

# SPECIFICATION

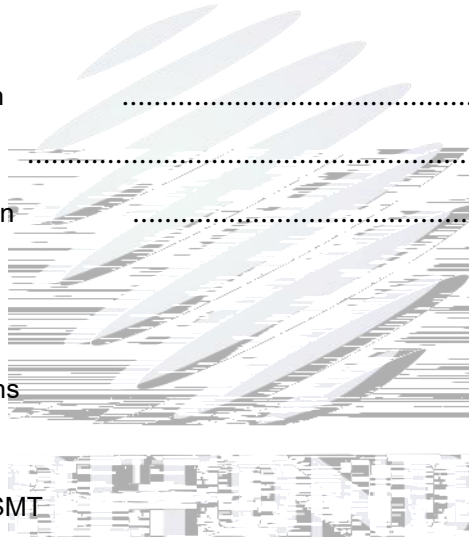
REFOND P/N

RF-IPD4428TS-14-G-P

Mass Product

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## General Description

This product uses the lead-free package, it has a high reliability.

Size: 4.42mmX2.76mmX3.74mm.

BT

4.42mmX2.76mmX3.74mm.

## 2. Features

ge.

- ▶ Peak wavelength  $\lambda_p=940\text{nm}$   $\lambda_p=940\text{nm}$
- ▶ Suitable for all SMT assembly and solder process.

Reliability level: Level 3.

- ▶ R



## 1.4 Package Dimension

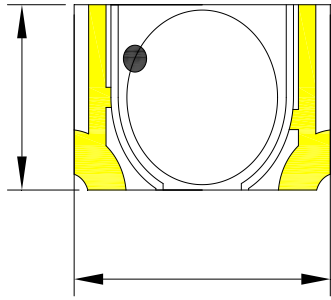


Fig.1-1 Top view

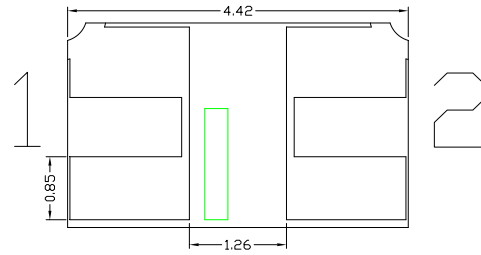


Fig.1-2 Bottom view

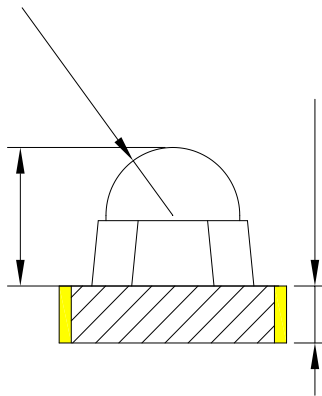


Fig.1-3 Side view

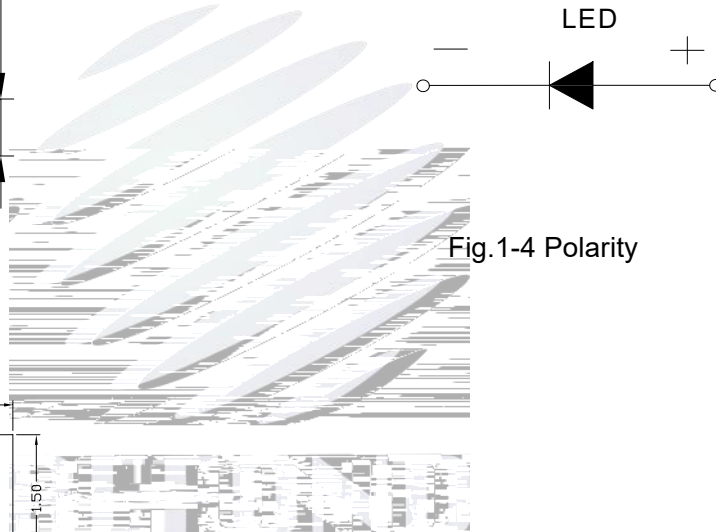


Fig.1-4 Polarity

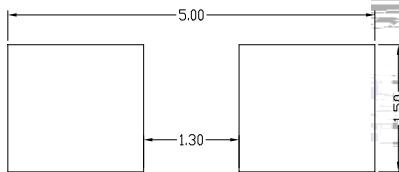


Fig.1-5 Soldering patterns

### Notes

All dimensions units are millimeters.

All dimensions tolerances are  $\pm 0.2\text{mm}$  unless otherwise noted.

## 1.5 Product Parameters

Table 1-1 Electrical / Optical Characteristics at Ts=25°C

| Item                         | Symbol          | Test Condition | Value |     |      | Unit    |
|------------------------------|-----------------|----------------|-------|-----|------|---------|
|                              |                 |                | Min.  | Typ | Max. |         |
| Reverse Current              | $I_R$           | $V_R=5V$       | ---   | --- | 5    | $\mu A$ |
| Forward Voltage              | $V_F$           | $I_F=50mA$     | 1.1   | 1.3 | 1.6  | V       |
| Peak Wavelength              | $\lambda_p$     | $I_F=50mA$     | ---   | 940 | ---  | nm      |
| Spectrum Radiation Bandwidth | $\Delta\lambda$ | $I_F=50mA$     | ---   | 45  | ---  | nm      |
| Radiant Intensity            | $\Phi_e$        | $I_F=50mA$     | 60    | --- | ---  | mW/sr   |
| Viewing Angle                | 2 $\theta$ 1/2  | $I_F=50mA$     | ---   | 30  | ---  | deg     |
| Thermal Resistance.          | $R_{THJ-S}$     | $I_F=50mA$     | ---   | 450 | ---  | /W      |

Notes :  $V_R=5V$  For test conditions:  $V_R=5V$

Table 1 Absolute Maximum Ratings at Ts=25°C

| Symbol          | Parameter                        | Unit | Value      |
|-----------------|----------------------------------|------|------------|
| $I_F$           | Forward Current                  | mA   | 20         |
| $V_F$           | Forward Voltage                  | V    | 2.0        |
| $\lambda_d$     | Dominant Wavelength              | nm   | 625        |
| $I_{LW}$        | Luminous Intensity               | mcd  | 10         |
| $\theta_{1/2}$  | Viewing Angle                    | °    | 30         |
| $T_{jmax}$      | Junction Temperature             | °C   | 100        |
| $T_{stg}$       | Storage Temperature              | °C   | -40 to 100 |
| $T_{op}$        | Operating Temperature            | °C   | -40 to 100 |
| $T_{sol}$       | Soldering Temperature            | °C   | 260        |
| $T_{reflow}$    | Reflow Temperature               | °C   | 260        |
| $T_{wave}$      | Wave Soldering Temperature       | °C   | 260        |
| $T_{lead}$      | Lead Temperature                 | °C   | 350        |
| $T_{case}$      | Case Temperature                 | °C   | 100        |
| $T_{amb}$       | Ambient Temperature              | °C   | 25         |
| $P_{tot}$       | Total Power Dissipation          | mW   | 100        |
| $P_{case}$      | Case Power Dissipation           | mW   | 100        |
| $P_{lead}$      | Lead Power Dissipation           | mW   | 100        |
| $P_{solder}$    | Solder Power Dissipation         | mW   | 100        |
| $P_{wave}$      | Wave Soldering Power Dissipation | mW   | 100        |
| $P_{reflow}$    | Reflow Power Dissipation         | mW   | 100        |
| $P_{storage}$   | Storage Power Dissipation        | mW   | 100        |
| $P_{operating}$ | Operating Power Dissipation      | mW   | 100        |

Notes

- 1/10 Duty cycle, 0.1ms pulse width.
- The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ .
- The above dominant wavelength measurement allowance tolerance is  $\pm 2nm$ .
- The above luminous intensity measurement allowance tolerance  $\pm 10\%$ .
- 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.
- When the LEDs are in operation the maximum current should be decided after measuring the package temperature, junction temperature should not exceed the maximum rate.

REVISION HISTORY

| REV. | DESCRIPTION                       | DATE       |
|------|-----------------------------------|------------|
| 01   | Initial Release                   | 2018-08-01 |
| 02   | Update Pin Configuration          | 2019-03-15 |
| 03   | Change Electrical Characteristics | 2019-06-20 |
| 04   | Revise Mechanical Dimensions      | 2020-01-10 |
| 05   | Update RoHS Compliance            | 2020-05-01 |
| 06   | Final Release                     | 2020-09-01 |

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## 1.6 Typical Optical Characteristics Curves

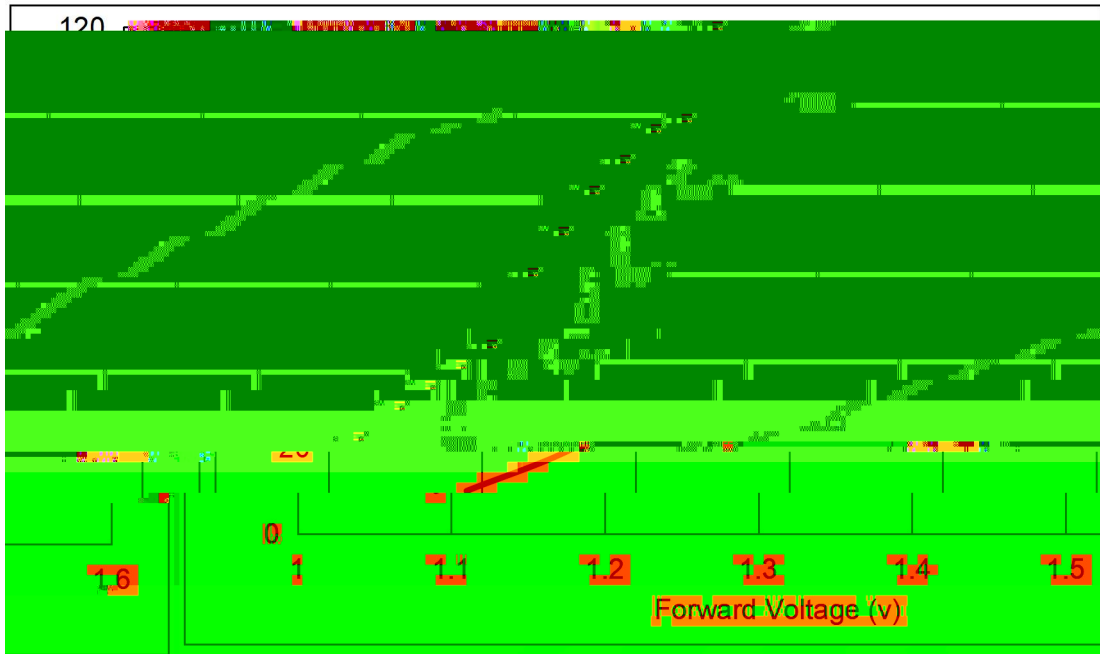


Fig 1-6 Forward Voltage Vs Forward Current

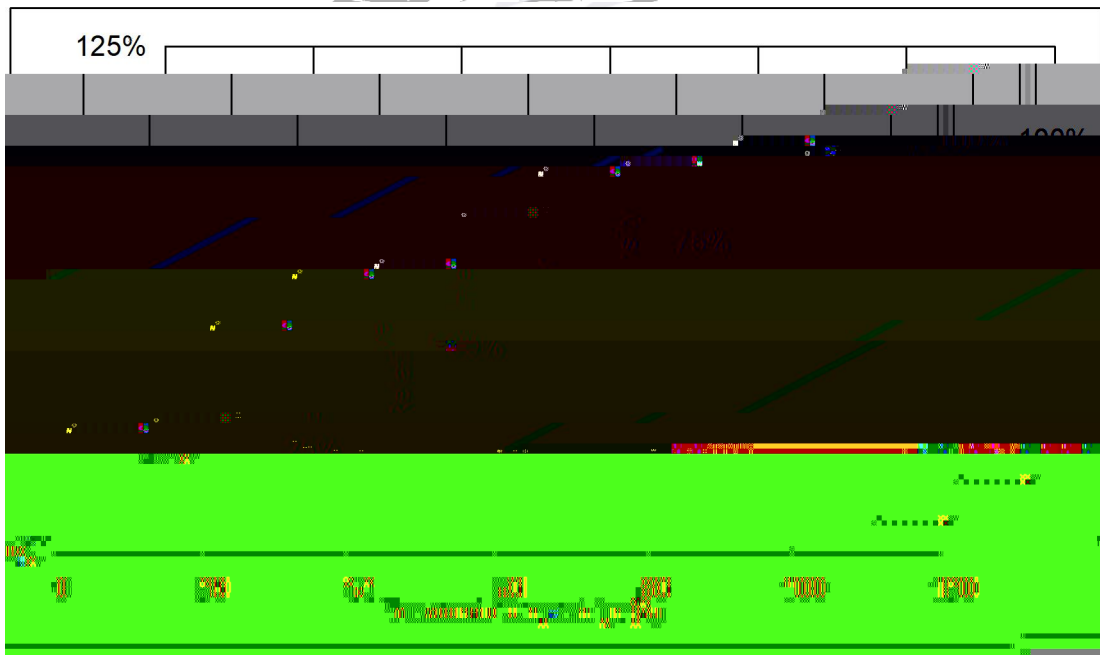


Fig 1-7 Forward Current Vs Relative Intensity

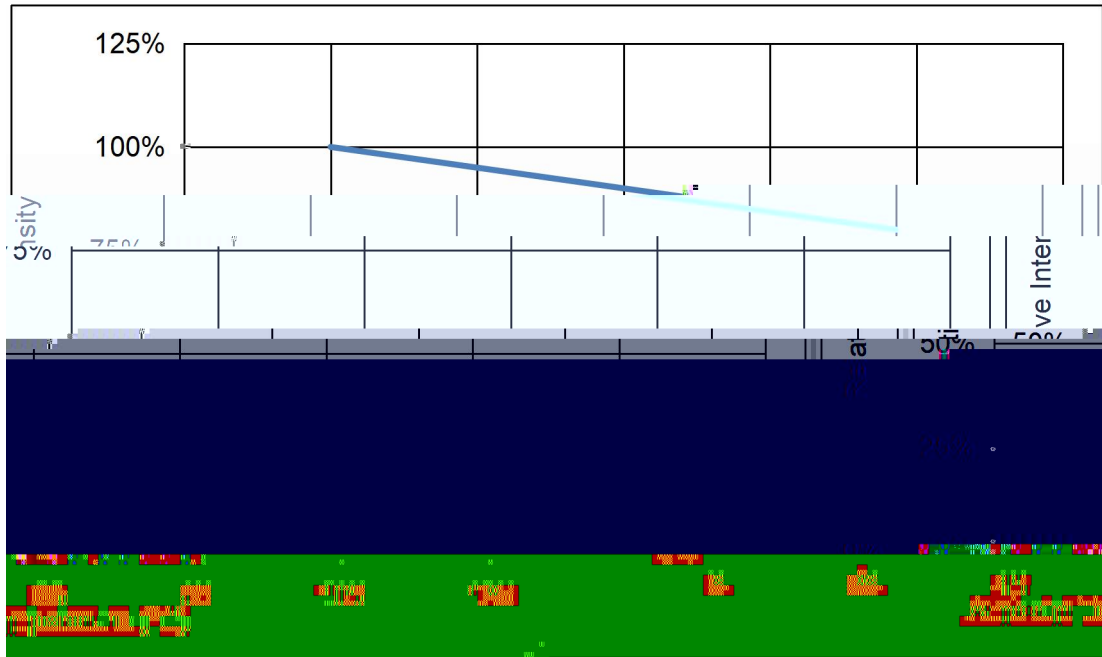


Fig 1-8 Pin Temperature Vs Relative Intensity

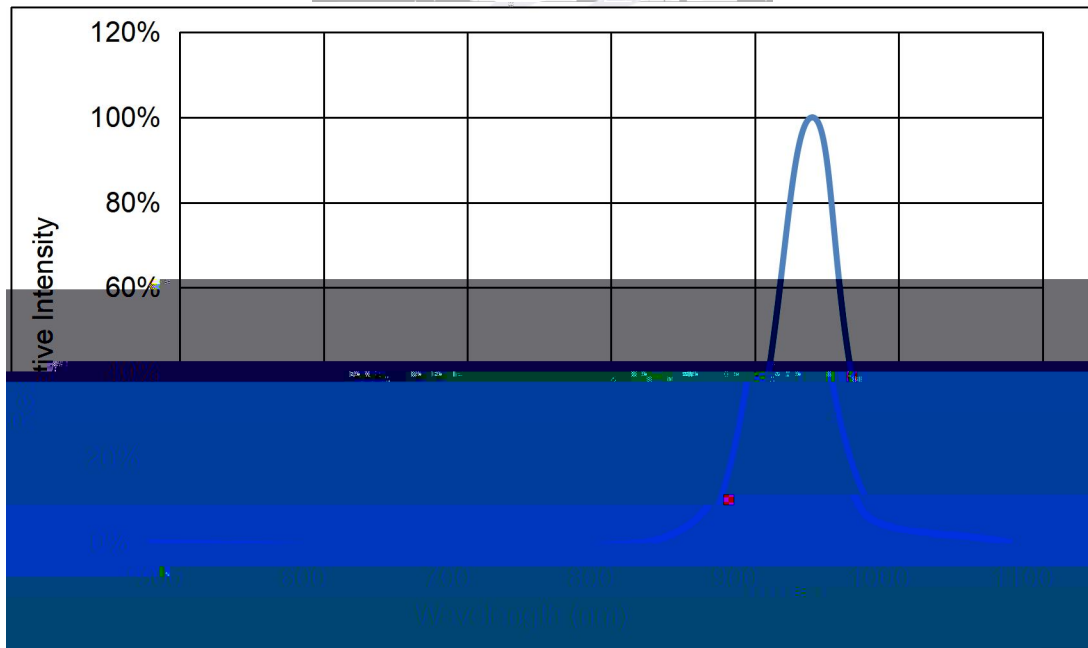
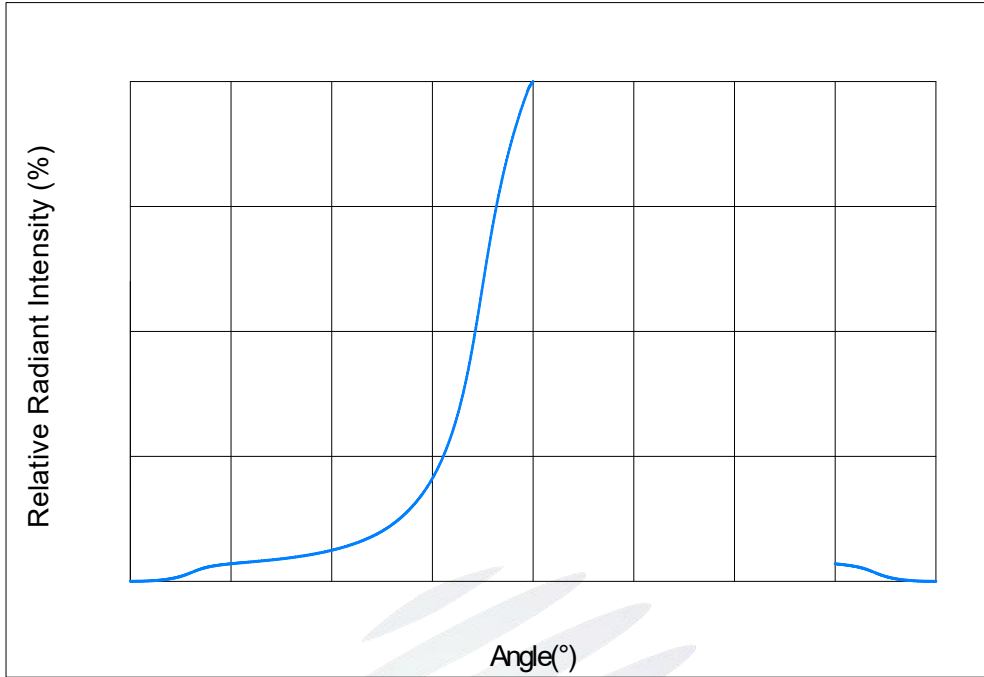


Fig 1-9 Spectrum Distribution



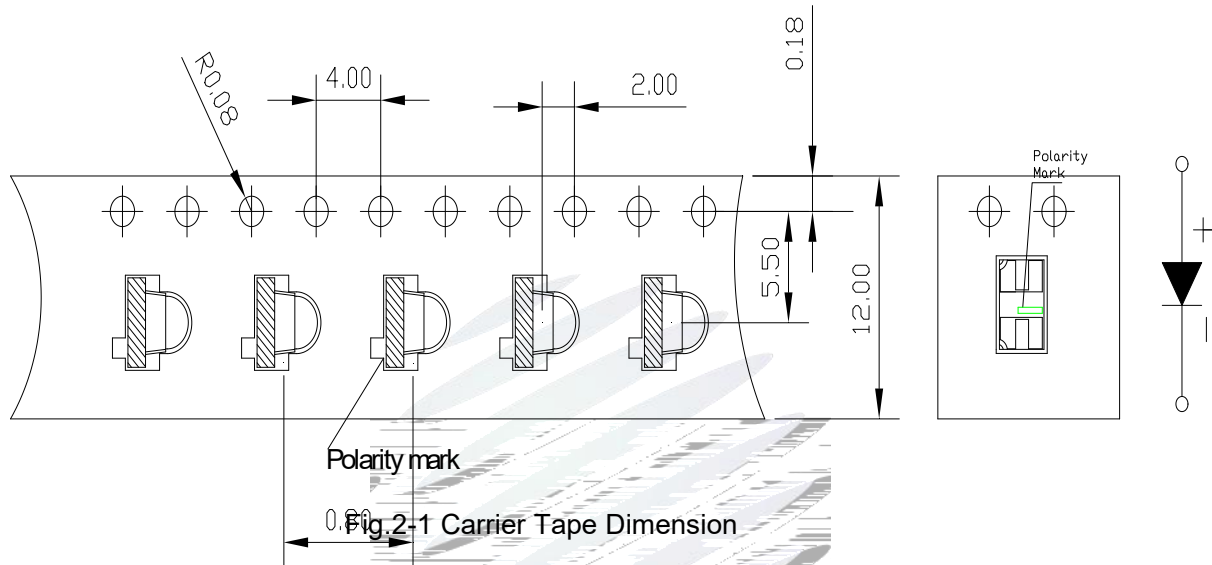


## 2. Packaging

### 2.1 Packaging Specification

Package: 2500pcs/reel.      2500pcs

#### 2.1.1 Carrier Tape Dimension



#### 2.1.2 Reel Dimension

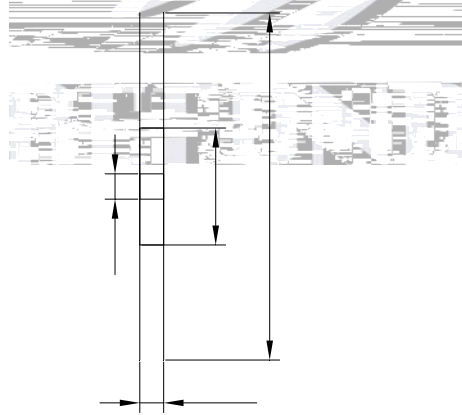
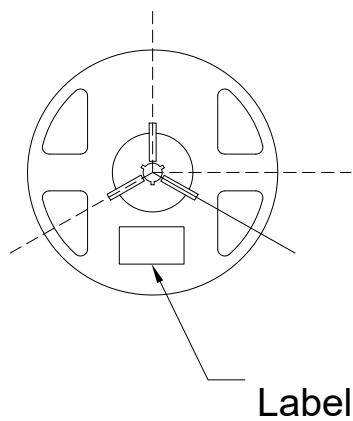


Table 2-1 Dimension

|   |             |
|---|-------------|
| A | 12.7 ±0.3mm |
| B | 330.2±2mm   |
| C | 79.5±1mm    |
| D | 14.3±0.2mm  |

Fig.2-2 Reel Dimension

#### Notes

The tolerances unless mentioned  $\pm 0.1\text{mm}$ . Unit : mm

### 2.1.3 Label Form Specification



## 2.4 Reliability Test Items And Conditions

Table 2-3 Reliability Test Items And Conditions

| Test Items               | Ref.Standard | Test Condition                              | Time       | Quantity | Ac/Re / |
|--------------------------|--------------|---|------------|----------|---------|
| Reflow                   | JESD22-B106  | Temp:260 max<br>T=10 sec                    | 2 times    | 22Pcs.   | 0/1     |
| Temperature Cycle        | JESD22-A104  | 100 30 min<br>↑↓5 min<br>-40 30 min         | 100 cycles | 22Pcs.   | 0/1     |
| Thermal Shock            | JESD22-A106  | -40 15min<br>↑↓<br>100 15min                | 300 cycles | 22Pcs.   | 0/1     |
| High Temperature Storage | JESD22-A103  | Temp:100                                    | 1000 hrs.  | 22Pcs.   | 0/1     |
| Low Temperature Storage  | JESD22-A119  | Temp:-40                                    | 1000 hrs.  | 22Pcs.   | 0/1     |
| Life Test                | JESD22-A108  | T <sub>a</sub> =25<br>I <sub>F</sub> =100mA | 1000 hrs.  | 22Pcs.   | 0/1     |



### 3. SMT Reflow Soldering Instruction SMT

#### 3.1 SMT Reflow Soldering Instructions SMT

Fig.3-1 SMT Reflow Soldering Instructions SMT

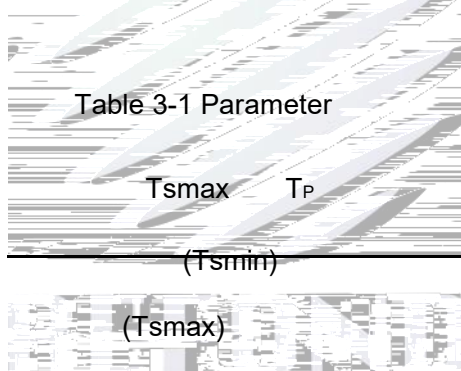


Table 3-1 Parameter

| Parameter  | Symbol                  | Value                  |
|--|-------------------------|------------------------|
| Average temperature rise speed                             | $T_{sm}$                | 3 °C/ s    Max 3 °C/ s |
| Preheating: minimum temperature                            | ( $T_{smmin}$ )         | 150 °C                 |
| Preheating: Max temperature                                | ( $T_{smmax}$ )         | 200 °C                 |
| Preheating: Time   | $T_{smmin}$ $T_{smmax}$ | 60 - 120    60s-120s   |
| Time limited to maintain high temperature: the temperature | ( $T_l$ )               | 217 °C                 |
| Time limited to maintain high temperature: The Time        | ( $t_l$ )               | 60    Max 6            |



## 4. Handling Precautions

### 4.1 Handling Precautions

(1) LED operating environment and sulfur element composition cannot be over 100PPM in the LED mating usage material. This is provided for informational purposes only and is not a warranty or endorsement. LED

(2) In order to prevent external material from getting into the inside of LED, which may cause the malfunction of LED, the single content of Bromine element is required to be less than 900PPM, the single content of Chlorine element is required to be less than 900PPM, the total content of Bromine element and Chlorine element in the external materials of the application products is required to be less than 1500PPM. This is provided for informational purposes only and is not a warranty or endorsement.

(3) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LEDs and discolor when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues. Refond advises against the use of any chemicals or materials that have been found or are suspected to have an adverse affect on device performance or reliability. To verify compatibility, Refond recommends that all chemicals and materials be tested in the specific application and environment for which they are intended to be used. Attaching LEDs, do not use adhesives that outgas organic vapor.

(4) In designing a circuit, the current through each LED can not exceed the absolute maximum rating specified for each LED. In the meanwhile, resistors for protection should be applied,





(8) Similar to most Solid state devices; LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS).

(9) Other points for attention, please refer to our relevant information.







Declare

This specification is written both in English and in Chinese and the latter is formal.