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## 1. SCOPE/概述

The document details the electrical, mechanical and environmental specifications of a SMPS, the power supply provides **24 W** continuous output power.

资料详细描述了一款 **24 W**(连续输出功率)开关电源的电气性,结构性及环境等要求.

The power supply shall meet the **RoHS** requirements.

此款电源符合 **RoHS** 要求.

### Description/描述:

- SMPS Adapter(Wall mount)/插墙式适配器       SMPS Adapter(Desk-top)/桌面型适配器  
 Open Frame/开放式结构       SMPS Unit (With Case)/带铁壳型  
 Others/其他

## 2. Input Characteristics/输入特性

### 2.1. Input Voltage & Frequency/输入电压与频率

The range of input voltage is from **90Vac** to **264Vac** with a single phase.

输入电压范围: 从 **90Vac** 到 **264Vac**, 单相输入.

	Minimum/最小	Rating/额定值	Maximum/最大
Input Voltage/输入电压	<b>90Vac/60Hz</b>	<b>100Vac~240Vac</b>	<b>264Vac/50Hz</b>
Input Frequency/输入频率		<b>50Hz/60Hz</b>	

### 2.2. Input AC Current/输入交流电流

**0.7Amax. @ 90Vac input & Full load/在 90Vac 输入和满载条件下最大 0.7A**

### 2.3. Inrush Current (cold start)/浪涌电流(冷启动)

Power supply inrush current shall be less than the ratings of its critical components (including bulk rectifiers, fuses, and surge limiting device) under all conditions of line voltage of Section 2.1.

在 2.1 中所有输入条件下, 浪涌电流应小于关键器件的额定值(包括保险丝、桥整等浪涌限制元件)。

### 2.4. Average Efficiency /平均效率

While input 115Vac and 230Vac, the average efficiency is more than **86.2%**. The test point is at 25%, 50%, 75% and 100% of max load respectively.

在输入 115Vac 和 230Vac 条件下, 平均效率不小于 86.2%。测试点分别是最大载的 25%, 50%, 75% 和 100%。

### 2.5. No-Load Input Power Dissipation/输入空载功率损耗

While input 115Vac or 230Vac and the output is no load, the input power loss must be less than **100mW**.

在输入 115Vac/230Vac, 空载功耗小于 **100mW**.

## 3. Output Characteristics/输出特性

### 3.1. Static Output Characteristics <Vo & R+N>/静态输出特性<输出&纹波+噪音>

Output	Rated Load/额定负载		Output Range	R+N	Remark
Rating	Min. Load	Max. Load	输出电压范围	纹波与噪声	备注
<b>+12.0V</b>	<b>0A</b>	<b>2.0A</b>	<b>11.4V ~ 12.6V</b>	<b>180mVp-p</b>	

Ripple & Noise: Tested by a oscilloscope using 20MHz bandwidth and the output is paralleled a 0.1uF ceramic capacitor and a 10uF electrolysis capacitor. (Under the input Voltage 100~240Vac)

纹波与噪声: 量测时示波器选用 20MHz 带宽限制,输出端要并联一颗 0.1uF 的陶瓷电容和一颗 10uF 的电解电容(输入电压 100~240Vac)

### 3.2. Line/ Load Regulation/线性/负载调整率

Output Rating	Load Condition/负载条件		Line Regulation 线性调整率	Load Regulation 负载调整率	Remark 备注
	Min. Load	Max. Load			
+12.0V	0A	2.0A	±2%	±5%	

### 3.3. Turn - on Delay Time/开机延迟时间

3S max. @ 90Vac input & Full load/在 90Vac 输入和满载条件下最大 3S

### 3.4. Hold-up Time/关机维持时间

10mS min. @115Vac/50Hz input turn off at output current 1.6A

在 115Vac/50Hz 输入, 1.6A 情况下关机, 最小 10mS

### 3.5. Rise Time/上升时间

200mS max. @ Full load/在满载条件下最大 200mS

### 3.6. Fall Time/下降时间

20mS max. @ Full load/在满载条件下最大 20mS

### 3.7. Output Overshoot / Undershoot/输出过冲/欠冲

10% max. When the power on or off/当电源开, 关机时最大 10%

### 3.8. Output Load Transient Response/输出负载瞬态响应

Output voltage is within 11.4-12.6V while the load step is from 25% to 50% to 25% of max load or 50% to 75% to 50% of max load, R/S: 0.1A/uS, periods: 4mS, Output Overshoot is less then ±5%.

输出电压在 11.4-12.6V 之间,负载变化: 从最大载的 25%到 50%再到 25%或从最大载的 50%到 75%再到 50%,斜率: 0.1A/uS,周期: 4mS, 输出过冲应小于±5%.

## 4. Protection Requirements/保护要求

### 4.1. Over Current Protection/过流保护

OCP Point Limited:  $\geq 2.1A$  保护点限制:大于等于 2.1A

The output shall hiccup when the over current applied to the output, and shall be self-recovery when the fault condition is removed

当过电流时,输出将进入打嗝模式,当过流情况解除后,产品将会自动恢复正常

### 4.2. Short Circuit Protection/短路保护

The input power shall decrease when the output is short to GND; the power supply shall not damage, and shall be self-recovery when the fault condition is removed

当输出对地短路时,产品输入功率降低且不会损伤,当短路情况解除后,产品将会自动恢复正常

### 4.3. Over Voltage Protection/过压保护

OVP Point Limited:  $V_{ovp} \leq 18V$ /过压保护点限制: 小于等于 18V

The power supply shall be hiccup mode, when the output is over voltage, and the power supply shall not be damaged.

当输出过压时,电源进入将打嗝保护模式产品不会损伤

## 5. Environment Requirements/环境要求

### 5.1. Operating Temperature and Relative Humidity/操作温度和湿度要求

0°C to +40°C

10%RH to 95%RH

### 5.2. Storage Temperature and Relative Humidity/存储温度和湿度要求

-40°C to +70°C

10%RH to 95%RH (non-condensing) @ Sea level shall below 5000M

在海拔低于 5000M 的条件下, 低温存储下限为-40°C (无结冰环境); 高温存储上限为 +70°C,相对湿度为 10%RH to 95%RH。

## 6. Reliability Requirements/可靠性要求

### 6.1. Drop in/跌落

6 Surfaces each once, Height: 100cm, on the cement plane

6 面各一次, 跌落高度: 100 厘米, 跌落到水泥地板上

### 6.2. Vibration/振动

10 to 300Hz sweep at a constant acceleration of 1.0G (Breadth: 3.5mm Max) for 1Hour for each of the perpendicular axes X, Y, Z

扫描频率: 10 to 300Hz, 恒定加速度: 1.0G(位移: 最大 3.5mm), X, Y, Z 三垂直坐标轴向各振动 1 小时

### 6.3. MTBF Qualification/平均间隔故障时间估算

The MTBF shall be at least 100,000hours at 25°C, Full load and nominal input condition

平均间隔故障时间: 至少 100,000 小时,25°C 环境及额定输入与满载条件下

### 6.4. The lifetime electrolyte capacitor/电解电容寿命

The lifetime of electrolyte capacitor shall be at least 26280 hours at 30°C, of full load and 100Vac/240Vac input condition

电解电容寿命至少 26280 小时,30°C 环境及 100Vac/240Vac 输入满载条件下

## 7. EMI/EMS Standards/EMI/EMS 标准

### 7.1. EMI Standards/EMI 标准

EN 55032: 2015

EN 61000-3-2:2014

EN 61000-3-3:2013

满足最新标准

### 7.2. EMS Standards/EMS 标准

EN 61000-4-2:2009	Electrostatic Discharge(ESD): 15kV air discharge, 8kV contact discharge
EN61000-4-3 : 2006+ A1 : 2008 + A2: 2010	Radio-Frequency Electromagnetic Field Susceptibility Test-RS

EN61000-4-4: 2012	Electrical Fast Transient/Burst-EFT ±2kV
EN 61000-4-5:2014	Surge Immunity Test: Differential mode ±2kV, Common mode ±2kV
EN61000-4-6: 2014	Conducted Radio Frequency Disturbances Test-CS
EN61000-4-8: 2010	Power Frequency Magnetic Field Test
EN61000-4-11:2004	Voltage Dips

## 8. Safety Standards/安规标准

### 8.1. Dielectric Strength(Hi-pot)/介电耐压强度(高压)

Primary to Secondary: 3000Vac / 3.5mA / 60 seconds

Or 4242Vdc / 3.5mA / 60 seconds

初级对次级: 3000Vac / 3.5mA / 60 秒

或 4242Vdc / 3.5mA / 60 秒

### 8.2. Leakage Current/漏电流

0.25mAmax. at 264Vac / 50Hz input/在输入 264Vac/50Hz 的条件下最大 0.25mA

### 8.3. Insulation Resistance/绝缘阻抗

20MΩ min. @ primary to secondary add a 500Vdc test voltage

在初级与次级间加 500Vdc 进行测试,最小 20MΩ

### 8.4. Regulatory Standards/安规标准

Type	Country	Standard	Type	Country	Standard
<input type="checkbox"/> UL/CUL	USA	UL60950-1	<input type="checkbox"/> PSB	Singapore	IEC60950-1
<input type="checkbox"/> TUV	Europe	EN60950-1	<input type="checkbox"/> PSE	Japan	J60950
<input checked="" type="checkbox"/> CCC	China	GB4943	<input type="checkbox"/> NOM	Mexico	NOM-001
<input type="checkbox"/> CE	Europe	EN60950-1	<input type="checkbox"/> GOST	Russia	MEK60950
<input type="checkbox"/> CB	/	IEC 60950-1	<input type="checkbox"/> CB	/	IEC 60065

## 9. Mach. Outline Drawing/外观图

