

# SPECIFICATION



REFOND P/N

RF-A4E27-R30F-R4

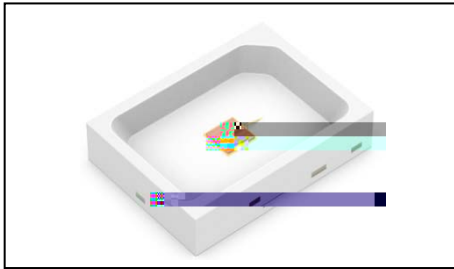
R&D

Mass Production



## 1. Description

### 1.1 General Description



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

Product Package:2.7mmX2.0mmX0.6mm.

LED AlGaInp

2.7mmX2.0mmX0.6mm.

### 1.2 Features

yEMC 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

yRoHS compliant. RoHS

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

AEC-Q102

### 1.3 Application

yAutomotive Lighting Interior and Exterior.

## 1.4 Package Dimension

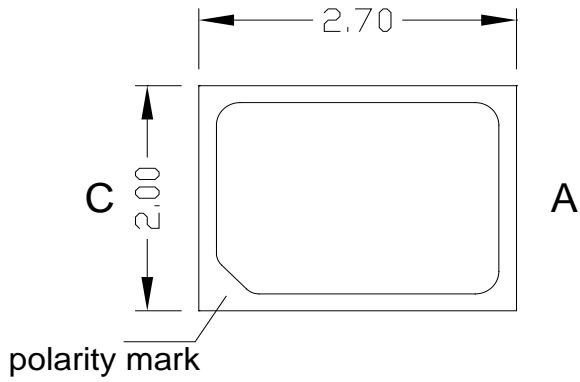


Fig.1-1 Top View

Fig.1-2 SideView

Fig.1-3 BottomView

Fig.1-4 Polarity



Fig.1-5 Soldering Patterns

### Notes

1. All dimensions units are millimeters.
2. All dimensions tolerances are  $\pm 0.05\text{mm}$  unless otherwise noted.

$\pm 0.05$

## 1.5 Product Parameters

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

Item	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	$V_F$	$I_F=200\text{mA}$	1.8	---	2.4	V
Reverse Current	$I_R$	$V_R=5\text{V}$	---	---	10	$\mu\text{A}$
Dominant Wavelength	$\lambda_D$	$I_F=200\text{mA}$	627.5	---	635	nm
Luminous Flux	-	$I_F=200\text{mA}$	24.2	---	37	lm
Viewing Angle	-	$I_F=200\text{mA}$	---	120	---	deg
Thermal Resistance.	$R_{THJ-S}$	$I_F=200\text{mA}$	---	---	22	/W

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

Parameter	Symbol	Rating	Units
Power Dissipation	$P_D$	576	mW
Forward Current	$I_F$	240	mA
Peak Forward Current	$I_{FP}$	300	mA
Reverse Voltage	$V_R$	5	V
Electrostatic Discharge (HBM)	$E_{SD}$	2000	V
Operating Temperature	$T_{OPR}$	-40 ~ +125	-
Storage Temperature	$T_{STG}$	-40 ~ +125	-
Junction Temperature	$T_J$	150	-

Notes

1. 1/10 Duty cycle, 10ms pulse width.      10ms,      1/10.
2. The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ .       $\pm 0.1V$ .
3. The above color coordinates measurement allowance tolerance is  $\pm 0.005$ .       $\pm 0.005$ .
4. The above luminous intensity measurement allowance tolerance  $\pm 10\%$ .  
 $\pm 10\%$ .
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 2000V ESD (HBM). ESD protection during products handling is needed. 90% LED  
ESD2000V

## 1.6 Bin Range Of Forward Voltage and Luminous Flux (IF=200mA)

### BIN (IF=200mA)

Table 1-3

V <sub>F</sub>		B0	C0	D0	
		2.0-2.2	2.2-2.4	2.4-2.6	
3	Hm	LA	LB	MA	MB
		24.2-26.9	26.9-30	30-33.4	33.4-37
WD(nm)		F2	G1	G2	
		627.5-630	630-632.5	632.5-635	

## 1.7 Typical Optical Characteristics Curves

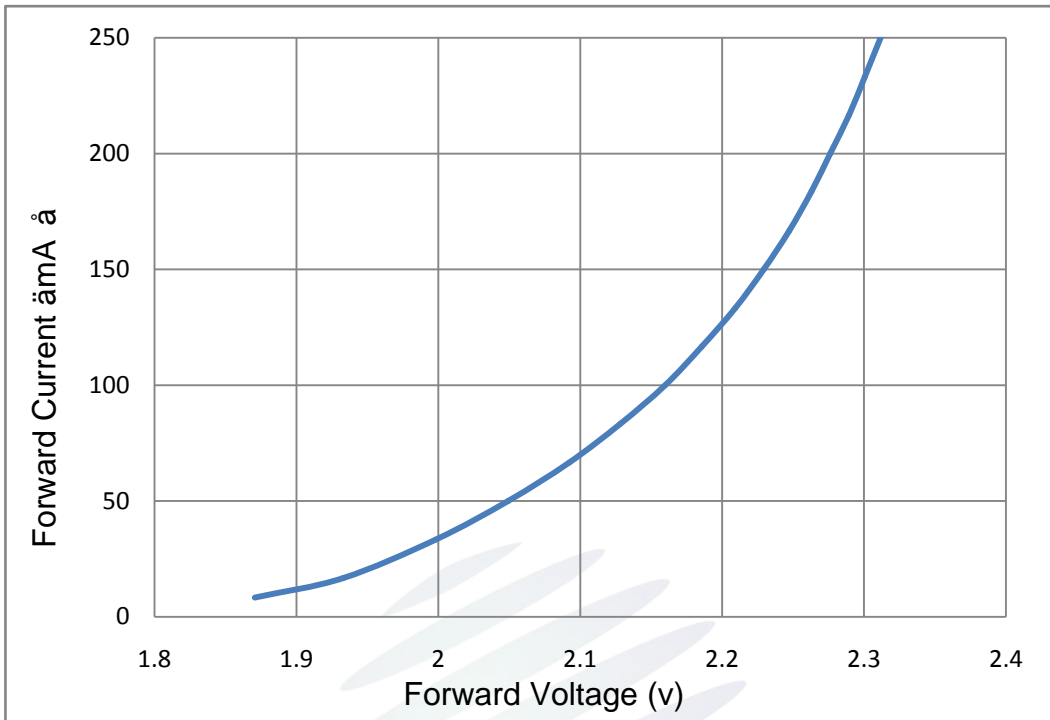


Fig. 1-7 Forward Voltage Vs Forward Current

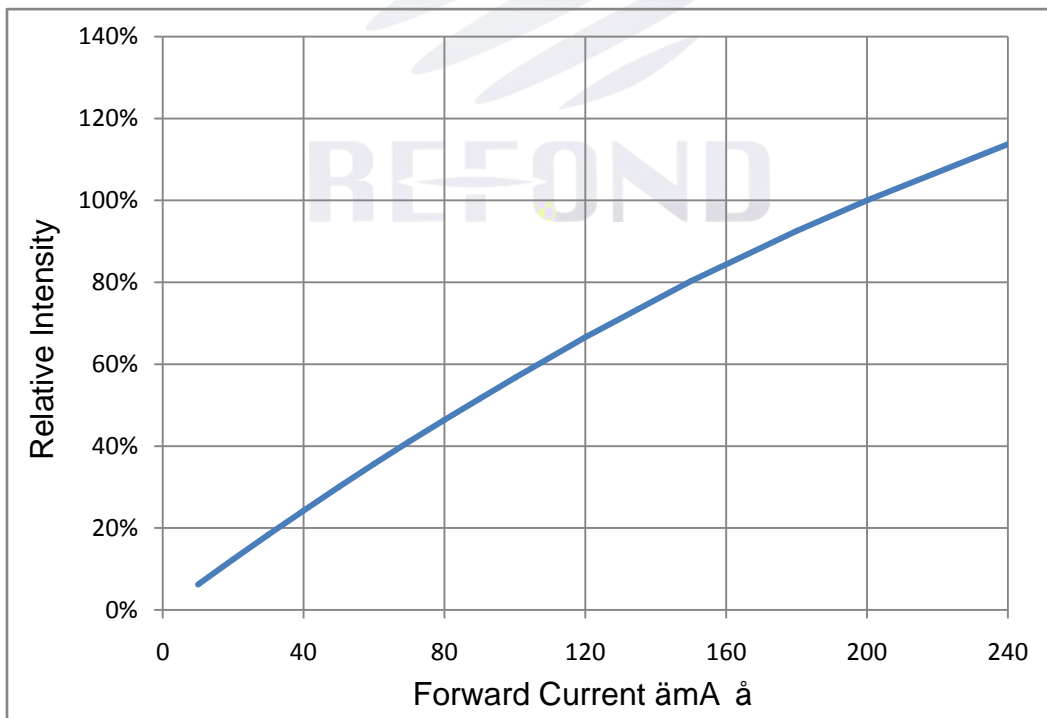


Fig. 1-8 Forward Current Vs Relative Intensity

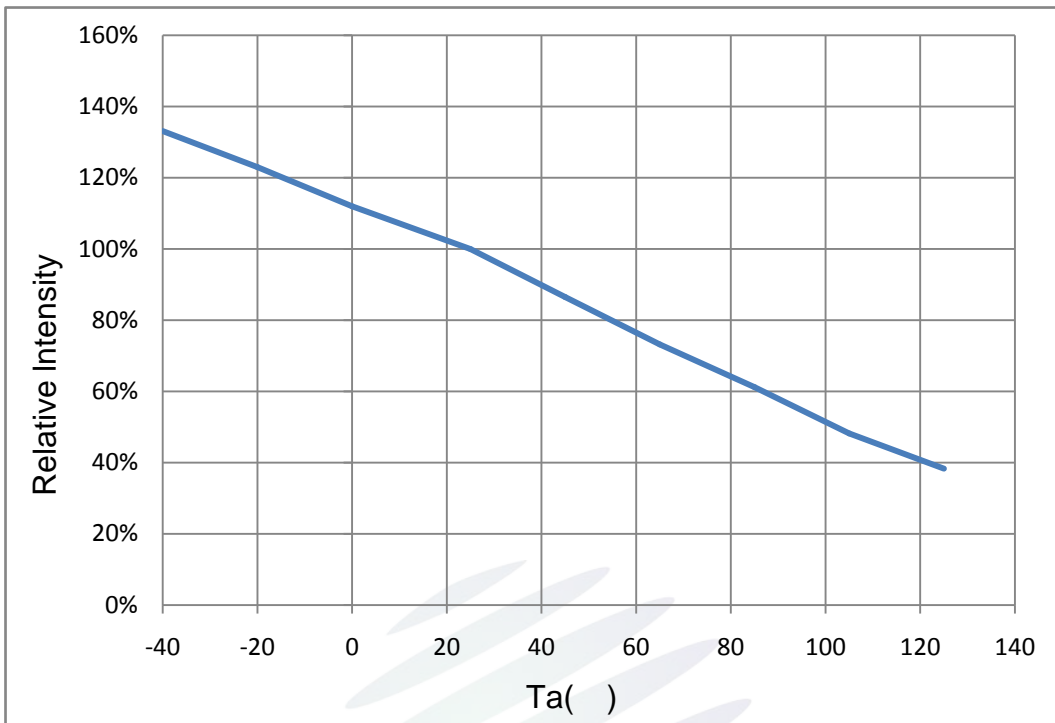


Fig. 1-9 Solder Temperature Vs Relative Intensity

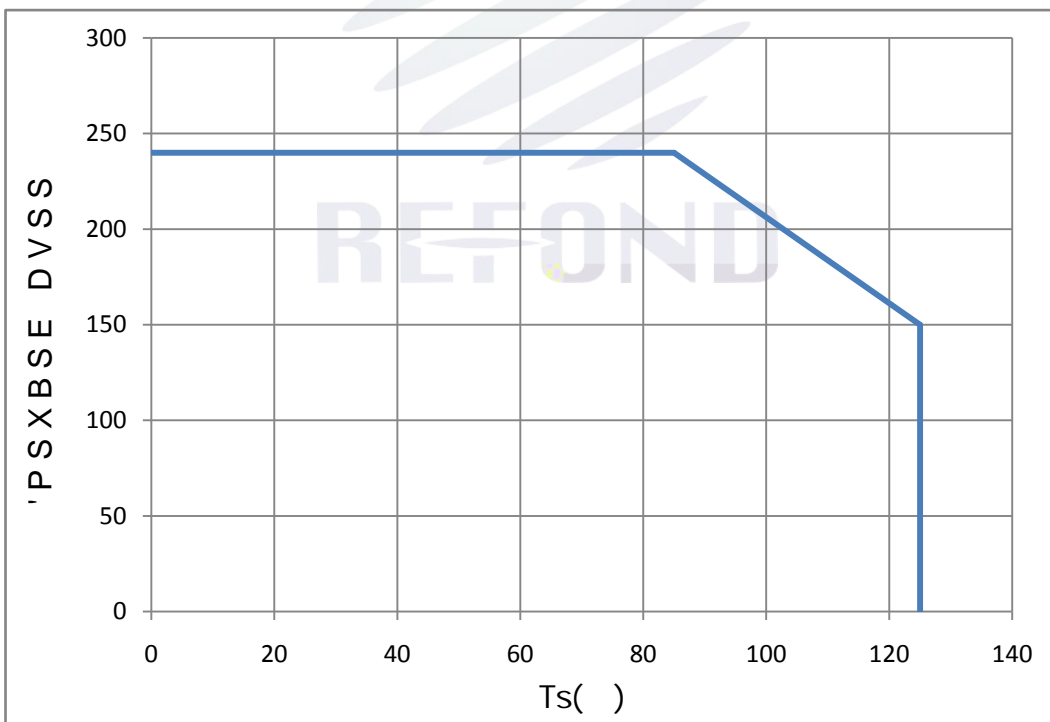


Fig. 1-10 Solder Temperature Vs Forward Current

Tj 150

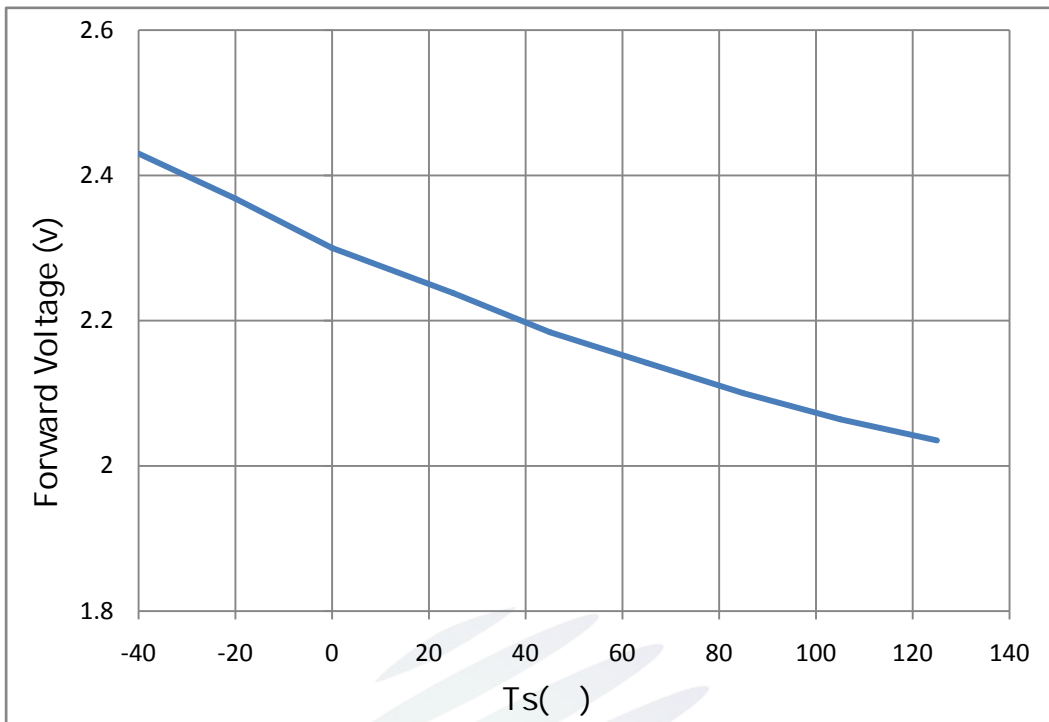


Fig. 1-11 Forward Voltage Vs Solder Temperature

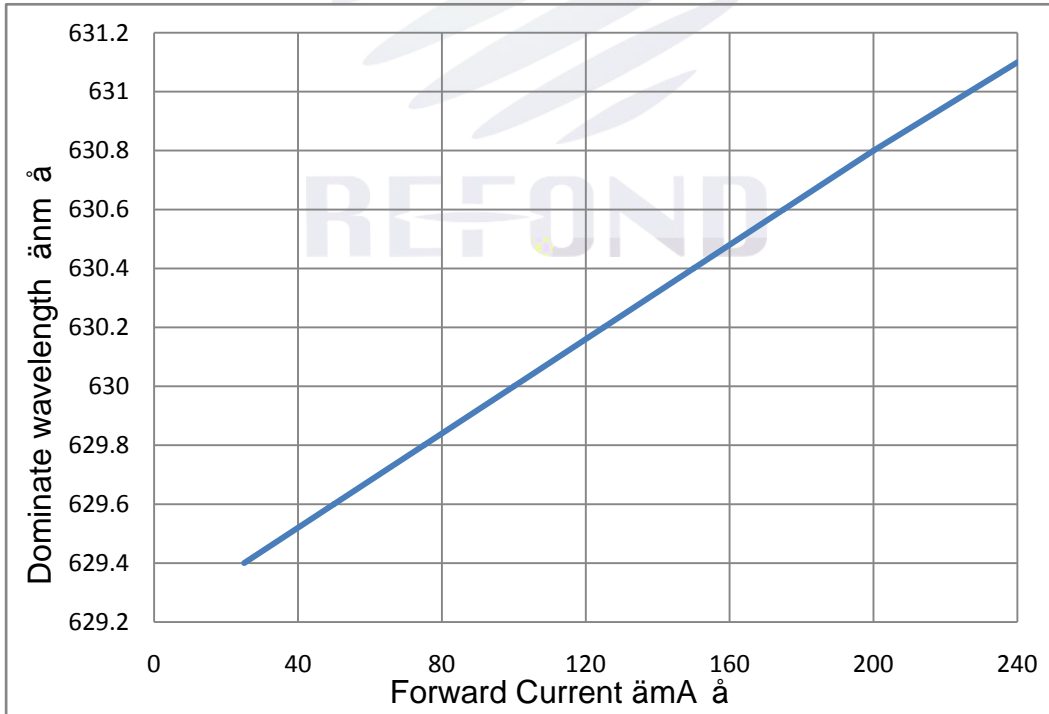


Fig. 1-12 Forward current vs. Color Shift (Ts=25°C)

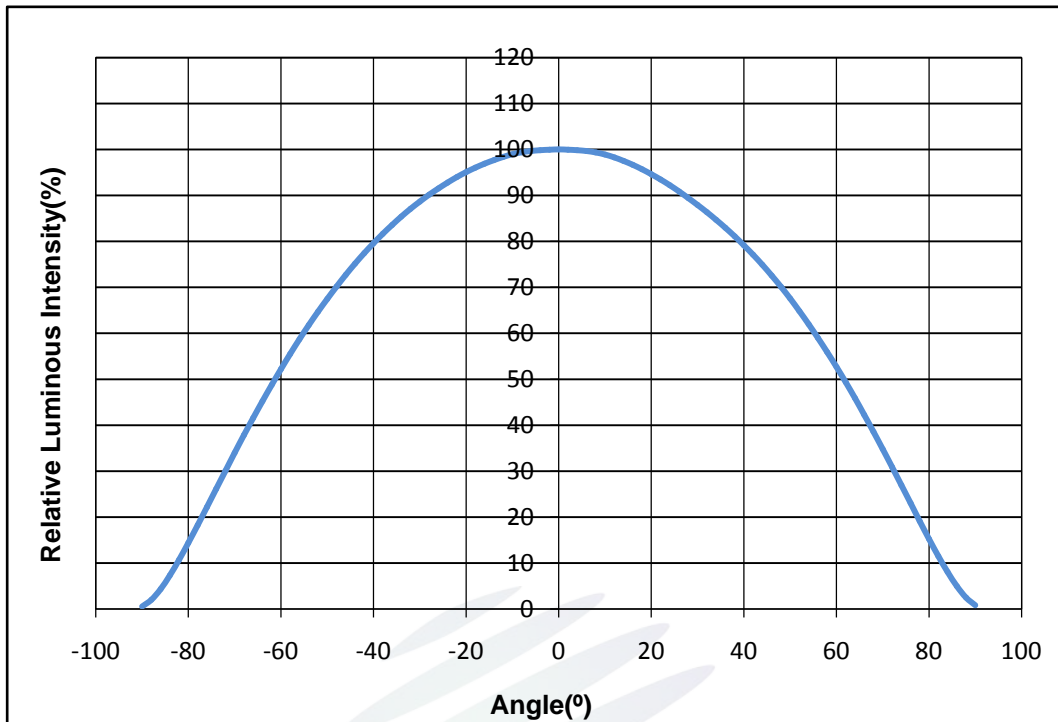


Fig. 1-13 Radiation diagram

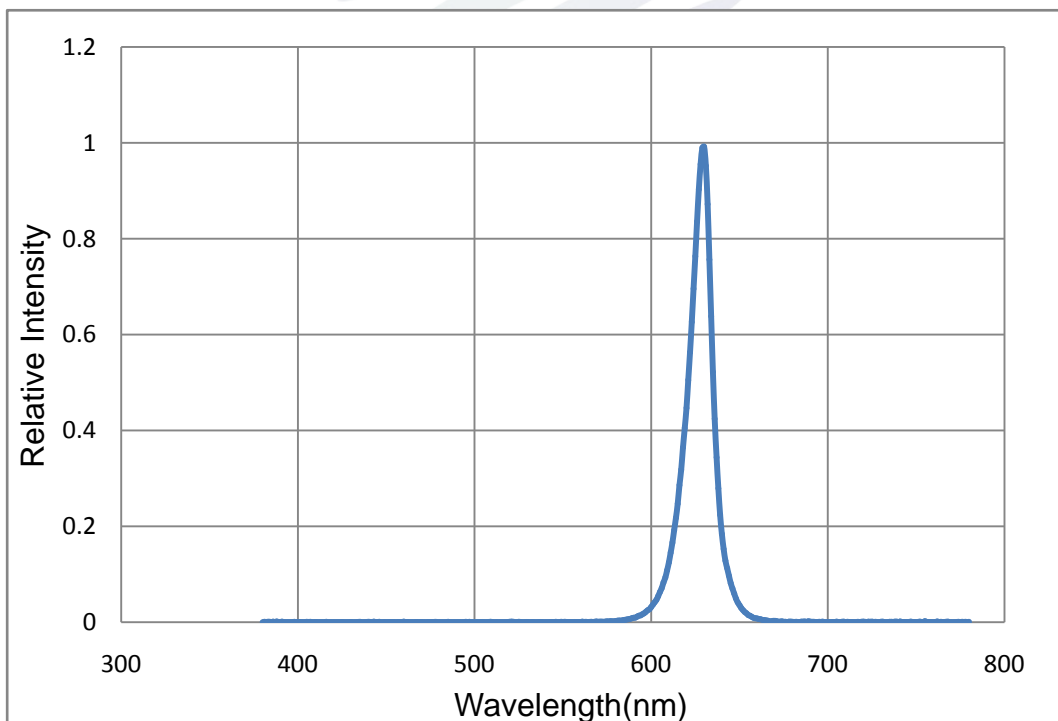


Fig. 1-14 Spectrum Distribution

## 2. Packaging

### 2.1 Packaging Specification

Package:4000pcs/reel.      4000pcs

#### 2.1.1 Carrier Tape Dimension

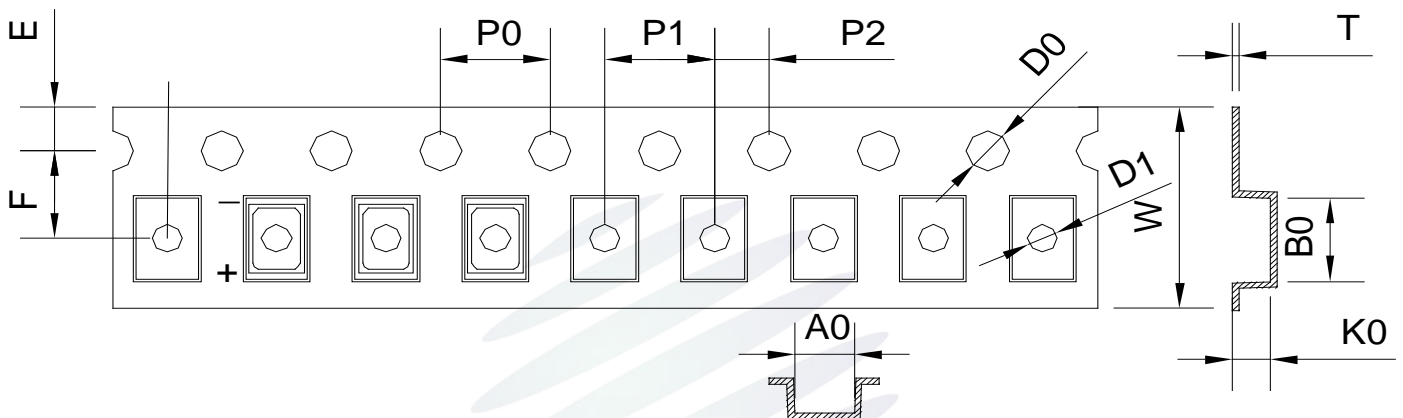


Fig.2-1 Carrier Tape Dimension

#### 2.1.2 Reel Dimension

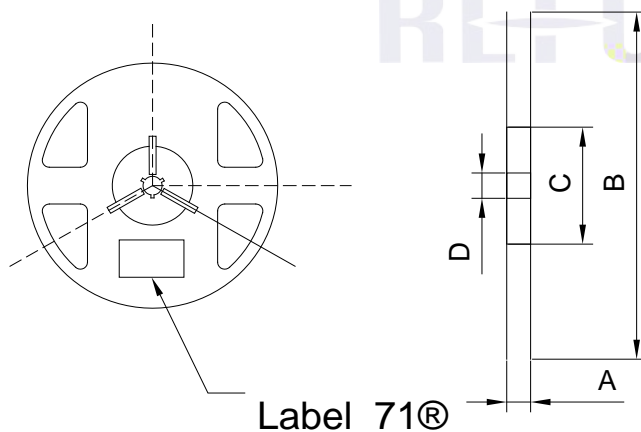


Fig.2-2 Reel Dimension

Table 2-1 Reel Dimension

A	12± 0.1mm
B	180± 1mm
C	60± 1mm
D	13.0± 0.5mm

#### Notes

The tolerances unless mentioned  $\pm 0.1$ mm. Unit : mm

$\pm 0.1$

### 2.1.3 Label 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 <sub>F</sub>	Forward Voltage
WLD	Wavelength
QTY	Packing Quantity
DATE	Made Date

Fig. 2-3 Label

### 2.2 Moisture Resistant Packing

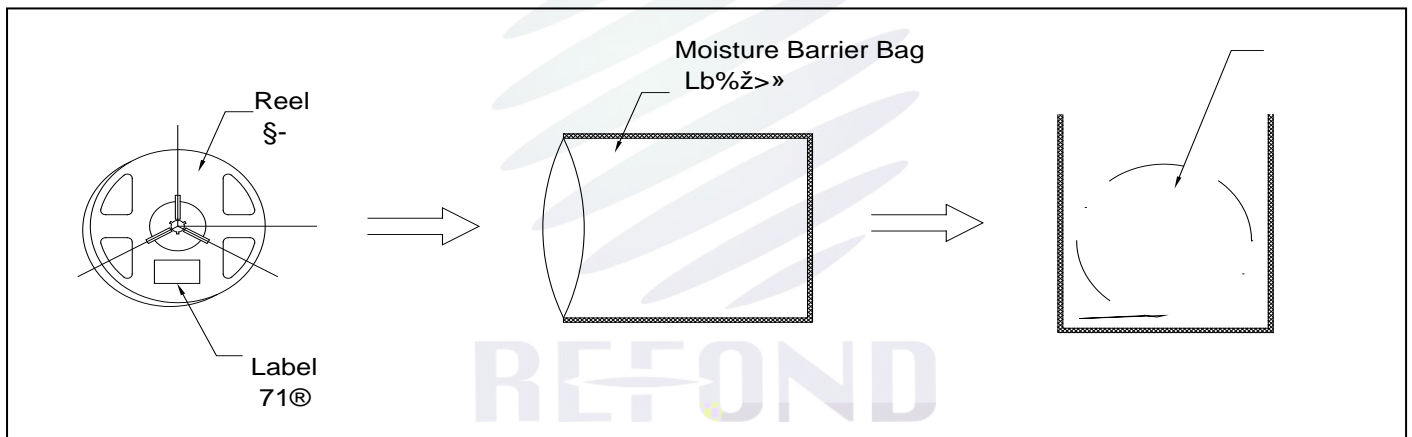


Fig.2-4Moisture Resistant Packing Lb%ž 5>õ

### 2.3 Cardboard Box



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

## 2.4 Reliability Test Items And Conditions

Table 2-3 Reliability Test Items And Conditions

Test Items	Ref.Standard	Test Condition	Time	Quantity	Ac/Re
					/

Reflow



## 2.5 Criteria For Judging Damage

Table 2-4 Criteria For Judging Damage

Test Items	Symbol	Test Condition	Criteria For Judgement	
			Min.	Max.



### 3. SMT Reflow Soldering Instructions SMT

#### 3.1 SMT Reflow Soldering Instructions SMT

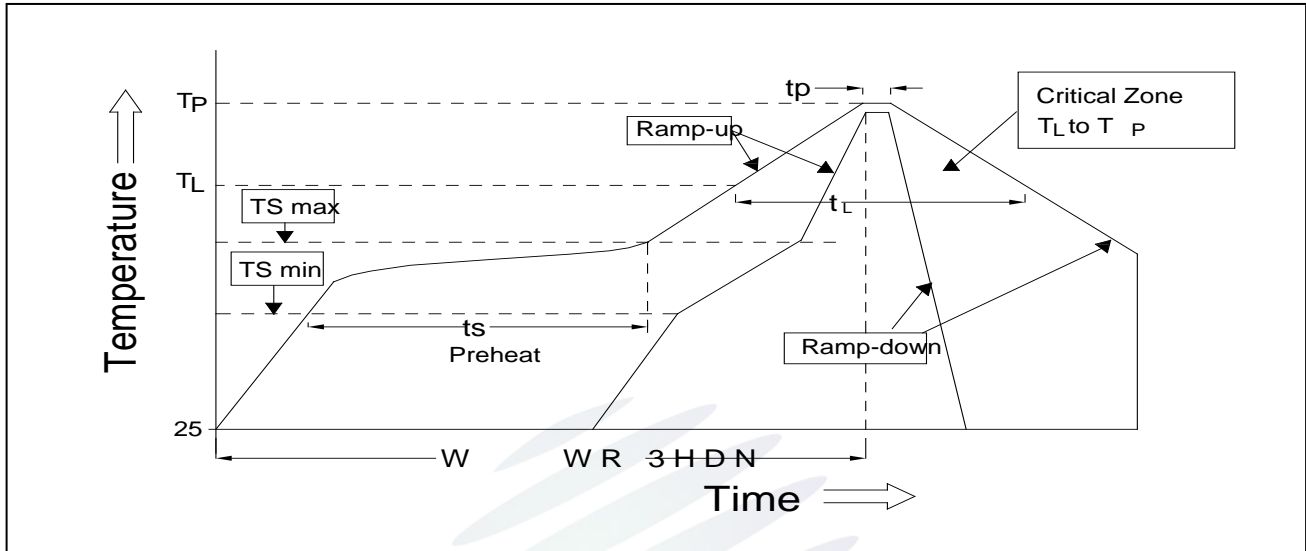


Fig.3-1 SMT Reflow Soldering Instructions SMT

Table 3-1 Reflow parameters #q': ò

Average temperature rise speed	Tsmax TP	3 °C/ Max 3 °C/ s
Preheating: minimum temperature	(Tmin)	150 °C
Preheating: Max temperature	(Tmax)	200 °C
Preheating: Time	Tmin Tmax	60 - 120 60s-120s
Time limited to maintain high temperature: the temperature	(TL)	217 °C
Time limited to maintain high temperature: The Time	(tL)	60 Max 60s
Peak /Classification of temperature:	/ (TP)	260 °C
Time limit classification of peak temperature time	tp	10 Max 10s
Hold time within 5°C with the actual peak temperature (TP)	(TP) 5°C	30 Max 30s
Cooling speed		6 °C/ Max 6 °C/ s
Needed time from 25 °C to TP 25°C		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. 24 LED

(2)When soldering , do not put stress on the LEDs during heating.

### 3.1.1 Soldering Iron

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

300 3

(2) Soldering by hand should be done only one time.

### 3.1.2 Repairing

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

LED

### 3.1.3 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 LED

(2) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board.LED PCB

(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.

## 4. Handling Precautions

### 4.1 Handling Precautions



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 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.

LED

LED

(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

(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 so



Date	Revisor	Version	Verifier	Remarks
2022/12/15	[REDACTED]	E0	Zhu Yiming	[REDACTED]





Declare

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