



规格书

SPECIFICATION

产品名称 Description: 5V 6脚5050(5.0*5.4*1.6)幻彩led

产品型号 Model : ZH5050L6-1812XD-B01

客户代码 Customer NO:

制作日期 Date: 2022, 06, 16

制造编码 Date: ZH-AFZL-9001

制作 Prepared By	审核 Checked By	市场部 Marketing Dept
客户确认 APPROVED SIGNATURES		
核准 Approval	审核 Examine.	承认 Admit





主要特点

(Main features)

- IC 控制电路与 LED 点光源共用一个电源。
The IC control circuit and the LED point light source share one power supply.
- 控制电路与 RGB 芯片集成在一个 5050 封装的元器件中，构成一个完整的外控像素点。
The control circuit and the RGB chip are integrated in a 5050 packaged component, constituting a complete externally controlled pixel point.
- 内置信号整形电路，任何一个像素点收到信号后经过波形整形再输出，保证线路波形畸变不会累加。
Built-in signal shaping circuit. After any pixel point receives the signal, it is output after waveform shaping to ensure that the waveform distortion of the line will not accumulate.
- 内置上电复位和掉电复位电路。
Built-in power-on reset and power-down reset circuits
- 每个像素点的三基色颜色可实现 256 级亮度显示，完成 16777216 种颜色的全真色彩显示。
The three primary colors of each pixel point can achieve 256-level brightness display, and complete the true-color display of 16,777,216 kinds of colors.
- 串行级联接口，能通过一根信号线完成数据的接收与解码。
Serial cascade interface, which can complete the reception and decoding of data through a single signal line.
- 任意两点传输距离在不超过 5 米时无需增加任何电路。
When the transmission distance between any two points does not exceed 5 meters, there is no need to add any circuit.
- 当刷新速率 30 帧/秒时，级联数不小于 1024 点。
When the refresh rate is 30 frames per second, the cascade number is not less than 1024 points.
- 数据发送速度可达 800Kbps。
The data transmission speed can reach up to 800 Kbps.
- 光的颜色高度一致，性价比高。
The color of the light is highly consistent and has high cost performance

主要应用领域

(Main application fields)

- LED 全彩发光字灯串，LED 全彩软灯条硬灯条，LED 护栏管。
LED full-color luminous word light string, LED full-color flexible light strip and hard light strip, LED guardrail tube.
- LED 点光源，LED 像素屏，LED 异形屏，各种电子产品，电器设备跑马灯。
LED point light source, LED pixel screen, LED special-shaped screen, various electronic products, marquee lights of electrical equipment.



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产品概述

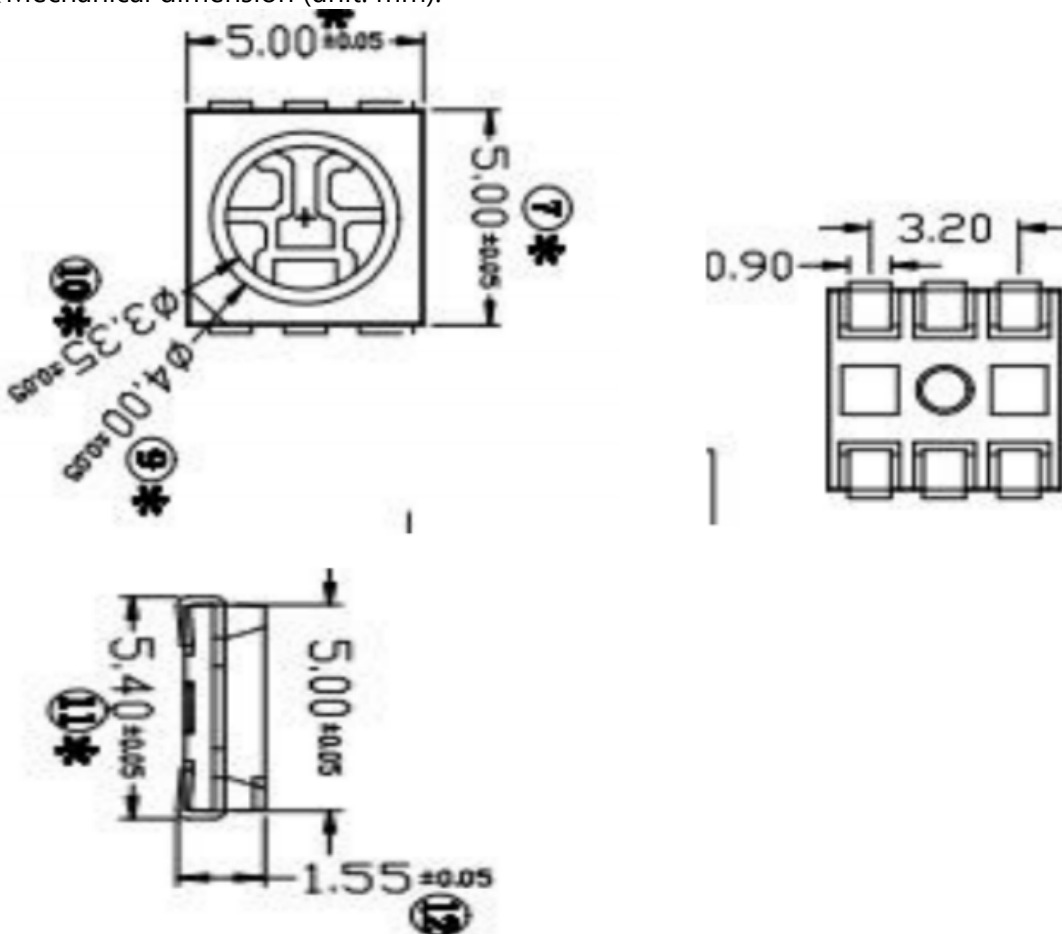
(Product overview.)

ZH5050L6-1812XD-B01 是一个集控制电路与发光电路于一体的智能外控 LED 光源。具有较小体积，其外型尺寸与一个 5050LED 灯珠相同，每个元件即为一个像素点。像素点内部包含了智能数字接口数据锁存信号整形放大驱动电路，还包含有高精度的内部振荡器和可编程定电流控制部分，有效保证了像素点光的颜色高度一致。

ZH5050L6-1812XD-B01 is an intelligent external-controlled LED light source that integrates the control circuit and the light-emitting circuit. It has a relatively small volume, and its external dimension is the same as that of a 5050 LED lamp bead, and each element is a pixel point. The pixel point contains an intelligent digital interface data latch signal shaping amplification driving circuit, and also includes a high-precision internal oscillator and a programmable constant current control part, which effectively ensures a high degree of consistency in the color of the light of the pixel point.

机械尺寸（单位mm）

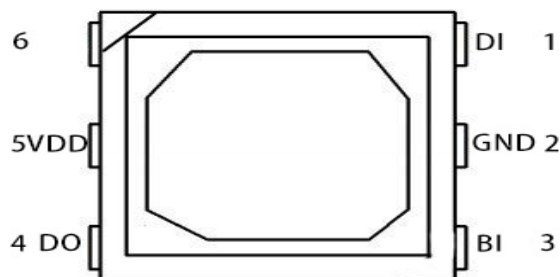
(Mechanical dimension (unit: mm).)





引脚功能:

(Pin function)



引脚功能 (Pin Function)

序号 Serial number	符号 sign	管脚名 Pin name	功 能 描 述 Function Description
5	VDD	电源	供电管脚 (Power supply)
4	DOU T	数据输出	控制数据信号输出 (Control data signal output)
2	GND	地	信号接地和电源接地 (Signal grounding and power supply grounding)
1	DIN	数据输入	控制数据信号输入 (Control data signal input)
3	BI	备用数据输入	控制数据信号输入 (Control data signal input)
6	NC	空脚	

最大额定值 (如无特殊说明, $T_A=25^{\circ}\text{C}$, $V_{SS}=0\text{V}$)

(Maximum Rated Value (Unless otherwise specified, $T_A = 25^{\circ}\text{C}$, $V_{SS} = 0\text{V}$))

参数 argument	符号 sign	范围 extent	单位 unit
电源电压Power supply voltage	V_{DD}	+3.5~+5.5	V
逻辑输入电压 Logic input voltage	V_I	-0.5~ $V_{DD}+0.5$	V
工作温度Working temperature	T_{opt}	-40~+85	$^{\circ}\text{C}$
储存温度Storage temperature	T_{stg}	-40~+105	$^{\circ}\text{C}$
ESD耐压 (设备模式) ESD withstand voltage (device mode)	V_{ESD}	200	V
ESD耐压 (人体模式) ESD withstand voltage (human body mode)	V_{ESD}	2K	V



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电气参数 (如无特殊说明, $T_A = -20 \sim +70^\circ\text{C}$, $V_{DD} = 4.5 \sim 5.5\text{V}$, $V_{SS} = 0\text{V}$)

Electrical parameters (Unless otherwise specified, $T_A = -20$ to $+70^\circ\text{C}$, $V_{DD} = 4.5$ to 5.5V , $V_{SS} = 0\text{V}$)

参数 parameter	符号 sign	最小min	典型 typical	最大 max	单位 unit	测试条件 Test conditions
芯片内部电源电压 Internal power supply voltage of the chip	VDD	---	5	7.5	V	---
R/G/B 端口耐压 Withstand voltage of R/G/B ports	VDS,MAX	---	---	9.5	V	---
DOUT 驱动能力 DOUT driving capability	IDOH	---	15	---	mA	DOUT 接地, 最大驱动 电流
	IDOL	---	30	---	mA	DOUT 接正, 最大灌电 流
信号输入翻转阈值Signal input inversion threshold	VIH	$0.7 \times V_{DD}$	$0.9 \times V_{DD}$	VDD	V	VDD=5.0V
	VIL	0	$0.1 \times V_{DD}$	$0.3 \times V_{DD}$	V	
PWM 频率 PWM frequency	FPWM	---	4	---	KH Z	---
静态功耗 Static power consumption	IDD	---	0.65	---	mA	---



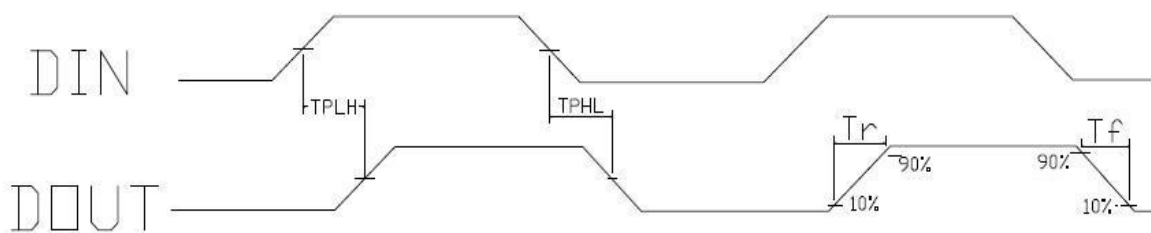
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开关特性（如无特殊说明， $T_A = -20 \sim +70^\circ\text{C}$ ， $V_{DD} = 4.5 \sim 5.5\text{V}$ ， $V_{SS} = 0\text{V}$ ）

(Switching characteristics (Unless otherwise specified, $T_A = -20$ to $+70^\circ\text{C}$, $V_{DD} = 4.5$ to 5.5V , $V_{SS} = 0\text{V}$))

参数 parameter	符号 sign	最小 min	典型 typical	最大 max	单位 unit	测试条件 Test conditions
数据传输速度 Data transmission speed	fDIN	---	800	1100	KHZ	占空比 67%（数据 1） Duty cycle 67% (Data 1)
DOUT 传输延迟 DOUT transmission delay	T_{PLZ}	---	---	200	ns	DIN→DOUT
Iout 上升时间 Iout rising time	T_r	---	---	400	ns	$V_{DS} = 1.5\text{V}$ $I_{OUT} = 12\text{mA}$
	T_f	---	---	400	ns	



LED 特性参数（Characteristic parameters of LED）

	参考值 Reference value
R/G/B 通道恒流 Constant current of RGB channels	12mA
红光亮度 Red light brightness	250-400mcd
绿光亮度 Green light brightness	600-1000mcd
蓝光亮度 Blue light brightness	200-350mcd
红光波长 Red light wavelength	620-630nm
绿光波长 Green light wavelength	515-530nm
蓝光波长 Blue light wavelength	460-475nm



数据传输时间 (Data transmission time)

名称 (title)	描述 (description)	典型值 (Reference value)	容许误差 (Allowable error)
T0H	0 码, 高电平时间 High-level time	0.3 μ s	$\pm 0.05 \mu$ s
T1H	1 码, 高电平时间 High-level time	0.6 μ s	$\pm 0.05 \mu$ s
T0L	0 码, 低电平时间 Low-level time	0.6 μ s	$\pm 0.05 \mu$ s
T1L	1 码, 低电平时间 Low-level time	0.3 μ s	$\pm 0.05 \mu$ s
RES	帧单位, 低电平时间 Frame unit, low-level time	80 μ s 以上	

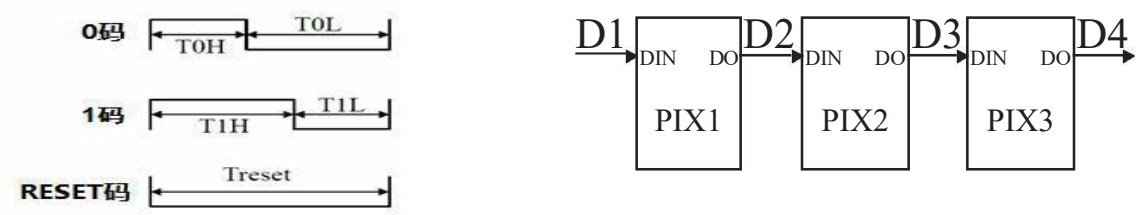
1. 协议采用单极性归零码, 每个码元必须有低电平, 本协议的每个码元起始为高电平, 高电平时间宽度决定“0”码或“1”码。
2. 书写程序时, 码元周期最低要求为 1.2 μ s。
3. “0”码、“1”码的高电平时间需按照上表的规定范围, “0”码、“1”码的低电平时间要求小于 20 μ s

1. The protocol adopts unipolar return-to-zero code. Each symbol must have a low level. The start of each symbol of this protocol is a high level. The width of the high-level time determines the "0" code or the "1" code.
2. When writing the program, the minimum requirement for the symbol period is 1.2 μ s.
3. The high-level time of the "0" code and the "1" code needs to be within the specified range in the above table. The low-level time requirements of the "0" code and the "1" code are less than 20 μ s.



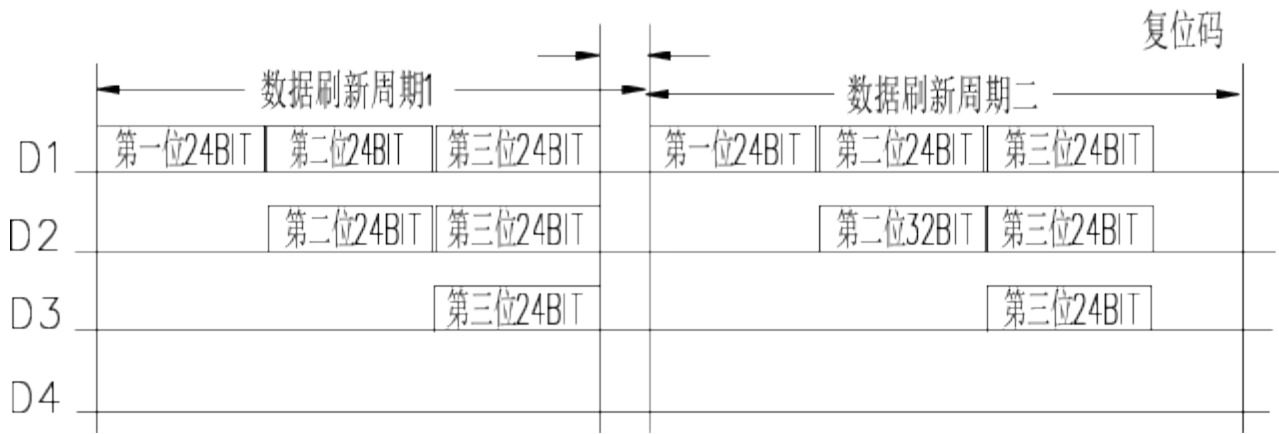
时序波形图 (Timing waveform diagram)

输入码型 (Input code pattern) : 连接方法 (Connection method) :



数据传输方法
(Data transmission

method
)
:
复位码
≥80us



注：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

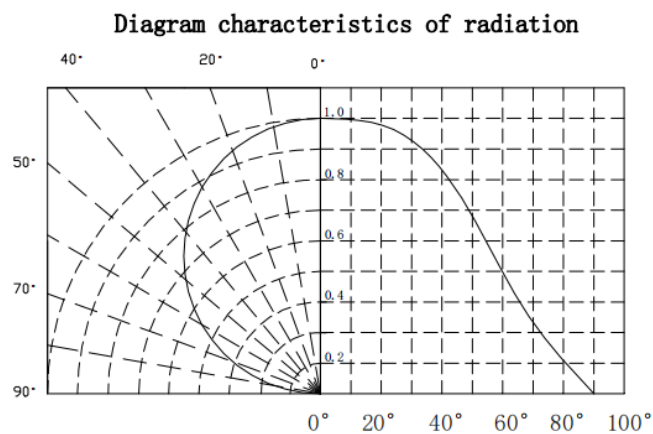
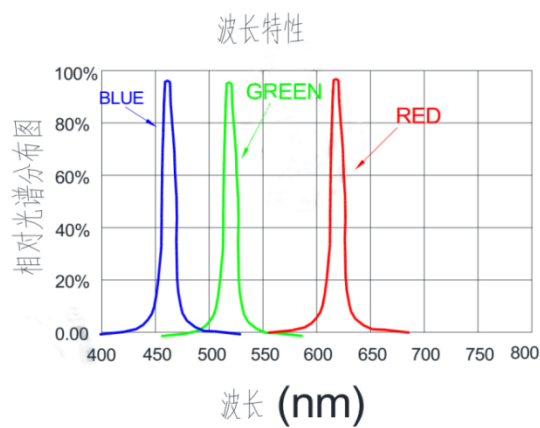
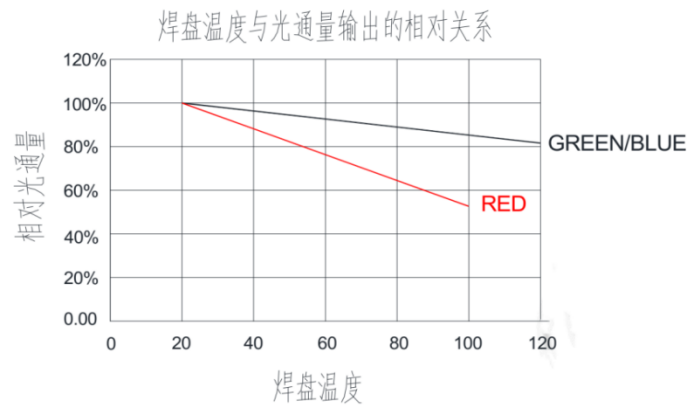
24bit 数据结构 (Data structure) :

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：高位先发，按照 GRB 的顺序发送数据 (G7 → G6 → B0)
Note: The high bits are sent first, and the data is sent in the order of GRB (G7 → G6 → B0)



光电特性 (photoelectric characteristics)





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测试项目及条件 (TEST ITEMS AND RESULTS)

试验项目 Test Items	实验条件 Test Conditions	试验数量 Quantity	判断标准 Judging Criteria
Solderability 可焊性试验	焊接温度 (Solder Temperature) : 300°C 焊接时间 (Solder Duration) : (3.5±0.5) sec.	22PCS	上锡面积在95%以上 Solderable Area Over 95%
Temperature Cycle 冷热冲击	-40°C 20min↑↓ 5 min 100°C 20min 100 cycles	22PCS	C=0 & I*
High Temperature Storage 高温储存	Ta=85°C 1000 hrs	22PCS	C=0 & I*
Life Test 寿命测试	Ta=25°C 1000 hrs@5v	22PCS	C=0 & I*
Low Temperature Storage 低温储存	Ta=-35°C 1000 hrs	22PCS	C=0 & I*

失效判断标准 (Criteria For Judging Damage)

Items 测试项目	Symbol 符号	Test Conditions 测试条件	Criteria For Judging Damage I* 失效判断标准 I*	Criteria For Judging Damage I** 失效判断标准 I**
Forward Voltage 正向电压	V _F	I _F =12mA	≥USL×1.2	≥USL
Luminous Intensity 光强	I _v	I _F =12mA	≤LSL×0.5	≤LSL

* USL: 标准值上限值, LSL: 标准值下限值 * USL: Upper Standard Level, LSL: Lower Standard Level

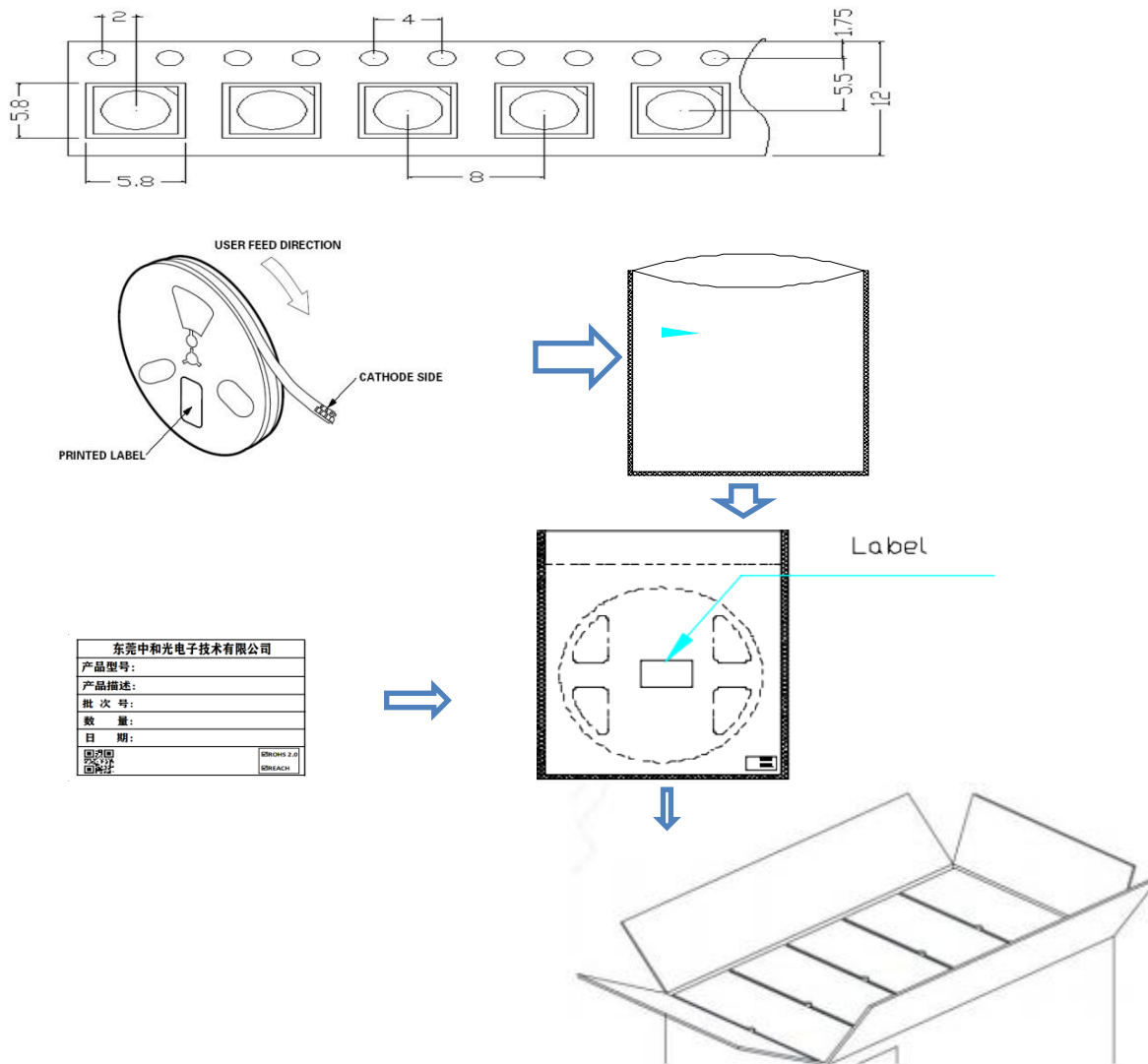


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包装说明：（Packaging Instructions）



说明：1：表面贴装led采用卷盘包装，led在防静电包装袋包装后再装入纸箱中，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。

2：卷盘两种包装数量，小盘为1000pcs/盘，大盘为5000pcs/盘。内附干燥剂，湿度卡。

Instructions:

1: Surface mount LEDs are packaged in reels. LEDs are packaged in anti-static bags and then placed in cartons. Cartons are used to protect LEDs from mechanical shock during transportation. Cartons are not waterproof, so please pay attention to moisture-proof and waterproof.

2: There are two packaging quantities for reels. The small reel is 1000pcs/reel, and the large reel is 5000pcs/reel. Desiccant and humidity cards are included.