茂硕电源科技股份有限公司
MOSO POWER SUPPLY TECHNOLOGY CO., LTD

MOSO Industrial Park, Nanshan District,
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TEL: 86-755-27657000 27657555
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参考规格书

SPECIFICATION FOR REFERENCE

CUSTOMER/客户： _____

CUSTOMER P.N./客户物料号： _____

MODEL NO./产品型号: P50-V2250U200-045K0-US

PRODUCT NO./产品编号： _____

SAMPLE DATE/送样日期： _____

CUSTOMER AUTHORIZED SIGNATURE/客户承认签核		

Please return to us one copy of "SPECIFICATION FOR APPROVAL" with you approved signature./客户确认签字，盖章后请回传一份承认书给我司.

ADD: MOSO Industrial Park, Nanshan District, Shenzhen, Guangdong 518108, P. R. China
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拟　制：	安规工程师：	项目工程师：	批　准：

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E. C. LIST/变更履历表

Rev. 版本	Description of Change/变更内容描述		Changed Date/日期	ECN No.
	Before/变更前	After/变更后		
A.1	Original Release（初次发行）	---	2024-11-27	---

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1. SCOPE/简述

The document details the electrical, mechanical and environmental specifications of a SMPS, the power supply provide 45W2C continuous output power.

资料详细描述了一款 45W2C 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 requirement.

此款电源符合 RoHS 要求.

1.1. Description

- ☐ SMPS Adaptor(Wall mount)/插墙式适配器
- ☐ SMPS Adaptor(Desk-top)/桌面型适配器
- ☐ Open Frame/开放式结构
- ☐ SMPS Unit (metal Case)/带铁壳型
- ■ PD ADAPTER (Wall mount) **PD** 适配器
- ☐ Others/其他

1.2. Supports fast charge protocol

PD2.0/PD3.0/PPS
QC2.0/QC3.0/ QC4.0+
SCP
FCP
AFC
BC1.2
DCP1.5A
PE+2.0
APPLE 2.4A
Samsung 5V2A

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 single phase.

输入电压范围：从 90Vac 到 264Vac，单相输入.

	Minimum/最小	Nominal/额定值	Maximum/最大
Input Voltage/输入电压	90Vac	100Vac-240Vac	264Vac
Input Frequency/输入频率	47Hz	50Hz /60Hz	63Hz

2.2. Input AC Current/AC 输入电流

1.2Amax. @ 100-240Vac input & Full load

输入电压 100-240Vac 满载时，输入电流不超过 1.2A。

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

Peak inrush current shall be limited to 160A for a cold start at 240Vac at 25°C ambient and full load. There is no immediate damage or long-term impact on the reliability of the supply

对于在 25°C 环境温度和满载条件下以 240Vac 冷启动时，峰值浪涌电流应限制为 160A。 不会对电源的可靠性造成直接损害或长期影响。

2.4. Averaged Efficiency/平均效率

5V3.0A: 76.41 % min. @115V/230Vac input (@25%, 50%, 75% and 100% of max load)
9V3.0A: 80.82 % min. @115V/230Vac input (@25%, 50%, 75% and 100% of max load)
12V3A: 82.98 % min. @115V/230Vac input (@25%, 50%, 75% and 100% of max load)
15V3A: 84.65 % min. @115V/230Vac input (@25%, 50%, 75% and 100% of max load)
20V2.25: 84.65 % min. @115V/230Vac input (@25%, 50%, 75% and 100% of max load)

2.5. Energy Consumption /空载功耗

No load Consumption ≤0.3W(115Vac/60Hz, 230Vac/50Hz input).

输入电压 **115Vac/60Hz, 230Vac/50Hz** 时,空载功耗均小于 **0.3W**。

2.6. Protection/保护

The supply shall be subjected to the following tests while under maximum rated load. No component damage is permitted.

- Brownout: 100 Vac 50 Hz to 0 Vac @ 50 Hz in 1 volt decrements in 30s.
- Brownout recovery: 0 vac 50 Hz to 100 Vac @ 50 Hz in 1 volt increments in 30s.

After completion of the test, power will be reapplied within the rated line voltage ranges and normal operation is expected.

在最大额定负载下，电源应进行以下测试。 不允许组件损坏。

欠压：**100 Vac 50 Hz** 至 **0 Vac @ 50 Hz**，以 **1** 伏为单位在 **30s** 内递减。

掉电恢复：**30** 秒钟内以 **1** 伏为增量从 **0 Vac 50 Hz** 转换为 **100 Vac @ 50 Hz**。

测试完成后，将在额定线路电压范围内重新通电，并正常运行。

3. Output Characteristics/输出特性

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

3.1.1:Only USB-C1/ USB-C2

Output Rate	Rated Load/额定负载		Output Range 输出电压范围	R+N 纹波与噪声	Remark 备 注
	Min. Load	Max. Load			
5.00V	0.0A	3.0A	4.60-5.40V	200mVp-p	
9.00V	0.0A	3.0A	8.55-9.45V	200mVp-p	
12.00V	0.0A	3.0A	11.40-12.60V	200mVp-p	
15.00V	0.0A	3.0A	14.25-15.75V	200mVp-p	
20.00V	0.0A	2.25A	19.0-21.0V	200mVp-p	

3.1.2:USB-C1 + USB-C1 (The first port is 30W and the other is 15W)

Output port	Maximum power	Output voltage		Min. Load	Max. Load	Output Range 输出电压范围	R+N 纹波与噪声	Remark 备 注
C1+C2	30W+12W	C1	5V	0A	2.4A	4.70-5.30V	200mVp-p	
			9V	0A	2.22A	8.55-9.45V	200mVp-p	
			12V	0A	1.67A	11.40-12.60V	200mVp-p	
			15V	0.0A	2.0A	14.25-15.75V	200mVp-p	

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			20V	0.0A	1.5A	19.0-21.0V	200mVp-p	
		C2	5V	0A	2.4A	4.7-5.3V	200mVp-p	

Ripple & Noise: Measurement is done by 20MHz bandwidth oscilloscope and the output paralleled a 0.1uF ceramic capacitor and a 10uF electrolysis capacitor. (test under the condition of rated input and rated output)

纹波与噪声: 测量时，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. **(**在额定输入及输出的条件下检测**)** 。

3.2. Line/ Load Regulation/线性/负载调整率

3.2.1 USB-C1/ USB-C2

Output Rate	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			
5.00V	0.0A	3.0A	±3%	±6%	
9.00V	0.0A	3.0A	±3%	±5%	
12.00V	0.0A	3.0A	±3%	±5%	
15.00V	0.0A	3.0A	±3%	±5%	
20.00V	0.0A	2.25A	±3%	±5%	

3.3. Turn - on Delay Time/开机延迟时间

3S max. @ 100Vac to 240Vac input & Full load.

输入电压 **100-240Vac** 满载时，开机延迟时间不超过 **3S**。

3.4. Hold-up Time/关机维持时间

10mS min. @ Full load &115Vac/60Hz input turn off at the worst case.

输入电压 **115Vac/60Hz** 满载时，关机时间最差情况不小于 **10** 毫秒。

20mS min. @ Full load &230Vac/50Hz input turn off at the worst case.

输入电压 **230Vac/50Hz** 满载时，关机时间最差情况不小于 **20** 毫秒。

3.5. Rise Time/上升时间

30mS max. @ Rated load.

额定负载时，上升时间不超过 **30** 毫秒。

3.6. Fall Time/下降时间

30mS max. @ Full load.

满载时，下降时间不超过 **30** 毫秒。

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

10% max. When the power on or off, when it is the full input voltage and full load.

开关机时，输出过冲/欠冲均不大于 **10%**。

3.8. Dynamic load change response/动态负载变化响应

The output voltage shall stay within +/-10% of the nominal output voltage while the output load is stepped from 20% to 80% of the rated load. The nominal voltage must be recover in 10ms after overshoot.

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输出电压应保持在额定输出电压的**+/- 10**%之内，而输出负载应从额定负载的 **20**%升至 **80**%。 过冲后，标准电压必须在 **10ms** 内恢复。

4. Protection Requirements/保护要求

4.1. Over Current Protection/过流保护

4.1.1 ONLY Cport (USB-C1/ USB-C2)：

Output Rate	Rated Load /额定负载		Over Current 输出电流	Input Voltage 输入电压	Remark 备注
	Min. Load	Max. Load			
5.00V	0.0A	3.0A	3.1-3.9A	100-240VAC	
9.00V	0.0A	3.0A	3.1-3.9A	100-240VAC	
12.00V	0.0A	3.0A	3.1-3.9A	100-240VAC	
15.00V	0.0A	3.0A	3.1-3.9A	100-240VAC	
20.00V	0.0A	2.25A	2.3-3.0 A	100-240VAC	

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

当过流电流时,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 rail short, the power supply shall no damage, and shall be self-recovery when the fault condition is removed.

当输出短路时，输入功率应减小，电源应无损坏，并且当故障条件消除后，电源应可自动恢复。

4.3. Over Voltage Protection/过压保护

4.3.1 USB-C1/ USB-C2

Output Rate	Rated Load/额定负载		Over Voltage 输出电压	Input Voltage 输入电压	Remark 备注
	Min. Load	Max. Load			
5.00V	0.0A	3.0A	＜25.0V	100-240VAC	
9.00V	0.0A	3.0A		100-240VAC	
12.00V	0.0A	3.0A		100-240VAC	
15.00V	0.0A	3.0A		100-240VAC	
20.00V	0.0A	2.25A		100-240VAC	

5. Environment Requirements/环境要求

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

-10℃ to +25℃

35%RH to 85%RH

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

-20 80℃ to ℃

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5%RH to 95%RH non-condensing

温度-20℃ to +80℃，湿度 5%RH to 95%RH。

5.3. Vibration/振动

10 to 300Hz sweep at a constant acceleration of 1.0G(Breadth: 3.5mm) 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: 3.5mm), X, Y, Z 三垂直坐标轴向各振动 1 小时.

5.4. Drop Test/跌落

Height: 1m; the product should be fell off on the hardwood with the thickness of 20mm, and the hardwood should be put on the base of the cement or on the ground without flexibility. Apply one times on all surfaces, total 6 times. The electric performance must be OK after the drop tests.

跌落高度:1 米，并跌落到厚度为 20mm 的硬木上,且硬木应放在水泥基座或等同的无弹性地面上,6 个面，每面各 1 次，在跌落后电气性能测试 OK.

6. Reliability Requirements/可靠性要求

6.1. Burn-in/老化

The power supply shall be burn-in for 4 Hours under normal input and 80% rated load at 30℃± 5℃. the electric performance and Hi-Pot test must be OK.

30℃±5℃，电源在正常输入电压和 80%额定负载条件下老化 2 小时后，电气性能及高压测试 OK.

6.2. MTBF Qualification/平均间隔故障时间估算

The MTBF shall be at least 5,000H at 25℃, under 100% load and 100Vac/240Vac input condition.

产品在额定电压 100-240V 输入电压，输出 100%负载，常温 25 度环境下，平均无故障时间达到 5 千小时以上。

6.3. E-caps lifetime/电解电容寿命

The E-caps used in this PSU must be with lifetime of 5000H min at 25℃of 80% load and 100-240Vac input.

在 25℃,80%载，输入 100-240Vac 条件下,电容寿命达 5000H.

*Standard:

$$\text{Life Time} = Lr * 2^{(To-Tx)/10} * 2^{(\triangle To-\triangle T)/5}$$

$$(\triangle To-\triangle T)/5 = 1-[Ia/(Is*Tf*Ff)]^2$$

Note-3 CE Capacitor Life time　　ΔTo: Self Heat Coefficient (85 ℃ =10, 105℃ = 5)

Lr : Capacitor Life Spec　　Ia : Measured Ripple Current

T ○: Capacitor Temp Spec　　Is : Ripple Current spec

Tx : Capacitor case Temp　　Ff : Frequency Factor

ΔT : Capacitor Self Heat　　Tf : Temperature Factor

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7. EMI/EMS Standards/EMI/EMS 标准

7.1. EMI Standards/EMI 标准

EN55032

7.2. EMS Standards/EMS 标准

7-2-1 EN 61000-4-2,electrostatic discharge(ESD) requirement/静电抗扰度要求

Discharge characteristic/静电规格	Test level/测试条件	judgment criteria/评定标准
Air discharge/空气放电	+/-8KV	B
Contact discharge/接触放电	+/-4KV	B

7-2-2 EN 61000-4-3,radiated electromagnetic field susceptibility(rs)/辐射骚扰场强

Test level/测试条件	judgment criteria/评定标准
3V/m (r.m.s)	A
80-1000MHz,80%AM(1KHz) sine-wave	

7-2-3 EN 61000-4-4,electric fast transients(burst) immunity requirement/电快速瞬变脉冲群

Coupling/测试端口	Test level/测试条件	judgment criteria/评定标准
AC-input/交流输入	0.5KV	A
AC-input/交流输入	1KV	A

7-2-4 EN 61000-4-5,surge capability requirement/浪涌抗扰度要求

Surge voltage/雷击电压	judgment criteria/评定标准
Common mode/共模 +/-2KV	B
Differential mode/差模 +/-1KV	

7-2-5 EN 61000-4-6, Induced radio frequency fields conducted disturbances immunity requirement/电源端子传导骚扰实验

Test level/测试条件	judgment criteria/评定标准
3V	A
0.15-80 MHz,80%AM(1KHz)	

7-2-6 Assessment criteria /评估标准

Acceptance criteria 可接受标准	Performance 性能
A	Agreed operational behavior within the specified limits 性能不允许变化；如果性能会发生变化，则变化的范围在产品规格书规定的范围内.

B	Time limited functional diminishment or malfunction during the tests is permitted. The function is self-reactivated by the unit following completion of the tests. 设备在测试过程中, 性能降低允许在产品规格书要求范围内, 干扰消除后, 设备能恢复正常, 不允许出现复位和任何方式的人工干预.
C	Malfunction is permitted .The function can be reactivated either by reconnection to the mains or by operator intervention. 在测试过程中，设备允许出现业务中断，测试完毕后允许自行恢复或者人工干预恢复（包括硬件上干预）；测试中只允许初级防护器件损坏，并且更换损坏的初级防护器件后，设备能恢复正常

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 max. / 60S (when safety testing).

初级对次级: 3000Vac / 10mA max. / 60 秒（安规试验）.

Primary to Secondary: 3300Vac /5mA max. / 3S (when production).

初级对次级: 3300Vac / 5mA max. /3S(生产作业).

8.2. Leakage Current/漏电流

0.25mA max. at 264Vac / 60Hz.

8.3. Insulation Resistance/绝缘阻抗

100MΩ min. at primary to secondary add 500Vdc/1min test voltage

在初级与次级间加 500Vdc/1min 进行测试，绝缘阻抗：正常大气下 100MΩ，湿热条件下 10 MΩ.

8.4. Regulatory Standards/安规标准

Type/安规	Country/国家	Standard/标准	State/状况	Note/备注
/	/	/	/	/

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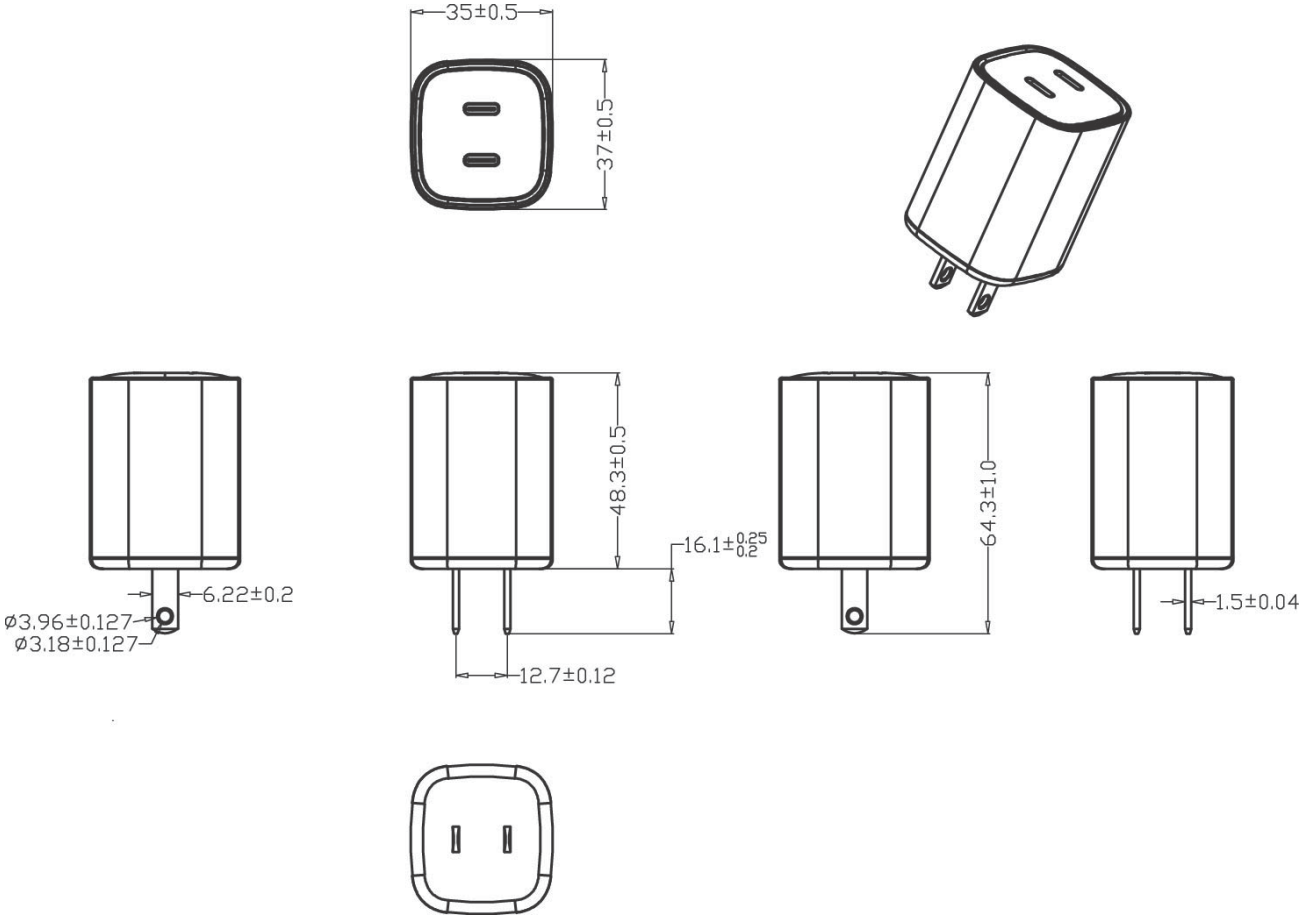
9. Mechanical Outline Drawing/外观示意图



Case material: ■PC temperature resistance: 125℃
□PC+ABS temperature resistance: 95℃
Remark: 1)PC material compliances with ball pressure testing requirement.
2)The color of enclosure are White.

外壳材质：■PC 耐温：125℃
□PC+ABS 耐温：95℃
备注：1）PC 材料符合球压试验要求。
2） 外壳的颜色是白色的。

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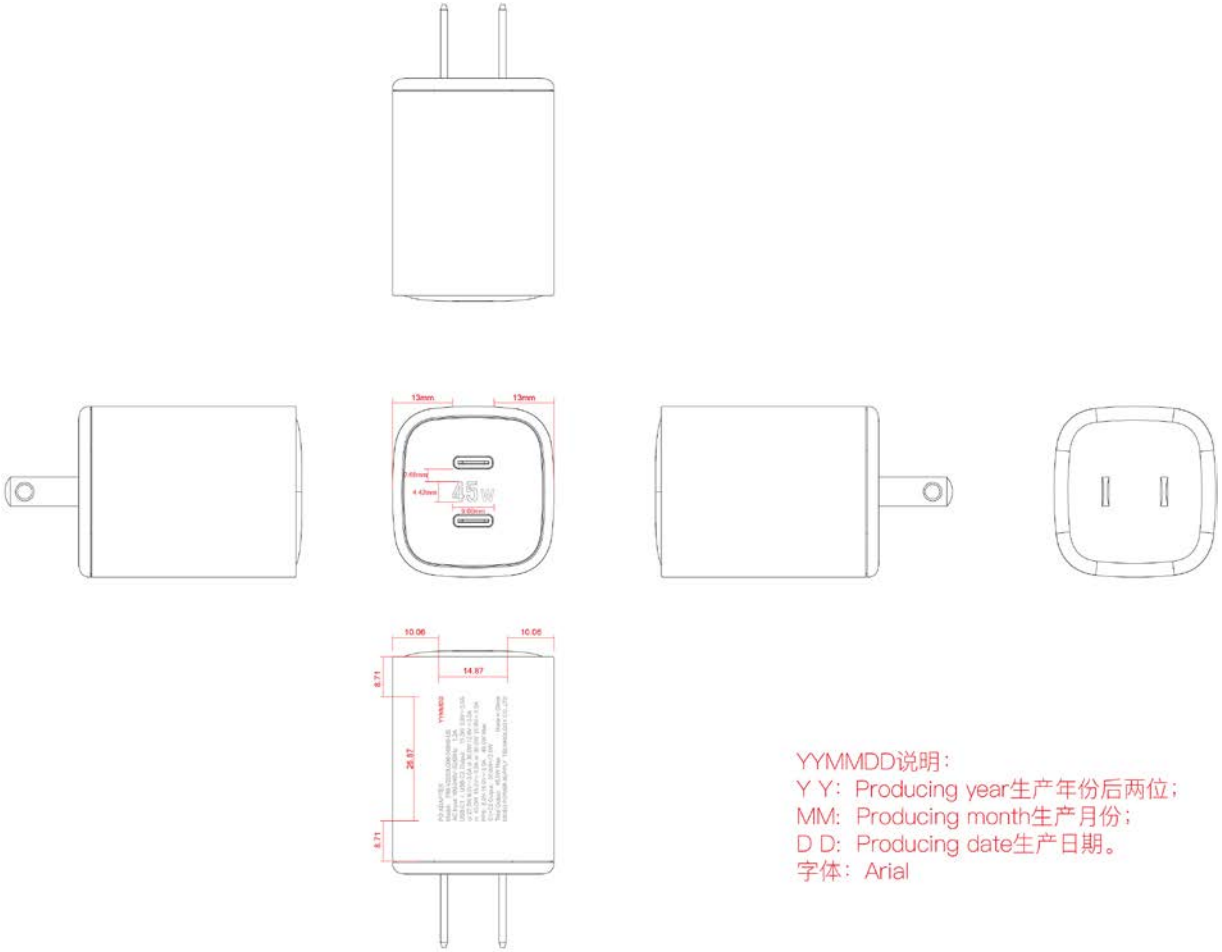
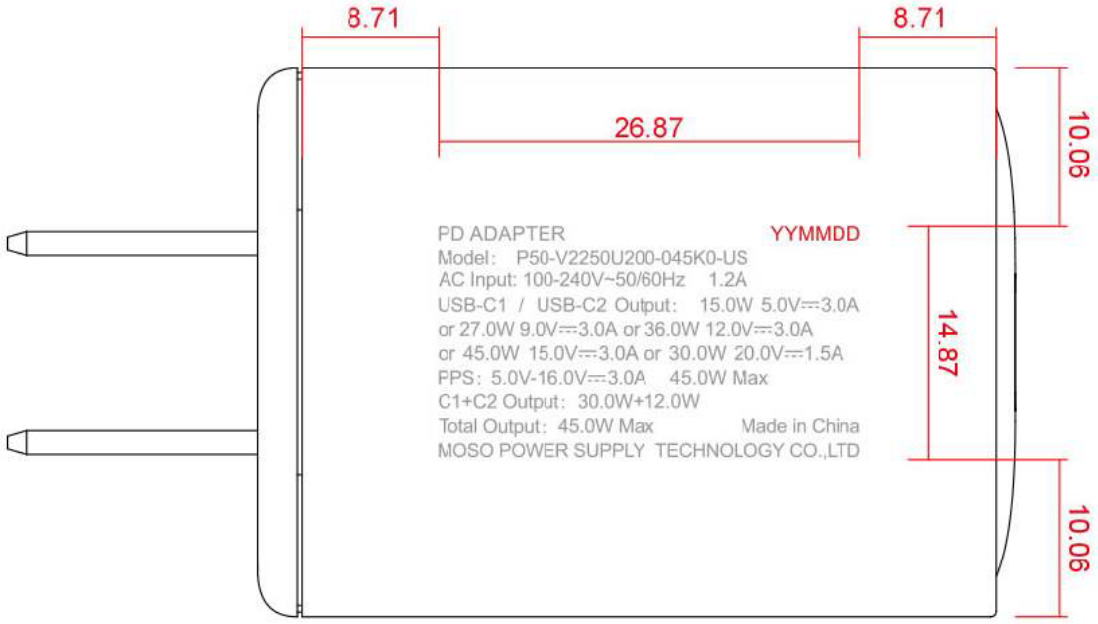
10.I/O Marking Drawing/铭牌示意图



YYMMDD说明：
Y Y：Producing year生产年份后两位；
MM：Producing month生产月份；
D D：Producing date生产日期。
字体：Arial

45W美规
工艺：镭雕
单位：mm
公差：±0.5mm



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11.Package Drawing/包装示意图

PE 袋包装要求: ☐PE 袋不用胶带封口;
☐PE 袋用胶带封口;
☐其它要求;
备注:若客户未进行选择 PE 袋包装要求或备注时,
我司默认采用 PE 袋不用胶带封口包装方式。