Specification For 5 Watts/ Switching Mode Power Supply

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1. SCOPE/概述

The document details the electrical, mechanical and environmental specifications of a SMPS, the power supply provides 5 W continuous output power.

资料详细描述了一款 5 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 Without Halogen requirements.

此款电源符合无卤要求。

.Description/描述：

- ■ SMPS Charger(Wall mount)/插墙式充电器
- □ 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	90Vac	100Vac~240Vac	264Vac
Input Frequency/输入频率	47Hz	60Hz/50Hz	63Hz

2.2. Input AC Current/AC 输入交流电流

0.2Amax. @ 90Vac input & Full load/在 90Vac 输入和满载条件下最大 0.2A。

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

30Amax. @ 230Vac input/在 230Vac 输入条件下最大 30A。

2.4. Average Efficiency /平均效率

While input 115Vac and 230Vac, the average efficiency is more than 73.77%.The test point is at 25%, 50%, 75% and 100% of max load respectively. The efficiency is more than 64.59% at 10% of max load.

在输入 115Vac 和 230Vac 条件下，平均效率不小于 73.77%,测试点分别是最大载的 25%,50%,75%和 100%。最大负载 10%的时候，效率大于 64.59%。

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 0.075W.

在输入 115Vac/230Vac 条件下，空载功耗小于 0.075W。

2.6. Flow Backward Electric Current Tests/倒灌电流测试

When cut down AC power, input 0—5V DC power into charger, the current should less than 5mA.

当充电器不接交流电的条件下,在充电器输出端加入 0—5VDC 直流电压,通过充电器的电流应小于 5mA。

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 Rating	Rated Load/额定负载			Output Range 输出电压范围	R+N 纹波与噪声	Remark 备 注
	Rated. Load	CC Mode	Range CV：3.5-4.85V			
+5V	1000mA	1A	1.0-1.2 A	4.85V ~5.25V	150mVp-p	

1. Load range CV：Under the input Voltage 100 Vac~240Vac.

CV 模式测试在 100Vac~240Vac 输入条件下测试。

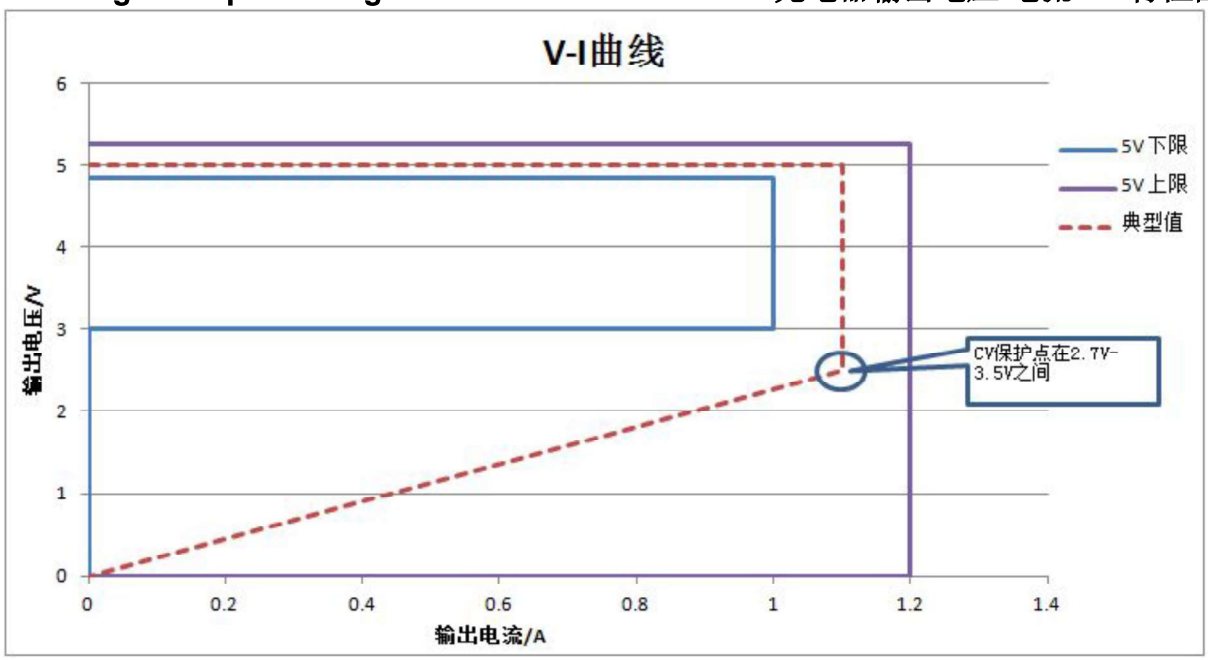
2. Under the input Voltage 100 Vac~240Vac.

测试在 100Vac~240Vac 输入条件下测试。

3.Ripple & Noise: Tested by an 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 0.1uF 的陶瓷电容和 10uF 电解电容各一颗(输入电压 100~240Vac)。

3.2. Charger Output Voltage/Current Characteristics/充电器输出电压/电流 V-I 特性图



5V 下限制		典型值		5V 上限	
4.85	0	5	0	5.25	0
4.85	1	5	1.1	5.25	1.2
3.5	1	3	1.1	2.7	1.2
3.5	0	0	0	0	1.2
0	0	0	0	0	1.2
		0	0	0	0

3.3. Turn - on Delay Time/开机延迟时间

3S max. @ 100-240 Vac input & Full load./在 100-240Vac 输入和满载条件下最大 3S。

3.4. Hold-up Time/关机维持时间

5mS min. @ Full load &115Vac/60Hz input turn off at worst case.

在 115Vac/60Hz 输入, 满载同时最差情况下关机，最小 5mS。

10mS min. @ Full load &230Vac/50Hz input turn off at worst case.

在 230Vac/50Hz 输入, 满载同时最差情况下关机，最小 10mS。

3.5. Rise Time/上升时间

50mS max. @ Full load./在满载条件下最大 50mS（VON=3V）。

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 ±10%while the load step is from 10% to 90%,0 to 50% of max load, R/S: 0.25A/uS, frequency: 1000Hz and 0.5mS duration at 90% of max load.

输出电压在±10%之间,负载变化: 从最大载的 10%到 90%,0 到 50%斜率: 0.25A/uS,频率: 1000Hz, 90%负载持续时间为 0.5mS。

3.9. Capacitance Load/容性负载

While input 90Vac and capacitance load is 1000uF,the adapter can turn on normally and the output is in the rated range.

在输入 90Vac，1000uF 容性负载条件下，适配器能正常开机，并且输出电压范围在额定范围下。

3.10. Temperature Coefficient/温度系数

±0.02%/℃ max./最大为±0.02%/℃

4. Protection Requirements/保护要求

4.1. Over Current Protection/过流保护

OCP Point Limited: 1.0-1.5A /保护点限制:1.0-1.5A.

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

When the output voltage is over, the output voltage is less than 150% of the rated output voltage.

当输出过压时,输出电压不高于额定输出电压的 1.5 倍。

5. Environment Requirements/环境要求

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

-10℃ to +45℃

5%RH to 95%RH

Sea level shall below 5,000 meter/在海拔低于 5000 米的条件下，能正常工作。

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

-40℃ to +70℃

5%RH to 95%RH non-condensing@ Sea level shall be low 9,000 meter

在海拔低于 9,000 米的条件下，低温存储下限为-40℃（无结冰环境）；高温存储上限为+70℃,相对湿度为 5%RH to 95%RH。

6. Reliability Requirements/可靠性要求

6.1. Lifetime /寿命

The lifetime shall be at least 21900 hours at 25℃, 80% full load and 115Vac/230Vac input condition.

寿命至少 21900 小时，25℃工作温度环境，115Vac/230Vac 输入与 80%负载条件。

6.2. MTBF Qualification/平均间隔故障时间估算

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

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

6.3. Environmental reliability/环境可靠性

6.3.1. High and low temperature storage /高低温存储

The power supply with non-operated stored in -40℃/70℃ for 24 hours, , no abnormality in electric and mechanical characteristic after 2 hours recovery at the room temperature.

在低温-40℃—70℃环境下存储 24 小时，恢复 2 小时后，电源能正常开机，输出电压范围在额定范围内。

6.3.2. High and low temperature operating /高低温工作

Ambient temperature: -10℃—45℃, input voltage: 90Vac/264Vac & full load, in two input voltage for each work 12hours; No abnormality in electric and mechanical characteristic after 2 hours recovery at the room temperature.

环境温度为-10℃—45℃，输入电压为 90Vac 和 264Vac。工作负载 为满载。在二种电压应力下分别工 12 小时。测试结束后在常温下恢复 2 小时，电气性能和机械性能无异常。

6.3.3. High and low temperature cycle work/高低温循环工作

Ambient temperature: -10~45℃, high-low temperature each settle 3 hours, temperature change: 1℃/min, aggregately cycle 2.

环境温度：-10~45℃，高低温各停留 3 小时，温度改变时间 1℃/min，共 2 个循环。

6.3.4. Temperature impact/温度冲击

-40~70℃ temperature impact: at -40~70℃,high-low temperature each settle 1 hour, conversion time is less than 20S,aggregately cycle 24

-40~70℃温度冲击： -40~70℃， 高低温各停留 1 个小时， 温度转换时间小于 20s， 共 24 个循环。

6.4. Mechanical reliability/机械可靠性

6.4.1. Load test/载重测试

70Kgf @ 2S. /对外壳施加 70Kgf，保持 2S。

6.4.2. Vibration/振动

10 to 300Hz sweep at a constant acceleration of 1.0G (Breadth: 3.5mm Max) for 1 Hour 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。

6.4.3. Working impact test/工作冲击测试

3 Edges thrice, half sine wave, acceleration 30G, pulse breadth for 11 mS.

半正弦波，加速度为 30G，脉冲宽度为 11mS，X、Y、Z 三方向，各 3 次。

6.4.4. Plug endurance test/插拔耐久测试

6000times @ 20-30 times every minute

6000 次@20-30 次/min。

6.4.5. Charger room temperature controlled drop test/常温受控跌落测试

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

6 面各一次，跌落高度: 100 厘米，跌落到水泥地板上。

6.4.6. Inserting and Pulling out force test/插拔力测试

Insertion force：5N~~20N Pullout force：8N~~20N（before 1000times）

Pullout force：6N~~20N（after 1000times）

插入力：5N~~20N　拔出力：8N~~20N（1000 次循环前）拔出力：6N~~20N（1000 次循环后）

6.4.7. Label/Nameplate durability test/标示/铭牌耐久性测试

Dips in water cotton cloth to wipe 15S, then dip gasoline cotton cloth to wipe 15S.

蘸水棉布擦拭 15S，然后蘸汽油棉布擦拭 15S。

6.4.8. Salt spray test/盐雾测试

5%NaCl, 35℃, 8 hours, Dry 16 hours.

5%NaCl，35℃，8 小时，晾干 16 小时。

7. EMI/EMS Standards/EMI/EMS 标准

7.1. EMI Standards/EMI 标准

EN 55022
EN 61000-3-2
EN 61000-3-3
CISPR 22 AS/NZS CISPR 22
满足最新标准

7.2. EMS Standards/EMS 标准

IEC 61000-3-2	Harmonic current emissions
IEC 61000-3-3	Voltage fluctuations & flicker

IEC*61340-5-1*	Electrostatic Discharge(ESD): 15kV air discharge,8kV contact discharge
IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test-RS
IEC 61000-4-4	Electrical Fast Transient/Burst-EFT±1kV
IEC 61000-4-5	Surge Immunity Test: Differential mode 1kV, Common mode 2kV
IEC 61000-4-6	Conducted Radio Frequency Disturbances Test-CS
IEC 61000-4-8	Power Frequency Magnetic Field Test
IEC 61000-4-11	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 / 10mA / 60secondor 4242Vdc / 10mA / 60second

初级对次级: 3000Vac / 10mA / 60 秒 或 4242Vdc / 10mA / 60 秒

0.02mAmax. at 264Vac / 50Hz/在输入 264Vac/50Hz 的条件下最大 0.02mA

8.2. Insulation Resistance/绝缘阻抗

100MΩ min. at primary to secondary add a 500Vdc test voltage

在初级与次级间加 500Vdc 进行测试,最小 100MΩ

8.3. Regulatory Standards/安规标准

Type	Country	Standard	Type	Country	Standard
☐ UL/CUL	USA	UL60950-1	☐ PSB	Singapore	IEC60950-1
☐ TUV	Europe	EN60950-1	☐ PSE	Japan	J60950
■ CCC	China	GB4943	☐ NOM	Mexico	NOM-001
☐ CE	Europe	EN60950-1	☐ GOST	Russia	MEK60950

9. 净重/ net weight:

9.1.净重为 30g/1PCS

10. Mach. Outline Drawing/外观图