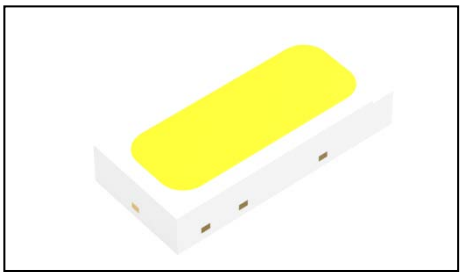
1. Description

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

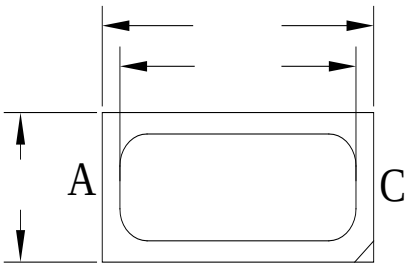
yQualifications: The product qualification test plan is based on the guidelines of AEC -Q102 Stress Test Qualification for Automotive Grade Discrete Semiconductors

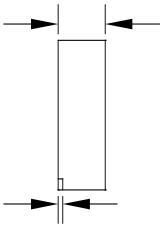
AEC-Q102

1.3Application

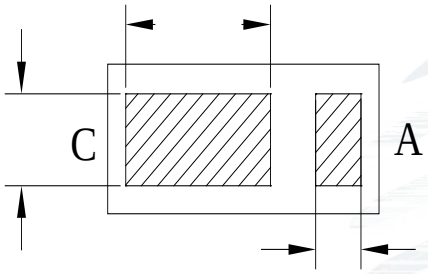
y Automotive Lighting Interior and Exterior.

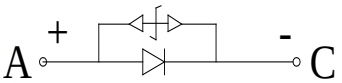
1.4Package Dimension

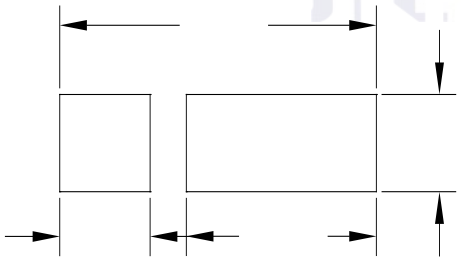




) L J 7 R S 9 L H Z!“M’?ö .







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	

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
-	OA	OB	PA	PB		
	45.3-50	50-55.3	55.3-61.2	61.2-67.8		

1.7 Typical Optical Characteristics Curves

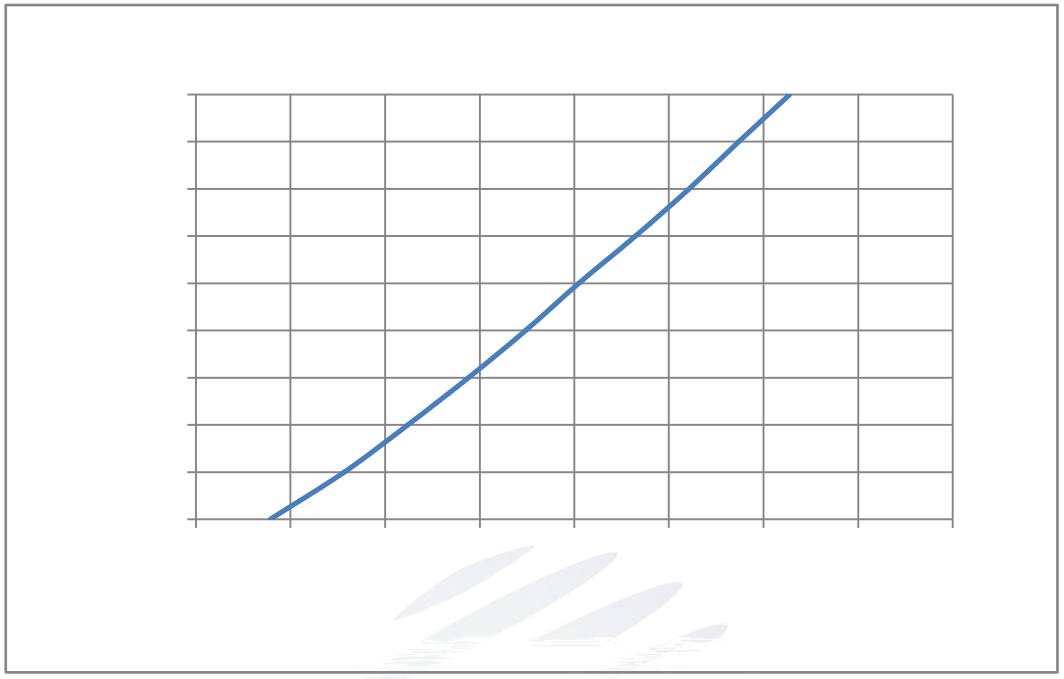


Fig. 1-7 Forward Voltage Vs Forward Current

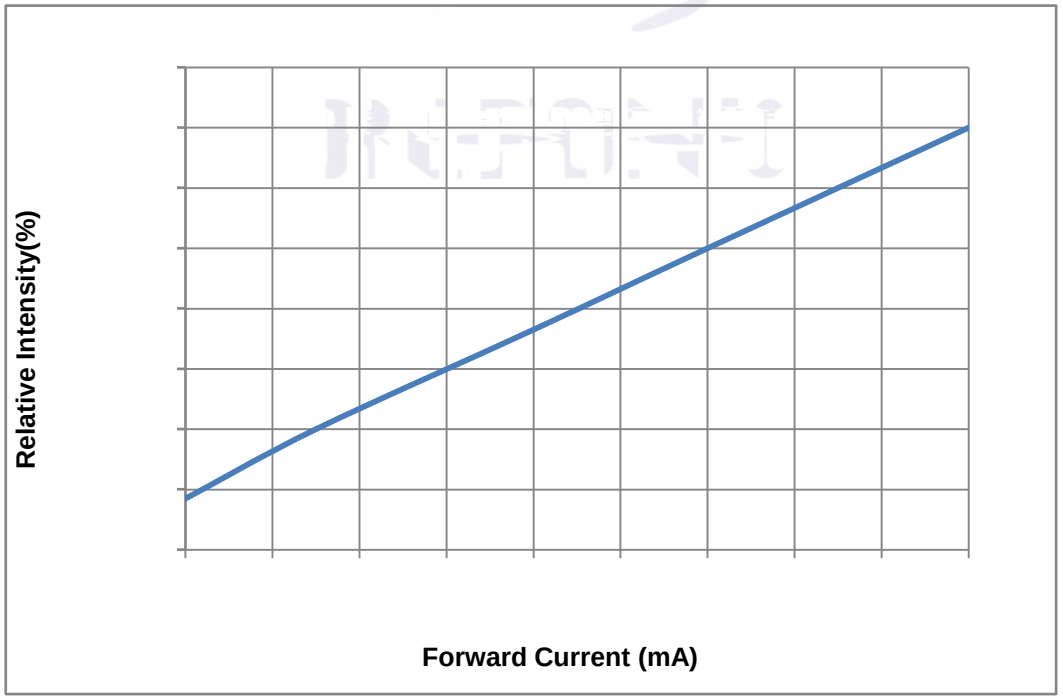


Fig. 1-8 Forward Current Vs Relative Intensity

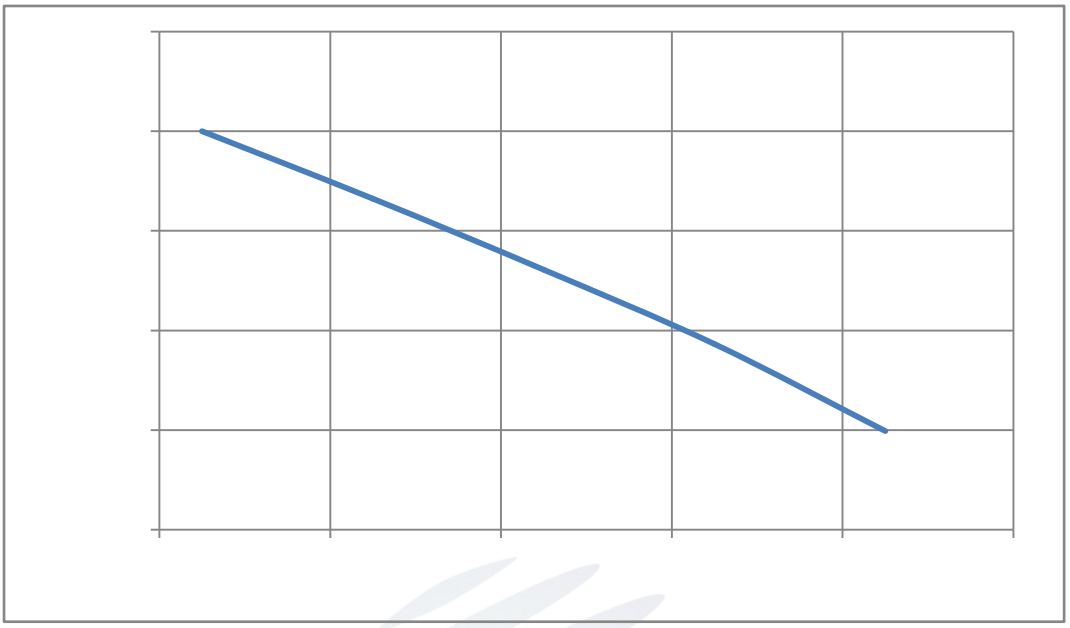


Fig. 1-9 Solder Temperature Vs Relative Intensity

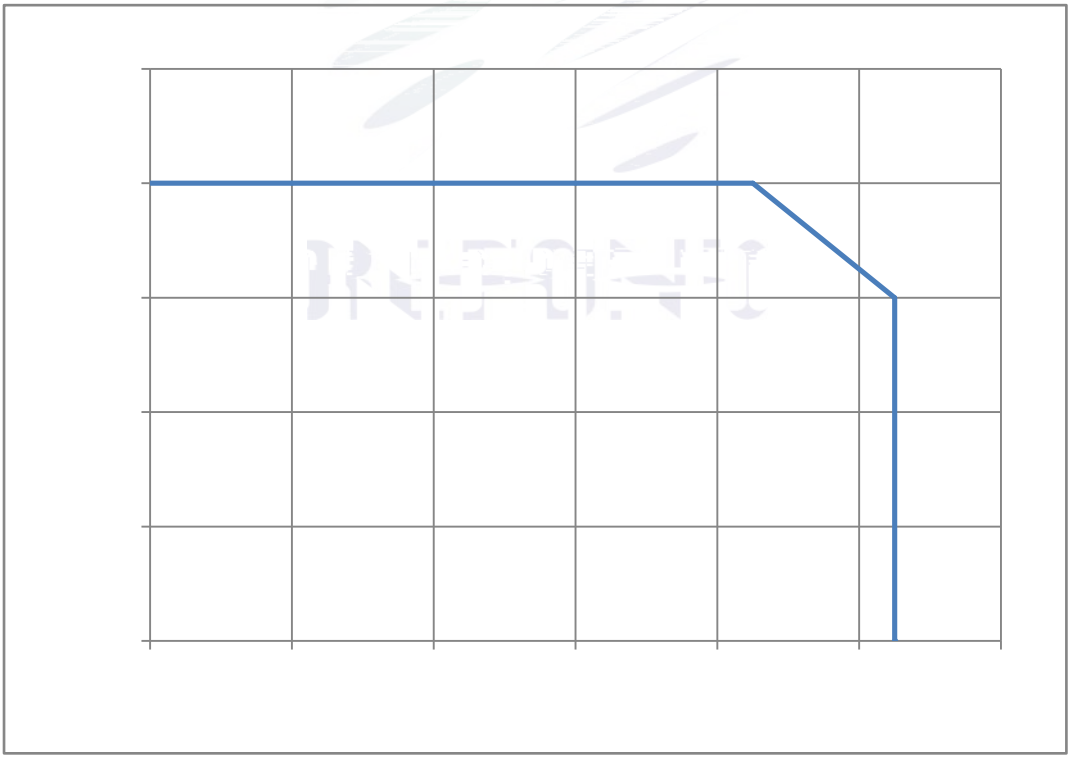


Fig. 1-10 Solder Temperature Vs Forward Current

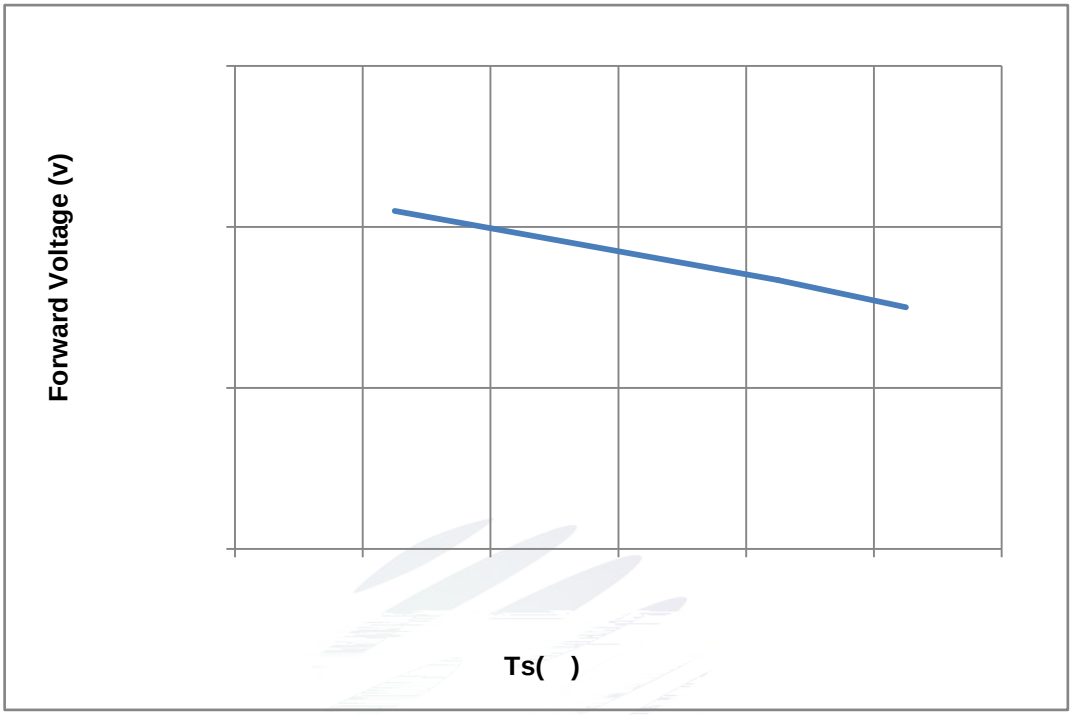


Fig. 1-11 Forward Voltage Vs Solder Temperature

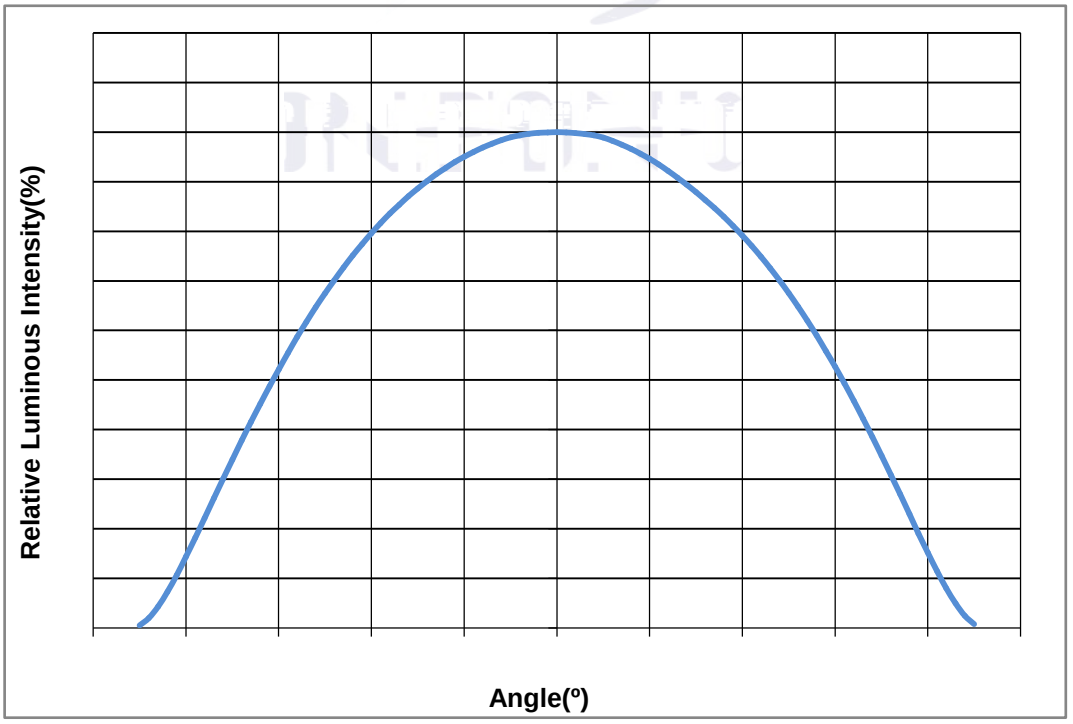


Fig. 1-12 Radiation diagram

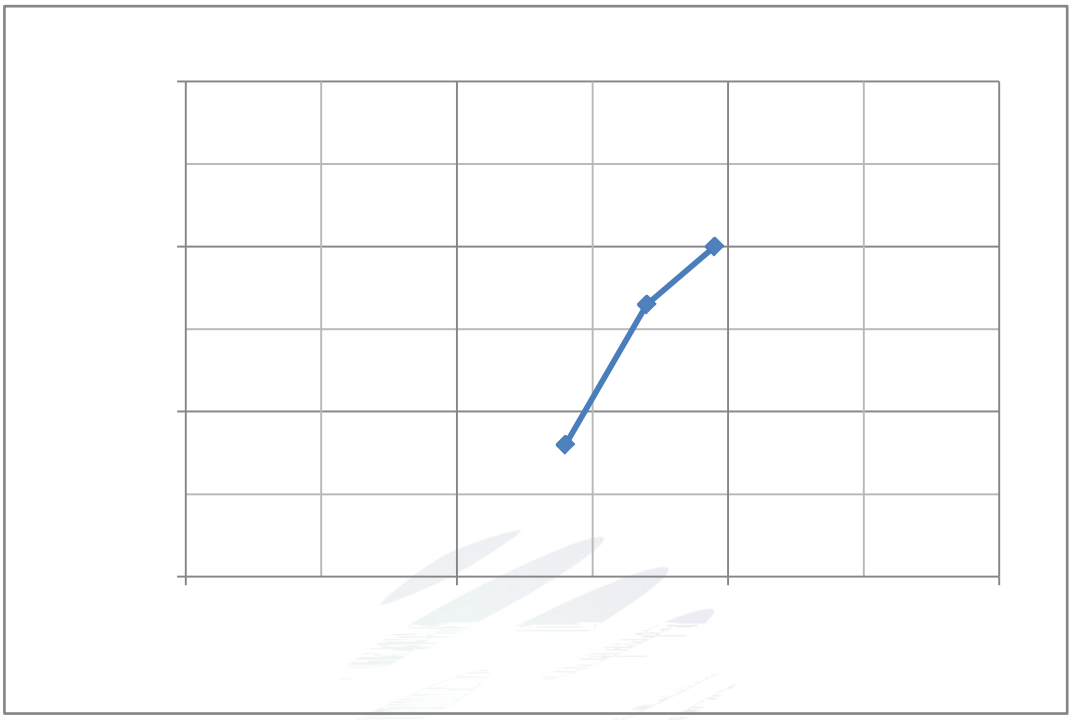


Fig. 1-13 Forward Current vs. Color Shift (Ts=25°C) (Ts=25°C)

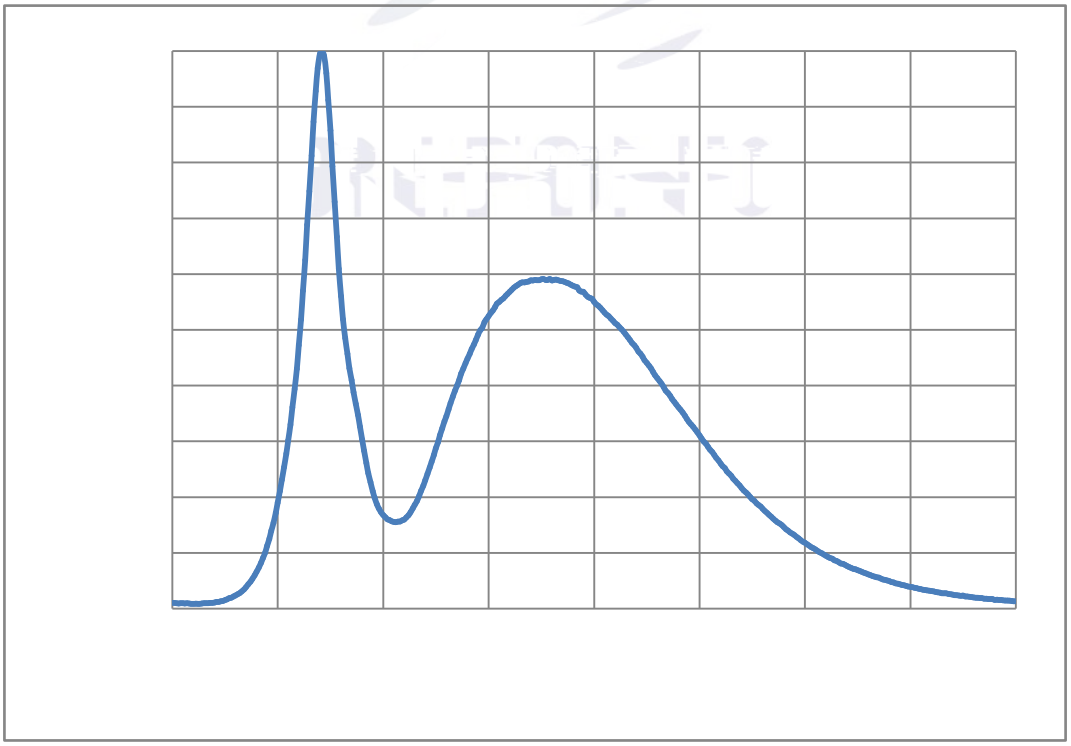


Fig. 1-14 Spectrum Distribution

2. Packaging

2.1 Packaging Specification

Package:5000pcs/reel.

2.1.1 Carrier Tape Dimension mm

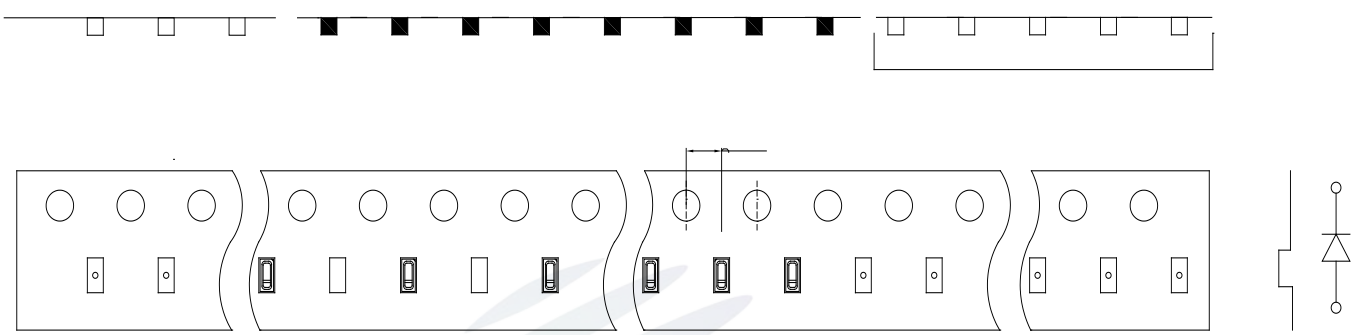


Fig.2-1 Carrier Tape Dimension

2.1.2Reel Dimension

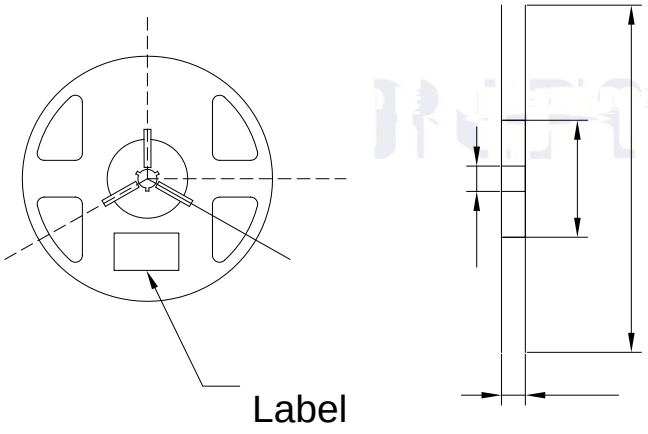


Fig.2-2 Reel Dimension # F€+â+

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

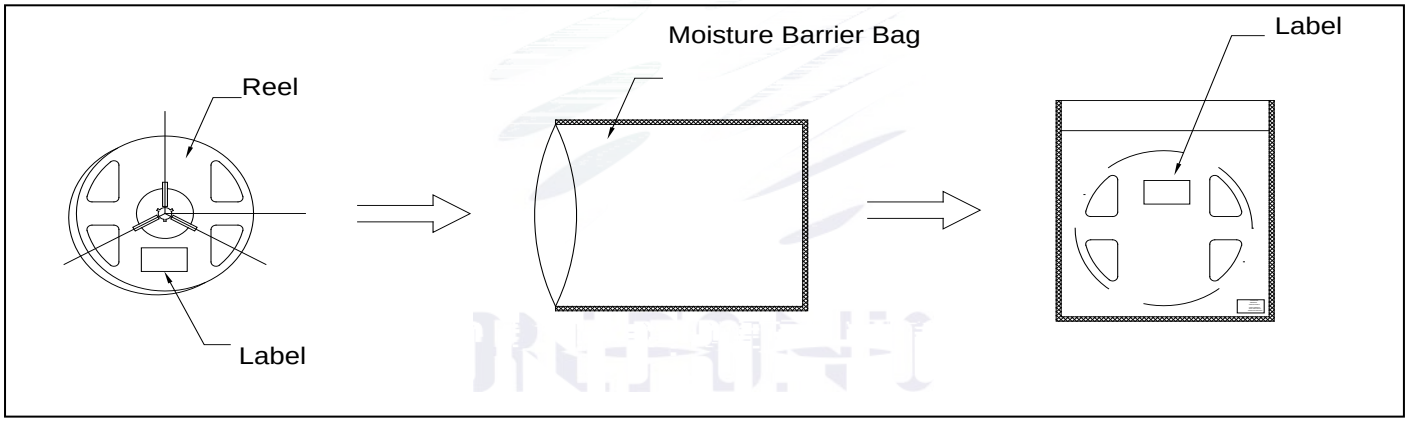


Fig.2-4 Moisture Resistant Packing eÚ? "-Xm

2.3Cardboard Box

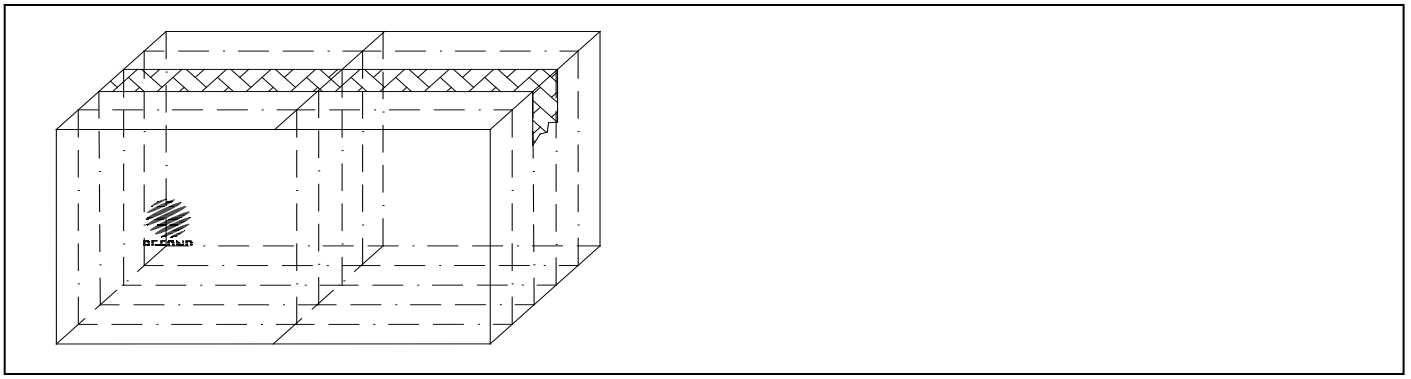


Fig.2- Cardboard Box "-XmN`KY

2.4Reliability Test Items And Conditions

Table 2-3 Reliability Test Items And Conditions

Test Items	Ref.Standard	Test Condition	Time	Quantity	Ac/Re /
Reflow	JESD22-B106	Temp:260 max T=10 sec	2times	20pcs.	0/1
MSL2 2	JESD22-A113	85 / 60%R_H	168 hrs.	20pcs.	0/1
Thermal Shock	JEITAED-4701 300307	-40 15min 9 ;10s 125 15min	1000 cycle	20pcs.	0/1
Life Test	JESD22-A108	Ta=105 IF=140mA	1000hrs.	20pcs.	0/1
High Temperature High Humidity Life Test	JESD22-A101	85 / 85%R_H 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

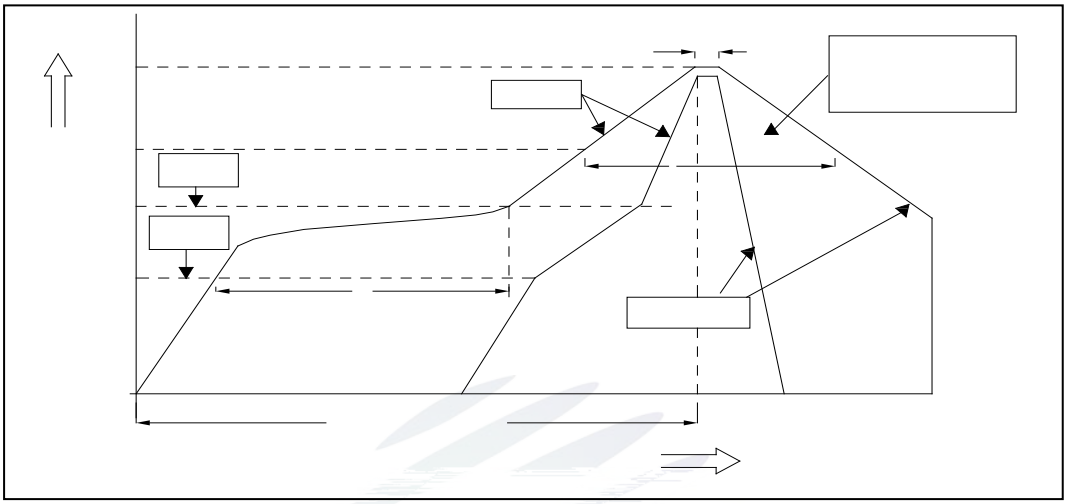


Fig.3-1 SMT Reflow Soldering Instructions SMT &†<é@²[œ5¶

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

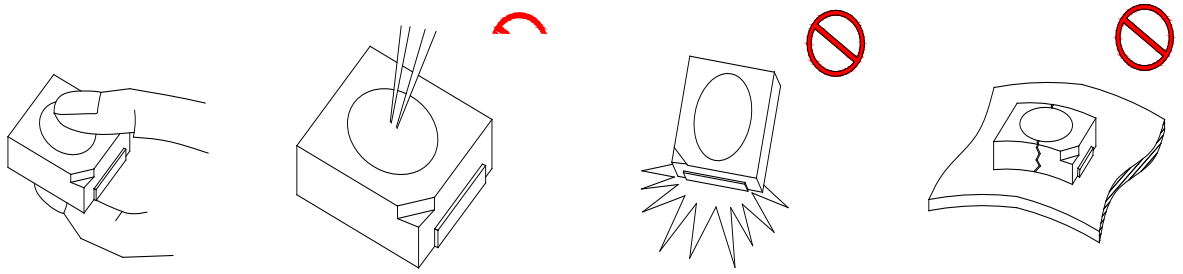


Fig 4-1 Handling Precautions

(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 &ŧŁED 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»&ˆ 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¥ ÂŧĘD -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 1‰^= .ž8…$ " G·
Baking		60 ± 5	-	≥ 24hours 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

novation enrich life

瑞豐光電 REFOND

www.refond.com

Declare

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