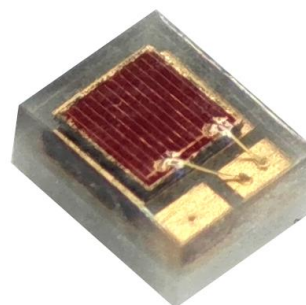


# V51519V20CPN1

- ◆ **Outline : 1.5\*1.9\*0.8mm**
- ◆ **High Power Output And High efficiency**
- ◆ **Good thermal dissipation & Optical uniformity**



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## Features

- RoHS and REACH-compliant
- MSL2 qualified according to JEDEC J-STD 020
- ESD 2KV (HBM: ANSI/JEDEC JS-001 Class 2)
- Reliability Test: AEC Q-102qualified

## Applications

- Automotive Exterior Lighting

**■ Product Code**

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V5 - 1519 - V20 - C - P - N1

①      ②      ③      ④      ⑤      ⑥

①	②	③	④	⑤	⑥
Process Type	Lead Frame Size	Dice wavelength	Cap Color	Spectral Condition Code	Flow Code
V5 : special product	1519: 1.5* 1.9mm	V20: red	C: water transparent	P:500mA	N: no zener 1: no expression above meaning for company

**■ Typical Product Characteristics(Ta=25°C)**

Item	Symbol	Value			Unite	Test Condition
		Min.	Typ.	Max.		
<b>Forward Voltage<sup>1</sup></b>	V <sub>F</sub>	2.2		2.8	V	I <sub>F</sub> =500mA
<b>Reverse Current</b>	I <sub>R</sub>			10	μA	V <sub>R</sub> =5V
<b>Luminous Intensity<sup>2</sup></b>	Φ	38		76	lm	I <sub>F</sub> =500mA
<b>Viewing Angle<sup>3</sup></b>	2θ <sub>1/2</sub>		120		deg	I <sub>F</sub> =500mA
<b>Dominant Wavelength</b>	WLD	620		630	nm	I <sub>F</sub> =500mA

Notes:

1. The above forward voltage measurement allowance tolerance is ±0.05V
2. The above luminous flux measurement allowance tolerance ±7%
3. The above Viewing angle (2θ<sub>1/2</sub>) measurement allowance tolerance ±10°
4. IS standard test.

**■ Maximum Rating (Ta =25°C)**

Characteristics	Symbol	Min.	Typ.	Max.	Unit
<b>DC Forward Current<sup>1</sup></b>	I <sub>F</sub>			1000	mA
<b>Pulse Forward Current<sup>2</sup></b>	I <sub>PF</sub>			1500	mA
<b>Reverse Voltage</b>	V <sub>R</sub>			5	V
<b>Junction Temperature<sup>3</sup></b>	T <sub>J</sub>			125	°C
<b>Thermal Resistance Junction/ Solder Point</b>	R <sub>THJ-S</sub>		5		°C/W
<b>Operating Temperature Range</b>	T <sub>OPR</sub>	-40	—	105	°C
<b>Storage Temperature Range</b>	T <sub>STG</sub>	-40	—	105	°C
<b>Soldering Temperature</b>	T <sub>SD</sub>			260	°C

**Notes:**

1. For other ambient, limited setting of current will depend on de-rating curves.
2. Duty 1/10, pulse width 0.1ms
3. When drive on maximum current , T<sub>J</sub> must be kept below 125°C

**■ Dominant Wavelength Binning (IF=500mA)**

Bin Code	Min. $\lambda_d$ (nm)	Max. $\lambda_d$ (nm)
V2	620	625
V3	625	630

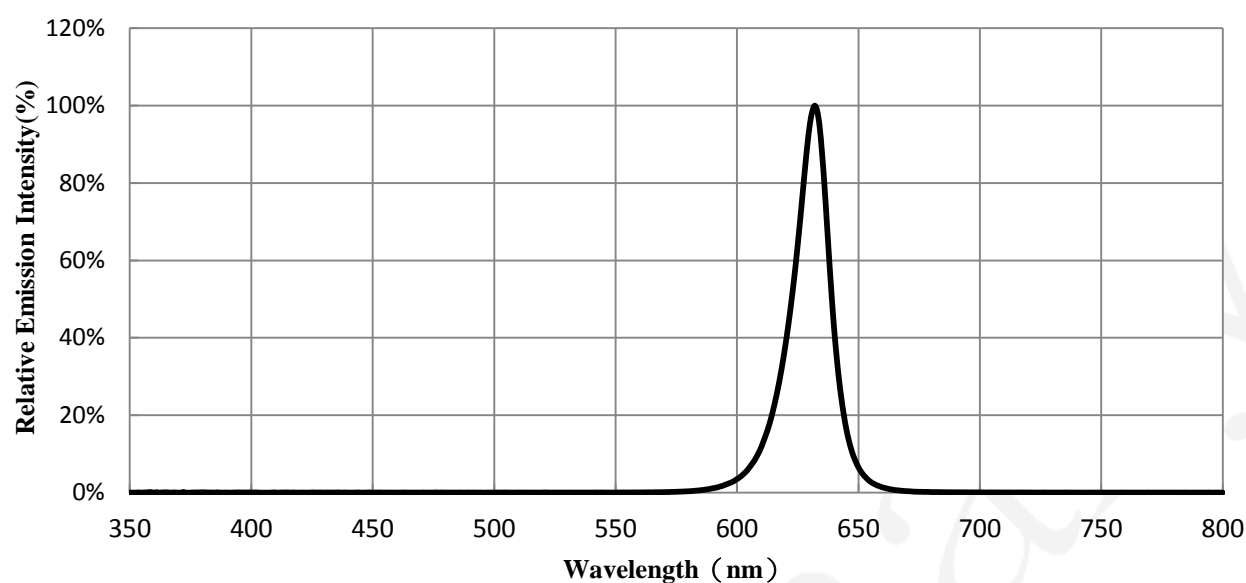
**■ Luminous Intensity Binning (IF=500mA)**

Bin Code	Min. $\Phi_v$ (Lm)	Max. $\Phi_v$ (Lm)
19	38	44
20	44	50
21	50	58
22	58	66
23	66	76

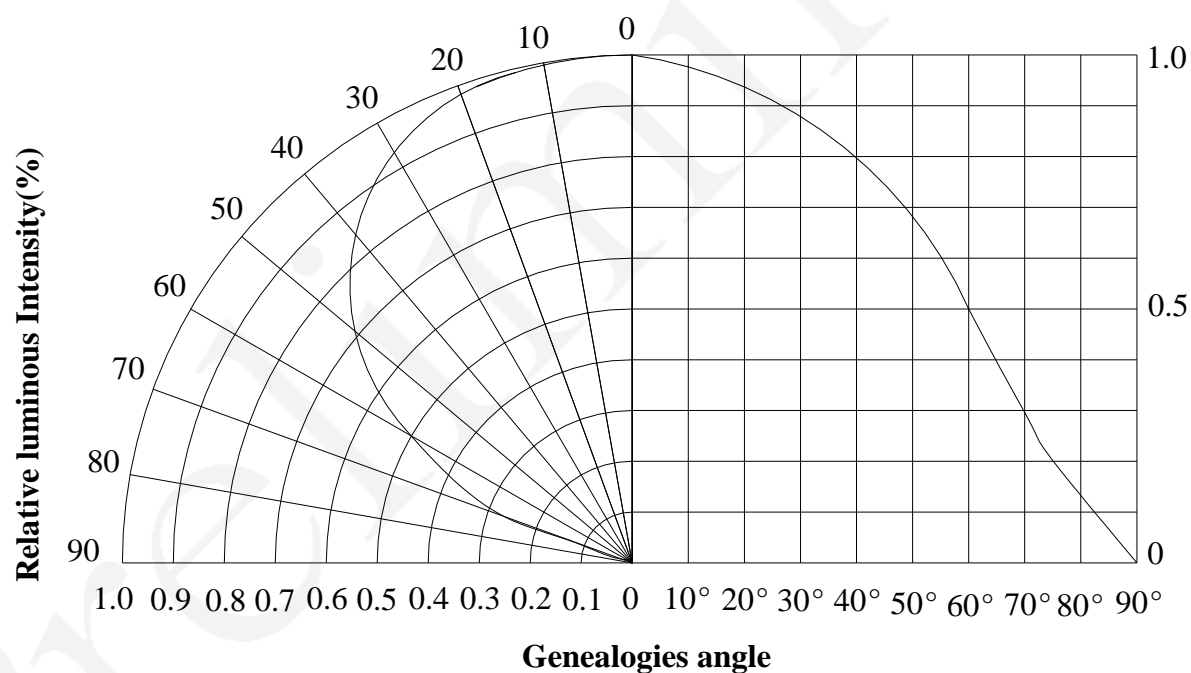
**■ Forward Voltage Binning (IF=500mA)**

Bin Code	Min. $V_F$ (V)	Max. $V_F$ (V)
G	2.2	2.4
H	2.4	2.6
J	2.6	2.8

## ■ Relative Spectral Power Distribution

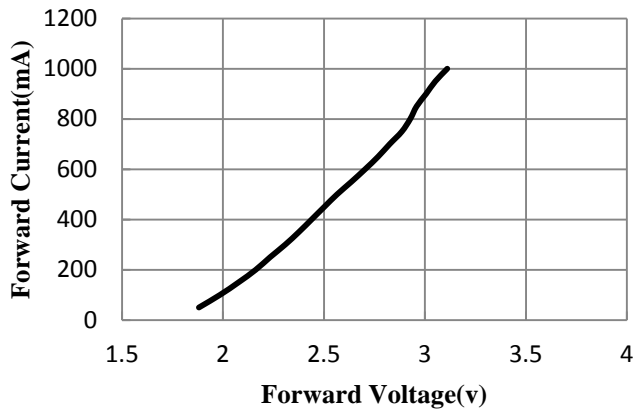


## ■ Typical Diagram Characteristics of Radiation

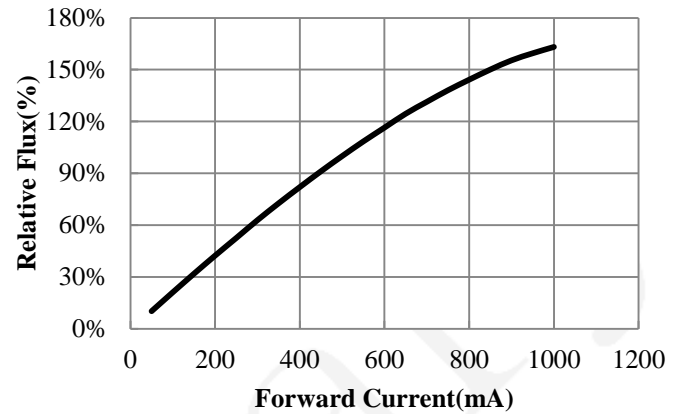


## ■ Electronic-Optical Characteristics

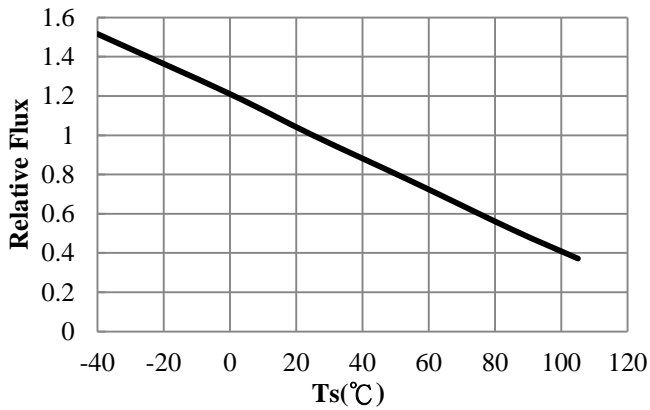
**Forward Current vs. Forward Voltage**



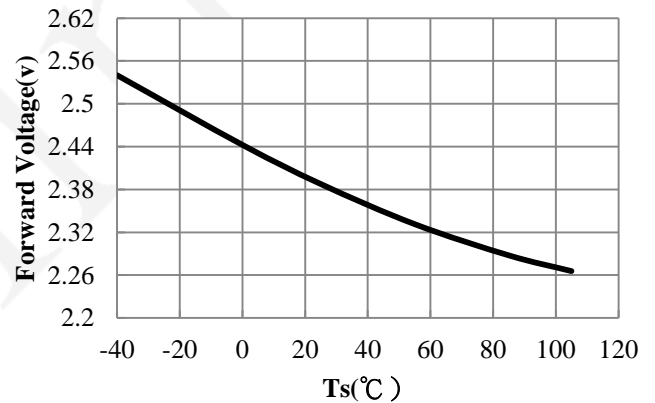
**Relative Flux vs. Forward Current**



**Relative Luminous Flux vs. Solder Temperature**

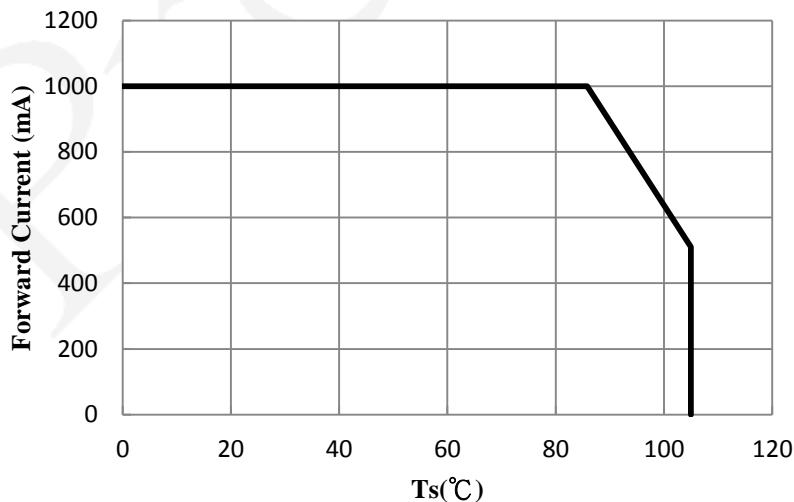


**Forward Voltage vs. Solder Temperature**

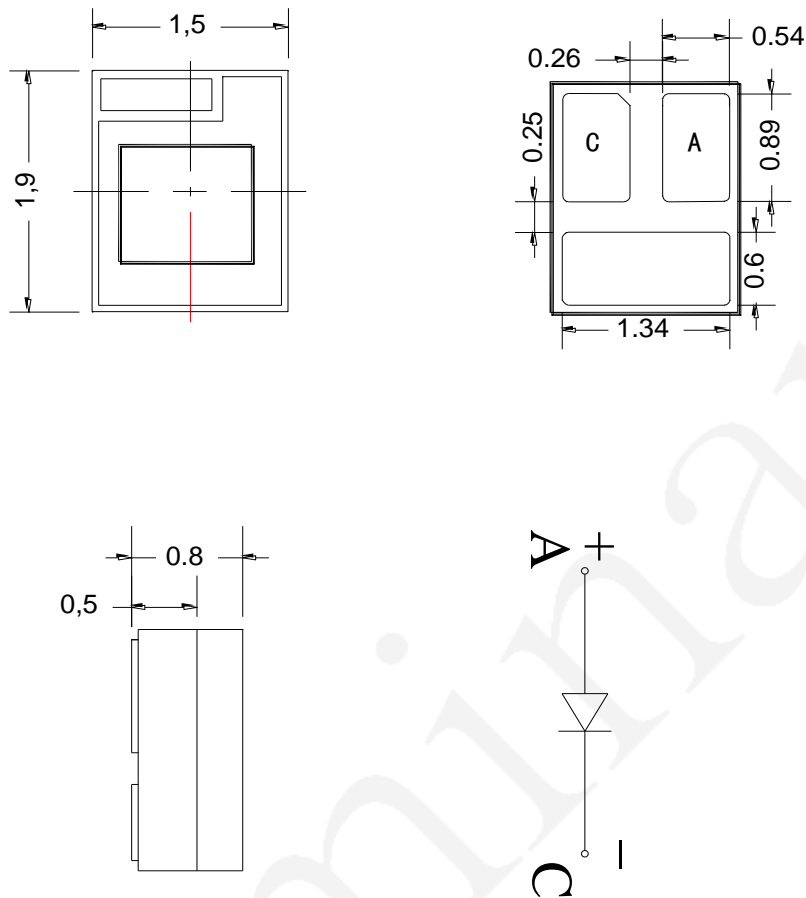


## ■ Thermal Design for De-rating

The maximum forward current is determined by the thermal resistance between the LED junction and solder point. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.



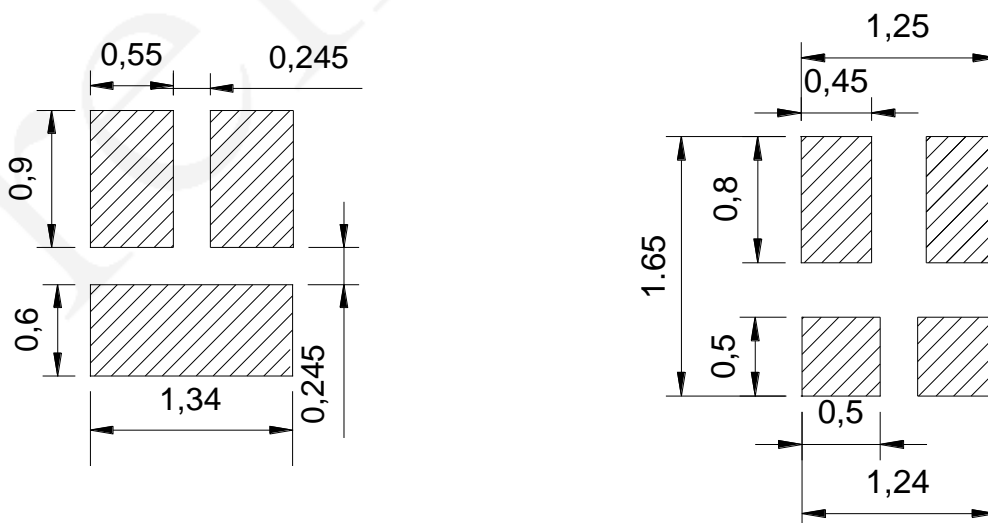
## ■ Dimensions



§ All dimensions are in millimeters.

§ Tolerance is  $\pm 0.13\text{mm}$  unless other specified.

## ■ Suggest Stencil Pattern (Recommendations for reference)



**RECOMMENDED PCB SOLDER PAD**

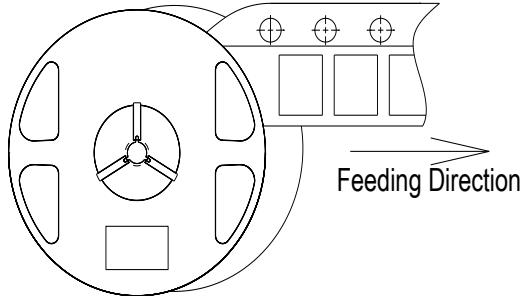
**RECOMMENDED STENCIL PATTERN  
(HATCHED AREA IS OPENING)**

§ Suggest stencil  $t = 0.12\text{ mm}$

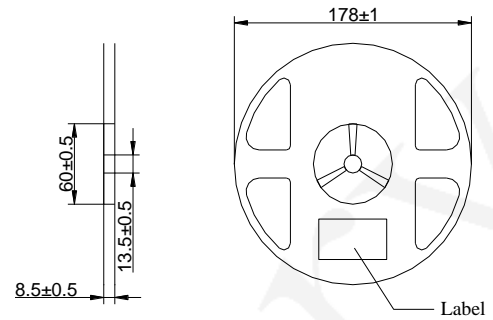


## ■ Packaging

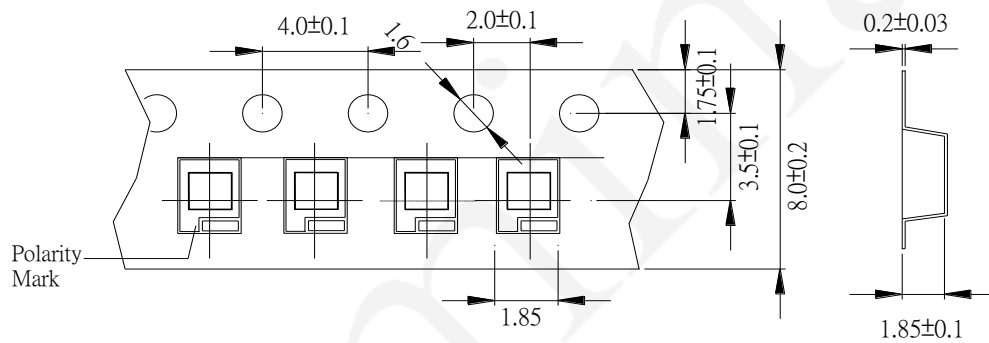
### ● Feeding Direction (Unit: mm)



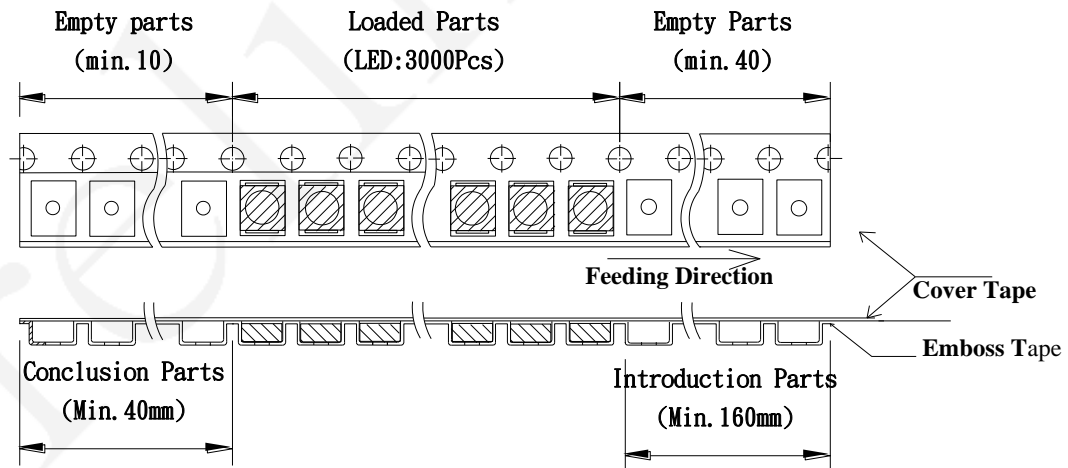
### ● Dimensions of Reel (Unit: mm)



### ● Dimensions of Tape (Unit: mm)



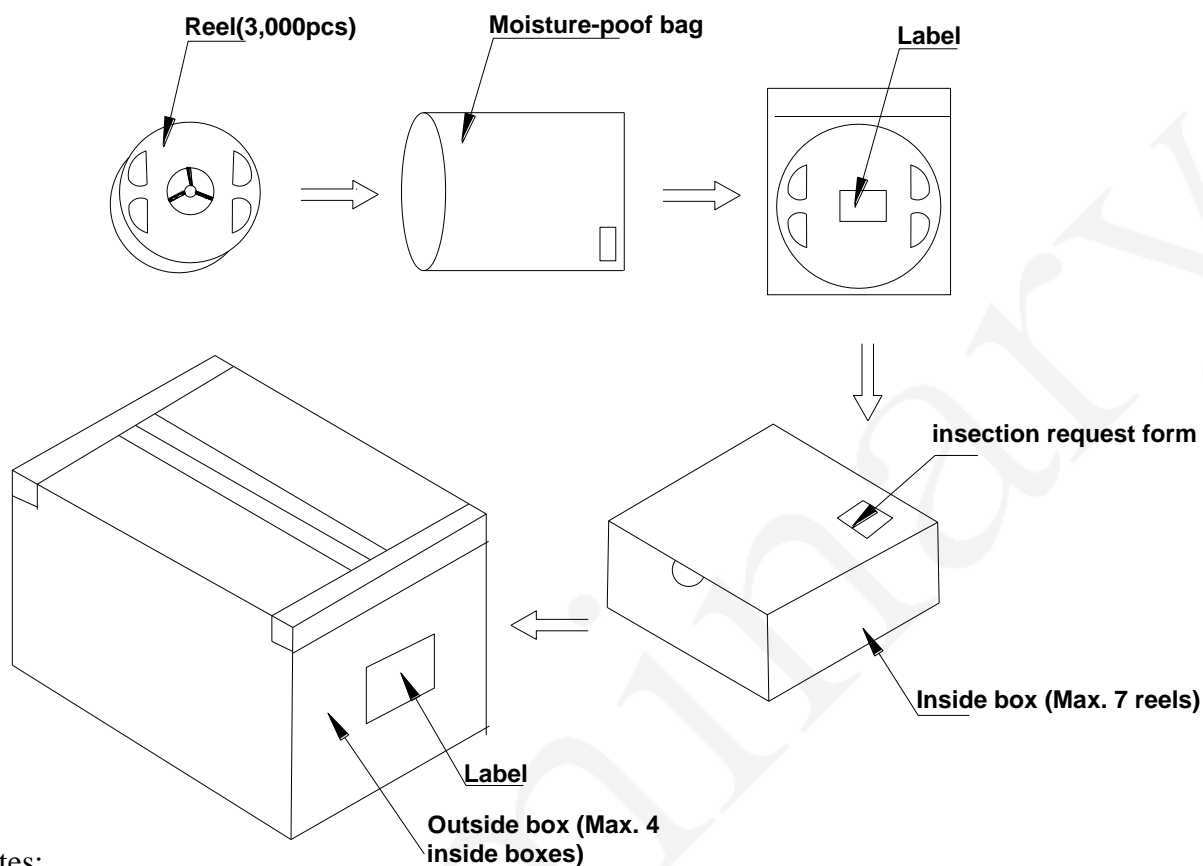
### ● Arrangement of Tape



### Notes:

1. Empty component pockets are sealed with top cover tape
2. The max loss number of SMD is 2pcs;
3. The cathode is oriented towards the tape sprocket hole in accordance with ANSI/EIA RS-481 specifications;
4. 3,000pcs per reel;
5. The remainder packing in multiples of 500pcs.

## ■ Packaging

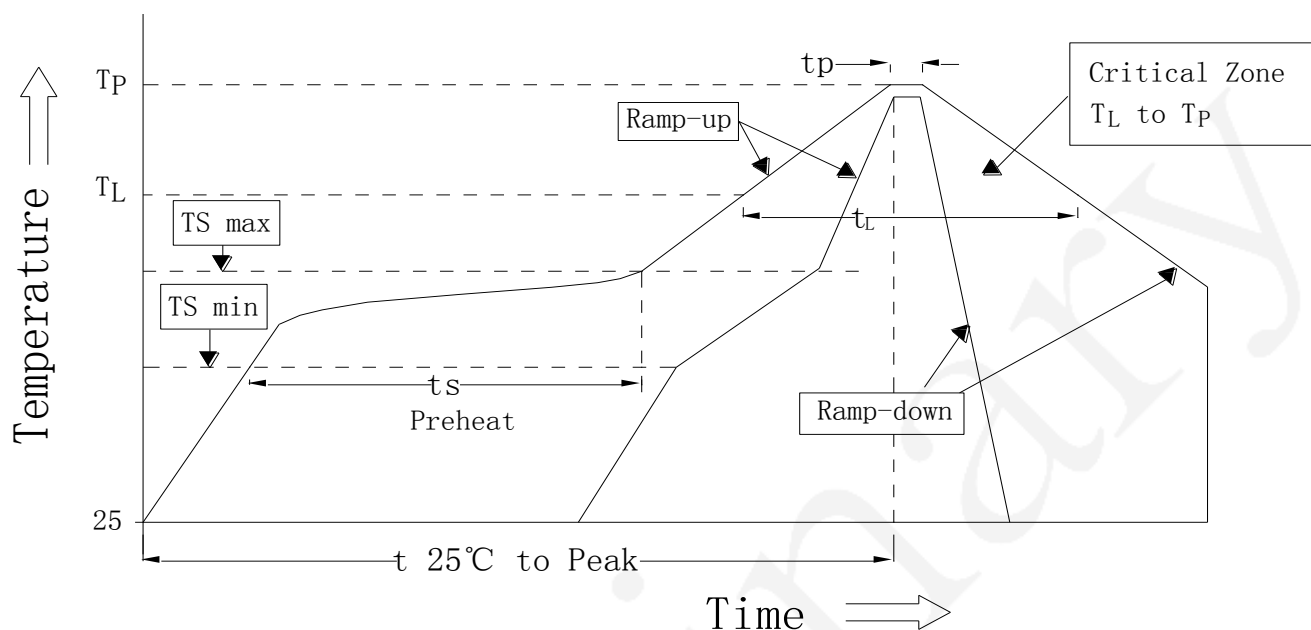


### Notes:

Reeled product (max.3,000) is packed in a sealed moisture-proof bag. Seven bags are packed in an inner box (size: about 260 X 230 X 100 mm) and four inner boxes are in an outer box (size: about 480 X 275 X 215 mm). On the label of moisture-proof bag, there should be the information of Part No., Lot No. and quantity number; also the total quantity number should be on inspection request form on outer box.

## ■ Reflow Profile

### SMT Reflow Soldering Profile



Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Min.	Recommendation	Max.	
Ramp-up rate to preheat (25°C to 150°C)			2	3	K/s
Time $t_S$ ( $T_{S \min}$ to $T_{S \max}$ )	$t_S$	60	100	120	s
Ramp-up rate to peak ( $T_{S \max}$ to $T_P$ )			2	3	K/s
Liquidus temperature	$T_L$		217		°C
Time above liquidus temperature	$t_L$		80	100	s
Peak temperature	$T_P$		245	260	°C
Time within 5 °C of the specified peak temperature $T_P - 5$ K	$t_p$	10	20	30	s
Ramp-down Rate ( $T_P$ to 100 °C)			3	4	K/s
Time 25 °C to $T_P$				480	s

#### Notes:

- Do not stress the silicone resin while it is exposed to high temperature.
- The reflow process should not exceed 2 times.

## ■ Precautions

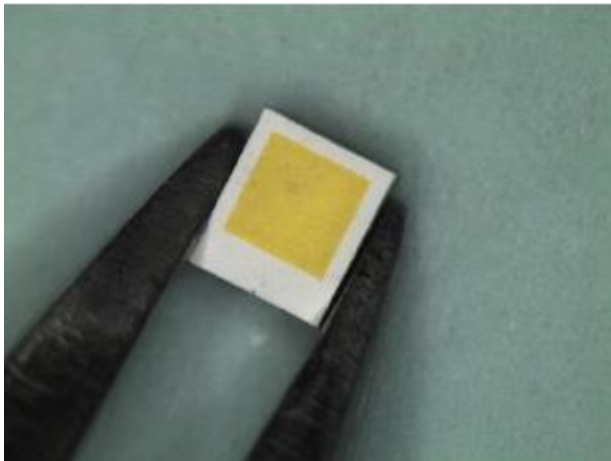

### 1. Recommendation for using LEDs

- 1.1 The lens of LEDs should not be exposed to dust or debris. Excessive dust and debris may cause a drastic decrease in the luminosity.
- 1.2 Avoid mechanical stress on LED lens.
- 1.3 Do not touch the LED lens surface. It would affect the optical performance of the LED due to the LED lens' damage.
- 1.4 Pick & place tools are recommended for the remove of LEDs from the factory tape & reel packaging

### 2. Lens handling

Please follow the guideline to pick LEDs.

- 2.1 Use tweezers to pick LEDs.
- 2.2 Do not touch the lens by using tweezers.
- 2.3 Do not touch lens with fingers.
- 2.4 Do not apply more than 4N (400gw) directly onto the lens.

Correct ( ✓ )	Wrong ( X )
	

### 3. Lens cleaning

In the case which a small amount of dirt and dust particles remain on the lens surface, a suitable cleaning solution can be applied.

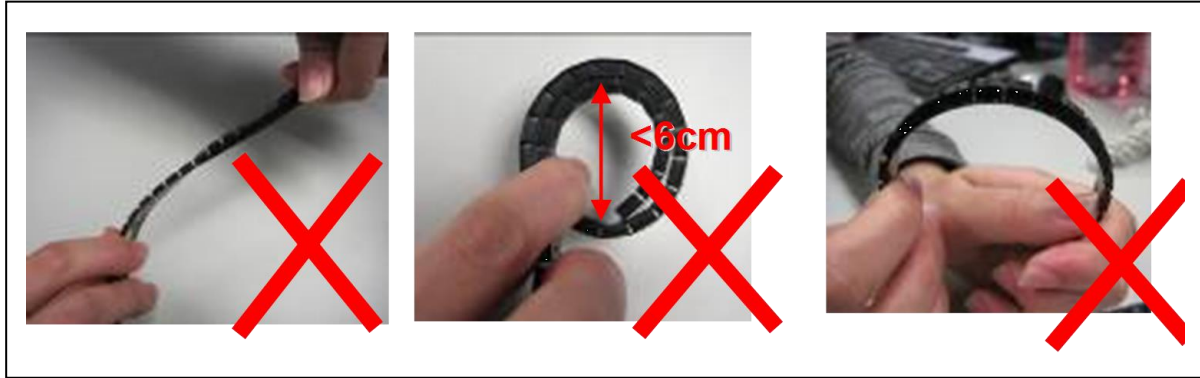
- 3.1 Try a gentle wiping with dust-free cloth.
- 3.2 If needed, use dust-free cloth and isopropyl alcohol to gently clean the dirt from the lens surface.
- 3.3 Do not use other solvents as they may directly react with the LED assembly.
- 3.4 Do not use ultrasonic cleaning which will damage the LEDs.

### 4. Carrier tape handling

The following items are recommended when handling the carrier tape of LEDs.

- 4.1 Do not twist the carrier tape.
- 4.2 The inward bending diameter should not be smaller than 6cm for each carrier tape.

#### 4.3 Do not bend the tape outward.



#### 5. Storage

##### 5.1 The moisture-proof bag is sealed :

The LEDs should be stored at 30°C or less and 90%RH or less. And the LEDs are limited to use within one year, while the LEDs is packed in moisture-proof package with the desiccants inside.

##### 5.2 The moisture-proof bag is opened :

The LEDs should be stored at 30°C or less and 60%RH or less. Moreover, the LEDs are limited to solder process within 168hrs. If the humidity indicator card shows the pink color in 10% even higher or exceed the storage limiting time since opened, that we recommended to baking LEDs at 60°C at least 24hrs. To seal the remainder LEDs return to the moisture-proof bag, it's recommended to be with workable desiccants.

## ■ Test Items and Results of Reliability

Test Item	Test Conditions	Duration/ Cycle	Number of Damage	Reference
Thermal Shock	-40℃ 30min ↑↓5min 105℃ 30min	1000 cycles	0/26	JESD22 A-104
High Temperature Storage	T <sub>a</sub> =105℃	1000 hrs	0/26	JESD22 A-103B
Low Temperature Storage	T <sub>a</sub> =-40℃	1000 hrs	0/26	JESD22 A-119
Life Test	T <sub>a</sub> =25℃ I <sub>f</sub> =1000mA	1000 hrs	0/26	JESD22 A-108
High Humidity Heat Operation	85℃ RH=85% I <sub>f</sub> =700mA	1000 hrs	0/26	JESD22 A-101
High Temperature Operation	T <sub>a</sub> =105℃ I <sub>f</sub> =700mA	1000 hrs	0/26	JESD22 A-108C
ESD(HBM)	2KV at 1.5kΩ;100pF	3 times	0/30	ANSI/JEDEC JS-001

Failure Criteria				
Item	Symbol	Condition	Criteria for Judgment	
			Min	Max
Forward Voltage	V <sub>F</sub>	I <sub>f</sub> =500mA	-	USL <sup>1</sup> ×1.1
Reverse Current	I <sub>R</sub>	V <sub>R</sub> =5V	-	10μA
Radiant Power	P <sub>O</sub>	I <sub>f</sub> =500mA	LSL <sup>2</sup> ×0.7	-

### Notes

1. USL: Upper specification level
2. LSL: Lower specification level