



# TOYO LED ELECTRONICS LIMITED

Unit 10-11, 19/F, Metro Loft, 38 Kwai Hei Street, Kwai Chung, New Territories, Hong Kong

Tel : (852) 2540 7288  
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CERTIFIED  
ISO 9001



## P/N: TY-AO3020UR1(1.3)

3.0 \* 2.0 mm SMD Series

### ➤ Features:

- ✧ 3.0mm×2.0mm SMT LED, 1.3 mm thickness
- ✧ PLCC-2 package
- ✧ White package
- ✧ Suitable for all SMT assembly and solder process
- ✧ Available on tape and reel

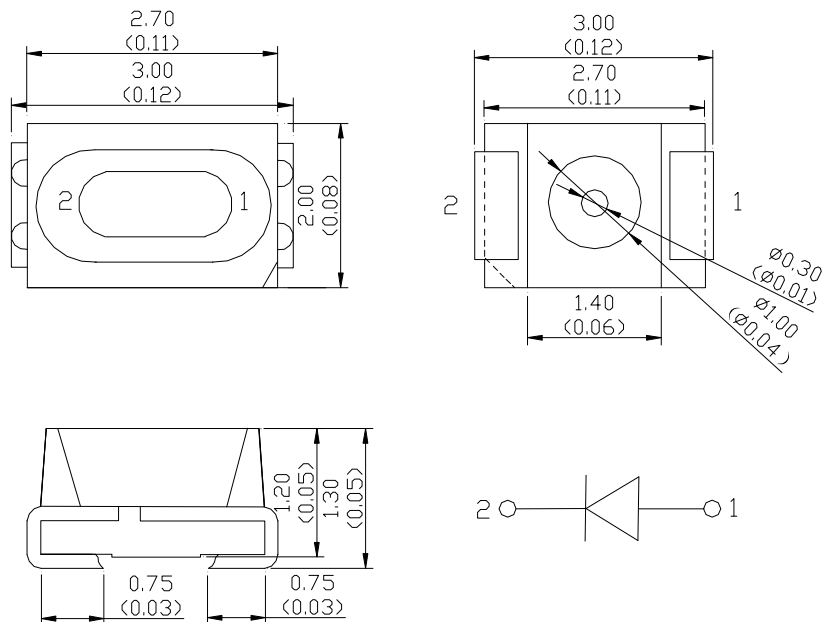
### ➤ Description

- ✧ The Red source color devices are made with AlGaInP on sapphire Light Emitting Diode.

### ➤ Application

- ✧ Optical indicator
- ✧ Indicator and backlighting in telephone and fax
- ✧ Flat backlight for LCD, switch and symbol
- ✧ Light pipe application
- ✧ General use

### ➤ Package Dimensions



### NOTES:

1. All dimensions are in millimeter[unit];
2. Tolerance is  $\pm 0.2\text{mm}$  (0.008 ") especially other specified;
3. Specifications are subject to change without notice.



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Part No.	Emitted Color	Len's Color	Chip Material
TY-AO3020UR1(1.3)	Red	Water clear	AlGaInP

### ➤ Absolute Maximum Ratings(Ta=25°C)

Item	Symbol	Maximum	Unit
Power Dissipation	PD	55	mW
Continuous Forward Current	I <sub>Fmax</sub>	25	mA
Peak Forward Current(1/10 Duty Cycle 0.1ms Pulse Width)	I <sub>FP</sub>	60	mA
Reverse Voltage	V <sub>R</sub>	5	V
Electrostatic Discharge	ESD	2000	V
Operating Temperature Range	T <sub>opr</sub>	-40 to+85	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to+85	°C
Lead Solder Temperature	T <sub>sol</sub>	260°C for 3 seconds	

### ➤ Electrical/Optical Characteristics(Ta=25°C)

Item	Symbol	Condition	Min.	Typ.	Max	Unit
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =20mA	1.8	2.0	2.4	V
Luminous Intensity	I <sub>V</sub>	I <sub>F</sub> =20mA	600	800	--	mcd
Wavelength	λ	I <sub>F</sub> =20mA	620	625	630	nm
Chromaticity Coordinates	X	I <sub>F</sub> =20mA	--	--	--	--
	Y	I <sub>F</sub> =20mA	--	--	--	--
Viewing Angle	2θ <sub>1/2</sub>	I <sub>F</sub> =20mA	--	120	--	Deg
Reverse Current	I <sub>R</sub>	V <sub>R</sub> =5V	--	--	10	uA



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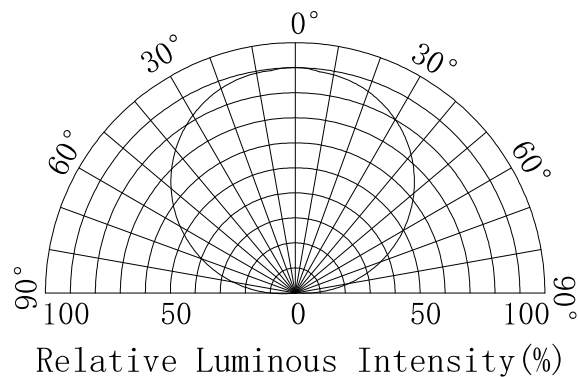
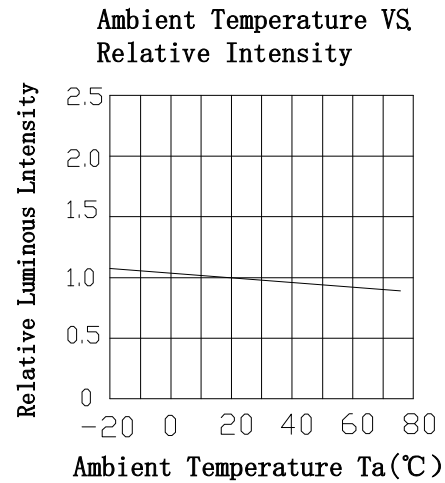
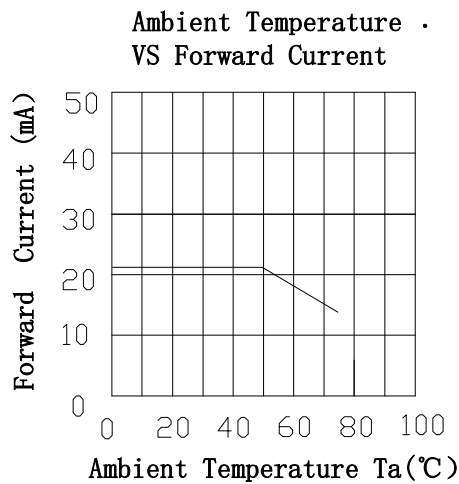
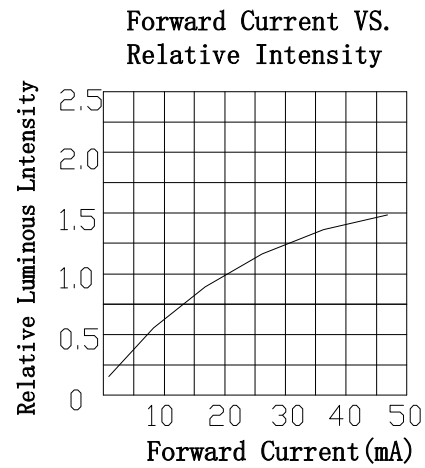
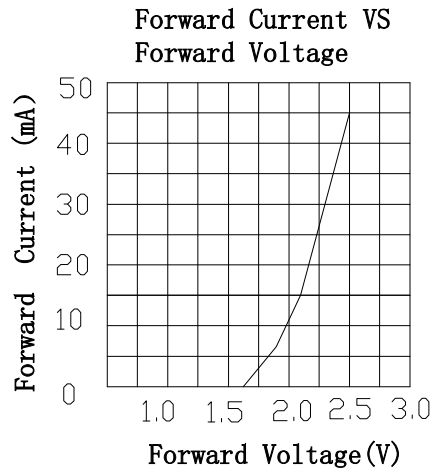
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### ➤ Typical Electro-Optical Characteristics Curves





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### ➤ Reliability Test Items And Conditions

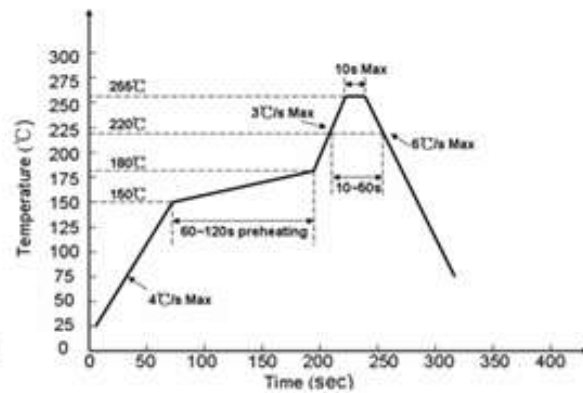
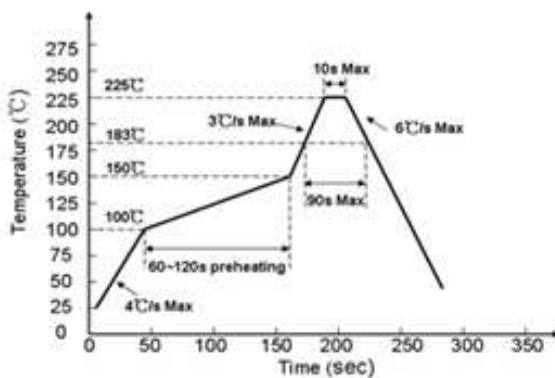
NO.	Test Item	Reference	Item Test Conditions	Duration /Cycle	Sample Size	Ac/Re
1	Reflow Soldering	JESD22-B106	Tsld=260±10°C, ≤10sec	3times	22	0/1
2	Temperature Cycle	JESD22-A104	85°C±5°C (30Min)~25°C±5°C (5min) ~-40°C±5°C (30Min)	100 cycle	22	0/1
3	Thermal Shock	JESD22-A105	-40°C (15Min) ~105°C (15Min)/ 1Min	100 cycle	22	0/1
4	High Temperature Storage	JESD22-A108	Ta=100±5°C	1000hrs	22	0/1
5	Humidity Heat Storage	JESD22-A101	85±5°C/85±5%RH;	1000hrs	22	0/1
6	Low Temperature Storage	JESD22-A119	Ta=-40±5°C	1000hrs	22	0/1
7	Life Test	EIAJED-4701100 103	Ta=25±5°C IF=20mA	1000hrs	22	0/1
8	High Temperature Life Test	JESD22-A108	Ta=100±5°C IF=5mA	1000hrs	22	0/1
9	Low Temperature Life Test	EIAJED-4701200 202	Ta=-40±5°C IF=20mA	1000hrs	22	0/1

### ➤ SMT Reflow Soldering Instructions

Reflow soldering			Hand welding	
	Lead Solder	Lead-free Solder	Temperature	350° C Max.
Pre-heat	140 ~ 160° C	180 ~ 200° C	Soldering time	3 sec. Max. (onetime only)
Pre-heat time	120 sec. Max.	120 sec. Max.		
Peak temperature	230° C Max.	260° C Max.		
Soldering time	10 sec. Max.	10 sec. Max.		
Condition	Refer to the picture below	Refer to the picture below		

(Lead Solder)

(Lead-Free Solder)





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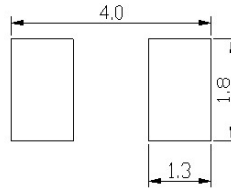
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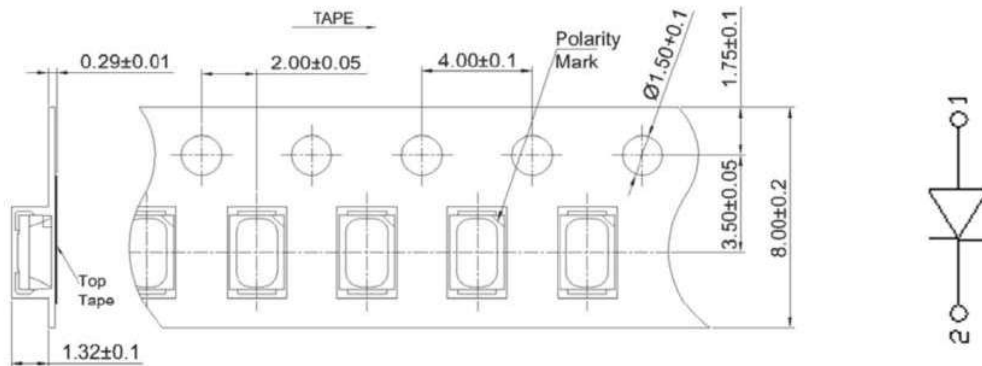
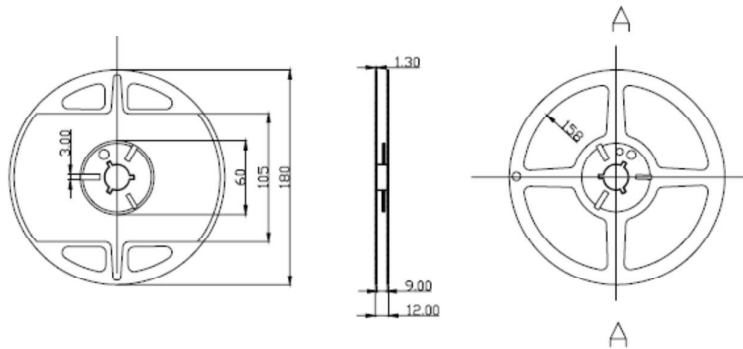
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### ➤ Recommended Soldering Pad Dimensions



### ➤ Tape Specification: 3,000PCS per reel



### ➤ Package Label

<b>SMD LED</b>	
PART NO: _____	QA Pass
LOT NO : _____	
Q' TY : _____	
VF : _____ IV : _____	
WL : _____ BIN: _____	Pb
DATA : _____	
TOYO LED ELECTRONICS LIMITED	
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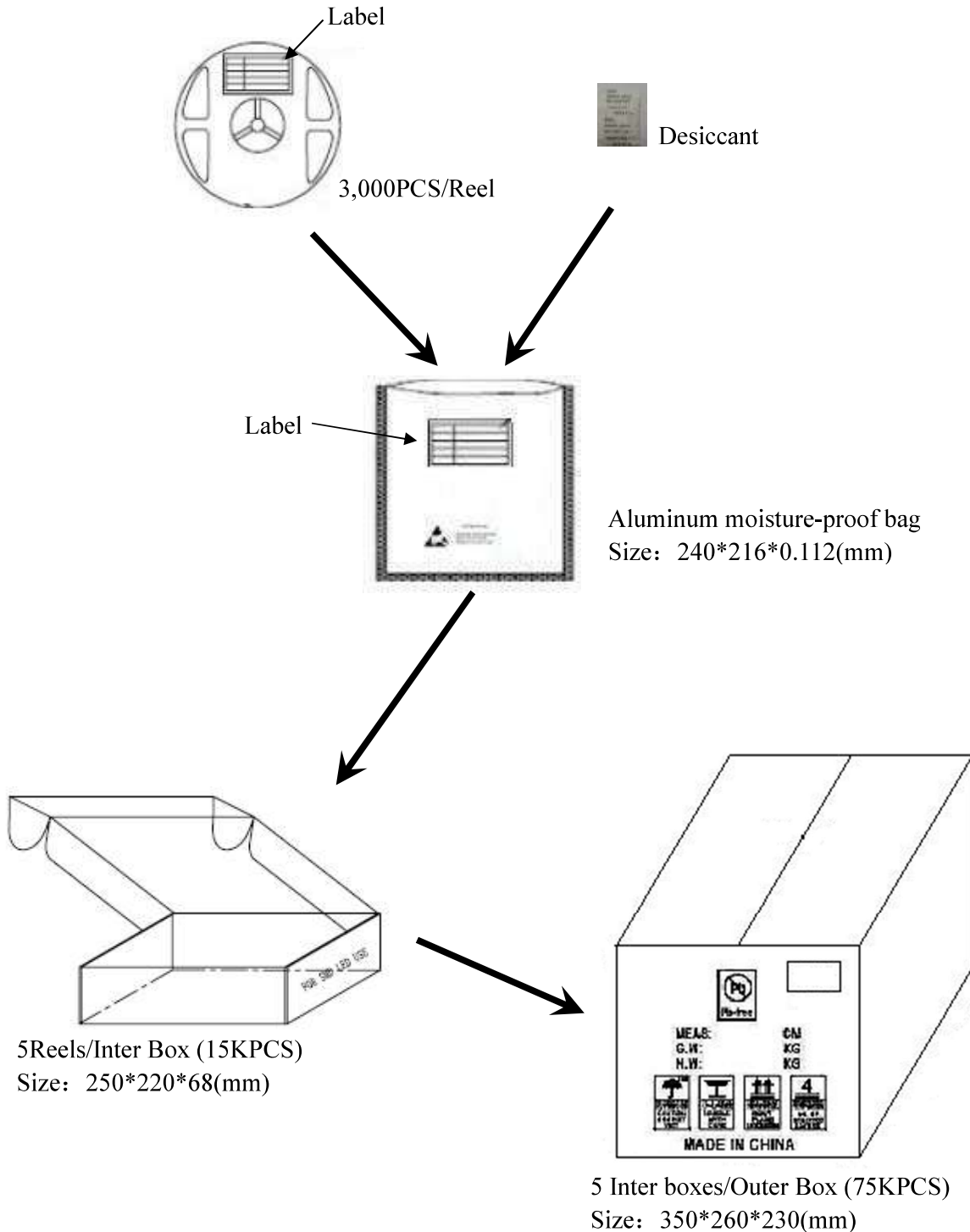
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### ➤ Package & Shipping Instructions





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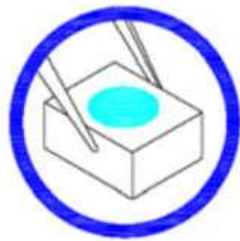
3.0 \* 2.0 mm SMD Series

### ➤ Handling Precautions

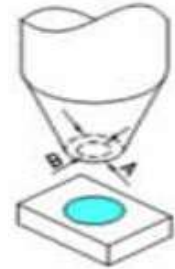
Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force.

As a result, special handling precautions need to be observed during assembly using silicone encapsulated LED products. Failure to comply might lead to damage and premature failure of the LED.

1. Handle the component along the side surface by using forceps or appropriate tools; do not directly touch or handle the silicone lens surface, it may damage the internal circuitry.



2. The outer diameter of the SMD pickup nozzle should not exceed the size of the LED to prevent air leaks. The inner diameter of the nozzle should be as large as possible. A pliable material is suggested for the nozzle tip to avoid scratching or damaging the LED surface during pickup. The dimensions of the component must be accurately programmed in the pick-and-place machine to ensure precise pickup and avoid damage during production.



3. Do not stack together assembled PCBs containing LEDs. Impact may scratch the silicone lens or damage the internal circuitry

4. Not suitable to operate in acidic environment,  $\text{pH} < 7$



5. LED operating environment and sulfur element composition cannot be over 100PPM in the LED mating usage material.

6. When we need to use external glue for LED application products, please make sure that the external glue matches the LED packaging glue. Additionally, as most of LED packaging glue is silica gel, and it has strong Oxygen permeability as

well as strong moisture permeability; in order to prevent external 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 element is required to be less than 900PPM, the total content of Bromine element and Chlorine element in the external glue of the application products is required to be less than 1500PPM



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### ➤ ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrostatic glove is recommended when handling these LED. All devices, equipment and machinery must be properly grounded.

### ➤ Notes for designing

Care must be taken to provide the current limiting resistor in the circuit so as to drive the TOYO LEDs within the rated figures. Also, caution should be taken not to overload TOYO LEDs with instantaneous voltage at the turning ON and OFF of the circuit.

When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as to be subjected to reverse voltage when turning off the TOYO LEDs.

### ➤ Storage

1. We recommend the reflow temperature  $240 \pm 5^\circ\text{C}$ . The maximum soldering temperature should be limited to  $245^\circ\text{C}$  for 10s (max).

2. SMD products are easily moisturized. Before soldering the unpacked SMD, de-moisturize process under  $65 \pm 5^\circ\text{C}$  / 24 hours is recommended. It could effectively prevent the defects caused by rapid expansion of hydro particles in the plastic under heat;

3. All unpacked and de-moisturized SMD should be used up within 72 hours. Otherwise, you need to de-moisturize them under  $65 \pm 5^\circ\text{C}$  / 24 hours again;

4. During reflow soldering, tin paste high in hydro or with sulfide cannot be used; Also, avoid using thinner to remain tin paste for fear that moisture penetrates to the base of the SMD and causes defects.

5. SMD storage conditions:  $5-30^\circ\text{C}$ , humidity: 60% MAX

6. Product is not recommended to work in high temperature and high humidity environment, will affect the life of the product

7. During manual welding, the welding temperature should be controlled at  $380^\circ\text{C}$  / 3 seconds to avoid direct contact with the product colloid at the high temperature of the hot head, so as to prevent defective dead lamps caused by high temperature during welding

8. The number of reflow welding of the product is 1, and the repeated reflow will cause the product dead lamp to be defective

9. Moisture sensitivity level: 4



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### REVISION HISTORY

DATE	REVISION CONTENTS	VERSION
2025-10-10	<b>Initial release</b>	A