

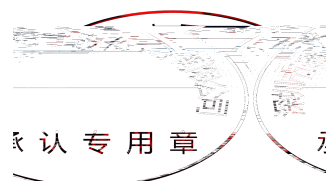
SPECIFICATION

REFOND P/N

RF-TGM190TS-CA-P1

☐ R&D

☒ Mass Product



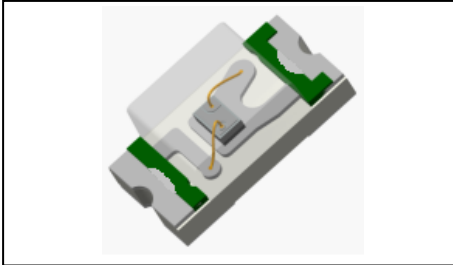
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1. Description

1.1 General Description



The Colour LED which was fabricated using a green chip Package Dimension :
1.6mmX0.8mmX0.4mm.

LED

1.6mmX0.8mmX0.4mm

1.2 Features

Extremely wide viewing angle.

Suitable for all SMT assembly and solder process.

Moisture sensitivity level: Level 3.

Level3

RoHS compliant.

RoHS

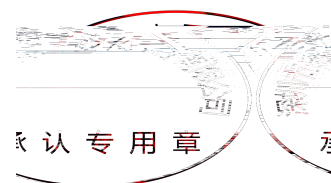
SMT

1.3 Application

Optical indicator.

Switch and symbol, display.

General use.



1.4 Package Dimension

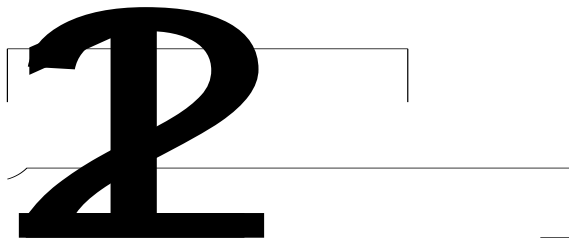


Fig.1-1 Top view

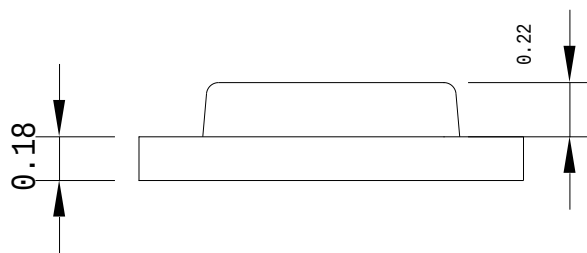


Fig.1-2 Side view

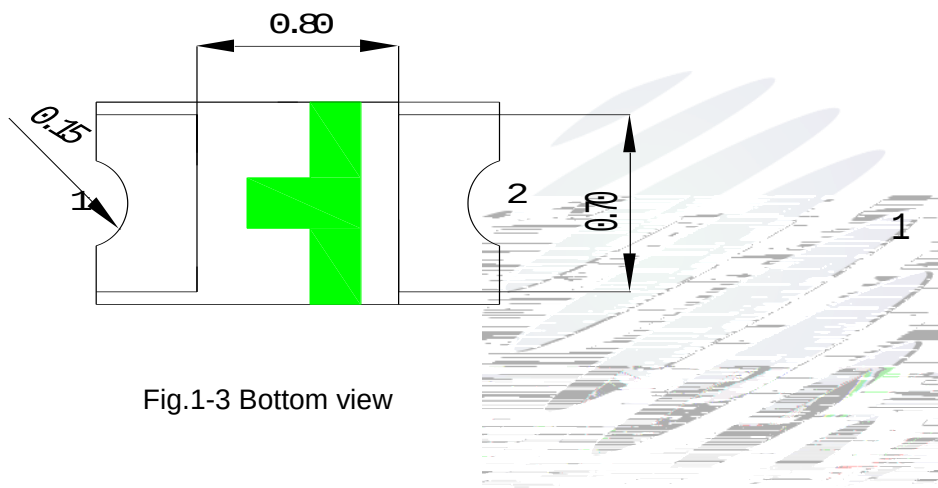


Fig.1-3 Bottom view

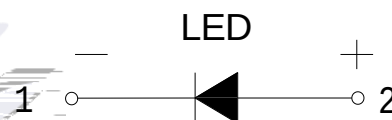


Fig.1-4 Polarity

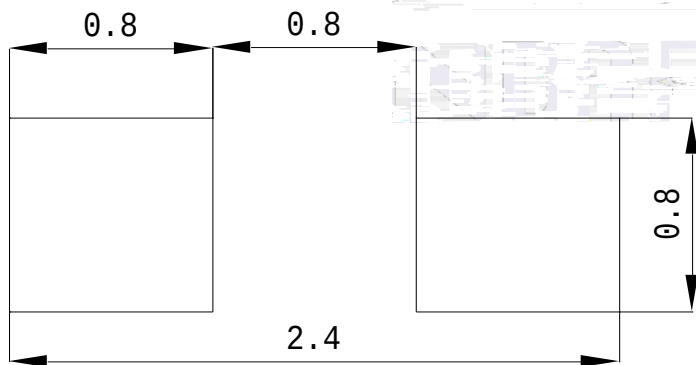
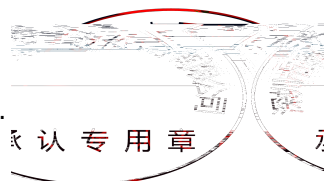


Fig.1-5 Soldering patterns

Notes

1. All dimensions units are millimeters.

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



± 0.2

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 _F =2mA	Δ		--	15	--	nm
Forward Voltage	I _F =2mA	V _F	D2	2.3	--	2.4	V
			E1	2.4	--	2.5	V
			E2	2.5	--	2.6	V
			F1	2.6	--	2.7	V
			F2	2.7	--	2.8	V
			G1	2.8	--	2.9	V
			G2	2.9	--	3.0	V
Dominant Wavelength	I _F =2mA	λ_D	F10	525	--	527.5	nm
			F20	527.5	--	530	nm
			G10	530	--	532.5	nm
			G20	532.5	--	535	nm
Luminous Intensity	I _F =2mA	I _v	FD0	90	--	100	mcd
			GA0	100	--	110	mcd
			GB0	110	--	120	mcd
			1FJ	120	--	130	mcd
			1FQ	130	--	140	mcd
			1FR	140	--	150	mcd
			1FS	150	--	160	mcd
Viewing Angle	I _F =2mA			--	140	--	deg
Reverse Current	V _R =5V	I _R		--	--	10	μA
Thermal Resistance.	I _F =2mA	R _{THJ-S}		--	--	450	/W

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

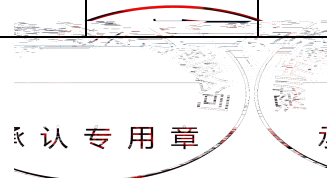
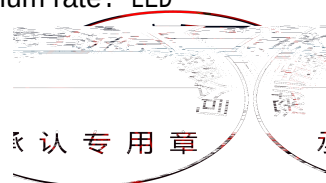


Table 1-2 Absolute Maximum Ratings at Ts=25°C

Parameter	Symbol	Rating	Units
Power Dissipation	P_d	60	mW
Forward Current	I_F	20	mA
Peak Forward Current Of Pulse	I_{FP}	60	mA
Electrostatic Discharge (HBM)	E_{SD}	1000	V
Operating Temperature	T_{opr}	-40 ~ +85	
Storage Temperature	T_{stg}	-40 ~ +85	
Junction Temperature	T_j	95	

Notes

1. 1/10 Duty cycle, 0.1ms pulse width. 0.1ms, 1/10.
2. The above forward voltage measurement allowance tolerance is $\pm 0.1V$.
3. The above dominant wavelength measurement allowance tolerance is $\pm 2nm$.
4. The above luminous intensity measurement allowance tolerance $\pm 10\%$.
5. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.
6. All measurements were made under the standardized environment of Refond.
7. 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. LED



1.6 Typical Optical Characteristics Curves

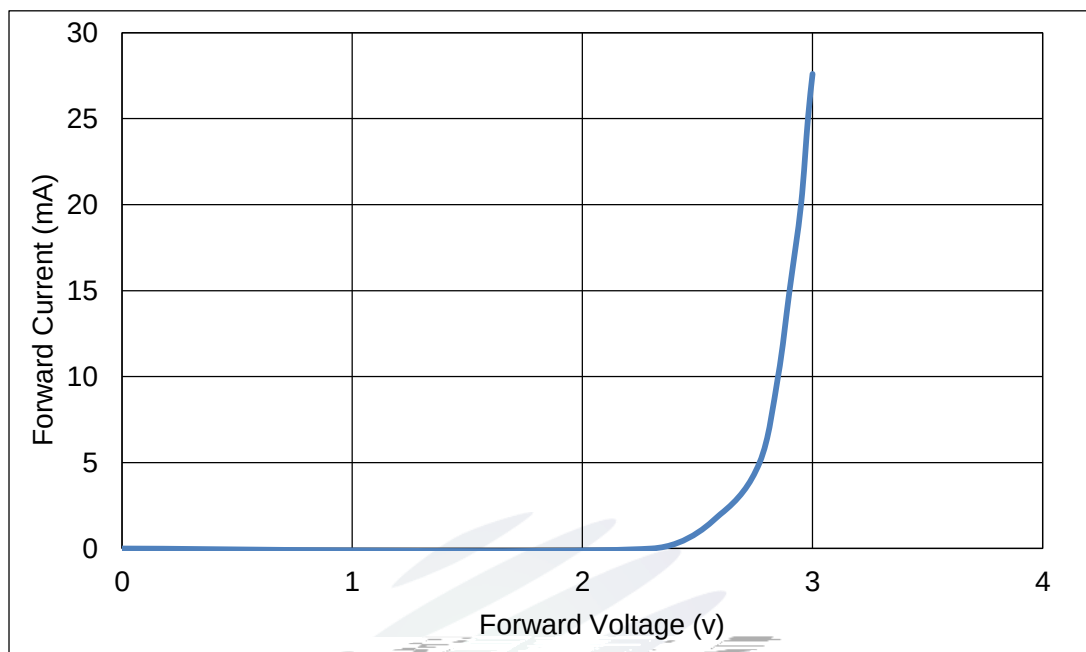


Fig 1-6 Forward Voltage Vs Forward Current

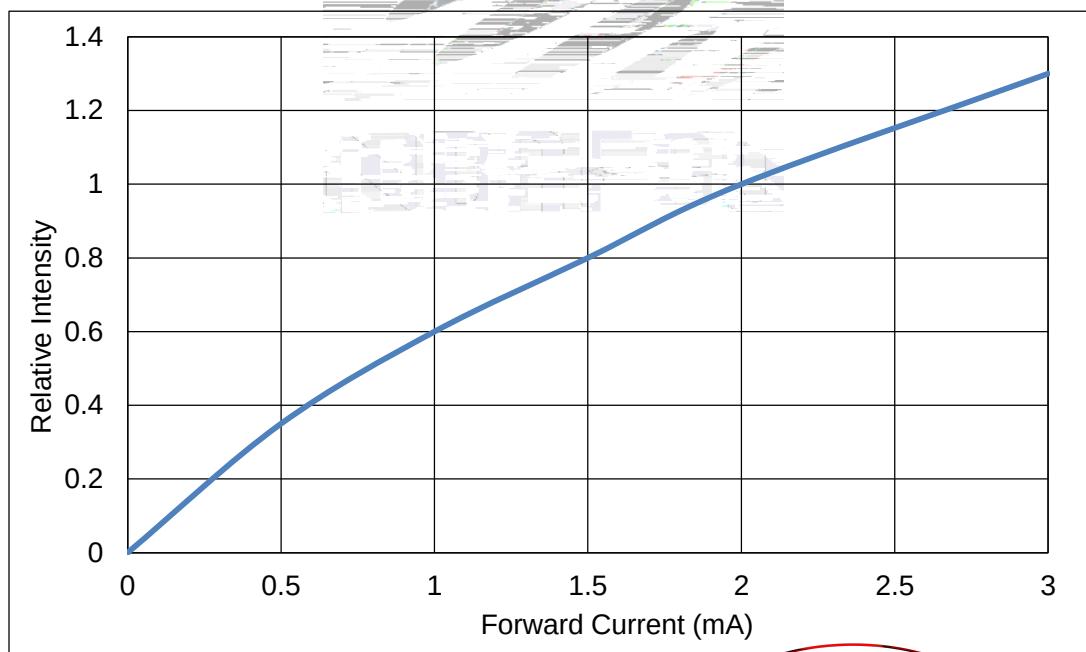
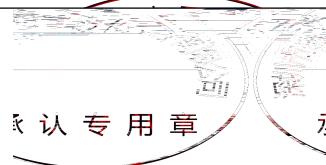


Fig 1-7 Forward Current Vs Relative Intensity



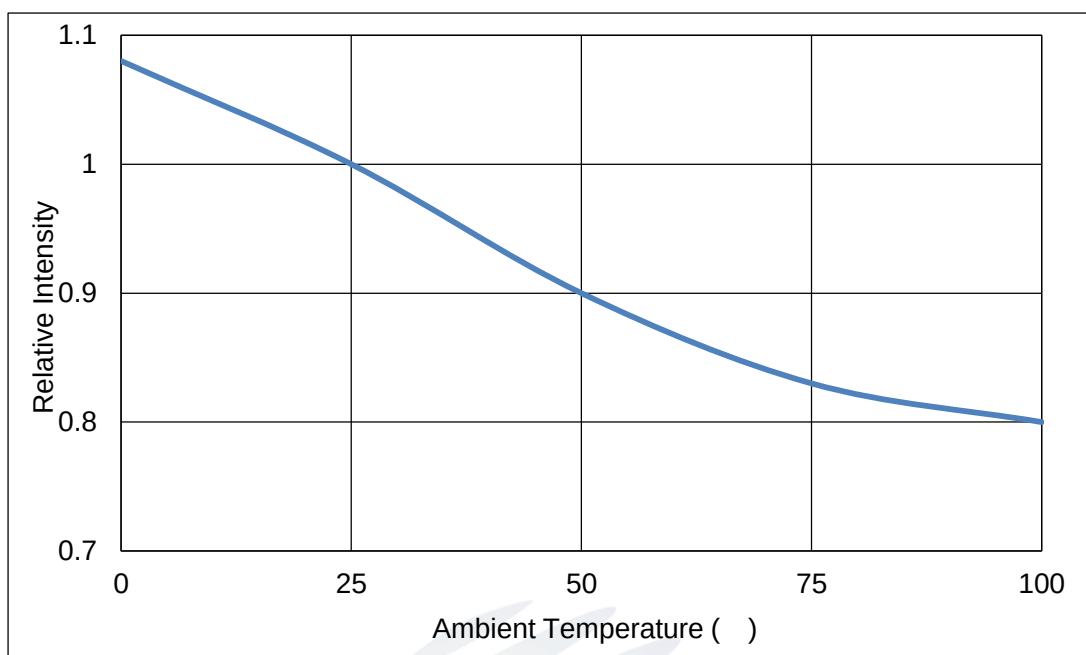


Fig 1-8 Pin Temperature Vs Relative Intensity

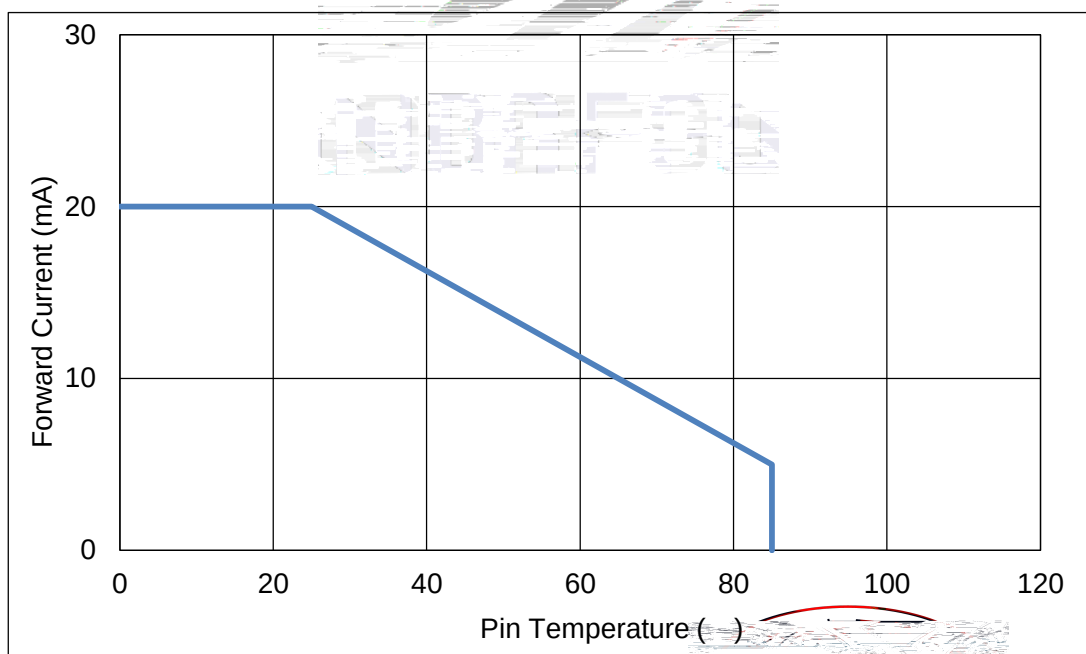


Fig 1-9 Pin Temperature Vs Forward Current

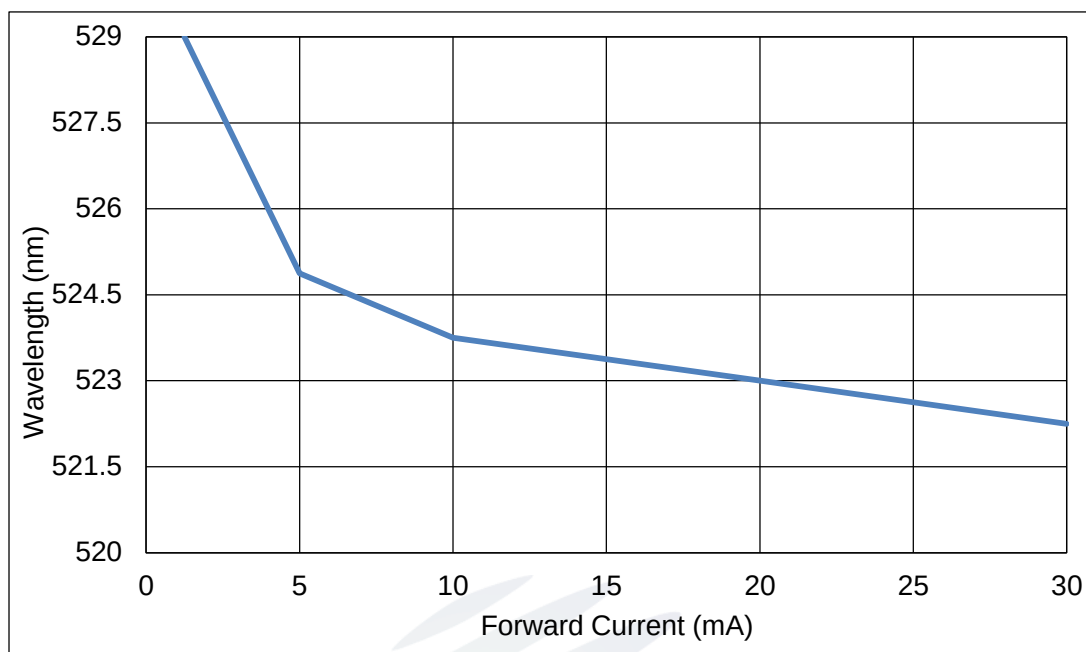


Fig 1-10 Forward Current Vs Dominate Wavelength (Ta=25)

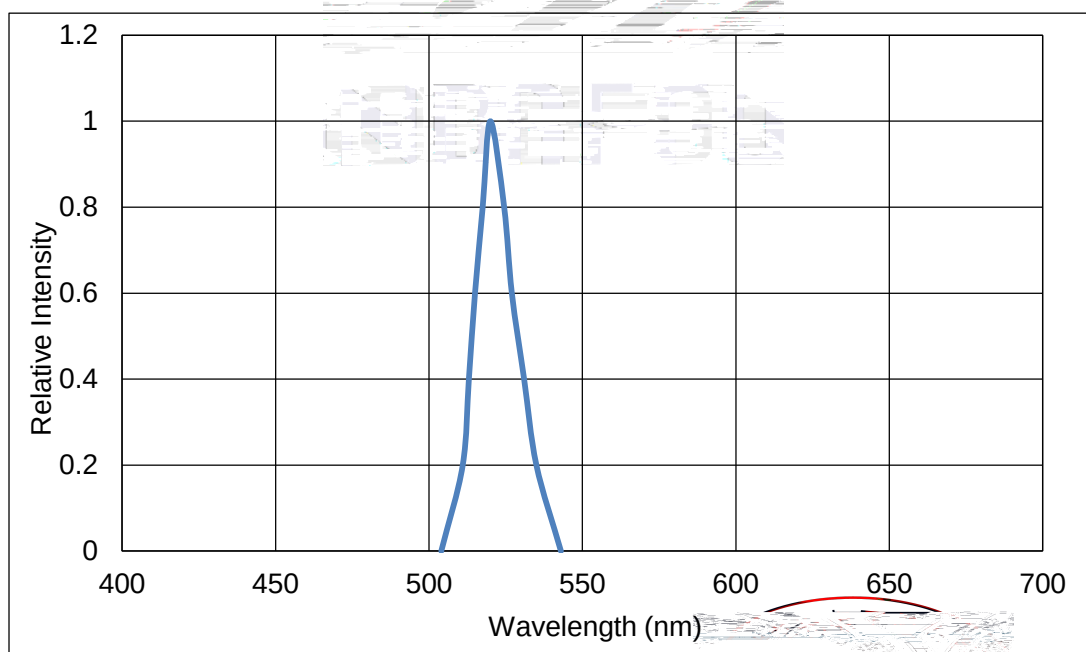
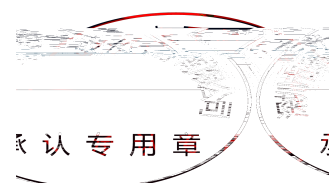


Fig 1-11 Relative Intensity Vs Wavelength (Ta=25)



Fig 1-12 Diagram characteristics of radiation



2. Packaging

2.1 Packaging Specification

Package: 4000pcs/reel.

4000pcs

2.1.1 Carrier Tape Dimension

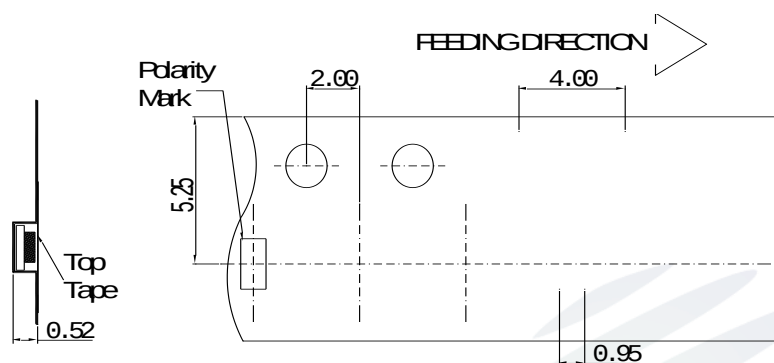


Fig.2-1 Carrier Tape Dimension

2.1.2 Reel Dimension

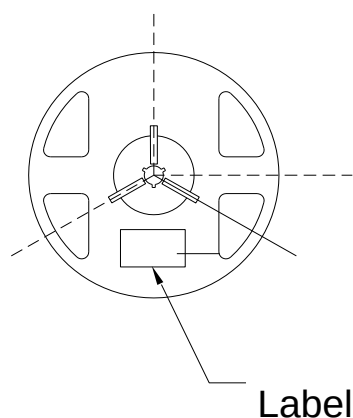


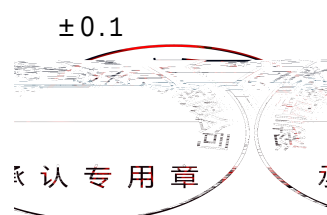
Fig.2-2 Reel Dimension

Table 2-1 Dimension

A	$8.0 \pm 0.1\text{mm}$
B	$178 \pm 1\text{mm}$
C	$60 \pm 1\text{mm}$
D	$13.0 \pm 0.5\text{mm}$

Notes

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



2.1.3 Label Form Specification

PART NO:	
SPEC NO:	
LOT NO	
   	
QTY:	
DATE:	

Table 2-2 Parameter

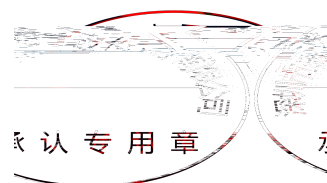
PART NO.	Part Number
SPEC NO.	Spec Number
LOT NO.	Lot Number
BIN CODE	Bin Code
	Luminous flux
XY	Chromaticity Bin
V _F	Forward Voltage
WLD	Wavelength
QTY	Packing Quantity
DATE	Made Date

Fig. 2-3 Label Form Specification

2.2 Moisture Resistant Packing



Fig.2-4 Moisture Resistant Packing



2.3 Cardboard Box

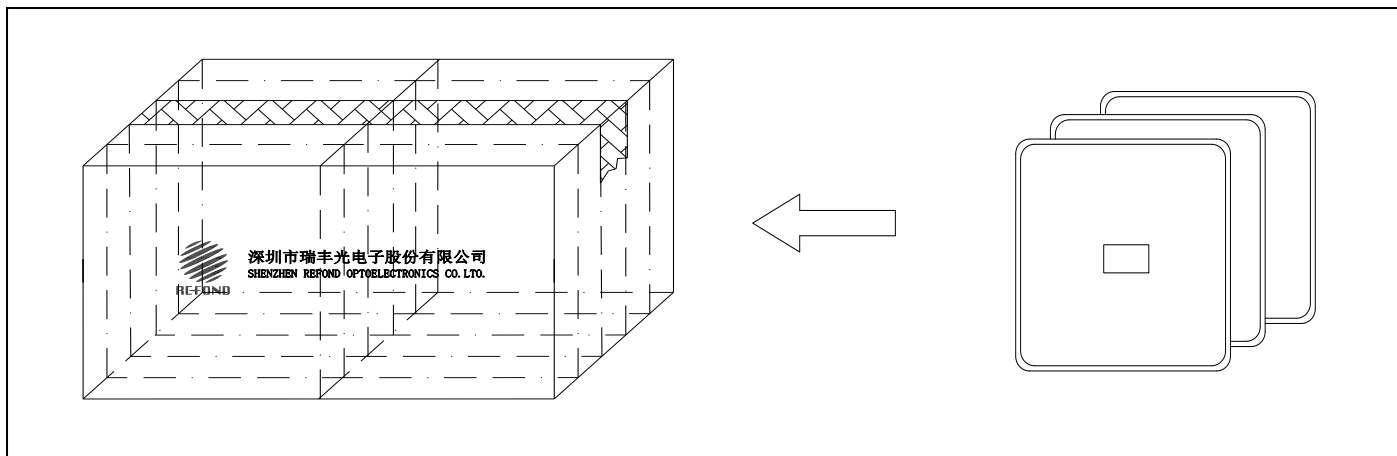


Fig.2-5 Cardboard Box

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	T _a =25 I _F =2mA	1000 hrs.	22Pcs.	0/1

2.5 Criteria For Judging Damage

Table 2-4 Criteria For Judging Damage

Test Items	Symbol	Test Condition	Criteria For Judgement	
			Min.	Max.
Forward Voltage	V_F	$I_F=2mA$	-	$U.S.L^*) \times 1.1$
Reverse Current	I_R	$V_R=5V$	-	$U.S.L^*) \times 2.0$
Luminous Flux		$I_F=2mA$	$L.S.L^*) \times 0.7$	-

Notes

1.U.S.L: Upper standard level

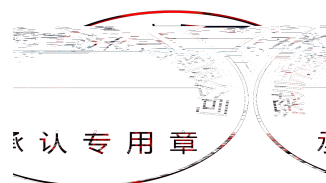
L.S.L: Lower standard level

2.The above reliability tests is based on the verification of a single/strip LED of Refond's existing experimental platform,the reliability experiment was taken under good heat dissipation conditions. When customers applies the LED to the series and parallel circuit,should take consideration of all the factors such as the current, voltage distribution, heat dissipation and others.

/ LED

LED

3.The technical information shown in the data sheets is limited to the typical characteristics and circuit examples of the referenced products. It does not constitute the warranting of industrial property nor the granting of any license.



3. SMT Reflow Soldering Instructions SMT 回流焊说明

3.1 SMT Reflow Soldering Instructions SMT

Fig.3-1 SMT Reflow Soldering Instructions SMT

Table 3-1 Parameter

Average temperature rise speed	Tsmax Tp	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)

Notes

(1)Reflow soldering should not be done more than twice. If more than 24 hours between the two solderings , LED will be damaged.

24 LED

(2)When soldering , do not put stress on the LEDs during heating.

3.1.1 Soldering Iron

(1) When do soldering by hand, keep the temperature of iron below less 300℃ less than 3 seconds , 300 3

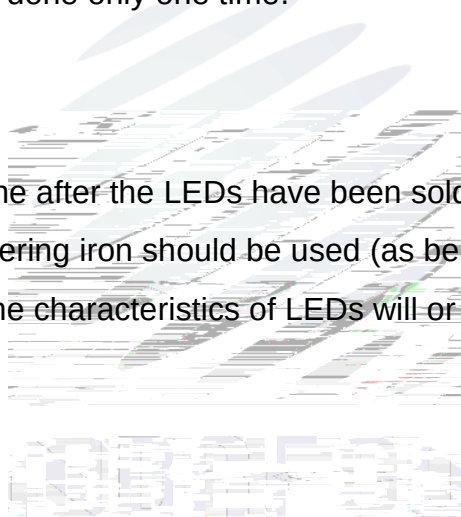
(2) Soldering by hand should be done only one time.

3.1.2 Repairing

Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable,a double-head soldering iron should be used (as below figure). It should be confirmed in advance whether the characteristics of LEDs will or not be damaged by repairing.

LED

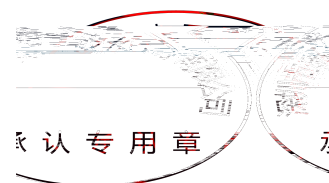
LED



3.1.3 Cautions

(1) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board.LED PCB

(2) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering. Do not rapidly cool device after soldering.

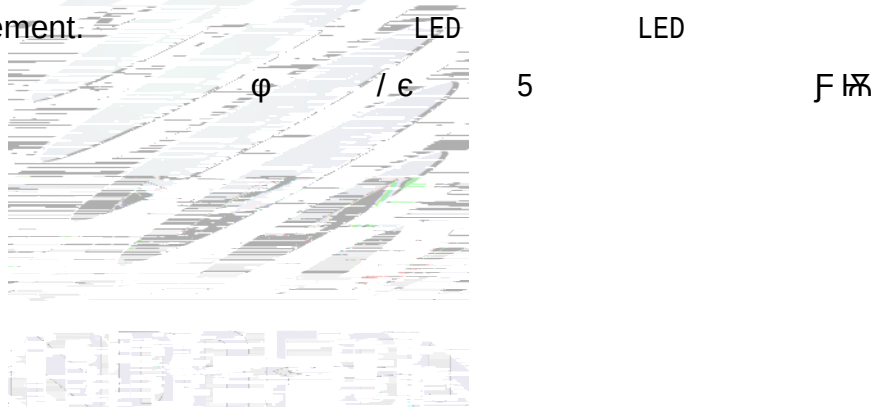


4. Handling Precautions

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 LED 100PPM.

(2) In order to prevent ex-ternal 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.

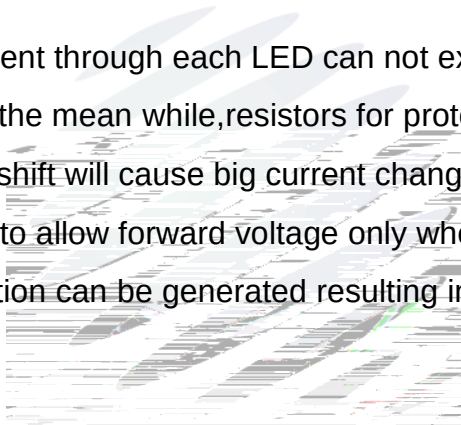


(4) Handle the component along the side surface by using forceps or appropriate tools; Do not directly touch or Handle the silicone lens surface, it may damage the internal circuitry.

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.

LED



LED

(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

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

LED.

LED

Table 4-1Storage

Conditions		Temperature	Humidity	Time
Storage	Before Opening Aluminum Bag	≤ 30	$\leq 75\%$	Within 1 Year From Date
	After Opening Aluminum Bag	≤ 30	$\leq 60\%$	168hours 168
Baking		60 ± 5	-	≥ 24 hours 24

(8) If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time,baking treatment should be performed after unpacking and based on the following condition (65 ± 5) °C for above 24 hours.

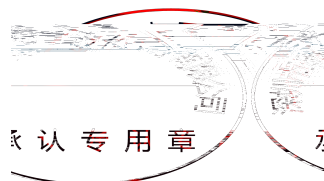
60 ± 5 24

If the package is flatulence or damaged,please notify the sales staff to assist.

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

LED

(10) 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.

