

# AX2200

The Acriche series of LEDs are designed for AC operation and high flux output applications. Acriche LEDs are an environmentally friendly semiconductor lighting source that can be directly connected to an AC power source without any DC conversion required.



Acriche's thermal management performance exceeds other power LED solutions by incorporating state-of-the-art SMD design and use of specialized thermal emission material. Acriche is an ideal light source for general purpose illumination applications

## AX2200

### Features

- Connect directly to AC power
- Power Saving
- Long Life
- Simplified B.O.M
- Small design footprint
- Low thermal resistance
- SMT solderability
- Lead Free and RoHS compliant

### Application

- Architectural lighting
- Task lighting
- Decorative and Pathway lighting
- White goods and gaming
- Spot lighting

\* product specification may change without notice

**Part number of AX2200**

**1. Part Number form : A X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub>**

<b>X<sub>1</sub></b>	<b>Color</b>
W	Pure White
N	Warm White

<b>X<sub>2</sub></b>	<b>Acriche Series</b>
2	A2

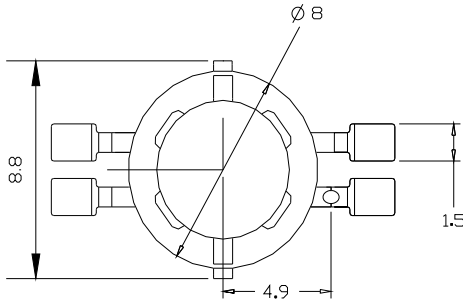
<b>X<sub>3</sub></b>	<b>LENS Type</b>
2	Dome Type

<b>X<sub>4</sub></b>	<b>Operating Voltage [V]</b>
0	100 / 110

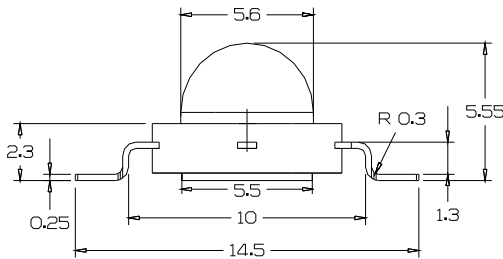
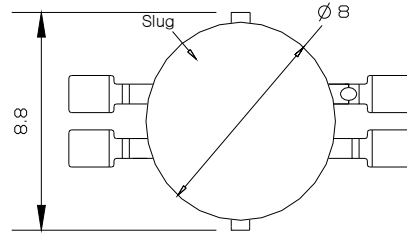
<b>X<sub>5</sub></b>	<b>PCB Type</b>
0	Emitter
4	PCB

Outline dimensions

TOP VIEW



BOTTOM VIEW



Notes :

1. All dimensions are in millimeters. (tolerance :  $\pm 0.2$  )
2. Scale : none
3. Drawings without tolerances are for reference only
4. Slug of package isn't connected to anode or cathode

## Characteristics of Acriche

### 1. Pure white

1-1 Electro-Optical characteristics at 100V/110V RMS,  $T_A=25^{\circ}\text{C}$

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux <sup>[1]</sup>	$\Phi_V$ <sup>[2]</sup>	-	80	-	lm
Illuminance <sup>[3]</sup>	$\Phi_l$		91		lux
Correlated Color Temperature <sup>[4]</sup>	CCT	-	6300	-	K
CRI	$R_a$	-	70	-	-
Operating Current	$I_{opt}$	-	20	-	mA[RMS]
Power Dissipation	$P_D$	1.7			W
Operating Frequency	Freq	50 / 60			Hz
View Angle	$2\theta$ 1/2	120			deg.

### 1-2 Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Operating Voltage	$V_{opt}$ <sup>[5]</sup>	115/127	V [RMS]
Power Dissipation	$P_D$	3.7	W
Junction Temperature	$T_j$	125	$^{\circ}\text{C}$
Operating Temperature	$T_{opr}$	-30 ~ +85	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +120	$^{\circ}\text{C}$
ESD Sensitivity	-	$\pm 2,000\text{V}$ HBM	-

\*Notes :

- [1] Acriche series maintains a tolerance of  $\pm 10\%$  on flux and power measurements.
- [2]  $\Phi_V$  is the total luminous flux output as measured with an integrating sphere.
- [3] Illuminance is measured at 50cm distance
- [4] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.  
CCT  $\pm 5\%$  tester tolerance
- [5] 'Operating Voltage' doesn't indicate the maximum voltage which customers use, but it means tolerable voltage according to the voltage variation rate by one's country.  
It is recommended that the temperature of lead frame should be below  $70^{\circ}\text{C}$ .



Lead Temperature

## Characteristics of Acriche

### 2 Warm white

2-1 Electro-Optical characteristics at 100V/110V RMS,  $T_A=25^{\circ}\text{C}$

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Luminous Flux <sup>[1]</sup>	$\Phi_V$ <sup>[2]</sup>	-	65	-	lm
Illuminance <sup>[3]</sup>	$\Phi_l$		73		lux
Correlated Color Temperature <sup>[4]</sup>	CCT	-	3000	-	K
CRI	$R_a$	-	80	-	-
Operating Current	$I_{opt}$	-	20	-	mA[RMS]
Power Dissipation	$P_D$	1.7			W
Operating Frequency	Freq	50 / 60			Hz
View Angle	$2\theta$ 1/2	120			deg.

### 2-2 Absolute Maximum Ratings

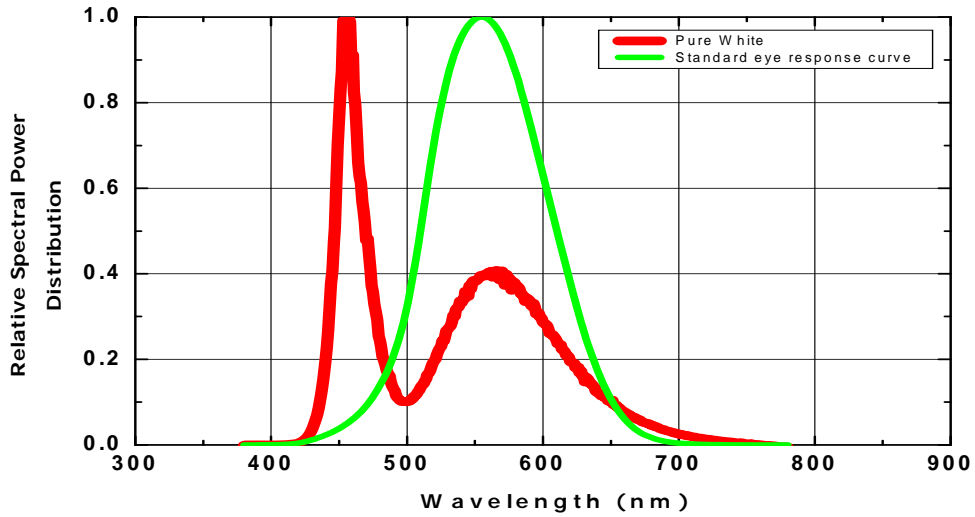
Parameter	Symbol	Value	Unit
Operating Voltage	$V_{opt}$ <sup>[5]</sup>	115/127	V [RMS]
Power Dissipation	$P_D$	3.7	W
Junction Temperature	$T_j$	125	$^{\circ}\text{C}$
Operating Temperature	$T_{opr}$	-30 ~ +85	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +120	$^{\circ}\text{C}$
ESD Sensitivity	-	$\pm 2,000\text{V}$ HBM	-

\*Notes :

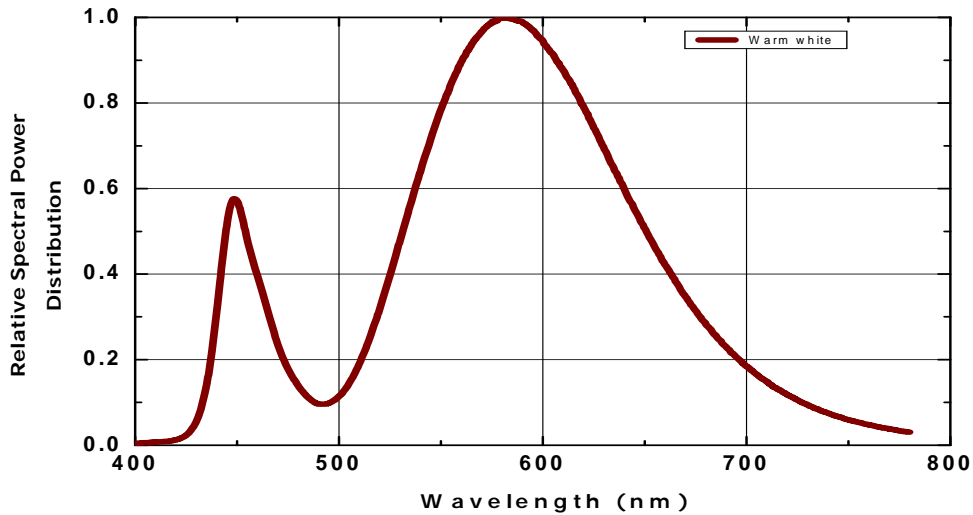
- [1] Acriche series maintains a tolerance of  $\pm 10\%$  on flux and power measurements.
- [2]  $\Phi_V$  is the total luminous flux output as measured with an integrating sphere.
- [3] Illuminance is measured at 50cm distance
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It is recommended that the temperature of lead frame should be below  $70^{\circ}\text{C}$ .

**Color spectrum, Ta=25°C**

**1. Pure white**

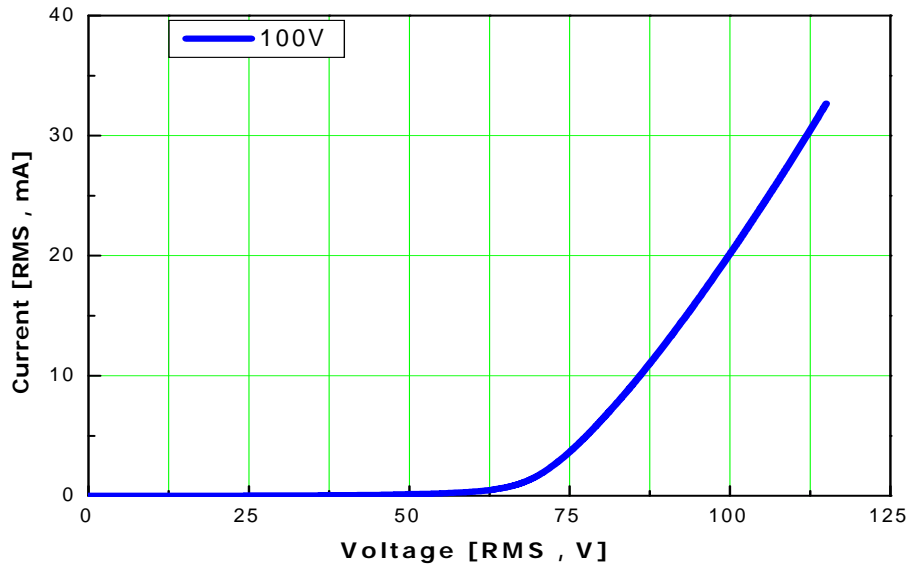


**2. Warm white**

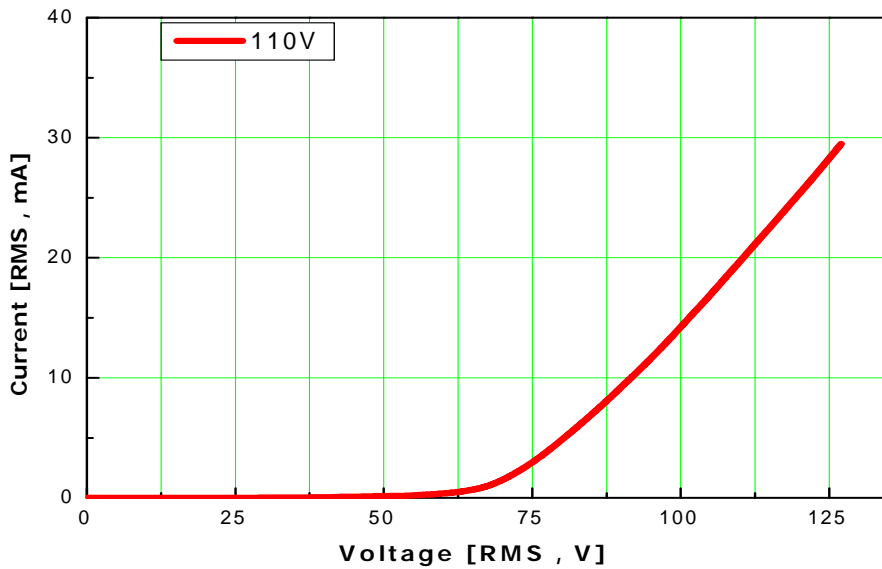


**Current – Voltage characteristics, Ta=25°C**

**1. Current[RMS] vs Voltage[RMS] - 100V**

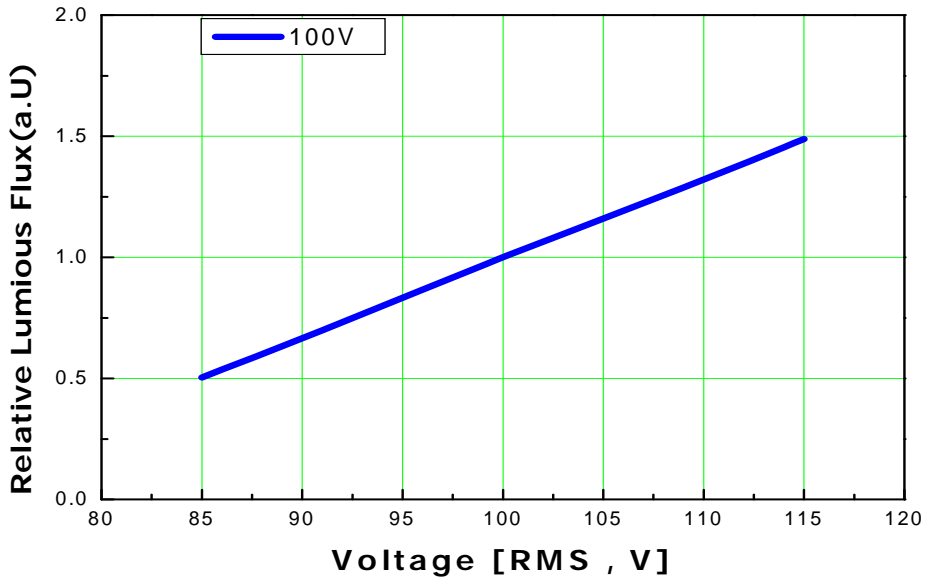


**2. Current[RMS] vs Voltage[RMS] - 110V**

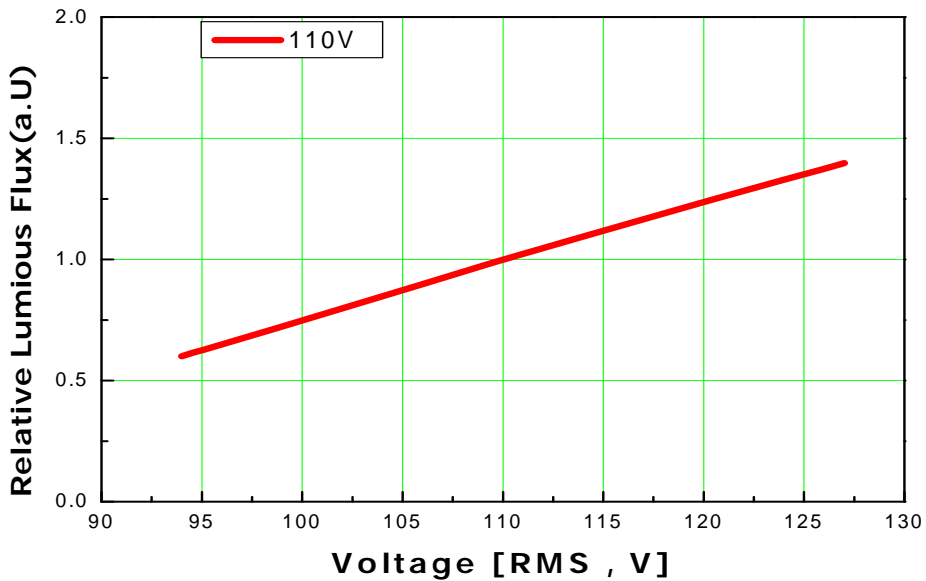


**Voltage – Relative flux characteristics, Ta=25°C**

**1. Voltage[RMS] vs. Normalized Relative Luminous Flux -100V**



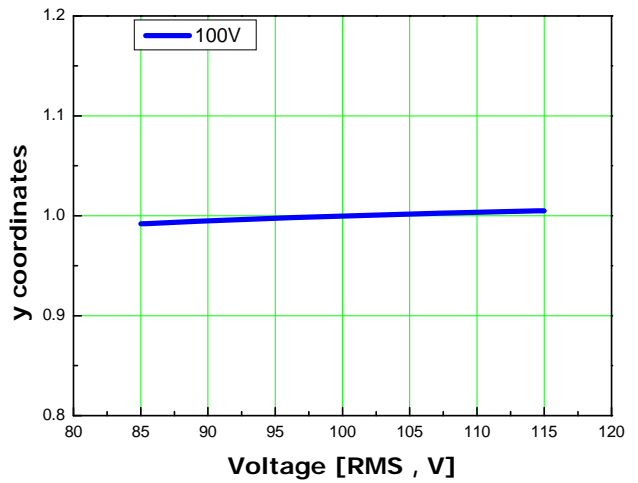
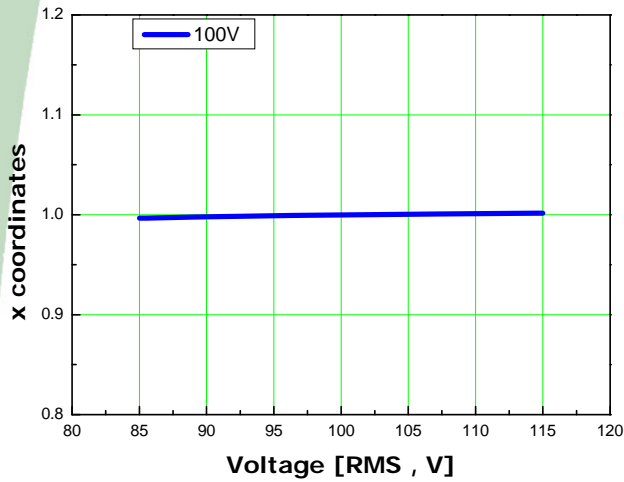
**2. Voltage[RMS] vs. Normalized Relative Luminous Flux -110V**



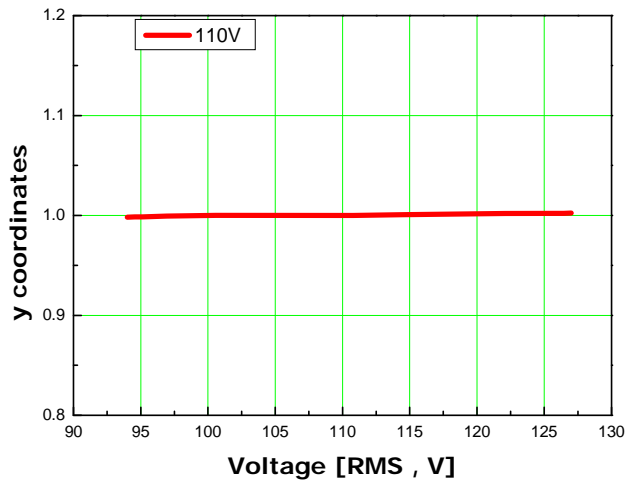
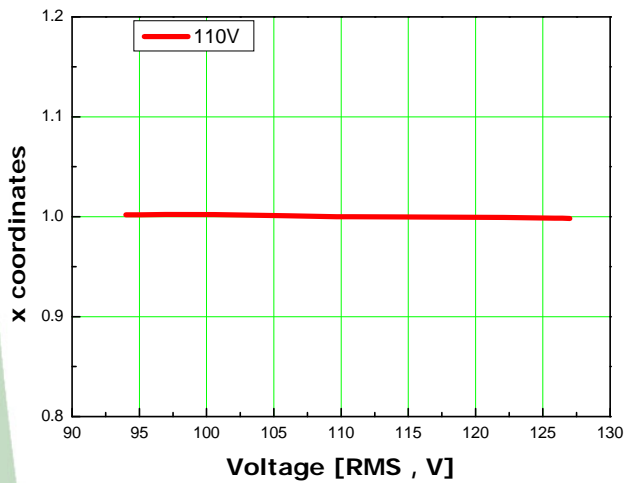


**Voltage – XY Coordinate Shift, Ta=25°C**

**1. Voltage[RMS] vs. XY Coordinate Shift -100V**

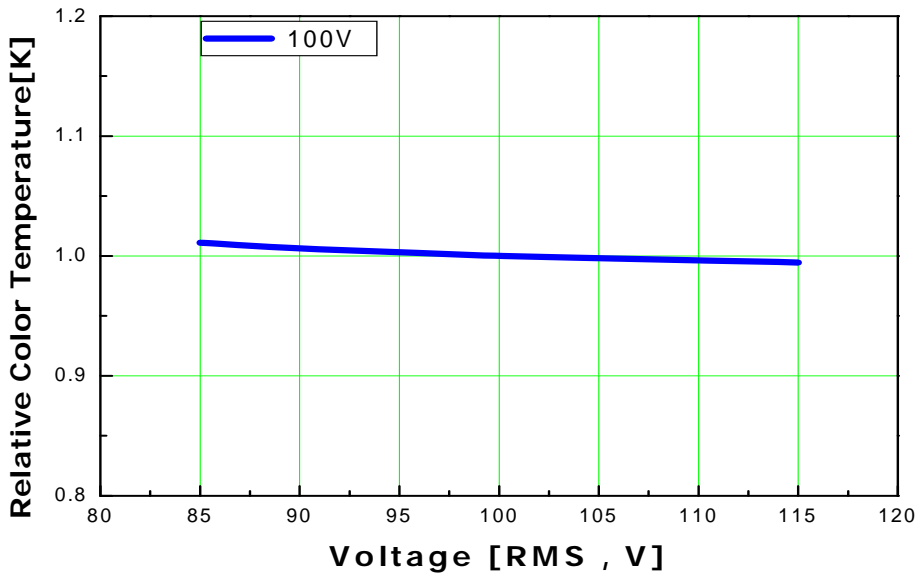


**2. Voltage[RMS] vs. XY Coordinate Shift -110V**

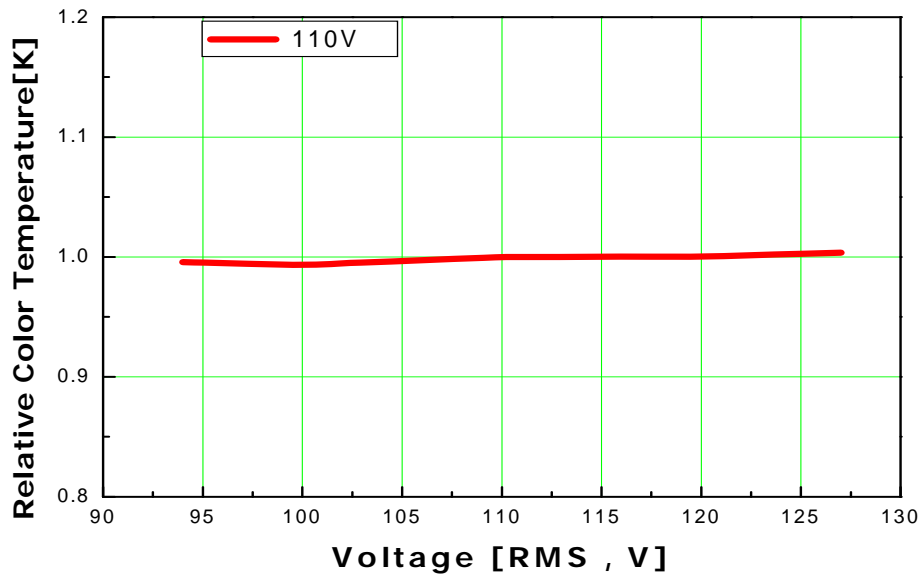


**Voltage - Color Temperature Shift, Ta=25°C**

**1. Voltage[RMS] vs. Color Temperature Shift -100V**

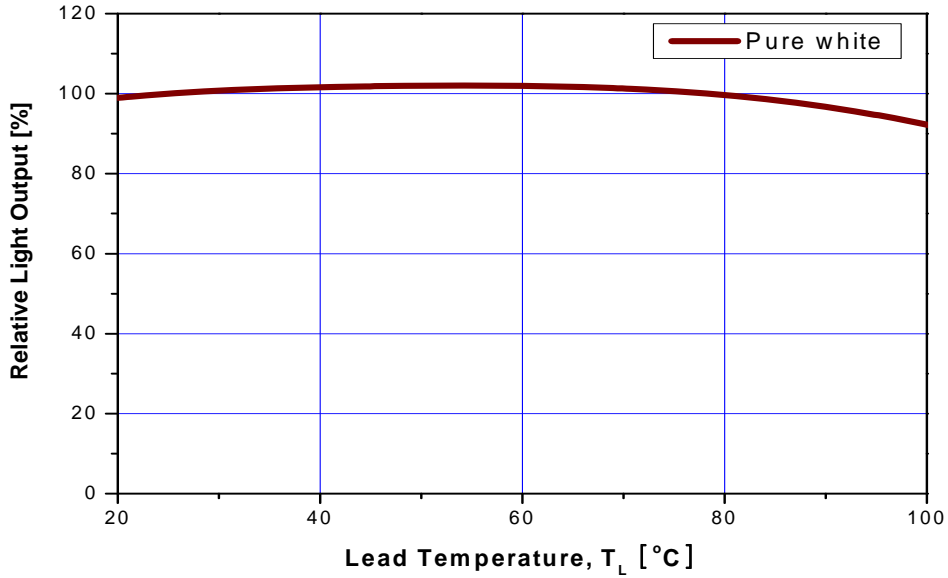


**2. Voltage[RMS] vs. Color Temperature Shift -110V**

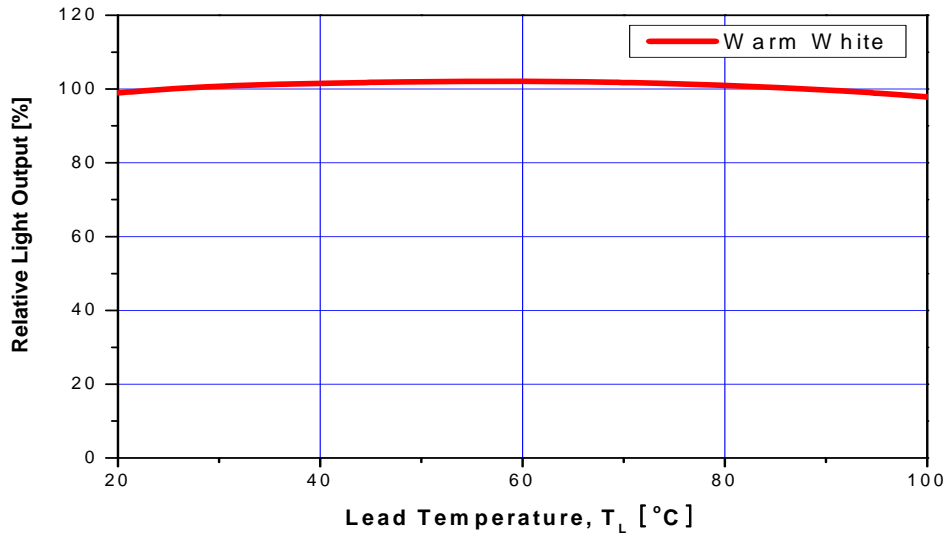


## Relative Flux – Lead temperature characteristics

### 1. Pure white

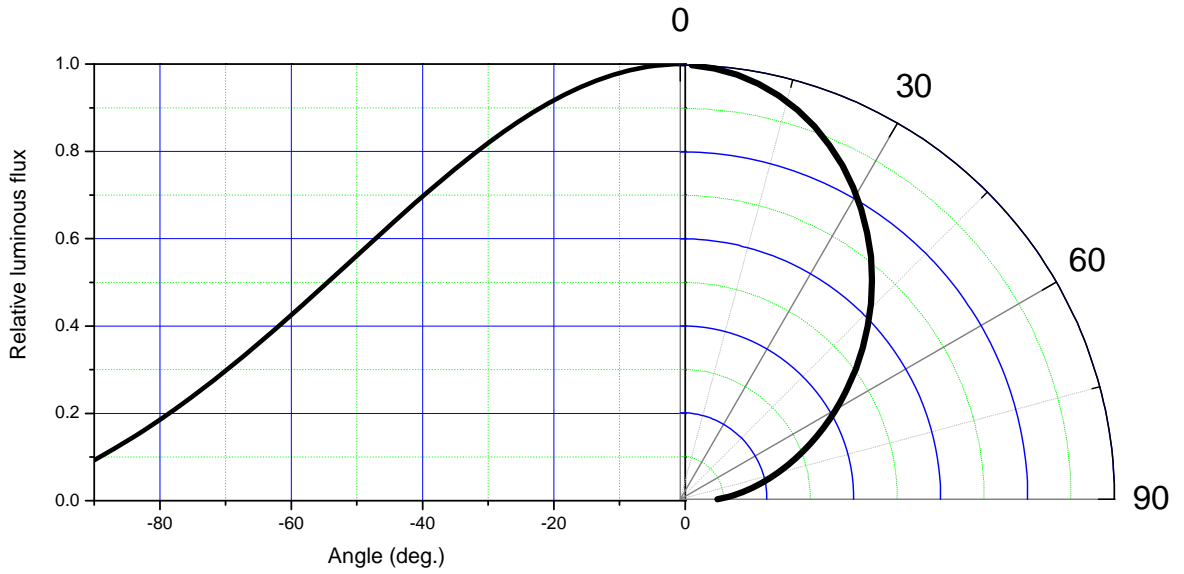


### 2. Warm white

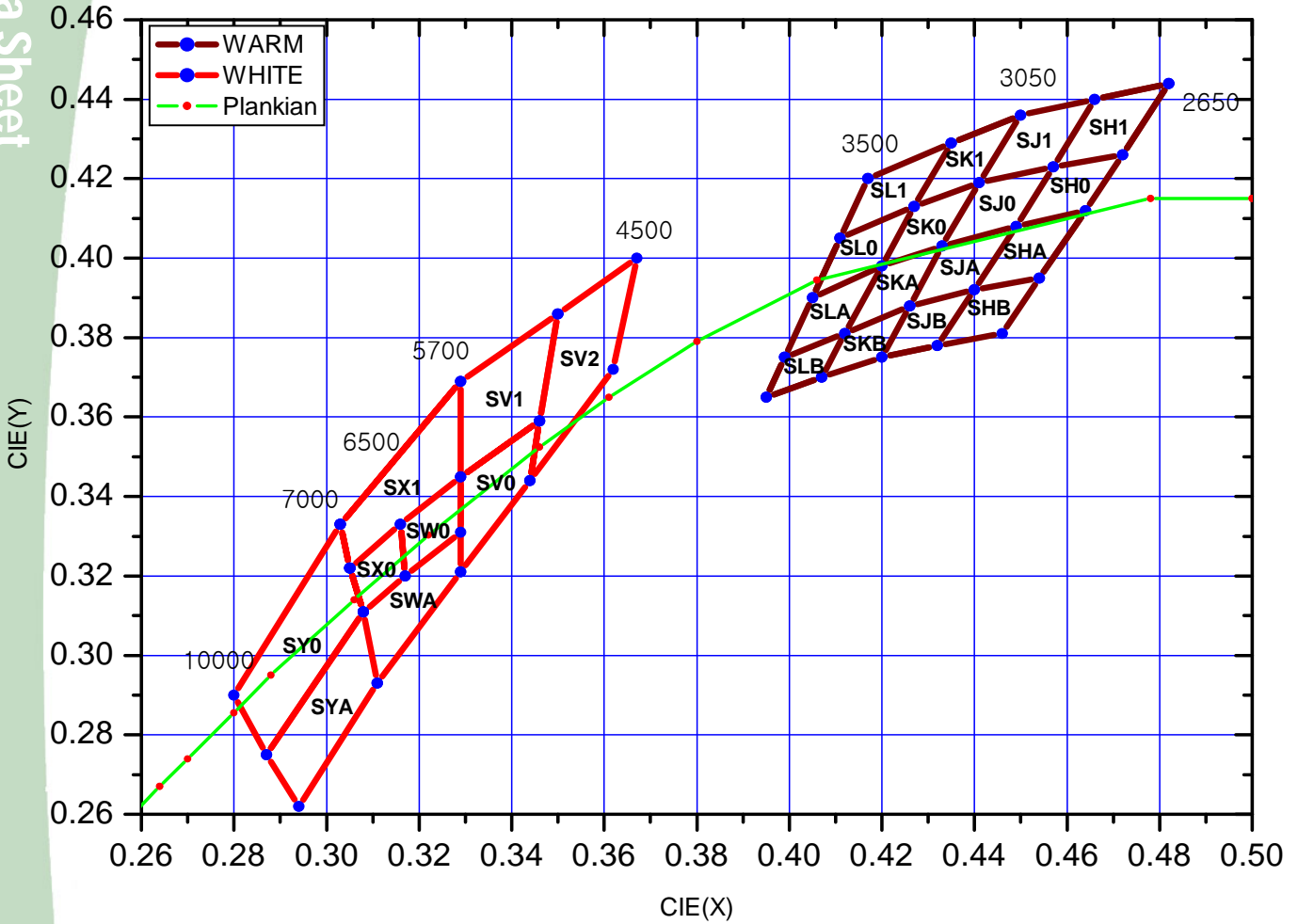


## Typical Dome Type Radiation pattern

### 1. Pure White, Warm White



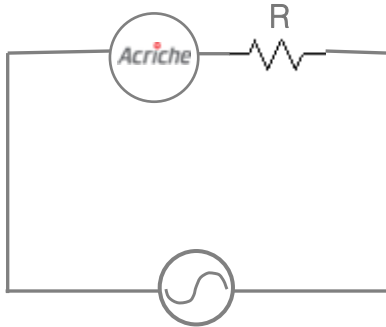
**Acriche Binning structure graphical representation**



## Operating instructions of AX2200

### 1. Operating in 100V/110V

#### 1-1. Circuit for driving



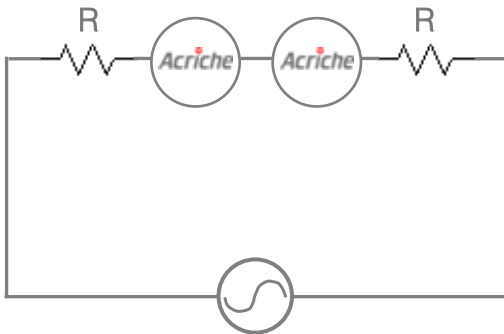
100V/110V

#### 1-2. Resistance sheet

VF BIN code	100V	110V
A	720Ω	1120Ω
B	540Ω	1020Ω
C	440Ω	940Ω
D	400Ω	860Ω

### 2. Operating in 220V/230V

#### 2-1. Circuit for driving



220V/230V

#### 2-2. Resistance sheet

VF BIN code	220V	230V
A	2.2KΩ	2.7KΩ
B	2KΩ	2.4KΩ
C	1.8KΩ	2.2KΩ
D	1.6KΩ	2KΩ

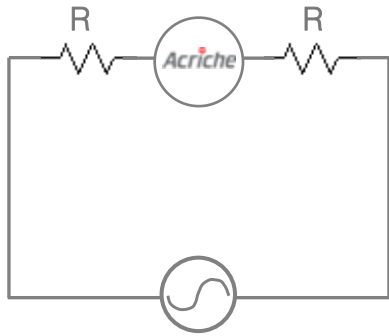
Notes :

- [1] Acriche must be used with resistance certainly.
- [2] Acriche may be driven at maximum rated current of 20mA[RMS].
- [3] The tolerance of current is ±5% on each resistance rank.
- [4] When the resistance is used, Check the rated power of resistance. Apply the proper resistance  
The rated power = operating current<sup>2</sup> X resistance

**Recommended circuit**

- Example of using 3216 size , 1/4W resistance

**1. Operating in 100V/110V**

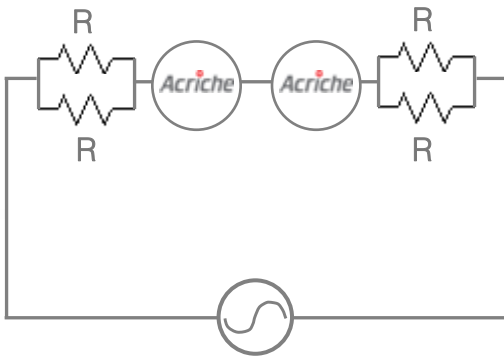


100V/110V

Voltage [V,RMS]	Bin code	Optimized resistor	Recommend resistor
100	A	720Ω	360Ω X 2EA
	B	540Ω	270Ω X 2EA
	C	440Ω	220Ω X 2EA
	D	400Ω	200Ω X 2EA
110	A	1120Ω	560Ω X 2EA
	B	1020Ω	510Ω X 2EA
	C	940Ω	470Ω X 2EA
	D	860Ω	430Ω X 2EA

At I=20mA[RMS], Ta= 25°C

**2. Operating in 220V/230V**



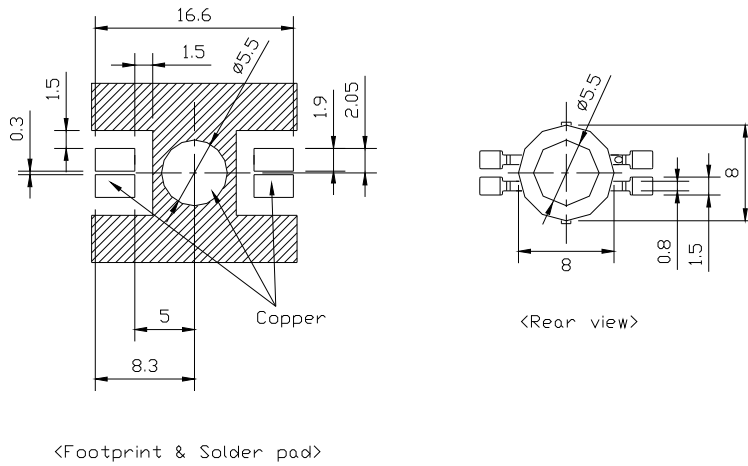
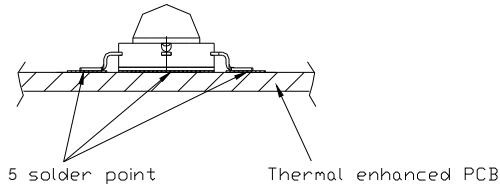
220V/230V

Voltage [V,RMS]	Bin code	Optimized resistor	Recommend resistor
220	A	2.2KΩ	2.2KΩ X 4EA
	B	2KΩ	2KΩ X 4EA
	C	1.8KΩ	1.8KΩ X 4EA
	D	1.6KΩ	1.6KΩ X 4EA
230	A	2.7KΩ	2.7KΩ X 4EA
	B	2.4KΩ	2.4KΩ X 4EA
	C	2.2KΩ	2.2KΩ X 4EA
	D	2KΩ	2KΩ X 4EA

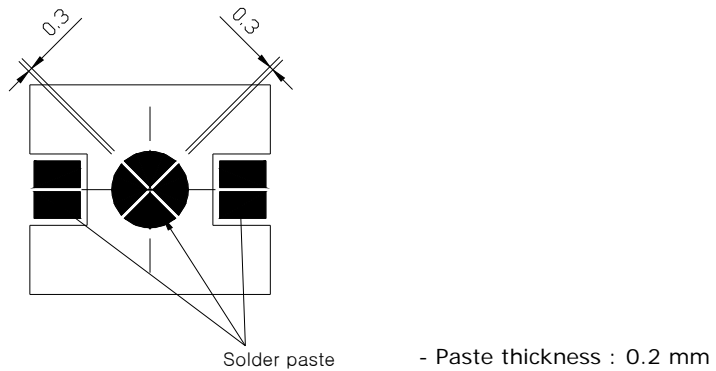
At I=20mA[RMS], Ta= 25°C

## Recommended solder pad

### 1. Solder pad



### 2. Solder paste pattern



Note :

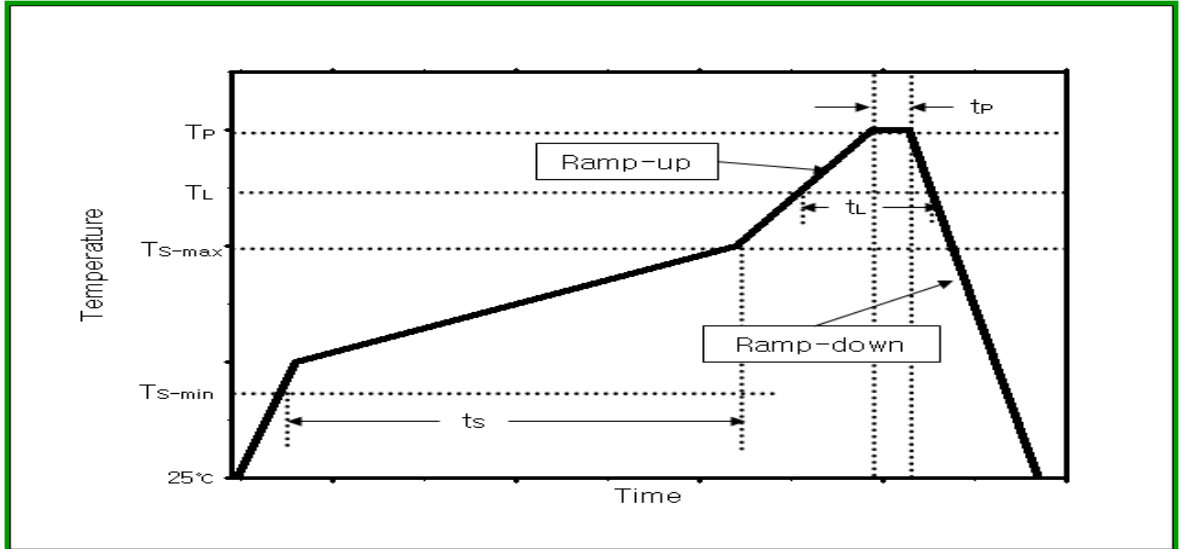
1. All dimensions are in millimeters (tolerance :  $\pm 0.2$  )
2. Scale none

\*The appearance and specifications of the product may be changed for improvement without notice.



## Solder profile

### 1. Reflow solder conditions / profile



Reflow condition	Pb-Free assembly
Average ramp-up rate (Ts-max to Peak)	2~3°C / second
Preheat Temperature Min (Ts-min)	150°C
Preheat Temperature Max (Ts-max)	200°C
Time maintained above: : Liquidus Temperature (TL)	217~220°C
Time maintained above: Time (tL)	60~150 seconds
Peak Temperature (TP)	250°C
Time within 5°C of actual Peak Temperature (tp)	20~40 seconds
ramp-down rate	4~6°C / second
Time 25°C to Peak Temperature	6 minutes max

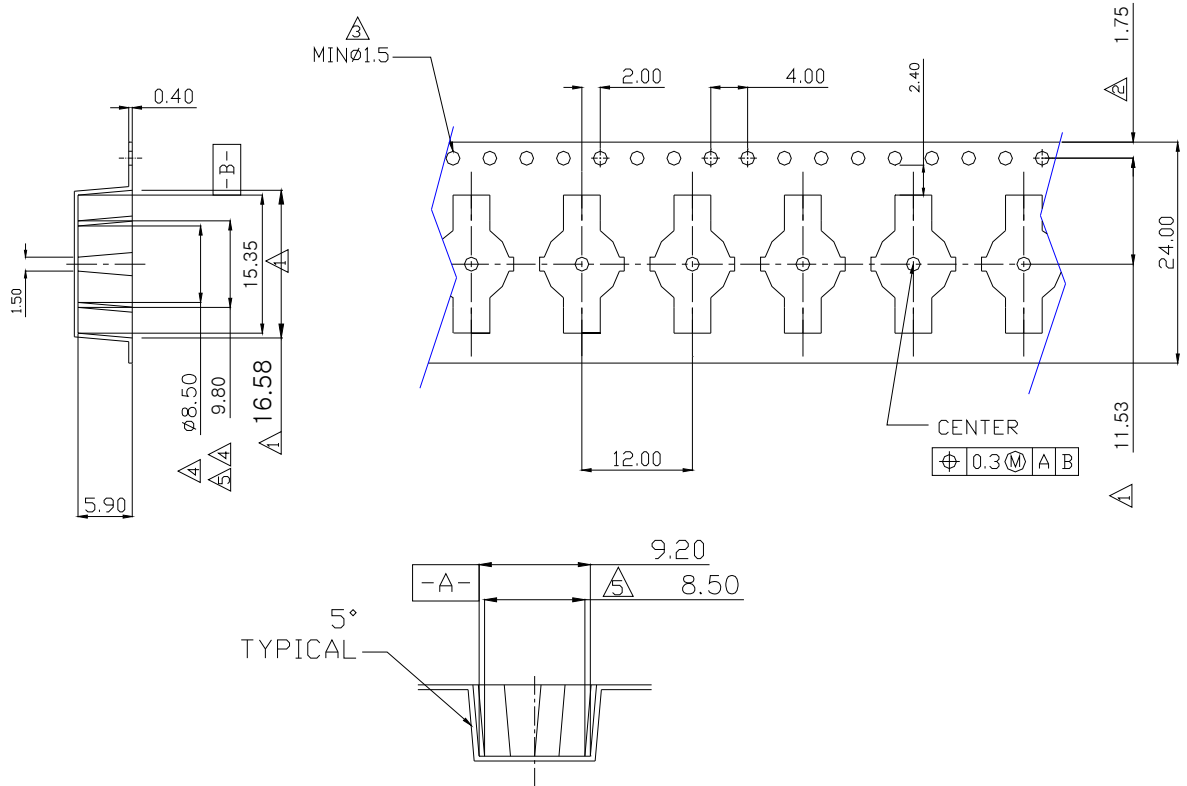
### 2. Hand Solder conditions

- 2-1 Lead : Not more than 3 seconds @MAX280°C
- 2-2 Slug : Use a thermal-adhesives

#### \* Caution

- [1] Reflow soldering should not be done more than one time.
- [2] Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, suitable tools have to be used.
- [3] Die slug is to be soldered.
- [4] When soldering, do not put stress on the LEDs during heating.
- [5] After soldering, do not warp the circuit board.
- [6] Recommend to use a convection type reflow machine with 7 ~ 8 zones.

## Emitter Reel Packaging



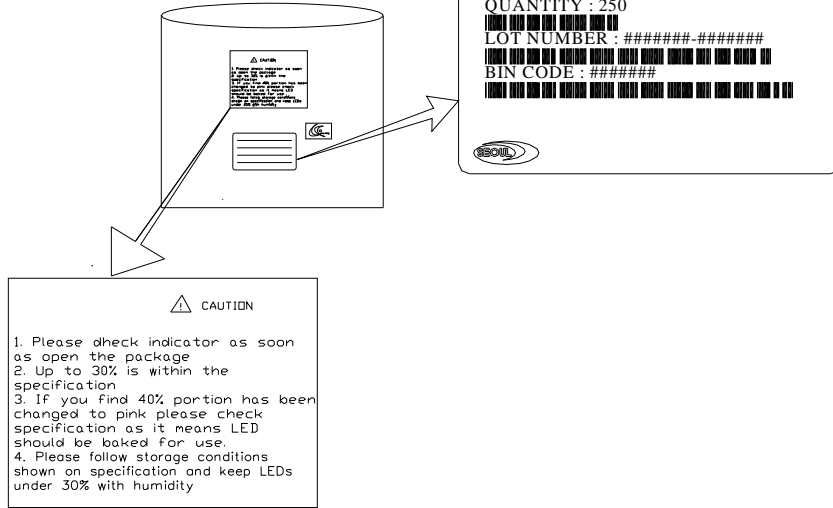
Note :

1. The number of loaded products in the reel is 250ea
2. All dimensions are in millimeters (tolerance :  $\pm 0.2$  )
3. Scale none

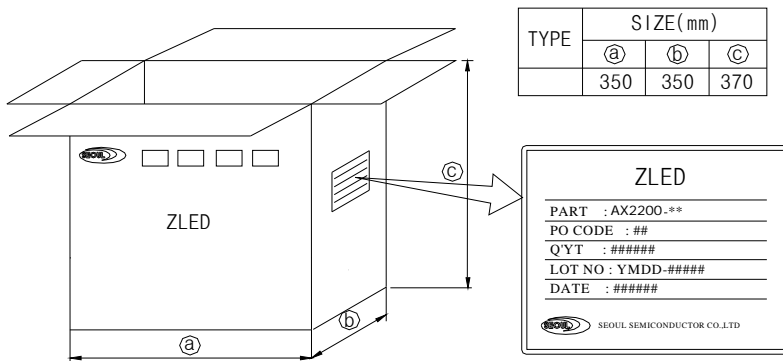
\*The appearance and specifications of the product may be changed for improvement without notice.

## Packaging Structure

### Aluminum Vinyl Bag



### Outer Box



**Note :**

1. 6~10 reels are loaded in box
2. Scale none
3. For more information about binning and labeling, refer to the Application Note - 1

## Precaution for use

- [1] Please note Acriche runs on high voltage so use caution when near the leads or if a dome is inadvertently removed while circuit is active
- [2] Please do not touch any of the circuit board, components or terminals with bare hands or metal while circuit is electrically active.
- [3] Please do not add or change wires while Acriche circuit is active

## Handling of silicone resin for LEDs

- [1] Acriche series is encapsulated by silicone resin for the highest flux efficiency.
- [2] Avoid touching silicone resin portion of LED especially with sharp tools such as Pincette (tweezers).
- [3] Avoid leaving fingerprints on silicone resin parts.
- [4] Silicone resin is dust sensitive and needs a covered container for storage
- [5] When populating boards in SMT production there are no unusual restrictions regarding the form of the pick and place nozzle except that mechanical essure on the surface of the resin must be avoided.
- [6] Please do not apply diagonal force to the silicone lens in excess of 3000gf or permanent and fatal damage will occur.
- [7] Please do not cover the silicone resin with any other resin (epoxy, urethane, etc)