

Customer :

# Specification for Approval

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Part Name : WT23N1F

**(Preliminary)**

Customer : \_\_\_\_\_ 2015. \_\_\_\_ . \_\_\_\_ .

Checked	Checked	Approved	Remark
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WOOREE E&L Co., Ltd. 2015. 10. 16.

Designed	Checked	Approved
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**WOOREE E&L CO., LTD**

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 **WOOREE E&L Co.,Ltd.**

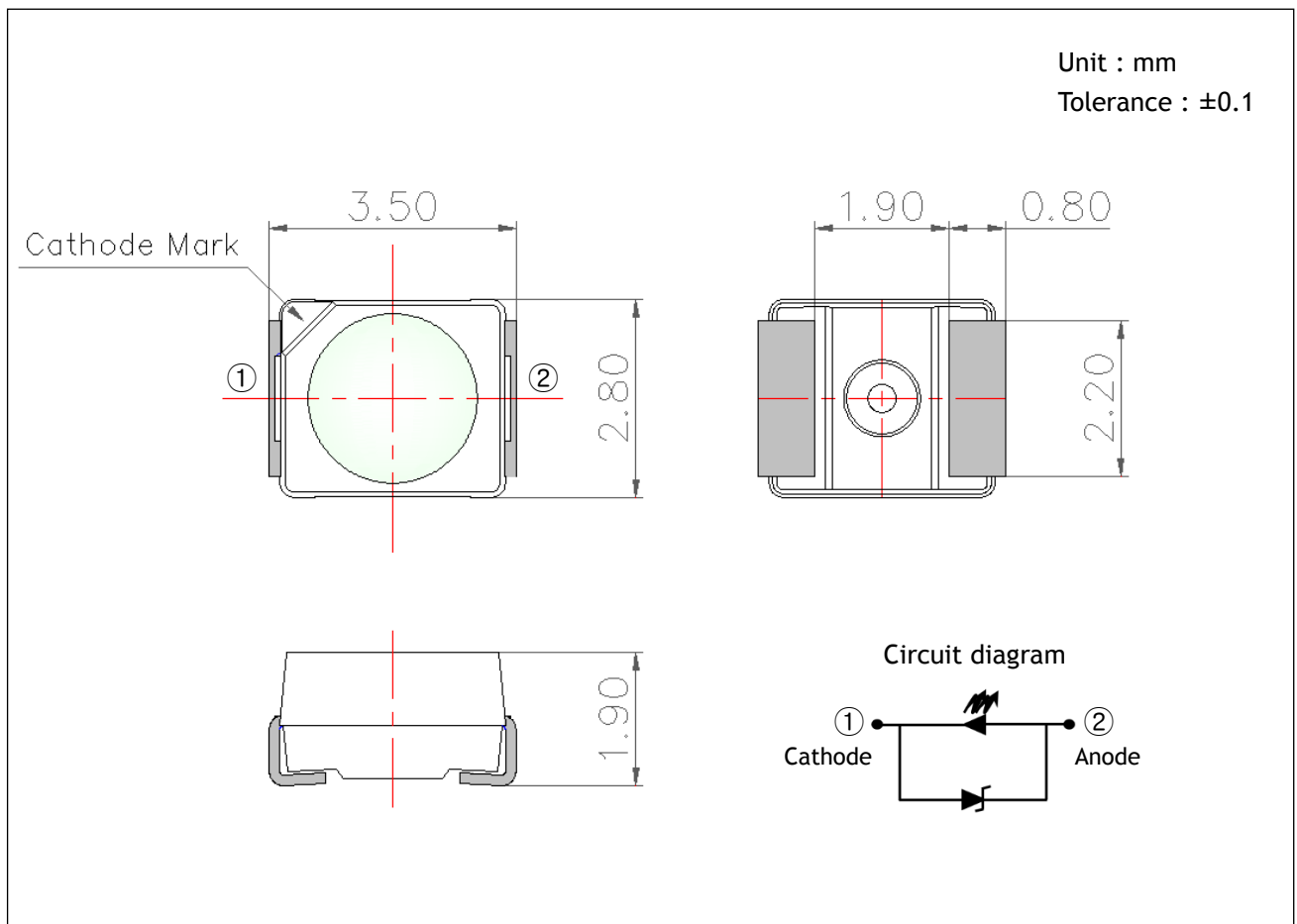
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## 1. Features

- SMD Top View Type
- Long Time Reliability (with ESD Protection)
- Package size is 3.5\* 2.8\* 1.9t (mm)
- Application : Automotive interior
- Emitting Color : Red

## 2. Outline Dimension



### Part list

Parts No.	Name	Description
1	Chip source	Blue LED
2	Body	Thermo Plastic
3	Lead frame base	Metal
4	Resin	Encapsulant

### 3. Absolute maximum ratings

Item	Symbol	Absolute Maximum Ratings	Unit
Forward Current	$I_F$	25	mA
Pulse Forward Current*1	$I_{FP}$	90	mA
Power Dissipation	$P_D$	0.04	W
Operating Temperature	$T_{OPR}$	-40 ~ +85	°C
Storage Temperature	$T_S$	-40 ~ +100	°C
Solder Temperature	$T_{SLD}$	Reflow 260 °C, 10sec under Hand 340 °C 3sec under	°C
Junction Temperature	$T_J$	100	°C

\*1. Pulse Width ≤ 10msec, Duty ≤ 10%

### 4. Electrical/Optical characteristics

(Ta=25 °c)

Item	Symbol	Condition	Value			Unit
			Min	Typ.	Max	
Forward Voltage*1	$V_F$	$I_F=20mA$	1.9	2.0	2.3	V
Luminous Intensity*2	$\Phi_V$	$I_F=20mA$	180	-	240	mcd
Dominant Wavelength*3	$W_d$	$I_F=20mA$	620	-	625	nm
Full Width at Half Maximum	$\Delta\lambda$	$I_F=20mA$	-	18	-	nm
Viewing Angle	$2\theta_{1/2}$	$I_F=20mA$	-	120	-	Deg.

\*1. Forward voltage measurement allowance is ±0.05V

\*2. Luminous Intensity measurement allowance is ±5%

\*3. Dominant Wavelength measurement allowance is ±1.0nm

## 5. Ranks

### (1) Forward Voltage

(Ta=25°C)

Rank	Condition	Min.	Max.	Unit
9	I <sub>F</sub> = 20mA	1.9	2.1	V
1		2.1	2.3	

### (2) Luminous Intensity

(Ta=25°C)

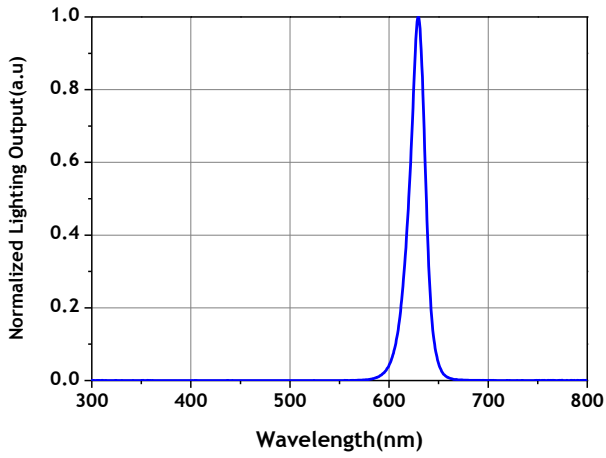
Rank	Condition	Min.	Max.	Unit
180	I <sub>F</sub> = 20mA	180	210	mcd
210		210	240	

### (3) Dominant Wavelength

(Ta=25°C)

Rank	Condition	Min.	Max.	Unit
620	I <sub>F</sub> = 20mA	620	622	nm
622		622	625	

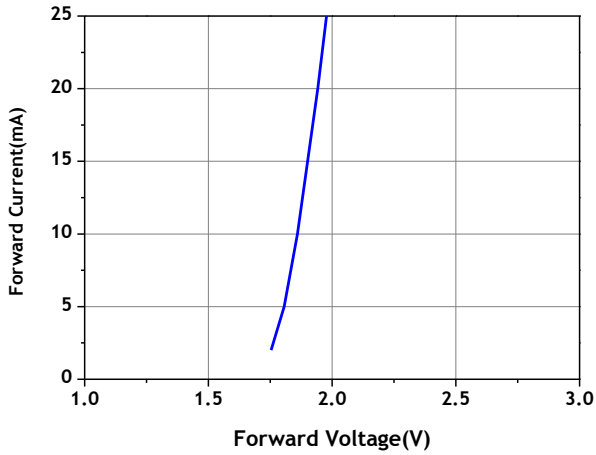
## 6. Color Spectrum



## 7. Characteristic Diagrams

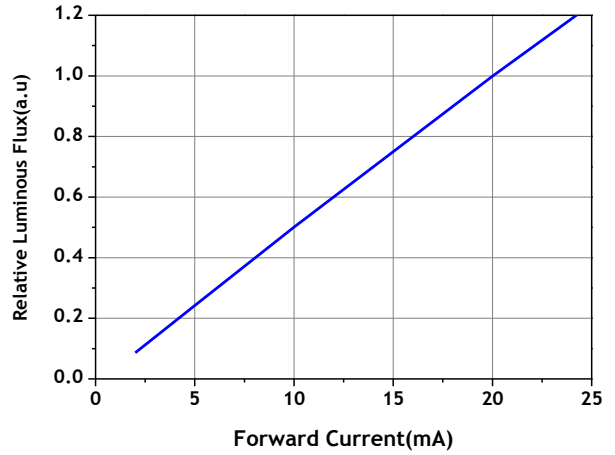
(1) Forward Voltage vs Forward Current

(Ta = 25°C)

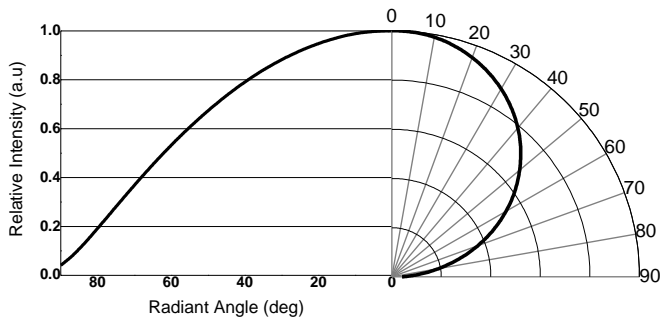


(2) Forward Current vs Relative L-Flux

(Ta = 25°C)



(3) View angle profile



## 8. Reliability

### (1) Test items and results

NO	Test Item	Standard Test Method	Test Conditions	Note	Number of Damaged
1	Temperature Cycle	JEITA ED-4701 100 105	-40℃ ~ 25℃ ~ 100℃ ~ 25℃ 30min. 5min. 30min. 5min	100 cycles	0/20
2	High Temperature Storage	JEITA ED-4701 200 201	Ta=100℃	1000 hrs	0/20
3	Temperature Humidity Storage	JEITA ED-4701 100 103	Ta=85℃, RH=85%	1000 hrs	0/20
4	Low Temperature Storage	JEITA ED-4701 200 202	Ta=-40℃	1000 hrs	0/20
5	Steady State Operating Life	-	Ta=25℃, I <sub>F</sub> =25mA	1000 hrs	0/20
6	Steady State Operating Life of High Temperature	-	Ta=85℃, I <sub>F</sub> =20mA	1000 hrs	0/20
7	Steady State Operating Life of High Humidity Heat	-	Ta=85℃, RH=85%, I <sub>F</sub> =20mA	1000 hrs	0/20
8	Steady State Operating Life of Low Temperature	-	Ta=-40℃, I <sub>F</sub> =25mA	1000 hrs	0/20
9	Electro-Static Discharge Threshold	ESD (HBM)	1500Ω, 100pF	6000V	0/10

### (2) Criteria for judging the damage

ITEM	Symbol	Test Condition	Criteria for Judgement	
			Min.	Max.
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =20mA	-	Init. Value + 0.2V
Luminous Flux	Φ <sub>V</sub>	I <sub>F</sub> =20mA	Init. Value*0.7	

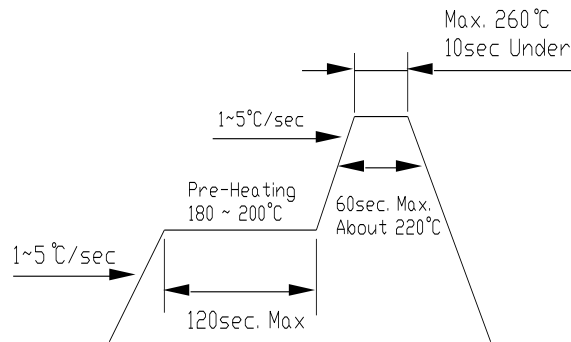
## 9. Recommend soldering conditions

### (1) Recommend soldering conditions

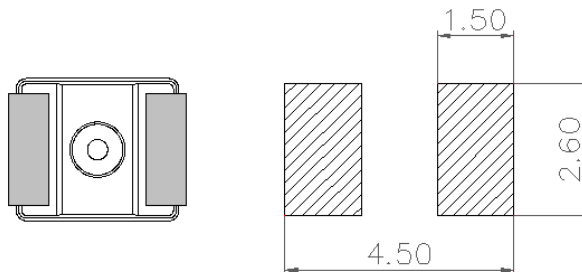
Reflow Soldering		Hand Soldering(Lead Part)	
Pre-heat Pre-heat time Peak temperature Soldering Time Condition	Lead Free Solder	Temperature Soldering Time	Max. 340°C Max. 3sec (only one time)
	180~200°C 120sec. Max. Max. 260°C Max. 10sec		

### Temperature-profile

#### <Lead-free Solder>



#### <Recommended soldering pad design>





## (2) Moisture Proof Package

When moisture is absorbed into the SMT package it may vaporize and expand during soldering. There is a possibility that this can cause exfoliation of the contacts and damage to the optical characteristics of the LEDs. For this reason, the moisture proof package is used to keep moisture to a minimum in the package. The moisture proof package is made of an aluminum moisture proof bag. A package of a moisture absorbent material(silica gel) is inserted into the aluminum moisture proof bag. The silica gel changes its color from blue to pink as it absorbs moisture.

## (3)Storage

[Storage conditions]

Before opening the package

The LEDs should be kept at 30°C or less and 90% RH or less. The LEDs should be used within a year. When storing the LEDs, moisture proof packaging with absorbent material(silica gel) is recommended.

After opening the package

The LEDs should be kept at 30°C or less and 70% RH or less. The LEDs should be soldered within 168 hours(7days) after opening the package. If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with package of moisture absorbent material(silica gel). It is also recommended to return the LEDs to the original moisture proof bag and to reseal the moisture proof bag again. If the moisture absorbent material(silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.

Baking treatment : more than 24hours at  $65\pm 5^{\circ}\text{C}$

LED part's electrodes and lead frames are silver plated copper alloy.

The silver surface may be affected by environments which contain corrosive substances.

Please avoid conditions which may cause the LED to corrode, tarnish or discolor.

The corrosion or discoloration might lower solderability or might affect on optical Characteristics.

Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

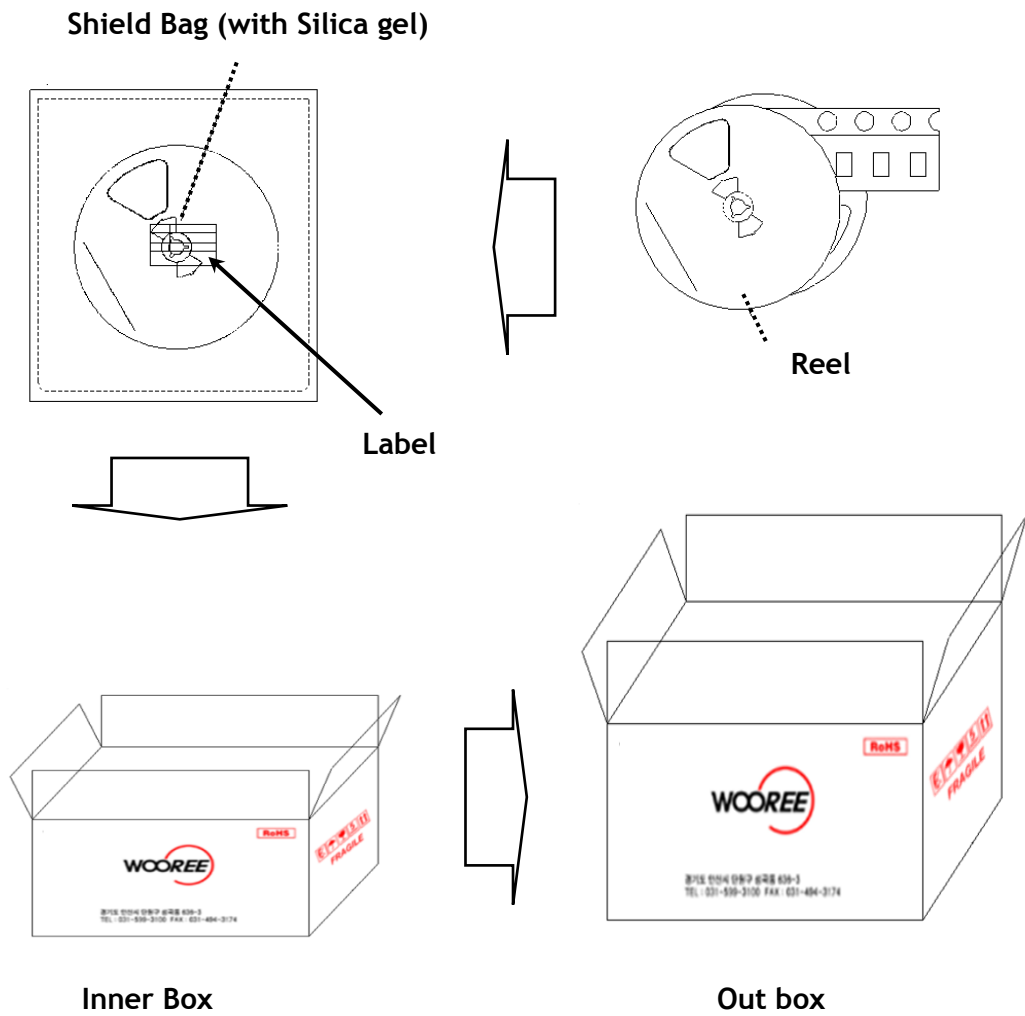
## (4)Heat Generation

Thermal design of the end product is of paramount importance. Please consider the heat generation of the LED when making the system design. The coefficient of temperature increase per input electric power is affected by the thermal resistance of the circuit board and density of LED placement on the board, as well as other components. It is necessary to avoid intense heat generation and operate within the maximum ratings given in the specification.

The operating current should be decided after considering the ambient maximum temperature of LEDs.

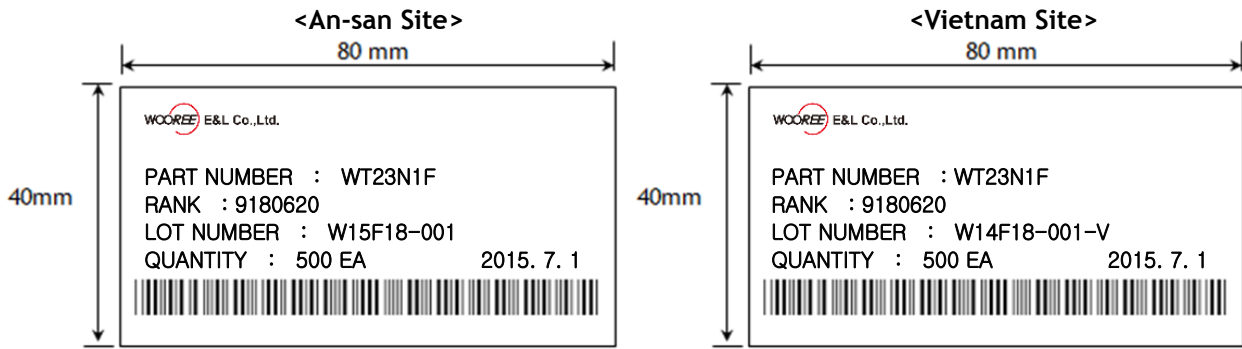


**(3) Boxing**



Box	Dimension (mm)	Reel/Box	Quantity/Box
Inner box	500*260*250	36 Reel max.	108,000 ea
Out box	555*515*540	144 Reel max.	432,000 ea

**(4) Label Information**



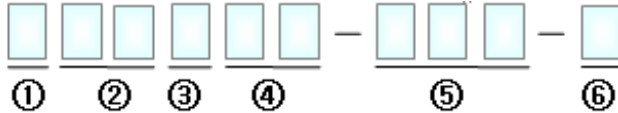
**(5) Lot Number**

**<An-san Site>**



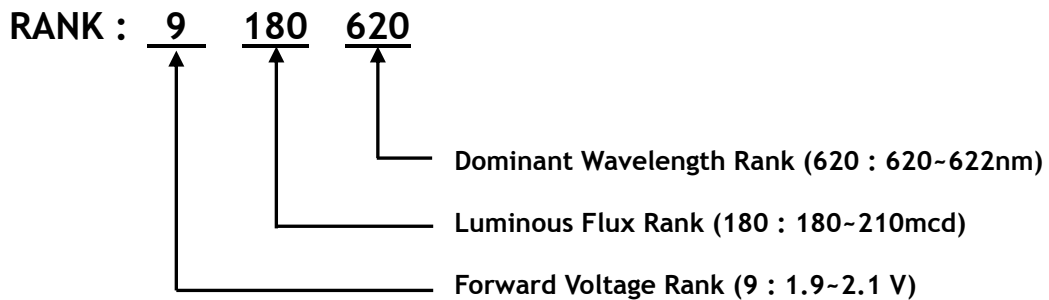
- ① WOOREE E&L Initial
- ② Year (15 for 2015)
- ③ Month (A for Jan., B for Feb., ... , M for Dec.)
- ④ Day (01 for 1,....31 for 31)
- ⑤ WOOREE E&L Product Running Number

**<Vietnam Site>**



- ① WOOREE E&L Initial
- ② Year (15 for 2015)
- ③ Month (A for Jan., B for Feb., ... , M for Dec.)
- ④ Day (01 for 1,....31 for 31)
- ⑤ WOOREE E&L Product Running Number
- ⑥ WOOREE E&L Manufacturing Plant (V for Vietnam)

**(6) Rank Code description**



## 11. Revision History

Spec NO.			
Title	Specification for Approval		
Times	Date	Summary of revision	Remarks
1	2015. 10. 16	INITIAL ISSUE	R(0)