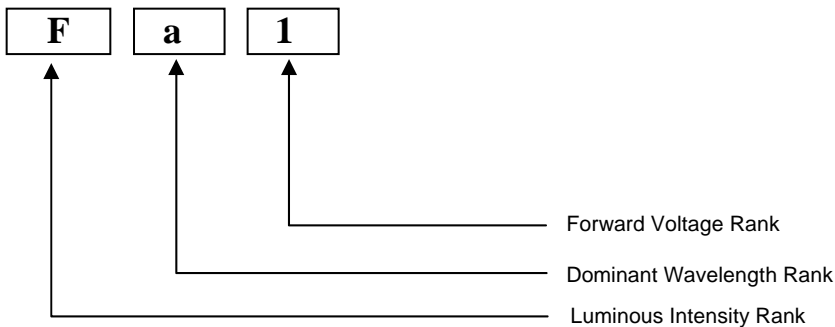
\* U means the upper limit of specified characteristics, S means initial value.



### 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 be considered and taken in the initial design stage. If manual work/process is needed, please ensure the device is well protected from ESD during all the process.

■ **Spec. Review History**

<b>Review Ver.</b>	<b>Date</b>	<b>Correction List</b>	<b>Etc.</b>
Ver 1.0	2009.09.28	Established	
Ver 2.0	2010.04.19	Changed Recommendable soldering pattern & Part Name Description	