

产品规格书

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Customer approval			Opsco approval		
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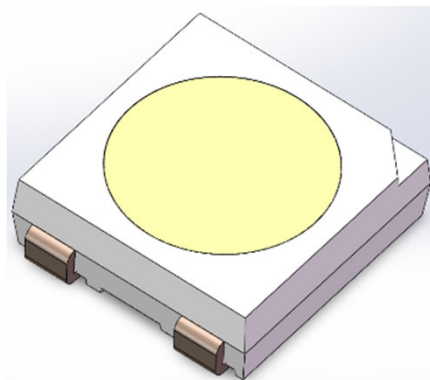
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1.产品概述 Product overview:

- 工作电压：5V@8.5mA(OUTRGB) ；
Forward voltage: 5V@8.5mA (OUTRGB) ；
- 发光角度：120° ；
Luminescent angle: 120° ；
- 胶体颜色：半透明；
Lens color: translucent ；
- 内置复位电路，上电不亮灯；
Built-in reset circuit, power does not light ；
- 灰度调节：256级；
Grayscale adjustment：256 levels ；
- 单线归零码传输协议，可无限级联；
Single-line zero code transmission protocol, can be infinite cascade ；
- 数据传输频率可达800Kbps ；
The data transmission frequency can reach 800Kbps, ；
- 湿敏等级：5a ；
MSL：5a ；
- 静电ESD：2KV ；
ESD level: 2KV ；
- 符合RoHS REACH ；
RoHS and REACH-compliant.



2.主要应用 Main applications:

- 幻彩软硬灯条、像素屏、异形屏、各种电子产品、电器设备显示灯
Illusionary soft and hard light strips, pixel screens, irregular screens, various electronic products, and electrical equipment display lights
- 室内 LED 装饰照明、建筑 LED 外观/情景照明
Indoor LED decorative lighting, building LED appearance/scene lighting

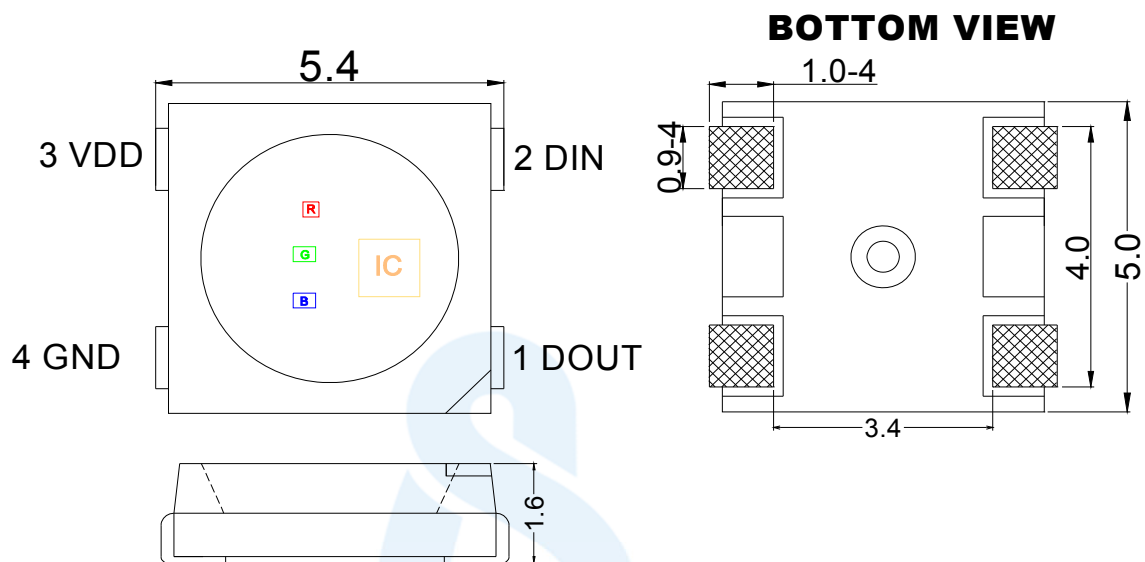
3. 产品命名一般说明 General instructions for product naming：

SK 6851N RG-002

① ② ③

①	②	③
系列 Series	IC系列与电流代码 IC series and current codes	内部编码 Internal code
默认为RGB晶片与 IC集成在一起 Default to RGB chip integrated with IC	6851N：指68系列IC；8.5mA电流版本 6851N: Refers to the 68 series IC; 8.5mA current version	RG-002:内部编码 RG-002: internal code

4.机械尺寸 Mechanical dimensions:



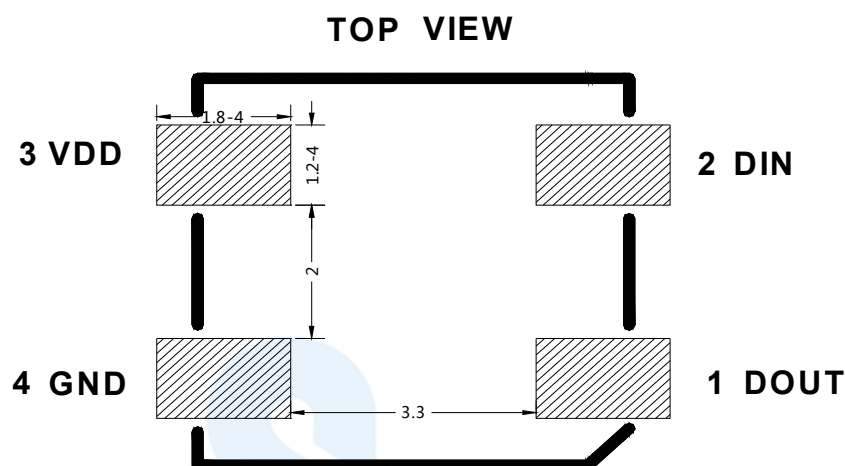
备注 notes:

1. 以上标示单位为毫米.
The above markings are in millimeters
2. 除非另外注明, 尺寸公差为 ± 0.1 毫米.
Unless otherwise specified, the dimensional tolerance is ± 0.1 millimeters

5. 引脚功能说明 Pin Function Description :

序号 Serial Number	符号 Symbol	管脚名 Pin name	功能描述 Function Description
1	DOUT	数据输出 Data output	控制数据信号输出 Control data signal output
2	DIN	数据输入 Data input	控制数据信号输入 Control data signal input
3	VDD	电源 Power supply	供电管脚 Power supply pins
4	GND	地 Grounds	电源接地 Power grounding

6.PCB建议焊盘尺寸 PCB recommended pad size :



7.IC极限参数 IC limit parameter : (Ta=25℃)

参数 Parameter	符号 Symbol	范围 Range	单位 Unit
芯片钳位电压 Chip clamping voltage	V_{DD}	+3.8 ~ +4.2	V
工作温度 Operation temperature	T_{opt}	-40~+85	℃
储存温度 Storage temperature	T_{stg}	-40~+85	℃
ESD耐压 (人体模式) ESD withstand voltage (human mode)	V_{ESD}	2K	V

8. RGB LED 光电参数 Optoelectronic parameters :

颜色 Colour	SK6851N-RG-002 8.5mA	
	波长 (nm) Wavelength (nm)	亮度 (mcd) Brightness (mcd)
红色 (RED)	620-630	160-320
绿色 (GREEN)	520-535	580-1050
蓝色 (BLUE)	460-475	120-240

注：亮度误差±10%，波长误差±1.0nm

Note:Luminous Intensity: ±10%Iv, Dominant Wavelength: ±1.0nm

9. IC电气参数 IC electrical parameters : (TA=25℃)

参数 Parameter	符号 Symbol	最小 Minimum	典型 Typical	最大 Maximum	单位 Unit	测试条件 Test conditions
工作电压 Chip input voltage	V _{DD}	---	4.2	---	V	I _{DD} =1mA, V _{DD} VF
信号输入翻转阈值 Signal input flip threshold	V _{IH}	6.3	---	---	V	V _{DD} =4.2V, DIN 输入高电平 V _{DD} =4.2V, DIN input high level
	V _{IL}	---	---	5.1	V	V _{DD} =4.2V, DIN 输出低电平 V _{DD} =4.2V, DIN output low level
R/G/R输出驱动电流 B/G/R output drive current	I _{DOUT}	---	8.5	---	mA	V _{DD} =4.2V, V _{OUT} =2V
PWM频率 PWM frequency	F _{PWM}	---	4.0	---	KHz	---
静态功耗 Static power consumption	I _{DD}	---	40	---	mA	---
数据传输速率 Transfer rate	F _{DIN}	---	800	---	Kbps	占空比67% (数据1) Duty cycle 67% (Data 1)

10. 建议数据传输时间 Suggested data transmission time :

时序表名称 Timeline Name	Min.	实际值 Actual value	Max.	单位 Unit
T 码元周期 Symbol period	1.20	--	--	μs
T0H 0码, 高电平时间 0 code, high-level time	0.20	0.30	0.40	μs
T0L 0码, 低电平时间 0 code, low-level time	0.80	--	--	μs
T1H 1码, 高电平时间 1 code, high-level time	0.65	0.90	1.0	μs
T1L 1码, 低电平时间 1 code, low-level time	0.20	--	--	μs
Reset Reset码, 低电平时间 Reset code, low-level time	>200	--	--	μs

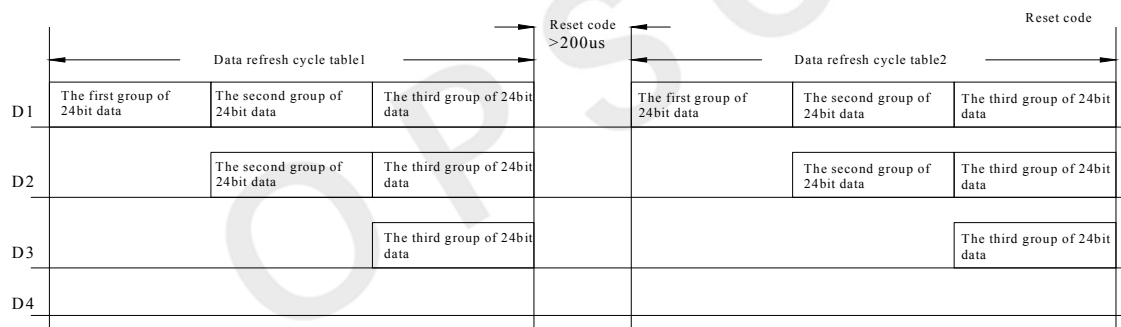
1. 书写程序时, 码元周期最低要求为1.2μs。

When writing a program, the minimum required code period is 1.2 μ s.

1. “0”码、“1”码的高电平时间需按照上表的规定范围, “0”码、“1”码的低电平时间要求小于20μs。

The high-level time of "0" and "1" codes should be within the specified range in the table above, and the low-level time of "0" and "1" codes should be less than 20 μ s.

11. 数据传输方式 Data transmission method : (Ta=25℃)

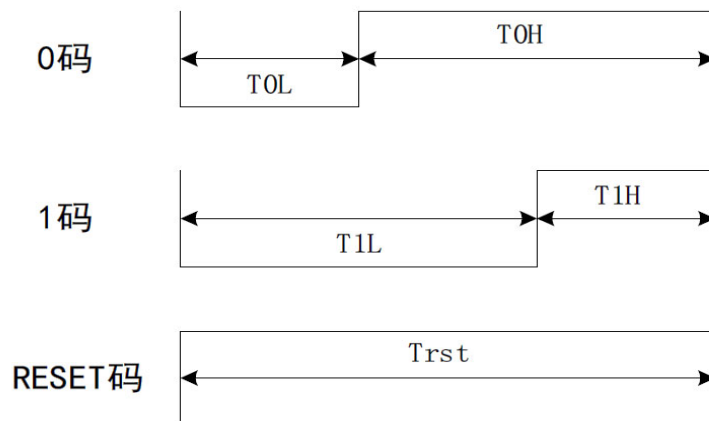


注Note : 其中D1为MCU端发送的数据, D2、D3、D4为级联电路自动整形转发的数据。

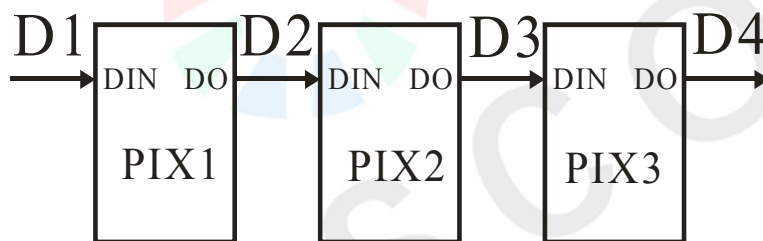
Among them, D1 is the data sent by the MCU end, and D2, D3, and D4 are the data automatically shaped and forwarded by the cascaded circuit.

12. 时序波形图 Time series waveform diagram : ($T_a=25^{\circ}\text{C}$)

输入码型 Input code type :



连接方式 Connection method :



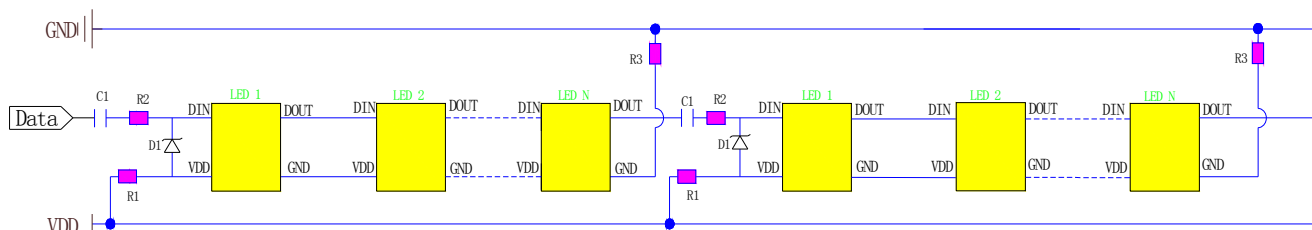
13. 24bit数据结构 24 bit data structure : ($T_a=25^{\circ}\text{C}$)

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

注Note : 高位先发, 按照RGB的顺序发送数据($G7 \rightarrow G6 \rightarrow \dots \rightarrow B0$)

High bit first send, send data inRGB order ($G7 \rightarrow G6 \rightarrow \dots \rightarrow B0$)

14.应用电路原理图 Principles of Applied Circuits :



1.以上应用图中，C1 为 10nF，用于耦合 DIN 信号；

1. In the above application diagram, C1 is 10nF, used for coupling DIN signals;

2.D1 为 SS14 肖特基二极管，用于 DIN 和 VDD 隔离；

2. D1 is an SS14 Schottky diode used for DIN and VDD isolation;

3.限流电阻 R1/R3 只能串接于每串灯珠前端或尾端，不能串接于灯珠中间

3. The current limiting resistor R1/R3 can only be connected in series at the front or rear end of each string of lamp beads, and cannot be connected in series in the middle of the lamp beads

4.需要根据不同的串接灯珠数量，计算 R1/R3 限流电阻的阻值，每串灯串恒流值为 30mA，芯片钳位电压 4.2V，N 为芯片数，所以灯带串联的总电阻值为 $R = [(120V \times 1.414) - (V_{Led} \times N)] / 0.03A$ ；

4. It is necessary to calculate the resistance value of R1/R2 current limiting resistor based on different numbers of connected light beads. The constant current value of each string of lights is 30mA, the chip clamping voltage is 4.2V, and N is the number of chips. Therefore, the total resistance value of the light strip in series is $R = [(120V \times 1.414) - (V_{Led} \times N)] / 0.03A$;

5. R2 为首芯片 DIN 端口保护电阻，建议值 220Ω。

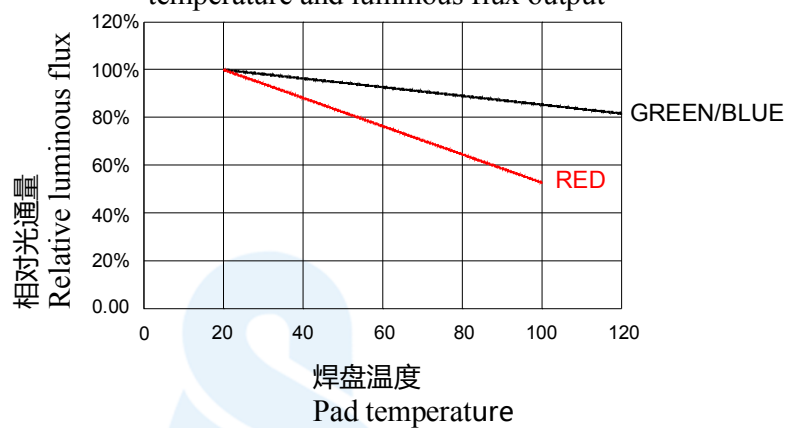
5. R2 is the lead chip DIN port protection resistor, with a recommended value of 220 Ω.

6. 产品电路适用工作电压：24V、120V，24V串接光源6PCS，120V串接光源30PCS。

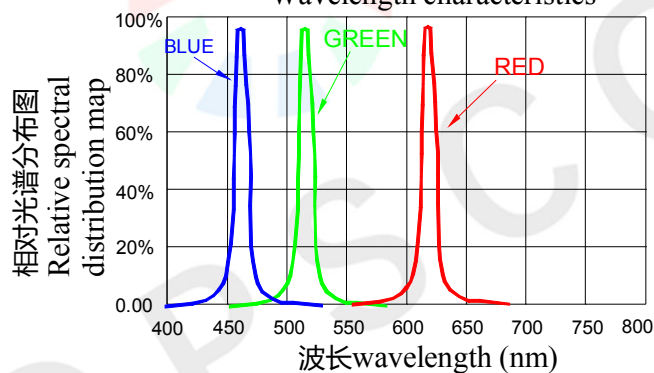
6. Applicable working voltage for product circuit: 24V, 120V, 24V series connected light source 6PCS, 120V series connected light source 30PCS.

15. 光电特性 Photoelectric characteristic :

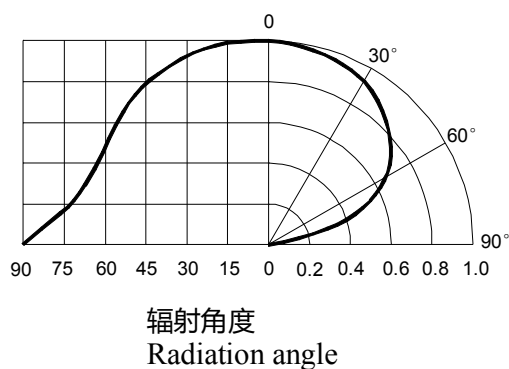
焊盘温度与光通量输出的相对关系
 The relative relationship between pad temperature and luminous flux output



波长特性
 Wavelength characteristics

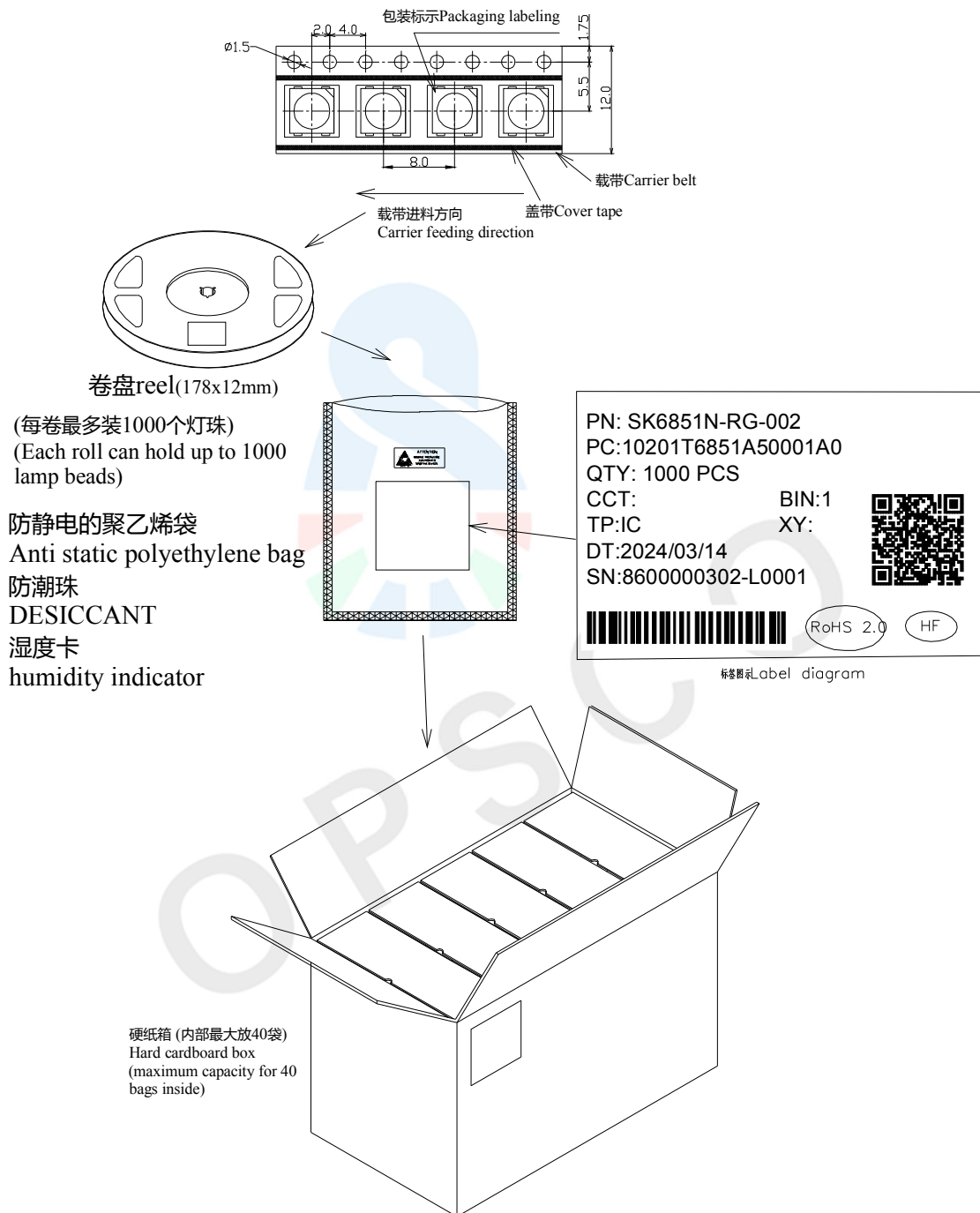


典型的辐射方向图 120°
 Typical radiation pattern 120°



16. 包装标准 Packaging standards :

SK6851N-RG-002



表面贴装LED采用卷盘包装，LED在用普通或防静电袋包装后再装在纸箱中。纸箱用于保护运输途中LED不受机械冲击，纸箱不防水，因此请注意防潮防水。

Surface mounted LEDs are packaged in rolls, and the LEDs are packaged in regular or anti-static bags before being packed in cardboard boxes. The cardboard box is used to protect the LED from mechanical impact during transportation. The cardboard box is not waterproof, so please pay attention to moisture-proof and waterproof.

17. 可靠性测试 Reliability testing:

序号 Serial Number	实验项目Pilot projects	实验条件 Experimental condition	参考标准 Reference standards	判断 Determine
1	冷热冲击 Thermal Shock	$100 \pm 5^{\circ}\text{C} \sim -40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 15min~15min 100cycles	MIL-STD-202G	0/22
2	高温储藏 High temperature storage	$T_a = +100^{\circ}\text{C}$ 1000hrs	JEITA ED-4701 200 201	0/22
3	低温储藏 Low temperature storage	$T_a = -40^{\circ}\text{C}$ 1000hrs	JEITA ED-4701 200 202	0/22
4	高温高湿储藏 High temperature and high humidity storage	$T_a = 60^{\circ}\text{C}$ RH=90% 1000hrs	JEITA ED-4701 100 103	0/22
5	温度循环 Temperature cycling	$-40^{\circ}\text{C} \sim 25^{\circ}\text{C} \sim 100^{\circ}\text{C} \sim 25^{\circ}\text{C}$ 30min~5min~30min~5min 100 cycles	JEITA ED-4701 100 105	0/22
6	耐焊接热 Resistance to Soldering Heat	$T_{\text{sld}} = 260^{\circ}\text{C}$, 10sec. 2 times	JEITA ED-4701 300 301	0/22
7	常温寿命测试 Normal temperature life test	25°C , IF: Typical current , 1000hrs	JESD22-A 108D	0/22

失效判定标准 Failure criteria:

项目 Project	符号 Symbol	测试条件 Test conditions	判断标准Judgment criteria	
			最小值 Minimum value	最大值 Maximum value
发光强度 Intensity	IV	DC=5V,规格典型电流 DC=5V, typical current specification	初始数据X0.7 Initial data X0.7	---
耐焊接热 Resistance to Soldering Heat	---	DC=5V,规格典型电流 DC=5V, typical current specification	无死灯或明显损坏 No dead lights or obvious damage	

修订记录 Revision record

日期 Date	Rev. No.	修改/改变的原因 Reason for modification/change	签名 Signature
2023-02-28	A/0	首次发行 first issue	Kevin Zhu
2024-03-18	B/0	1.更改规格书版式 1.Change the layout of the specification sheet 2.升级IC 电气参数 2.Upgrade IC electrical parameters	Liu Feng