SPECIFICATION

REFOND P/N

RF-W1SA15HS-N47

Mass Product

深圳市瑞丰光电子股份有限公司
承认专用章

0755-2967-5000
0755-6683-9322
sales@refond.com

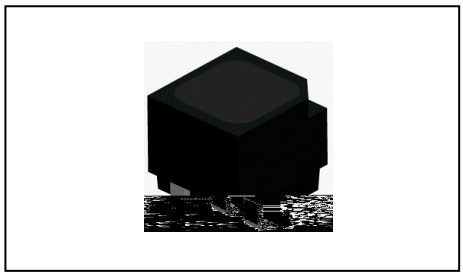
Contents

0755-2967-5000
0755-6683-9322
sales@refond.com

0755-2967-5000
0755-6683-9322
sales@refond.com

1. Description

1.1 General Description



The product is a full-color LED device, Common cathode RGB SMD, High contrast(Designed on all black surface),The product size: 1.6mmX1.7mmX1.6mm.

LED RGB SMD

1.6mmX1.7mmX1.6mm

1.2 Features

►Extremely wide viewing angle.

►High luminous Intensity, Low power dissipation, Good reliability and Long life.

► Water-resistant (IPX6). (IPX6)

► Moisture sensitivity level: 5a. 5a

►RoHS compliant.

►Matte surface.

►Pb-free reflow soldering application.

1.3 Application

► Outdoor full-color video screen.

► Indoor and outdoor decorative lighting.

► Amusement.

►General use.

深圳市瑞丰光电子股份有限公司 承认专用章

0755-2967-5000
0755-6683-9322
sales@refond.com

1.5 Product Parameters

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

Item	Symbol	Test Condition	Value			Unit
			R	G	B	
Reverse Current	I_R	V_R=5V	6	6	6	μA
Forward Voltage	$V_{F\ (min)}$	R I_F = 10mA G I_F = 10mA B I_F = 5mA	1.7	2.5	2.5	V
	$V_{F\ (max)}$		2.4	3.3	3.3	V
Dominant Wavelength	λ_D		617~ 628	520~545	460~475	nm
			5nm per Bin	3nm per Bin	3nm per Bin	
Spectrum Radiation Bandwidth	Δ λ		24	38	30	nm
Luminous Intensity	$I_{V(min)}$		135	325	30	mcd
	$I_{V(avg)}$		215	520	50	mcd
	$I_{V(max)}$		345	830	80	mcd
	BIN Range		1:1.3	1:1.3	1:1.3	
Viewing Angle	$2\theta_{1/2}$		110			deg

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

Parameter	Symbol	Absolute Maximum Ratings			Unit
		R	G	B	
Forward Current	I_F	20	15	15	mA
Reverse Voltage	V_R	5	5	5	V
Operating Temperature	T_{OPR}	-30 ~ +85			
Storage Temperature	T_{STQ}	-40 ~ +100			
Power Dissipation	P_D	48	49.5	49.5	mW
Sns k t m shmmSdl odq st qd	T_J	100	100	100	
Electrostatic Discharge (HBM)	E_{SD}	1000V			

0755-2967-5000
0755-6683-9322
sales@refond.com

Notes

1. The above forward voltage measurement allowance tolerance is ±0.1V.

2. The above Tolerance of measurement of dominant wavelength ±1nm.

3. The above luminous intensity measurement allowance tolerance ±10%.

4. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.

5. All measurements were made under the standardized environment of Refond.

6. Luminous intensity range is for reference only,specific parameters please refer to the label.

1.6 Typical optical characteristics curves

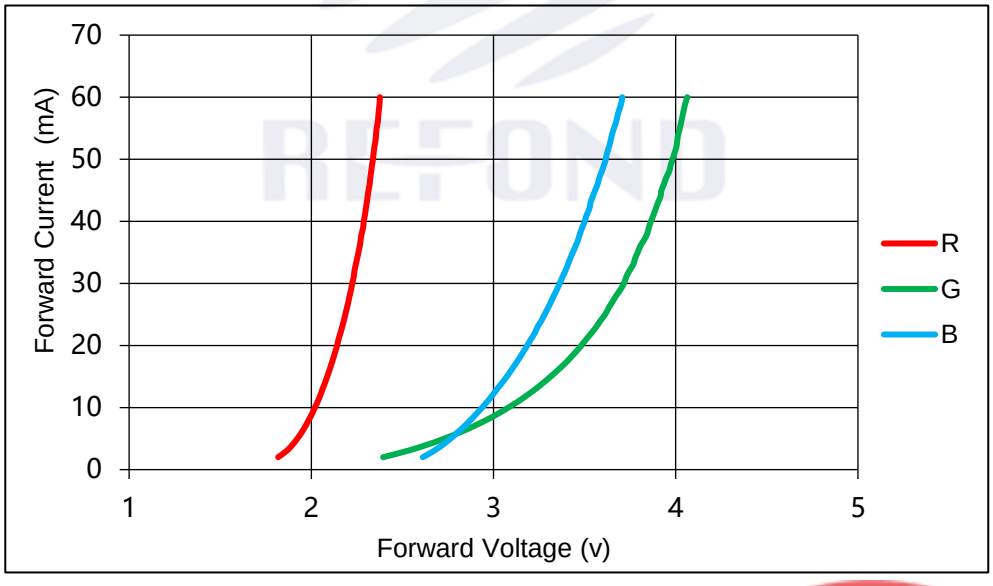


Fig 1-6 Forward Voltage Vs. Forward Current

0755-2967-5000
0755-6683-9322
sales@refond.com

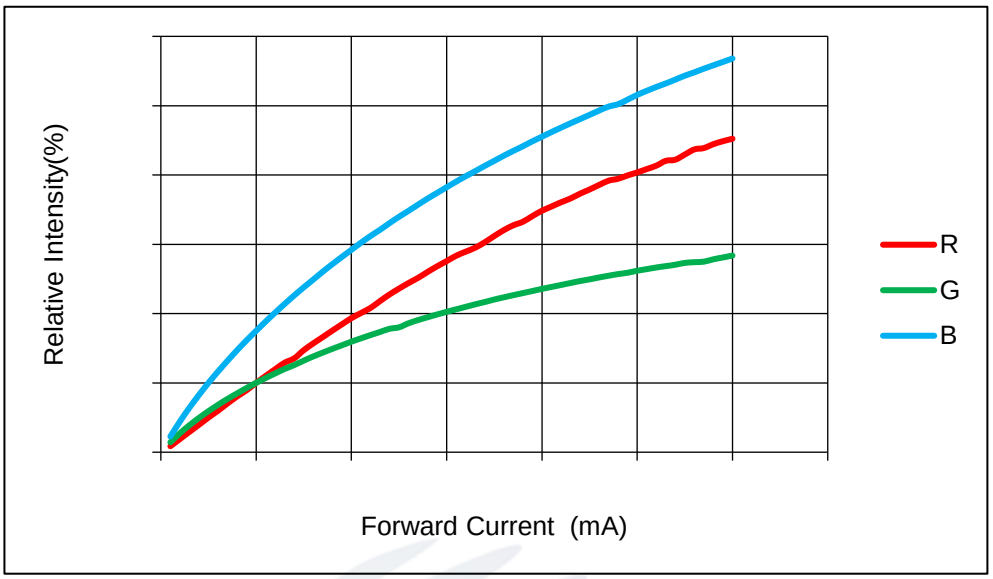


Fig 1-7 Forward Current Vs. Relative Intensity

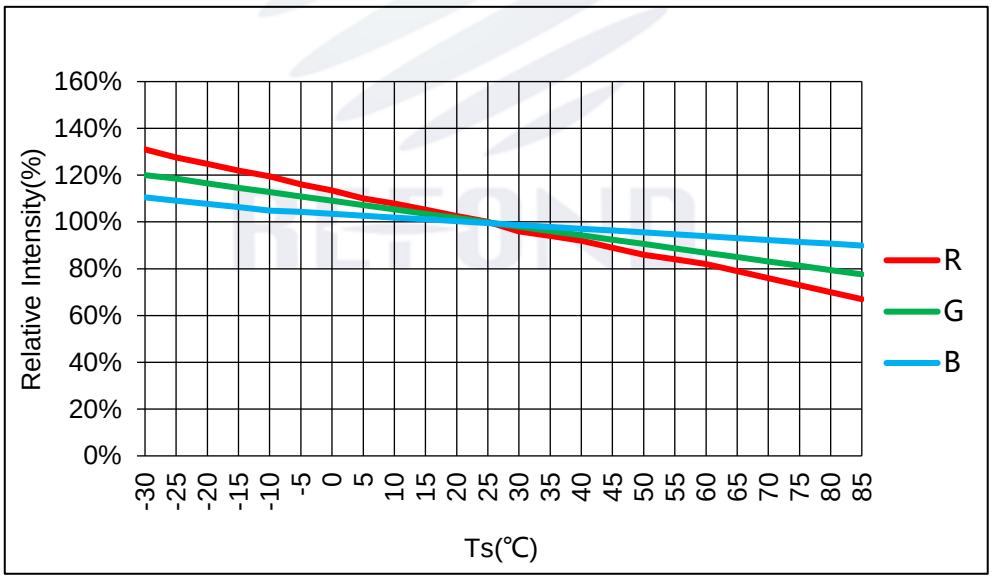


Fig 1-8 Luminous Intensity VS Ambient Temperature

0755-2967-5000
0755-6683-9322
sales@refond.com

Fig 1-9 Solder Temperature Vs Forward Current

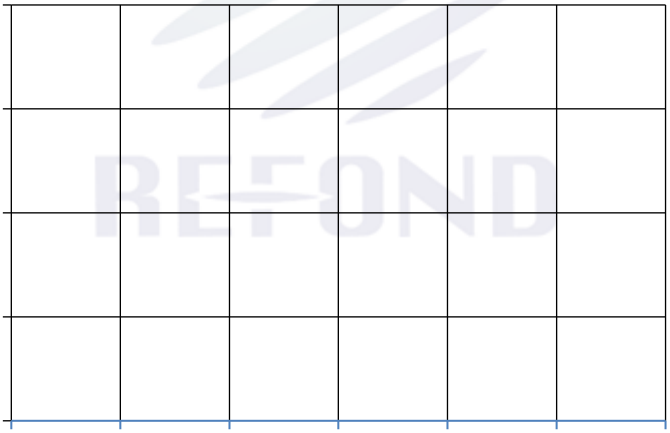


Fig 1-10 Spectrum Distribution

0755-2967-5000
0755-6683-9322
sales@refond.com

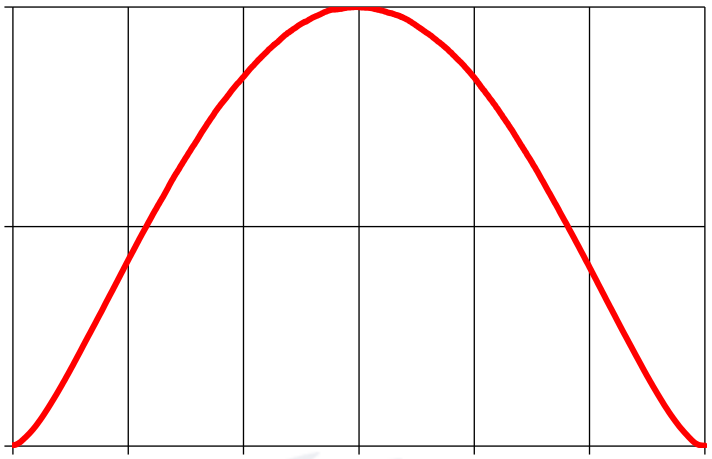


Fig 1-11 Directivity X-X radiation angle X

Fig 1-12 Directivity Y-Y radiation angle Y

0755-2967-5000
0755-6683-9322
sales@refond.com

2. Packaging

2.1 Packaging Specification

Package:15500pcs/reel. 15500pcs

2.1.1 Carrier Tape Dimension

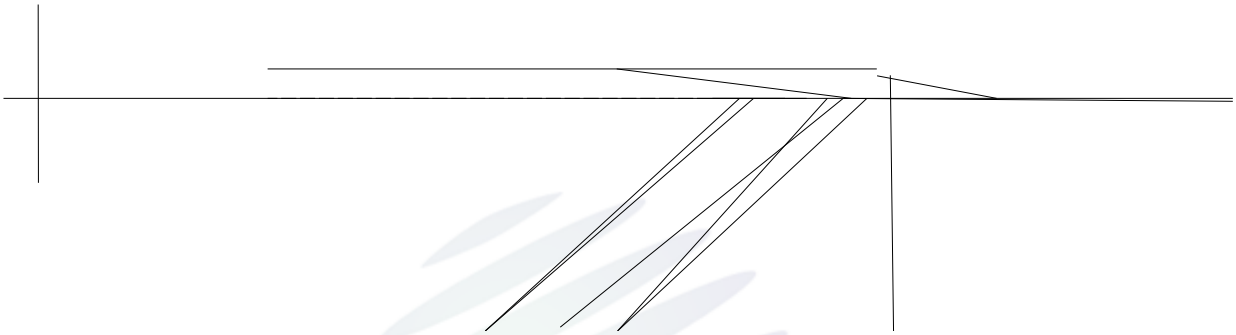


Fig.2-1 Carrier Tape Dimension

2.1.2 Reel Dimension

Fig.2-2 Reel

A	400 2mm
B	100.0 0.4mm
C	14.3 0.3mm
D	2.6 0.2mm
E	12.4 0.3mm
F	8.6 0.2/-0.3 mm
T	1.9 0.2mm

Notes

The tolerances unless mentioned ±0.1mm. Unit : mm ±0.1

深圳市瑞丰光电子股份有限公司 承认专用章

0755-2967-5000
0755-6683-9322
sales@refond.com

2.1.3 Label Form Specification

Table 2-2 Description

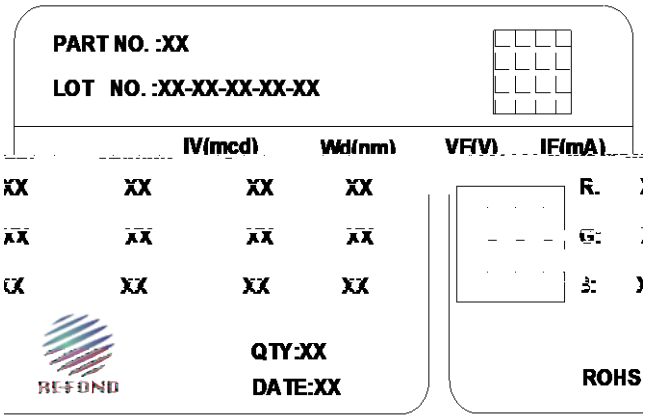


Fig 2-3 Label

PART NO.	Part Number
LOT NO.	Lot Number + Packing Machine No. + Serial Number +BIN No. + Quantity (K) + + +BIN + K
IV	Llight intensity
VF	Forward Voltage
Wd	Wavelength
IF	Forward current
QTY	Packing Quantity
DATE	Made Date

2.2 Moisture Resistant Packing

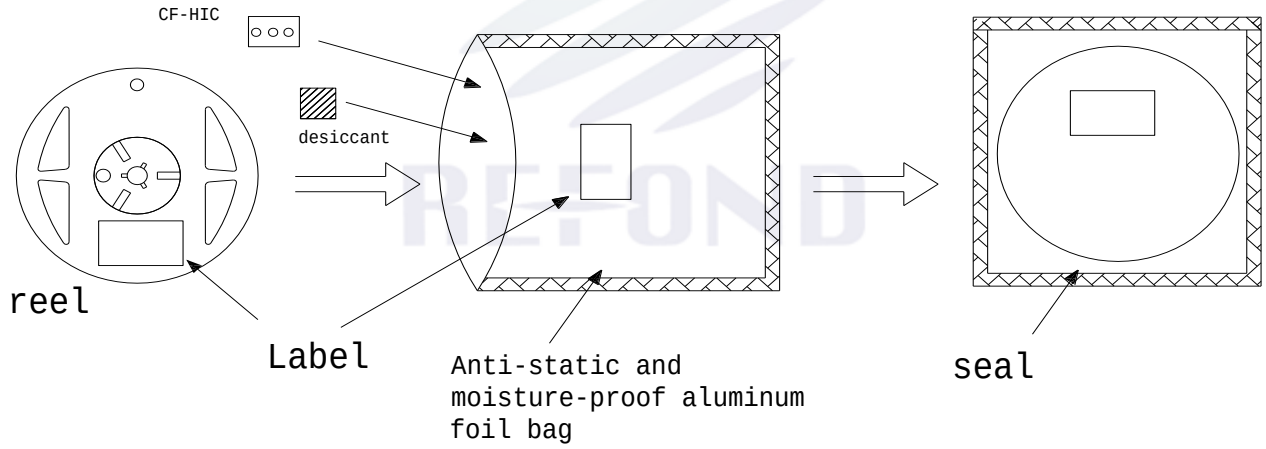


Fig.2-4 Pack

2.3 Cardboard Box

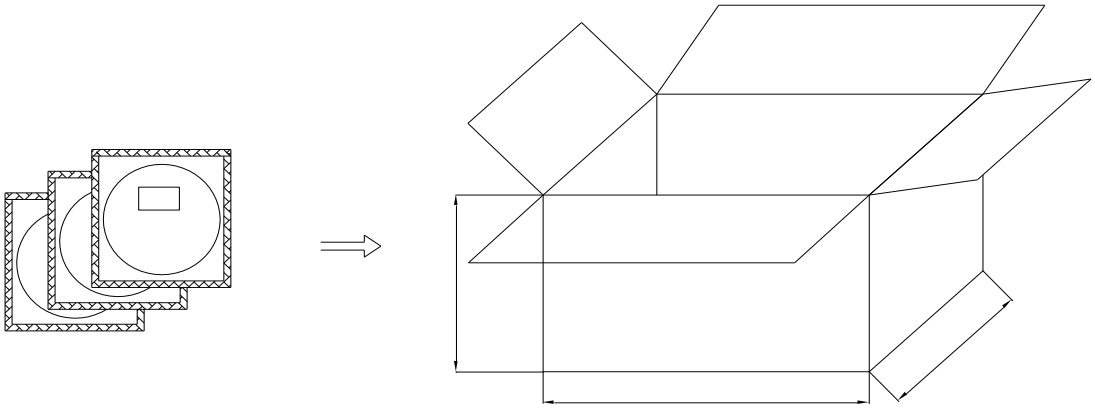


Fig.2-5 Box

2.4 Reliability Test Items And Conditions

Table 2-3 Reliability Condition

Test Items	Ref.Standard	Test Condition	Time	Quantity	Ac/Re /
Resistance to Soldering Heat	JESD22-B106	Temp:250 max T=10 sec	3times	22pcs.	0/1
Thermal Shock	JEITAED-4701 300 307	-40 15min ↑↓10s 100 15min	500cycle	22pcs.	0/1
Moisture Resistance	IPC/JEDEC J-STD-020D.1	1. Moisture Absorption Ta=85 / RH=85%/12HR 2. Tsol=250 , T=10s Reflow Soldering	3times	22pcs.	0/1
High Temperature Storage	JEITAED-4701 200 201	Temp:100	1000hrs.	22pcs.	0/1

0755-2967-5000
0755-6683-9322
sales@refond.com

Low Temperature Storage	JEITA ED-4701 200 202	Temp:-40	1000hrs.	22pcs.	0/1
Room Temperature Operating Life	JESD22-A108	T_A=25 I_F=10mA	1000hrs.	22pcs.	0/1
High Temperature High Humidity Life Test	JESD22-A101	85 / 85%R_H I_F=5mA	500hrs.	22pcs.	0/1
Temperature Humidity Storage	JEITA ED-4701 100 103	T_A=85 R_H=85%	1000hrs.	22pcs.	0/1
Low Temperature Life Test	JESD22-A108D	T_A=-40°C, I_F=10mA	1000hrs.	22pcs.	0/1

2.5 Criteria For Judging Damage

Table 2-4 Criteria

Test Items	Symbol	Test Condition	Criteria For Judgement
Forward Voltage	V_F	I_F=20mA	Initial Data 10% 10%
Reverse Current	I_R	V_R = 5V	I_R≤10μA
Luminous Intensity	I_V	I_F=20mA	Average Iv degradation rate≤30% Iv 30%
Material appearance	/	/	No internal cracks, no material between stripped, no deaded light

0755-2967-5000
0755-6683-9322
sales@refond.com

Notes

The Reliability tests are based on Refond existing test platform.

2.The above reliability tests is based on the verification of a single/strip LED of Refond's existing experimentalplatform,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.

3. SMT Reflow Soldering Instructions SMT

3.1 SMT Reflow Soldering Instructions SMT

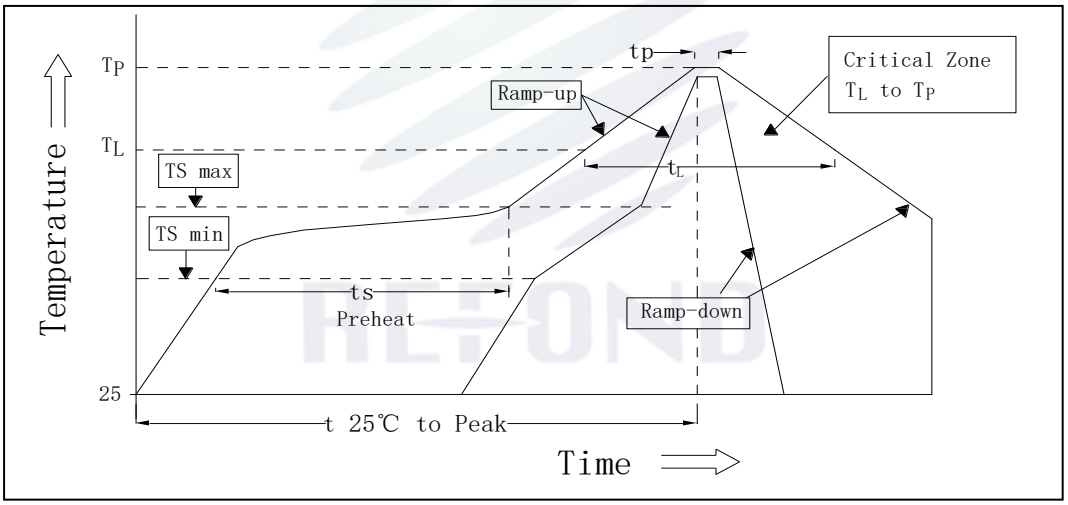


Fig.3-1 Profile

0755-2967-5000
0755-6683-9322
sales@refond.com

caused by heat or atmosphere.

6. This product can differ in optical characteristics depending on the number of reflow cycles.In a single display, only LEDs with same number of reflow cycles should be used regardless of the applicationtype, such as rental and/or permanent installations.

7. This LED is designed to be reflow soldered on to a PCB. If dip soldered, cannot guarantee itsreliability.

3.1.1 Soldering Iron

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

(2) The hand solder should be done only one time.

3.1.2 Repairing

Repair 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 will not be damaged by repairing.

LED

3.1.3 Cleaning

The LEDs should not be cleaned with water, benzene, and/or thinner. k ngnkhr qd nl l dmcdc enq kd mhmf Adenqd kd mhmf v hsg nsgdqrh hk qrnkudmsr okd rd l d rtqd sg s sgd rnkudms trdc v hkkmms trd c l fd sn sgd LDC Cn mms trd hmmh kpthcr nms hmhmf Bk mc dkdl dmsr sn kd msgd LDC rtqe d

0755-2967-5000
0755-6683-9322
sales@refond.com

4.Handling Precautions

4.1Handling Precautions

4.1.1 Storage

(1) Moisture proof and anti-electrostatic package with moisture absorbent material is used, Suggest storage time is less than 6 months.

, , 6 .

(2) Storage condition: temperature ≤30℃, humidity ≤60% RH.

, ≤30 ≤60%RH .

(3) Before opening the package, please check the package for air leaks, if there exists any air leaks, please return the product to our company for package after dehumidification by baking before your second use.

(4) After the package is opened, the product must be used in the specified environment of temperature below 30℃/humidity below 60% RH, and soldered within 12HR. Unused material must be stored in the environment of temperature below 30℃/humidity below 10% RH , These surplus products should be baked 65±5℃/24H before next use.

, 30 60%RH

12 :30 :10%RH ,

:65 5 /24H

(5) Before SMT, LEDs need to be baked , baking requirement as below：

深圳市瑞丰光电子股份有限公司 承认专用章

0755-2967-5000
0755-6683-9322
sales@refond.com

Customer pre-treatment conditions before use				
Condition before use	undamped Production date 2 months 2	undamped Production date 2-6 months 2-6	undamped Production date 6-12 months 6-12	damped or Production date exceed 12 months 12
Pre-treatment	Baked 65 5 /12H 65 5 /12H	Baked 65 5 /24H 65 5 /24H	Baked 65 5 /48H 65 5 /48H	Return to the original factory for processing

4.1.2 Static Electricity

Static electricity and surge voltage damage the LEDs. Damaged LEDs will show some unusual characteristics such as theforward voltage becomes lower, or the LEDs do not light at the low current and even not light.All devices, equipment and machinery must be properly grounded. At the same time, it is also recommended that anti-electrostatic wrist bands, pads, uniforms, gloves or containers can be used as effective measures when dealing with the LEDs.

4.1.3 Reverse voltage protection

In generally the reverse current of LED is very small, it can’t effect using the component normally, but when it often suffered the reverse voltage which exceed the limits of the component than it will be damaged, the reverse current increases rapidly causing the string light display gray scale so when designing, please pay attention to control the reverse voltage we suggest the reverse voltage less than 5V.

LED , .

,LED , , , .

, LED 5V.

深圳市瑞丰光电子股份有限公司 承认专用章

0755-2967-5000
0755-6683-9322
sales@refond.com

4.1.4 The safe temperature for LEDs working

0755-2967-5000
0755-6683-9322
sales@refond.com

used for a long time, the main power should be switched off,Dehumidification is necessary before using the screen again.

LED

(5) Make sure that the reverse voltage will not exceed the Absolute MaxRatingwhen using the LEDs with matrix drive. Ensure that excessive voltages such as lightning surges are not applied to the LEDs.

LED

LED

(6) Aging is recommended in order todetect manufacturing and assembly defects. Particularly, make sure that excessive current and/or voltage is not applied to the LEDs. This aging should be conducted in environments where water condensation does not occur.

LED

(7) when the LEDs are used in the following environments, incorporate sufficient measures into the display to prevent debris, water/moisture and gasesthat will adversely affect the product.

- where water vapor is abundant
- where water condensation is likely to occur
- where water is likely to splash onto the LEDs
- where frost is likely to form on the surface of the LEDs (e.g. freezer, ice skating rink, etc.)
- where dust, dirt, debris, loose metallic materialsand/or gases that will adversely affect the product are present

LED ,

-

-

- LED

-LED

深圳市瑞丰光电子股份有限公司 承认专用章

0755-2967-5000
0755-6683-9322
sales@refond.com

(2) Do not handle the LEDs with bare hands as it will contaminate the LED surface and may affect the optical characteristics: it mightcause the LED to be deformed and/or the wire to break, which will cause the LED not to illuminate. The lead could also cause aninjury.

LED LED LED

LED

(3) Do not stack assembled PCBs together. Otherwise, it may cause damage to the resin (e.g. cut,

0755-2967-5000
0755-6683-9322
sales@refond.com

Version History/

Date	Revisor	Version	Verifier	Remarks
2019-04-03		E5		
2019-08-30		E6		
2022-05-08		E7		
2023-06-05		E8		
2024-12-04		E9		

0755-2967-5000
0755-6683-9322
sales@refond.com

瑞豐光電

www.refond.com

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

深圳市瑞丰光电子股份有限公司
承认专用章

0755-2967-5000
0755-6683-9322
sales@refond.com

创新科技，丰富人类生活！
Innovation enriches life