

**COMMODITY: SURFACE MOUNT LED SMD SPECIFICATION**

**Part No:1TC5003W52E2WFC9**

**Characters**

- § 5.0mm×5.0mm SMT LED , 1.5mm THICKNESS.
- § LOW POWER CONSUMPTION.
- § VIEWING ANGLE 120°.
- § VARIOUS COLORS AND LENS TYPES AVAILABLE.
- § PACKAGE: 1000 PCS/REEL.

| ITEM          | MATERIALS |
|---------------|-----------|
| Resin(Mold)   | Silicon   |
| Lens Color    | Yellow    |
| Dice          | InGaN     |
| Emitted color | White     |

**Absolute Maximum Ratings ( Ta=25°C )**

| Item                               | Symbol | Value       | Unit |
|------------------------------------|--------|-------------|------|
| Power Dissipation/DICE             | PD     | 120*3       | mW   |
| DC Forward Current/DICE            | IF     | 30*3        | mA   |
| Single Chip Pulsed Forward Current | IFP    | 100※        | mA   |
| Reverse Voltage                    | VR     | 5           | V    |
| Operating Temperature              | Topr   | -30 ~ +80■  | °C   |
| Storage Temperature                | Tstg   | -40 ~ +100  | °C   |
| Soldering Temperature              | Tsol   | 240for5sec△ | °C   |

※Duty 1/10 , Pulse Width 0.1ms .

△Soldering time max 10sec

■please refer to IF-Ta diagram of curves for the temperature during application

## Electrical-Optical Characteristics (Ta=25°C)

| Parameter             | Symbol            | Value |        |      | Unit | Test condition         |
|-----------------------|-------------------|-------|--------|------|------|------------------------|
|                       |                   | Min.  | Typ.   | Max. |      |                        |
| Forward Voltage       | V <sub>f</sub>    | 2.8   | 3.2    | 3.6  | V    | I <sub>f</sub> =20mA*3 |
| Luminous intensity    | I <sub>v</sub>    | 3600  | 6000   | 7800 | mcd  | I <sub>f</sub> =20mA*3 |
|                       | Φ <sub>v</sub>    | 11    | 17.5   | 23   | Lm   |                        |
| Wavelength            | X                 |       | 0.3791 | ---  | ---  | I <sub>f</sub> =20mA*3 |
|                       | Y                 |       | 0.3798 | ---  | ---  | I <sub>f</sub> =20mA*3 |
| Reverse Current       | I <sub>r</sub>    | ---   | ---    | 10   | μA   | V <sub>r</sub> =5V     |
| Viewing angle         | 2θ <sub>1/2</sub> | ---   | 120    | ---  | Deg  | I <sub>f</sub> =20mA*3 |
| Color Rendering Index | CRI               |       | 80     |      |      | I <sub>f</sub> =20mA*3 |

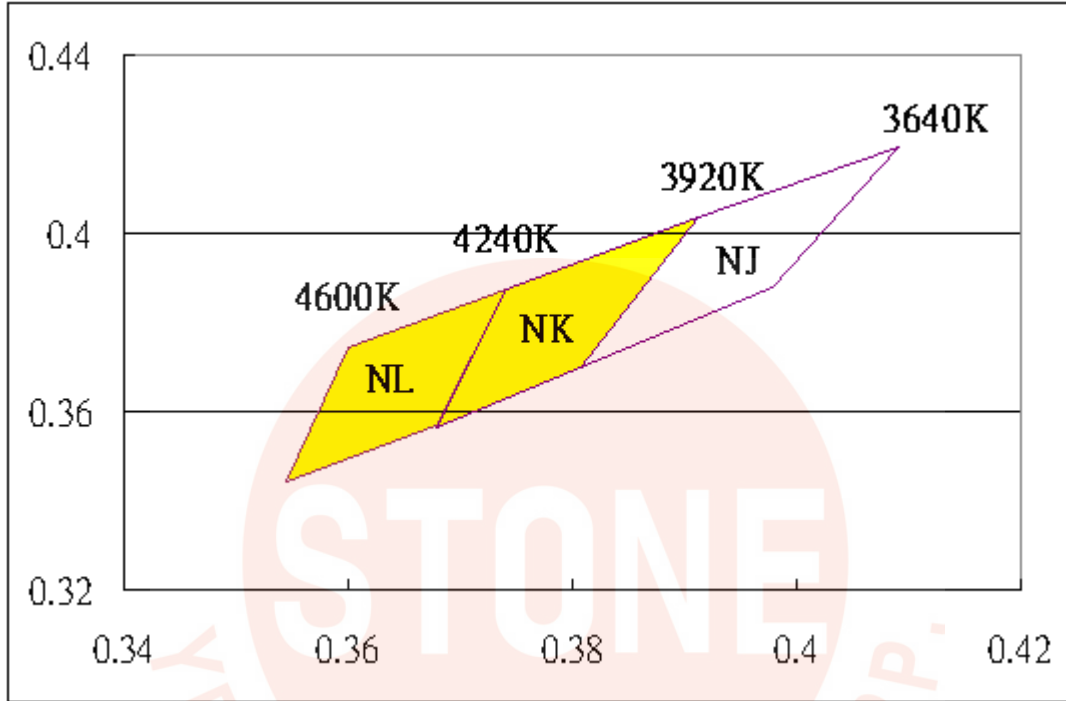
▲ 1.Luminous intensity (IV) ±10%, Forward Voltage(VF) ±0.1V, Wavelength(X、Y) ±0.01  
 CRI±5%.

2.IS standard testing

### Range of bins

|                |           |           |           |         |         |         |         |
|----------------|-----------|-----------|-----------|---------|---------|---------|---------|
| <b>Bin</b>     | BinB      | BinC      | BinD      | BinE    | BinF    | BinG    | BinH    |
| <b>VF(v)</b>   | 2.8-2.9   | 2.9-3.0   | 3.0-3.1   | 3.1-3.2 | 3.2-3.3 | 3.3-3.4 | 3.4-3.5 |
| <b>Bin</b>     | Bin1      |           |           |         |         |         |         |
| <b>VF(v)</b>   | 3.5-3.6   |           |           |         |         |         |         |
| <b>Bin</b>     | Bin20     | Bin21     | Bin22     |         |         |         |         |
| <b>Iv(mcd)</b> | 3600-4600 | 4600-6000 | 6000-7800 |         |         |         |         |
| <b>Bin</b>     |           |           |           |         |         |         |         |
| <b>WL</b>      | <b>NK</b> | <b>NL</b> | <b>NJ</b> |         |         |         |         |

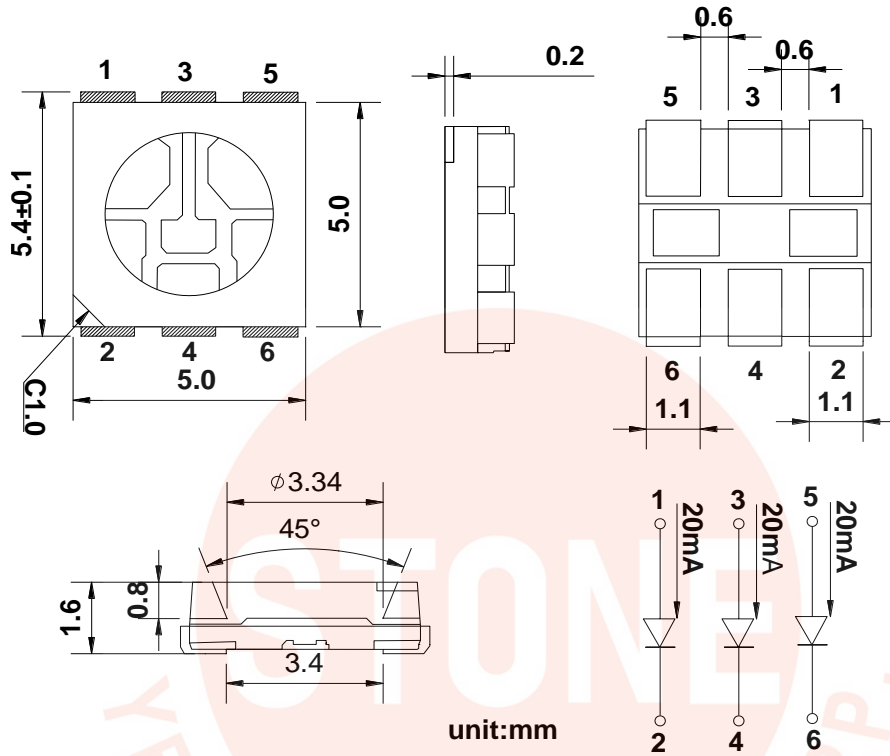
### Color coordinate Comparison



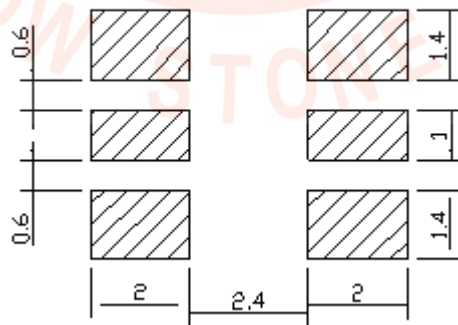
| Bin Code | X      | Y      | X      | Y      | X      | Y      | X      | Y      |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|
| NL       | 0.3599 | 0.3742 | 0.3545 | 0.3443 | 0.3678 | 0.3567 | 0.3741 | 0.3872 |
| NK       | 0.3741 | 0.3873 | 0.3678 | 0.3563 | 0.3808 | 0.3696 | 0.3914 | 0.4034 |
| NJ       | 0.3914 | 0.4034 | 0.3808 | 0.3696 | 0.398  | 0.3877 | 0.4092 | 0.419  |

 IS Main BIN.

### Outline Dimensions



### RECOMMEND PAD LAYOUT



- § All dimensions are in millimeters.
- § Tolerance is  $\pm 0.1$  mm unless other specified
- § Specifications are subject to change without notice.

**COMMODITY: SURFACE MOUNT CHIP LED SMD SPECIFICATION**

**DEVICE NUMBER: 1TC5003W52E2WFC9**

Fig.1 IF-VF(Ta=25°C)

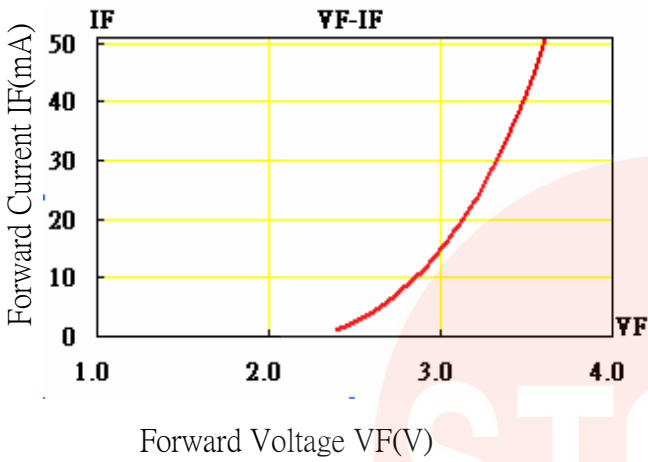


Fig.2 Relative Luminous Intensity-IF (Ta=25°C)

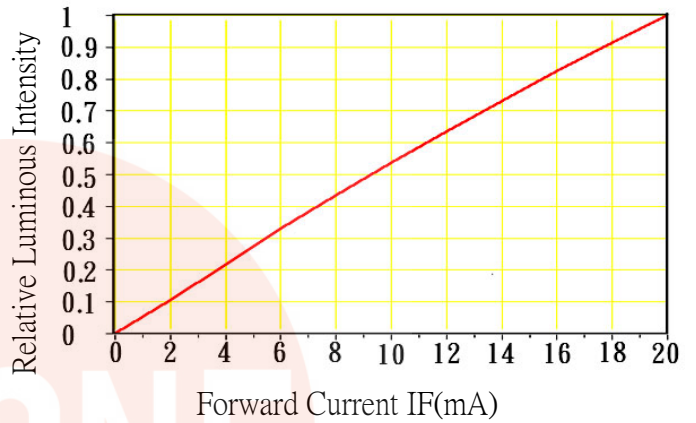


Fig.3 Wavelength Characteristics (Ta=25°C)

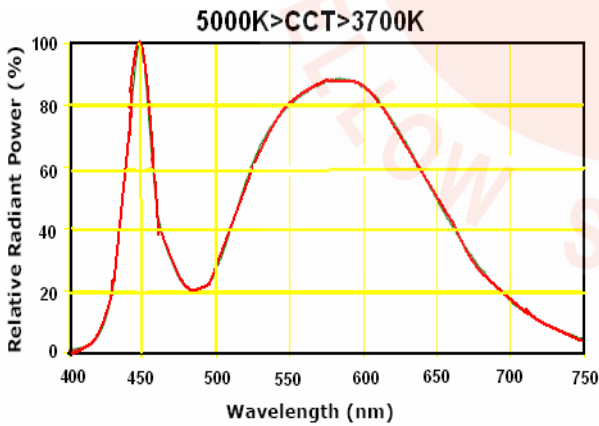


Fig.4 Relative Luminous Intensity-Ta

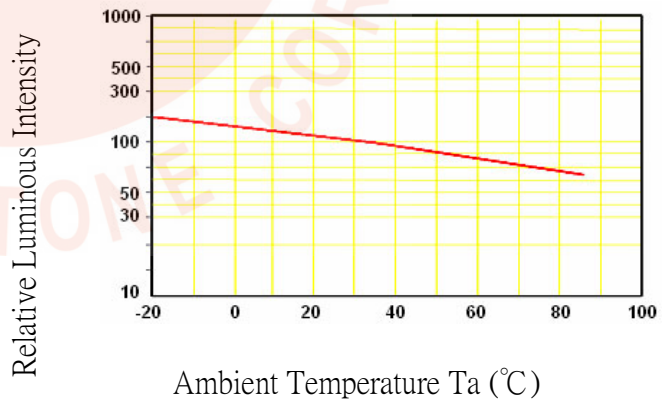
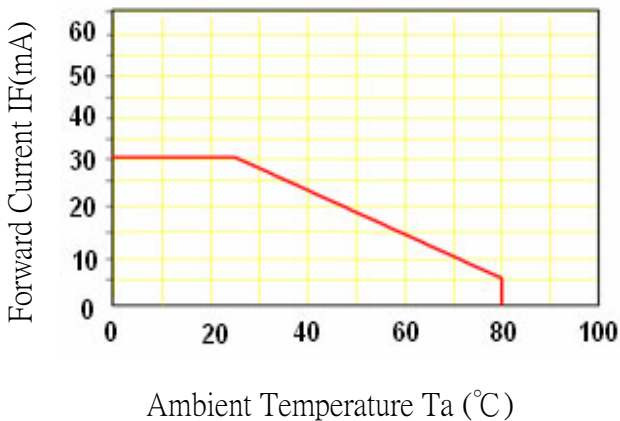
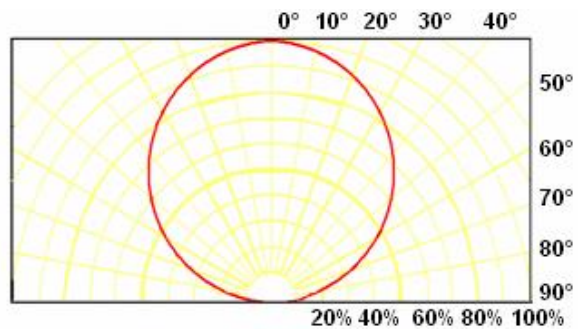


Fig.5 IF-Ta



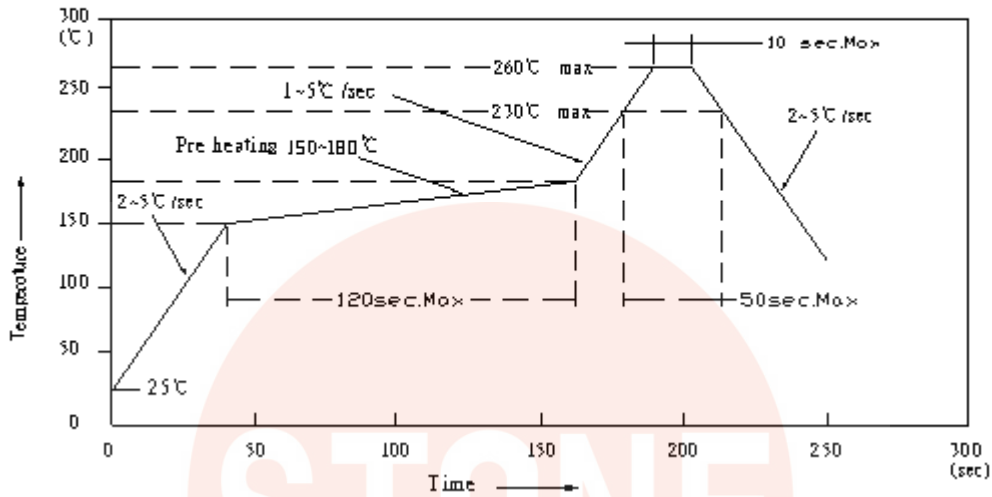
Directive Characteristics (Ta=25°C)



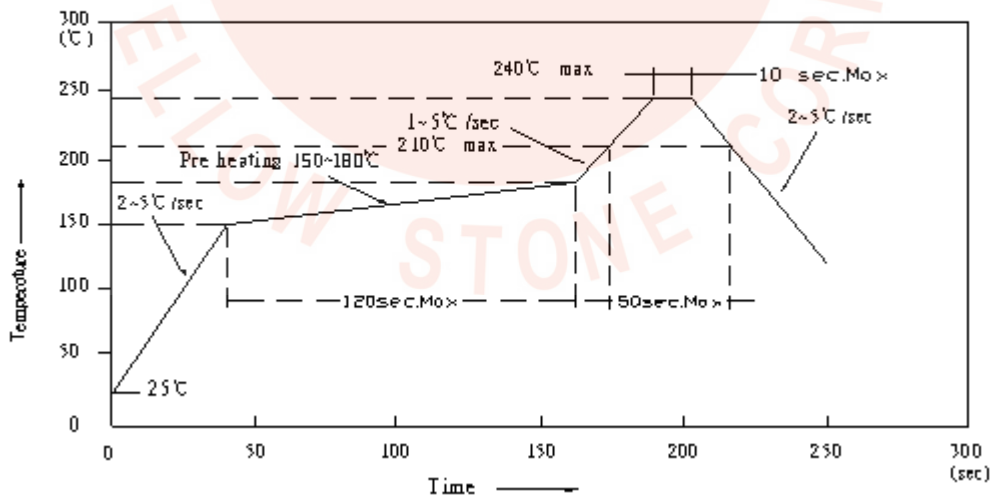
## Reflow Profile

### ■ Reflow Temp/Time

**IR Reflow Soldering Profile  
Lead Free Solder**



**IR Reflow Soldering Profile  
Lead Solder**

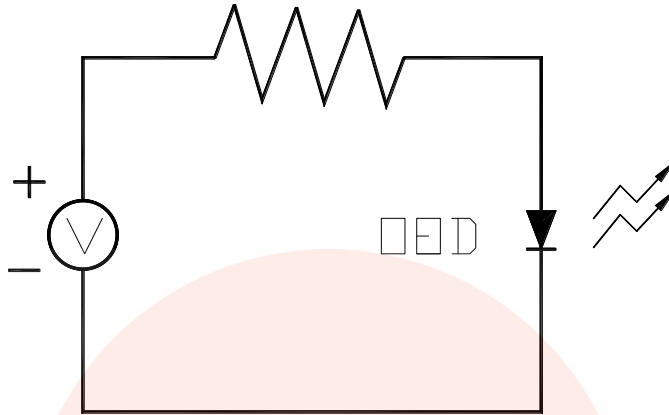


#### NOTES:

1. We recommend the reflow temperature 240°C(±5°C).the maximum soldering temperature should be limited to 260°C.
2. Don't cause stress to the silicone resin while it is exposed to high temperature.
3. Number of reflow process shall be 1 time.

## Test circuit and handling precautions

### ■ Test circuit



### ■ Handling precautions

#### 1. Over-current-proof

Customer must apply resistors for protection; otherwise slight voltage shift will cause big current change (Burn out will happen).

#### 2.Storage

2.1 It is recommended to store the products in the following conditions:

Humidity: 60% R.H. Max.

Temperature : 5°C~30°C (41°F~86°F)

2.2 Shelf life in sealed bag: 12 month at <math> < 5^{\circ}\text{C} \sim 30^{\circ}\text{C}</math> and <math> < 60\% \text{ R.H.}</math> after the package is Opened, the products should be used within a week or they should be keeping to stored at  $\leq 20\% \text{ R.H.}$  with zip-lock sealed.

#### 3.Baking

It is recommended to baking before soldering when the pack is unsealed after 24hrs. The Conditions are as followings:

3.1  $70 \pm 3^{\circ}\text{C}$  x(12~24hrs) and <math> < 5\% \text{ RH}</math>, taped reel type

3.2  $100 \pm 3^{\circ}\text{C}$  x(45min~1hr), bulk type

3.3  $130 \pm 3^{\circ}\text{C}$  x(15~30min), bulk type

## Test items and results of reliability

| Type                   | Test Item                    | Test Conditions                               | Note      | Number of Damaged |
|------------------------|------------------------------|---|-----------|-------------------|
| Environmental Sequence | Temperature Cycle            | -45°C 30min<br>↑ ↓ 20 min<br>105°C 30min      | 100 cycle | 0/22              |
|                        | Thermal Shock                | -10°C 15min<br>↑ ↓ 5sec<br>100°C 15min        | 100 cycle | 0/22              |
|                        | High Humidity Heat Cycle     | 30°C ⇔ 65°C<br>90%RH 24hrs/1cycle             | 10 cycle  | 0/22              |
|                        | High Temperature Storage     | T <sub>a</sub> =100°C                         | 1000 hrs  | 0/22              |
|                        | Humidity Heat Storage        | T <sub>a</sub> =85°C<br>RH=85%                | 1000 hrs  | 0/22              |
|                        | Low Temperature Storage      | T <sub>a</sub> =-40°C                         | 1000 hrs  | 0/22              |
| Operation Sequence     | Life Test                    | T <sub>a</sub> =25°C<br>I <sub>F</sub> =60mA  | 1000 hrs  | 0/22              |
|                        | High Humidity Heat Life Test | 85°C RH=85%<br>I <sub>F</sub> =30mA           | 500 hrs   | 0/22              |
|                        | Low Temperature Life Test    | T <sub>a</sub> =-20°C<br>I <sub>F</sub> =60mA | 1000 hrs  | 0/22              |







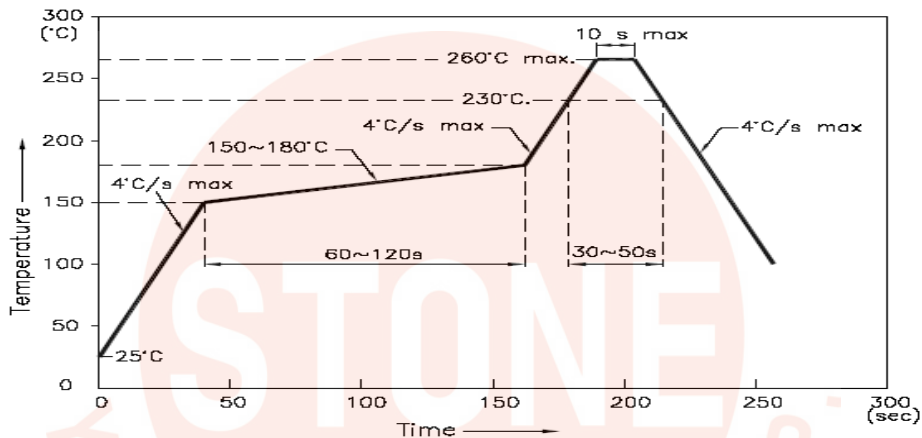
## LED Usage and Handling Instructions

### No.1 、Soldering

A 、It is not better to be manual soldering.

B 、Reflow soldering :

1 、Soldering according to the following temperature chart is highly recommended



### 2 、Soldering paste

Use soldering paste with the melting point at 230°C is recommended

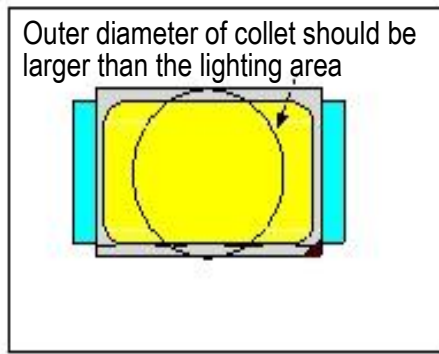
### No.2 、Collet

1 、Abnormal situation caused by improper setting of collet

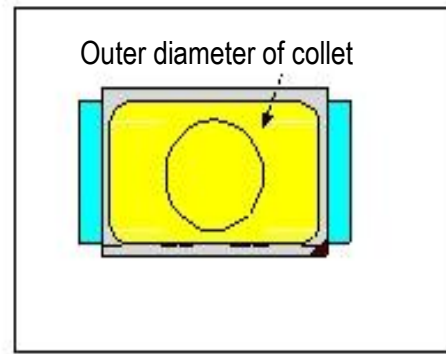
To choose the right collet is the key issue in improving the product's quality. LED is different from other electronic components, which is not only about electrical output but also for optical output. This characteristic made LED more fragile in the process of SMT. If the collet's lowering down height is not well set, it will bring damage to the gold wire at the time of collet's picking up and loading which will cause the LED fail to light up, light up now and then or other quality problems

2 、How to choose the collet

During SMT, please choose the collet that has larger outer diameter than the lighting area of lens, in case that improper position of collet will damage the gold wire inside the LED. Different collets fit for different products, please refer to the following pictures cross out:



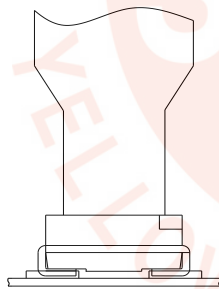
Picture 1 (✓)



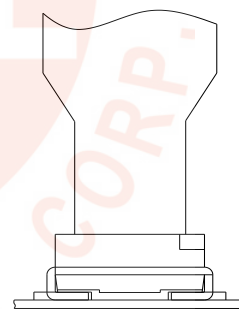
Picture 2 (✗)

### 3、How to set the height of collet

The reason why for top view SMD, the height of collet before it presses downward will directly affect the quality of products during SMT is that if the collet go down too much, it will press lens and cause the distortion or breaking of gold wire. The setting of collet position should follow the pictures belowed.



Picture 3 (✓)



Picture 4 (✗)

### No.3、Other points for attention

- A、No pressure should be exerted to the epoxy shell of the SMD under high temperature.
- B、Do not scratch or wipe the lens since the lens and gold wire inside are rather fragile and cross out easy to break.
- C、LED should be used as soon as possible when being taken out of the original package, and should be stored in anti-moisture and anti-ESD package.

No.4、This usage and handling instruction is only for your reference.