

**承 认 书**  
*SPECIFICATION FOR  
APPROVAL*

CUSTOMER (客户) : \_\_\_\_\_ 联合创新 \_\_\_\_\_

Model Number (型号) : \_\_\_\_\_ AY078D-1SF30 \_\_\_\_\_

Part Description (元件描述) : \_\_\_\_\_ switching power supply \_\_\_\_\_

Part No. of Customer (客户编号) : \_\_\_\_\_

Date of Approval (确认日期) : \_\_\_\_\_ 2019-8-07 \_\_\_\_\_

Prepared By: AOYUAN (奥源确认栏)

Reported By	Checked By	Approved By

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Customer Signature: (客户签名栏)

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东莞市奥源电子科技有限公司  
DONGGUAN AOYUAN ELECTRONICS TECHNOLOGY CO., LTD

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1	首次发行	2019-8-7	V1.0
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拟制 部门	研发中心	拟制		审核		批准	
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## 1. Scope (范围)

The AY078D-1SF30 comprises a 75 Watts multi-output LED switching power supply.  
(AY078D-1SF30 是一款多路输出总输出功率为 75 瓦的 LED 开关电源)。

## 2. Feature (特性)

1. All products including samples delivered will meet all the requirements as outlined in the document. The basic requirements of the design features are listed below:

所有提供的产品包括样品将满足本文件所描述的产品规格。其设计基本要求如下

2. Output Voltages: +12V , 2 String LED Drive.

输出电压: +12V, 2 通道 LED 驱动。

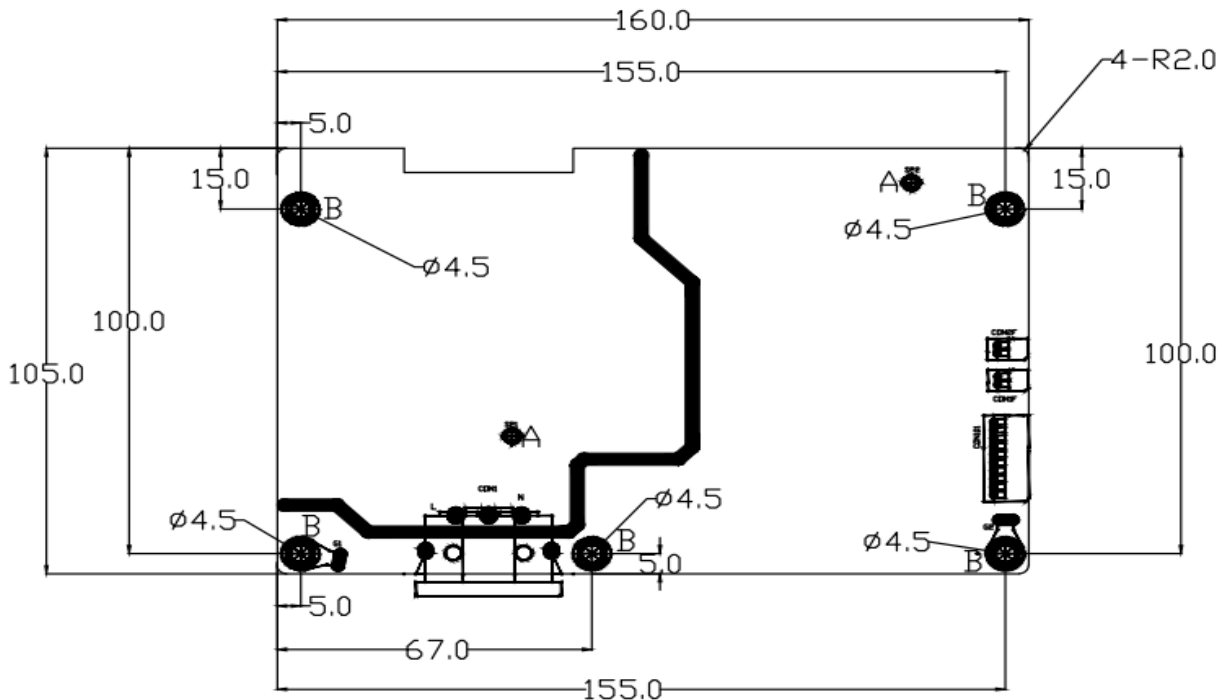
3. Short circuit protection /Over current protection/Over voltage protection  
短路保护/过流保护/过压保护。

4. High efficiency : The efficiency is greater than 80% .

效率: 大于 80% .

## 3. Physical characteristics (物理特性)

### 3.1 Outline dimensions(unit: mm) (结构图)



160.0(L)\*105.0(W)\*16.0(H) mm (长L \*宽W \* 高H) (AC座高度为22mm)

Note: The sample height not include the components pin and PCB

样品的高度不包括元件引脚和 PCB 板

### 3.2 Weight (重量)

单板样机重量约 220g

The single-board prototype weighs about 220 克

### 3.3 Power supply pin definition (电源连接器脚位定义)

Table 1. CON1 Connection and Function (插座 CON1 的引脚定义)

NO.	Pin Connection	Function
1	AC-L	AC INPUT LINE
2	NC	NC
3	GND	GROUND
4	NC	NC
5	AC-N	AC INPUT NEUTRAL

Note: CON1: is white, pitch 3.96mm, angle 180° (CON1: 白色 间距 3.96mm, 180 度)

Table 2. CON101 Connection and Function (插座 CON101 的引脚定义)

NO.	Pin connection	Function
1,2,3	+12V	+12V OUTPUT
4,5,6	GND	GROUND
7	ON/OFF	BACK LIGHT ON/OFF CONTROL
8	PWM	BRIGHTNESS CONTROL
9	ADIM	ADIM SIGNAL
10	ICTI	ICTI SIGNAL

Note: CON101: is 10Pin, pitch 2.0 mm, angle 90° (CON101: 10Pin 间距 2.0 mm, 90 度)

Table 3. CON1F, CON2F Connection and Function (插座 CON1F, CON2F 的引脚定义)

NO.	Pin connection	Function
1	LED +	LED power supply
2	LED -	LED current sense for string

Note: CON1F, CON2F: is 2Pin, pitch 2.0 mm, angle 90° (CON1F, CON2F 间距 2.0 mm, 90 度)

### 3.4 Time Sequence (时序)

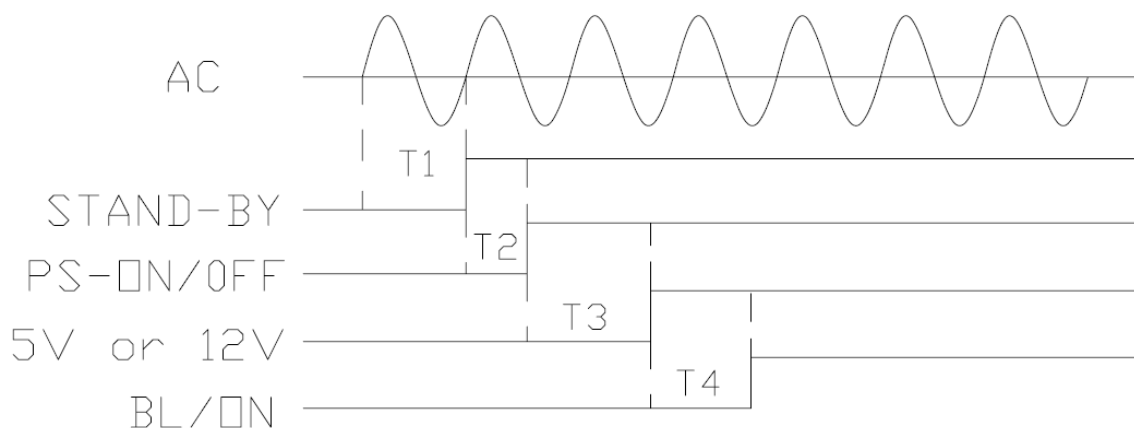


Table 4. Time Sequence (电源时序)

ITEM	MIN	TYP	MAX	UNITS
T1	0	1000	3000	ms
T2	10	-----	-----	ms
T3	5	10	-----	ms
T4	10	20	-----	ms

Note: The timing requirements for the power supply operation must meet table 6.

(电源应用时序必须符合表格 4 内要求)。

## 4. Electrical requirements (电气特性)

### 4.1 Input Electrical Characteristics Overview (输入特性)

Table 5. Input Electrical Characteristics (输入特性)

Input voltage range 输入电压	90Vac to 264 Vac
Normal voltage range 标称输入	100Vac to 240 Vac
Limited working Range 极限工作范围	90 Vac to 264 Vac
Frequency range 频率范围	50Hz/60Hz ± 5%
Max input ac current 满载输入电流	3.15A max at full load and 90Vac condition
Inrush Current 浪涌电流	100A max at full load , cold and 240Vac condition

## 4.2 Output Voltages and Loads(输出电压与负载)

Table 6. Output voltage and load. (输出电压与负载)

Output Voltage 输出电压	Regulation 调整率	Min. Load 最小负载(A)	Rate Load 标称负载(A)	Max. Load 最大负载
+12V	+10.8V- 13.2V	0.2A	2.5A	3.0A

Note: The Max current or power should be test at other of dc output at Rated load, and the max current pulse width within 100ms

最大电流或功率的测试是在其它各组负载在标称值时测试，且脉宽小于 100 毫秒

## 4.3 Cross regulation (交叉调整率)

Table 7. Output Voltage, Current & Regulation. (交叉调整率)

Vin 输入电压	Volts limit (电压范围)	Output Load(输出负载)
	12V	12V(A)
90Vac	+10.8V- 13.2V	0.2
264Vac	+10.8V- 13.2V	0.2
90Vac	+10.8V- 13.2V	2.5
264Vac	+10.8V- 13.2V	2.5

Note: 1. All of the cross load conditions, the regulation must be meet Table 7  
所有交叉负载条件内，输出调整率符合 Table 7.

2. All of the cross load conditions, the LED must be start-up 所有交叉负载条件内，LED 必须保持正常开启。



## 4.4 LED Backlight Characteristics (LED 背光电性参数)

Table 8. LED backlight characteristics. (LED 电性参数)

Parameter	Symbol	MIN	TYP	MAX	REMARK
ADIM	DC	0V	---	3V	ON/OFF=5V
Output voltage	Vout	45V	60V	68V	ON/OFF=5V, PWM=100%, ADIM=0V-3V
Output current <sub>1,2</sub> MAX	Iout	330mA	360mA	390mA	ON/OFF=5V, PWM=100%, ADIM=3V
LED input voltage	Vinput	32V	36V	40V	ON/OFF=5V, PWM=100%, ADIM=3V
Output current <sub>1,2</sub> 额定	ADIM 电压为 2.6V 时, 正常额定工作电流为 60V/300mA*2				
Output current <sub>1,2</sub>	Iout	20mA	---	40mA	ON/OFF=5V, ADJ=100%, ADIM=0.2V
备注: CON101 的 ICTI 默 认状态为高电平	CON101 的 ICTI 接入高电平---60V/420-460mA*2 ICTI 为高电平, PWM 占空比<40%				

Note: 1. ADIM 为 DC 线性调光, 亮度调节电压范围为 0-3V DC 调光, 且 0V 最暗, 3V 最亮; PWM 信号为高电平

2. 360mA\*2 电流为设定电流, 此状态下整机持续工作时长不超过 40min, 此时 ADIM 为高电平 (电压大于 3V), ICTI 为低电平, PWM 信号给 100% 占空比

3. 背光电流额定值通过 ADIM 脚电压去调节, 额定值为 300mA\*2 时, 此状态下电流可以长期工作, 电流为 600mA 时, ADIM 为 2.6V ( $\pm 5\%$  偏差), ICTI 为低电平, PWM 信号给 100% 占空比, 通过调节 ADIM 信号电压 0-2.6V 范围变动, 可实现背光电流 0-600mA 调节, 此时 ICTI 为低电平, PWM 信号给 100% 占空比

4. MPRT 模式说明: 此状态下峰值电流会到 420-460mA\*2; 此时 ICTI 和 PWM 信号为高电平, 板卡需工作在 PWM 调光状态, PWM 信号 PWM 占空比范围为 10%-40%, 频率可支持范围为 100-400HZ

## 4.5 Signal Control Level (控制电平)

Table 9. ADIM, BL-ON/OFF and PWM. (电源、背光、调光电平)

signal	ADIM voltage	BL-ON/OFF	Level	PWM voltage	RMARK
on	3V-3.3V	2.5-5.0 Vdc	high	2.5-5.0 Vdc	BL-ON/OFF, PWM, ADIM is on, output=12V and LED
off	0-0.5Vdc	0-0.5 Vdc	low	2.5-5.0 Vdc	BL-ON/OFF is off, output= only 12V

Note: 1. ADIM voltage is 0V~3.0V DC signal, 0V is minimum output, 3V is maximum output

(亮度调节电压范围为 0V~3V 直流调光, 且 0V 最暗, 3V 最亮)

2. ADIM 引脚需要给直流电压为 3V

#### 4.6 DC Output Ripple & Noise(输出纹波与噪音)

Table 10. Ripple and Noise (输出纹波和噪音)

Output Voltage	Ripple & Noise (mV)	
负载类别	阻性负载	整机负载
12V	≤240	≤400

Dimming-Resistance load(调光状态)

Output Voltage 输出电压	Ripple(Max) and Noise 动态负载 (mV)
12V	≤1200

Note: 1. Measurements shall be made with an oscilloscope with 20MHz bandwidth.

示波器须设置在 20 兆赫兹带宽

2. Outputs shall be bypassed at the connector with a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor to simulate system loading.

输出须并联 0.1uF 的陶瓷电容和 10uF 的电解电容来模拟负载

#### 4.7 DC Output Overshoot During Turn-On & Turn-Off (输出超调)

Output Voltage 输出电压	Over shoot voltage(V)超调电压	
	Turn on 开机	Turn off 关机
12V	<13.2	<13.2

Note: All of dc output current from Min to Max. 测试时负载范围：最小到最大

#### 4.8 Dynamic Response (动态响应)

Output Voltage 输出电压	Voltage Regulation 电压变化率	Slew Rate 斜率	Load Change 负载变化
12V	10%	0.2A/us	Min to 50% load and 50% to Max load 最小载至半载；半载至满载

Note:Dynamic response measurements shall be set with a load changing repetition rate of 50Hz to 200Hz.

动态测试的负载变化频率范围是 50 赫兹到 200 赫兹。

#### 4.9 Output impulse current (输出冲击电流)

Output Voltage 输出电压	+12V
Impulse Max Current (A)	10A

最大冲击电流 (A)	
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Note: The PSU should be able to power up and operate normally when output is matching system of capacitance load.

当电源输出匹配系统的容性负载时，电源应能正常开启并正常工作。

## 4.10 Protection(保护)

### 4.10.1 DC Output Over current Protection(输出过流保护)

Table 13. DC Output Over current Protection(输出过流保护)

Output Voltage	Over Current (A)	Specification
12V	3.3-8.5A	Hiccup or Shutdown

Note: 1. The over current protection should be test at other of dc output at Rated load.

过电流保护应在其它 DC 输出工作在标称负载条件下测试

2. 过流保护时，LED 背光电性参数按照 ADIM 电压为 2.6V 时，正常额定工作电流为 60V/300mA\*2

### 4.10.2 Over voltage(过压保护)

Output Voltage 输出电压	Spec (V)	Specification
12V	14V-25V	Hiccup or Shutdown

### 4.10.3 DC Output Short Circuit Protection (输出短路保护)

Table 14. DC Output Short Protection(输出短路保护)

Output Voltage	Specification
12V	Hiccup or Shutdown

Note: Each DC output shall have short circuit protection. A short condition on any of DC outputs shall cause no damage to the power supply. The unit shall recover function automatically or by next AC cycle as soon as the short condition is removed. The Short Circuit protection should be test at other of dc output at Rated load. 每路输出都有输出短路保护功能，且短路时不会对电源造成损害。一旦短路条件解除，电源将尽快自动或通过下一次重新开机恢复正常功能。另外输出短路保护应在其它 DC 输出工作在标称负载条件下测试

### 4.10.4 LED Short Circuit Protection (输出短路保护)

LED	Specification
OPEN	Hiccup or Shutdown
SHORT	Hiccup or Shutdown

#### 4.10.5 LED Open Protection (LED 开路保护)

AC Input 输入电压 (Vac)	Frequency 频率 (Hz)	LED Max Vout LED 最大输出范围 (V)	
90	47	75 min	90 max
264	63	75 min	90 max

#### 4.10.6 Fuse protection (保险丝保护)

The Fuse inside the power supply shall open when the AC input current is over the rated current of fuse. This Fuse protection will cause switching power supply to fail.

当 AC 输入电流超过保险丝的额定电流的时候，电源内部的保险丝将熔断，呈开路状态。保险丝保护启动后电源将不能启动。

#### 4.10.7 Reset After Shutdown (保护功能复位)

Recycle the AC signal, the power supply will restart after the fault removed. 故障去除后，关掉 AC 信号再打开，电源即可恢复。

#### 4.11 Efficiency(效率)

80 % min, It will be measured at the maximum load and typical line (220VAC). 效率在最大负载和典型输入电压下测量 (220V)，效率  $\geq 80\%$ 。

#### 4.12 Green mode function(环保模式)

Green mode function: input power should be under 0.3 W (12Vsb/12mA) at 240Vac. 环保模式：在 240V 交流输入下，输入功率不超过 0.3 W (12Vsb/12mA)。

#### 4.13 Turn on delay time(开机延迟时间)

The turn on delay form application of AC input power to the establishment of rated DC power voltage should not exceed 3 seconds during the range from 220Vac to 264 Vac with rate load.

开机延迟时间是指，在 220~264 V 范围交流输入与标称负载情况下，从有交流输入到有额定直流电压输出的时间间隔，并且此时间间隔不能超过 3 秒。

#### 4.14 Output voltage rise time(输出爬升时间)

Output Voltage 输出电压	Rise time (mS)
12V	$\leq 100$

The output voltage rise time from 10% to 90% of normal regulation. 输出爬升时间为正常负载时输出电压从 10% 上升到 90% 的时间。

#### 4.15 Hold-up time(关机保持时间)

The power supply shall maintain voltage regulation within the specified limits in table 8 for at least 10 milliseconds (one cycle drop) after losing of input voltage under the following conditions:

关机时间是指，在如下的条件下关断输入电压，电源输出电压在满足表格 8 所示的规格的情况下持续的时间，且这段时间最少保持 10 毫秒。

Input voltage (输入电压) : 90Vac-220Vac

Loading (负载) : Rate load (标称输出负载)

#### 4.16 Mean time between failures (MTBF) (平均无故障时间)

50000 hrs at 25 degrees centigrade when calculated using MIL-HDBK-217F. The vendor can use agreed upon F. I. T. (failure - in - time) number in place of MTBF. 在 25 摄氏度条件下，使用 MIL-HDBK-217F 估计电源的平均无故障时间大约为 50000 小时。也可以使用商用 F. I. T. 来计算平均无故障时间。

#### 4.17 Hi-pot Test(耐压测试)

100% Hi-pot tested, Primary to second: 1.8KVAC or 2525VDC 1 minute.

初级到次级，100%耐高压测试，条件是 1800V 交流或 2525V 直流输入，持续时间 1 分钟

### 5. Environmental requirement (工作环境)

#### 5.1 Temperature (环境温度)

Operating	0°C to +40 °C (non-condensing)
Store	-20°C to +70°C

#### 5.2 Humidity (环境湿度)

Operating	10% to 90% (non-condensing)
Store	5% to 95%

#### 5.3 Altitude (海拔高度)

Operating	5000m. (max)
Store	6096m. (max)

## 6. International Standards (国际性认证)

### 6.1 EMC (电磁兼容性)

#### 6.1.1 EMI standards (EMI 标准)

The power supply shall compliance with the following radio disturbance Criterion  
该电源应符合下列无线电干扰标准。

Information technology equipment 信息技术设备

EN55032	Electromagnetic compatibility of multimedia equipment — Emission requirements
GB9254	信息技术设备无线电骚扰限值和测量方法
FCC CFR 47 Part 15 subpart B:美国联邦通信法规第 47 卷 15 章内无意式的辐射器材的相关规定	

#### 6.1.2 EMS standards (EMS 标准)

The power supply shall compliance with the following immunity Criterion  
该电源应符合下列抗扰度标准

Information technology equipment 信息技术设备

EN55024	:	Information technology equipment—Immunity characteristic limits and methods of measurement	
GB/T17618	:	信息技术设备抗扰度限值和测量方法	
EN61000-4-2	:	Electrostatic discharge immunity test	CON:±4KV; AIR:±8KV;
GB/T17626.2	:	静电放电抗扰度试验	10 charge/point for Con; 10 charge/point for Air
EN61000-4-3	:	Radiated, radio-frequency, electromagnetic field immunity test	80-1000 MHz, 3 V/m, 1KHz, 80% AM Modulated
GB/T17626.3	:	射频电磁场辐射抗扰度试验	80-1000 MHz, 3 V/m, 1KHz, 80% AM Modulated
EN61000-4-4	:	Electrical fast transient/burst immunity test	AC port:±1KV
GB/T17626.4	:	电快速脉冲群抗扰度试验	
EN61000-4-5	:	Surge immunity test	AC port:
GB/T17626.5	:	浪涌（冲击）抗扰度试验	差模±2KV

		共模±4KV
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## 6.2 Safety (安全)

The power supply shall compliance with the following safety Criterion  
 电源应符合以下安全标准

Information technology equipment信息技术设备

IEC/EN60065	Audio, video and similar electronic apparatus - Safety requirements
IEC/EN60950	Information technology equipment - Safety requirements
IEC/EN62368-1	Audio/video, information and communication technology equipment -Part 1: Safety requirements
GB8898	音频、视频及类似电子设备安全要求
GB4943.1	信息技术设备 - 安全 - 第一部分 通用要求
UL60065	UL Standard for Safety for Audio, Video and Similar Electronic Apparatus - Safety Requirements
UL60950	Information technology equipment - Safety - Part 1:General Requirements
UL62368-1	Audio/video, information and communication technology equipment -Part 1: Safety requirements

Certificate	Country/国家	Standards/标准
<input type="checkbox"/> CCC	China/中国	GB8898-2011
<input type="checkbox"/> CCC	China/中国	GB4943-2011
<input type="checkbox"/> CCC	China/中国	GB4943. 1-2022
<input checked="" type="checkbox"/> CQC	China/中国	GB4943. 1-2022
<input type="checkbox"/> CQC	China/中国	GB4706
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<input type="checkbox"/> UL/CUL	USA/美国	UL62368
<input type="checkbox"/> UL/CUL	USA/美国	UL1310
<input type="checkbox"/> UL/CUL	USA/美国	UL60601-1
<input type="checkbox"/> CB	/	IEC62368
<input type="checkbox"/> CB	/	IEC60335
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<input type="checkbox"/> GS	Europe/欧洲	EN62368
<input type="checkbox"/> GS	Europe/欧洲	EN60335
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<input type="checkbox"/> UKCA	England/英国	BS EN 62368
<input type="checkbox"/> UKCA	England/英国	BS EN 60335
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<input type="checkbox"/> UKCA	England/英国	BS EN 60601-1
<input type="checkbox"/> RCM	Australia/澳洲	AS/NZS 62368
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<input type="checkbox"/> KC	Korea/韩国	K62368
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<input type="checkbox"/> EAC	Russia/俄罗斯	IEC 62368
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<input type="checkbox"/> EAC	Russia/俄罗斯	IEC 61558
<input type="checkbox"/> EAC	Russia/俄罗斯	IEC 60601-1



## 7. Notice (注意事项)

7.1、For safety issue, please keep 4.0mm at least from the metal parts of the system. Or put a high-voltage insulator between the power and the metal parts to avoid the situation of Hi-POT failure or arcing---etc.

出于安全问题的考虑,请在组装时确保板和系统金属材料间保持至少 4mm 以上的距离,或者使用具有足够绝缘等级的绝缘材料加以隔离,以避免产生高压放电

7.2、Don' t twist, deform, drop or knock the power supply during assembly  
组装时,请确保无扭曲,弯折,掉落及碰撞等现象的发生

7.3、The power supply is usually designed without the case. Please take care about ESD at anytime

因为本产品为无外壳之设计,故在任何时候均应注意静电防护

7.4、When assembling, in order to avoid interference, please separate AC cable, DC output cable and LED cable from each other, and keep some distance.

组装时,为避免干扰,请把 AC 输入线、DC 输出线与 LED 输出线三线分开并保持一定的距离排放。

## 8. Function Layout (产品外观图)

Considering the stability of material supply and the competitiveness of cost , we'll use 2-3 brands for each component of this model.this picture is for you reference only. If you have any requests, please contact with us.

考虑到物料供应的稳定性和成本控制的竞争性，本产品相关物料可能会使用到两至三个品牌规格。此图片仅供参考，有特殊要求请贵司提出双方共同确认

