APPROVAL SHEET

Part No: BAR5050A-C3C-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 – C3C – 012mA

- BAR5050A: SOLIDLITE LED – BAR5050A Series
- C3C: RGB+IC Series
- 012mA: Test Condition

Description of Lot.

□ □□□

- □: Month
- □□□: NO.

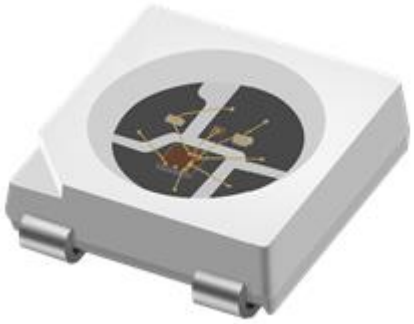
Solidlite Corp.

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-C3C-012mA is an intelligent controlled LED light source that integrates a control circuit and a light-emitting circuit. Its appearance is the same as a 5050 SMD LED, and each element is a pixel. The pixel contains an intelligent digital interface data latch signal shaping amplifier drive circuit, a power supply voltage regulator circuit, a built-in constant current circuit, a high-precision RC oscillator, and the output drive adopts patented PWM technology to effectively ensure the color consistency of the pixel light.

The data protocol adopts a unipolar return-to-zero code communication method. After the pixel is power-on reset, the DIN terminal accepts the data transmitted from the controller. The first 24bit data sent is extracted by the first pixel and sent to the pixel point the internal data latch, the remaining data is reshaped and amplified by the internal shaping processing circuit and then forwarded to the next cascaded pixel through the D0 port. After each pixel is transmitted, the signal is reduced by 24 bits.

LED has the advantages of low voltage drive, environmental protection and energy saving, high brightness, large scattering angle, good consistency, ultra-low power, and ultra-long life. Integrating the control circuit on the LED makes the circuit simpler, smaller in size, and easier to install.

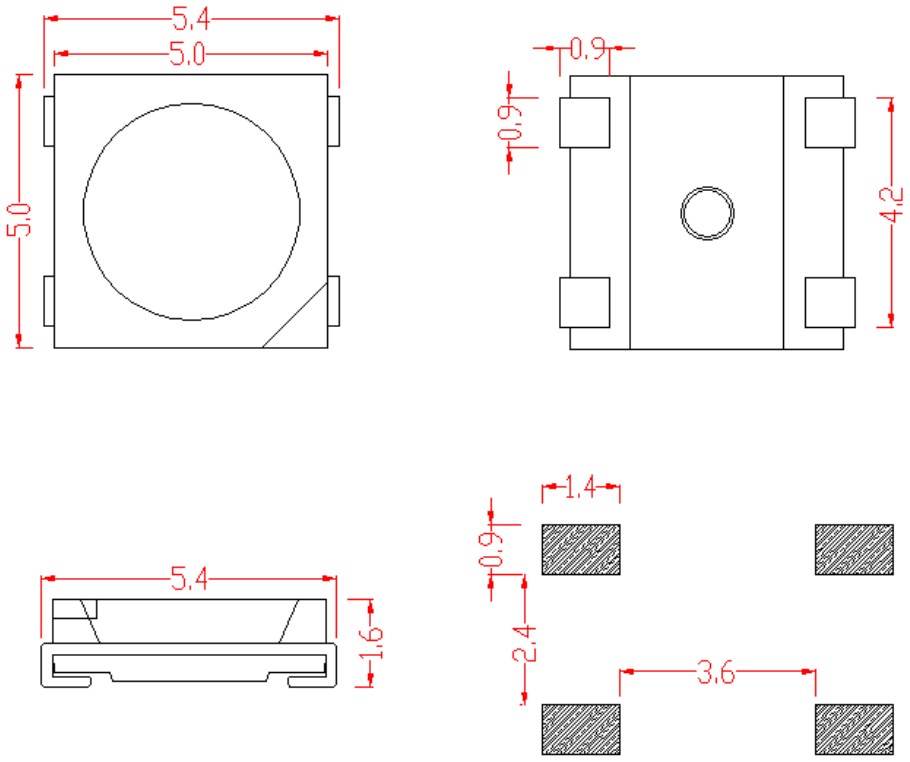
2. Applications

- 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 control circuit and chip are integrated in the SMD 5050 components to form a complete external control pixel, with uniform effect and high consistency.
- Built-in data shaping circuit, any pixel receives the signal after waveform shaping and then output, to ensure that the wire waveform distortion will not accumulate.
- 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).
- Special processing for red light drive, more balanced color matching.
- Single-wire data transmission, unlimited cascading.
- Reshaping and forwarding enhanced technology, the transmission distance between two points exceeds 10M.
- The data transmission frequency can reach 800Kbps. When the refresh rate is 30 frames per second, the number of cascades is not less than 1024 points.

4. Package Dimensions

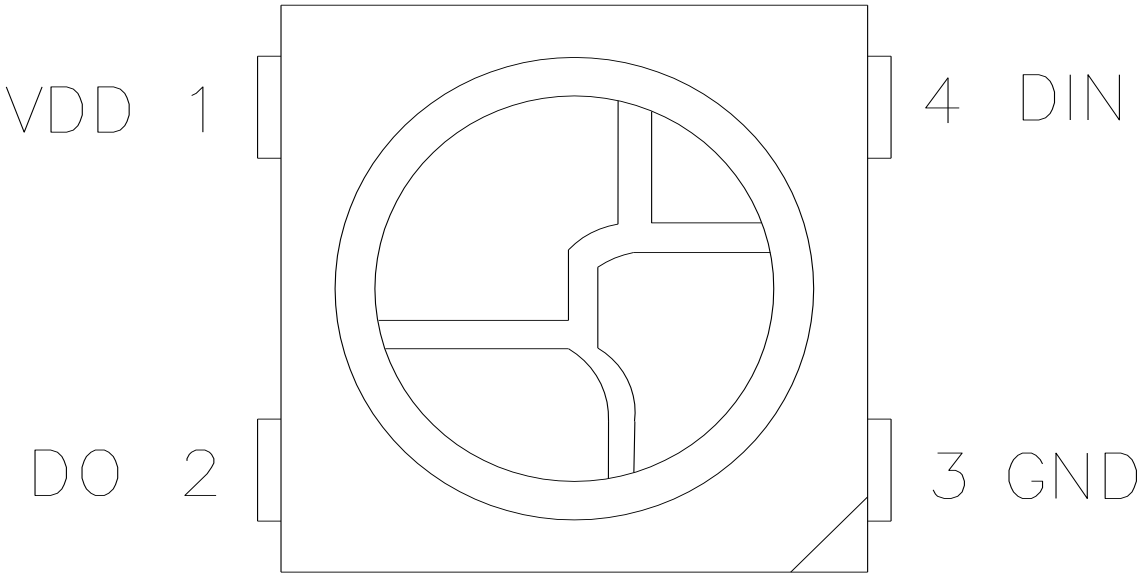


Recommended size of solder pad

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	chip power supply pin
2	D0	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	-	525	nm	IF=12mA
		R	620	-	625		
		B	465	-	470		
Luminous intensity	IV	G	800	-	1200	mcd	IF=12mA
		R	200	-	400		
		B	150	-	300		

7. Absolute maximum ratings at Ta=25℃

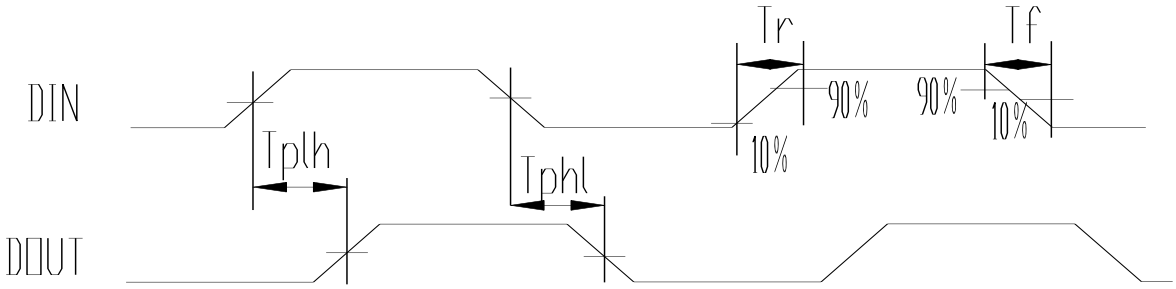
Parameter	Symbol	Range	Unit
Logic power supply voltage	V_{DD}	3.5～7.5	V
Logic input voltage	V_I	-0.5～5.5	V
Operating temperature	T_{opt}	-40～85	℃
Storage temperature	T_{stg}	-40～120	℃
ESD withstand voltage	V_{ESD}	4K	V

8. IC Electric Spec

Parameter name	Symbol	Min	Typical	Max	Unit	Test conditions
R/G/B output port withstand voltage	V_{ds}	8.5	9	9.5	V	--
R/G/B output drive current	I_O	9.6	12	14.4	mA	--
High level input voltage	V_{IH}	0.7V_{DD}	0.9V_{DD}	V_{DD}	V	--
Low-level input voltage	V_{IL}	0	0.1V_{DD}	0.3V_{DD}	V	--
DO source current capability	I_{DOH}	--	15	--	mA	--
DO source current capability	I_{DOL}	--	30	--	mA	--
PWM frequency	F_{PWM}	3	4	5	KHZ	--
Static power	I_{DD}	0.6	0.8	1	mA	--

9. Dynamic parameter

Parameter name	Symbol	Min	Typical	Max	Unit	Test conditions
Data transfer rate	F_{DIN}	--	800	1100	KHZ	--
Transmission delay time	T_{PLZ}	--	--	200	ns	DIN→DO
Output current conversion time	T_r	--	--	400	ns	V_{ds}=1.5V I_O=12mA
	T_f	--	--	400	ns	

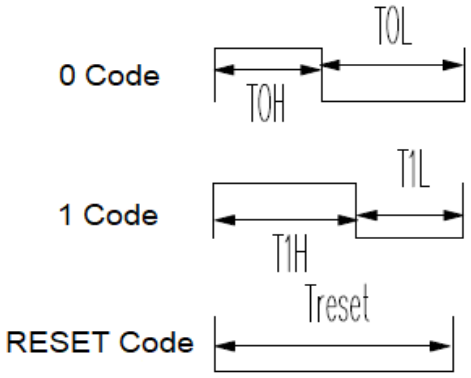


10. The data transmission time

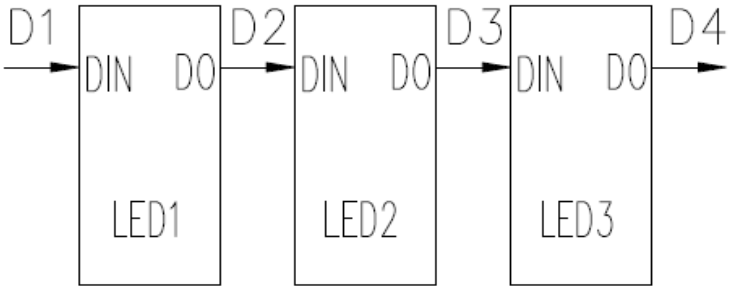
T Symbol	Code	Min	Typical	Max	Unit
TOH	0 code, high level time	245	295	345	ns
TOL	0 code, low level time	545	595	645	ns
T1H	1 code, high level time	545	595	645	ns
T1L	1 code, low level time	245	295	345	ns
Trst	Reset code, low level time	80	--	--	us

11. Temporal waveform figure

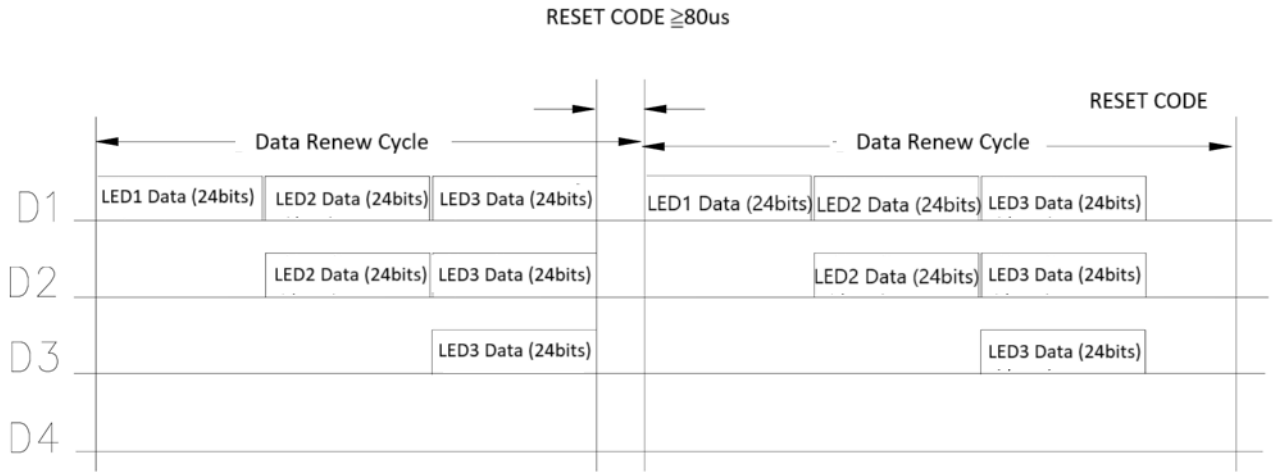
Input code：



Connect method：



12. Mode of data transmission



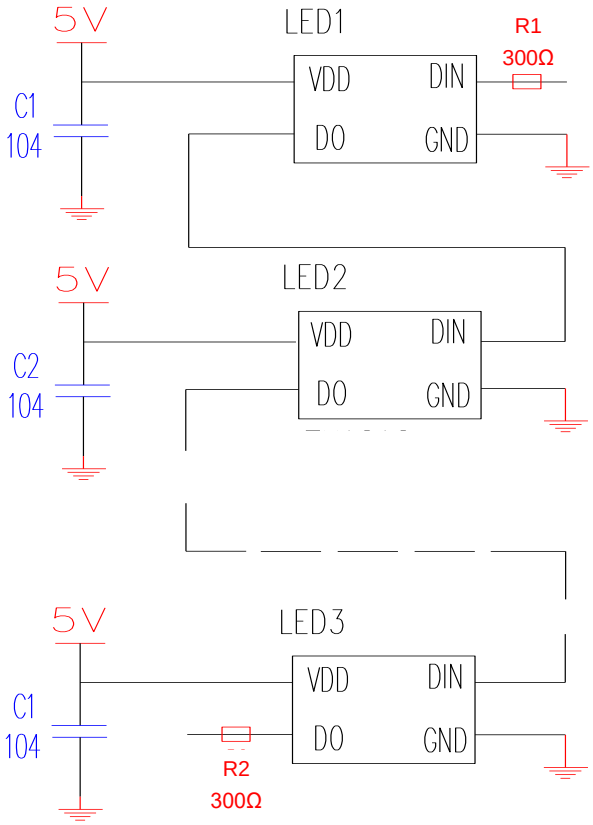
Note: D1 is the data sent by the MCU, and D2, D3, and D4 are the data that the cascade circuit automatically reshapes and forwards.

13. Mode of data transmission

G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4	R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0

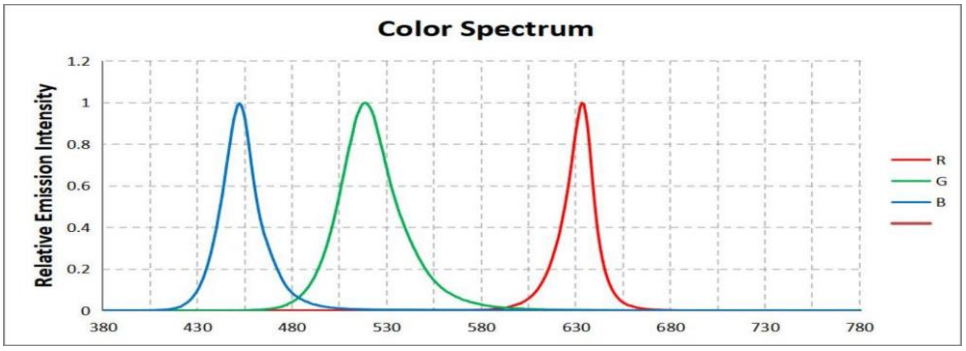
Note: The high bit is sent first, and the data is sent in the order of GRB (G7→G6……B0)

14.Typical application circuit

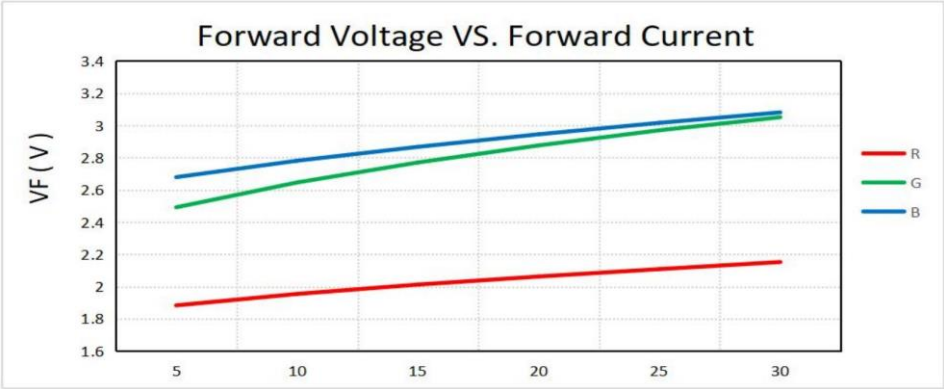


15. Typical optical characteristics curves

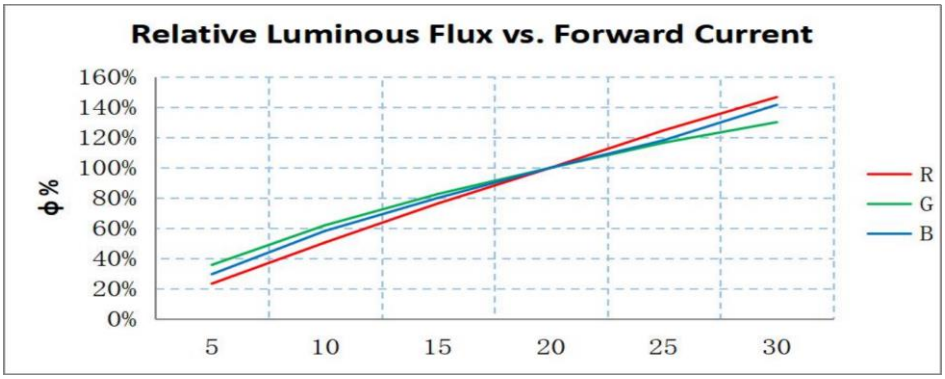
■ **Spectrogram， Ta=25℃**



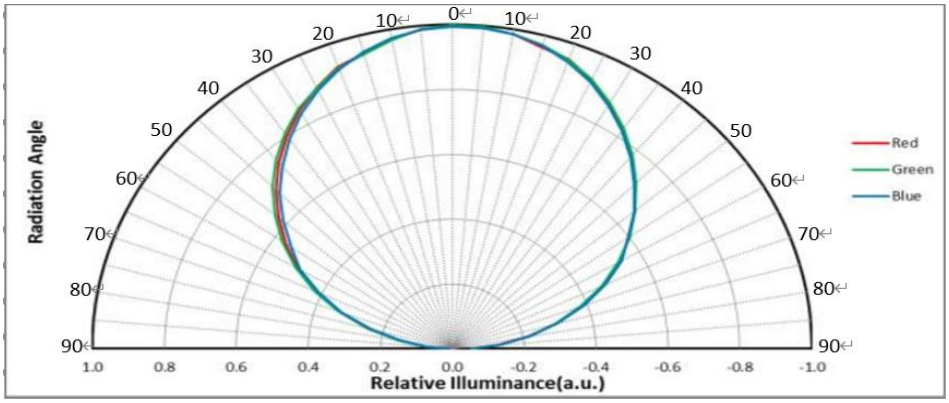
■ **Relationship between voltage and current，Ta=25℃**



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

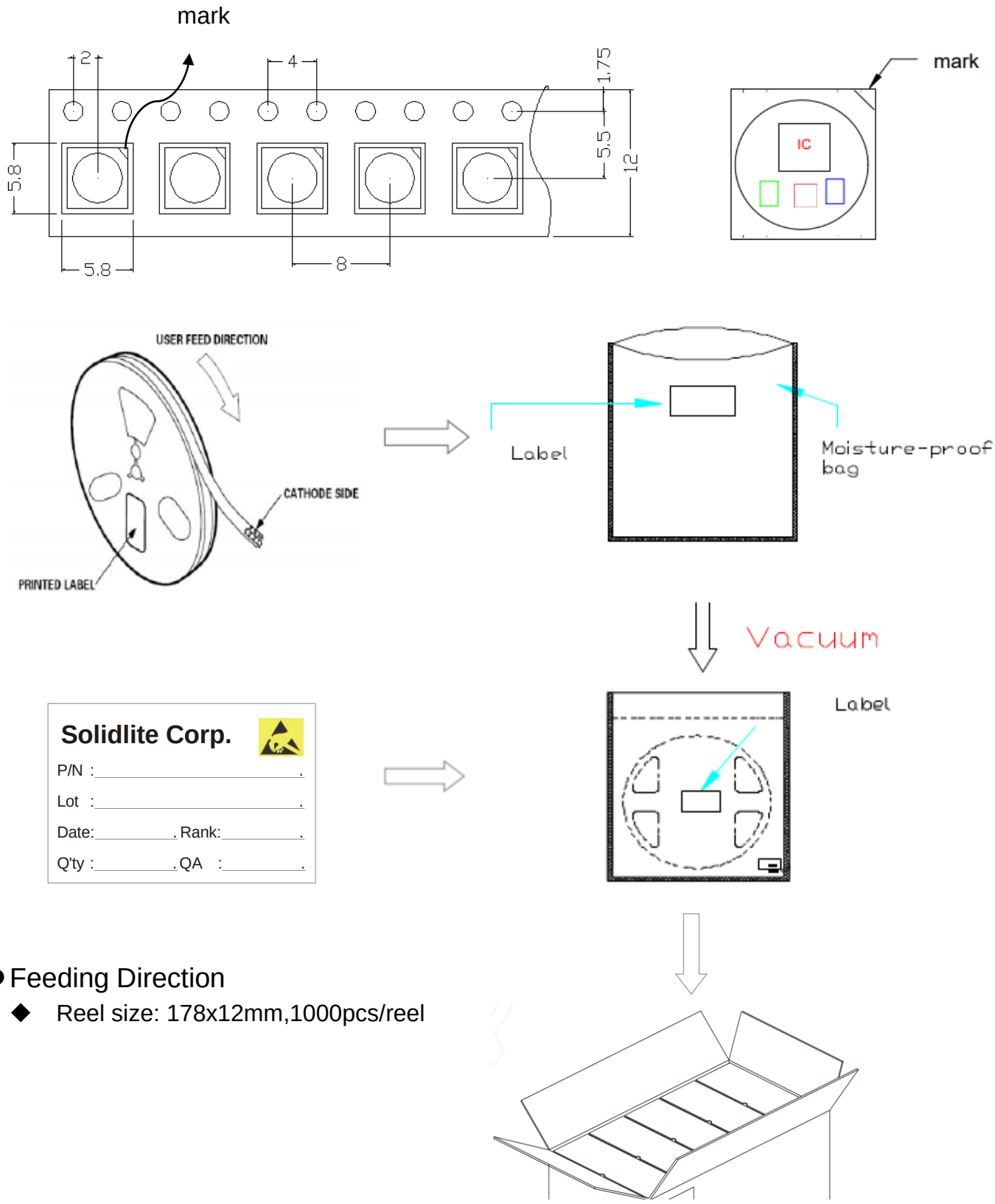


■ **Angle diagram, Ta=25 ℃ , If=12mA**



16. Packaging Specifications

● Feeding Direction



● Feeding Direction

◆ Reel size: 178x12mm,1000pcs/reel

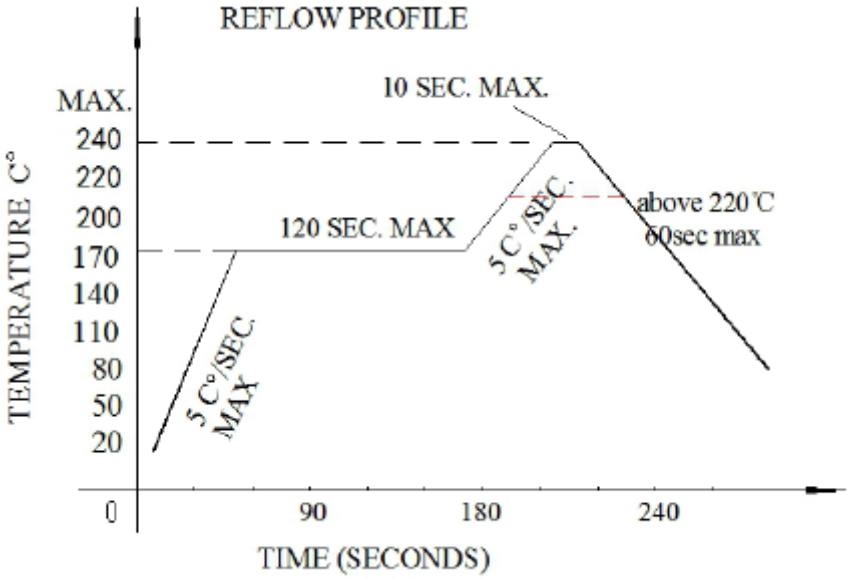
17. Reliability

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 Off 5min100℃>15min	200cycle	0/22
7	Life Test	JESD22-A108	Ta=25℃ IF=12mA	1000hrs	0/22
8	High Humidity Heat Life Test	JESD22-A101	60℃RH=90% IF=12mA	1000hrs	0/22

18. Reflow profile

SMD Reflow Soldering Instructions



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

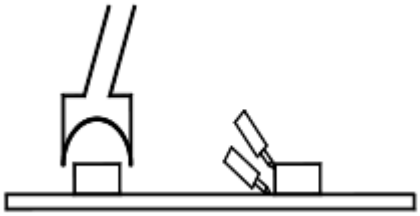
b. When soldering, do not put stress on the LEDs during heating.

Soldering iron

a. Keep the temperature under 300 ˚C withing 3 seconds when soldering.
b. The hand soldering should be done only one time.

Rework

a. The rework should be done within 5 seconds under 240˚C.
b. Do not touch silicone encapsulation while taking the LED.
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. The lamp 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 return which 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 LED is encapsulated with silicone, therefore, the top surface of the LED is soft. The pressure to the top surface will influence the reliability of the LEDs. Please do not touch silicone encapsulation while taking the LED.