



深圳市中顺半导体照明有限公司

— Shenzhen Zhongshun Semiconductor Lighting Co., Ltd. —

Specification 规格书

Customer Name: _____

客户名称

Customer P/N: _____

客户品号

Factory Model: Z-L3528RGB01IC01

公司型号

Sending Date: _____

呈送日期

R&D 研发规格书 Sample 样品规格书 Product 产品规格书

Customer Approval

客户审核

ZS Approval

中顺审核

Approval

核准

Audit

确认

Confirmation

制作

Approval

核准

Audit

确认

Confirmation

制作

吴东



Qualified

授受

Disqualified

不接受

Date:

日期: 2023.02.25

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LM-80

EN 62471



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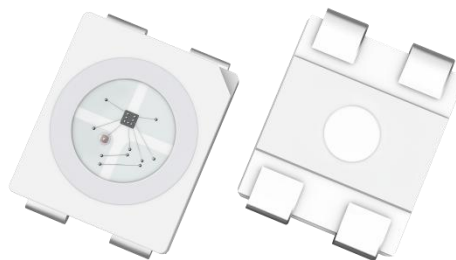
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Version History 修订履历

Date 日期	Revised content 修订内容	Version 版本	Revised by 修订人
2023.02.25	新增	A0	吴顺

Features (特征)

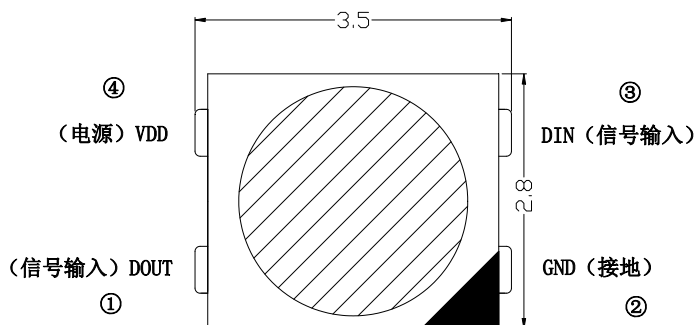
1. PLCC-6 package (PLCC-6 封装)
2. Top view RGB LED (平面式全彩 LED)
3. Wide viewing angle (大角度发光)
4. RoHS compliant (符合 RoHS 标准)
5. Package:5000pcs/reel. (包装每卷 5000PCS)



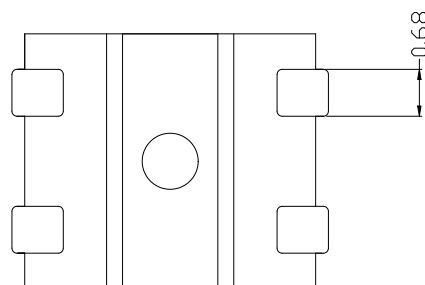
Application (应用)

1. Decorative and Entertainment Lighting (装饰与娱乐照明)

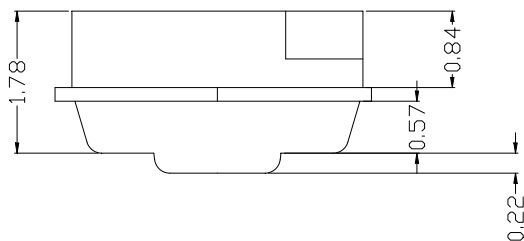
Package Dimension (封装尺寸)



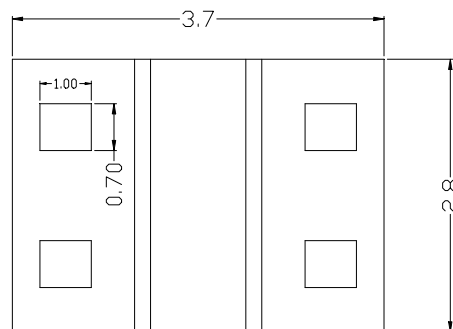
1-1 Top view 正视图



1-3 Bottom view 背视图



1-2 Side view 侧视图



1-4 Soldering patterns 推荐焊盘

Notes (备注):

1. All dimensions are in millimeters (所有标注尺寸单位为毫米)
2. Tolerances are $\pm 0.15\text{mm}$ unless otherwise noted (除特别标注外, 允许公差为 $\pm 0.15\text{mm}$)

Product Number Explanation (产品编码说明)

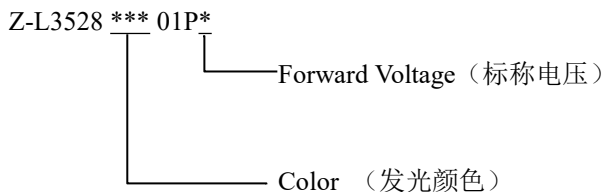


Table of Specifications (规格表)

NO.	P/N	Model	Color	Rendering Wavelength	Min.Light intensity
			R	615-630	350
		Z-L3528RGB08IC01	G	515-530	800
			B	460-475	150

Absolute maximum ratings @ $T_a=25^{\circ}\text{C}$ (绝对最大额定值)

	Symbol (符号)	Absolute Maximum Rating (数值)	Unit (单位)
Forward Current (正向电流)	I_F	12: 12: 12	mA
Reverse Voltage (反向电压)	V_R	5	V
Power Dissipation (功率消耗)	P_D	100	mW
Operating Temperature (工作温度)	T_{opr}	-30~+85	$^{\circ}\text{C}$
Storage Temperature (储存温度)	T_{stg}	-30~+100	$^{\circ}\text{C}$
Junction Temperature (结温)	T_J	85	$^{\circ}\text{C}$
Thermal Resistance (热阻)	R_{th}	60	$^{\circ}\text{C}/\text{W}$
Electrostatic Discharge (静电)	ESD	2000 (HBM)	V

Electric Spec (电气特性)

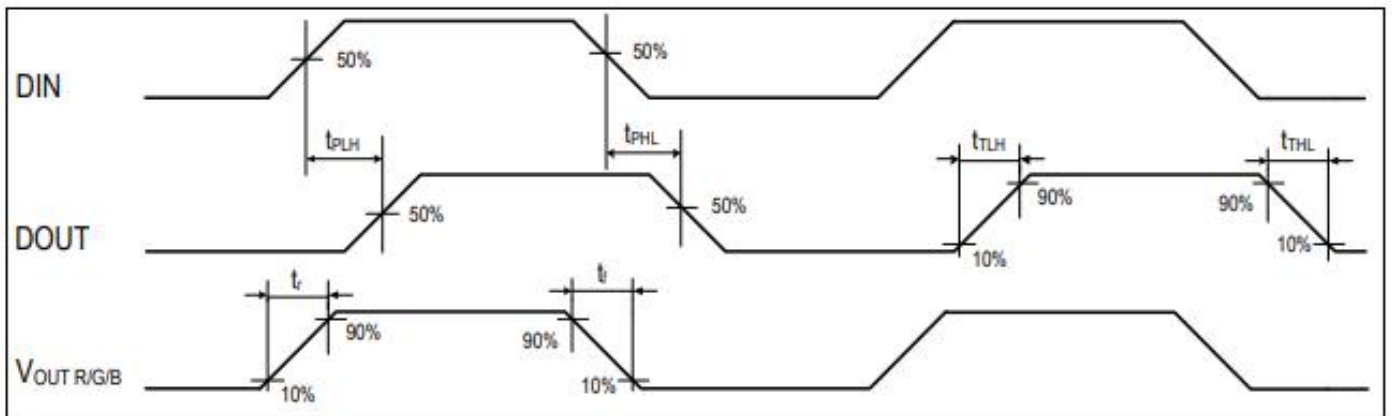
符号	参数	范围	单位
VDD	芯片工作电压	-0.4~+5.5	V
V _I	逻辑输入电压	-0.4~VDD+0.4	V
BV _{OUT}	OUT R/G/B 端口耐压	14	V
T _J	工作结温范围	-40~150	°C
T _{STG}	存储温度	-55~150	°C
V _{ESD}	HBM 人体放电模式	>2	KV

符号	参数	测试条件	最小值	典型值	最大值	单位
VDD	芯片工作电压	-	3.5	-	5.5	V
I _{DD}	静态电流	VDD = 4.5V, I _{OUT} "OFF"		0.35		mA
V _{IH}	输入信号阈值电压	VDD=5V, 调节 DIN 输入电平	2.8	-	-	V
V _{IL}			-	-	1.6	V
I _{OH}	DOUT 输出电流	DOUT 输出高, 串接 10Ω 电阻至	-	-35	-	mA
I _{OL}	DOUT 灌电流	DOUT 输出低, 电源对 DOUT 灌电流	-	35	-	mA
I _{OUT}	OUT R/G/B 输出电流	VDD=5V, V _{DS} =1.0V	-	12	-	mA
V _{DS_S}	OUT R/G/B 恒流拐点电压	VDD=5V, I _{OUT} = 12mA	-	0.6	-	V
%VS.V _{DS}	OUT R/G/B 输出电流 变化量	I _{OUT} = 12mA, V _{DS} = 1.0~3.0V	-	0.5	-	%
%VS.VDD		I _{OUT} = 12mA, VDD = 4.5~5.5V	-	0.5	-	%
%VS.T _A		I _{OUT} = 12mA, T _A = -40~+85°C	-	5.0	-	%
I _{leak}	OUT R/G/B 端口漏电流	V _{DS} = 15V, I _{OUT} "OFF"	-	-	1	uA

Dynamic parameter (开关特性)

符号	参数	测试条件	最小值	典型值	最大值	单位
f_{PWM}	OUT R/G/B 输出 PWM 频率	$I_{OUT}=5mA$, OUT 端口串接 200 Ω 电阻 至 VDD	-	1.0	-	KHz
t_{PLH}	信号传输延时 (注 4)	DOUT 端口对地负载电容 30pF, DIN 至 DOUT 的信号传输延时	-	67	-	ns
t_{PHL}			-	93	-	ns
t_{TLH}	DOUT 转换时间 (注 5)	DOUT 端口对地负载电容 30pF	-	15	-	ns
t_{THL}			-	23	-	ns
t_r	OUT R/G/B 转换时间 (注 6)	$I_{OUT R/G/B}=5mA$, OUT R/G/B 端口串接 200 Ω 电阻至 VDD, 对地负载电容	-	104	-	ns
t_f			-	298	-	ns

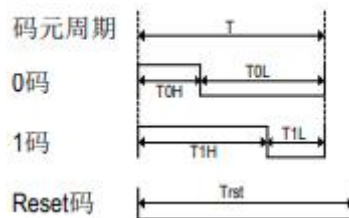
注 4、注 5、注 6: 如下图所示



Data communication protocol (数据通信协议)

协议采用的是单极性归零码, 每一个码元都必须有低电平。本协议的每个码元起始为高电平, 高电平时间宽度决定“0”码或者“1”码。

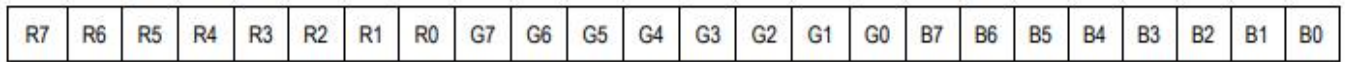
输入码型:



符号	参数	最小值	典型值	最大值	单位
T	码元周期		1250		ns
T0H	0 码, 高电平时间	200	340	420	ns
T0L	0 码, 低电平时间	800	--	--	ns
T1H	1 码, 高电平时间	560	640	1000	ns
T1L	1 码, 低电平时间	200	--	--	ns
Trst	Reset 码, 低电平时间	200			μs

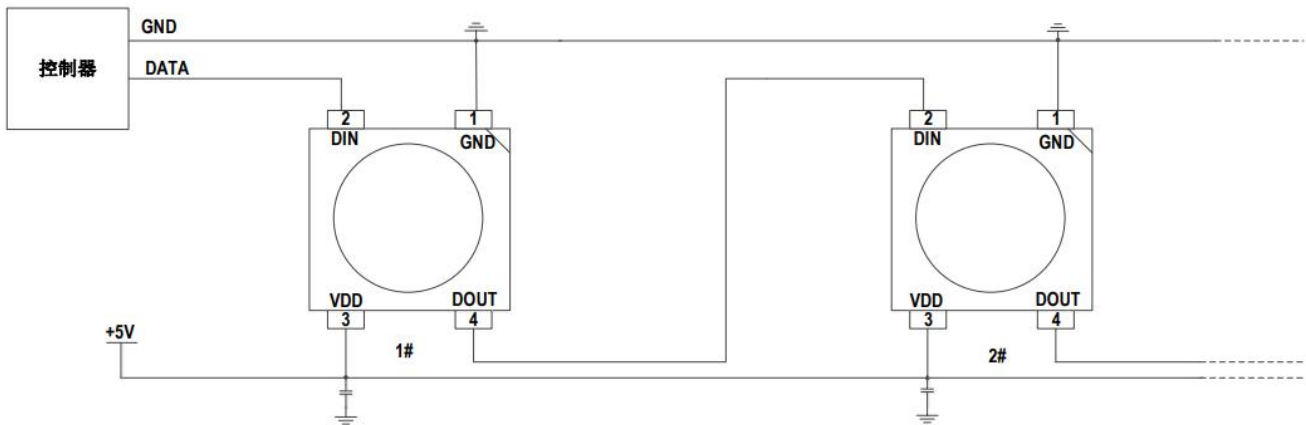
Mode of data transmission (数据结构)

24bit 灰度数据结构: 高位在前, 按照 RGB 的顺序发送



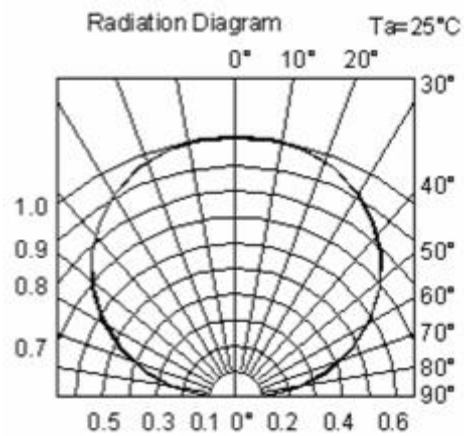
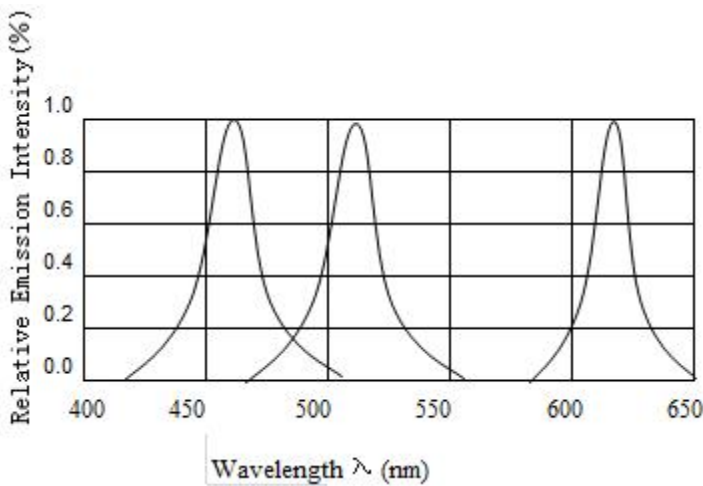
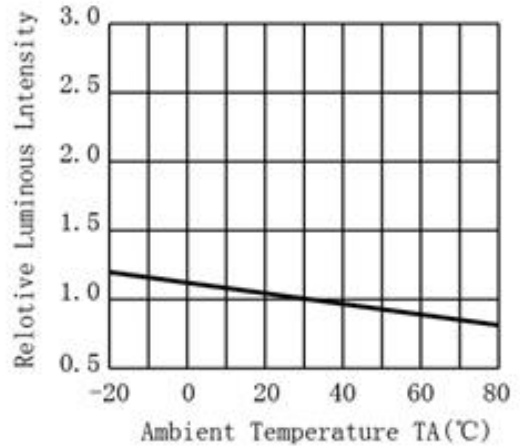
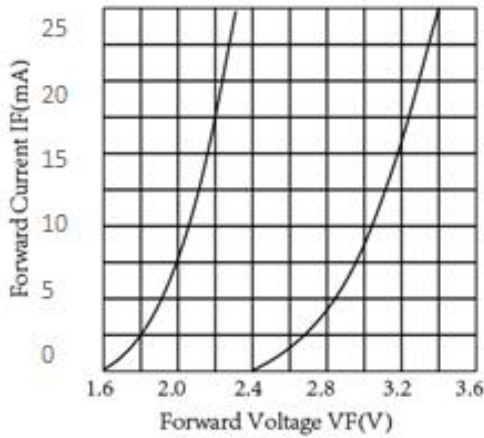
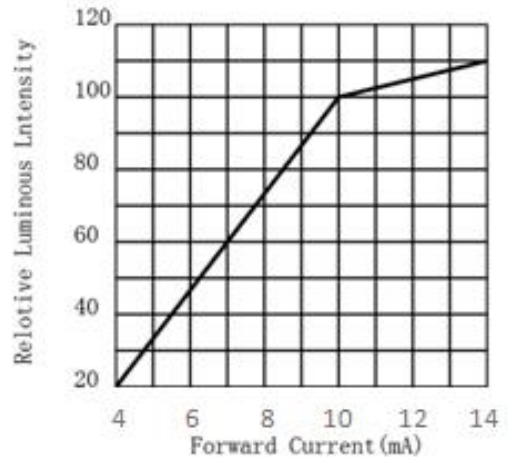
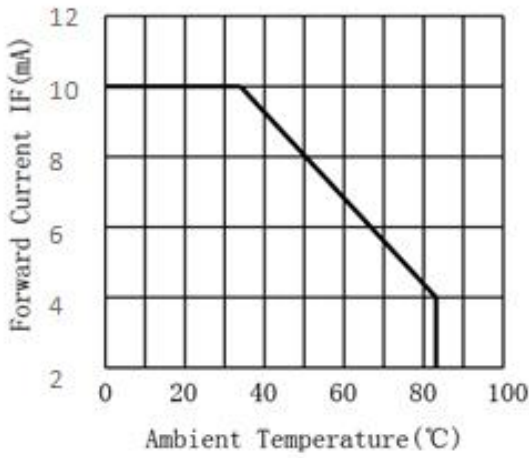
bit23.....bit0

Typical application circuit (典型应用电路)



Typical optical characteristics curves @ $T_a=25^{\circ}\text{C}$ (典型光学特性曲线)

Ambient Temperature VS. Forward Current



Reliability Test Items And Conditions (信赖性测试项目及条件)

Test Item (项目)	Ref.Standard (参考标准)	Test Conditions (测试条件)	Time (时间)	Quantity (pcs) (数量)
High Temperature Storage (高温储存)	JESD22-A103	Temp:100°C±5°C	1000 hrs	22
Low Temperature Storage (低温储存)	JESD22-A119	Temp:-40°C±5°C	1000 hrs	22
Thermal Shock (冷热冲击)	JESD22-A104	100°C±5°C 30min ↓↑15S -40°C±5°C 30min	200 cycle	22
Reflow (回流焊)	JESD22-B106	Temp:max260°C Time:10sec 8min/cycle	3 cycle	22
Life Test (常温老化)	JESD22-A108	Ta=25°C±5°C IF=12: 12: 12mA	1000 hrs	22
High Temperature Life Test (高温老化)	JESD22-A108	Ta=85°C±5°C IF=12: 12: 12mA	1000 hrs	22
High Temperature High Humidity Life Test (高温高湿老化)	JESD22-A101	85°C±5°C/85%RH IF=12: 12: 12mA	1000 hrs	22

Criteria For Judging Damage (失效判定标准)

Item (项目)	Symbol (符号)	Test Conditions (测试条件)	Criteria for Judgement (判定标准)	
			Min. (最小)	Max. (最大)
Forward Voltage (正向电压)	VF	IF=12: 12: 12mA	—	(U.S.L*) × 1.1
Luminous Intensity (光通量)	ΦV	IF=12: 12: 12mA	(L.S.L*) × 0.7	—


Note (备注):

U.S.L.:Upper Standard Level (规格上限)

L.S.L.:Lower Standard Level (规格下限)

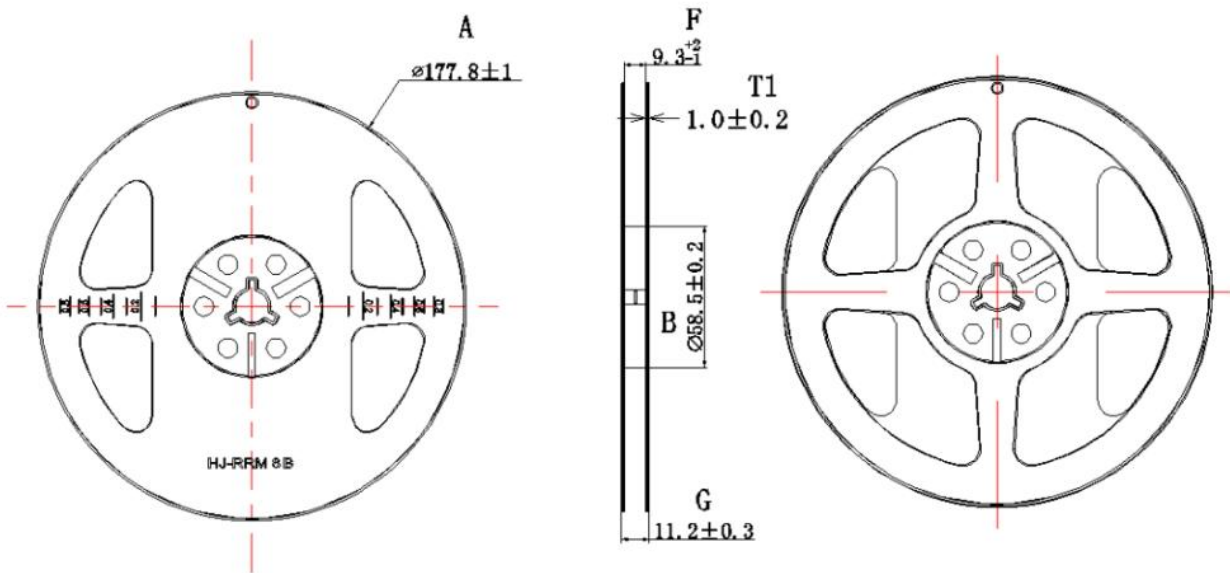
Label Explanation (标签说明)

P/N:*****			
Model: *****			
	IV (mcd)	WD(nm)	VF(V)
R:	**_**	**_**	**_**
G:	**_**	**_**	**_**
B:	**_**	**_**	**_**
x/y : **			
QTY: **K EA			
Lot No.: *****			BIN: **



- P/N:Part number (产品料号)
- Model:Product model (产品型号)
- IV:Light intensity rank (亮度)
- WLD:Wavelength BIN (波长)
- VF:Forward Voltage (电压)
- x/y: Color
- QTY:Number of packages (数量)
- Date: Production date (生产日期)
- Lot NO.:Lot number (批号)

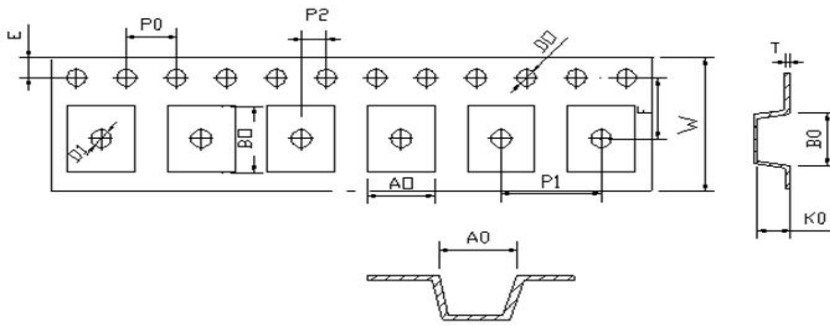
Reel Dimensions (卷盘尺寸)



Note (备注):

1. Tolerance unless mentioned is ±0.3mm; unit=mm
未标注公差为±0.3mm, 尺寸单位: mm

Carrier Tape Dimensions (载带尺寸)

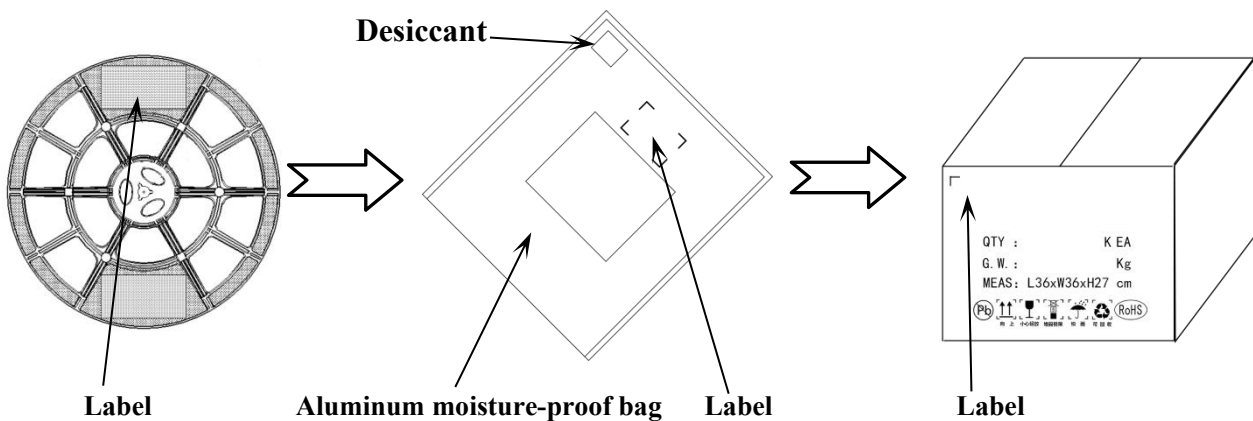


W	12.0 ± 0.10	E	1.75 ± 0.10	P0	4.00 ± 0.10	AO	5.50 ± 0.10
T	0.20 ± 0.05	F	5.50 ± 0.10	P1	8.00 ± 0.10	BO	5.80 ± 0.10
D1	1.60 ± 0.05	DO	1.60 ± 0.05	P2	2.00 ± 0.05	KO	1.90 ± 0.10

Note (备注) :

1. Tolerance unless mentioned is ±0.1mm; unit=mm.
允许公差为 ±0.1mm, 单位 mm

Moisture Resistant Packing Process (防潮包装过程)



Note (备注) :

1. The cathode is oriented towards the tape sprocket hole in accordance with ANSI/ELARS-481 specifications
负极朝向定位孔, 符合 ANSI/ELARS-481 规格。

Precautions for use Over-current-proof (通电使用时的注意事项)

Customer must apply resistors for protection otherwise slight voltage shift will cause big current change (burn out will happen).

客户必须使用电阻进行保护, 否则轻微的电压变化会引起大电流变化(会发生烧坏)。

Storage (存储)

1. Do not open moisture proof bag before the products are ready to use.

在使用之前禁止打开防潮包装。

2. Storage conditions prior to uncapping : 5 - 30 °C , maximum relative humidity of 60%.

开封前的贮藏条件: 5-30°C, 最大相对湿度为 60%。

3. After opening the package, The LEDs should be soldered within 4 hours after opening the package.

打开包装之后,应在 4hrs 内焊接完毕。

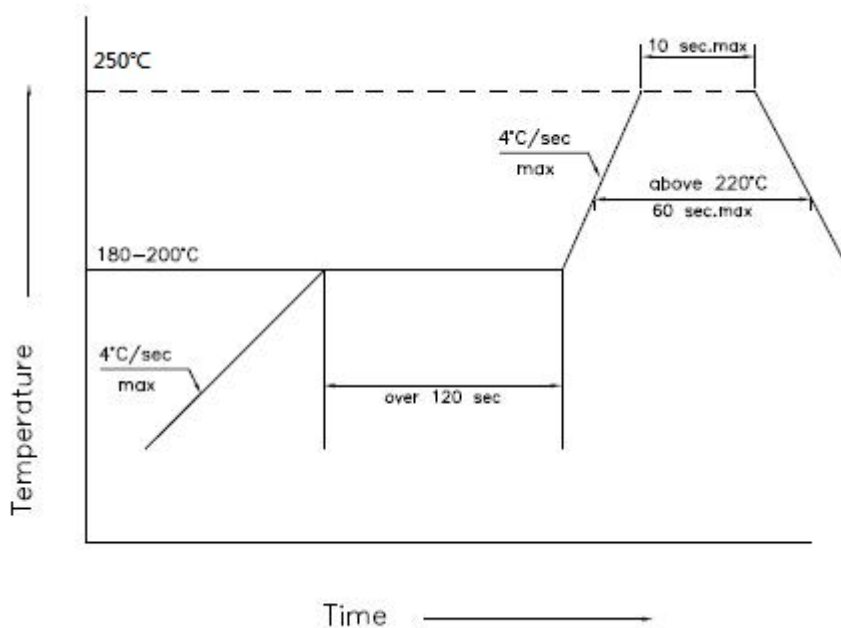
Soldering Condition (焊接条件)

1. Number of reflow process shall be less than 2 times and cooling process to normal temperature is required between first and Second soldering process.

本产品最多只可回流焊两次,且在首次回焊后须冷却至室温之后方可进行第二次回流焊。

2. Recommended soldering conditions:

推荐焊接条件:



3. LED operating environment and sulfur element composition cannot be over 25 PPM in the LED mating usage material.

LED 工作环境及与 LED 适配的材料中硫元素及化合物成份不可超过 25PPM。

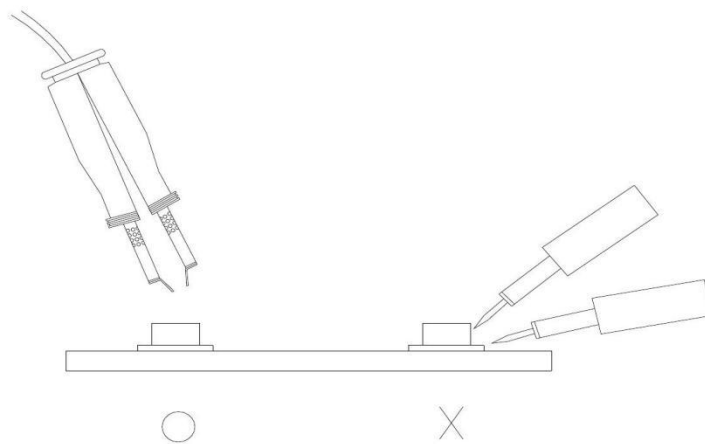
Soldering Iron (烙铁焊接)

1. When hand soldering, keep the temperature of iron below less 250°C less than 10 seconds.
当手工焊接时，烙铁的温度必须小于 250°C，时间不可超过 10 秒。
2. The hand solder should be done only one time.
手工焊接只可焊接一次。

Repairing (返修)

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.

不应在 LED 焊接后进行修复。当修复不可避免时，应使用（如下图）之类的双头烙铁，应事先确认此种修补方法会不会损坏 LED 本身。



Cautions: (使用注意事项)

1. Please check if there is air leak before opening the package, if so, please return the goods back to take drying process for later using.
在开包装之前，请先检查包装袋有无漏气，如果有漏气现象，请退回我司重新烘烤除湿包装后再使用
2. Products can be used within 6 months after packaging, after that, they must be:
抽真空包装材料未超过 6 个月可正常使用，包装袋开启后,产品必须:
 - A.Soldered within 4 hrs;
A.在 4hrs 内焊接完毕;
 - B.Used in the condition: 30°C within and 60%RH below.
B.使用条件需：温度:30°C 以内，湿度:60%RH 以下。
3. The vacuum packaging material is not used for more than 6 months after being packaged unless opening the package and take drying our process in 70°C/12H.
抽真空包装材料超过 6 个月未使用，再使用时需重新拆铝箔袋取出烘烤 70°C/12H 除湿后才可使用。