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3.1 SMT Reflow Soldering Instructions SMT ғ ǁ ب ″

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4.1 Handling Precautions ғ β Æ ғ ├ Ɣ’ °

1. Description 产品介绍

1.1 产品描述

The Red source color devices are made with AlGaInp on Substrate Light Emitting Diode .

Product Package:1.60mmX0.80mmX0.55mm.

1.60mmX0.80mmX0.55mm.

1.2Features 产品特征

PLCC2 Package.

Extremely wide viewing angle.

Suitable for all SMT assembly and solder process.

Available on tape and reel.

Moisture sensitivity level: Level 2.

Qualifications: The product qualification test plan is based on the guidelines of AEC-Q101 Stress Test Qualification for Automotive Grade Discrete Semiconductors

1.3Application 产品应用

Automotive Lighting Interior.

Switches.

1.4Package Dimension 封装尺寸

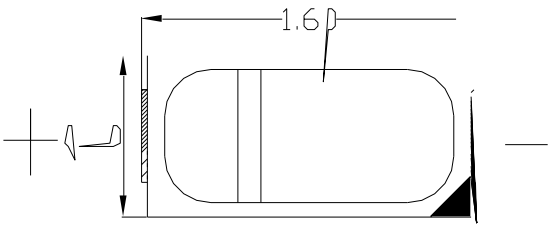


Fig.1-1 Top View* ₌ ð g„

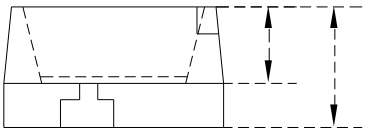


Fig.1-2SideView Ë ₌ ð g„

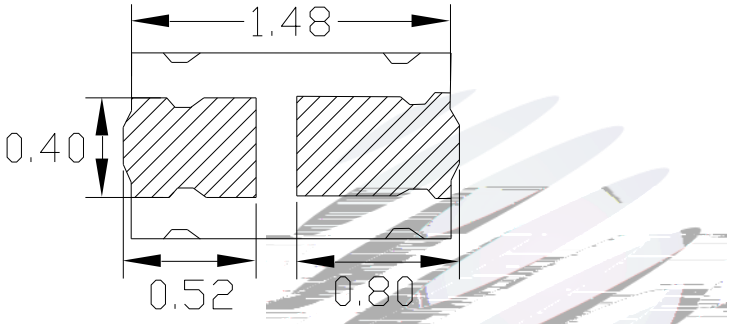


Fig.1-3BottomView ŭ ₌ ð g„

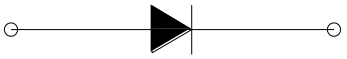


Fig.1-4Polarity ‖ ó

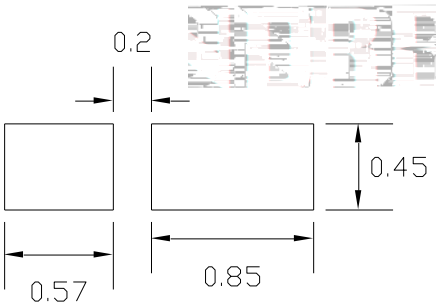


Fig.1-5Soldering Patterns ò □ `

Notes ł ├ χ

All dimensions units are millimeters. ¨A õ ò ¦ ‰ ├ ɒ ʜ ʬ ← ∜

All dimensions tolerances are ±0.2mm unless otherwise noted. ტ ≠ ˛ ‰ ├ ᵘ ı ¨A õ ò ¦ ʒ Ţ ʬ ° ← ∜

1.5Product Parameters ғ β ν Ѭ

Table 1-1 Electrical / Optical Characteristics at Ts=25°C ɔ ό лъ ж ę ≠ ό

Item ° ˎ	Symbol ㄚ N	Test Condition ⊥ ː⍞ Ţ	Value			Unit ᴅ Ꮋ
			Min. ε ѡ ṇ Ө ζ	Typ. ε Ɛ ʒ Ө ζ	Max. ε ѡ ᵶ Ө ζ	
Forward Voltage ε* ᵇ ɔ я ζ	V_F	I_F=20mA	1.8	2.0	2.4	V
Reverse Current ε ɾ ᵇ ɔ Ш ζ	I_R	V_R=5V	---	---	10	uA
Luminous Intensity ε ∧ ж Ặ ў ζ	IV	I_F=20mA	80	100	150	mcd
Dominant wavelength	Wd	IF=20mA	627.5	632.5	637.5	nm
Viewing Angle ε ∧ ж Ư ў ζ		I_F=20mA	---	120	---	deg
Thermal Resistance. ε ♬ ڜ ζ	R_{THJ-S}	I_F=20mA	---	300	---	/W

Table 1-2 Absolute Maximum Ratings at Ts=25°C ∧ Ḿ ѡ ᵶ Ө

Parameter ε ν Ѭ ζ	Symbol ε ㄚ N ζ	Rating ε Ө ζ	Units ε ᴅ Ꮋ ζ
Power Dissipation ε ı ă ζ	P_D	72	mW
Forward Current ε* ᵇ ɔ Ш ζ	I_F	30	mA
Peak Forward Current ε Ś Ө ɔ Ш ζ	I_{FP}	50	mA
Reverse Voltage ε ɾ ᵇ ɔ я ζ	V_R	5	

Notes ｷ ├ χ

1. 1/10 Duty cycle, 10ms pulse width. ｲ Ķ ｉ Ｗ ⅝

2. The above forward voltage measurement allowance tolerance is ±0.1V. Ⓠ ｉ Ａ˜ ɔ я ╨ ｟ ﾀ Ţ °3l4Y1

3. The above color coordinates measurement allowance tolerance is °0.005. Ⓠ ｉ Ａ˜ ɑ‰╨ ｟ ﾀ Ţ °3l3381

4. The above luminous intensity measurement allowance tolerance ±10%. ｉ ﾀ ∧ ж Ă ỷ ▯╨ ： ы ƥ ϛ Ţ ʁ °43 (1

5. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product. Æ ｷ ｉ ' j ｲ ∧ ص h ｈ▯ѡ ｚ Ë

6. All measurements were made under the standardized environment of Refond. Ａ ѽ ╨ ： ɸu ｉ ｇ ｗ ʁ ∧ ѽ▯ ‰ ╨ ： Ẉ ﾉ

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 Æ ｷ▯ѡ ｚ ɔ ╙ ₄ ｌ ⋮ Ỏ Ọ♬ ｷ Ţ. ｈ ｉ ﾉ □ j ｲ ∧ صѡ ｚ Ë

8. ESD yield is over 90% at 2000V ESD (HBM). ESD protection during products handing is needed. ▯ ۾ ص Ķ ч ₩ Ã ╨ ： ƥ Ḥ Ă Ḥ ت ├ Ỿ ـ ɔ گ ｉ

1.6 Bin Range Of Forward Voltage and Luminous Intensity (IF=20mA)电压与发光强度分 BIN 范围(IF=20mA)

Table 1-3

80

V_F V	B1	B2	C1	C2	D1	D2
	1.8-1.9	1.9-2.0	2.0-2.1	2.1-2.2	2.2-2.3	2.3-2.4
IV mcd	F2	G1	G2			
	80-100					

1.7 Typical Optical Characteristics Curves 典型光学特性曲线

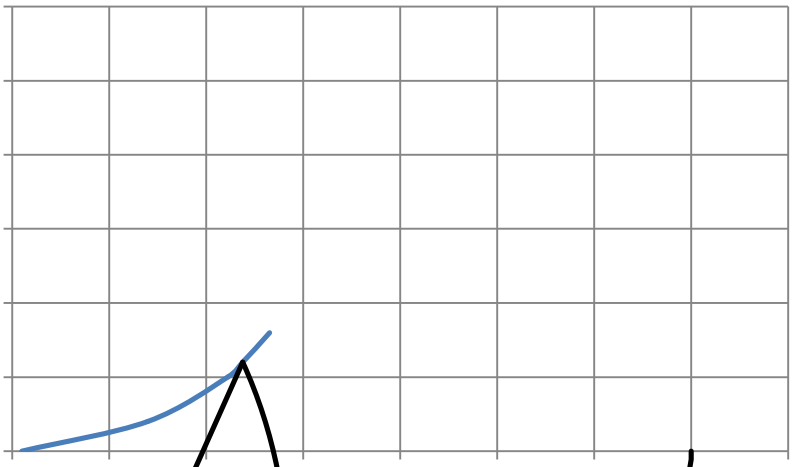


Fig. 1-7 Forward Voltage Vs Forward Current

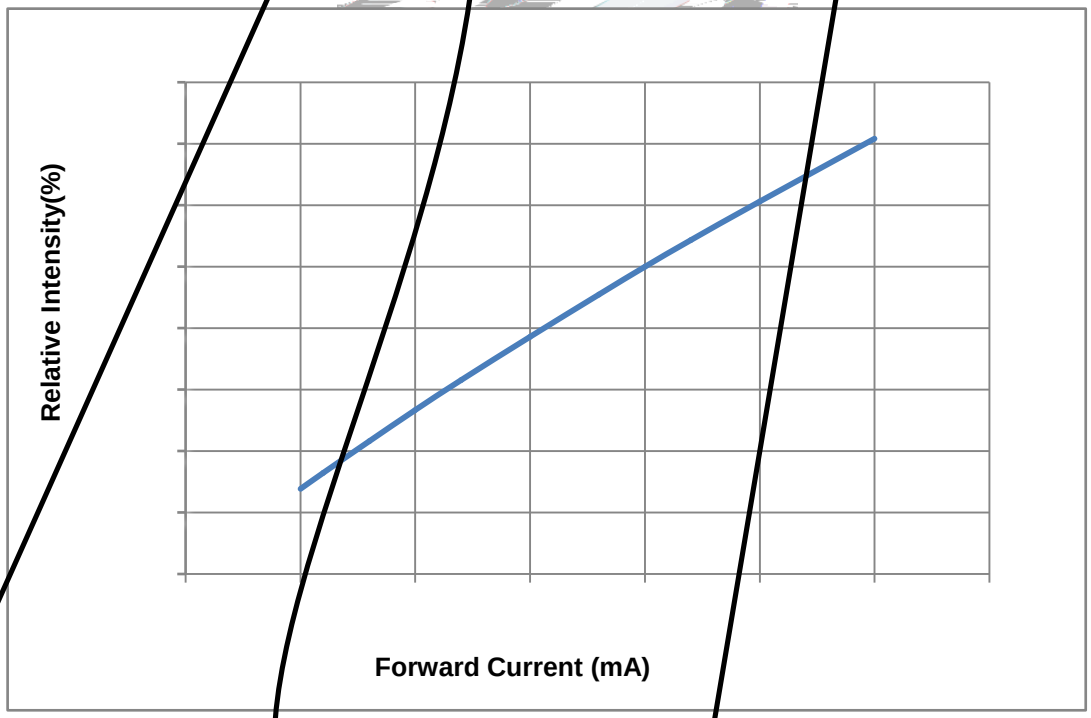


Fig. 1-8 Forward Current Vs Relative Intensity

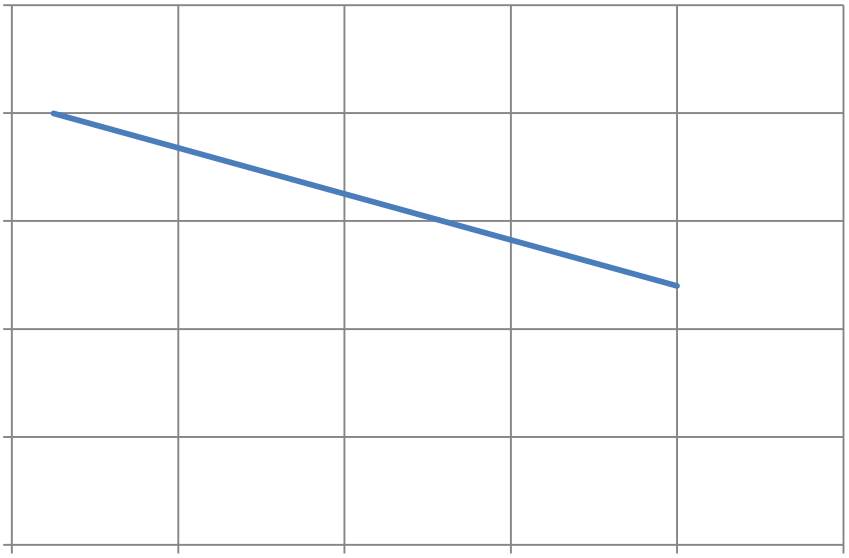


Fig. 1-9 Solder Temperature Vs Relative Intensity ٦ ű □ ỷ лъ̂ Ḿ ж Ą ≠ ớ ΄Y ١

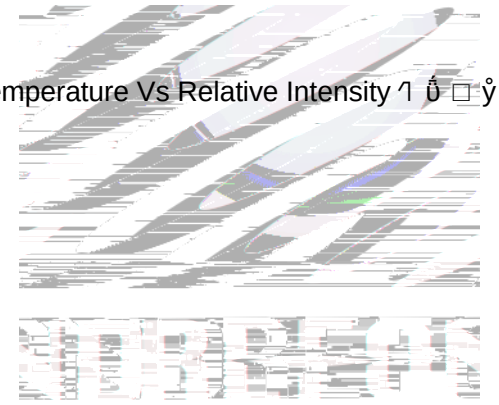


Fig. 1-10 Solder Temperature VsForward Current ٦ ű □ ỷ лъ* ᵇ ↄ Ш ≠ ớ ΄Y ١

Tj∨120 ł

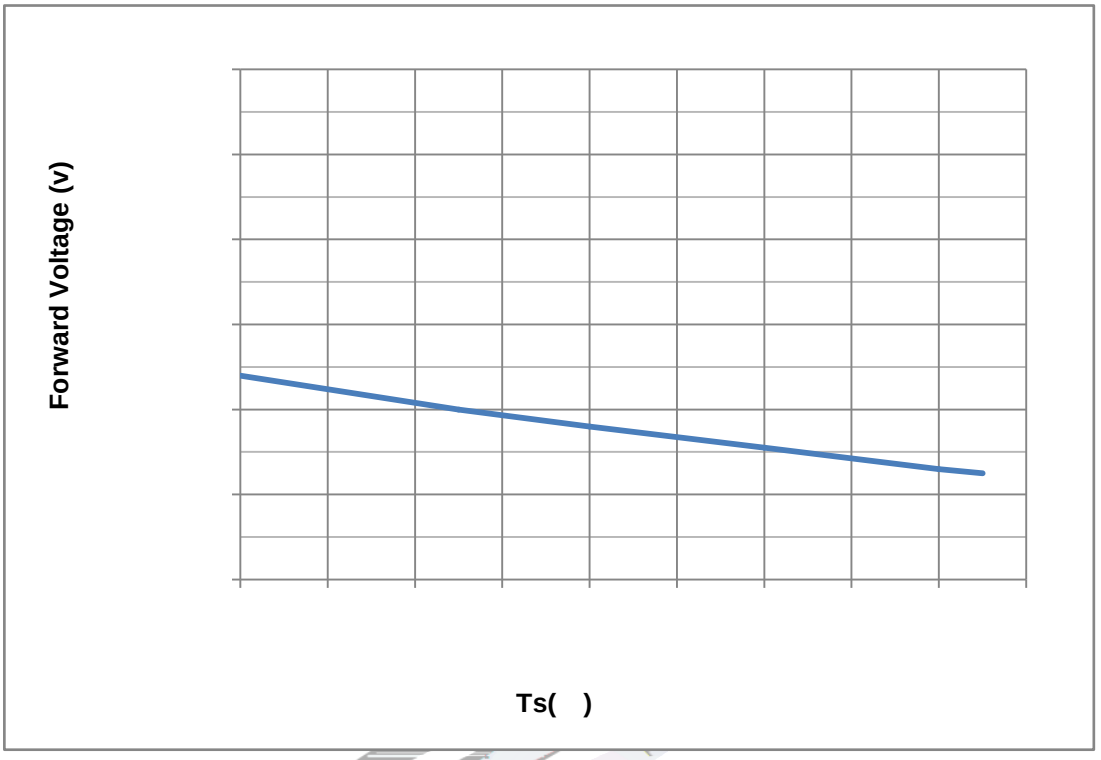


Fig. 1-11 Forward Voltage Vs Solder Temperature ɔ я лъ ٦ ŭ □ ў ≠ ớ ΄Y ٤

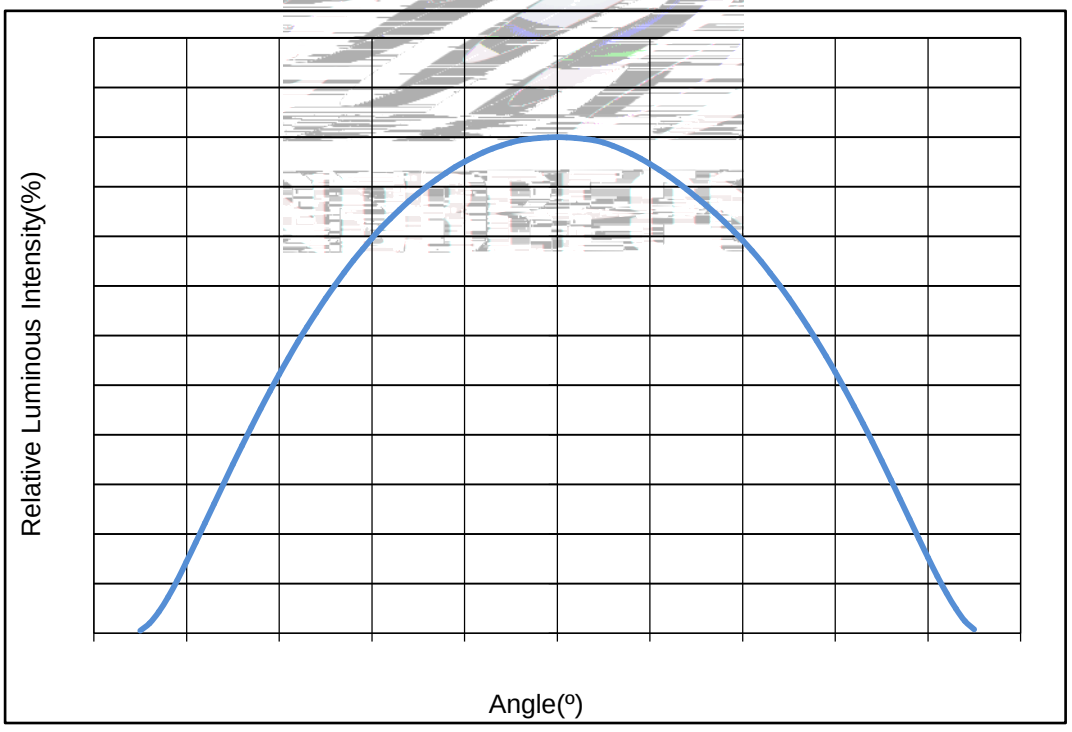


Fig. 1-12 Radiation diagram ɜ ṃ ≠ ớ ΄Y ٤

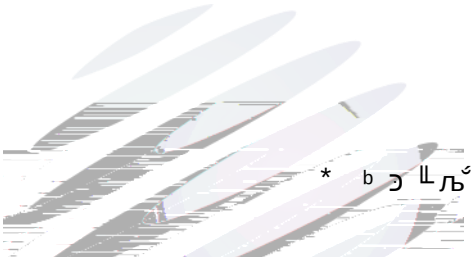
Fig. 1-13  * ᵇ ɔ ⊥ лъ ɕ ɑ‰ ≠ ớ ´Y ɨ (Ts=25°C)

Fig. 1-14 Spectrum Distribution ⁎ ‘ ų ≠ ớ ´Y ɨ

2. Packaging 产品包装

2.1 Packaging Specification 包装规格

Package:4000pcs/reel. γ Ь ⅛ ∩

2.1.1Carrier Tape Dimension ɜ Ⱶ ὸ ḽ

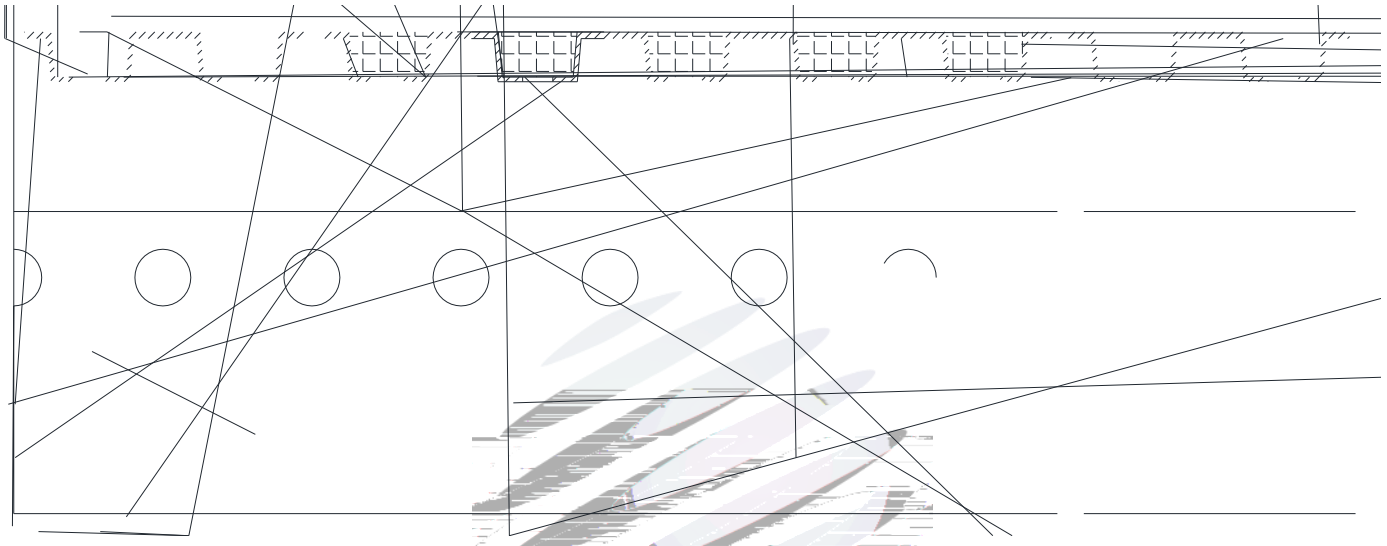
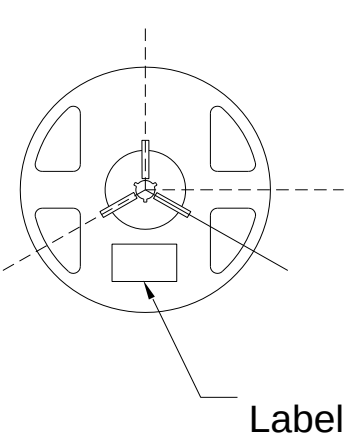


Fig.2-1 Carrier Tape Dimension ɜ Ⱶ ὸ ḽ

2.1.2Reel Dimension ∩ ` ὸ ḽ



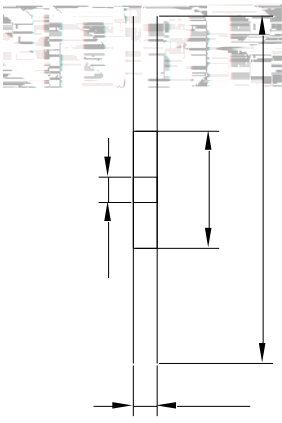


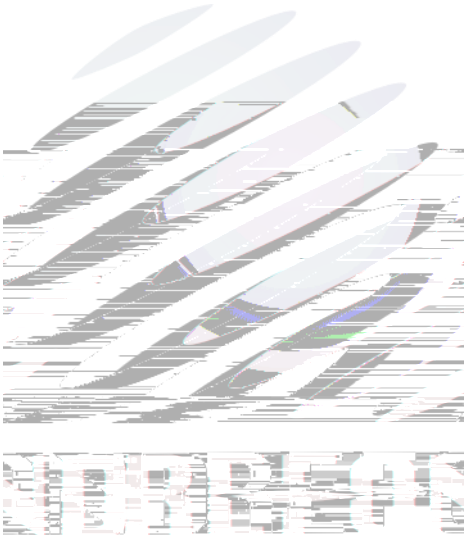
Fig.2-2Reel Dimension

Reel Dimension

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

Notes ł ├ χ

The tolerances unless mentioned ±0.1mm. Unit : mm ├ χ ' ├ ϡ Ţ ㎜ ° 3l ← ヘ ı ὸ ḽ ɒ ㄐ χ ← ヘ



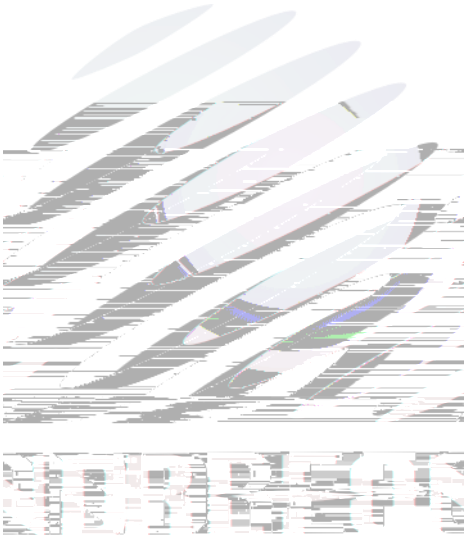
High Temperature High Humidity Life Test ㄡ□ㄡ►ㄐ ：	JESD22-A101	85 ｔ / 85%R_H I_F=20mA	1000hrs.	20pcs.	0/1
Temperature Humidity Storage ㄡ□ㄡ►ㄘ è	JEITA ED-4701 100 103	T_A=85 ｔ R_H=85%	1000hrs.	20pcs.	0/1

2.5 Criteria For Judging Damage 失效判定标准

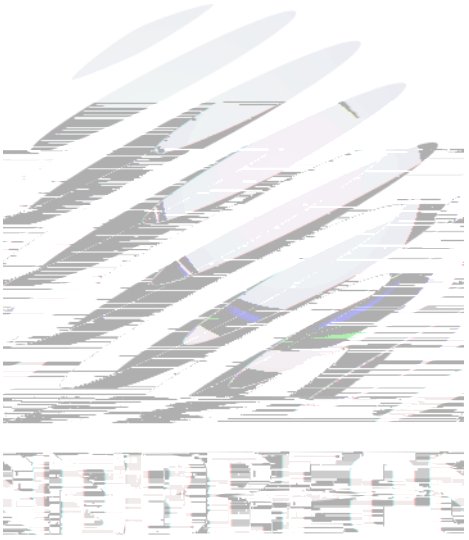
Table 2-4Criteria For Judging Damage ， ῦ， ḧ‰´

Test Items °、	Symbol ㄚN	Test Condition ㄐ ：ㄧ ㄒ	Criteria For Judgement ， ḧ‰´

3.The technical information shown in the data sheets is limited to the typical characteristics and circuit examples



Peak /Classification of temperature: δ



3.1.3 Cautions ├Ÿ’ °

The encapsulated material of the LEDs is silicone. Therefore the LEDs have a soft surface on the top of package. The pressure to the top surface will be impacted on the reliability of the LEDs. Precautions should be taken to avoid the strong pressure on the encapsulated part. So when usethe picking up nozzle, the pressure on the silicone resin should be proper. LED Ṃ Ł ỉ ћ ỉ ı ˊ ˵ ˍ ˬ ı ŕ ⊤ˇ Y я ỉ ч ˊ ˵ h ẽ φ ı 、 ό ı ŕ % Ẓ ω ĺ گ ù Ạ ₹ d ƍ ˇ Y я ʜ ţ ı Ẹ Æ ŕ ϐ ‵H ı ỉ ч ˊ ˵ OBJ я ⊤ Ẓ ĩ ụ Ẹ OBJ

(2) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board.LED ♂ ƾ j ļ ì ƍ ả ´Y OBJ — i ı ì ɵ ª ı ◌̂ j ļ ả i ﻯ —

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering. ŕ ╙ ɵ ª ˛ ɔ ص ٧ ʌ ı j ļ Ḿ ɑ ƕ ŕ ᵘ ⊤ ı ◌̂ j ļ ω ى ט ı ŕ ╙ ª ı j ļ پ ŕ ☼ ˛ ɔ OBJ ΆÃ

4. Handling Precautions 产品使用注意事项

4.1 Handling Precautions 产品使用注意事项

(1) LED operating environment and sulfur element composition cannot be over 100PPM in the LEDmating usage material. This is provided for informational purposes only and is not a warranty or endorsement.LED Ṫ Ă ע ᴸ ȝ ЛЬ گ پ OBJ ɑ ʌ Ғ ע ȝ ₽ ᵀ ŕ ă ¥ j ˡ ʌ ص ف ᴱ ĩ ʌ ấ ɲ ı j Ă γ Ṃ ᵝ و ˝ I Ȝ

(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 elementis 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.ћ گ Ƀ ᵘ ᵑ ŕ و ف Ɔ ЛЧ Ҍ ج ă OBJ Ω Ҿ ı Ά ʃ ע ᴸ ȝ Ά ŕ ˷ ţ ע ע ı D OBJ Ғ ע ᵍ ˷ ļ ∂ ɲ ı D Ғ ע ᵍ ˷ ļ ∂ ɲ ı Ғ ע Лъ Ғ ע Ở ᵍ ˷ ọ ɛ ɲ ف ᴱ ĩ ʌ ấ ɲ ı j Ă γ Ṃ ᵝ و ˝ I Ȝ

(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 theuse of any chemicals or materials that have been found or are suspected to have an adverse affect on device performance or reliability. To verifycompatibility, Refond recommends that all chemicals and materials be tested in the specific application and environment for which they are intended tobe used. Attaching LEDs, do not use adhesives that outgas organic vapor.

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

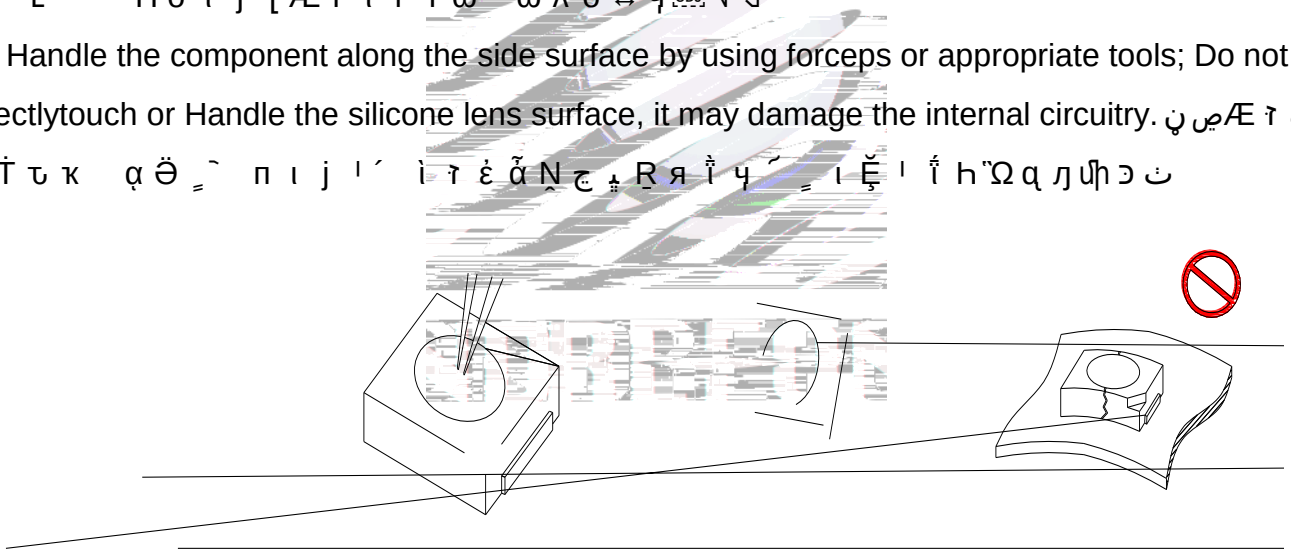


Fig 4-1Handling Precautions

(5) 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,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.

ڍ ڰ ɔ ╚ ψ ק ı ו ǐ Ṁ₇ ғ β ̈Ω⅓ ɔ ت ф щ ọ ɾ Ȝ - ᴱ ω̃ ƍ Ầ ᵏ ǎ ắ ћ ђ ▯H ö¸ א* ᵇ ɔ я ▯ ψ ק ı j ļ Ạ ɪ ɾ я ı ᵋ„ ח ̈Ω q

(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 ķ ˜ ɨ ₩₅ ڍ ▯ ʌ ♬ ⊃ ע ᴸ ▯ □ ẙ ώ ψ ắ ώ ψ ı □ ẙ ″ ב h ∪ Ң ʌ ж ѿ ' ı ẽ ᵠ ʌ ж ɟ ˇ ı ̈A Ꝍ ƍ ф щ ̀H Ẓ Ⱪ ̔ ắ Ɜ ̈Ω ♬ ڈ ڍ

(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. љ Ъ Ң Ṃ Ь ǐ ̓ ⅝ ı ǐ ụ Ẃ ẹ ợ ı ˊ ₌ ˜ ڜ ǐ ɨ ı Ẓ ɾ ̀H Ẓ ≠ ¸ ├ Ỵ ı Ẹ Ḿ ғ β ┼ ́ ẙ ļ ∂ ẹ ב ̀H ı ɨ ╚ Ꝗ ᵅ ₄ ļ ڀ ɾ ụ Ę ▯ ▌ ‖ ́A Ã ı ắ Ç ò □ ɾ ầ Ă ▌ ‖ ¯ ı ḅ ₄ ļ ɾ ̇ Ъ Ң ▌ ‖ ¯ ı ọ ɾ Ȝ - j ḥ ɋ Ṃ Ь ч ı ʌ ф ▌ ‖ ı ǐ h Ḿ Ṿ ̔ ̀Ω ḱ ı j ò □ ف ϒ ▌ ‖ ́A Ã

Table 4-1Storage Ч è

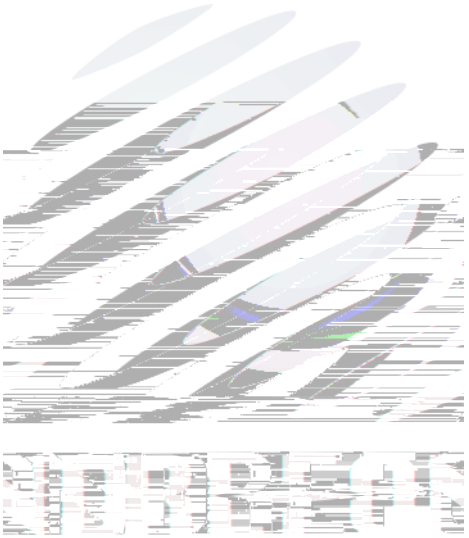
Conditions	
ϒ 1	

(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 for above 24 hours. þ ' ẇ ¯ ð̃ ɣ Ɛ ¸ ѽ ı ð̃ ð̈ ғ β j ɬ ᵀ Ꝙ i ѽ ѽ Ч è† ʇ ı ɹ ˝I ɣ ª ڤ Φ ı ǂ ʇ χ ° ɬ ı ⁂ ɲ ̀H

If the package is flatulence or damaged,please notify the sales staff to assist. þ ' ɣ Ɛ ↔ ð̃ ð̈ ¨Ω ı ت ̃ن ⁋ φ Ƙ ^ в ' ∫ ת

(9)Similar to most Solid state devices; LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). ч Ʊ H ⚀ Æ Ṁ ч ɔ Ḍ н ʇ ¯ ı Ḿ ̿ ɔ ص Ш ̀ Ⅵ ° Ẃ ѽ ɣ ı ɹ ɻ ӯ Ḅ گ ï

(10) Other points for attention, please refer to our relevant information. Ʊ Ḝ ├ Ɣ ' ° ت v Ł ѽ Ⱨ ̂ н ° ɑ



Version History/И ᵹ ᴗ ᴷ

Date ɳ Ω	Revisor И ᵹ ắ	Version v	Verifier Ị ⁄	Remarks ᵻ ├
	ز Ổ æ	E0	ắ ˝	À ∧ Φ New issue

Declare ╕ ˝
This specification is written both in English and in Chinese and the latter is formal.
ғ β h† ₩ Ꝙ ᴀ ᔑ ă Ά Ã ₩ ˚ ı ᵡ ῶ ˙ Ⴙ Ꝙ ᴀ ă ν ⱶ ´