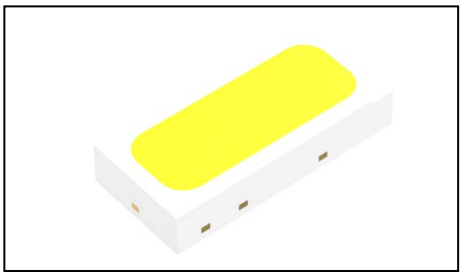
# 1. Description

## 1.1



The White LED, which was fabricated by using a blue chip and the phosphor.

Product Package: 3.00mmX1.40mmX0.52mm.

LED 3.00mmX1.40mmX0.52mm.

## 1.2Features

y EMC Package. EMC

yExtremely wide viewing angle.

ySuitable for all SMT assembly and solder process . SMT

yAvailable on tape and reel .

yMoisture sensitivity level: Level 2 . Level2

y RoHS compliant. 2Š RoHS0[ Ó

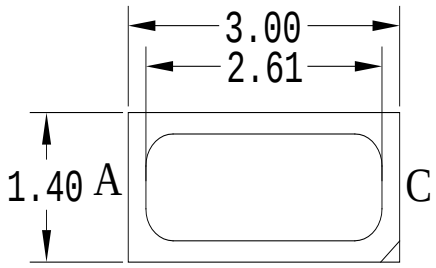
yQualifications: The product qualification test plan is based on the guidelines of AEC -Q102 Stress Test Qualification for Automotive Grade Discrete Semiconductors

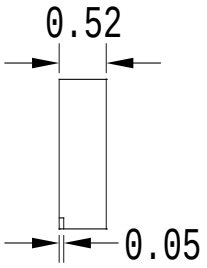
AEC-Q102

## 1.3Application

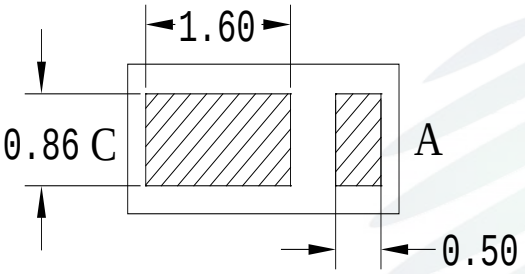
y Automotive Lighting Interior and Exterior.

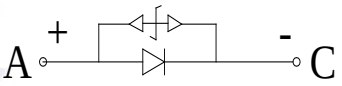
## 1.4Package Dimension

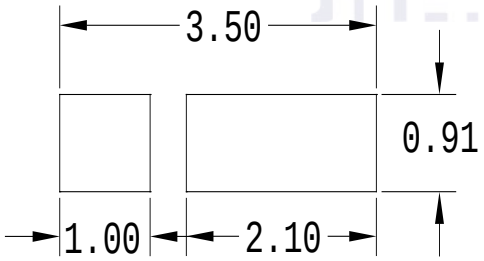



) L J 7 R S 9 L H Z!“M’?ö .




Notes

1. All dimensions units are millimeters.

2. All dimensions tolerances are r0.2mm unless otherwise noted. ± 0.2

## 1.5Product Parameters

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

| Item | Symbol | Test Condition | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Forward Voltage | $V_F$ | IF=140mA | 2.8 | 3.0 | 3.4 | V |
| Reverse Current | $I_R$ | $V_R$=5V | --- | --- | 10 | uA |
| Luminous Flux | - | IF=140mA | 45.3 | 55 | 67.8 | IF=140mA |

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

Notes

1. 1/10 Duty cycle, 10ms pulse width. 10ms, 1/10.

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

3. The above color coordinates measurement allowance tolerance is ± 0.005. ± 0.005.

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

8. ESD yield is over 90% at 8000V ESD (HBM). ESD protection during products handing is needed. 90% LED
ESD8000V ,

## 1.6 Bin Range Of Forward Voltage and Luminous Intensity (IF=140mA)

## BIN (IF=140mA)

Table 1-3

| $V_F$ V | G1 | G2 | H1 | H2 | I1 | I2 |
|---|---|---|---|---|---|---|
| | 2.8-2.9 | 2.9-3.0 | 3.0-3.1 | 3.1-3.2 | 3.2-3.3 | 3.3-3.4 |
| -(lm) | OA | OB | PA | PB | | |
| | 45.3-50 | 50-55.3 | 55.3-61.2 | 61.2-67.8 | | |

## 1.7 Typical Optical Characteristics Curves

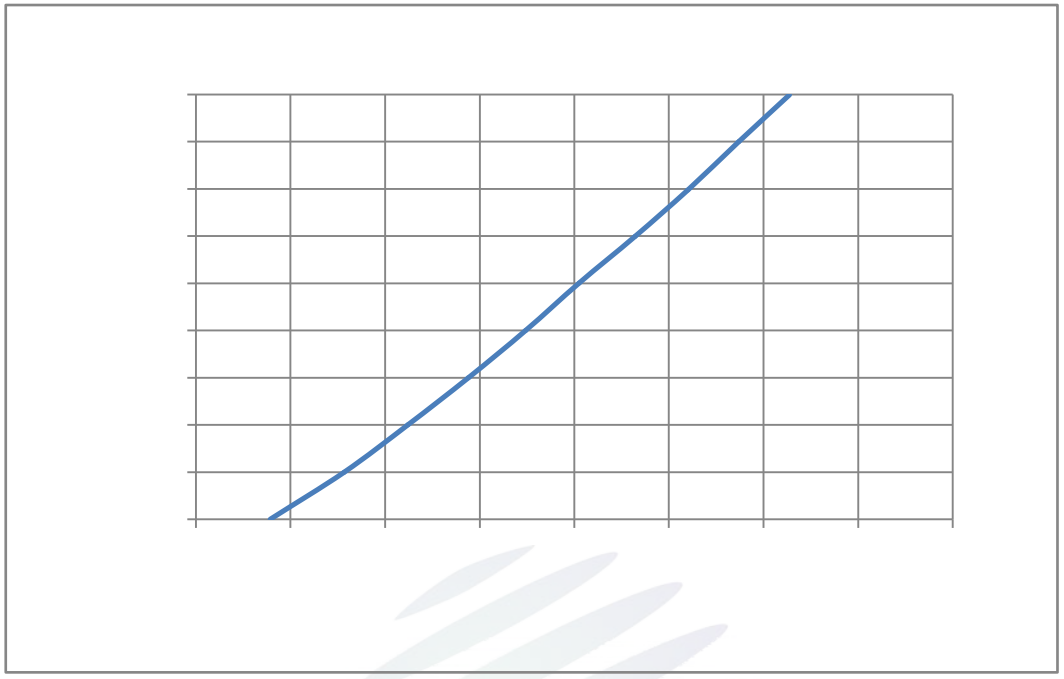


Fig. 1-7 Forward Voltage Vs Forward Current

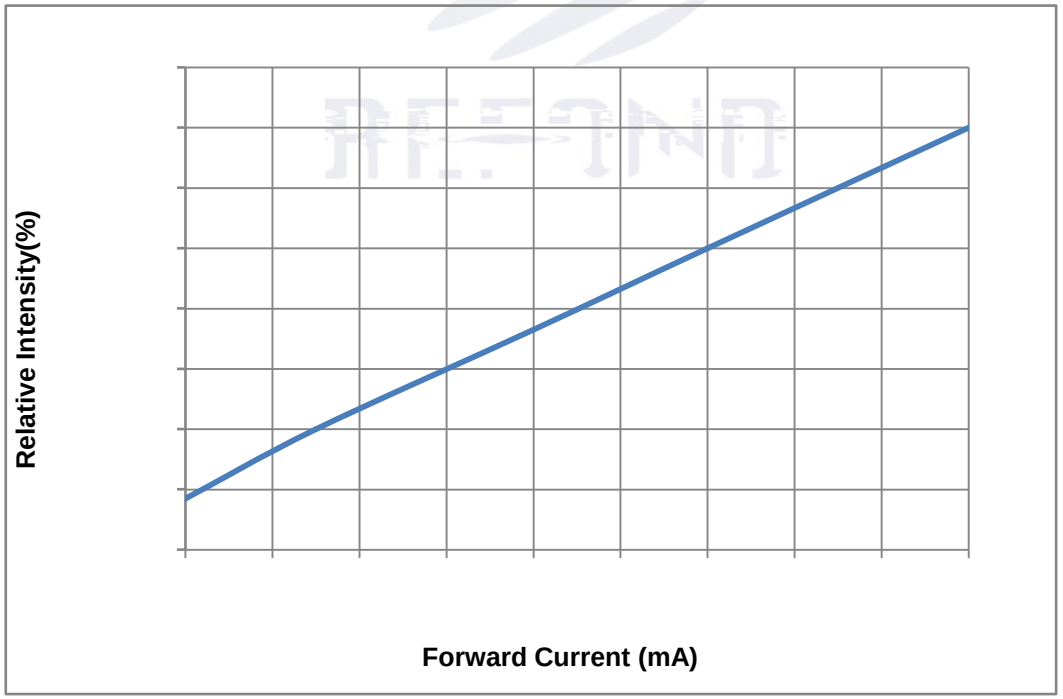



Fig. 1-8 Forward Current Vs Relative Intensity

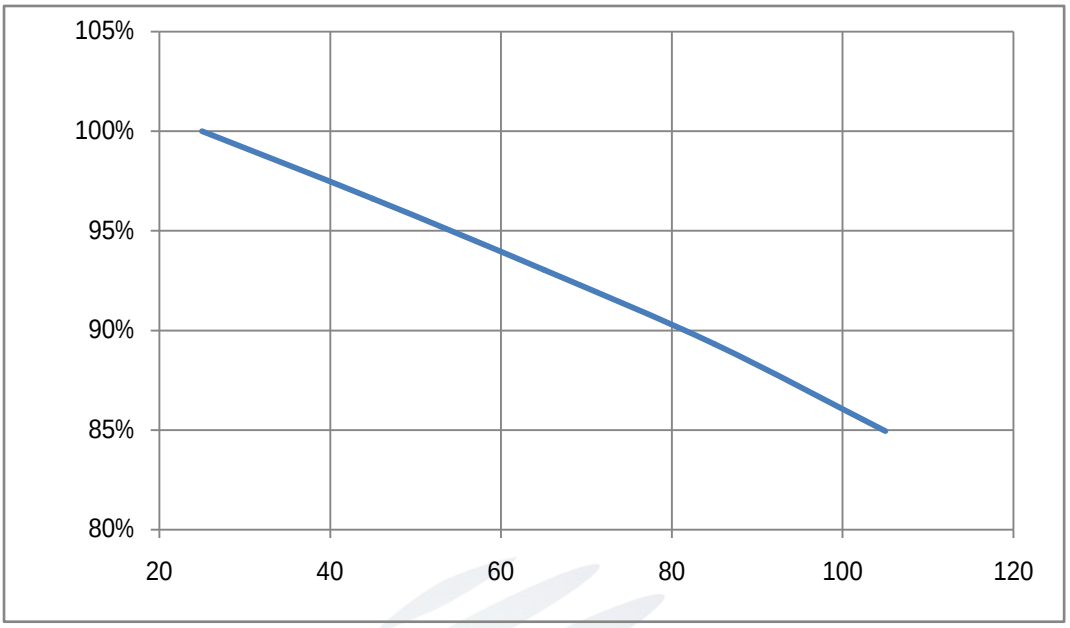



Fig. 1-9 Solder Temperature Vs Relative Intensity

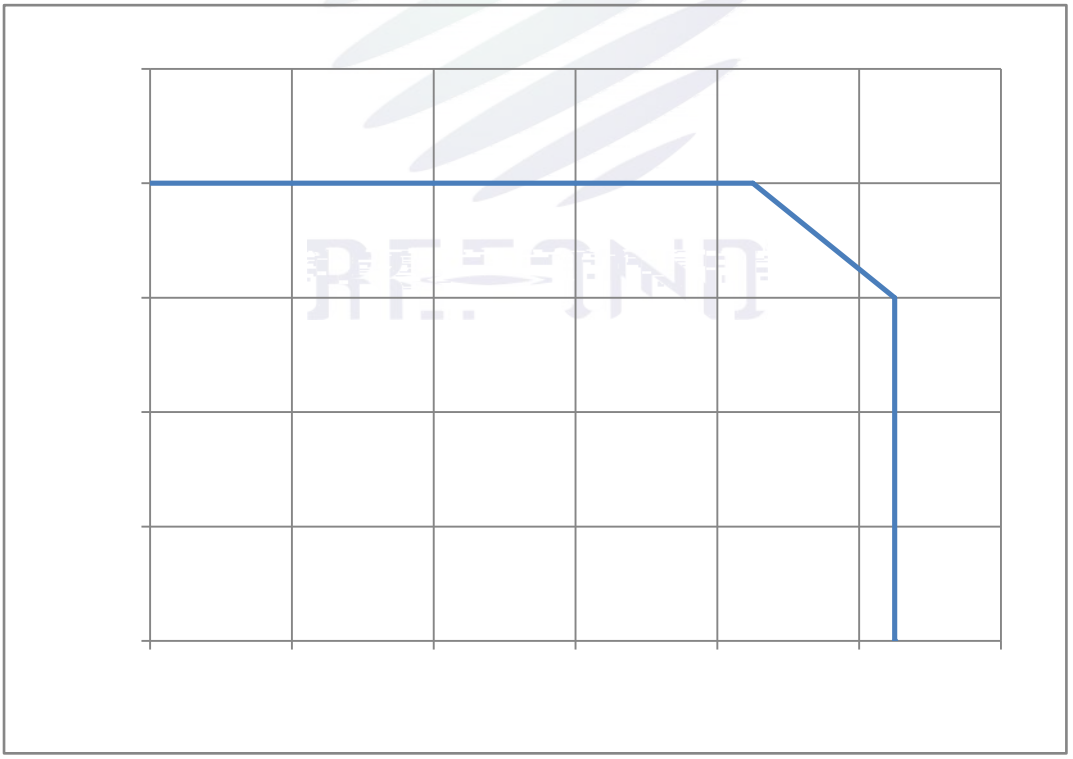


Fig. 1-10 Solder Temperature Vs Forward Current

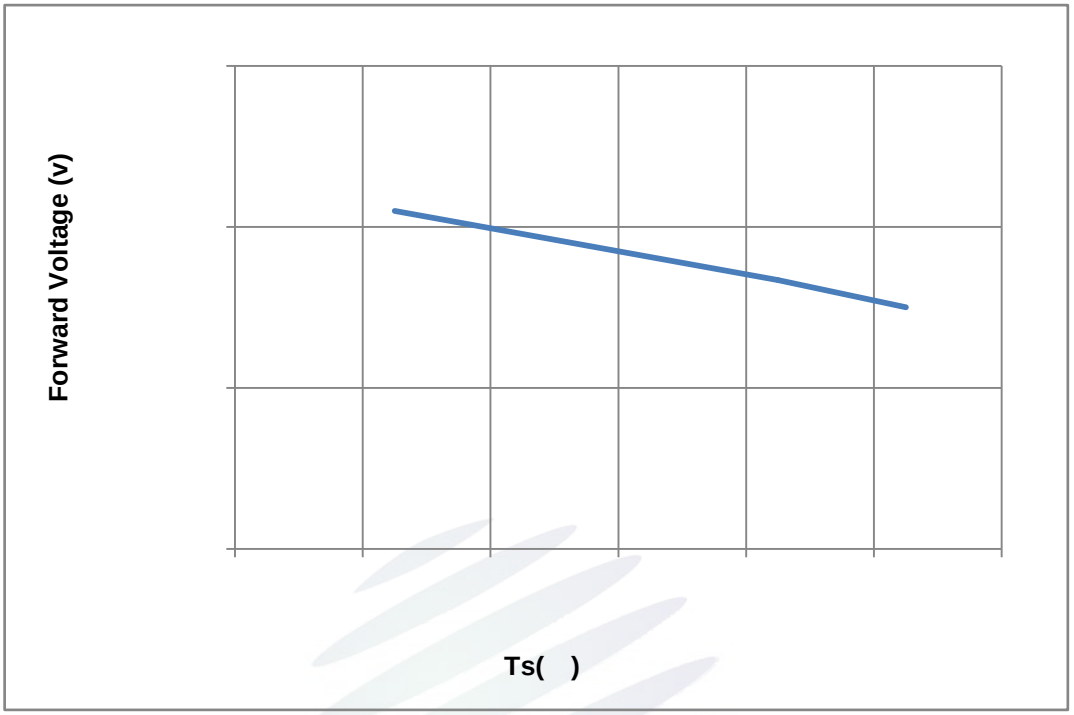



Fig. 1-11 Forward Voltage Vs Solder Temperature

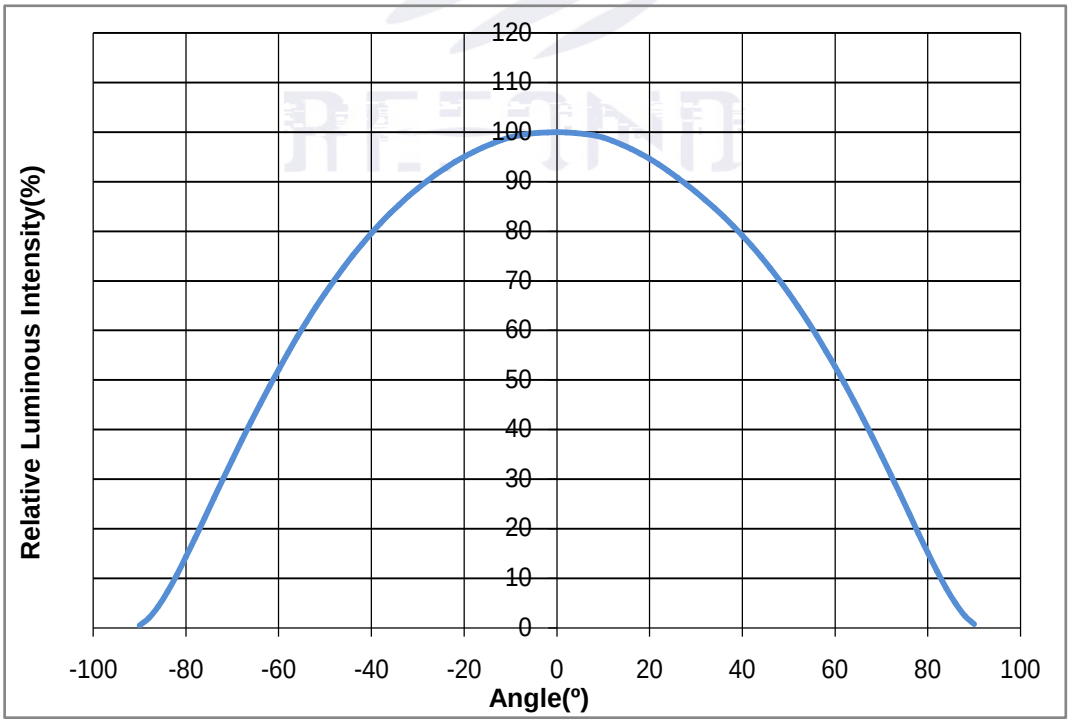



Fig. 1-12 Radiation diagram

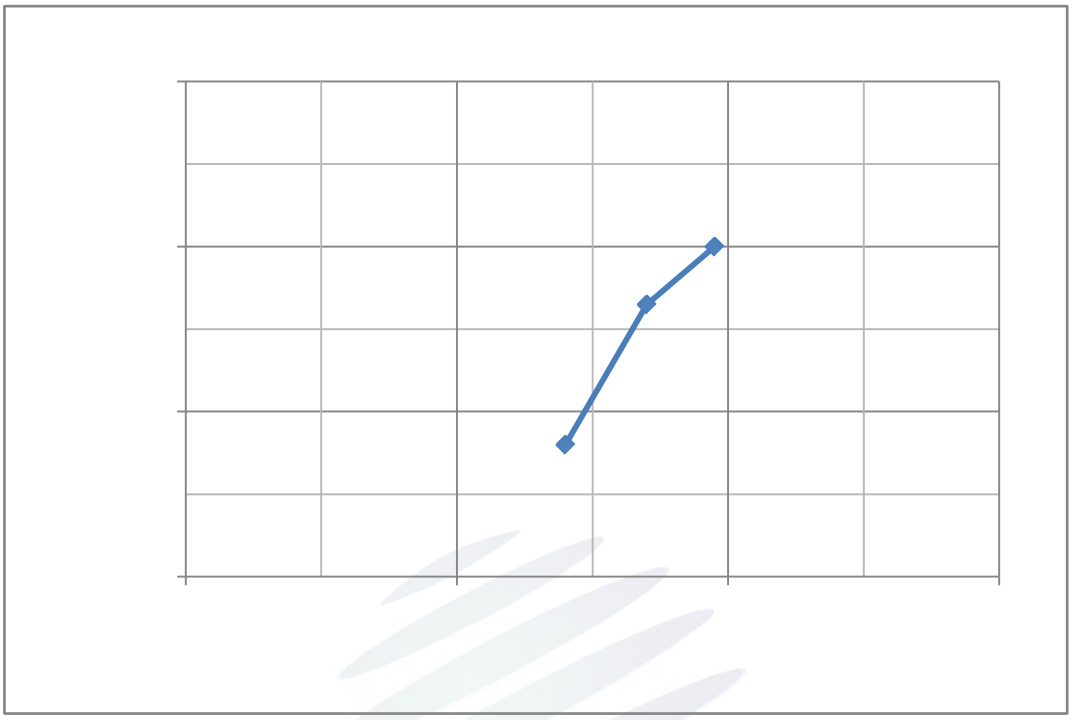


Fig. 1-13 Forward Current vs. Color Shift (Ts=25°C) (Ts=25°C)

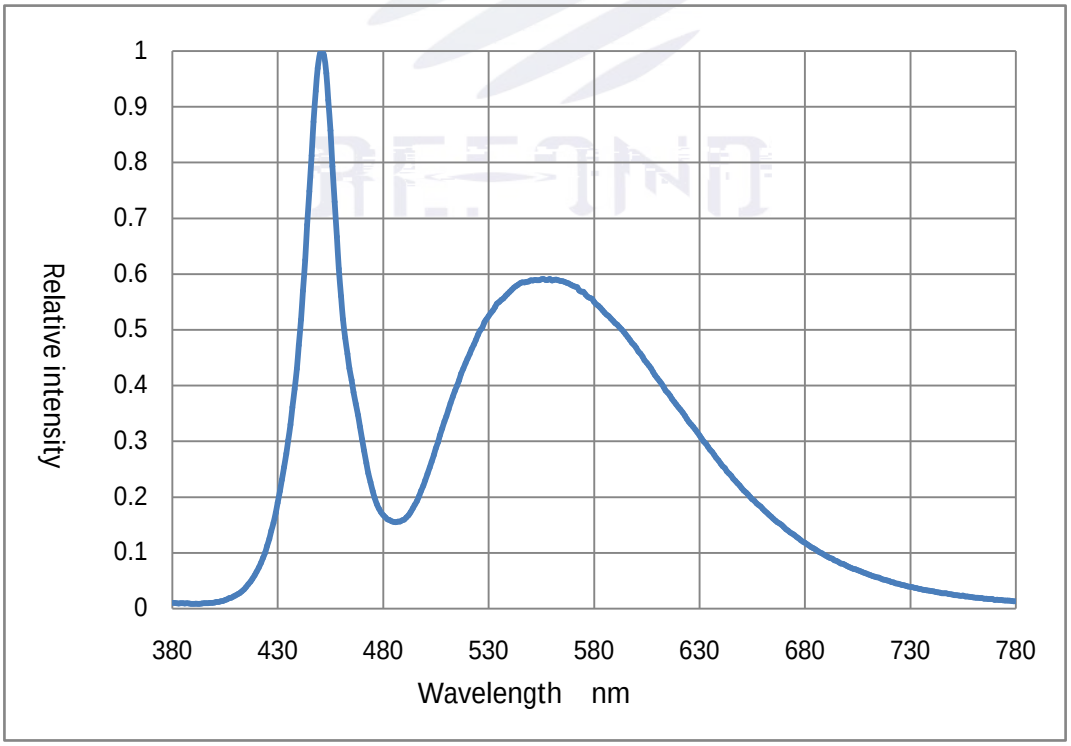



Fig. 1-14 Spectrum Distribution

# 2. Packaging

## 2.1 Packaging Specification

Package:5000pcs/reel. 5000pcs

2.1.1 Carrier Tape Dimension mm mm

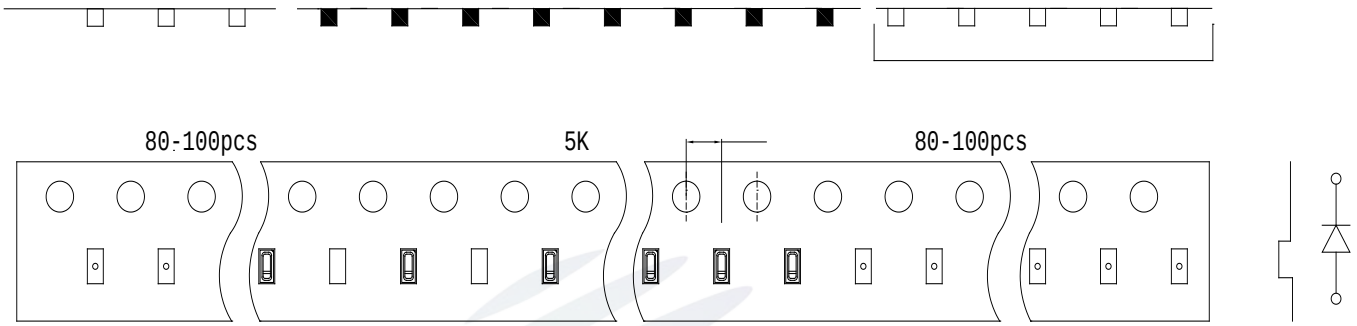



Fig.2-1 Carrier Tape Dimension

2.1.2Reel Dimension

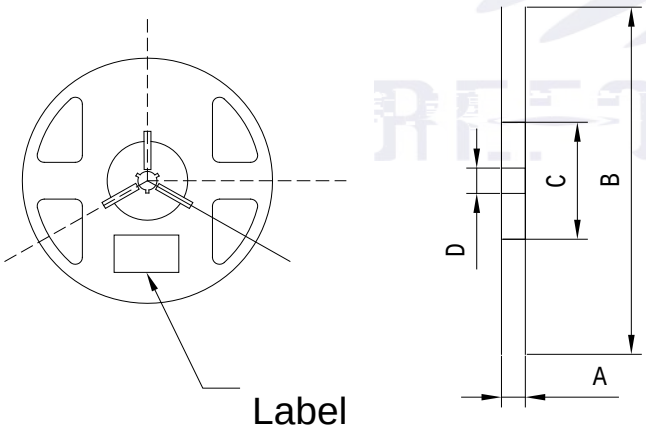



Fig.2-2 Reel Dimension # F€+â+

Table 2-1 Reel Dimension # F€+â+

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

Notes

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

### 2.1.3Label Form Specification

Table 2-2 Specification

| | |
|---|---|
| PART NO. | Part Number |
| SPEC NO. | Spec Number |
| LOT NO. | Lot Number |
| BIN CODE | Bin Code |
| N | Luminous flux |
| XY | Chromaticity Bin |
| $V_F$ | Forward Voltage |
| WLD | Wavelength |
| QTY | Packing Quantity |
| DATE | Made Date |

Fig. 2-3 Label Form Specification

## 2.2Moisture Resistant Packing

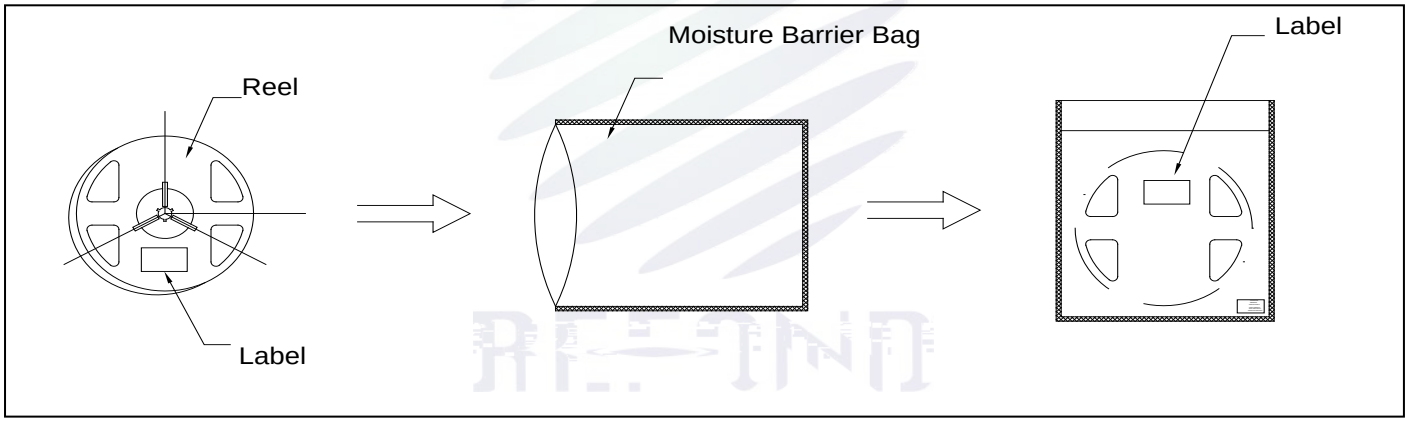



Fig.2-4 Moisture Resistant Packing eÚ? "-Xm

## 2.3Cardboard Box

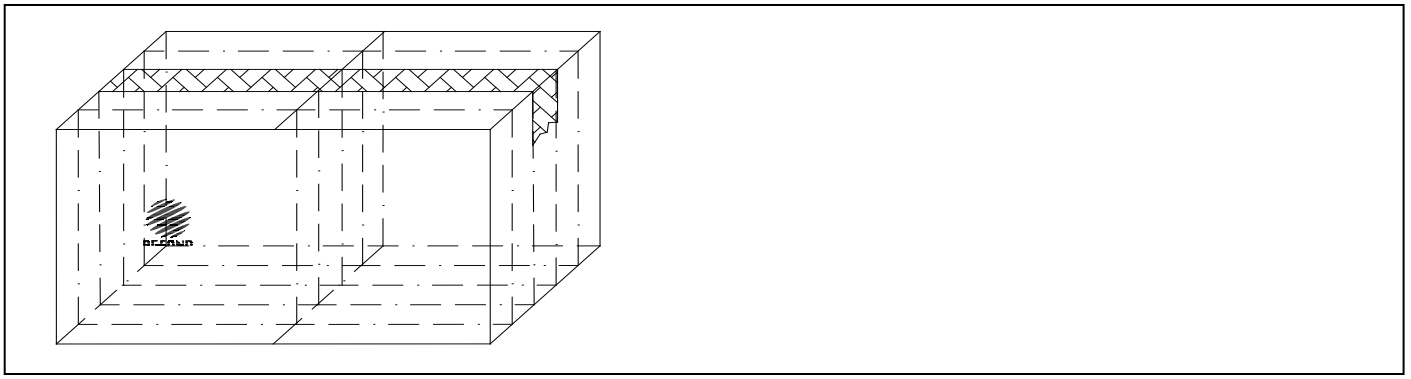


Fig.2-5 Cardboard Box "-XmN`KY

## 2.4Reliability Test Items And Conditions

Table 2-3 Reliability Test Items And Conditions

| Test Items | Ref.Standard | Test Condition | Time | Quantity | Ac/Re<br>/ |
|---|---|---|---|---|---|
| Reflow | JESD22-B106 | Temp:260 max<br>T=10 sec | 2times | 20pcs. | 0/1 |
| MSL2<br>2 | JESD22-A113 | 85 / 60%$R_H$ | 168 hrs. | 20pcs. | 0/1 |
| Thermal Shock | JEITAED-4701 300307 | -40 15min<br>9 ;10s<br>125 15min | 1000 cycle | 20pcs. | 0/1 |
| Life Test | JESD22-A108 | Ta=105<br>IF=140mA | 1000hrs. | 20pcs. | 0/1 |
| High Temperature<br>High Humidity Life Test | JESD22-A101 | 85 / 85%$R_H$<br>IF=140mA | 1000hrs. | 20pcs. | 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 | $V_F$ | IF=140mA | - | U.S.L*)x1.1 |
| Reverse Current | $I_R$ | $V_R$ = 5V | - | U.S.L*)x2.0 |
| Luminous Flux | N | IF=140mA | L.S.L*)x0.7 | - |

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 š WD y ƒ

## 3.1SMT Reflow Soldering Instructions SMT

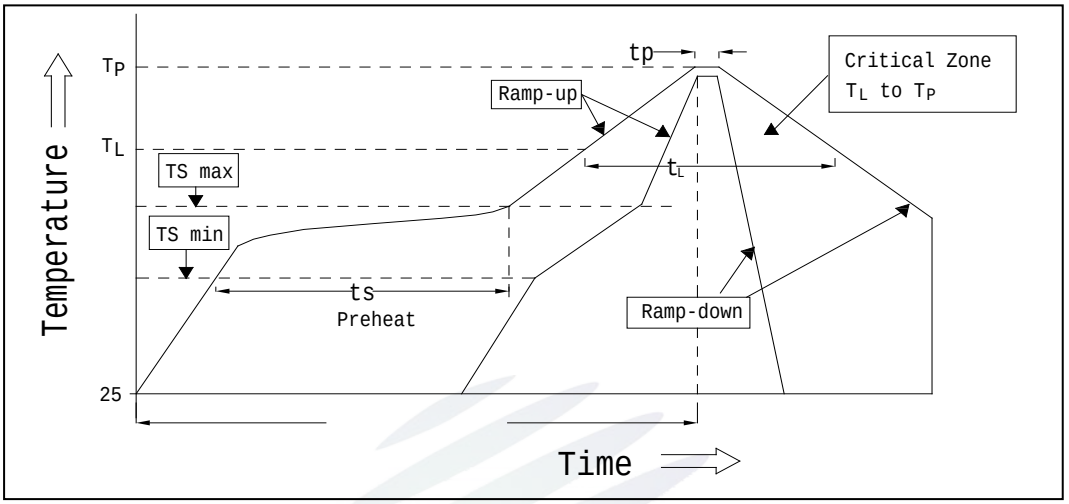



Fig.3-1 SMT Reflow Soldering Instructions SMT &†<é@²[œ5¶

Table 3-1 Reflow parameters &†<é@²#j5

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

Notes

(1)Reflow soldering should not be done more than twice. If more than 24 hours between the two solderings , LED will be damaged. &†<é@²:É5 µ#— •]-_o Ì:Ép» Ì:É&†<é@²F,5žeœeœf<)*7D]-_o2‡·5žp»LED#—P¥DÙ 6#à>' O´3 &÷ ä

(2)When soldering , do not put stress on the LEDs during heating..û@²3M5žp» µY)&Ð6ø5A#•@•5žDÐ"C#3Pž ûX g ä

3.1.1 Cautions

(1) 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 use the picking up nozzle, the pressure on the silicone resin should be proper. LED+©XmPž âGíPžp»X g _+_ p»DÐ"C2±#3Pž ûX g Â/ $uLÐ–g /Ïp»&ˆ; .< 6±h,eÚ3R5e`' õ&Ð2±#3& žp».û 'DÐ#à%Ü5žp»Pž ûX g F,#3"C.<5×0 .ûF, ä

(2) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board.LED @ Cˆ µY)@²3M&Ð.×6šP¸CB 7' ²p»@²3M ó#¶p» µY).×2@Ng]—7' ä

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering. Do not rapidly cool device after soldering.&†<é@² ó#¶!_# _oI³ Õp» µY)+¡6ø5A+F"H(¾"Cp» µY)6±f¯ "Pp»&†<é@²#¶p» µY)aoDÐ?h" !_# F,5a.· ä

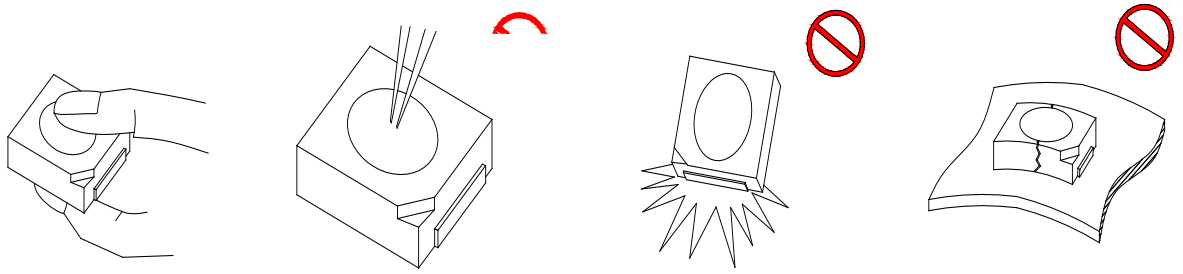


Fig 4-1 Handling Precautions

(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,other wise 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. [f[IDÝ]—5žp»_Â_oLED F,DÝ<é µP¥]-_oYl+BF,6¨(Ï äp»#´5žp»_€f¨ 'DÐ …2LDÝeãp»#Î!Áp»/V+·F,DÝ#3 #€"¾+® Â.½] _+(ÏDÝ<é#€"¾p»#—P¥+¤Qœ O$i3 ;i äDÝ]—[f[I/mh# …[i#'6±&Ð.¨#×1¾O-! e•F,5ž Á!¢CX; #¹DÝ#3F, #€"¾p» µY)5e"H#u#3p»#Î!Á Â3 &₹LED ä

(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 +a5»&^ âQ'^SF,#y@•$4CW(+F,=Ñ.N4á#€O´4á#€p»=Ñ.N"ïj€ Âeõ ö LED #y ñ4ðC/p»/ $u#y ñhDR p»1è •&Ð[f[I5ž.< í!®O«Uù5 @•e–h@ ä

(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. ¶! ~+©XmPžF ;|p»GíPž_Â-à_+_ p»X g 5»#àeìP·B p».<DÐ5ž.<B!!Ó <•0·p».û+¡ O$i<©!h.NY);ê_+j€5žp»&†<é@² •#¶f¨Y)aoDÐ0 .ûF,=-<¿5a.·p»1¹ ”3PRøDÐ.ª Áa/ =-<¿!êp»)*f¨Y) DÐ!Ø! ~=-<¿!êp»/mh# …[i µ ÂGÜ&÷+©Xm ûp»]-(˜=-<¿#—P¥ Â₺₺D -Î7 3 +[p» µ3PRø_•Iu=-<¿5a.· ä

Table 4-1Storage

| Conditions | | Temperature | Humidity | Time |
|---|---|---|---|---|
| Storage | Before Opening Aluminum Bag | ≤ 30 | ≤ 75% | Within 1 Year From Date |
| | After Opening Aluminum Bag | ≤ 30 | ≤ 60% | Recommended for use within 24 hours<br>1‰^₴4.ž8…$ " G· |
| Baking | | 60 ± 5 | - | ≥ 24hours<br>24 |

(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·60±5p¸B] for above 24 hours.)*7D. A•!ê1¾"-Xm(Ù4ðp»1¾O- O$i µJÎ#° • ²6±4ð P+ 7 žp»f¨2n"-#¶_ƒWô@€@Œp»@€@Œ7 žpÉ 60±5B]p»(Ï 6 24 +·5ž ä

If the package is flatulence or damaged,please notify the sales staff to assist.)*7D"-XmPh;¼1¾O-GÜ3 p»[Ÿ_ÂG•d¨ $Ö b$ "÷"Q(¬C® ä

(9)Similar to most Solid state devices; LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). w! ~F,"ò+¤ ûDÝ*ø& ž ¨7ßp»LED +¡g DÝ_o<é!£J'g -à4÷0Çp»f¨Y) )%eÚ2L ä

(10) Other points for attention, please refer to our relevant information.! ++<•0· 3h![Ÿ#jA D ØF ! \ì5A ä

Version History/

| Date | Revisor | Version | Verifier | Remarks |
|---|---|---|---|---|
| 2023/09/14 | Li Xianhui | E0 | Zhu Yiming | New issue |
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Declare

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