

Shenzhen Tiancheng Lighting Co.,Ltd

SPECIFICATIONS

产品规格书

| | | | |
|---------------------|--|----------------------|-------------------|
| 客户名称 Client Name | | 产品名称 Product Name | TX1818B |
| 客户代码 Client code | | 产品规格 Product Item | TC5050RGB-TX1818B |



| 客户确认 Client Confirmation | | | |
|-----------------------------|-------|---------|--|
| | | | |
| Formulate | Check | Confirm | |
| 黄奕源 | | 金国奇 | |
| 版本号 (Version No) : 1.0 | | | |



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◆ Description (描述)

TX1818A is an intelligent external controlled LED light source, which integrates circuit and a light emitting. Its appearance is the same as that of a 5050 SMD LED, and each element is a pixel point. The pixel contains intelligent digital interface data latch signal shaping and amplification driving circuit, power supply voltage stabilization circuit, built-in constant current circuit, high precision RC oscillator. The output driver uses patented PWM technology to effectively ensure high color consistency of the light inside the pixel.

The chip adopts the dual-data transmission mode and transmit the signal by the return to 0 code. After the chip is reset on the power, it receives data from the DIN end. After receiving 24 bits of data, the DOUT port is keeping pulling down and forward the data for input through next chip. At this moment, the chip will not receive new data. According to the 24 bit data, the chip OTR, OUTG and OUTB, three PWM outputs will send corresponding signals with different duty cycle at 4ms. If DIN end is the RESET signal, input signal chip will show the receiving data and receive the new data after finished the signal. After the start of 24 bit data, it will forward the data through DOUT port, OTR, OUTG and OUTB chip pin will remain the original output without accept reset code. when it receives more than 80μs low RESET code, the chip will just transmit the 24 bit PWM pulse width and output data to OTR, OUTG and OUTB pin. In addition to DIN, the chip has an additional FDIN input terminal design to receive the DIN data of the previous chip, namely the DOUT data of the previous chip. When cascaded, if one chip is damaged, data transmission is not affected, the subsequent chip can still receive data normally.

LED has the advantages of low voltage drive, environmental protection and energy saving, high robustness, high beam Angle, good consistency, ultra-low power rate and long life. The control circuit is integrated on the LED, making it easier, smaller and easier to install.

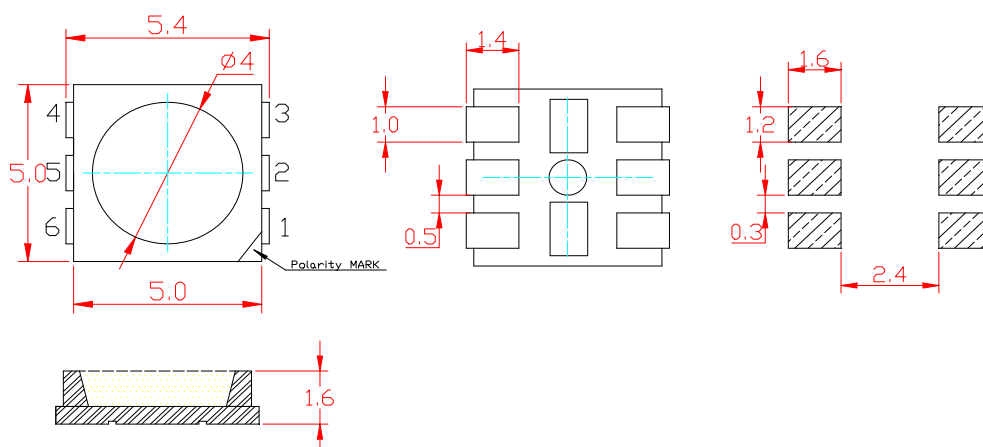
◆ Applications (领域)

- LED full-color light-emitting text string, LED full-color module, LED soft and hard strips, LED guardrail tube, LED appearance / scene lighting.
- LED point light source, LED pixel screen, LED special-shaped screens, all kinds of electronic products, electrical equipment entertaining marquee.

◆ Features (特征)

- Single IC or lamp bead damage will not affect the subsequent data.
- Adopts high voltage power CMOS process, R/G/B output port pressure 36V
- VCC built-in 5.4 V voltage regulator tube, concatenated resistance support after 6 ~ 30 V power supply voltage range
- R/G/B output constant current 12 ma, can be achieved by PWM level 256 brightness control.
- Gray-scale adjusting circuit (adjustable grayscale level 256)
- Double input level serial connection (DIN. FDIN.)
- Built in high precision and high stability oscillator
- Data shaping: Finish receiving this unit data, the subsequent data will be shaped and output automatically.
- Data transmission frequency up to 800 Kbps

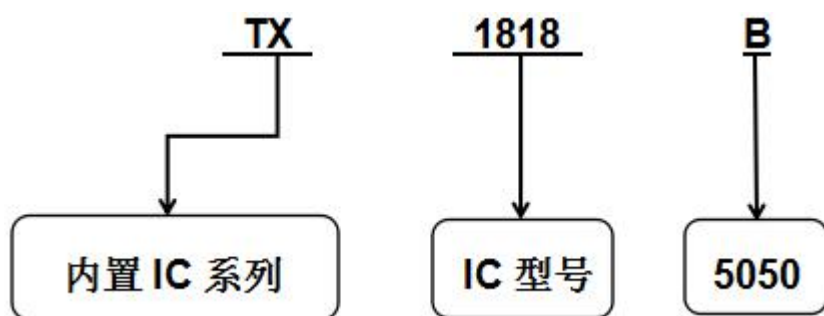
◆ Package Dimensions (封装尺寸)



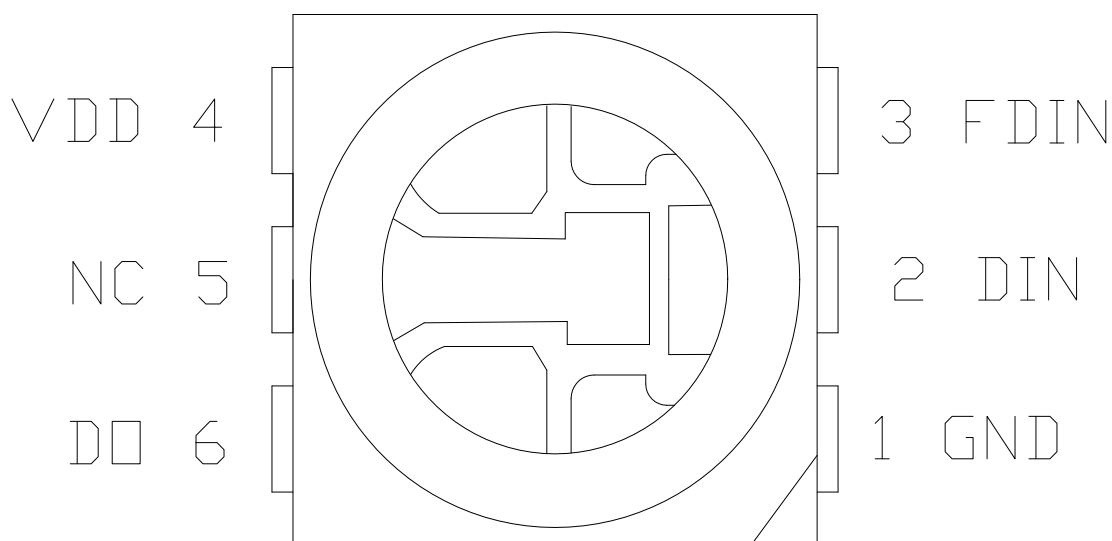
注;

1. 所有标注尺寸的单位均为毫米
2. 除了特别注明, 所有标注尺寸的公差均为 $\pm 0.2\text{mm}$

◆ Product naming principle (产品命名原则)



◆ Pin figure (引脚图)



◆ Pin function (引脚功能)

| Pin No. | Symbol | Pin name | Functional description |
|---------|--------|--------------|------------------------------|
| 1 | GND | Ground | Power Ground |
| 2 | DIN | Data input | Cascade data input |
| 3 | FDIN | Data input | Cascade alternate data input |
| 4 | VDD | Power Supply | Chip power supply pin |
| 5 | NC | Empty PIN | dangling do NC processing |
| 6 | DO | Data output | Cascading data output |

◆ Electro-optical characteristics at Ta=25°C (电光特性)

| (项目) | Symbol (符号) | Min (最小) | Typ (平均) | Max (最大) | Unit (单位) | Conditions (测试条件) | |
|------------------------------|----------------|-------------|-------------|-------------|--------------|----------------------|-----------|
| Forward voltage (正向电压) | VF | G | 2.8 | | 3.2 | V | IF=20mA*3 |
| | | R | 2.0 | | 2.4 | | |
| | | B | 2.8 | | 3.2 | | |
| Reverse current (反向电流) | IR | -- | -- | 5 | μ A | VR = 5V | |
| Dominant wavelength (主波长) | λ d | G | 520 | | 525 | nm | IF=20mA*3 |
| | | R | 620 | | 625 | | |
| | | B | 465 | | 470 | | |
| Luminous intensity (发光强度) | IV | G | 1300 | | 1800 | mcd | IF=20mA*3 |
| | | R | 500 | | 700 | | |
| | | B | 400 | | 600 | | |

◆ Absolute maximum ratings at Ta=25°C (绝对最大额定值)

| Parameter | Symbol | Range | Unit |
|-----------------------|------------------|----------------------------|------|
| Power supply voltage | VDD | -0.4~14V | V |
| Logical input voltage | V _I | -0.5~V _{DD} +7.0V | V |
| Working temperature | T _{opt} | -40~85°C | °C |
| Storage temperature | T _{stg} | -40~120°C | °C |

◆ Electric Spec (电气参数)

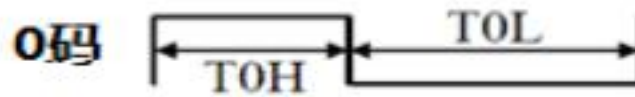
| Parameter | Symbol | Min. | Typical | Max. | Unit | Conditions |
|---------------------------------------|------------------|------|---------|------|------|------------|
| Internal power supply voltage of chip | V _{in} | 10.8 | 12 | 13.2 | V | -- |
| R/G/B port withstand voltage | L _{out} | 8.82 | 9 | 9.18 | mA | -- |
| Signal input tilting threshold | V _{IH} | 4 | -- | -- | V | VDD=12V |
| | V _{IL} | -- | -- | 1 | V | |
| The PWM frequency | FPWM | -- | 1.2 | -- | KHZ | -- |
| Static power | IDD | -- | 2 | -- | mA | -- |

◆ dynamic parameter (动态参数)

| Parameter | Symbol | Conditions | Typical | Unit | Parameter | Symbol |
|-------------------------|------------------|------------|---------|------|-----------|--------|
| Data transmission speed | F _{DIN} | -- | 800 | -- | KHZ | -- |
| Transmission delay time | T _{plz} | -- | -- | 500 | ns | -- |

◆ Temporal waveform figure (时序波形图)

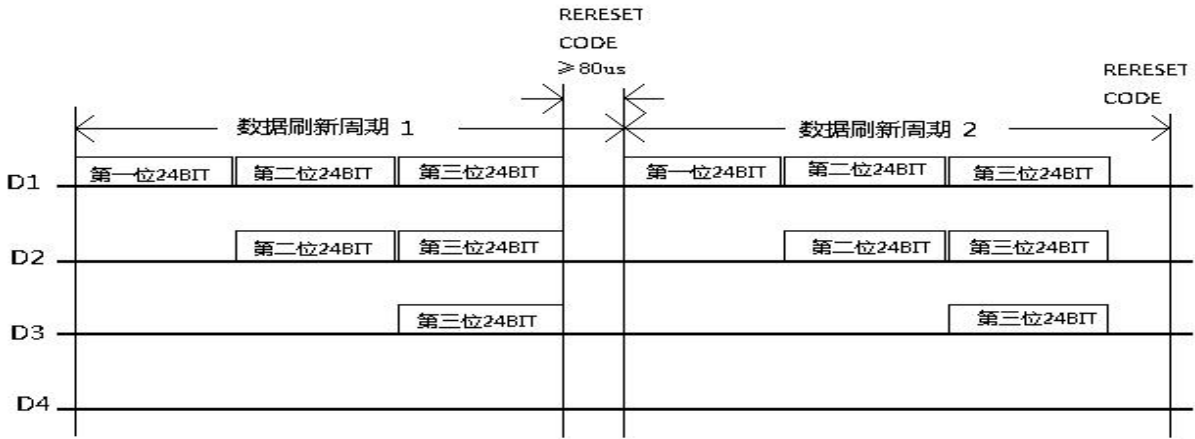
- The input type



➤ Slow mode time

| Symbol | Parameter Name | Typical | Allowable error |
|--------|----------------------------|---------|-----------------|
| T0H | 0 Code, high level time | 0.3 μs | ± 0.05us |
| T1H | 1 Code, high level time | 0.9 μs | ± 0.05us |
| T0L | 0 Code, low level time | 0.9 μs | ± 0.05us |
| T1L | 1 Code, low level time | 0.3 μs | ± 0.05us |
| Trst | Reset code, low level time | ≥80 μs | |

◆ Mode of data transmission (数据传输方式)



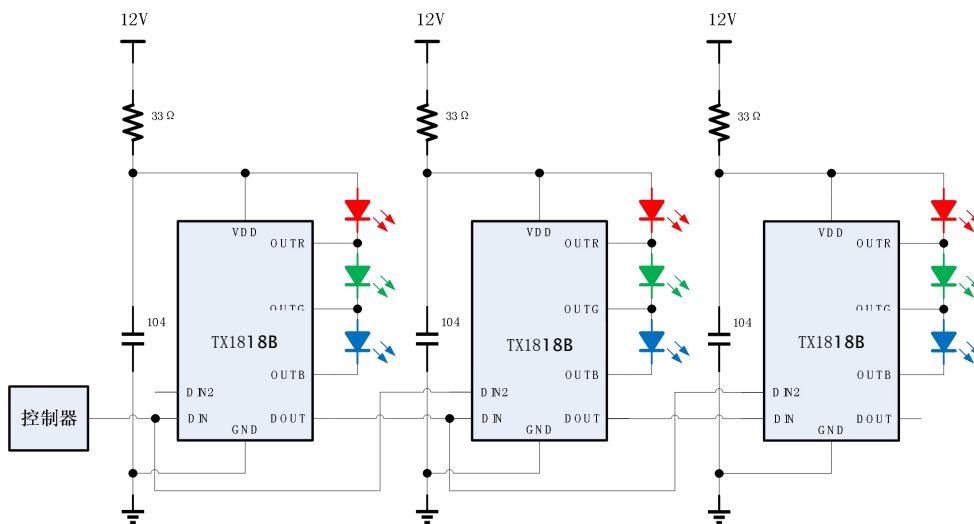
Note: D1 is the data sent by MCU terminal, and D2, D3 and D4 are the data of automatic shaping and forwarding of cascade circuits.

◆ **Data format (数据格式)**

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

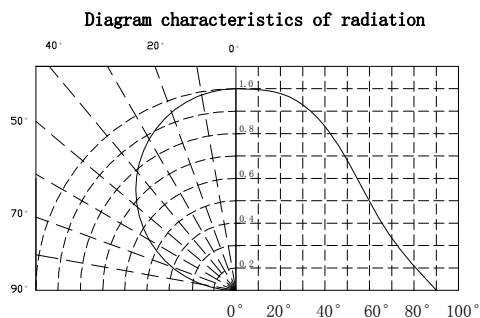
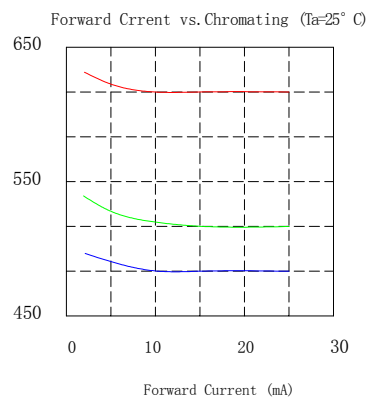
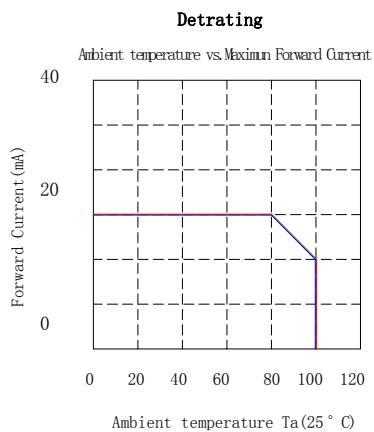
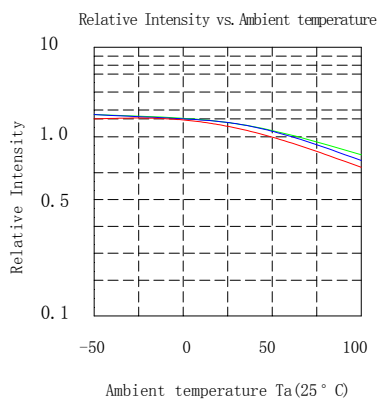
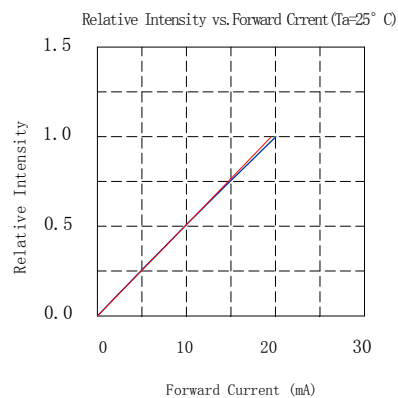
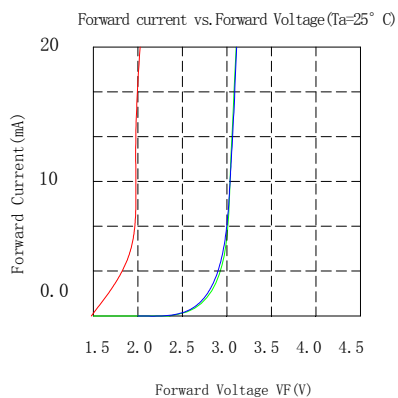
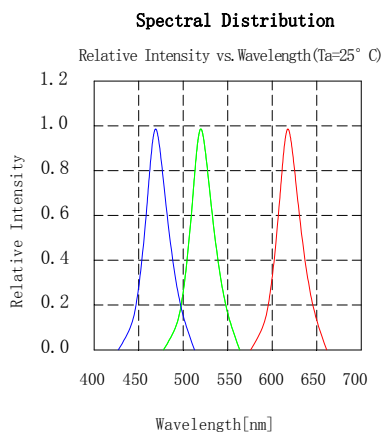
Note: High position start the data first , sending data in GRB order.

◆ **Typical application circuit (典型应用电路)**



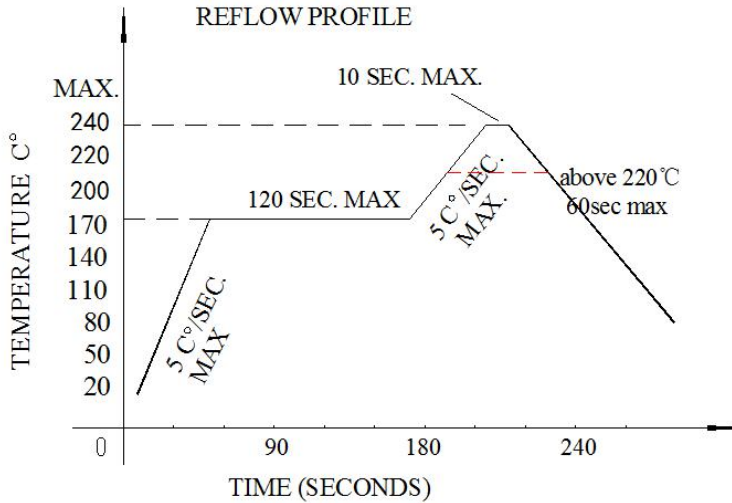
To prevent products chip signal input and output pins from damage during testing by instantaneous high pressure , it should be connect 100 Ω protection resistance in the signal input and output foot. In addition, the decoupling capacitance (0.1uf) of each chip in the figure is indispensable, and the Vcc and Vss pins that are wired to the chip should be as short as possible to achieve the best decoupling effect and stabilize the chip work.

◆ Typical optical characteristics curves (典型光学特性曲线)



◆ Reflow profile (焊接说明)

■ SMD Reflow Soldering Instructions (回流焊简介)



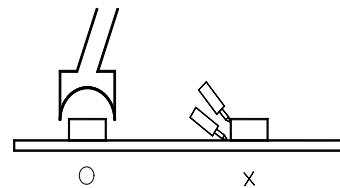
1. Reflow soldering should not be done more than two times
回流焊次数不应超过 2 次
2. When soldering, do not put stress on the LEDs during heating
焊接时，在加热过程中不能有应力作用于 LED 灯珠

■ Soldering iron (烙铁)

1. When hand soldering, keep the temperature of the iron under 300°C, and at that temperature keep the time under 3 sec.
手工焊接时，烙铁温度控制在 300°C 以下，且时间不可超过 3 秒
2. The hand soldering should be done only a time
手工焊接只可焊接一次

■ Rework (返工)

1. Customer must finish rework within 5 sec under 240°C
温度保持在 240°C 以下，5 秒内完成返工作业
2. The head of iron can not touch the LEDs
烙铁不能碰触到 LED 灯珠
3. Twin-head type is preferred.
双头形烙铁为最佳



■ CAUTIONS (注意事项)

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.

封装的 LED 为硅材料。该 LED 具有软表面的封装顶部。顶部表面的压力会影响 LED 的可靠性。应采取预防措施，以避免有过大的压力作用于在封装件上。因此，在选用吸嘴时，应适用于有机硅树脂的压力。

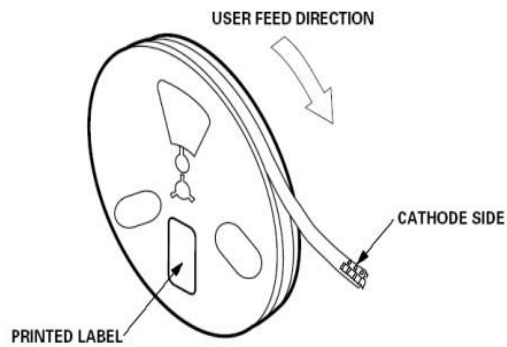
◆ Reliability (可靠性)

TEST ITEMS AND RESULTS (测试项目和结果)

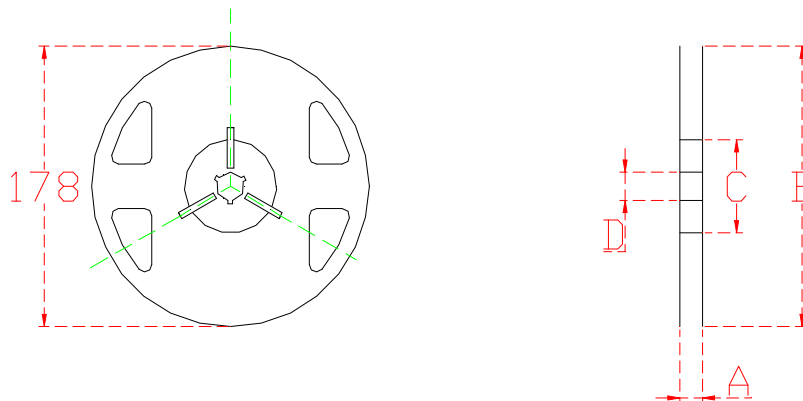
| Test Item (测试项目) | Ref.Standard (参考标准) | Test Conditions (测试条件) | Note (备注) | Conclusion (结论) |
|--|------------------------|--|--------------|--------------------|
| Reflow Soldering (回流焊) | JESD22-B106 | Tsld=240°C, 10sec | 3 times | 0/22 |
| Temperature Cycle (温度循环) | JESD22-A104 | -20°C 30min ↑↓15min 120°C 30min | 200 cycle | 0/100 |
| Thermal Shock (冷热冲击) | JESD22-A106 | -40°C 15min ↑↓15sec 125°C 15min | 200 cycle | 0/100 |
| High Temperature Storage (高温存储) | JESD22-A103 | T _a =100°C | 1000 hrs | 0/100 |
| Low Temperature Storage (低温存储) | JESD22-A119 | T _a =-40°C | 1000 hrs | 0/100 |
| Power temperature Cycling (点亮高低温循环) | JESD22-A105 | On5min-40°C>15min ↑↓ ↑↓<15min Off5min100°C>15min | 200 cycle | 0/100 |
| Life Test (老化测试) | JESD22-A108 | T _a =25°C I _F =30mA | 1000 hrs | 0/100 |
| High Humidity Heat Life Test (高温高湿) | JESD22-A101 | 60°C RH=90% I _F =30mA | 1000 hrs | 0/100 |

◆ Packaging Specifications (包装规格)

● Feeding Direction (进料方向)

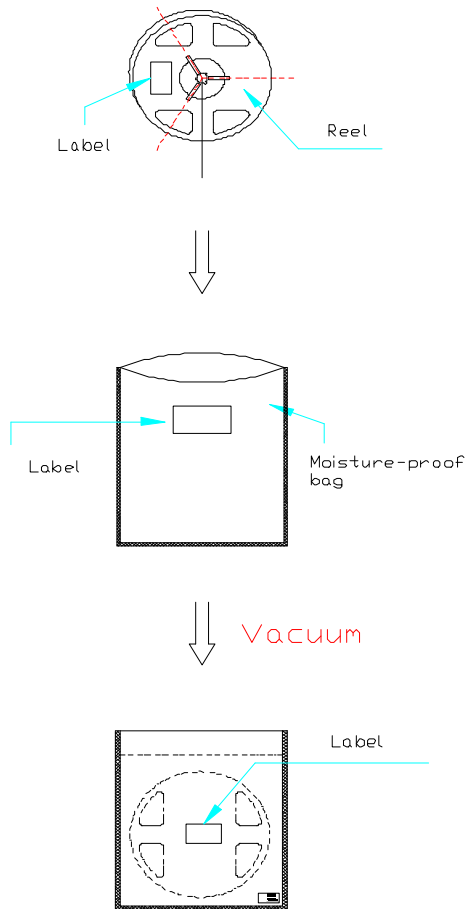


● Dimensions of Reel (Unit: mm) (卷轴尺寸 (单位: 毫米))



| | |
|---|--------------|
| A | 8.0±0.1mm |
| B | 178±1mm |
| C | 60±1mm |
| D | 13.0 ± 0.5mm |

1、Packing Icon (包装图标)



2、Label Icon (标签图标)