# SPECIFICATION

ƒ β h† w̄

REFOND P/N ƒ β ʒ N

RF-A2P08-R195-A2

□ . Λ

■ Mass Production ˌ ƒ ĕ o



创新科技，丰富人类生活！
Innovation enrich life

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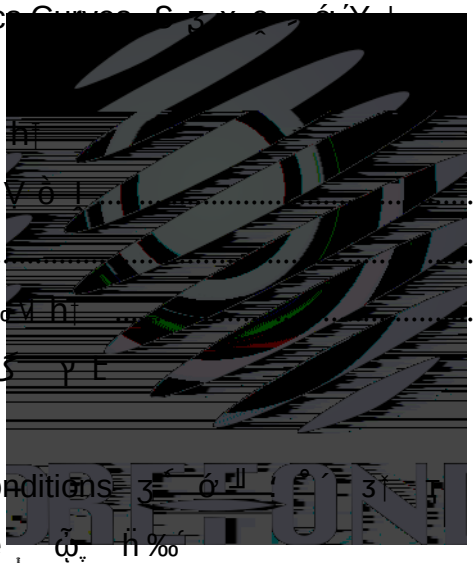
4.1 Handling Precautions ғ β Æ ғ ├ Ɣ ’ ˚



# 1. Description CÞ”

## 1.1

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

Product Package:1.60mmX0.80mmX0.55mm

60mmX0.80mmX0.55mm.

## 1.2Features CÞ¤

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 CÞ

Automotive Lighting Interior.

Switches.

## 1.4Package Dimension .G)

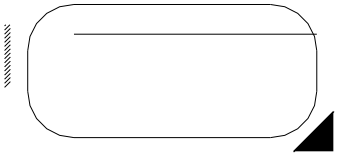


Fig.1-1 Top View* ₌ ð g„

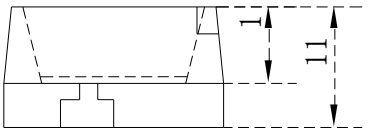



Fig.1-2SideView Ë ₌ ð g„

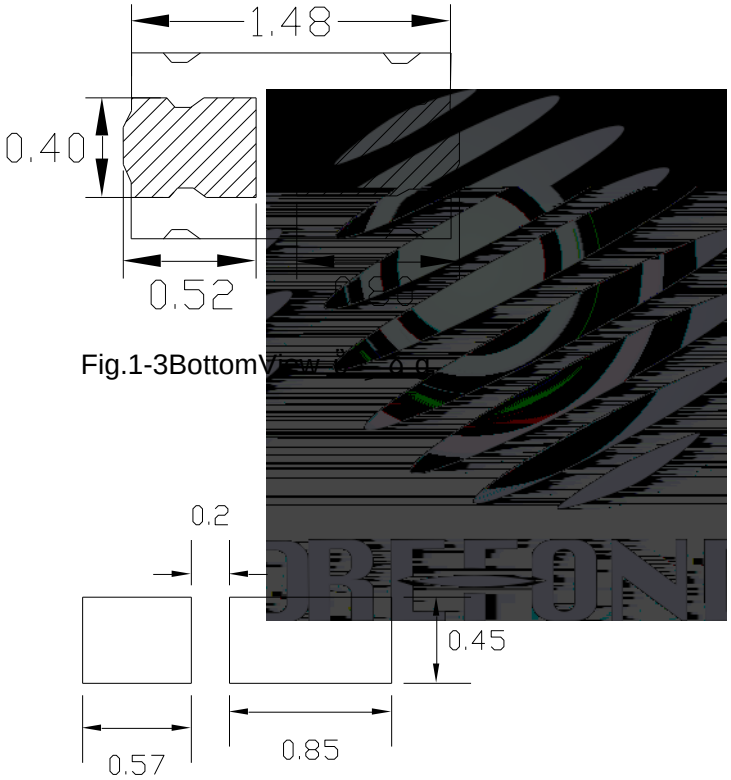



Fig.1-3BottomView ₌ ð g

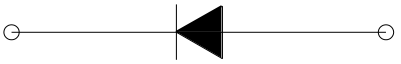


Fig.1-4Polarity ‖ ớ

Fig.1-5Soldering Patterns ò □ `

Notes ł ├ χ

All dimensions units are millimeters. Ά õ ò ¦ ‰ ├ ɒ ɥ ʜ ← ∜

All dimensions tolerances are ±0.2mm unless otherwise noted. ₺ ≠ ˛ ‰ ├ ᵘ ɪ Ά õ ò ¦ ʒ Ţ ʜ ° ← ∜

## 1.5Product Parameters ғ β ν Ѭ

Table 1-1 Electrical / Optical Characteristics at Ts=25℃ ɔ ό ль ж ę ≠ ό

| Item ° ˎ | Symbol ㄚ ᴺ | Test Condition ⫫ ⁝ˈ ţ | Value | | | Unit ᴅ ㄐ |
|---|---|---|---|---|---|---|
| | | | 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 ⊥ ζ | $I_R$ | $V_R$=5V | --- | --- | 10 | uA |
| Luminous Intensity ε ∧ ж Ặ ў ζ | IV | $I_F$=20mA | 650 | 800 | 1200 | mcd |
| Dominant wavelength | Wd | [illegible] | [illegible] | 620 | 625 | nm |
| Viewing Angle ε ∧ ж Ư ў ζ | | [illegible] | [illegible] | 120 | --- | deg |
| Thermal Resistance. ε ♬ ڳ ζ | $R_{THJ-S}$ | [illegible] | [illegible] | 300 | --- | /W |

Table 1-2 Absolute Maximum [illegible] Ts=25C ʌ Ḿ ѡ ᵶ Ө

| Parameter ε ν Ѭ ζ | Symbol ε [illegible] ζ | Rating ε Ө ζ | Units ε ᴅ ㄐ ζ |
|---|---|---|---|
| Power Dissipation ε ı ă ζ | $P_D$ | 72 | mW |
| Forward Current ε* ᵇ ɔ ⊥ ζ | $I_F$ | 30 | mA |
| Peak Forward Current ε Ś Ө ɔ ⊥ ζ | $I_{FP}$ | 50 | mA |
| Reverse Voltage ε ɾ ᵇ ɔ я ζ | $V_R$ | 5 | V |
| Electrostatic Discharge (HBM) ε ‗ ɔ ζ | $E_{SD}$ | 2000 | V |
| Operating Temperature ε Ѭ Ặ □ ў ζ | $T_{OPR}$ | -40 ~ +100 | |
| Storage Temperature ε Ч è □ ў ζ | $T_{OPR}$ | -40 ~ +100 | |
| Junction Temperature ε ɹ □ ζ | $T_J$ | 120 | |

Notes ł ├ χ

1. 1/10 Duty cycle, 10ms pulse width. ǐ Ķ ı Ⅵ ⅝

2. The above forward voltage measurement allowance tolerance is ±0.1V. Ꙫ i ˝A˜ ɔ я ╝ ˛ ئ Ţ ° 3l4Y1

3. The above color coordinates measurement allowance tolerance is °0.005. Ꙫ i ˝A˜ ɖ‰╝ ˛ ئ Ţ ° 3l3381

4. The above luminous intensity measurement allowance tolerance ±10%. i ڈ ʌ ж Ă ỷ▯╝ ˸ ы ƿ ҁ Ţ ʜ ° 43 ( 1

5. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product. Æ ŧ ı ' j ǐ ʌ ص h ḧ▯ѡ ᶻ Ë

6. All measurements were made under the standardized environment of Refond. ˝A ѻ ╝ ˸ ʠu ĩ ▯ ѡ ʜ א ѻ▯ ‰´ ╝ ˸ Ẉ ᴊ

7.When the LEDs are in operation the maximum current should be determined after measuring the package temperature,junction temperature should not exceed the maximum rate. Æ ŧ▯ѡ ᶻ ɔ ╚ ₓ ɻ ⁞ ˜Ω¨Ω♬ ţ. ḧ ı ɹ □ j ǐ ʌ ص ѡ ᶻ Ë

8. ESD yield is over 90% at 2000V ESD (HBM). Electrostatic protection during products handing is needed. ▯ ڀ ص Ķ ч ₩ Ã ╝ ˸ ƿ ¨H Ă H ت ┤ Y ɔ ɾ ł

## 1.6 Bin Range Of Forward Voltage and Luminous Intensity (IF=20mA)Θ

## ▯. BIN Ÿ (IF=20mA)

Table 1-3

| $V_F$ 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 | K2 | L1 | L2 | | | |
| | 650-800 | 800-1000 | 1000-1200 | | | |
| WD(nm) | D2 | E1 | E2 | | | |
| | 617.5-620 | 620-622.5 | 622.5-625 | | | |

## 1.7 Typical Optical Characteristics Curves

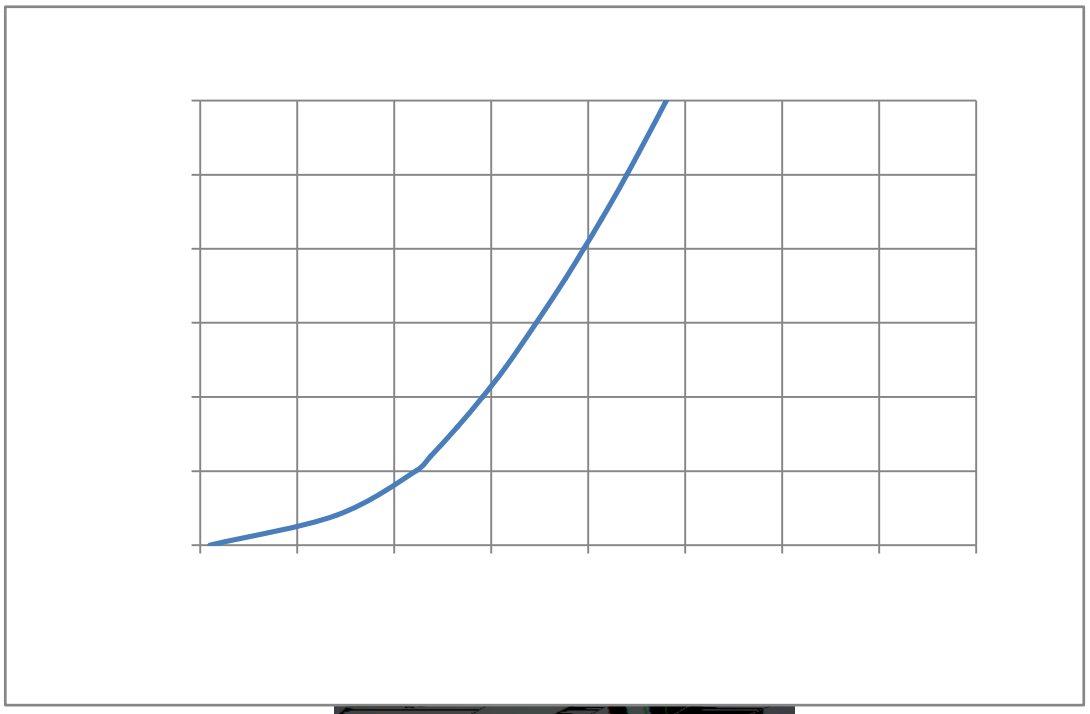


Fig. 1-7 Forward Voltage Vs Forward Current

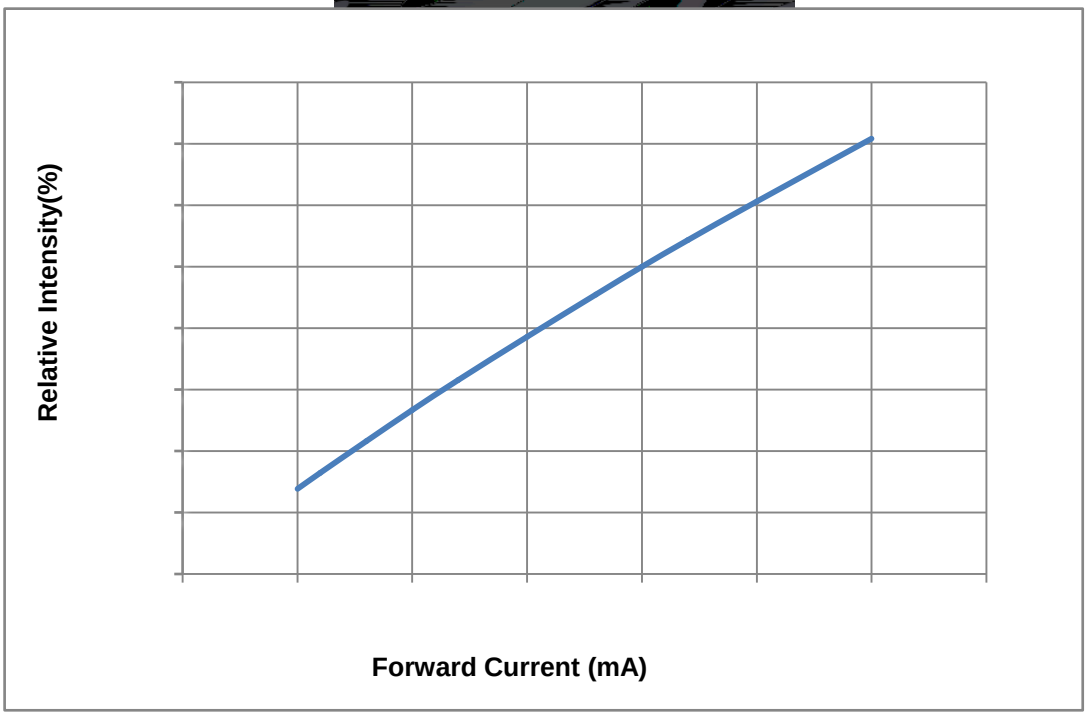



Fig. 1-8 Forward Current Vs Relative Intensity

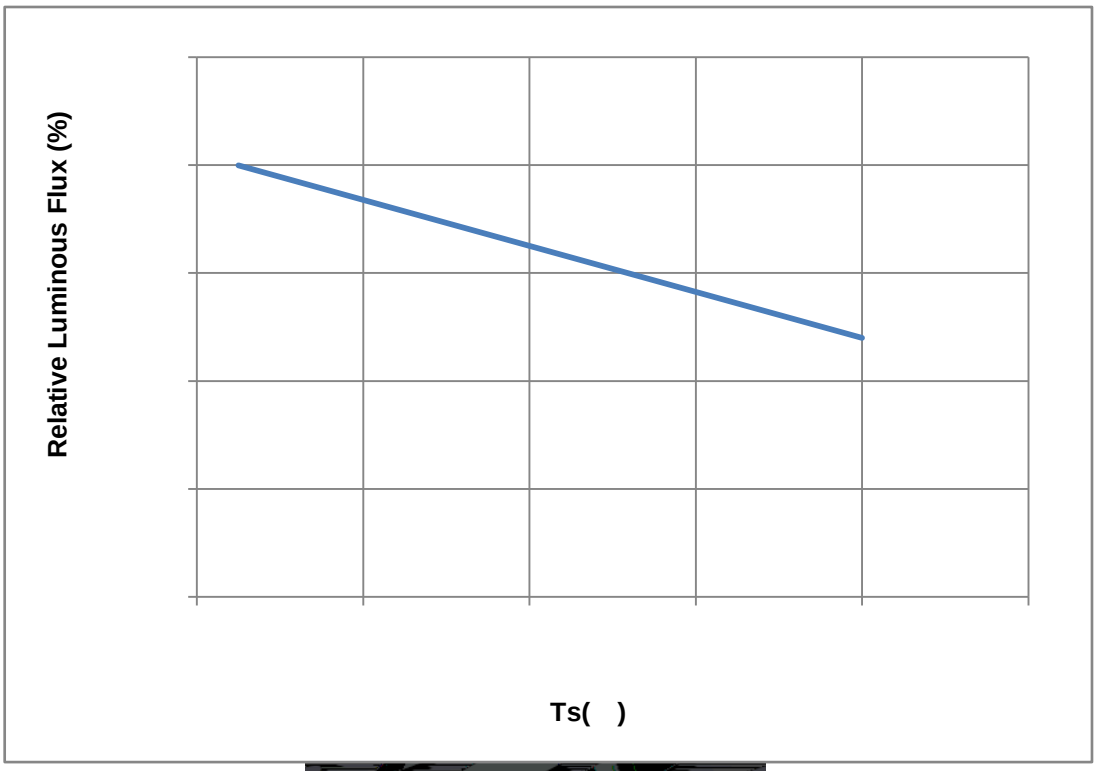



Fig. 1-9 Solder Temperature Vs Relative Intensity ŕ ő □ ỷ ль̂ Ḿ ж Ą ≠ ó ´Y ł

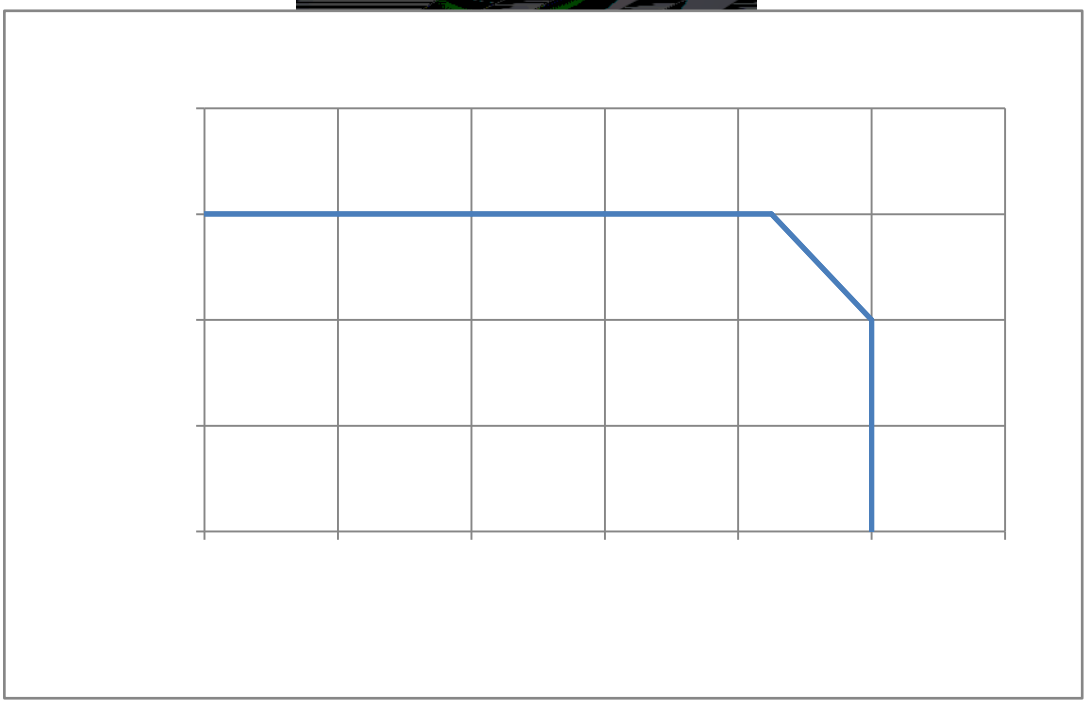


Fig. 1-10 Solder Temperature VsForward Current ٦ ő̂ □ ỷ ль* ᵇ ɔ ╚ ≠ ó ´Y ł

Tj∨120 ł

Fig. 1-13 ɖ‰ ≠ ό ′Y ɨ (Ts=25℃)

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| | | | | | | | | |

Fig. 1-14 Spectrum Distribution ⁎ ‘ ų ≠ ό ′Y ɨ

# 2. Packaging CÐ

## 2.1 Packaging Specification Ëá

Package:4000pcs/reel. γ Ł ⅛ ∩

### 2.1.1Carrier Tape Dimension ɜ Ṿ ὸ ḷ

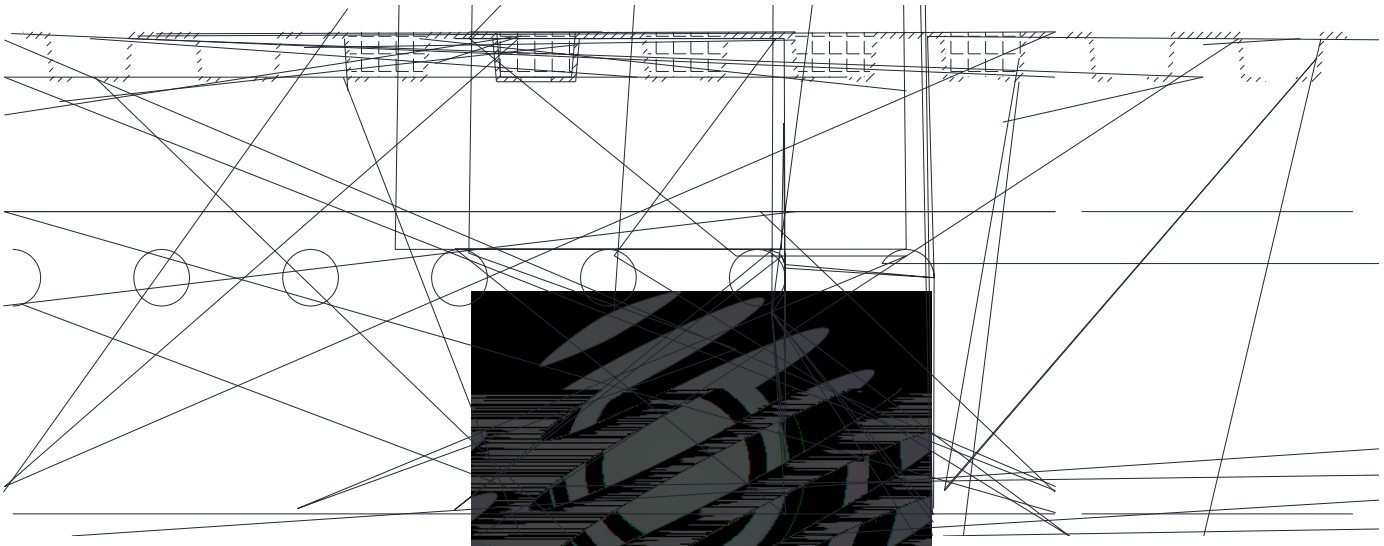
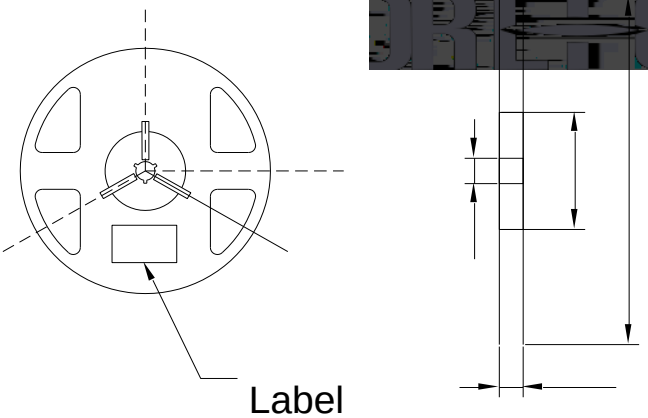


Fig.2-1 Carrier Tape Dimension ɜ Ṿ ὸ ḷ

### 2.1.2Reel Dimension ∩ ` ὸ ḷ




Reel Dimension # F€+â+

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

Fig.2-2Reel Dimension # F€+â+

Notes ł ├ χ

The tolerances unless mentioned ±0.1mm. Unit : mm ├ χ ' ├ ϡ Ţ ㎜ ° 3ł ← ヿ ı ὸ ḷ ɒ ㄐ χ ← ヿ

## 2.1.3Label Form Specification ‰ Ѡ h†

Fig. 2-3Label Form Specification ‰ Ѡ h†

| | Specification h† |
|---|---|
| PART NO. | Part Number β ɐ |
| SPEC NO. | Spec Number h† |
| LOT NO. | Lot Number ŋ Ӄ ᴺ |
| BIN CODE | Bin Code ν ΏΓъ |
| | Luminous flux ж ϑ ⁑ |
| XY | Chromaticity Bin ˇ ת |
| $V_F$ | Forward Voltage* ᵇ ɔ я |
| WLD | Wavelength ᴸ ɜ Γъ |
| QTY | Packing Quantity Ώ ⁑ |
| DATE | Made Date ɨ ғ ŋ Ω |

## 2.2Moisture Resistant Packing ŀBf

Fig.2-4Moisture Resistant Packing eÚ? "-Xm

| | |
|---|---|
| Peak /Classification of temperature: Š Ö / ˋ ↿ □ ỷ (Tᴘ) | 260 ℃ |
| Time limit classification of peak temperature time ب`H Š Öˋ ↿ □ ỷ χ `H ژ ε tᵨ ζ | ϣ ^ 10 ↾ Max 10s |
| лъ ḫ ڳŠ Ö □ ỷ (Tᴘ) ˀ Ţ 5 ℃ Ϣ л OBJ ʒ ˈY `H ژ Hold time within 5 ¯C with the actual peak temperature (TP) | ϣ ^ 30 ↾ Max 30s |
| ب □ ھ ỷ Cooling speed | ϣ ڃ6 ℃/ ↾ Max 6 ℃/ s |
| 25 ℃ ″₆ Š Ö □ ỷ ΅A ڵ `H ژ Needed time from 25 ℃ to Tp | ϣ ^ 8ˊ ت Max 8 minutes |

Notes ᵻ ├ χ

(1)Reflow soldering should not be done more than twice. When more than 24 hours between the two solderings , LED will be damaged. ᵻ ╙ Ҟ ̈Ω j ⁽ Ѳ ʌ ص ⁾ ⁽ Ҟ ı Ь Ҟ ᵻ OBJ ⁾ ⁽ ḅ ˈ ʌ ص ṇ `H ı ı ǐ ► ǟ ̈Ω q

(2)Whensoldering , do not put stresson the LED during heating up. ⁽ `H ı j ɻ ƥ ϙ ᴘ ♬ `H ᵻ ד я ǐ ч ˊ ˭

3.1.1 Soldering Iron ڤ ì

(1) When do soldering by hand, keep the temperature of iron below less 300 W less than 3 seconds Ę ė Ṫ ì `H ڤ OBJ □ ỷ ọ ᵋ ṇ ˆ ᵻ ⁻ `H ژ j ⁻ ʌ ص ↾

(2) Soldering by hand should be done only one time. ė Ṫ ì ᴱ ı ì Ҟ

3.1.2 Repairing Й ´

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 ᵻ ╙ ɑ j Ẓ Ỉ Й ᵸ ı Ę ọ ᵋ Й ᵸ `H ı ọ ᵋ Æ ᵻ ᵡ ̌ ڤ ı ǟ ħ’ Ӿ Ẓ ɳ % ↿ Ά Ã h j ḥ ̈Ω q ɕ OBJ ᵋ ό

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 ₶ ỉ ı ˊ ˭ ̧ ı ɾ ᵀ ˜Y я ỉ ч ˊ ˭ h ẽ ᵠ ˙ ˛ ı ó ı ł % Ẓ ω ĺ گ ù Ạ ₹ d ƍ ˜Y я ʰ ţ ı Ẹ Æ ɾ ɓ ̀H ı ỉ ч ˊ ˭ OBJ я ᵀ 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 å ´Y OBJ — i ı ì ɵ ª ı ◌̂ j ļ å i ﻯ —

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering. Do n y co devi ering. ł Ш ɵ ª ˛ ɔ ص ٧ ѧ ı j ļ Ḿ ą ḫ ɾ ᵘ ᵀ ı ◌̂ j ļ ω ى ت ª ˛ ˛ پ ˣ OBJ ´A Ã

## 4. Handling Precautions

### 4.1 Handling Precautions

(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 ʟ ȝ ڵ گ ٮ OBJ ą ѧ Ғ ٧ ȝ ᑭ ᵀ ɦ ă ¥ j ˡ ٨ ص ف E ĩ ѧ á ɲ ı j Ă γ Ɱ β و ˜l 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.₶ ˜ گ Ƀ ᵘ ᵑ ɦ و ف ϡ ЛЩ Ҷ ă OBJ ˜Ω Ҿ ı ˜A ʃ ע ʟ ȝ ˜A ɾ ˵ ţ ٧ ٧ ı D OBJ Ғ ٧ ᵍ ˵ ļ ∂ ŋ ı D Ғ ٧ ᵍ ˵ ļ ∂ ŋ ı Ғ ٧ ЛЬ Ғ ٧ Ở ᵍ ˵ ọ ɛ ŋ ف E ĩ ѧ á ɲ ı j Ă γ Ɱ β و ˜l 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.

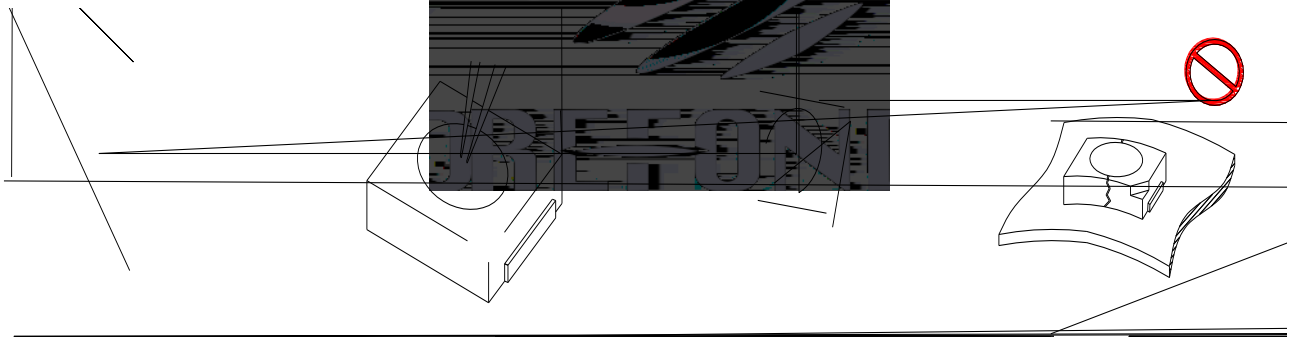


Fig 4-1Handling Precautions

(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.

ۏ ۼ ɔ ╚ ψ ק ı ˡ ǐ Ṁ₇ ғ β ̈Ω⅓ ɔ ت ф щ ọ ɛ Ȝ - ᴱ ω̃ ƍ Ã ᵏ ã ð̃ ћ ђ ⃞H ö¸ א* ᵇ ɔ я ⃞ ψ ק ı j ļ Ạ ɾ ɾ я ı ᵋ„ ћ ̈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 ₶ ڇ ⃞ ʌ ♬ ⊃ ע ᴸ ⃞ □ ỷ ѽ ψ ð̃ ѽ ψ ı □ ỷ ″ ב h ∪ Ң ʌ ж ѽ ' ı ẽ ᵠ ʌ ж ɟ ˇ ı ̈A Ѡ ƍ ф щ ̀H Ẓ Ⱪ ˊ ð̃ Ɜ ̈Ω♬ ڈ ۓ

(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. Before [illegible] propyl alcohol for cleaning. In case other solvents are used, it must be ensured that these solvents do not dissolve the package or resin. Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the LED. ль Ъ Ң Ṃ Ь ǐ ̂ ⅝ ı ǐ ɳ W ڍ [illegible] H Ẓ ≠ ¸ ├ Ỵ ı Ę Ḿ ғ β ┼ ´ ỷ ļ ∂ ۓ ح ̀H ı ғ ╚ Ѡ ª ڍ ļ ڀ ɾ u Ł ⃞ [illegible] Ă ▌ ‖ ¯ ı ḅ ڍ ļ ɾ ˙ Ъ Ң ▌ ‖ ¯ ı ọ ɛ Ȝ - j ḥ ą Ṃ Ь ч ı A ª [illegible] V ̈Ω ќ ı j ò □ ف ϒ ▌ ‖ Ά Ã

Table 4-1Storage 七 è

| Conditions<br>ϒ 1 | | Temperature<br>□ ỷ | Humidity<br>► ỷ | Time<br>`H ڑ |
|---|---|---|---|---|
| Storage | Before Opening Aluminum Bag<br>″I ɣ ˙ | ∨30 ɬ | ∨75% | Within 1 Year From Date<br>Ẉ ɲ |
| | After Opening Aluminum Bag<br>″I ɣ ª | ∨30 ɬ | ∨60% | Recommended for use within 24 hours<br>ấ ɲ 24H ɲ Æ ɾ |
| Baking | | 60 ° 5 ɬ | - | ˆ 24hours<br>ⷪ 24 ɳ `H |

(8) If the moisture absorbent materialp·silica gelp¸has faded away or the LEDs have exceeded the storage time,baking treatment should be performed after unpacking and based on the following conditionp·65 ²5p¸ W for above 24 hours. þ ' ẇ ¯ ǎ ɣ Ɛ¸ ѽ ı ǎ ă ғ ß j ϒ ᵀ Ꝙ i ѽ ѽ Ч è† ʇ ı ₓ ″I ɣ ª ف Φ ı ǂ ʇ χ ° ɬ ı ₴ ṇ ̀H

If the package is flatulence or damaged,please notify the sales staff to assist. þ ' ɣ Ɛ ↔ ǎ ą̈ ̈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 Ծ Н OBJ Æ Ṁ ч ɔ Ḍ ʜ ʇ ¯ ı Ḿ ـ ɔ ص Ш ̀ Ѵ ° Ẃ ѽ ɣ ı ₓ ļ ӯ Ḅ グ ï

(10) Other points for attention, please refer to our relevant information. Ծ Ḝ ├ Ỵ ' ° ت v Ł ѡ Ѭ ʜ ° ą

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<br>New issue |
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