APPROVAL SHEET

Part No: BAR5018A-C4C-012mA

NOTE :

Green Part

MAKER			CUSTOMER	
SOLIDLITE				
R&D	QA	Sales	Checked	Approved

Prepared	Checked	Approved
Rachel Lee	Sky Lin	Kenneth Wu

Description of P/N No.

<u>BAR5018A</u> – <u>C4C</u> – <u>012mA</u>

Test Condition

RGBW+IC Series

SOLIDLITE LED – BAR5018A Side View Series
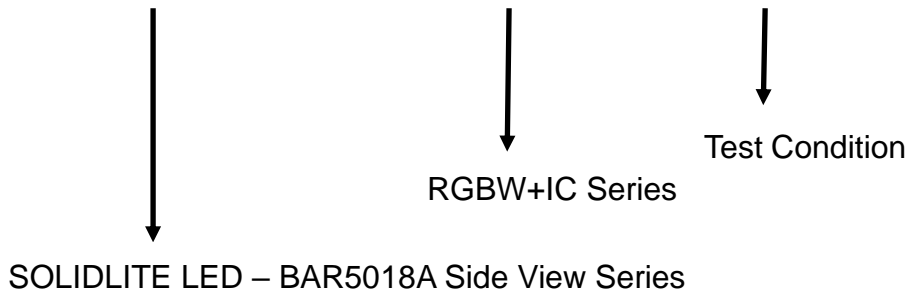
Description of Lot.

☐ ☐☐☐

NO.

Month

Solidlite Corp.

P/N : _____ .

Lot : _____ .
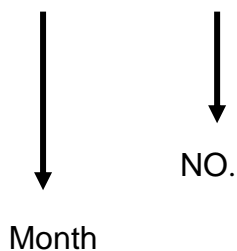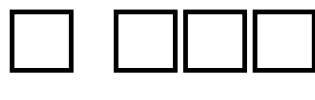
Date:_____ . Rank:_____ .

Q'ty : _____ . QA _____ .

Description of Rank

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Code: See page 5/15
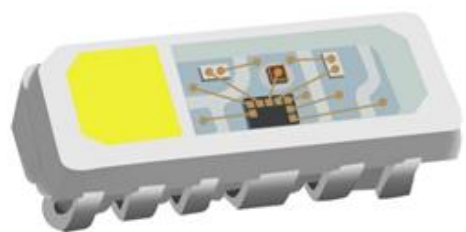
5018 RGBW LED with Intellectual IC control

1.Description

BAR5018A-C4C-012mA is a four-channel LED driver IC, integrated with MCU digital interface, data latch, LED driver and other circuits.   The single gray level of the lamp bead is realized by the peripheral MCU controller, and the color dot matrix luminescence of the screen product is realized by the cascade control.

The data protocol adopts the communication mode of single line return to zero code. After the chip is powered on and reset, it receives the data from DIN terminal. After receiving enough 32-BIT, the DOUT port starts to forward the data for the next chip to provide input data. Before forwarding, the DOUT port is always pulled down, and the lamp bead will not receive new data at this time. PWM output ports of the lamp bead OUTG, OUTR, OUTB and OUTW will send out corresponding signals with different duty cycles according to the 32-BIT data received, and the signal frequency is 4KHz. If the input signal of DIN terminal is RESET signal, the lamp bead will send the data received to display. The lamp bead will receive new data after the signal is over. After receiving the initial 32-BIT data, the data will be forwarded through the DOUT port. After receiving the initial 32-BIT data, the data is forwarded through the DOUT port. The original output of OUTG, OUTR, OUTB and OUTW pins remains unchanged before receiving the RESET code. When receiving the low level RESET code above 80us, the lamp bead outputs the 32-BIT PWM data pulse width just received to OUTG, OUTR, OUTB, OUTW pins.

2. Applications

- Full-color decorative LED.
- Full-color indicator LED.
- Speaker/Video decorative LED.

3. Features

➢ LED has integrated high-quality external control single-wire serial cascaded constant current IC.
➢ RGBW with four-channel LED driver IC.
➢ Forms a complete external control pixel, with uniform and high consistent light output.
➢ Built-in power on and off reset circuit, light is not on when power on by default.
➢ Gray adjustment circuit (256 levels of gray can be adjusted.)
➢ Built-in high precision and high stability oscillator.
➢ Built-in data shaping circuit, any pixel received signal after waveform shaping output.
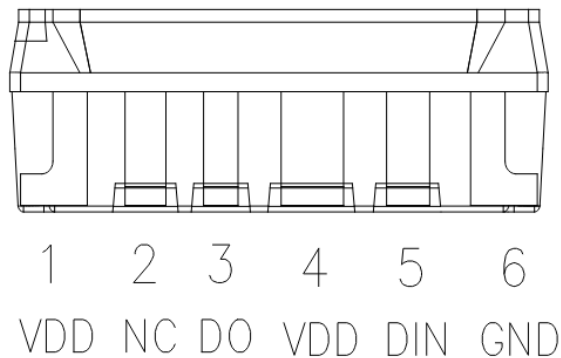
4. Package Dimensions
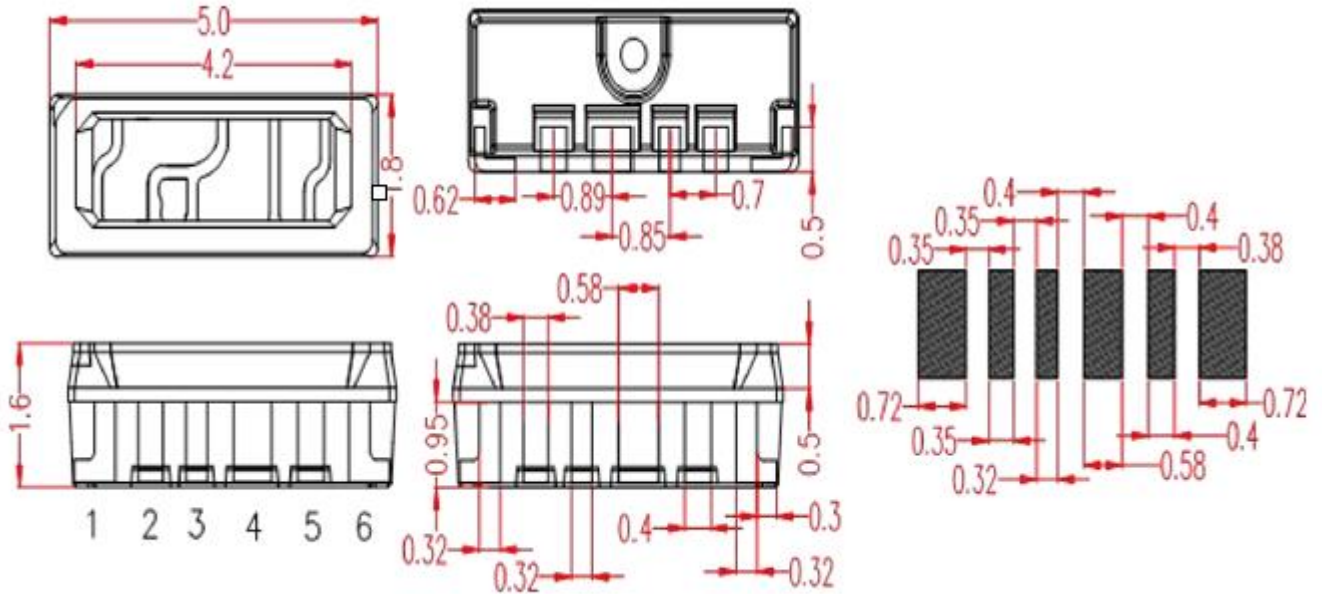
Recommended size of solder pad

Note：

a. Unit: mm

b. Tolerance ±0.2mm

c. Package size：5.0x1.8x1.6mm

5. Pin function

Pin No	Symbol	Pin name	Function description
1	VDD	power	White light supply pin
2	NC	empty pin	Connect the white light negative pole to the IC white light output port
3	DO	data output	Control data signal output
4	VDD	power	Power supply pin
5	DIN	data input	Control data signal input
6	GND	ground	Signal and power connect ground

6. Electro-optical characteristics at Ta=25°C (RGB)

Item	Symbol		Mix	Typ	Max	Unit	Conditions
Dominant wavelength	λd	G	520	-	525	nm	IF=12mA
		R	620	-	625		
		B	465	-	470		
Chromaticity	TC	W2	2600	-	2800	k	IF=12mA
		W3	2800	-	3200		
		W4	3800	-	4200		
		W5	4800	-	5200		
		W6	6000	-	6500		
Luminous intensity	IV	G	600	-	800	mcd	IF=12mA
		R	200	-	300		
		B	200	-	300		
		W	4	-	6	lm	

7. Absolute maximum ratings at Ta=25℃

Parameter	Symbol	Range	Unit
Logic power supply voltage	VDD	3.5~7.5	V
Logic input voltage	VI	-0.5~5.5	V
Operating temperature	Topt	-40~85	℃
Storage temperature	Tstg	-40~120	℃
ESD withstand voltage	VESD	4K	V

8. IC Electric Spec

Parameter name	Symbol	Min	Typical	Max	Unit	Test conditions
Power supply voltage inside the chip	VDD	-	5.0	7.5	V	-
High level input voltage	VIH	0.7xVDD	0.9xVDD	1xVDD	V	VDD=5.0V
Low-level input voltage	VIL	0	0.1VDD	0.3xVDD	V	
PWM frequency	FPWM	-	4	-	KHZ	-
Static power	IDD	-	5	-	uA	-

9. Dynamic parameter

Parameter name	Symbol	Min	Typical	Max	Unit	Test conditions
Data transfer rate	FDIN	--	800	1100	KHZ	--
Transmission delay time	Tpzl	--	--	500	ns	D IN→DO
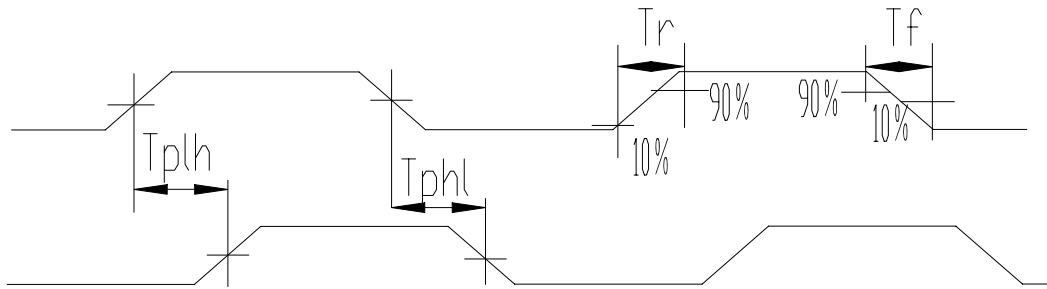
10. The data transmission time

T Symbol	Code	Min	Typical	Max	Unit
TOH	0code, high level time	0.295	0.3	0.305	us
TOL	0code, low level time	0.85	0.9	0.95	us
T1H	1code, high level time	0.85	0.9	0.95	us
T1L	1code, low level time	0.25	0.3	0.305	us
Trst	Reset code, low level time	80	--	--	us

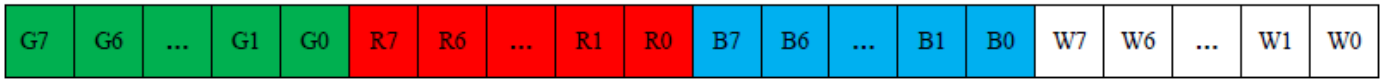## 11. Temporal waveform figure

Input code：

Connect method：
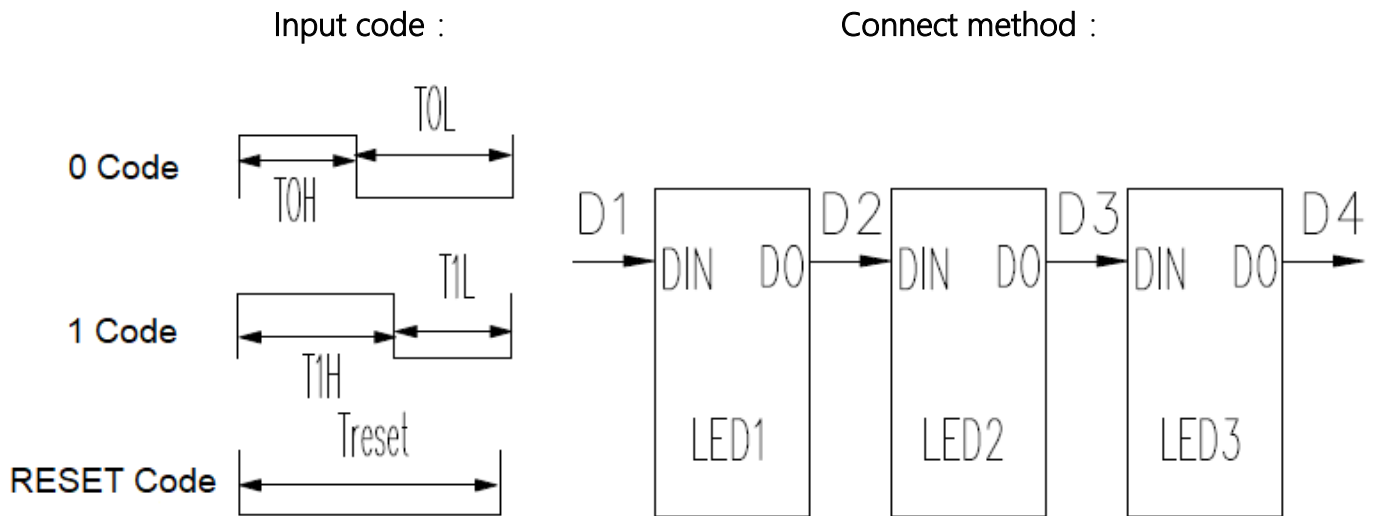
12. **Mode of data transmission**
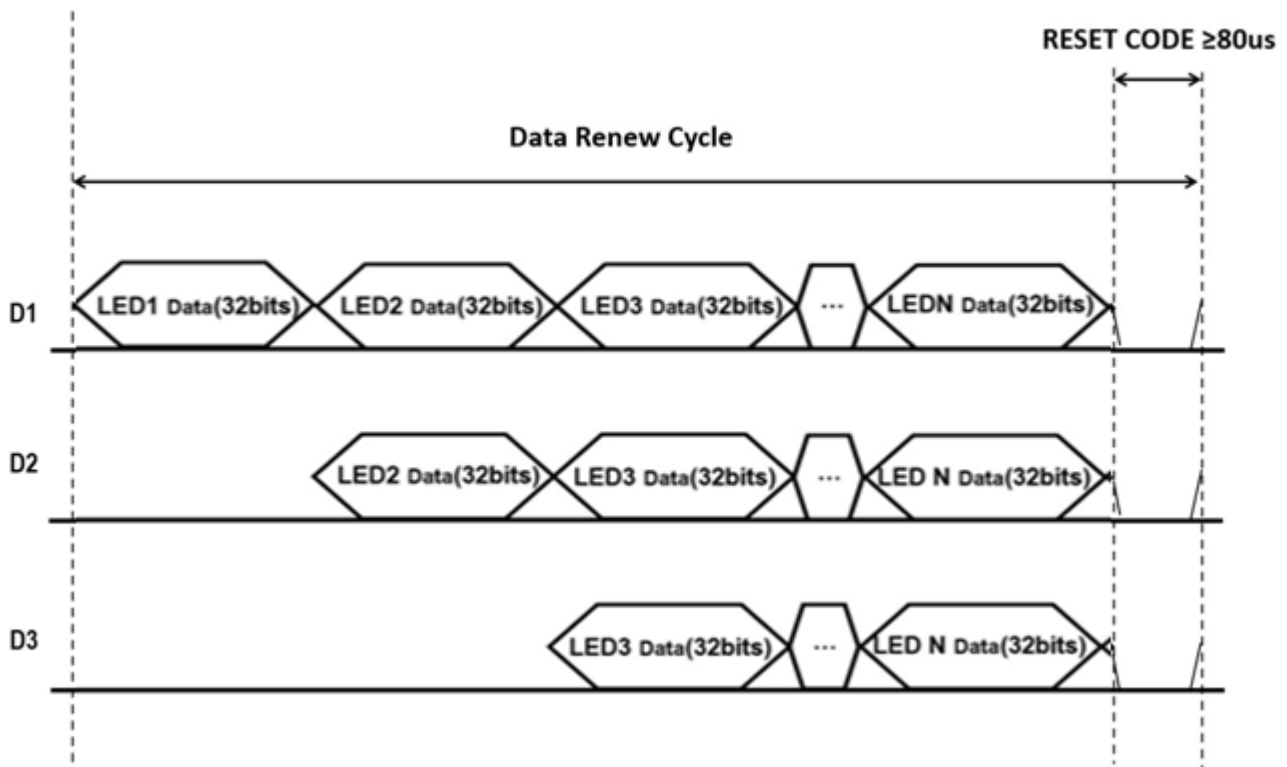
Note: D1 is the data sent by the MCU, and D2, D3, and D4 are the data that the cascade circuit automatically reshapes and forwards.
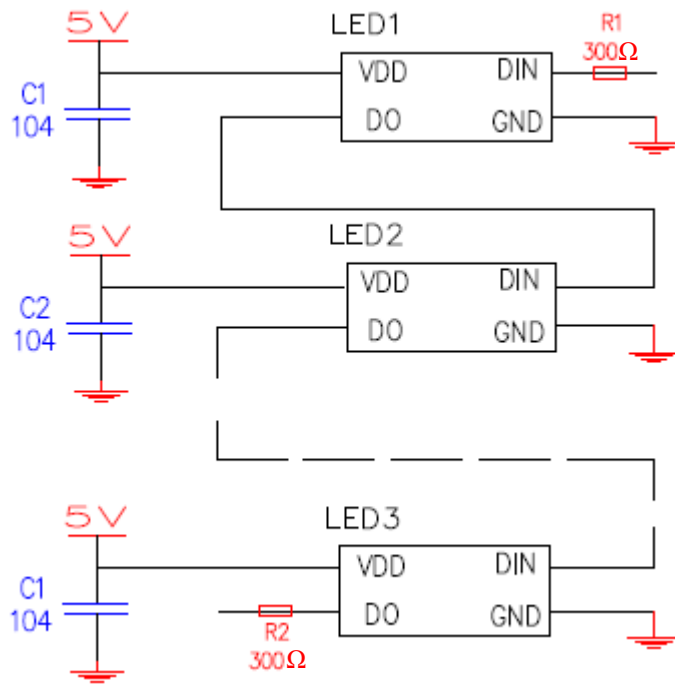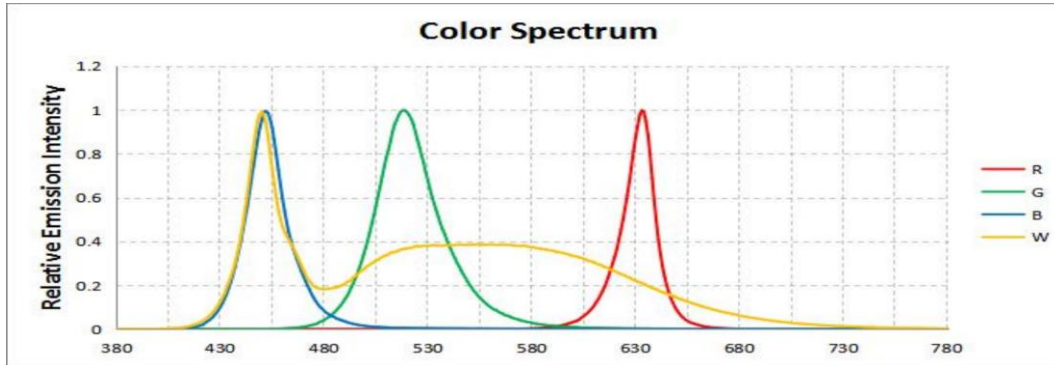.

13. Mode of data transmission (32-bit)

G7	G6	...	G1	G0	R7	R6	...	R1	R0	B7	B6	...	B1	B0	W7	W6	...	W1	W0

Note: The high bit is sent first, and the data is sent in the order of GRBW (G7→G6……W0)

14. Typical application circuit

15. Typical optical characteristics curves
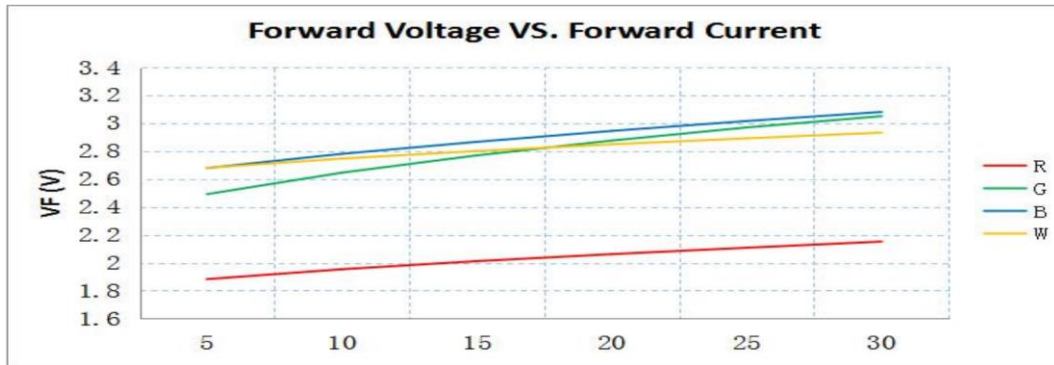
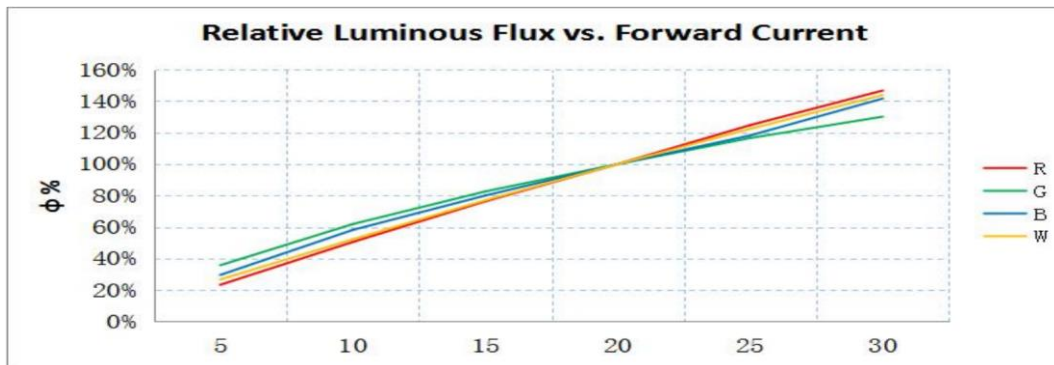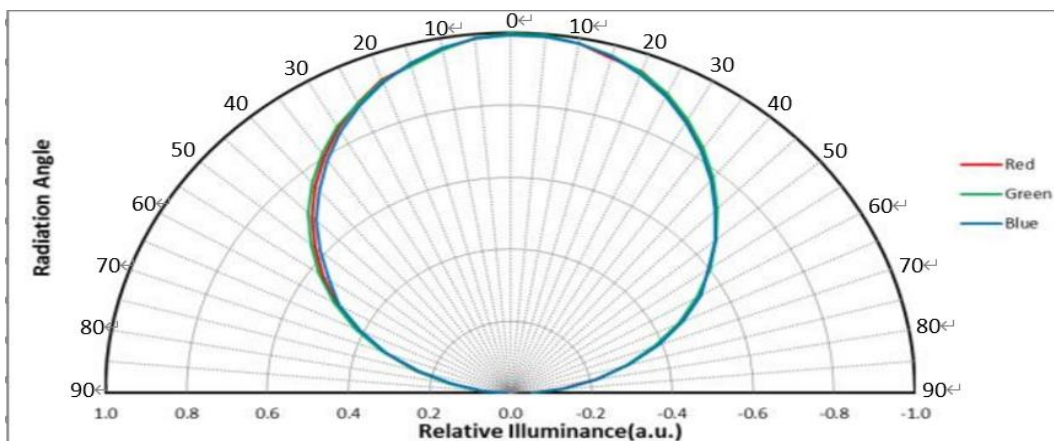■ **Spectrogram， Ta=25℃**

■ **Relationship between voltage and current，Ta=25℃**

■ **Relationship between brightness and current, Ta=25 ℃**

■ **Angle diagram, Ta=25 ℃ , If=12mA**

16. Packaging Specifications

● Feeding Direction
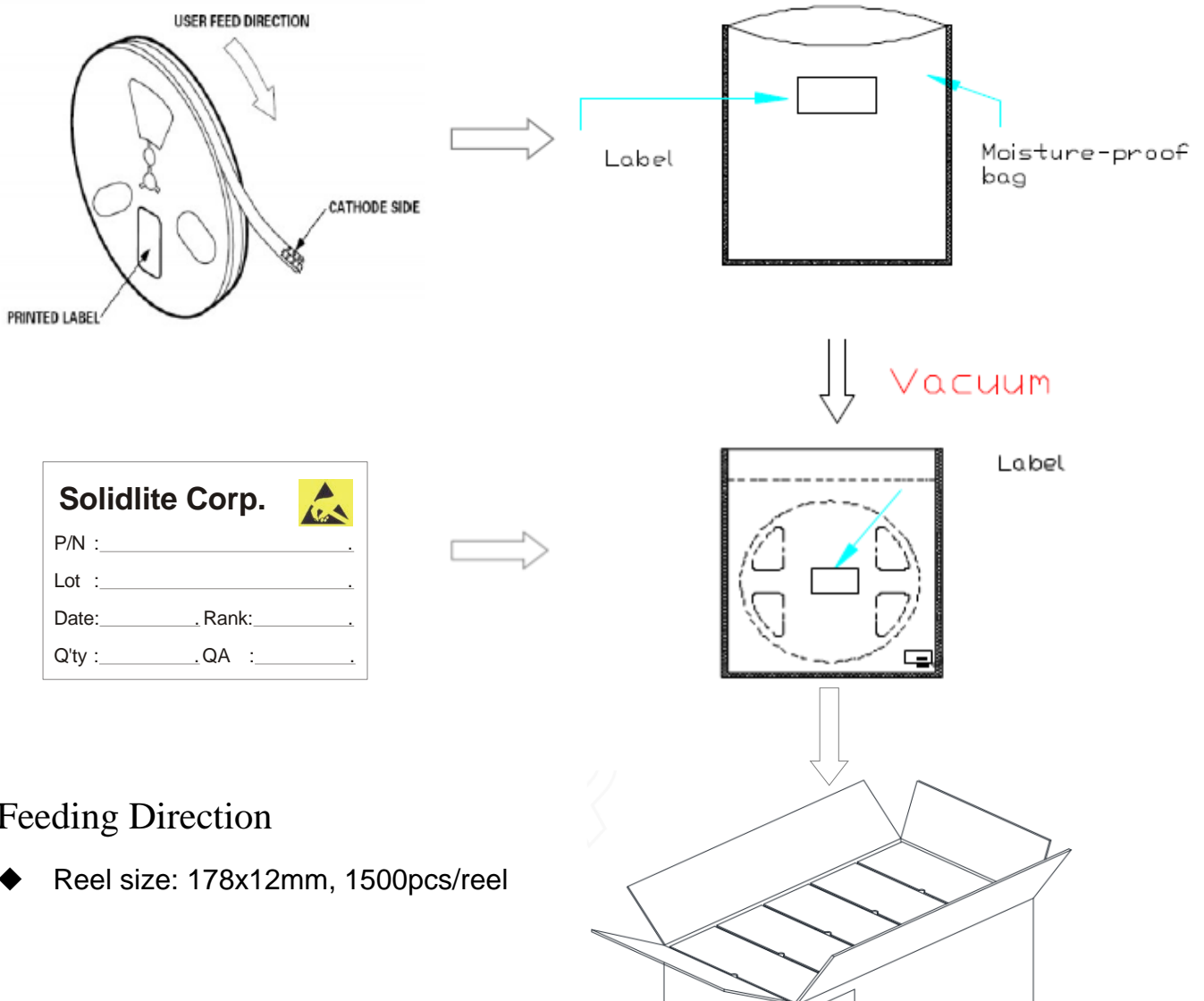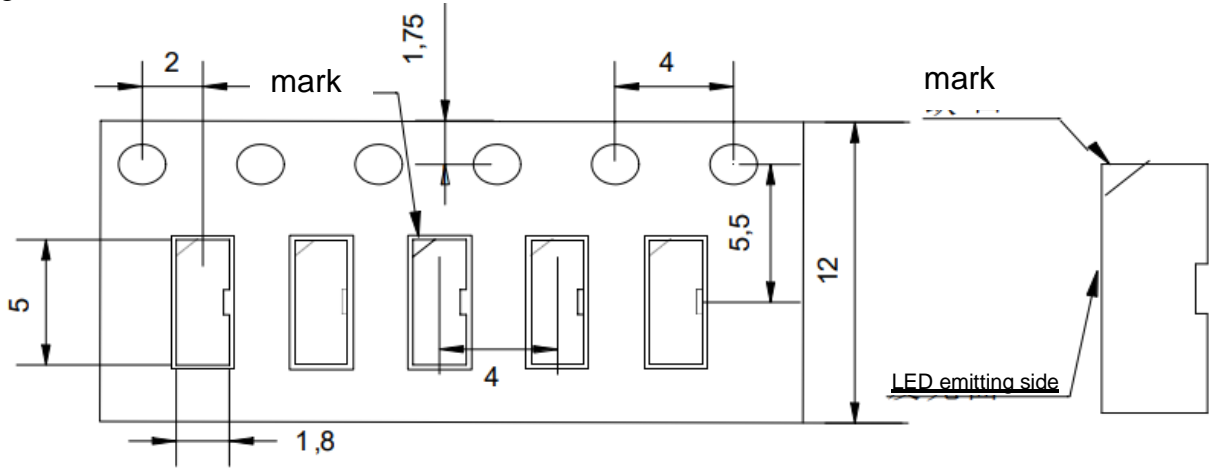
● Feeding Direction

◆ Reel size: 178x12mm, 1500pcs/reel

17. Reliability

TEST ITEMS AND RESULTS

Item	Test Item	Ref. Standard	Test Conditions	Note	Conclusion
1	Reflow Soldering	JESD22-B106	Tsld=240°C,10sec	3times	0/22
2	Temperature Cycle	JESD22-A104	-20°C30min ↑↓ 15min 120°C30min	200cycle	0/22
3	Thermal Shock	JESD22-A106	-40°C15min ↑↓ 15sec 125°C15min	200cycle	0/22
4	High Temperature Storage	JESD22-A103	T_a=100°C	1000hrs	0/22
5	Low Temperature Storage	JESD22-A119	T_a=-40°C	1000hrs	0/22
6	Power temperature Cycling	JESD22-A105	On5min-40°C>15min ↑↓ <15min ↑↓ Off5min100°C>15min	200cycle	0/22
7	Life Test	JESD22-A108	T_a=25°C I_F=12mA	1000hrs	0/22
8	High Humidity Heat Life Test	JESD22-A101	60°CRH=90% I_F=12mA	1000hrs	0/22

18. Reflow profile

SMD Reflow Soldering Instructions

REFLOW PROFILE
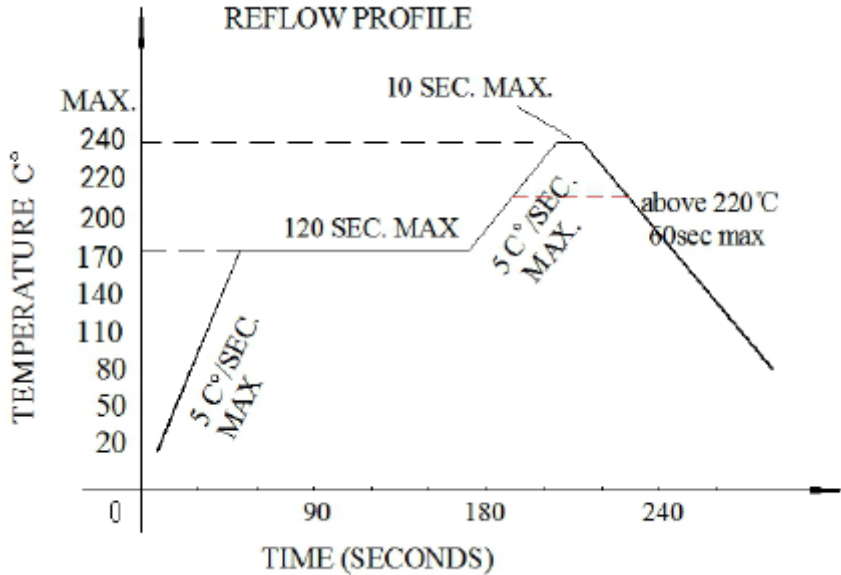
a. Reflow soldering should not be done more than two times.

b. When soldering, do not put stress on the LEDs during heating.

Soldering iron

a. When hand soldering, keep the temperature under $300°C$, and at that temperature keep the time under $3\,sec.$

b. The hand soldering should be done only by once.

Rework

a. The rework should be done withing 5 seconds at the temperature that is below $240°C$.

b. The head of iron cannot touch the LEDs

c. Twin-head type is preferred.
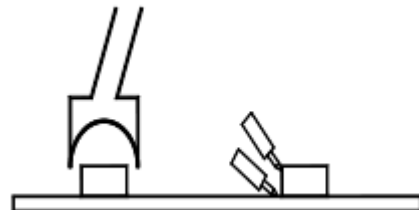
19. CAUTIONS

To ensure the quality & stability of the RGBW+IC LED performance during SMT reflow, please follow the procedures below:

a． Sample evaluation: RGBW+IC LED is different from RGB LED due to an additional integration of IC in this product. Please make sure an overall performance verification is done during sample evaluation stage.

b． IQC: Ensure the vacuum packing is intact and there is no vacuum leakage. If there is vacuum leakage, please confirm whether the reflow welding is abnormal. If it is abnormal, please return to the factory for high-temperature dehumidification.

c． The LED should not be exposed to air for more than 4 hours. The reflow welded should be done within 2 hours after the SMT is finished.

d． Maintenance: Test & repair should be completed within 4 hours after reflow soldering. 12hrs 65 ℃ dehumidification is required if the repair action exceeds 4 hours. 240℃ heating platform is forbidden for rework.

e. Electrostatic protection: LED is an electrostatic sensitive component, and electrostatic protection action should be taken. For example: wear an electrostatic bracelet during assembling. All equipment and instruments must be grounded. It is recommended that the assembled products being tested with electrostatic damage.

f. The LED is packed with silicon resin. Please handle the LEDs with care, do not press the silicon resin with tweezer.

Definition of moisture resistance

Moisture resistance level	Life span after unpacking		Verification condition			
	Time	Condition	Standard conditions		Accelerated conditions	
			Time	Condition	Time	Condition
LEVEL1	Unlimited	≦30℃/85%RH	168+5/-0H	85℃/85%RH	/	/
LEVEL2	1year	≦30℃/60%RH	168+5/-0H	85℃/60%RH	/	/
LEVEL2a	4weeks	≦30℃/60%RH	696+5/-0H	30℃/60%RH	120+5/-0H	60℃/60%RH
LEVEL3	168hours	≦30℃/60%RH	192+5/-0H	30℃/60%RH	40+5/-0H	60℃/60%RH
LEVEL4	72hours	≦30℃/60%RH	96+5/-0H	30℃/60%RH	20+5/-0H	60℃/60%RH
LEVEL5	48hours	≦30℃/60%RH	72+5/-0H	30℃/60%RH	15+5/-0H	60℃/60%RH
LEVEL5a	24hours	≦30℃/60%RH	48+5/-0H	30℃/60%RH	10+5/-0H	60℃/60%RH
LEVEL6	Take out And use	≦30℃/60%RH	Take out and use	30℃/60%RH	/	/

Table title: **Moisture resistance level verification**