APPROVAL SHEET

Part No: BAR5050A-C4C-012mA

NOTE :

Green Part

MAKER			CUSTOMER	
SOLIDLITE				
R&D	QA	Sales	Checked	Approved

Prepared	Checked	Approved
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Description of P/N No.

BAR5050A – C4C – 012mA

- BAR5050A: SOLIDLITE LED – BAR5050A Series
- C4C: RGBW+IC Series
- 012mA: Test Condition

Description of Lot.

□ □□□

- □: Month
- □□□: NO.

Description of Rank

□□

TC Code: See page 5/15

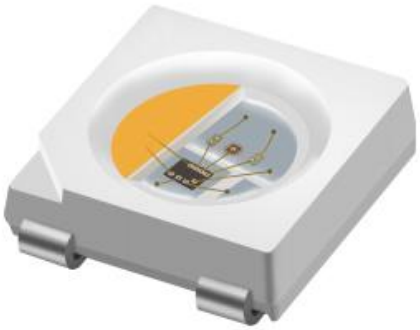
Solidlite Corp.

P/N :

Lot :

Date: . Rank:

Q'ty : . QA :



5050 Built-in IC multi-color Intelligent control LED light source
5.0x5.4x1.6mm
SMD LED Diode

1.Description

BAR5050A-C4C-012mA is a four-channel LED driver IC, internal integration 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 32BIT, 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 32BIT 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 32BIT data, the data will be forwarded through the DOUT port. After receiving the initial 32BIT 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 32BIT PWM data pulse width just received to OUTG, OUTR, OUTB, OUTW pins.

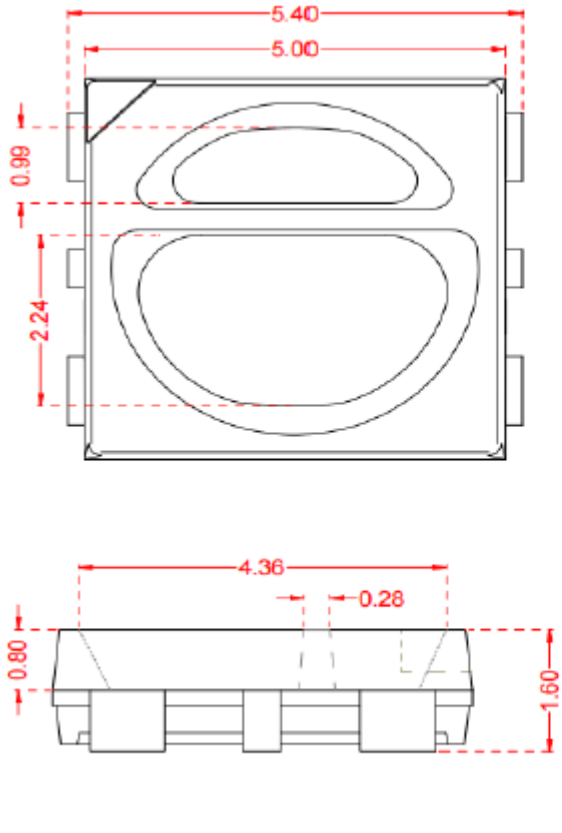
2. Applications

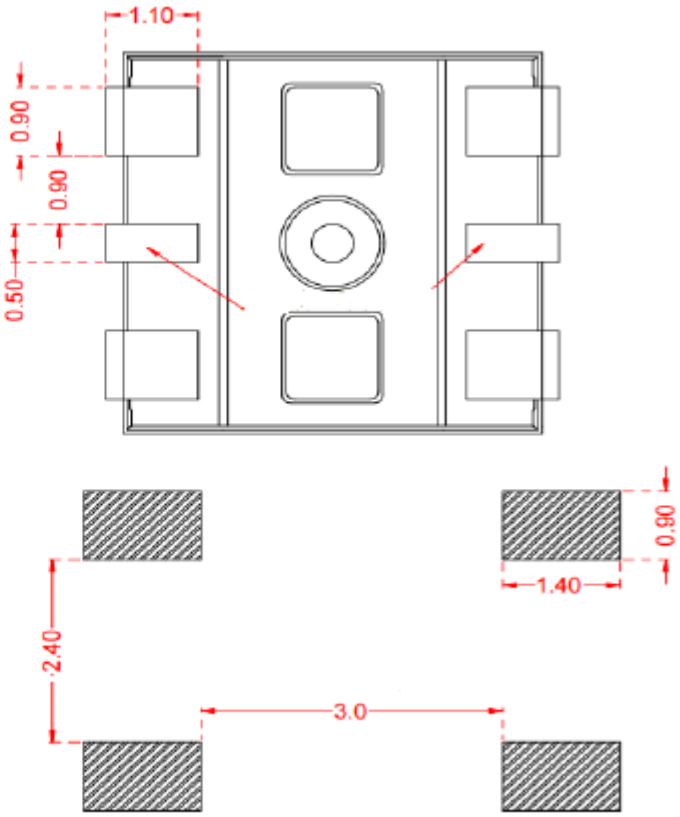
- LED full-color luminous character string light, LED full-color module, LED symphony soft and hard light bar, LED guardrail tube, LED appearance/scene lighting.
- LED point light source, LED pixel screen, LED special-shaped screen, various electronic products, electrical equipment marquee.

3. Features

- LED has integrated high-quality external control single-wire serial cascaded constant current IC
- The output constant current value can be adjusted by the controller.
- Built-in RGBW four-way channel;
- Built-in power-on reset and power-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 receives the signal after waveform shaping and then Output.

4. Package Dimensions





Recommended size of solder pad

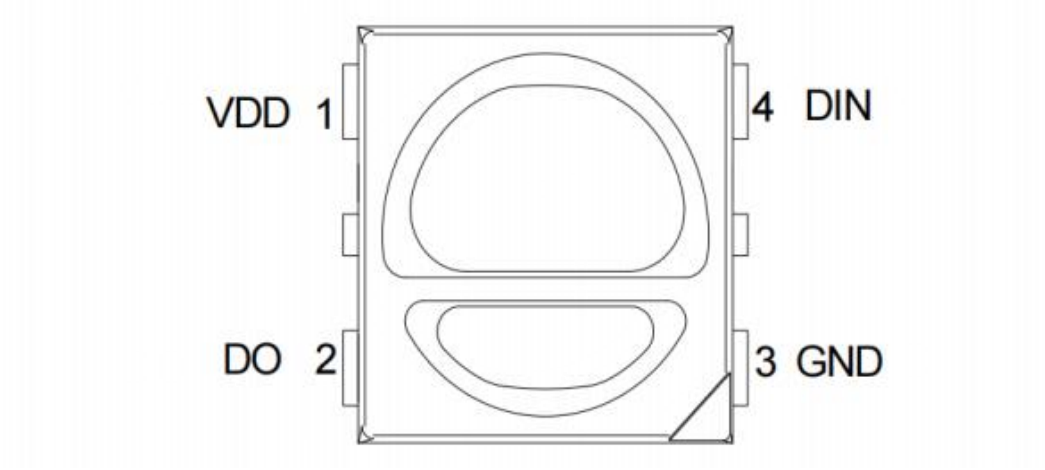
Note：

a. All dimensioning units are mm.

b. Unless otherwise specified, the tolerance of all marked dimensions is ±0.2mm

c. Package size：5.0x5.4x1.6mm

5. Pin function



Pin No	Symbol	Pin name	Function description
1	VDD	power	Power supply pin
2	DO	Data output	Control data signal output
3	GND	ground	Signal and power connect ground
4	DIN	Data input	Control data signal input

6. Electro-optical characteristics at Ta=25℃

Item	Symbol		Mix	Typ	Max	Unit	Conditions
Dominant wavelength	λd	G	520	-	530	nm	IF=12mA
		R	620	-	630		
		B	465	-	475		
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	6	-	8	lm	

7. Absolute maximum ratings at Ta=25℃

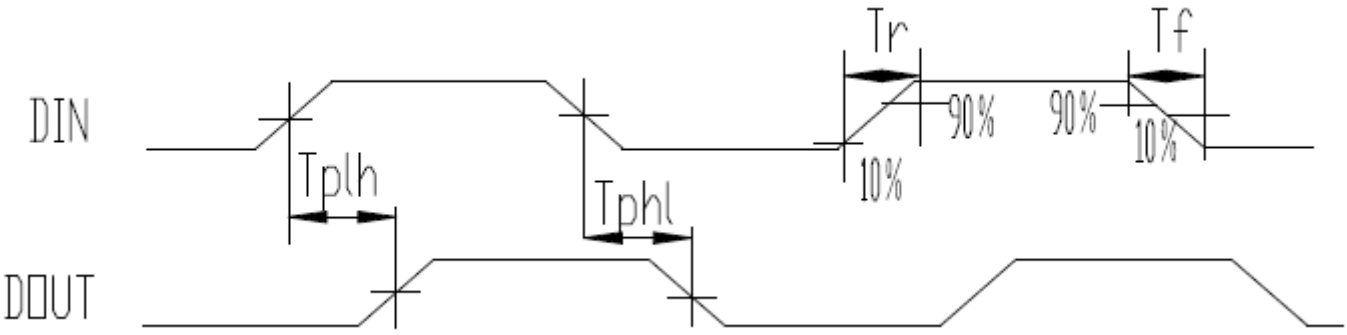
Parameter	Symbol	Range	Unit
Logic power supply voltage	VDD	3.5~7.5	V
Logic input voltage	VI	-0.5~5.5	V
Operating temperature	Topt	-40~85	℃
Storage temperature	Tstg	-40~120	℃
ESD withstand voltage	VESD	4K	V

8. IC Electric Spec

Parameter name	Symbol	Min	Typical	Max	Unit	Test conditions
Chip input voltage	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	--

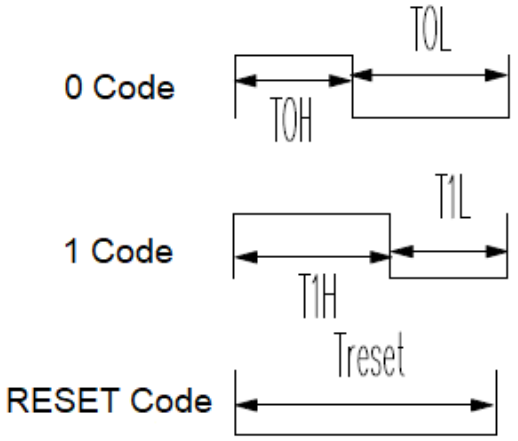


10. The data transmission time

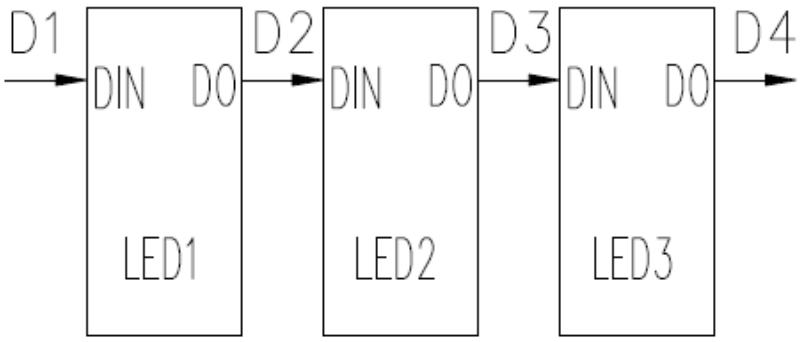
T Symbol	Code	Min	Typical	Max	Unit
TOH	0code, high level time	0.25	0.3	0.35	us
TOL	0code, low level time	0.85	0.9	0.95	us
TIH	1code, high level time	0.85	0.9	0.95	us
TIL	1code, low level time	0.25	0.3	0.35	us
Trst	Reset code, low level time	80	--	--	us

11. Temporal waveform figure

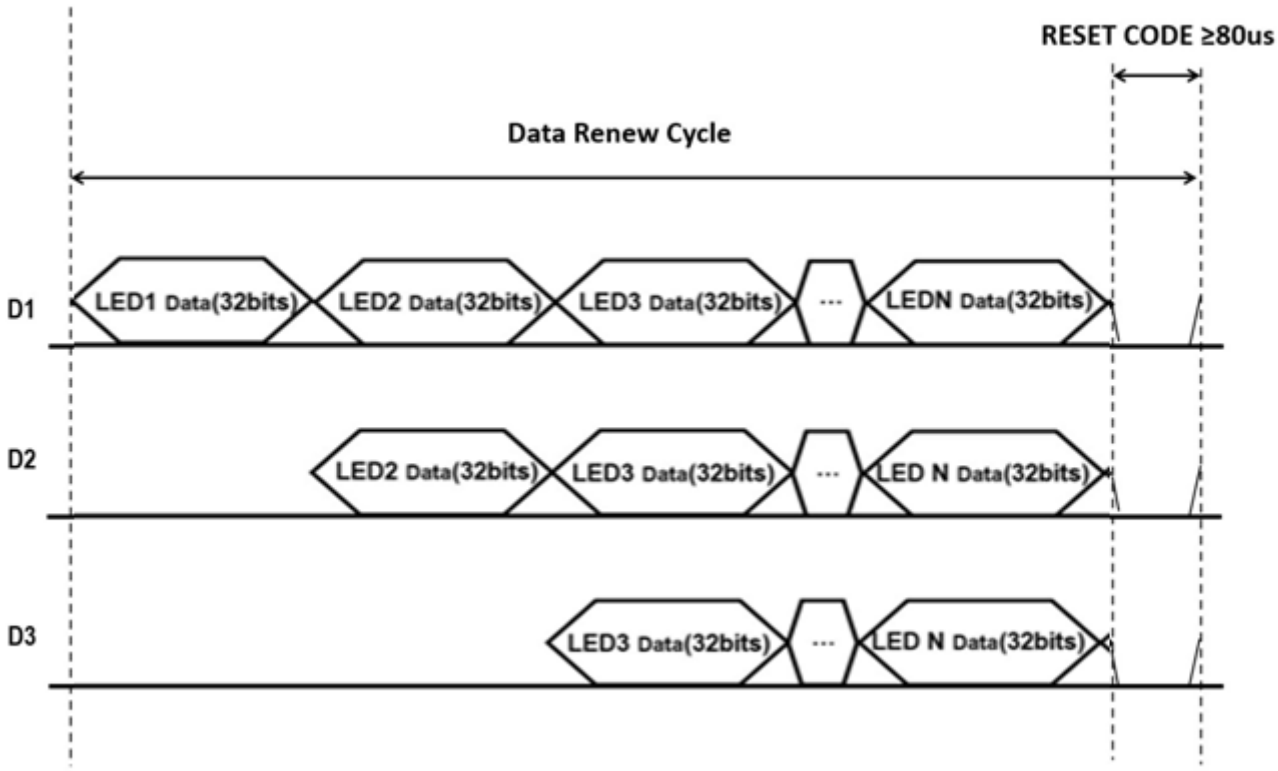
Input code：



Connect method：



12. Mode of data transmission



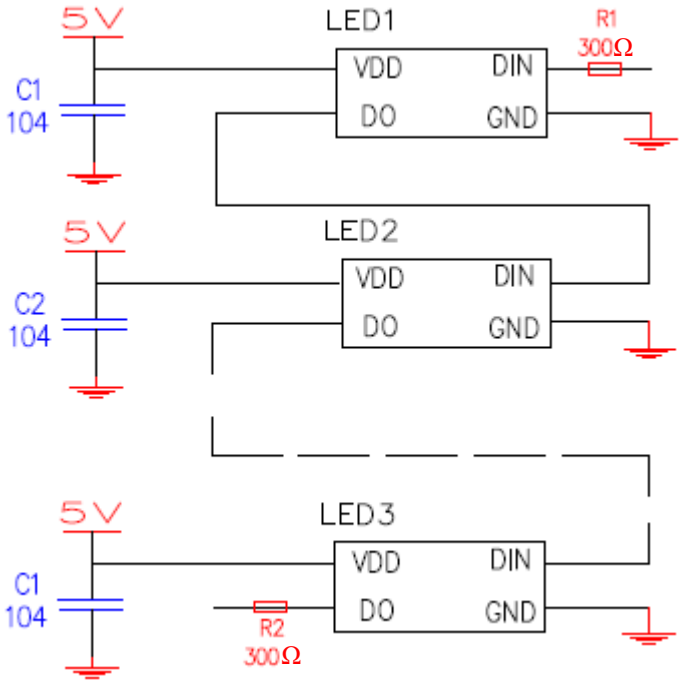
Note: D1 is the data sent by the MCU, and D2, D3, and D4 are the data that the cascade circuit automatically reshapes and forwards.

13. Mode of data transmission

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

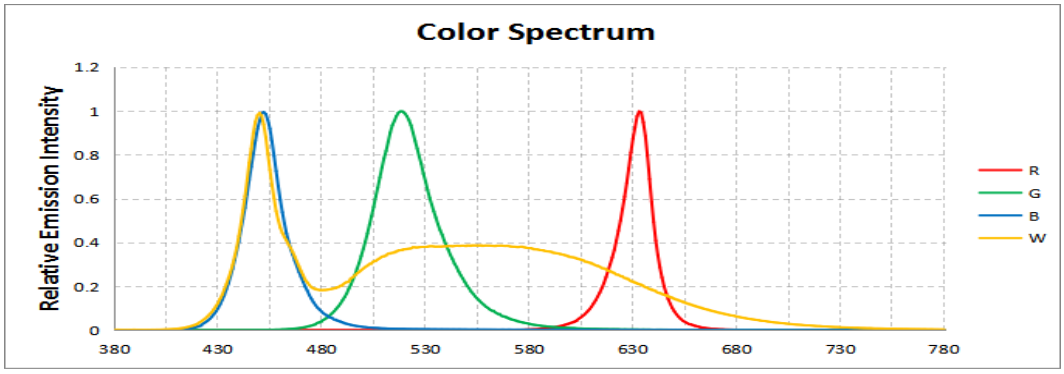
Note: The high bit is sent first, and the data is sent in the order of GRBW (G7→G6……W0)

14.Typical application circuit

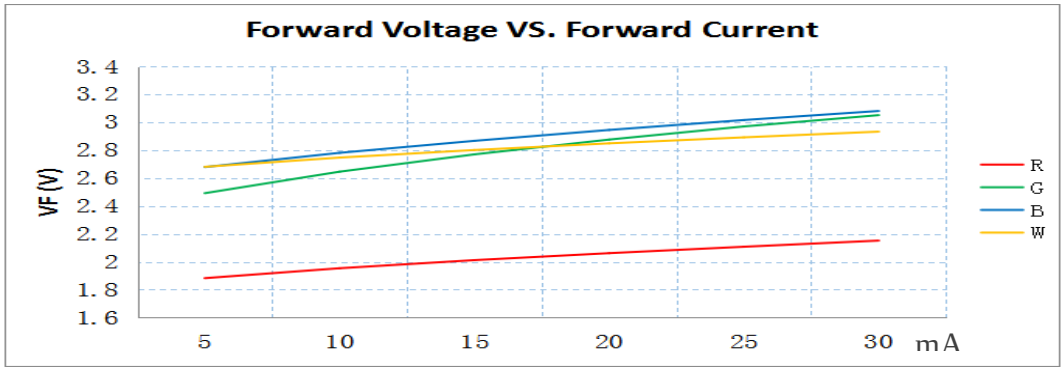


15. Typical optical characteristics curves

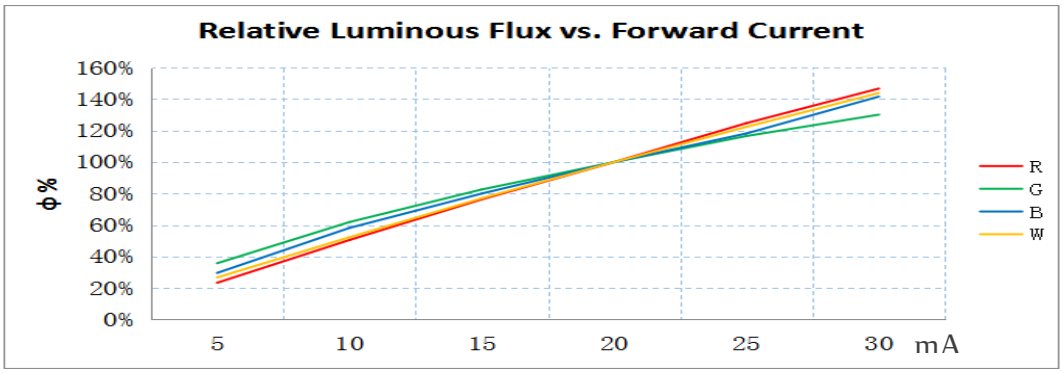
■ Spectrogram， Ta=25℃



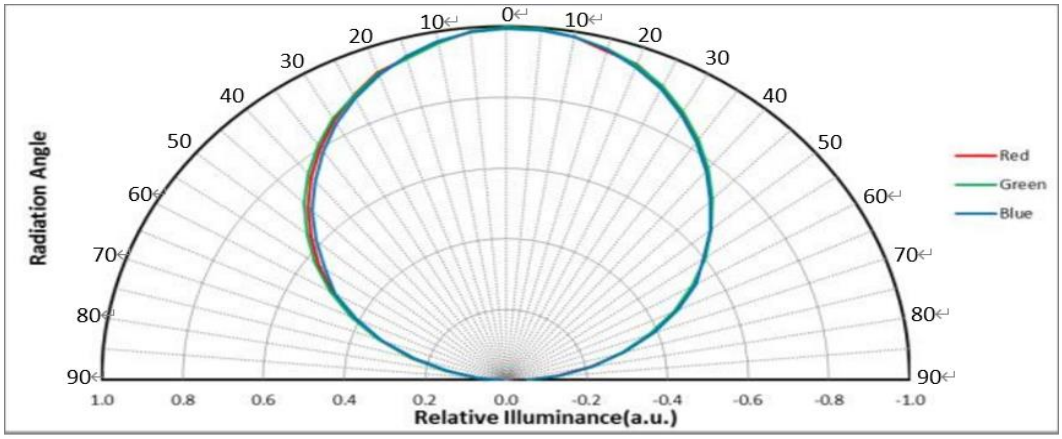
■ Relationship between voltage and current，Ta=25℃



■ Relationship between brightness and current, Ta=25 ℃

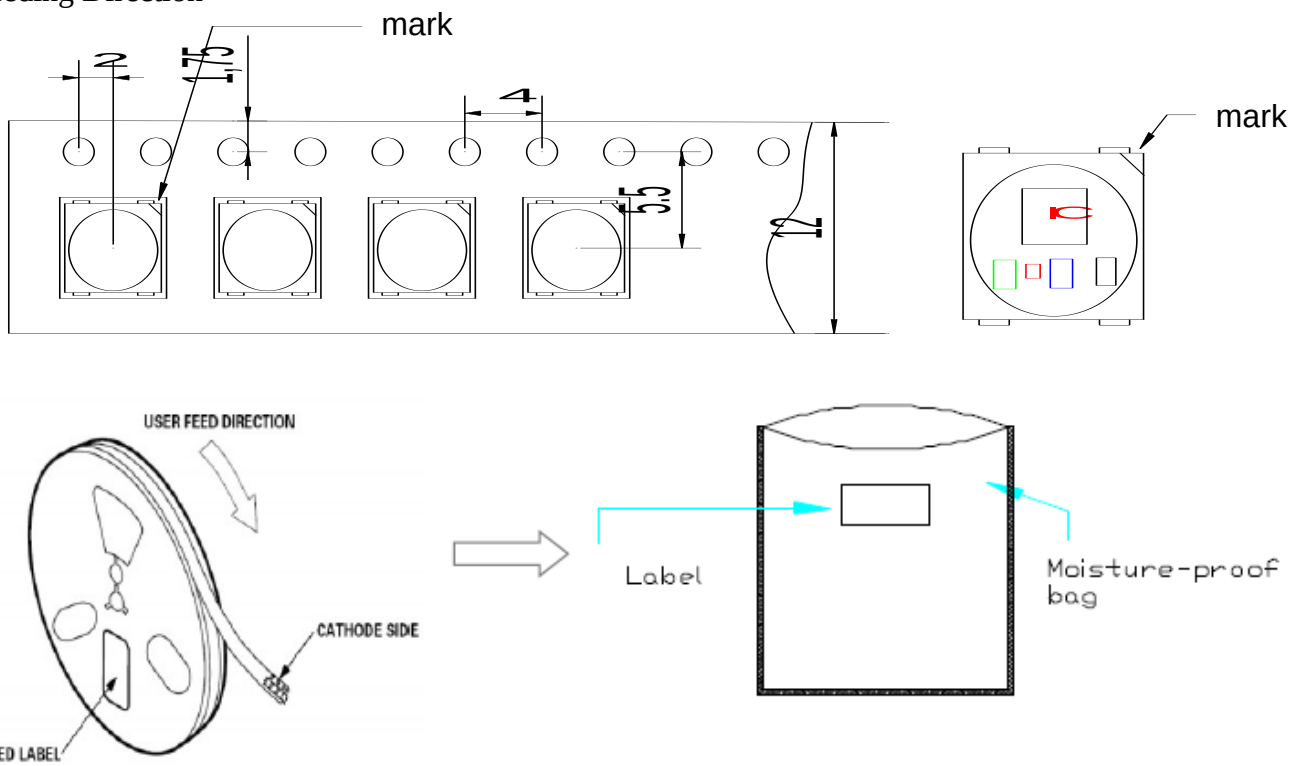


■ Angle diagram, Ta=25 ℃ , If=12mA



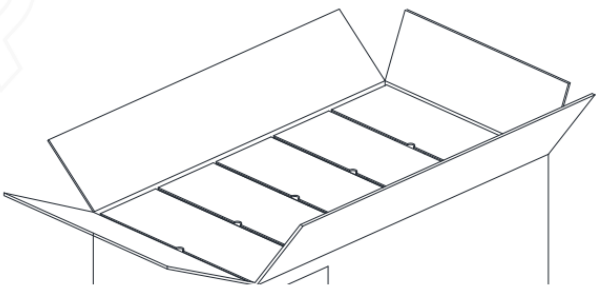
16. Packaging Specifications

● Feeding Direction



●Feeding Direction

- ◆ Reel size: 178x12mm,1000pcs/reel
- ◆ Reel size: 330x12mm,4000pcs/reel



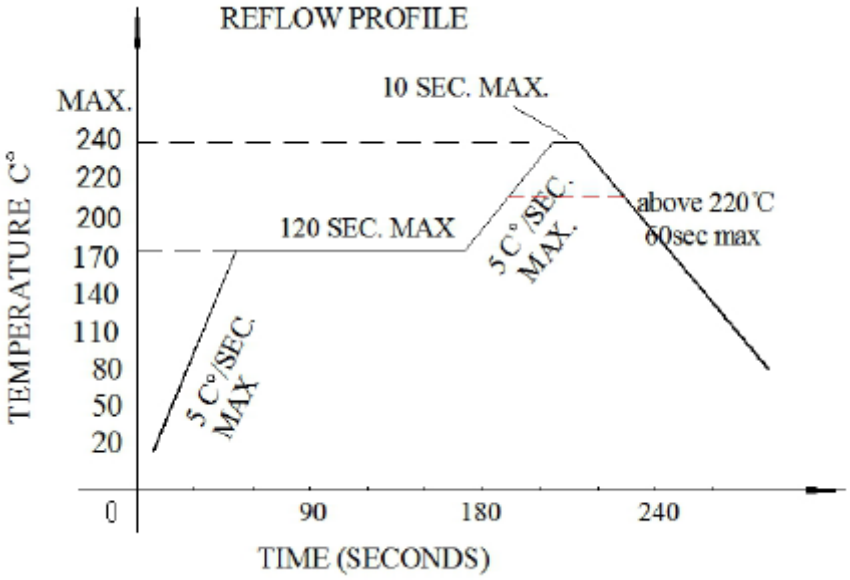
17. Reliability

TEST ITEMS AND RESULTS

Item	Test Item	Ref. Standard	Test Conditions	Note	Conclusion
1	Reflow Soldering	JESD22-B106	Tsld=240℃,10sec	3times	0/22
2	Temperature Cycle	JESD22-A104	-20℃30min ↑↓ 15min 120℃30min	200cycle	0/22
3	Thermal Shock	JESD22-A106	-40℃15min ↑↓ 15sec 125℃15min	200cycle	0/22
4	High Temperature Storage	JESD22-A103	T_a=100℃	1000hrs	0/22
5	Low Temperature Storage	JESD22-A119	T_a=-40℃	1000hrs	0/22
6	Power temperature Cycling	JESD22-A105	On5min-40℃>15min ↑↓↑↓ <15min Off5min100℃>15min	200cycle	0/22
7	Life Test	JESD22-A108	T_a=25℃ I_F=12mA	1000hrs	0/22
8	High Humidity Heat Life Test	JESD22-A101	60℃RH=90% I_F=12mA	1000hrs	0/22

18. Reflow profile

SMD Reflow Soldering In structions



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 of their on under 300℃, and at that temperature keep the time under3sec.

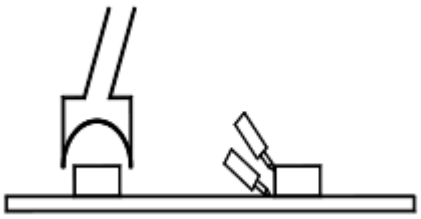
b. The hand soldering should be done only at time

Rework

a. Customer must finish rework within 5secunder240℃

b. The head of iron can not touch the LEDs

c. Twin-head type is preferred.



19. CAUTIONS

Note for use

In order to ensure that IC lamp beads are used in SMT patch reflow welding and in the use of the process yield and stability of the product, the following procedures are specified after many tests.

a、Sample evaluation: Because this product is a built-in IC product, the overall process is different from conventional RGB products, so the customer side needs to carry out all-round verification during the sample evaluation to ensure the matching performance of the product.

b、Incoming material inspection: 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、Use: Please confirm the first piece before the formal SMT. According to the principle of one pack and one package, the lamp bead should not be exposed to air for more than 4 hours. Thelamp bead should be reflow welded within 2 hours after the SMT is finished.

d、Maintenance: material should be completed within 4 hours and domestic demand after reflow soldering test and repair the lamp bead, such as more than 4 hours need to repair the lamp plate temperature above 65 ℃ dehumidification 12 hours to repair work, and repair the lamp bead also must carry on the low temperature above 65 ℃ dehumidification 12 hours, use prohibited in the process of maintenance with temperature over 240 ℃ heating machine repair, prohibit the whole plate placed in the heating stage repair, follow the principle of bad which returnwhich measuring.

e、Warm prompt: the whole process special considerations for light bead before use vacuum packing, dehumidification, SMT placement time and workshop of temperature and humidity control, product maintenance lamp plate if bare at room temperature environment for a long time need to dehumidification, light board and light bead light beads as LED electronic products, need to pay attention to moisture in spring and summer, autumn and winter anti-static, product quality is enterprise's life, to the quality strives for the survival, to the quality strives for the development is our consistent aim.Also in order to ensure the quality of the client, please strictly refer to the above recommendations.

Definition of moisture resistance

Moisture resistance level verification						
Moisture resistance level	Life span after un packing		Verification condition			
			Standard conditions		Accelerated conditions	
	Time	Condition	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	/	/

➢ 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 influence to the reliability of the LEDs. Precautions should be taken to avoid the strong pressure on the encapsulated part. So when using the picking up nozzle, the pressure on the silicone resin should be proper