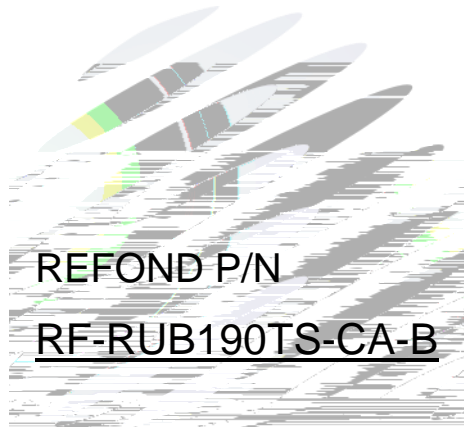


# SPECIFICATION

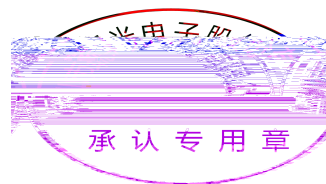


REFOND P/N

RF-RUB190TS-CA-B

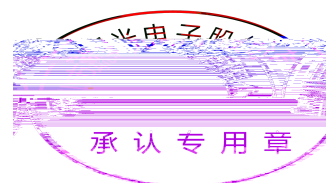
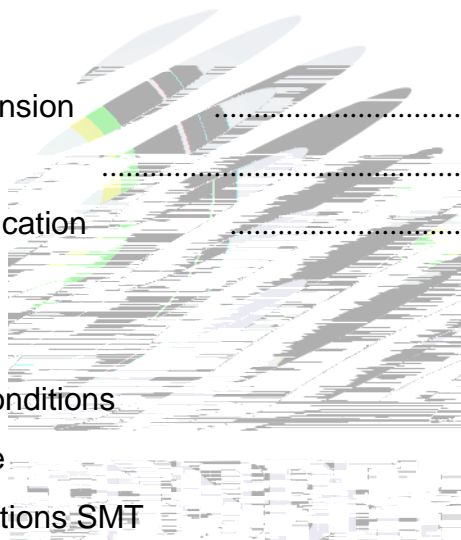


Mass Product



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4.1 Handling Precautions	



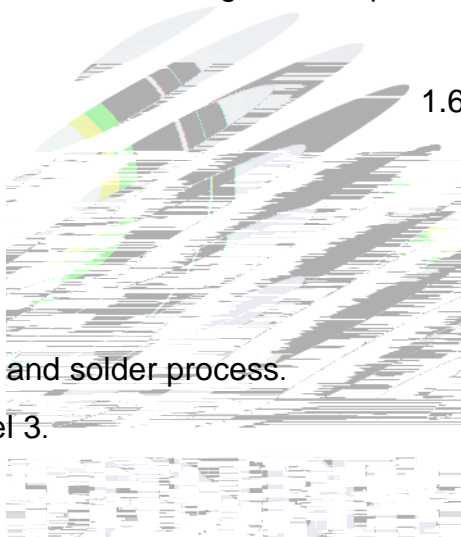
# 1. Description

## 1.1 General Description

The Colour LED which was fabricated using a red chip    Package Dimension :  
1.6mmX0.8mmX0.7mm.

LED

1.6mmX0.8mmX0.7mm



## 1.2 Features

Extremely wide viewing angle.

Suitable for all SMT assembly and solder process.

Moisture sensitivity level: Level 3.

RoHS compliant.

## 1.3 Application

Optical indicator.

Switch and symbol, display.

General use.

## 1.4 Package Dimension

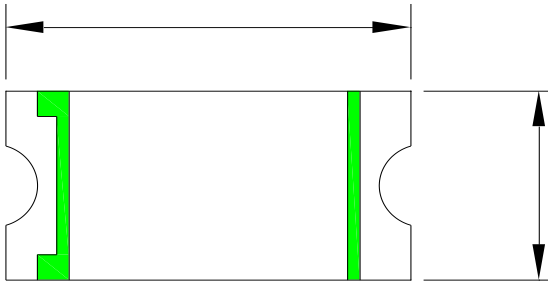


Fig.1-1 Top view

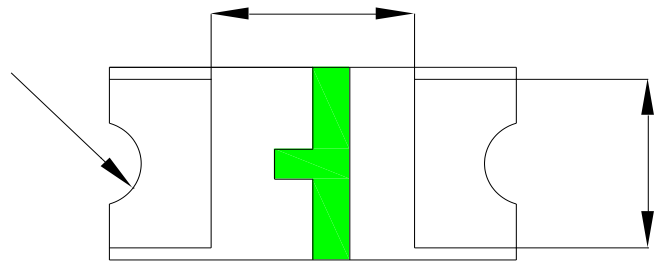


Fig.1-2 Side view

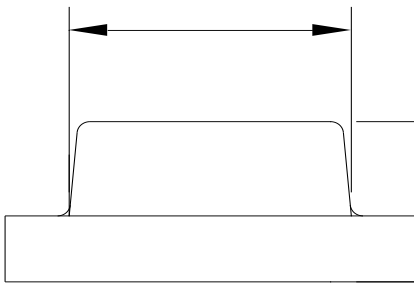


Fig.1-3 Bottom view

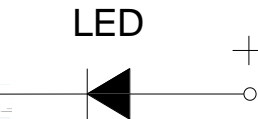
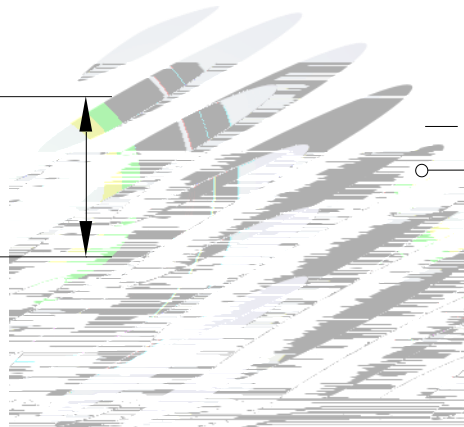


Fig.1-4 Polarity

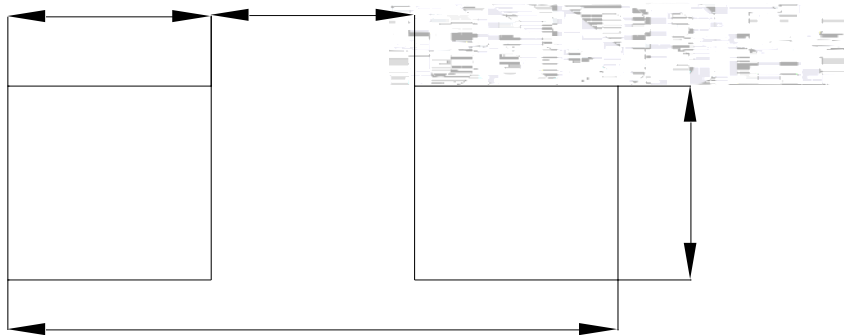
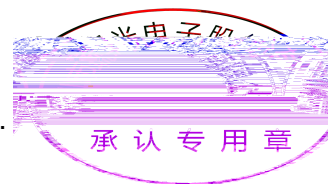


Fig.1-5 Soldering patterns

### Notes

All dimensions units are millimeters.

All dimensions tolerances are 0. mm unless otherwise noted.



## 1.5 Product Parameters

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

Item	Test Condition	Symbol	Value			Unit	
			Min. ( )	Typ.	Max.		
Spectral Half Bandwidth	I <sub>F</sub> =5mA	Δ	--	15	--	nm	
Forward Voltage	I <sub>F</sub> =5mA	V <sub>F</sub>	A0	1.6	--	1.8	V
			B0	1.8	--	2.0	V
			C0	2.0	--	2.2	V
			D0	2.2	--	2.4	V
			E0	2.4	--	2.6	V
Dominant Wavelength	I <sub>F</sub> =5mA	D	F10	625.0	--	627.5	nm
			F20	627.5	--	630.0	nm
			G10	630.0	--	632.5	nm
			G20	632.5	--	635.0	nm
			H10	635.0	--	637.5	nm
			H20	637.5	--	640	nm
Luminous Intensity	I <sub>F</sub> =5mA	I <sub>v</sub>	A00	8	--	12	mcd
			B00	12	--	18	mcd
			C00	18	--	28	mcd
			D00	28	--	43	mcd
			E00	43	--	65	mcd
Viewing Angle	I <sub>F</sub> =5mA		--	140	--	deg	

Reverse C

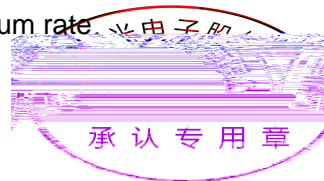
 Notes : V<sub>R</sub>=5V For test conditions. V<sub>R</sub>=5V

Table 1-2 Absolute Maximum Ratings at Ts=25°C

Parameter	Symbol	Rating	Units
Power Dissipation	$P_d$	78	mW
Forward Current	$I_F$	30	mA
Peak Forward Current Of Pulse	$I_{FP}$	60	mA
Electrostatic Discharge (HBM)	$E_{SD}$	2000	V
Operating Temperature	$T_{opr}$	-40 ~ +85	
Storage Temperature	$T_{stg}$	-40 ~ +85	
Junction Temperature	$T_j$	95	

## 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 of Refond.
- 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.



## 1.6 Typical Optical Characteristics Curves

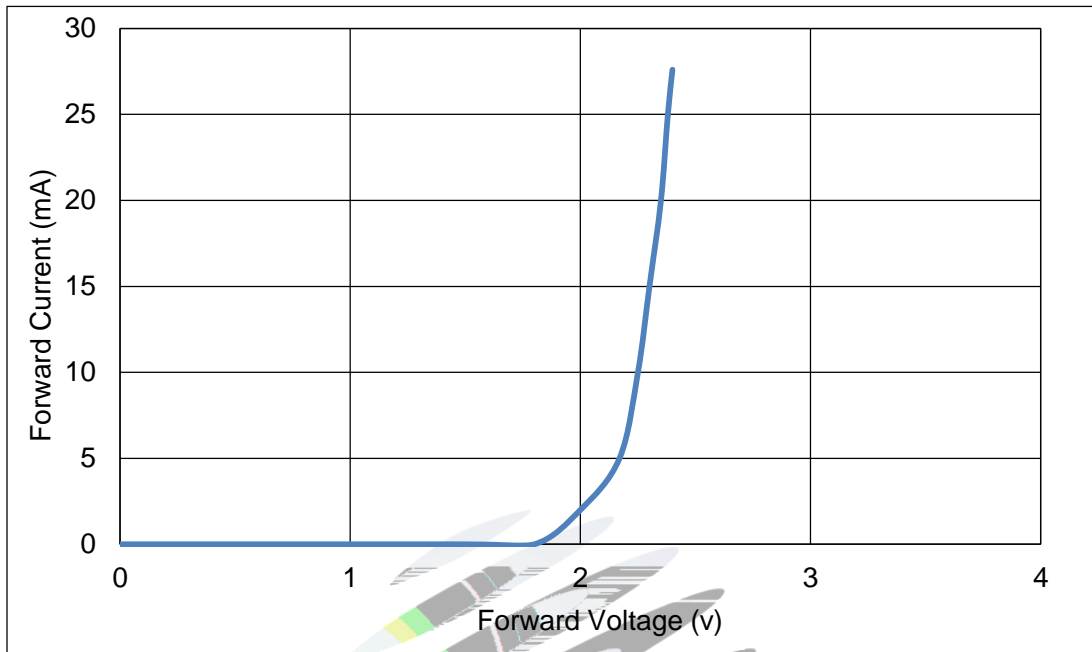


Fig 1-6 Forward Voltage Vs Forward Current

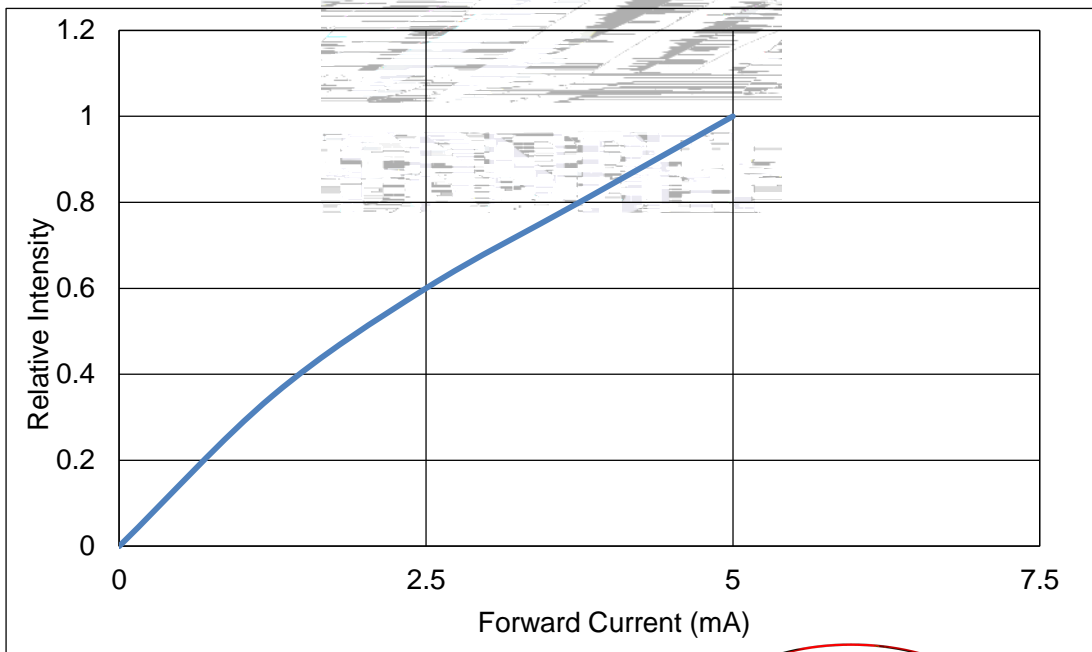
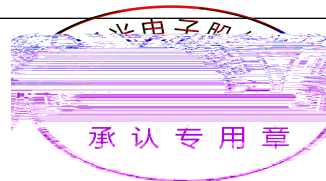


Fig 1-7 Forward Current Vs Relative Intensity



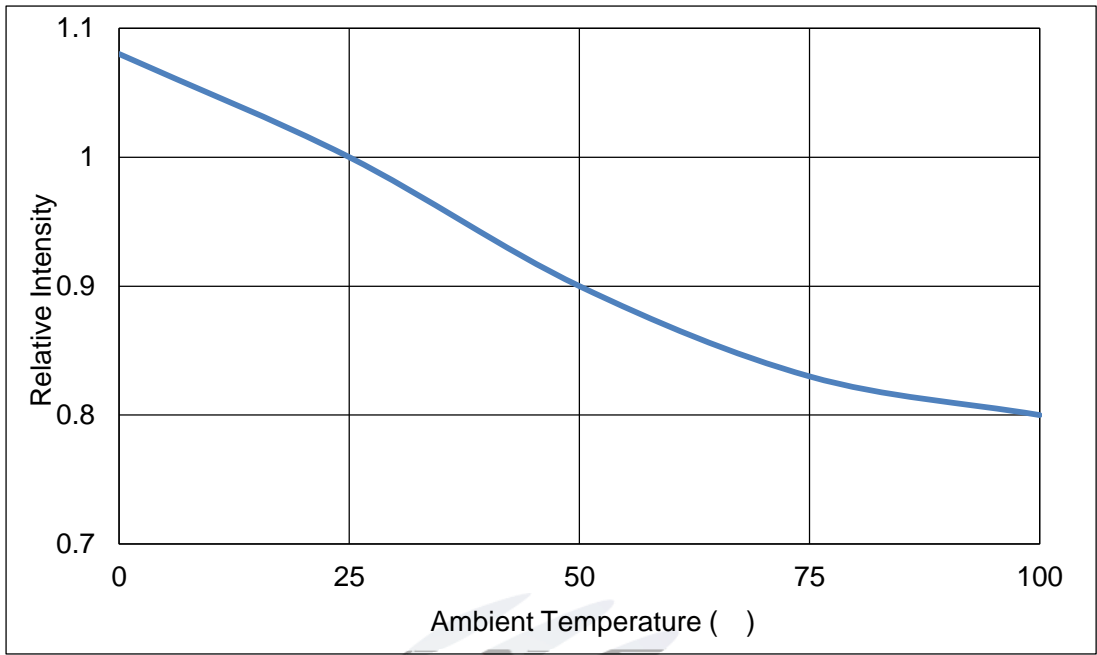


Fig 1-8 Pin Temperature Vs Relative Intensity

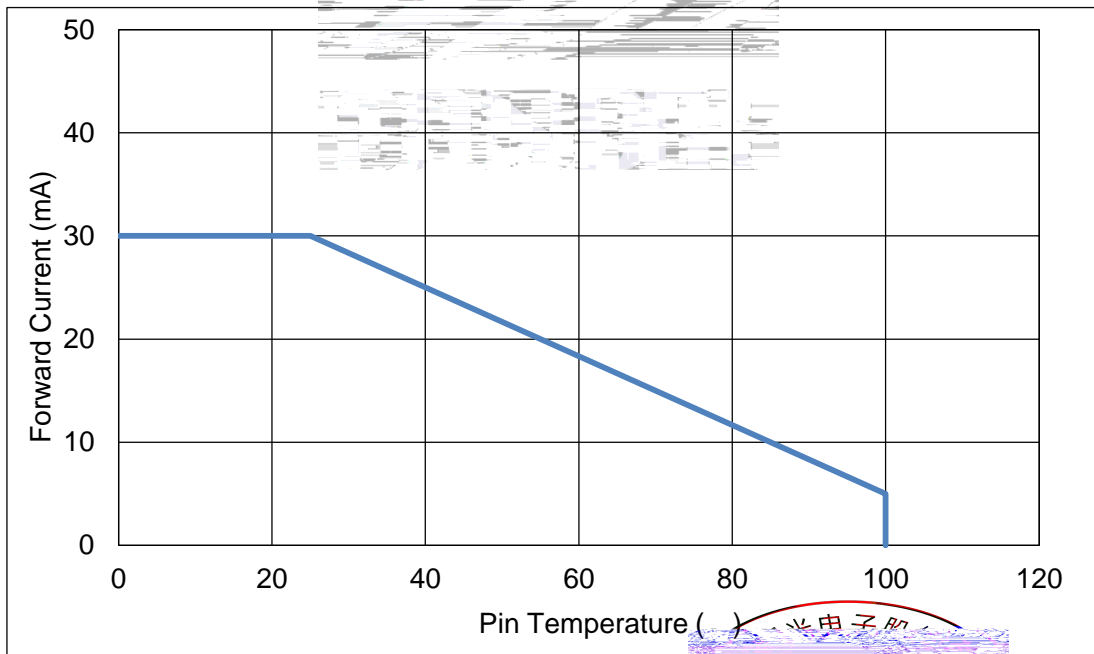
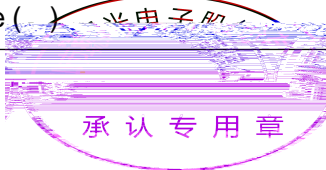


Fig 1-9 Pin Temperature Vs Forward Current





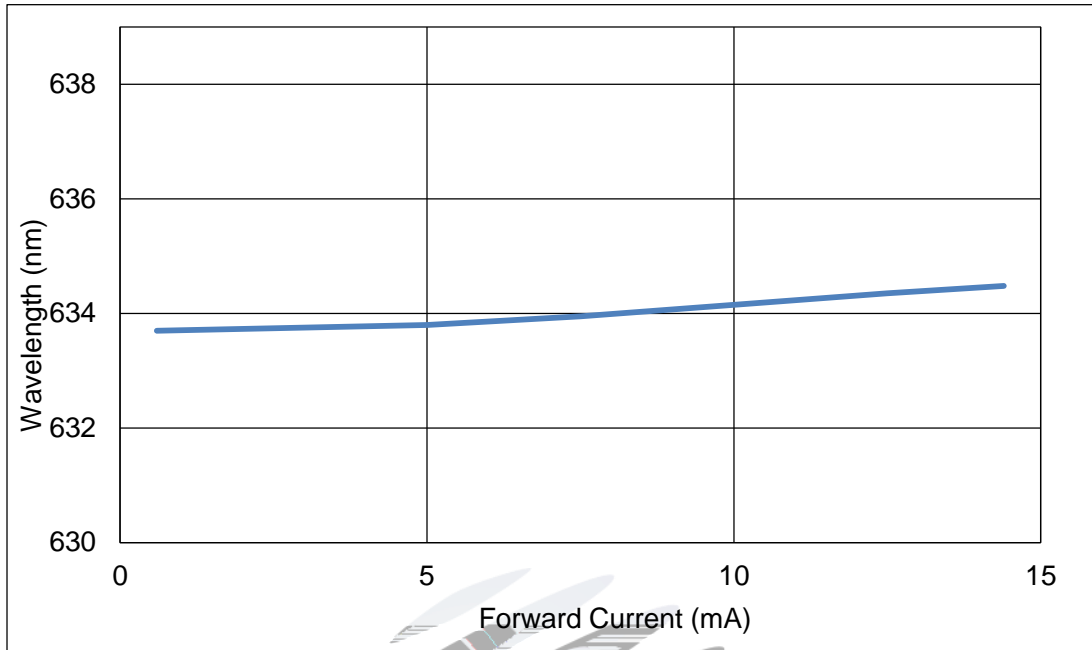


Fig1-10 Forward Current Vs Dominate Wavelength (Ta=25 )

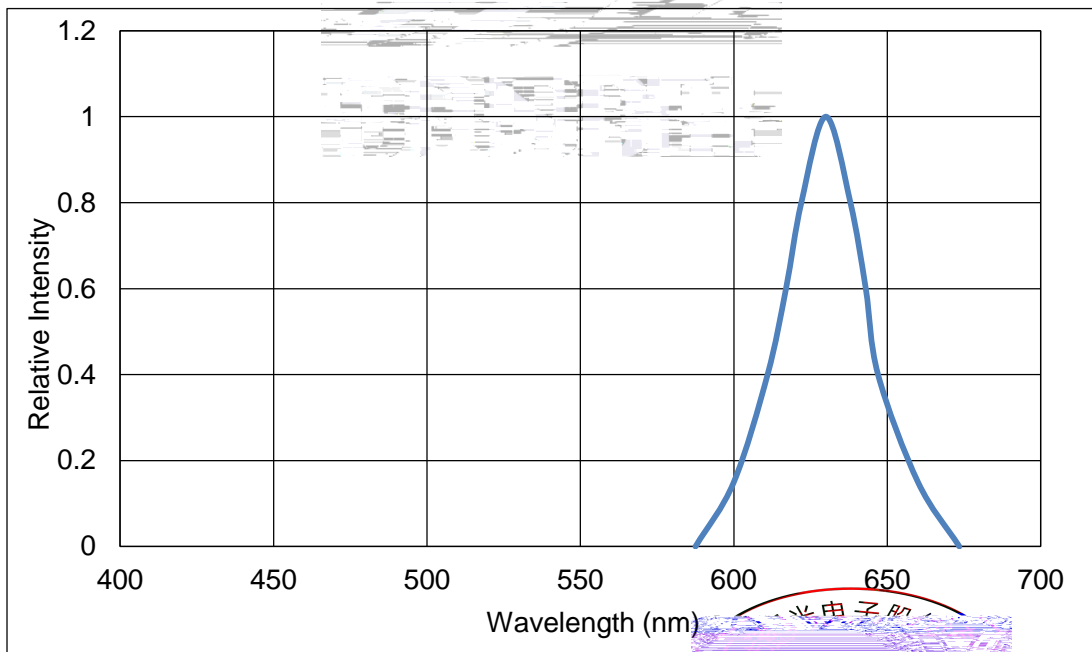
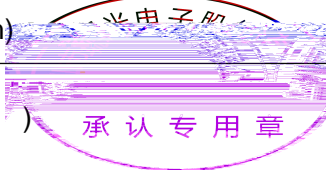


Fig 1-11 Relative Intensity Vs Wavelength (Ta=25 )



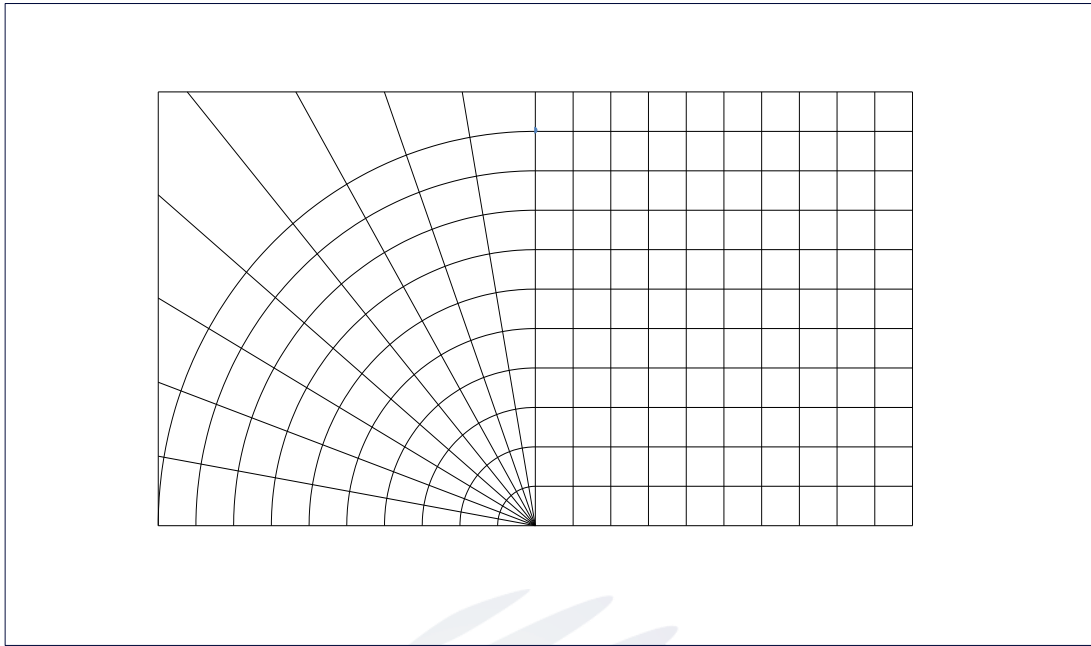
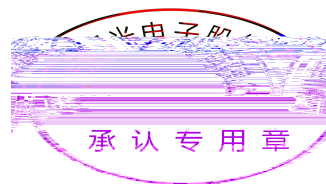
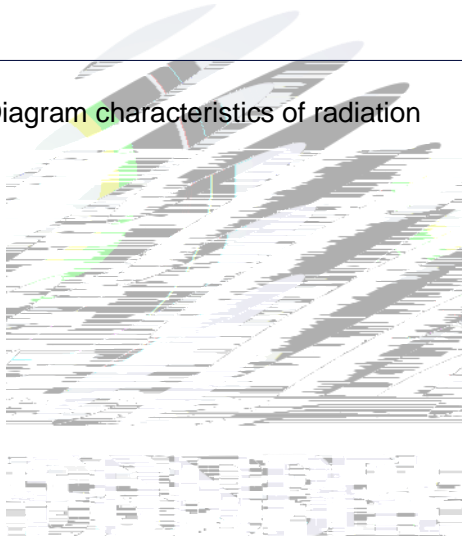


Fig 1-12 Diagram characteristics of radiation



## 2. Packaging

### 2.1 Packaging Specification

Package: 4000pcs/reel.                      4000pcs

#### 2.1.1 Carrier Tape Dimension

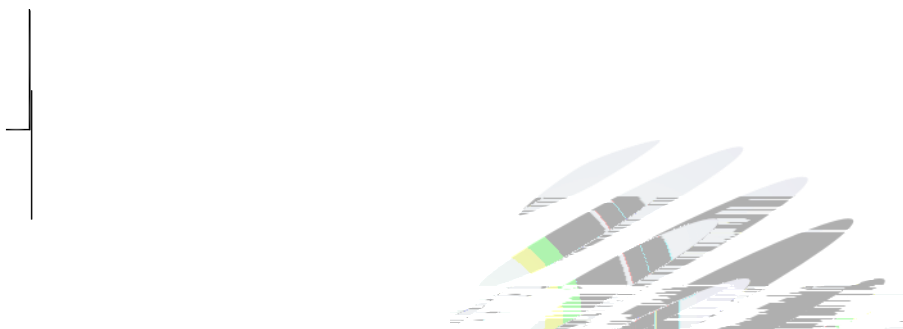
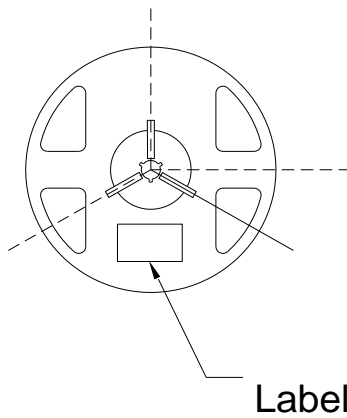


Fig.2-1 Carrier Tape Dimension

#### 2.1.2 Reel Dimension



Label

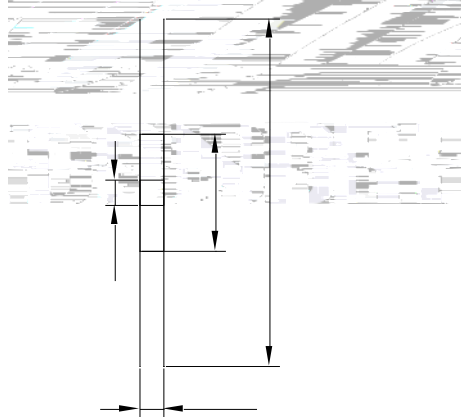


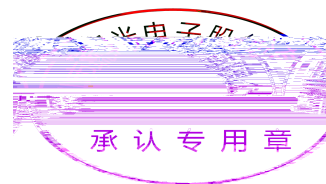
Table 2-1 Dimension

A	8.0 0.1mm
B	178 1mm
C	60 1mm
D	13.0 0.5mm

Fig.2-2 Reel Dimension

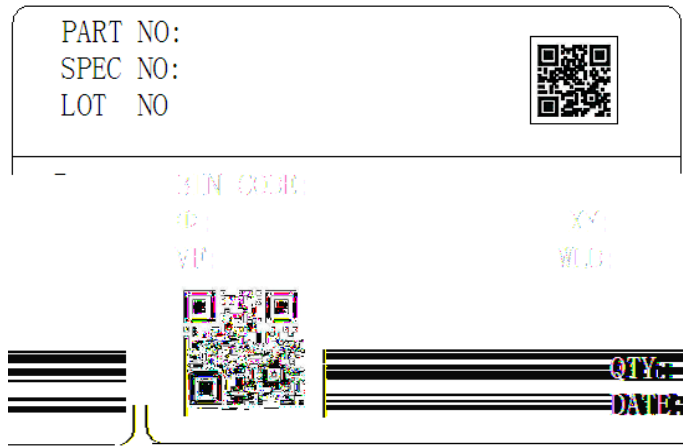
#### Notes

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



### 2.1.3 Label Form Specification

Table 2-2 Parameter



PART NO.	Part Number
SPEC NO.	Spec Number
LOT NO.	Lot Number
BIN CODE	Bin Code
	Luminous flux
XY	Chromaticity Bin
V <sub>F</sub>	Forward Voltage
WLD	Wavelength
QTY	Packing Quantity
DATE	Made Date

Fig. 2-3 Label Form Specification

### 2.2 Moisture Resistant Packing

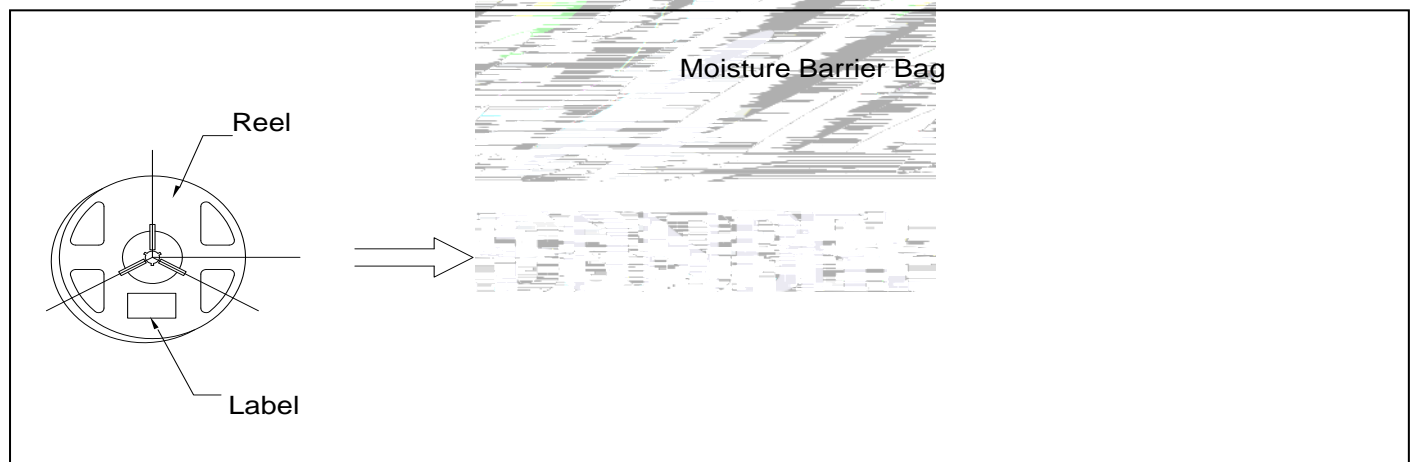
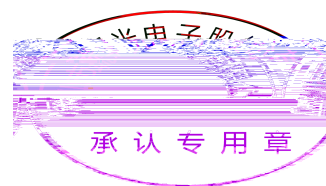


Fig.2-4 Moisture Resistant Packing



## 2.3 Cardboard Box

Fig.2-5 Cardboard Box

## 2.4 Reliability Test Items And Conditions

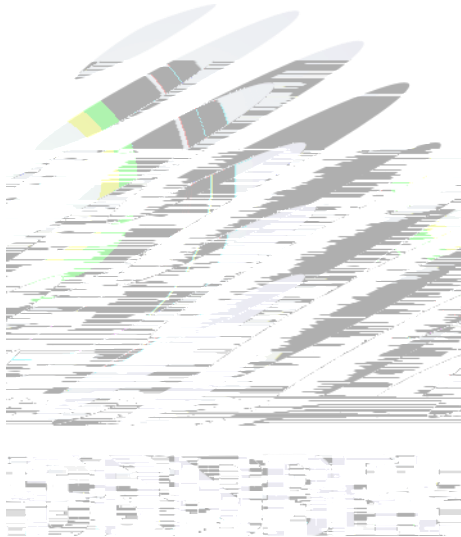
Table 2-3 Reliability Test Items And Conditions

Test Items	Ref.Standard	Test Condition	Time	Quantity	Ac/Re /
Reflow	JESD22-B106	Temp:260 max T=10 sec	2 times	22Pcs.	0/1
Temperature Cycle	JESD22-A104	100 30 min 5 min -40 30 min	100 cycles	22Pcs.	0/1
Thermal Shock	JESD22-A106	-40 15min 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

## 2.5 Criteria For Judging Damage



### 3. SMT Reflow Soldering Instructions SMT

#### 3.1 SMT Reflow Soldering Instructions SMT

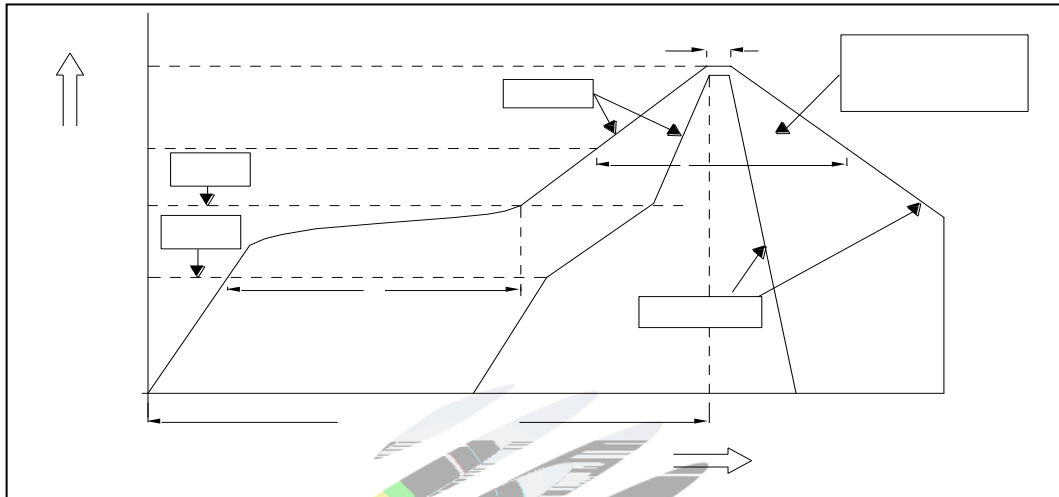
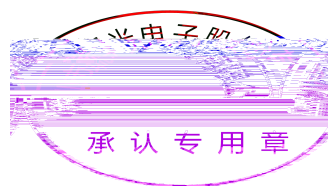


Fig.3-1 SMT Reflow Soldering Instructions SMT

Table 3-1 Parameter

Average temperature rise speed	$T_{smax}$ $T_P$	3 °C/ Max 3 °C/ s
Preheating: minimum temperature	( $T_{smin}$ )	150 °C
Preheating: Max temperature	( $T_{smax}$ )	200 °C
Preheating: Time	$T_{smin}$ $T_{smax}$	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 - 150 60s-150s
Peak /Classification of temperature:	/ ( $T_P$ )	260 °C
Time limit classification of peak temperature time	$t_p$	10 Max 10s
Hold time within 5 °C with the actual peak temperature ( $T_P$ )	( $T_P$ )	30 Max 30s
Cooling speed		6 °C/ Max 6 °C/ s
Needed time from 25 °C to $T_p$	25 °C	8 Max 8 minutes

Notes

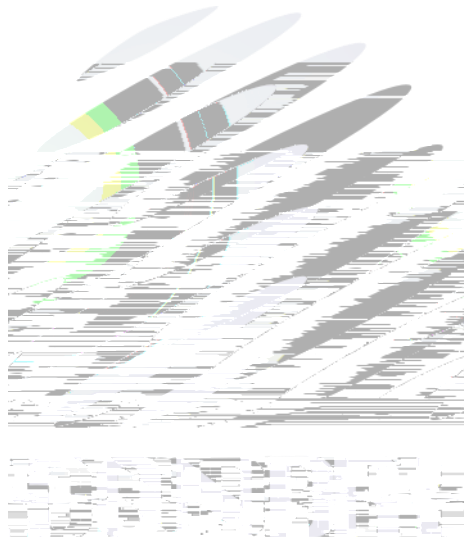




## 4. Handling Precautions

### 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

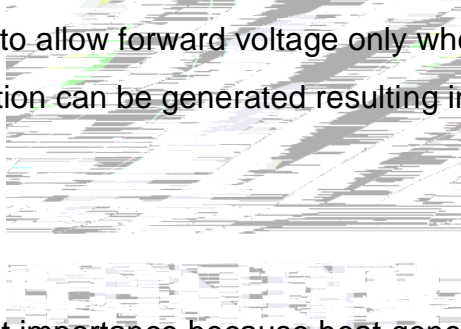


(4) Handle the component along the side surface by using forceps or appropriate tools; Do not directly touch or Handle the silicone lens surface, it may damage the internal circuitry.



Fig 4-1

(5) In designing a circuit, the current through each LED can not exceed the absolute maximum rating specified for each LED. In the mean while, resistors for protection should be applied, otherwise slight voltage shift will cause big current change, burn out may happen. The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.



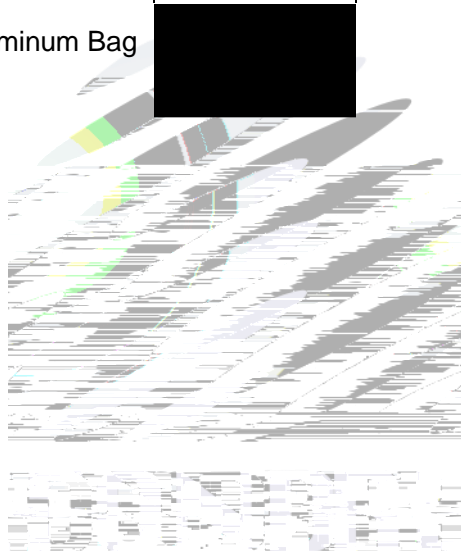
(6) Thermal Design is paramount importance because heat generation may result in the Characteristics decline, such as brightness decreased, Color change and so on. Please consider the heat generation of the LEDs when making the system design. LED

(7) Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust, requiring special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components. Refond suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin. Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the

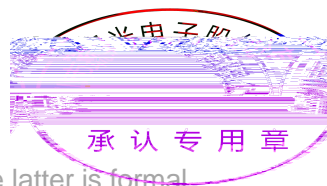
LED.

Table 4-1 Storage

Conditions		Temperature	Humidity	Time
Storage	Before Opening Aluminum Bag	30	75%	Within 1 Year From Date
	After Opening Aluminum Bag			







Declare

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