

规格书

SPECIFICATION FOR APPROVAL

客 户 名 称 (CUSTOMER):

客 户 料 号 (PART NO.):

客 户 品 名 (DESCRIPTION): 17 串三元电池充电器

品 名 (DESCRIPTION): 71.4V4A

日 期 (DATE): 2023-08-15

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with your approved signatures

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| 客户承认(CUSTOMER APPROVAL)   |                     |                      | 公司承认 ( APPROVAL)          |                     |                      |
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# 目 录

## Catalog

|                                                                 |   |
|-----------------------------------------------------------------|---|
| 变更履历表.....                                                      | 3 |
| 1. 导言Introduction.....                                          | 4 |
| 1.1 电源概况Power Supply Overview.....                              | 4 |
| 1.2 支持文件Applicable Documents.....                               | 4 |
| 2 电气规格 Electrical Specification .....                           | 4 |
| 2.1 AC输入 AC Input .....                                         | 4 |
| 2.1.1输入电压 Input Voltage .....                                   | 4 |
| 2.1.2输入频率 Input Frequency .....                                 | 5 |
| 2.1.3冲击电流 Inrush Current .....                                  | 5 |
| 2.1.4最大输入电流Input Current Limiting .....                         | 5 |
| 2.1.5效率Efficiency .....                                         | 5 |
| 2.2输出规格Output Specification .....                               | 5 |
| 2.2.1电压调整率DC Voltage Regulation .....                           | 5 |
| 2.2.2 输出电流及指示灯DC Output Current And The LED Light.....          | 5 |
| 2.2.3输出纹波与噪声Output Ripple and Noise .....                       | 6 |
| 2.2.4输出动态负载响应 定电流模式 Output Dynamic Load Response CC model ..... | 6 |
| 2.2.5电压过冲Overshoot at turn-on/ turn-off .....                   | 6 |
| 2.3保护功能Protection Function . .....                              | 6 |
| 2.3.1短路保护Short Circuit Protection .....                         | 6 |
| 2.3.2过流保护Over Current Protection.....                           | 7 |
| 2.4时序特性Timing .....                                             | 7 |
| 2.4.1保持时间Hold up Time .....                                     | 7 |
| 2.4.2启动时间Start up Time .....                                    | 7 |
| 3. 环境要求Environment Requirement.....                             | 7 |
| 3.1 温度Temperature.....                                          | 7 |
| 3.2湿度Humidity.....                                              | 7 |
| 3.3海拔高度Altitude.....                                            | 7 |
| 4. 可靠性Reliability .....                                         | 7 |
| 4.1 平均无故障间隔时间MTBF (MIL-HDBK-217F) .....                         | 7 |
| 4.2 老化寿命测试Burn-in and Life test.....                            | 7 |
| 5. 产品安规要求Product Safety Requirement.....                        | 8 |
| 5.1标准Standard .....                                             | 8 |
| 5.2泄露电流Leakage Current.....                                     | 8 |
| 5.3绝缘阻抗 Insulation Resistance .....                             | 8 |
| 5.4绝缘强度Dielectric Strength Testing.....                         | 8 |
| 6. 结构尺寸Mechanical Dimensions (单位:mm Unit:mm) .....              | 8 |
| 6.1 标贴 Label.....                                               | 8 |
| 6.2结构尺寸Mechanical Dimensions .....                              | 8 |
| 7 声明 Statement.....                                             | 9 |



1. 导言 Introduction

1.1 电源概况 Power Supply Overview

本产品效率高，可靠性高等特点，具有短路保护，过流保护等保护功能。

This product has the feature such as high efficiency and high reliability, and it also has the protection function such as short-circuit protection, over voltage protection and over current protection.

1.2 支持文件 Applicable Documents

本产品验证测试过程中遵循并选用以下标准（但不局限于）：

The products choose the standards as following for design verification test（but no limited）.

GB/T 2423.1-01 电工电子产品基本环境试验规程 试验 A：低温试验方法  
Basic environmental testing procedures for electric and electronic products Tests A: Cold

GB/T 2423.2-01 电工电子产品基本环境试验规程 试验 B：高温试验方法  
Basic environmental testing procedures for electric and electronic products Tests B: Dry heat

GB/T 2423.3-93 电工电子产品基本环境试验规程 试验 Ca：恒定湿热试验方法  
Basic environmental testing procedures for electric and electronic products Test Ca: Damp heat, steady state

GB/T 2423.4-93 电工电子产品基本环境试验规程 试验 Db：交变湿热试验方法  
Basic environmental testing procedures for electric and electronic products Test Db: Damp heat cyclic

GB/T 2423.5-95 电工电子产品环境试验 第 2 部分：试验方法 试验 Ea 和导则：冲击  
Environmental testing for electric and electronic products. Part 2: test methods. Test Ea and guidance: Shock

GB/T 2423.6-95 电工电子产品环境试验 第 2 部分：试验方法 试验 Eb 和导则：碰撞  
Environmental testing for electric and electronic products. Part 2: Test methods. Test Eb and guidance: Bump

GB/T 2423.8-95 电工电子产品环境试验 第 2 部分：试验方法 试验 Ed 和导则：自由跌落  
Environmental testing for electric and electronic products. Part 2: Test methods. Test Ed: Free fall

GB/T 2423.10-95 电工电子产品环境试验 第 2 部分：试验方法 试验 Fc 和导则：振动（正弦）  
Environmental testing for electric and electronic products. Part 2: Test methods. Test Fc and guidance: Vibration(Sinusoidal)

GB/T 2423.11-97 电工电子产品环境试验 第 2 部分：试验方法 试验 Fd 和导则：宽频带随机震动——一般要求  
Environmental testing for electric and electronic products. Part 2: Test methods. Test Fd: Random Vibration wide band\_ general requirements.

GB/T 2423.22-87 电工电子产品基本环境试验规程 试验 N：温度变化试验方法  
Basic environmental testing procedures for electric and electronic products. Test N: Change of temperature

GB 4943-2003 信息技术设备的安全  
Safety of information technology equipment

GB 17625.1-1998 低压电气及电子设备发出的谐波电流限值（设备每相输入电流≤16A）  
The limits for the harmonic current emissions caused by low-voltage electrical and electronic equipments(equipment input current≤16A per phase)

GB/T 17626.2-1998 电磁兼容 试验和测量技术 静电放电抗扰度试验  
Electromagnetic compatibility-Testing and measurement techniques-Electrostatic discharge immunity test

GB/T 17626.4-1998 电磁兼容 试验和测量技术 电快速瞬变脉冲群抗扰度试验  
Electromagnetic compatibility-Testing and measurement techniques-Electrical fast transient/ burst immunity test

GB/T 17626.5-1998 电磁兼容 试验和测量技术 浪涌（冲击）抗扰度试验  
Electromagnetic compatibility-Testing and measurement techniques-Surge immunity test

GB/T 17626.11-1998 电磁兼容 试验和测量技术 电压暂降、短时中断和电压变化的抗扰度试验  
Electromagnetic compatibility-Testing and measurement techniques-Voltage dips, short interruptions and voltage variations immunity tests

2 电气规格 Electrical Specification

2.1 AC 输入 AC Input

2.1.1 输入电压 Input Voltage

表格 1：列举 AC 输入电压范围，在此电压范围内，电源应正常工作并符合所有电气性能要求。

Table 1: Lists the AC input operating voltage range. The power shall work normally and meet all electrical requirements throughout this range.

表格 1：AC 输入电压限值 Table 1: AC Input Voltage Limitations

|             |             |             |
|-------------|-------------|-------------|
| 最小值 Minimum | 额定值 Nominal | 最大值 Maximum |
| 110Vac      | 220Vac      | 240Vac      |

2.1.2 输入频率 Input Frequency

表格 2：列举 AC 输入频率范围，在此频率范围内，电源应正常工作并符合所有电气性能要求。

Table 2: List the AC input operating frequency range. The power shall work normally and meet all electrical requirements throughout this range.

Table 2: AC Input Frequency Limitations AC 输入频率限值

|             |             |             |
|-------------|-------------|-------------|
| 最小值 Minimum | 额定值 Nominal | 最大值 Maximum |
| 47Hz        | 50Hz/60Hz   | 63Hz        |

2.1.3 冲击电流 Inrush Current

冲击电流峰值在额定电压输入，冷启动（25℃）时，不大于 50A;且在任何负载和输入条件下，不导致永久性损坏或危险，输入电压的定义见表格 1.

Peak inrush current shall be limited to 50A of rated input voltage and cold start at 25 degrees C, and shall not result in a permanent damage of the power supply under any conditions of load and input voltage as specified at any input voltage as specified in table 1.

2.1.4 最大输入电流 Input Current Limiting

在输入电压最小值，负载为满载条件下，最大输入电流不大于 5.0A。

The input current should be less than 3.0A, under minimum AC input and full load.

2.1.5 效率 Efficiency

在额定输入电压，最大负载和额定负载条件下，电源的效率大于 85%.

The power supply efficiency shall be greater than 85% under rated input voltage. It will be measured at the typical load and maximum load.

2.2 输出规格 Output Specification

2.2.1 电压调整率 DC Voltage Regulation

在输出端子量测的电压需符合表格 3 中标示的调整范围。

电压调整的限值不包括 2.2.4 节中要求的 DC 负载瞬态变化。

The DC output voltages will remain within the regulation ranges shown in Table 5 when measured ate the load end of the output connectors.

The voltage regulation limits do not include the transient DC load changes, which are covered in Section 3.2.4.

表格 3：输出电压调整限值 Table 3: DC Output voltage regulation limits

|                 |                                   |                            |                          |
|-----------------|-----------------------------------|----------------------------|--------------------------|
| Parameter<br>参数 | Charging finish voltage<br>充电电压范围 | Voltage regulation<br>电压调整 | Cross regulation<br>交叉调整 |
| V1:71.4V        | 71.3-71.5V                        | /                          | N/A                      |

2.2.2 输出电流及指示灯 DC Output Current And The LED Light

表格 4：输出电流限值 定电压模式 Table4: DC output current limits CV model

| Parameter 参数 | Min Current<br>最小恒电流 | Rate Current<br>标称电流 | Max Current<br>最大电流 | Unit 单位 |
|--------------|----------------------|----------------------|---------------------|---------|
| V1: 71.4V    | 3.6                  | 4                    | 4.4                 | A       |
| 标称充电电流       | 标称充电电流时最小电压          |                      | 标称充电电流时标称电压         |         |
| 4.0A         | 42.5V                |                      | 69.4V               |         |
| 充电 LED 指示    |                      |                      |                     |         |
| 接入 AC 插座时    | 绿色                   |                      | 输出电流<500mA          |         |
| 充电时          | 红色                   |                      | 输出电流>500mA          |         |
| 充电完成         | 绿色                   |                      | 输出电流<500mA          |         |

2.2.3 输出纹波与噪声 Output Ripple and Noise

下面表格 5 是纹波与噪声要求，以 2.2.2 节中定义的负载范围和 2.1.1 节定义的输入电压为测试条件，纹波与噪声均应符合要求，测试时示波器设置为 20MHz 带宽，输出端并接一 0.1uF 瓷片电容和一 10uF 钽电解电容（低 ESR 值）。

The following table 5 is output ripple and noise requirements, it will be met throughout the load ranges specified in Section 2.2.2 and under all input voltage conditions as specified Section 2.1.1, Measurements will be made with an oscilloscope set to 20MHz bandwidth limit. The outputs will be bypassed with one 0.1uF multilayer (type X7R) and one 10uF tantalum electrolytic (low ESR) capacitors.

表格 5：纹波与噪声限值 定电压模式 Table 5: Output ripples and noise limits CV model

| 参数 Parameter | 最大值 Max.               |
|--------------|------------------------|
| V1: 71.4V    | 2000mVp-p@25 degrees C |

2.2.4 输出动态负载响应 定电流模式 Output Dynamic Load Response CC model

输出电压在下列表格 6 定义的负载变化时，符合规格要求，负载变化率为 0.1Amps/uS, 50Hz~10 KHz 之间。

The output voltages will remain within specified regulation limit of the nominal set voltage for changes in load as specified below under the following load steps defined below table 8. At a slew rate of 0.1Amps/uS between 50Hz to 10 KHz.

表格 6：输出动态负载响应限值 Table6: Output dynamic load response limits

| Dynamic Load 动态负载 | DC Voltage Regulation 电压调整率 |
|-------------------|-----------------------------|
| 50%~100%~50%      | ±10%                        |

2.2.5 电压过冲 Overshoot at turn-on/ turn-off

开机或关机时，电压过冲不得超过标称值的 10%。  
Any overshoot at turn on or turn off shall be less than 10% of rated output voltage.

2.3 保护功能 Protection Function .

2.3.1 短路保护 Short Circuit Protection

输出的短路定义为其输出阻抗小于 0.1 欧姆，在上述 3.1 节中定义的输入条件下，电源将进行保护，

保护过程中，不会出现诸如元器件、连接器等损坏危险。

An output short circuit is defined as any output impedance of less than 0.1 ohms. The power supply will protect without damage to overseers of to the unit (components, connectors, etc) under the input conditions specified in Section 3.1 above.

2.3.2 过流保护 Over Current Protection

电源过流点符合下表限值要求，而且过流保护无任何危险和损坏，在保护去除后，电源自动恢复。

The power supply shall meet the limitation requirement as below table without any damage, the unit shall recover and function automatically after the protection is removed.

表格 7： 过流保护限值 Table 7: Over Current Protection limits

| 参数 Parameter | 最大值 Max | 单位 Unit |
|--------------|---------|---------|
| V1:71.4V     | 4.6     | A       |

2.4 时序特性 Timing

2.4.1 保持时间 Hold up Time

满载条件下，电源在 100Vac/47Hz 输入时，保持时间不小于 5mS；110/220Vacc/50/60Hz 输入时，保持时间不小于 10mS。

Hold-up time no less than 5mS at 100Vac/47Hz input and no less than 10mS at 110/220Vac/50/60Hz input, the output loading should be set up with full load during the test.

2.4.2 启动时间 Start up Time

满载条件下，电源在 100Vac/47Hz 输入时，启动时间不大于 3 秒；110/220Vac/50/60Hz 输入时，启动时间不大于 3 秒。

Start up time no more than 3 seconds at 100Vac/47Hz input and no more than 2 seconds at 110/220Vac/50/60Hz, the output loading should be set up with full load during the test.

3. 环境要求 Environment Requirement

3.1 温度 Temperature

工作环境温度: -10℃~ 40℃      Operating Ambient: -10℃~ 40℃  
贮存环境温度: -10℃~ +85℃      Non-operating Ambient: -10℃~ +85℃

3.2 湿度 Humidity

工作时: 25%~90%相对湿度（非冷凝）Operating: 25%~90% relative humidity (Non- condensing)  
贮存时: 10%~90%相对湿度（非冷凝）Non-operating: 10%~90% relative humidity (Non- condensing)

3.3 海拔高度 Altitude

工作时: 2000 米 Operating: 2000 meters  
贮存时: 5000 米 Non-operating: 5000meters

4. 可靠性 Reliability

4.1 平均无故障间隔时间 MTBF (MIL-HDBK-217F)

25℃环境温度，满载条件，额定电压输入条件，平均无故障间隔时间≥50K 小时。  
MTBF no less than 50K hours (25 degrees C, Full load and rated voltage input)

4.2 老化寿命测试 Burn-in and Life test

将与客户评估并确认电源产品室内老化寿命测试过程。

Shall discuss with customer to make sure the power in house Burn-In and life test procedures.

5. 产品安规要求 Product Safety Requirement

5.1 标准 Standard

遵循 IEC60950-1 要求.  
Meet IEC60950-1 (information technology and similar electric apparatus -safety requirement) standard requirement.

5.2 泄露电流 Leakage Current

接触电流不得超过 0.25mA (220Vac/50Hz).  
Leakage current shall not exceed 0.25mA at 220Vac/50Hz.

5.3 绝缘阻抗 Insulation Resistance

初级对次级: ≥50M 欧姆, 500VDC  
-Primary to Secondary: 50 Meg. Ohms min. 500VDC

5.4 绝缘强度 Dielectric Strength Testing

绝缘强度满足下表的要求, 100% 在线产品执行此项测试, 并每一项目至少保持 60S 时间, 无任何故障。  
Hi-pot test shall be met the table 8 requirements, an item listing this test as a 100% production test must be performed and be maintained at that level for a minimum of 3 seconds without failure.

表 8: 耐压测试 Table 8: Hi-pot test

| 项目 Item                        | 规格要求 Specification |      | 备注 Remark     |
|--------------------------------|--------------------|------|---------------|
| 输入-----输出 Primary to Secondary | 1500Vac            | <5mA | 无飞弧 No arcing |
| 输入-----地 Primary to P.G        | /                  | /    | 无击穿 No broken |

6. 结构尺寸 Mechanical Dimensions (单位:mm Unit: mm)

6.1 标贴 Label

按客户要求

6.2 结构尺寸 Mechanical Dimensions UNIT:(mm)



Size: 205\*121\*50 mm



7 声明 Statement

7.1 本承认书一式两份，客户一份，供应商一份，自双方确认签字之日起生效。

This specification for approval has two copies, one for customer, and the other for provider. It comes into effect after approval this specification by customers.

7.3 如有更新，需由双方协商解决，另行补充。

If specification for approval needs to update, it' s made an agreement after discuss between customer and provider.  
.....