



# 深圳市锐硕光电有限公司

Shenzhen Ruishuo Optoelectronic Co.,Ltd

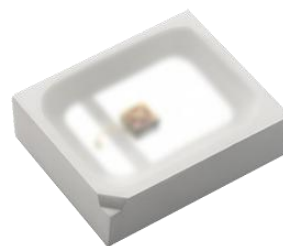
## SPECIFICATIONS FOR T20 SERIES MONOCHROMATIC LIGHT LED

Model: 2016

Part No: T20\*\*011F-\*\*\*\*\*

**Features:**

- \* Top view white LED
- \* Thermally Enhanced Package Design
- \* High luminous flux output
- \* High current capability
- \* Compact Package Size
- \* Wide viewing angle
- \* Pb-free Reflow Soldering Application
- \* The product itself will remain within RoHS compliant version

**Applications**

- \* Interior lighting
- \* Retrofits (replacement)
- \* General lighting
- \* Architectural / Decorative lighting

## Part Numbering System

T                                           -                                 

|    |    |    |    |    |    |    |    |    |     |
|----|----|----|----|----|----|----|----|----|-----|
| X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | X10 |
|----|----|----|----|----|----|----|----|----|-----|

| Item Number Code | Description          | Content                                                                                                                                                |
|------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| X1               | Type code            | 1S:1010; 1A:1919; 20:2016; 3B:3014; 28:2835<br>34:3020; 3C:3030; 5C:5050; 7C:7070; 1D:100100;<br>19: Ceramic 3535; 15: Ceramic 5050; 11: Ceramic 1616. |
| X2               | CCT code             | 2700K:27; 3000K:30; 4000K:40;<br>5000K:50; 5700K:57; 6500K:65.                                                                                         |
| X3               | Color Rendering      | Ra70:7; Ra80:8; Ra90:9.                                                                                                                                |
| X4               | No. of serial chip   | 1-Z.                                                                                                                                                   |
| X5               | No. of parallel chip | 1-Z.                                                                                                                                                   |
| X6               | Component code       | A-Z.                                                                                                                                                   |
| X7               | Color Code           | M:ANSI; F:ERP; R:85℃ ANSI; T:105℃ ANSI;<br>B:Backlighting; Q:Others; AT:Tospo                                                                          |
| X8               | Internal code1       | \                                                                                                                                                      |
| X9               | Internal code2       | \                                                                                                                                                      |
| X10              | Spare code           | \                                                                                                                                                      |

### Electro Optical Characteristics, IF = 40mA, Tj=25°C

| Color  | Luminous Flux |     |
|--------|---------------|-----|
|        | Typ           | Min |
| RED    | 5.5           | 2   |
| YELLOW | 5             | 2   |
| BLUE   | 2.3           | 1   |
| GREEN  | 10            | 8   |

\* Tolerance of measurements of the Luminous Flux is  $\pm 7\%$ .

### Absolute Maximum Ratings at Tj=25°C

| Item                  | Symbol | Absolute Maximum Rating                    |     | Unit |
|-----------------------|--------|--------------------------------------------|-----|------|
| Forward current       | IF     | 50                                         |     | mA   |
| Pulse Forward current | IFP    | 75                                         |     | mA   |
| Reverse Voltage       | VR     | 5                                          |     | mW   |
| Power Dissipation     | PD     | RED                                        | 130 | mW   |
|                       |        | YELLOW                                     | 130 |      |
|                       |        | BLUE                                       | 170 |      |
|                       |        | GREEN                                      | 170 |      |
| Operating Temperature | Topr   | -40~+105                                   |     | °C   |
| Storage Temperature   | Tstg   | -40~+85                                    |     | °C   |
| Junction Temperature  | Tj     | 110                                        |     | °C   |
| Soldering Temperature | Tsld   | Reflow Soldering: 230°C or 260°C for 10sec |     |      |

\* IFP condition with Pulse: Width≤100μs, Duty cycle≤1/10.

\* LED's properties might be different from suggested values like above and below tables if operation condition will be exceeded our parameter range. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.

\* All measurements were made under the standardized environment of Ruishuo LED.

### Electrical/Optical Characteristics at Tj=25°C

| Item                    | Symbol | Colour | Min  | Typ | Max | Unit | Condition |
|-------------------------|--------|--------|------|-----|-----|------|-----------|
| Forward Voltage         | VF     | RED    | -    | 2.1 | 2.6 | V    | IF=40mA   |
|                         |        | YELLOW | -    | 2.3 | 2.6 |      |           |
|                         |        | BLUE   | -    | 2.9 | 3.4 |      |           |
|                         |        | GREEN  | -    | 3.0 | 3.4 |      |           |
| Reverse Current         | IR     | RED    | -    | -   | 10  | μA   | VR=5V     |
|                         |        | YELLOW |      |     |     |      |           |
|                         |        | BLUE   |      |     |     |      |           |
|                         |        | GREEN  |      |     |     |      |           |
| Viewing Angle           | 2θ1/2  | RED    | -    | 120 | -   | °    | IF=40mA   |
|                         |        | YELLOW |      |     |     |      |           |
|                         |        | BLUE   |      |     |     |      |           |
|                         |        | GREEN  |      |     |     |      |           |
| Electrostatic Discharge | ESD    | RED    | 1000 | -   | -   | V    | HBM       |
|                         |        | YELLOW | 1000 | -   | -   |      |           |
|                         |        | BLUE   | 1000 | -   | -   |      |           |
|                         |        | GREEN  | 1000 | -   | -   |      |           |

\* Tolerance of measurements of the Forward Voltage is ±0.1V.

\* 2θ1/2 is the off-axis where the luminous intensity is 1/2 of the peak intensity.

## Bin Structure

### Luminous Flux Ranks, IF = 40mA, Tj =25°C

| Luminous Flux |     |     |
|---------------|-----|-----|
| Code          | Min | Max |
| AA            | 0   | 2   |
| AB            | 2   | 4   |
| AC            | 4   | 6   |
| AD            | 6   | 8   |
| AE            | 8   | 10  |
| AF            | 10  | 14  |
| AG            | 14  | 18  |

\* Tolerance of measurements of the Luminous Flux is  $\pm 7\%$ .

### The main wavelength standard grading, IF = 40mA , Tj = 25°C

| Color  | Min | Max | Unit 单位 |
|--------|-----|-----|---------|
| RED    | 620 | 625 | nm      |
|        | 625 | 630 | nm      |
|        | 630 | 635 | nm      |
| YELLOW | 585 | 590 | nm      |
|        | 590 | 595 | nm      |
|        | 595 | 600 | nm      |
| BLUE   | 455 | 460 | nm      |
|        | 460 | 465 | nm      |
|        | 465 | 470 | nm      |
| GREEN  | 520 | 525 | nm      |
|        | 525 | 530 | nm      |
|        | 530 | 535 | nm      |

\* Tolerance of measurements of the WD is  $\pm 1\text{nm}$ .

**Forward Voltage Ranks, IF = 40mA, Tj =25°C**

| Code          | Min | Max | Unit |
|---------------|-----|-----|------|
| RED<br>YELLOW | 1.8 | 2.0 | V    |
|               | 2.0 | 2.2 | V    |
|               | 2.2 | 2.4 | V    |
|               | 2.4 | 2.6 | V    |
| BLUE<br>GREEN | 2.6 | 2.8 | V    |
|               | 2.8 | 3.0 | V    |
|               | 3.0 | 3.2 | V    |
|               | 3.2 | 3.4 | V    |

\* Tolerance of measurements of the Forward Voltage is  $\pm 0.1V$ .

Fig 1. Color Spectrum, Tj = 25°C

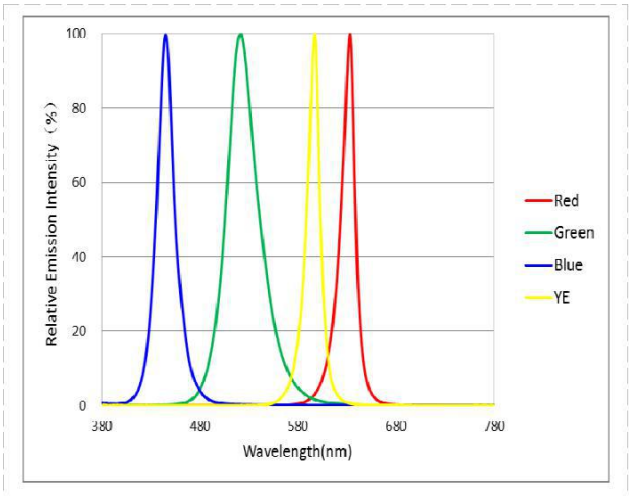
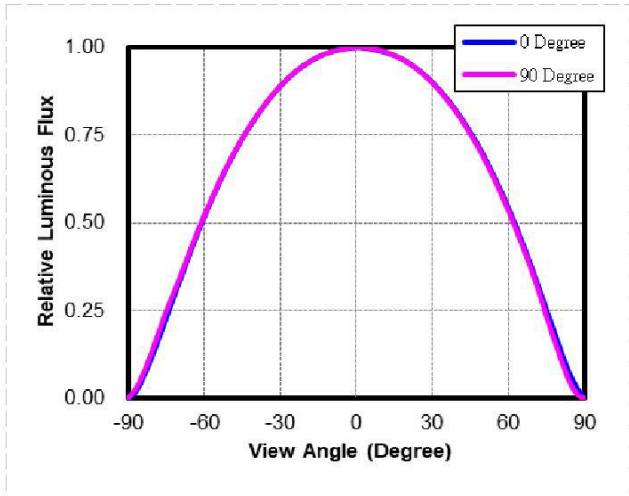
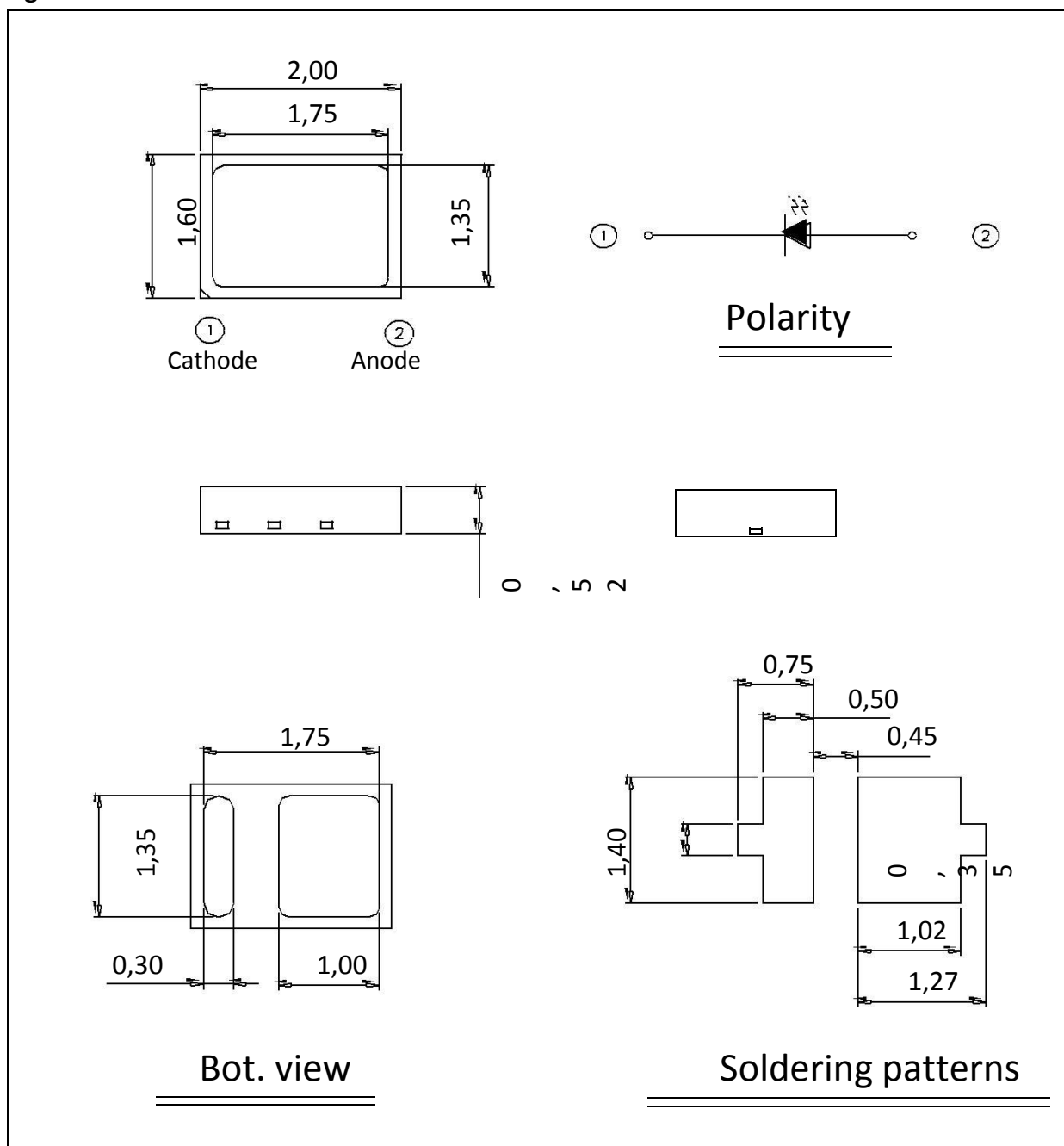


Fig 2. Viewing Angle Distribution, Tj = 25°C

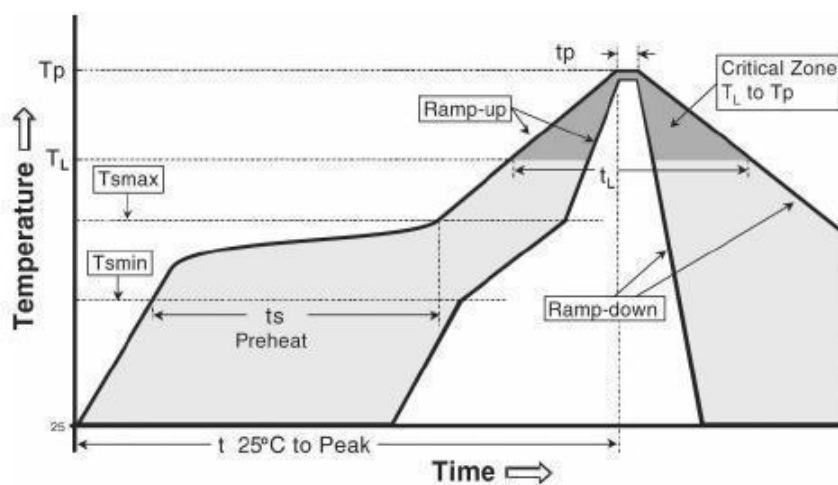


## Package Dimensions



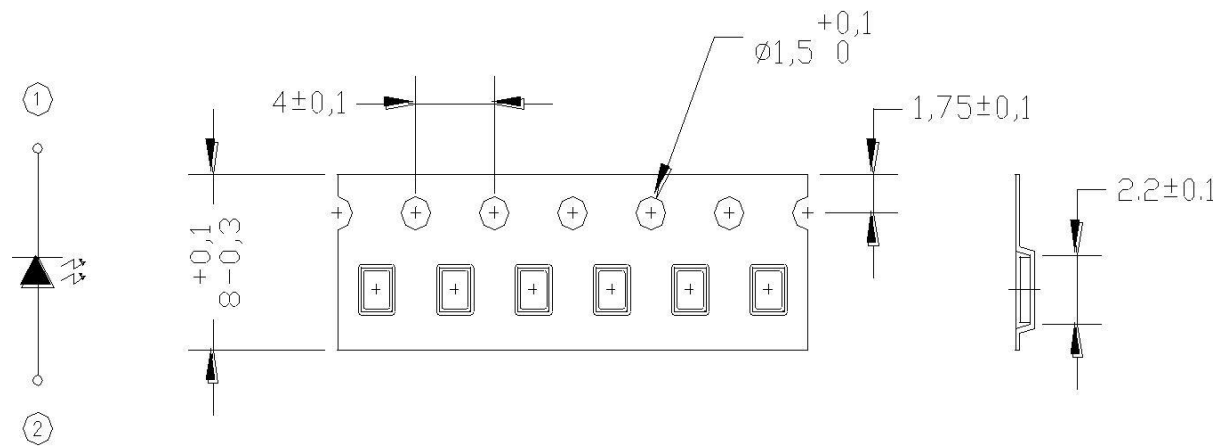
\* The tolerance unless mentioned is  $\pm 0.1\text{mm}$ , unit = mm

## Reflow Soldering Characteristics



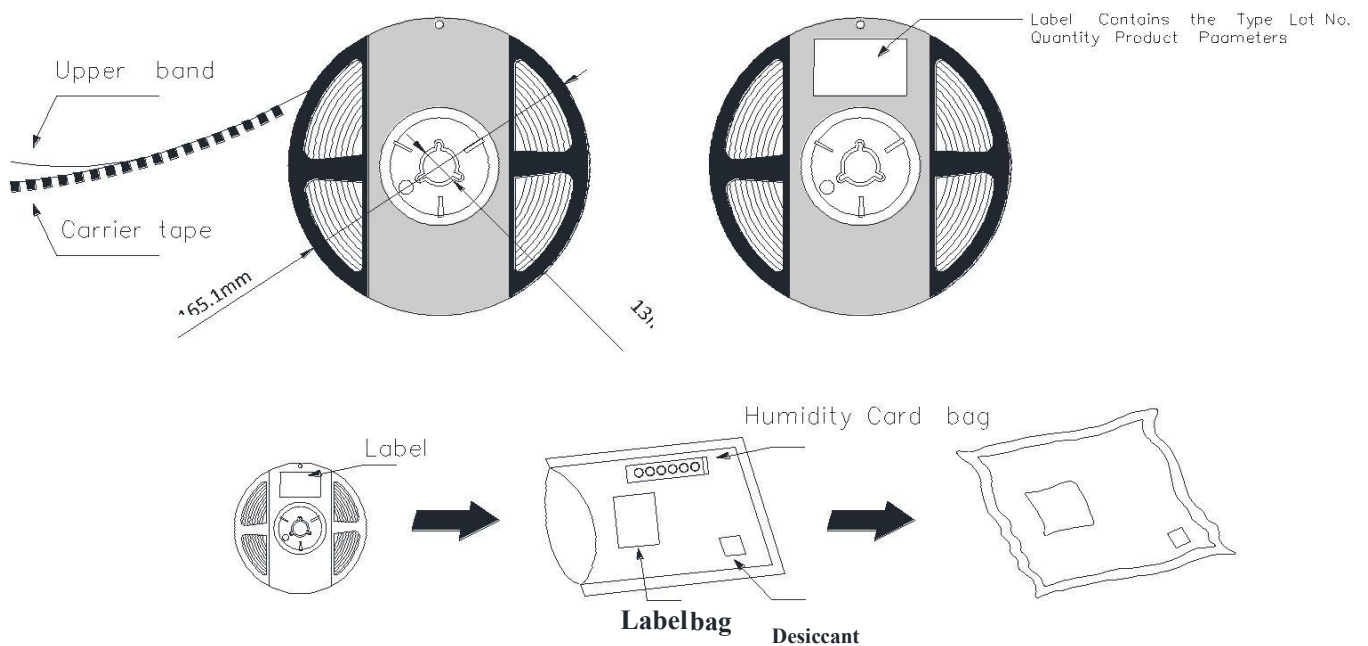
| Reflow soldering                                                                                  |                   |
|---------------------------------------------------------------------------------------------------|-------------------|
| Temperature Min (T <sub>smin</sub> )                                                              | 150° C            |
| Temperature Max (T <sub>smax</sub> )                                                              | 200° C            |
| Time(t <sub>s</sub> )from ( T <sub>smin</sub> to T <sub>smax</sub> )                              | 60-120 seconds.   |
| Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )                                                  | 3° C/seconds max. |
| Liquidous temperature( T <sub>L</sub> )                                                           | 217° C            |
| Time(t <sub>L</sub> ) maintained above T <sub>L</sub>                                             | 60-150 seconds    |
| Peak package body temperature( T <sub>p</sub> )                                                   | 260° C max        |
| Time (t <sub>p</sub> ) within 5° C of the specified classification temperature (T <sub>c</sub> ). | 30 seconds max    |
| Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )                                                | 6° C/second max   |
| Time 25 ° C to peak temperature                                                                   | 8 min max         |

## Package Dimensions of Tape

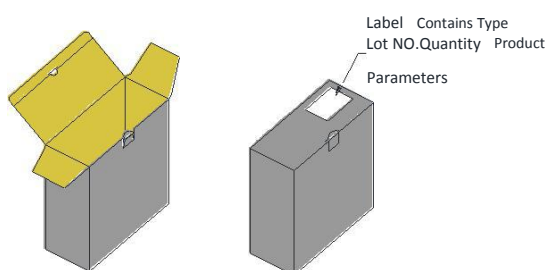


- \* Quantity : Max 5000pcs/Reel
- \* Cumulative Tolerance : Cumulative Tolerance/10 pitches to be  $\pm 0.2\text{mm}$
- \* Package : P/N, Manufacturing data Code No. and Quantity to be indicated on a damp proof Package.
- \* unit = mm

## Package Dimensions of Reel

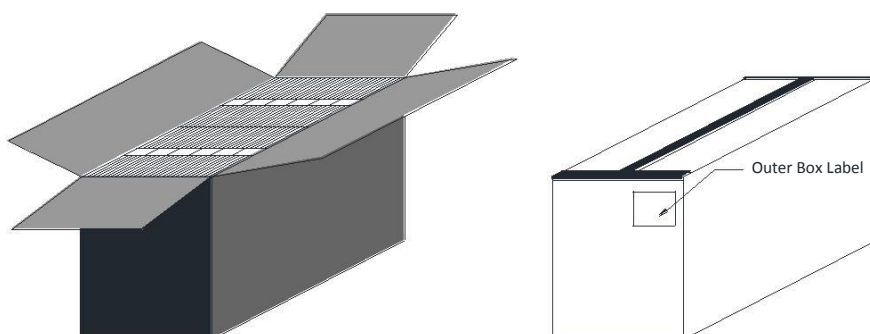


## Package Box



\* Capacity 10 reels per box.

## Outer Box



\* Capacity 30 or 60 reels per box.

## Label

### **Caution**

1. Reflow soldering is recommended not to be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs will be damaged.
2. Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LEDs during heating.
5. After soldering, do not warp the circuit board.

### **Notes on Ruishuo EMC Series soldering:**

1. Recommend to use reflow machine.
2. Recommend to use heating plate soldering.
3. Manual soldering is not recommended.

### **Notes on reflow process:**

1. To confirm whether the actual temperature curve in the reflow soldering conditions comply with recommended conditions. LEDs are guaranteed for one time reflow.
2. During reflow process do not apply force on LED active area.
3. After reflow process, PCB board should be cooled down before packing or storage.