

# SPECIFICATION

Product : Ceramic 3535 White LED

Part No. : IWS-C3522-PW-75K1

Date : 2013. 05. 07 Ver. 0.1

Proposed By	Checked By	Checked By	Checked By	Approval
Approved				

Comment



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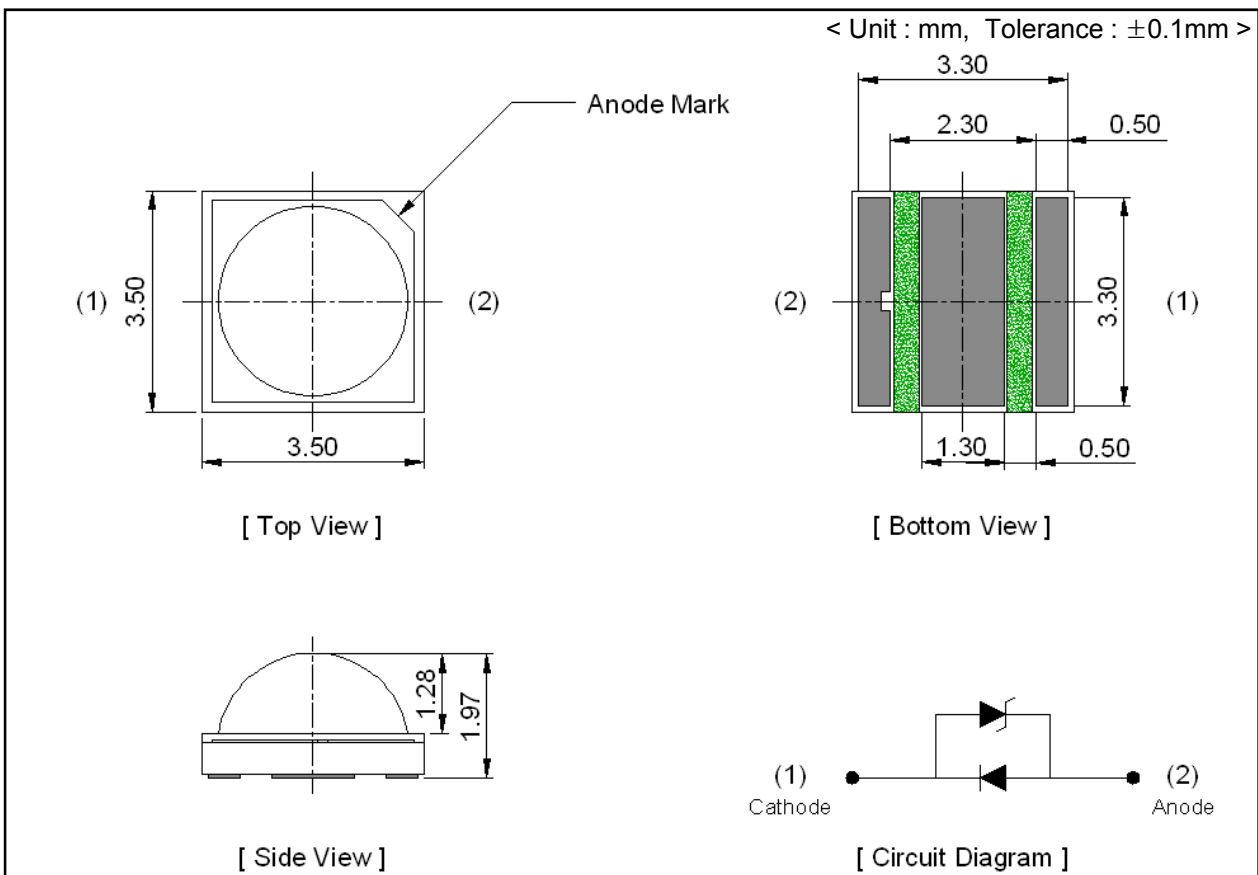
### 1. Features

- SMD Ceramic Package with Silicone Lens
- Small Size High-flux LED : 3.5 x 3.5 x 1.97 mm
- Wide Viewing Angle : 130°

### 2. Applications

- General Lighting
- Decorative and Entertainment Lighting
- Exterior and Interior Automotive Illumination
- Architectural Lighting
- Down Lights
- Streets Lighting

### 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 ( Ta = 25 °C )

Parameter	Symbol	Value	Unit
Power Dissipation per Chip	$P_d$	2.45	W
Continuous Forward Current	$I_F$	700	mA
Peak Forward Current *1	$I_{FP}$	1000	mA
Operating Temperature	$T_{opr}$	-30 ~ 85	°C
Storage Temperature	$T_{stg}$	-40 ~ 100	°C
Soldering Temperature	$T_{sol}$	260 (5sec)	°C
Thermal Resistance	$R_{thj-s}$	8	K/W

\*1 Duty ratio = 1/10, Pulse width = 1ms

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

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit.
Forward Voltage*2	$V_F$	$I_F = 350 \text{ mA}$	2.9	-	3.5	V
Luminous Flux*3	$\Phi_V$	$I_F = 350 \text{ mA}$	103	-	149	lm
Color Coordinates	CIE x CIE y	$I_F = 350 \text{ mA}$	Refer to Color Coordinates Rank			-
Color Rendering Index*4	$R_a$	$I_F = 350 \text{ mA}$	75	-	-	-
Viewing Angle*5	$2\theta_{1/2}$	$I_F = 350 \text{ mA}$	-	130	-	deg.

\*2 Forward Voltage has a tolerance of  $\pm 0.05 \text{ V}$ .

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

\*4 Color Rendering Index has an accuracy of 5%

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

##### 5.1 Luminous Flux Rank

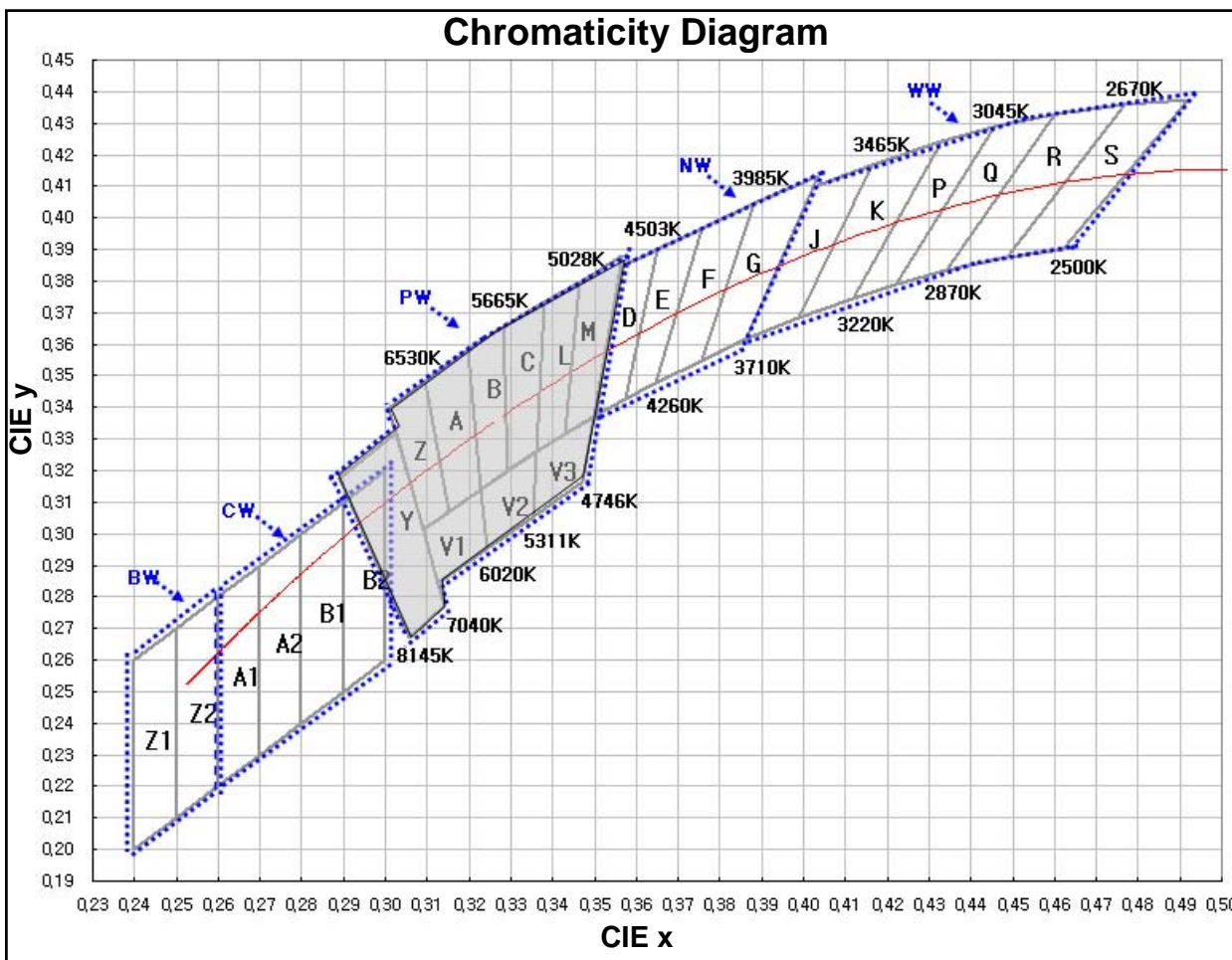
Rank	Luminous Flux (lm)
R1	103 ~ 113
R2	113 ~ 124
S1	124 ~ 136
S2	136 ~ 149

##### 5.2 Forward Voltage Rank

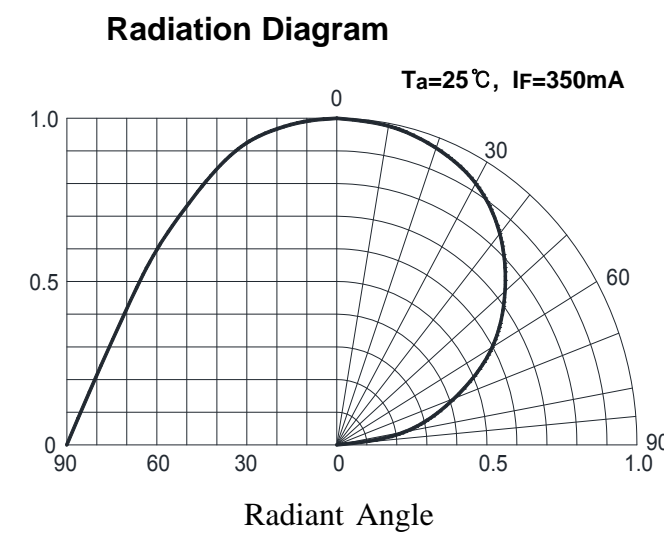
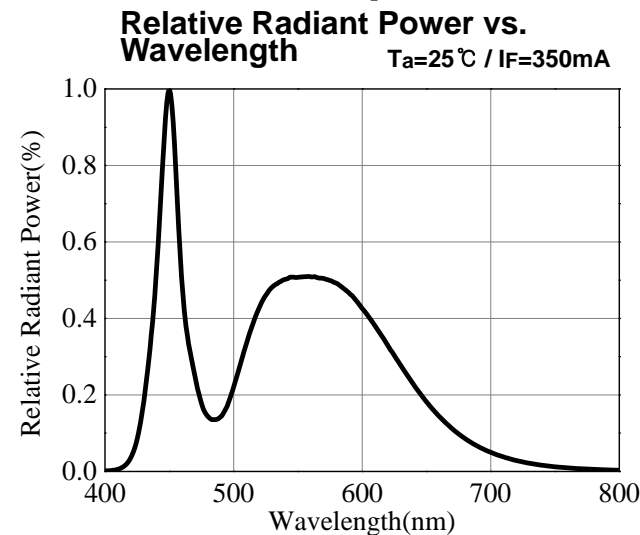
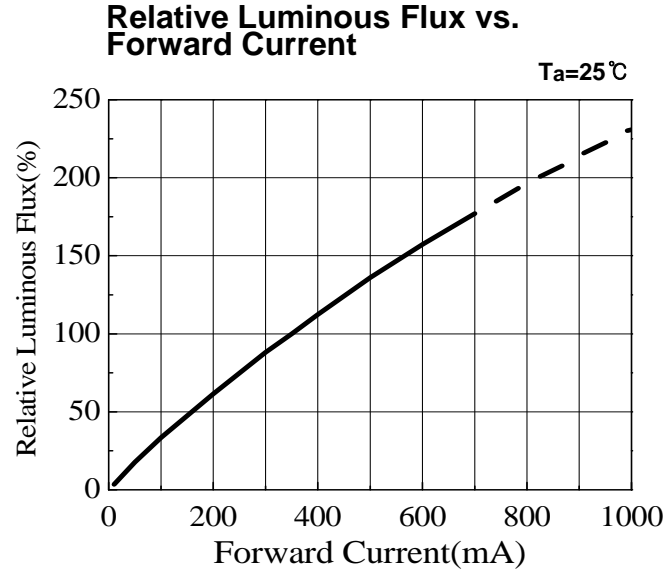
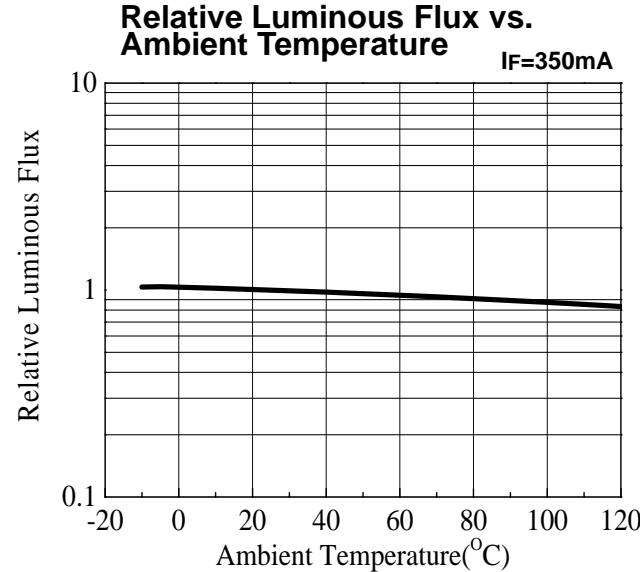
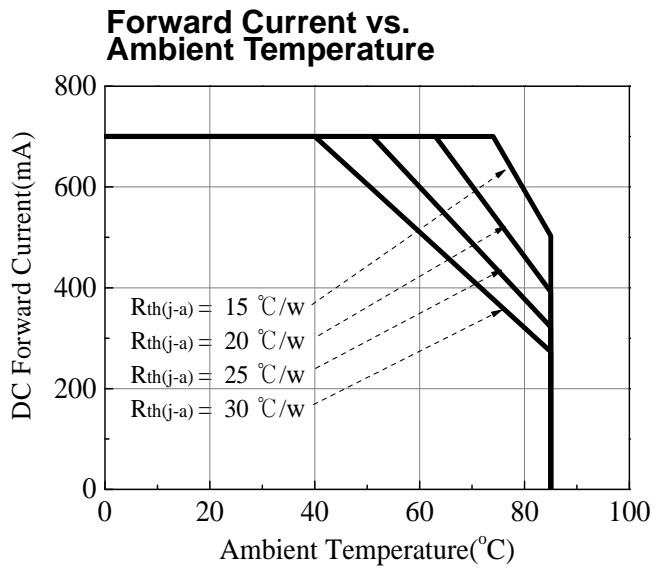
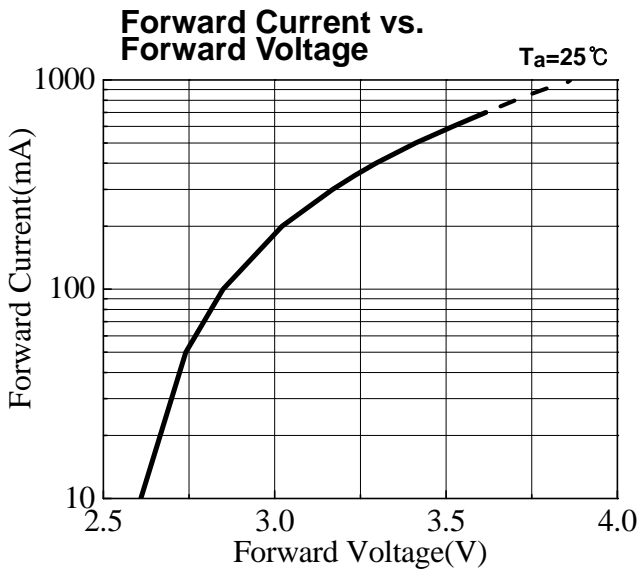
Rank	Forward Voltage (V)
1	2.9 ~ 3.1
3	3.1 ~ 3.3
5	3.3 ~ 3.5

**5.3 Color Coordinates Rank ( I<sub>F</sub> = 350 mA, T<sub>a</sub> = 25 °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		

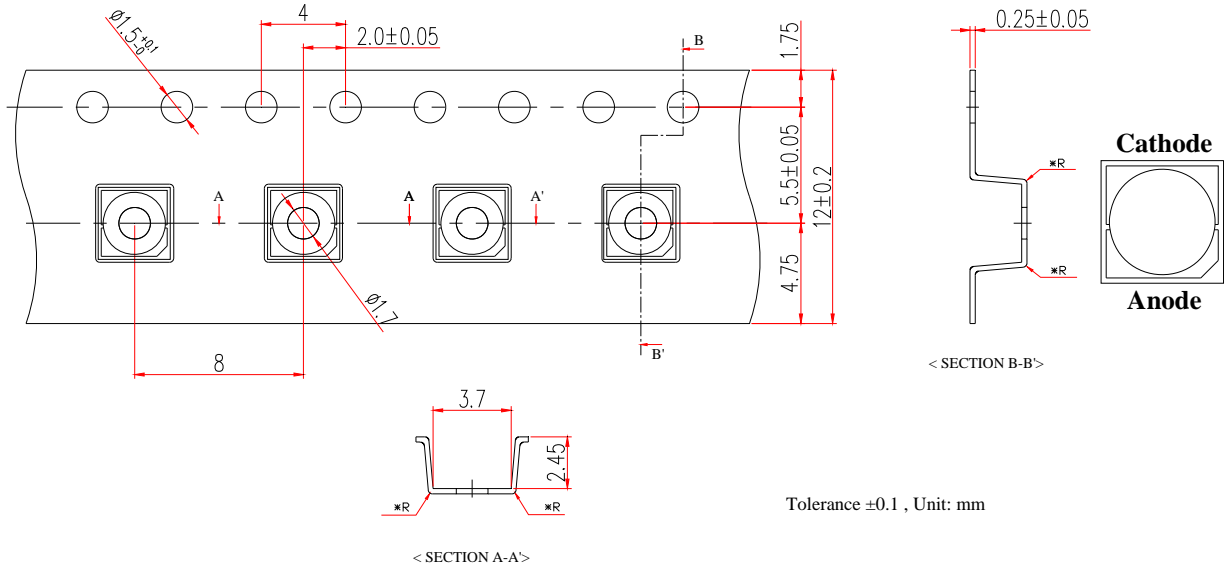


**6. Typical Characteristic Curve**

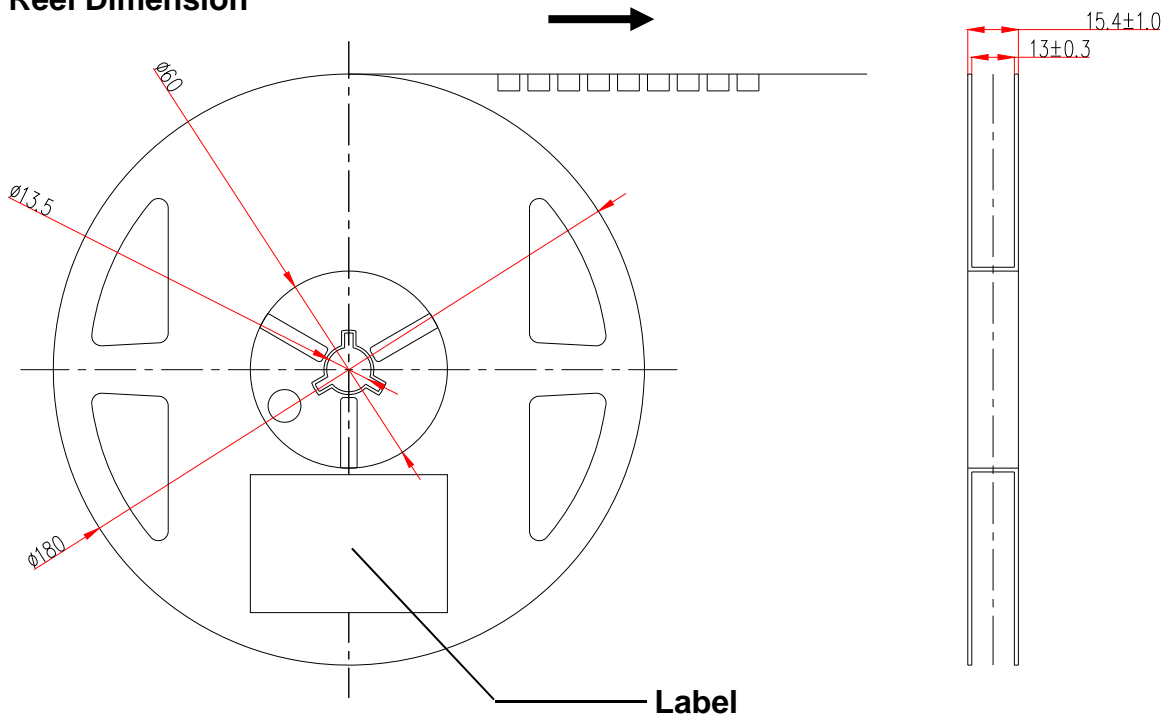


## 7. Dimension of Tape / Reel

### 7.1 Tape Dimension



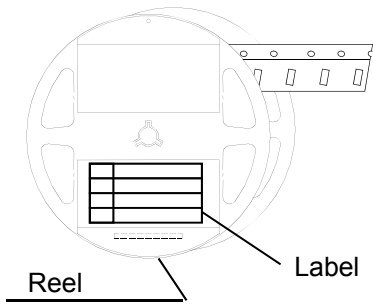
### 7.2 Reel Dimension



### 8. Packing Dimension

< Unit :mm >

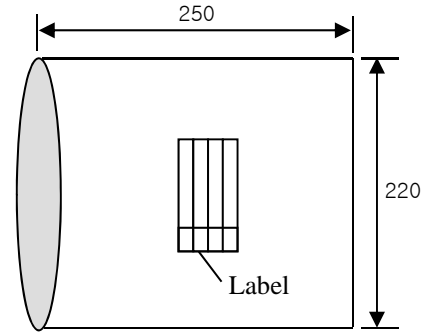
**Reel**



Bake: 60°C, 48hrs



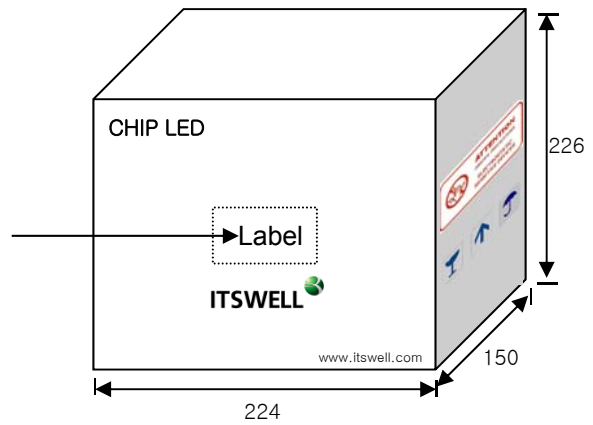
**Aluminum Shield Bag**




Including Silica gel in a bag



**Card board Box**



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

<b>ITSWELL</b> 				
Lot :		IWS-C3522-PW-75K1		
	MIN	AVG	MAX	STD
V <sub>F</sub> [V]				
Φ <sub>v</sub> [lm]				
CCT [K]				
Q'ty :		yyyy/mm/dd		

	Dimensions (mm)	Reel / Box	Q'ty / Box(pcs)
Reel	Diameter : Φ180 Width : 15mm	—	500 Max
Al Shield Bag	250 x 220	—	500 Max
Card board Box	224 x 150 x 226	9 Max	4,500 Max

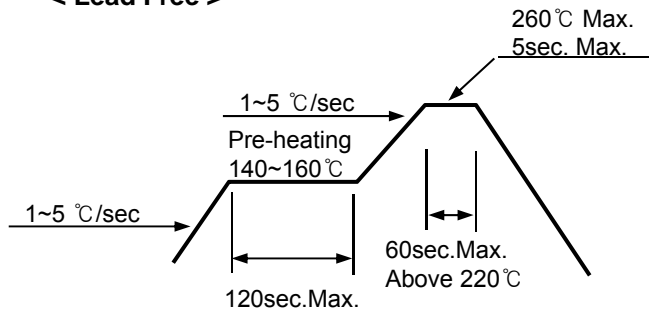


## 9. Precaution in use

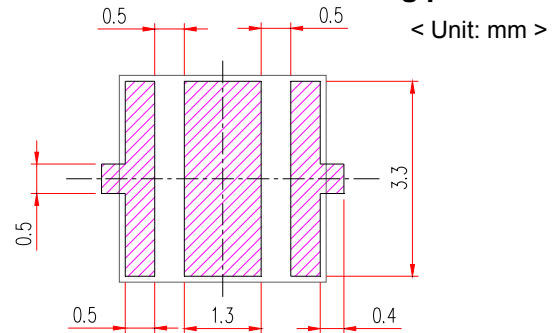
### 9.1 Soldering Conditions

- When soldering Power SMD, Heat may affect the electrical and optical characteristics of the LEDs.
- In soldering, do not stress the substrate 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.
- Reflow soldering should be done only once. If repair is necessary, suitable tools must be used.
- In Reflow soldering, recommend to use machine with 7~8 zones.
- 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 672 hours (4 Weeks) after opening the package.
- If the moisture absorbent material (silica gel) 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 silicone 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.
- When the lens is exposed by the sun for a long time, it can be discolored.
- Please consider the heat generation of the LED when it is designed the PCB.
- The LED's must be mounted on MCPCB or heat sink or applied thermal pad.

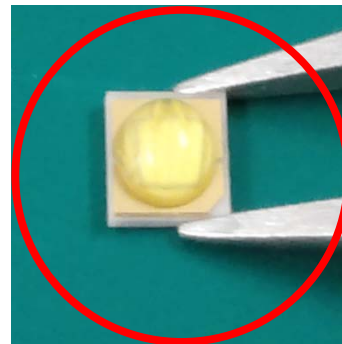
### 9.6 Handling LED

ITSWELL recommends the following at all times when handling C3522 LEDs or assemblies containing these LEDs :

- When handling the LED with tools like Tweezers or Nipper, do not apply Mechanical Forces directly on LED's Surface.
- Do not touch with hand LED Lens surface directly. It may contaminate the Lens 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.

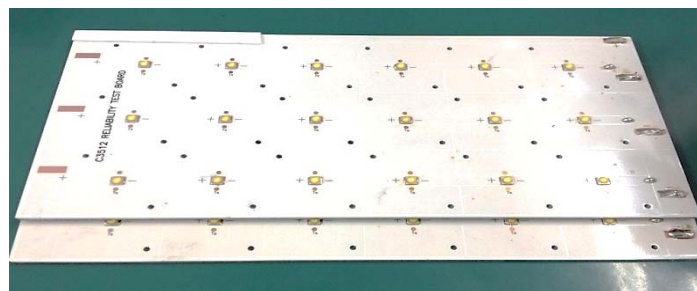


Incorrect Handling



Correct Handling

- Do not apply more than **1000gf** of shear force onto the lens. It will cause fatal damage of this product.
- Do not stack assembled PCBs together. Failure to comply may cause the resin portion of the product to be cut, chipped, delaminated, deformed, and/or the die/wire bonds to break, which will causes the LEDs not to illuminate.



Incorrect Handling

## 10. Reliability

### 10.1 Reliability Test Item

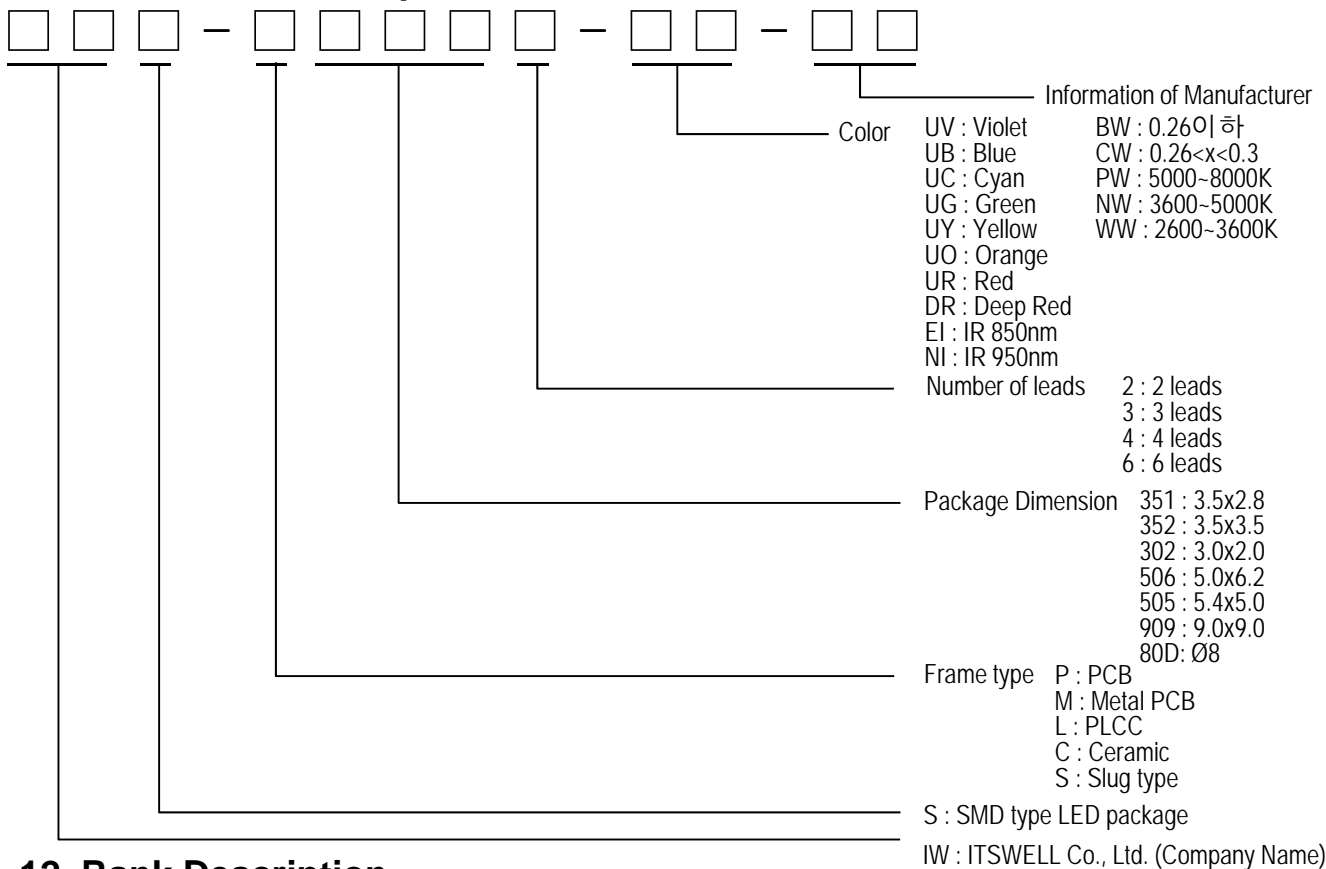
Test Items	Test Conditions	Notes
High Temperature Storage	100℃, 1,000hr.	0/18
Low Temperature Storage	-40℃, 1,000hr.	0/18
Temp. Humidity Storage	60℃, 90% RH, 1,000hr.	0/18
Steady State Operating life	25℃, 700mA, 1,000hr.	0/18
High Temperature Operating Life	85℃, 700mA, 1,000hr	0/18
Low Temperature Operating Life	-30℃, 700mA, 1,000hr.	0/18
Steady State Operating life Of High Humidity Heat	60℃, 90% RH, 700mA, 1,000hr.	0/18
Thermal Shock	-40℃(30min)→100℃(30min.), 100 cycle	0/25
ESD	HBM, 100 pF, 1.5K ohm, 3 times	0/20

### 10.2 Criteria for Judging the Damage

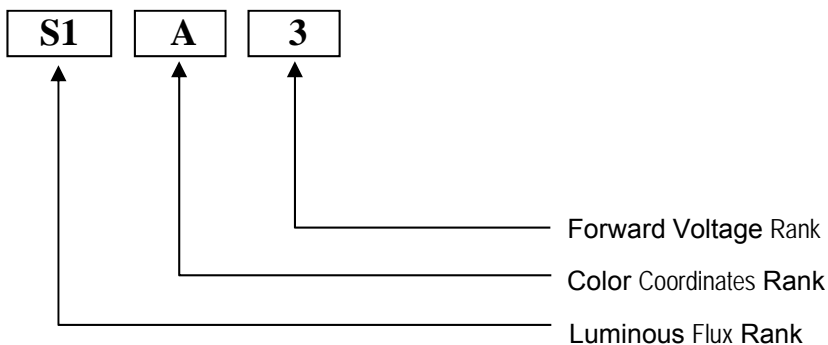
Items	Test Conditions	Criteria for judgment
Luminous Flux ( $\Phi_V$ )	$I_F = 700\text{mA}$	> 70% of S
Forward Voltage ( $V_F$ )	$I_F = 700\text{mA}$	Less than $\pm 110\%$ of U

\* 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**

Review Ver.	Date	Correction List	Etc.
Ver. 0.1	2013.05.07	Established	