



设计参考手册

Design Reference Manual

GaN 氮化镓

PD65W-AC6-1A2C 快充设计参考手册

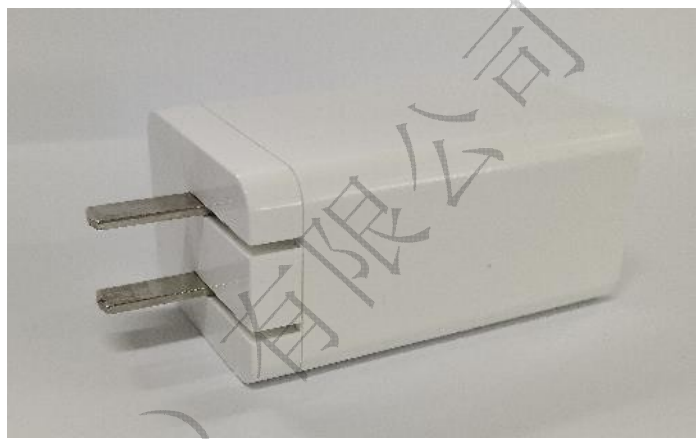
(VER: 1.0)

	签 名	日 期
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审核	邢志刚	
批准	王宏周	

<p>GaN 氮化镓</p> <p>PD 快充设计参考手册</p>	<p>版本:A1</p> <p>PD65W-AC6-1A2C-V1.0</p>
	<p>文档版本: VER: 1.0</p>

基于氮化镓设计的 PD65W-AC6-1A2C 三口六级能效快充电源

成品外观图(外型尺寸: L*W*H/66.5*41*31.3mm)



PCBA 图



主要特性:

- 1、 整机采用高效率电路架构: C 口由升降压直接输出; A 口从 C 口取电由降压 DC-DC 输出, 单 C 口满功率输出可达 93.3%以上超高效率;
- 2、 全电压输入设计, 工作电压范围 90VAC~264VAC;
- 3、 USB-C1/C2 口 (最大 65W 输出功率), 兼容: PPS/PD/QC3.0/QC4.0+/AFC/FCP/SCP/PE/IP2.4/DCP1.5/三星 5V2A 协议, 固定输出电压: 5VDC/3.0A、9VDC/3.0A、12VDC/3.0A、15VDC/3.0A、20VDC/3.25A, PPS:3.3-21V 3A (65W Max);
- 4、 USB-A 口(最大20W输出功率), 兼容: QC3.0/AFC/FCP/SCP/PE/IP2.4/DCP1.5/三星5V2A V00C 协议, 固定输出电压: 5V3A, 5V/4.5A, 4.5V5A, 9V3A, 12V3A, 20V/1.8A;
- 5、 USB-C1 和 USB-C2 同时工作时, 可自动分配功率为最大 45W(20V 降为 2.25A) + 最大 18W;
- 6、 USB-C1 和 USB-A 同时工作时, 可自动分配功率为 USB-C 最大 45W(20V 降为 2.25A) + USB-A 最大 18W;
- 7、 USB-C2 和 USB-A 同时工作时, 可自动分配功率为 USB-C + USB-A 最大 15W;
- 8、 USB-C1、USB-C2 和 USB-A 同时工作时, 可自动分配功率为 USB-C1 最大 45W(20V 降为 2.25A) + (USB-C + USB-A) 最大 15W;
- 9、 具有输出过流保护、短路保护、过温保护等功能;
- 10、 USB-C 口输出符合“DOE&COC”6 级能效标准;
- 11、 通过 GB4943 EN55022 ClassB 的 EMI 测试标准
- 12、 通过 EFT 4KV 测试标准;
- 13、 温升测试满足国内 CCC 认证标准和国际 IEC62368 认证标准。

版本更改说明			
时间	更改内容	版本升级	备注
	初版发布	V1.0	

润新微电子 (大连) 有限公司

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一、DME0参数信息

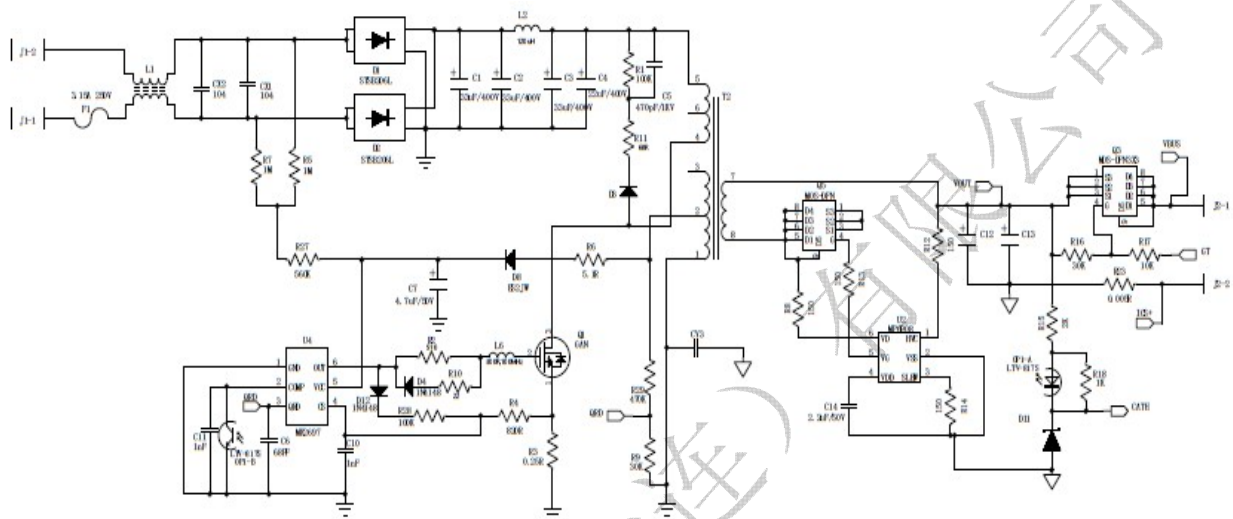
描述	符号	最小	额定值	最大	单位	备注
一，输入特性						
输入电压范围	V _{IN}	90	220	264	V _{ac}	单相输入
输入频率范围	F _{LINE}	47	50/60	63	Hz	
待机功耗	P _{stb}				mW	
二，输出特性 (220V 输入时测试)						
1，独立 USB-C 口工作 (最大输出功率 65W)						
1. 1 单独 C 口工作时，5V 输出						
输出电压	V _{OUT}	5.0	5.1	5.2	V	满载 5.10
输出电流 (最大为 OCP)	I _{OUT}	3	3.3	3.6	A	
1. 2 单独 C 口工作时，9V 输出						
输出电压	V _{OUT}	8.9	9.1	9.3	V	满载 8.97
输出电流 (最大为 OCP)	I _{OUT}	3	3.3	3.6	A	
1. 3 单独 C 口工作时，12V 输出						
输出电压	V _{OUT}	11.9	12.1	12.3	V	满载 11.97
输出电流 (最大为 OCP)	I _{OUT}	3	3.3	3.6	A	
1. 4 单独 C 口工作时，15V 输出						
输出电压	V _{OUT}	14.8	15.1	15.4	V	满载 14.97
输出电流 (最大为 OCP)	I _{OUT}	3	3.3	3.6	A	
1. 5 单独 C 口工作时，20V 输出						
输出电压	V _{OUT}	19.8	20.1	20.4	V	满载 19.94
输出电流 (最大为 OCP)	I _{OUT}		3.25	3.8	A	
2，独立 USB-A 口工作 (最大输出功率 18W)						
2. 1 单独 A 口工作时，5V 输出						
输出电压	V _{OUT}	5.0	5.1	5.2	V	空载 5.12
输出电流 (最大为 OCP)	I _{OUT}	3	3.3	3.6	A	
2. 2 单独 A 口工作时，9V 输出						
输出电压	V _{OUT}	8.9	9.1	9.3	V	空载 8.84
输出电流 (最大为 OCP)	I _{OUT}	3	3.3	3.6	A	
2. 3 单独 A 口工作时，12V 输出						
输出电压	V _{OUT}	11.9	12.1	12.3	V	空载 11.62
输出电流 (最大为 OCP)	I _{OUT}	3	3.3	3.6	A	
2. 4 单独 A 口工作时，SCP 输出 (3.3-5.5V)						
输出电压	V _{OUT}		4.5	5.0	V	
输出电流 (最大为 OCP)	I _{OUT}		5	4.5	A	最大输出22.5W
3，USB-C1 口 +USB-A 口 同时工作 (C 口降为 45W，A 口降为 18W)						
3. 1 C1 口+A 口同时工作时，自动功率分配为 C 口 45W + A 口 18W						
A 口输出电压及电流	5V3A, 9V2A, 12V1.5A					A 口最大功率为 18W
C1 口输出电压电流	5V3A, 9V3A, 12V3A, 15V3A, 20V2.25A (OCP3.6A)					C1 口最大功率为 45W
4，USB-C2 口 +USB-A 口 同时工作 (C2 口+A 口降为 15W)						

4.1 C2 口+A 口同时工作时, 自动功率分配为 C2 口+A 口 15W						
A 口输出电压及电流	5V2.7A					最大功率为 15W
C2 口输出电压电流	5V2.7A					
5, USB-C1 口 +USB-C2 口 同时工作						
5.1 C1 口+C2 口同时工作时, 自动功率分配为 45W + 18W						
C1 口输出电压电流	5V3A, 9V3A, 12V3A, 15V=3A, 20V=2.25A (45W Max) C1 PPS3.3V-16V 3A					
C2 口输出电压电流	5V3A, 9V2A, 12V1.5A, 15V=1.2A, 20V=0.9A (18W Max)					
6, USB-C1 口 +USB-C2 口 +USB-A 口同时工作						
6.1 USB-C1 口 +USB-C2 口 +USB-A 口同时工作, 自动功率分配为 C 口 45W + (C2 口+A 口) 15W						
C1 口输出电压电流	5V3A, 9V3A, 12V3A, 15V=3A, 20V=2.25A (45W Max) C1 PPS3.3V-16V 3A					
C2 口输出电压电流	5V2.7A					最大功率为 15W
A 口输出电压及电流	5V2.7A					
三, 性能描述						
3.1 性能描述						
描述	符号	最小	典型值	最大	单位	备注
C 口 20V 输出, 100%负载效率	η		94.37		%	@230VAC
C 口 20V 输出, 平均效率	η		93.51		%	25/50/75/100% @230VAC
A 口 12V 输出, 100%负载效率	η		83.66		%	$V_o=12V@230VAC$
A 口 12V 输出, 平均效率	η		84.89		%	25/50/75/100% @230VAC
电压调整率				± 3	%	
负载调整率				± 3	%	
C 口电压纹波与噪声	$V_{R\text{ON}}$		重测试波形	260	mV	20V 满载, A 空载
A 口电压纹波与噪声	$V_{R\text{ON}}$			306	mV	12V 满载, C 空载
启动时间	T_{ST_DELAY}	<2			s	
EMI	EN55022B					
3.2 保护特性						
短路保护		输出关闭 (打嗝模式), 可自恢复				
过流保护		输出关闭 (打嗝模式), 可自恢复				
过温保护		输出关闭, 可自恢复				
3.3 环境特性						
工作温度		0		40	$^{\circ}C$	
工作湿度		20%		90%	R. H.	
储存温度		-40		60	$^{\circ}C$	
储存湿度		0%		95%	R. H.	
外部尺寸	W*H*L	41*31.3*66.5			MM	
单只产品重量	Weight	118			g	

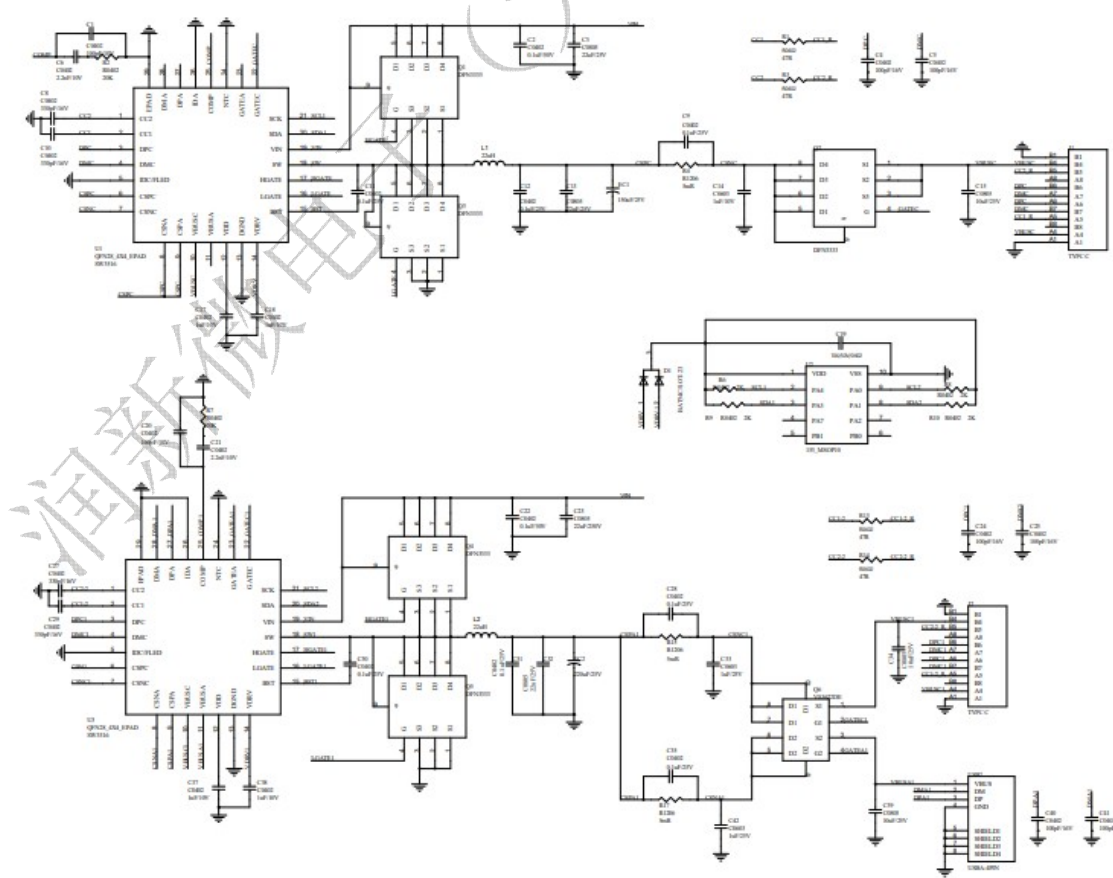
二 电源结构

2.1 电原理图

主板电原理图



PD 小板电原理图



2.2 材料清单

润新微电子（大连）有新公司 物料清单 环保

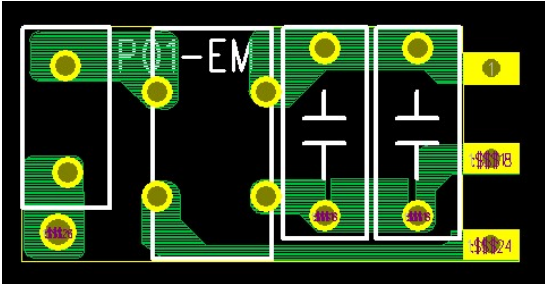
客户	产品名称: 65W PD 2C+1A	产品型号: AC6-AC-V1.0	版本: V1.0	日期: 2021.08.4			
层次	物料名称	规格型号	单位	用量	位置号		厂家
一	主板插件	20V3.25A 65W PD 多口输出电源适配器 产品型号:	PCS	1			
1	PCB板	FR-4 S/S 10ZCu 94V-0 双面板1.0 松香61.5*36mm 双面绿油 环保 文件AC6-AC-V1.1 0803	PCS	1			
2	电解电容	22uF 400V 105°C Φ8*18mm PIN距3.5mm 脚长<3.0MM KM系列 品牌:科尼盛	PCS	2	C3, C4	1.3829E+10	威迪
3	电解电容	33uF 400V 105°C Φ10*18mm PIN距5±0.5mm 特注: 脚长<3.0MM 3000小时 KCX系列 品牌:科尼盛	PCS	2	C2C1	1.3829E+10	威迪
4	电解电容	10uF 50V 105°C Φ5*11mm PIN距2.0mm 脚长<3.0MM GF系列	PCS	1	C7	1.3829E+10	威迪
5	固态电容	330uF 25V 105°C Φ6*12mm PIN距3.4±0.3mm 脚长<3.0MM	PCS	1	C13	1.3829E+10	威迪
6	Y电容	JT102M/400VAC PIN=10mm Y5V 125°C 脚长<3.0MM	PCS	1	CY1	1.3829E+10	威迪
7	Y电容	JT222M/400VAC PIN=10mm Y5V 125°C 脚长<3.0MM	PCS	1	CY3	1.3829E+10	威迪
8	工字电感	120uH 6*12 70Ts 0.32线径 加套管 脚长<3.0MM	PCS	1	L7	1.59E+10	格瑞安
9	变压器	KT-RM8-001 220UH RM8骨架6+0 磁芯材质: PC96 品牌: 针脚长<3MM	PCS	1	T2	1.3633E+10	旺城行
10	USB母座	OPPO USB母座	PCS	1	USB		
11	硅胶线	UL3239 22AWG L=35mm 红色 两端剥皮镀锡3.5mm 品牌: 组装焊	PCS	1	L		
二	主板贴片	20V3.25A 65W PD 多口输出电源适配器 产品型号:	PCS	1			
1	贴片电阻	27KΩ ±5% 0603 1/10W 品牌:国巨	PCS	1	R9		国巨
2	贴片电阻	3KΩ ±5% 0603 1/10W 品牌:国巨	PCS	1	R8		国巨
3	贴片电阻	150KΩ ±5% 0603 1/10W 品牌:国巨	PCS	1	R29		国巨
4	贴片电阻	560Ω ±5% 0603 1/10W 品牌:国巨	PCS	2	R4 R2		国巨
5	贴片电阻	2.4KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R16,		国巨
6	贴片电阻	1KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R17		
7	贴片磁珠	1.5K 100MHZ 400MA 0603	PCS	1	R13		
8	贴片电阻	200KΩ ±5% 0603 1/10W 品牌:国巨	PCS	1	R14		国巨
9	贴片电阻	330Ω ±5% 0603 1/10W 品牌:国巨	PCS	1	R12		国巨
10	贴片电阻	68Ω ±5% 0603 1/10W 品牌:国巨	PCS	1	R18		国巨
11	贴片电阻	17.4KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R10		国巨
12	贴片电阻	39KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R15		
13	贴片电阻	5.1Ω ±5% 0805 1/8W 品牌:国巨	PCS	1	R6		国巨
14	贴片电阻	6.8Ω ±5% 0805 1/8W 品牌:国巨	PCS	1	R30		国巨
15	贴片电阻	100KΩ ±5% 1206 1/4W 品牌:国巨	PCS	1	R1		国巨
16	贴片电阻	1MΩ ±5% 1206 1/4W 品牌:国巨	PCS	3	R7, R5, R27		国巨
18	合金电阻	250mΩ ±1% 2512 2W 颜色白面 品牌:萨特	PCS	1	R3		国巨
19	贴片电阻	68Ω ±5% 1206 1/4W 品牌:国巨	PCS	1	L5		
20	贴片磁珠	600R 100MHZ 1A 0603	PCS	1	L6		
21	贴片电容	2.2nF ±10% 1000V X7R 1206 222K 品牌:国巨	PCS	1	C5		国巨
22	贴片电容	2.2uF ±10% 50V X7R 0805 225K 品牌:国巨	PCS	1	C14		国巨
23	贴片电容	1nF ±10% 200V X7R 1206 102K 品牌:国巨	PCS	1	C26		国巨
24	贴片电容	1nF ±10% 50V X7R 0603 102K 品牌:国巨	PCS	2	C11, C6		国巨
25	贴片电容	470nF ±10% 50V X7R 0603 474K 品牌:国巨	PCS	1	C8		国巨
26	贴片LED	正光0603蓝色LED 亮度140-170mcd 电压2.8V-2.9V 0603 品牌:森科瑞	PCS	1	LED1		
27	贴片二极管	1N4148W 150mA 75V SOD-123 品牌:长电	PCS	1	D4		长电
28	贴片二极管	ES2JW 2A 600V SOD-123FL 品牌:晶导微	PCS	1	D3		晶导微
29	贴片二极管	E7 SOD-123FL	PCS	1	D8		
30	贴片光藕	TD1019(Z)-GV CTR:200-400	PCS	1	OP1		
31	贴片IC	MMBT431LT1 2.495V≥36V 0.5% SOT-23 品牌:龙晶微	PCS	1	U3		
32	贴片IC	MP6908A SOT23-6 品牌:MPS	PCS	1	U2		
33	贴片IC	MK2697 SOT23-6 频率200KHZ 品牌:茂睿芯	PCS	1	U1		茂睿芯
34	贴片桥堆	DBF310 3A 800V VF=1.05 品牌: 正沃	PCS	2	BR1, BR2		南丰
35	氮化镓MOS	RX65T300HS2A DFN 8×8 650V 9A 品牌: 润新微	PCS	1	Q1		润新微
36	贴片MOS管	CRSM062N10N 100V 79A Rds=5.7mΩ 品牌: 华润微	PCS	1	Q5		艾立德
三	EMC小板	20V3.25A 65W PD 多口输出电源适配器 产品型号:	PCS	1			
1	PCB板	AC6-EMC-V1.1-0803 FR4 双面1.0MM 绿油白字 23.5*11.4 环保					
2	共模电感	T9*5*3 100KHz测试100uH (min) 锰锌宽频 线径Φ0.5*9.5Ts 一组三层绝缘线加套管材质: M10K 品牌: 格瑞安	PCS	1	L1	1.59E+10	格瑞安
3	方形保险丝	T3.15A 250V 慢断 Φ8.3*8.0*4mm I2T≥57A2S SMT1315AP 品牌: 贝特	PCS	1	F1		贝特
4	X电容	MPX 0.1UF K X2 310V P=7.5 长10*厚4*高9mm	PCS	2	CX1, CX2	1.3829E+10	威迪
17	贴片电阻	560KΩ ±5% 1206 1/4W 品牌:国巨	PCS	2	R20 R19		

型号: AC6-DC-ZR10V1.2 AC6-DC展嵘MSOP-10			2021.08.04			
序号	类别	规格	封装	用量	位号	工艺
1	MCU	CR2206S12 (用2, 5脚) (效验3744) 展嵘	MSC	1	U2	SMT
2	MOS	RUH4040m2 锐俊	N3X3		U4 U11 U13 U14	二选
3		FKBB4052				
4		G33N03D3(双MOS)谷峰	DUA	1	Q1	SMT
5		BAT54C (KL3)	SOT	1	U5	SMT
6	IC	SW3516S 展嵘	QFN	1	U10	SMT
7		SW3518S 展嵘	QFN	1	U1	SMT
8	贴片电阻	4R7	R04	1	R24	SMT
9		47R	R04	4	R10 R12 R6 R7	
10		2K	R04	4	R25 R26 R27 R28	SMT
11		5.1K	R04	1	R5	SMT
12		20K	R04	2	R4 R9	SMT
13		5MR (合金电阻) 1% 温度系数小于 100PPM	R12	3	R1 R2 R3	SMT
14		贴片电容	101/10V X7R	C04	2	C17 C36
15	56PF/25V X7R		C04	4	C30 C31 C38 C39	
16	330pF/16V X7R		C04	4	C1 C2 C20 C21	SMT
17	222/10V X7R		C04	2	C16 C35	SMT
20	104/50V X7R		C04	10	C5 C8 C9 C11 C15 C24 C27	SMT
21	105/10V X7R		C06	4	C3 C4 C22 C23	SMT
	106/25V X7S		C08	1	C19	
22	475/25V X7R		C08	2	C10 C12	SMT
23	106/25V X7R		C12	4	C6 C25 C18 C37	SMT
25	220uF/25V 电解 固态电容		CE_	3	C7 C26 C33	SMT
26	磁环电感	22UH/8A 44125 卧式 套热缩管 线径0.8MM 整形 脚加长		2	L101 L102	
27	座子	TYPE-C 16PIN 直插6.5MM 亮盈 5A电流		2	C-1 C-2	插件
28	PCB板	PCB FR4 四层板面 1.0MM 绿油白字 34MM*25MM 文件: AC6-DC-ZR10V1.2 环保		1		

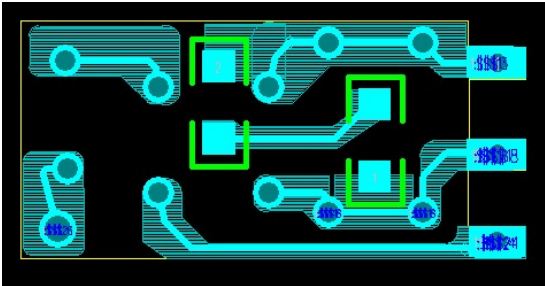
2.3 Demo 板 PCB 结构示意图

2.3.1 主板PCB 结构示意图

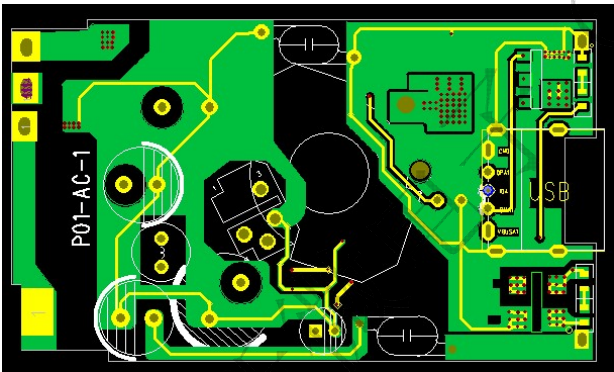
EMC 板 顶层布线图



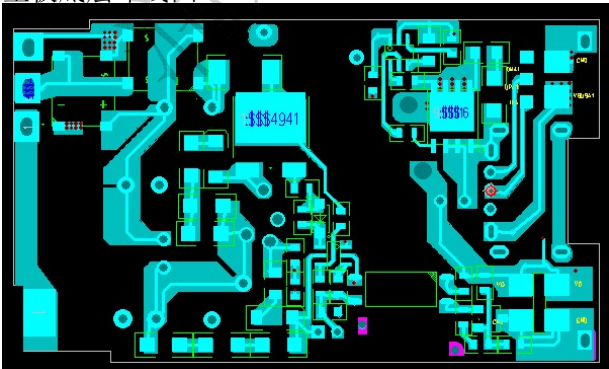
EMC 小板 底层布线图



主板顶层布线图

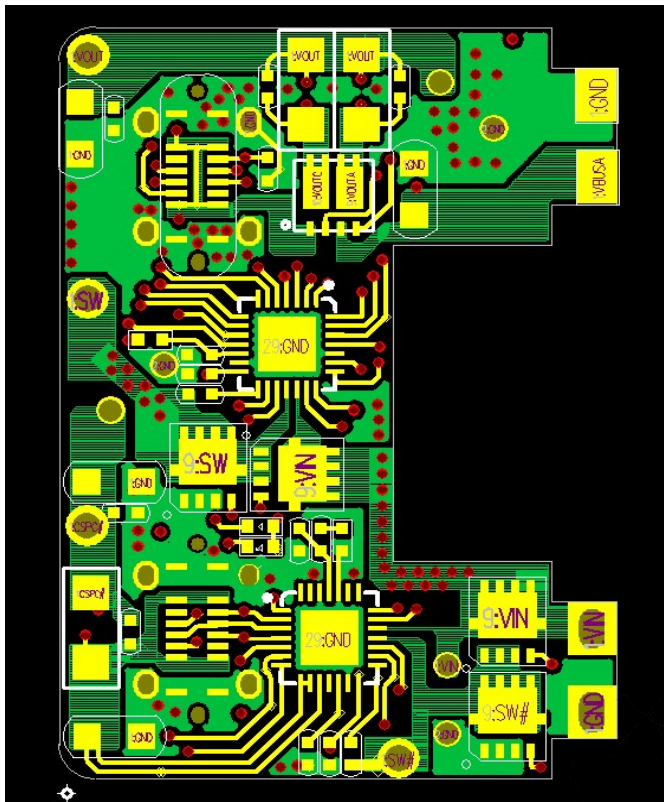


主板底层布线图

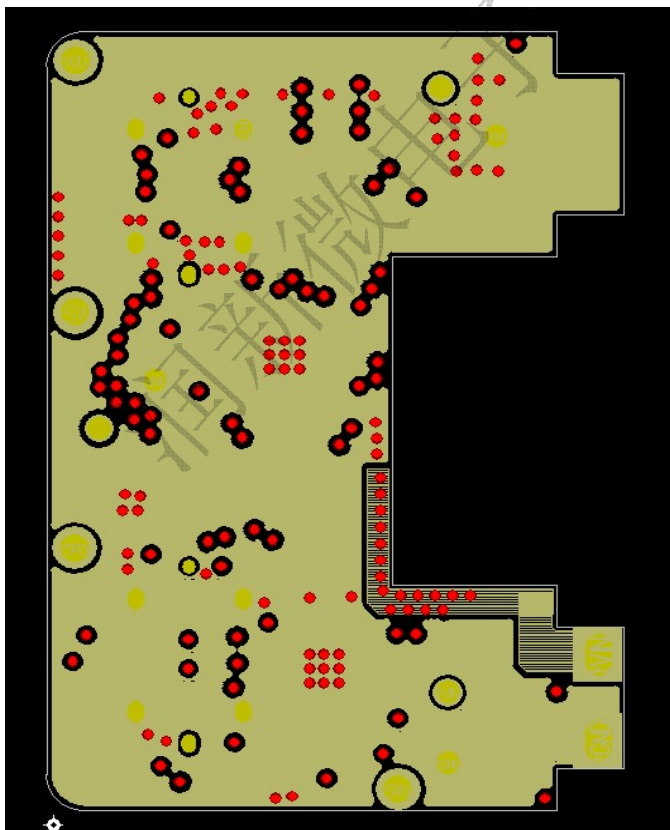


2.3. 2PD 板 PCB 结构示意图

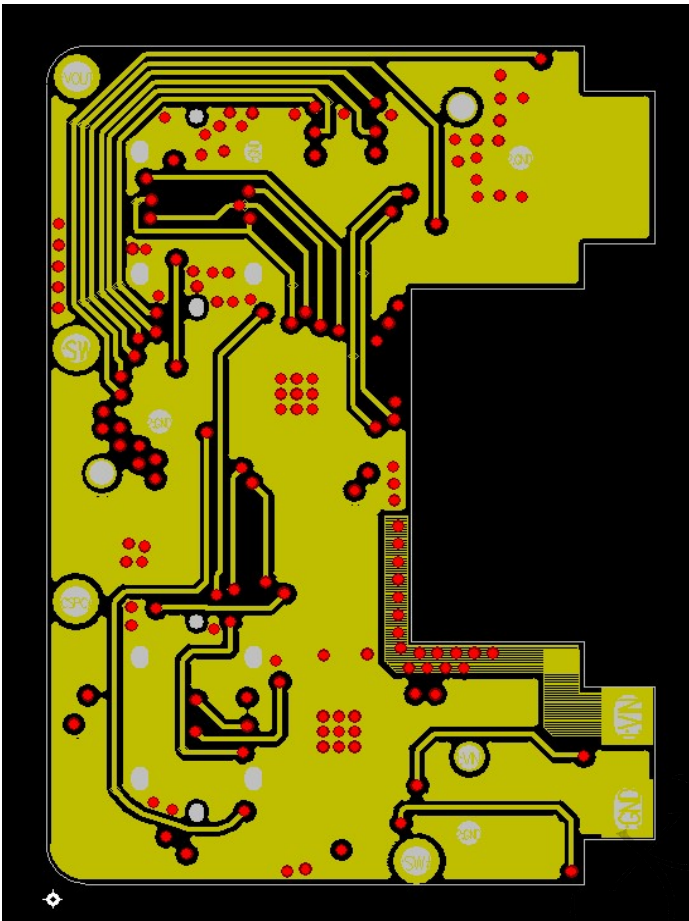
顶层布线图



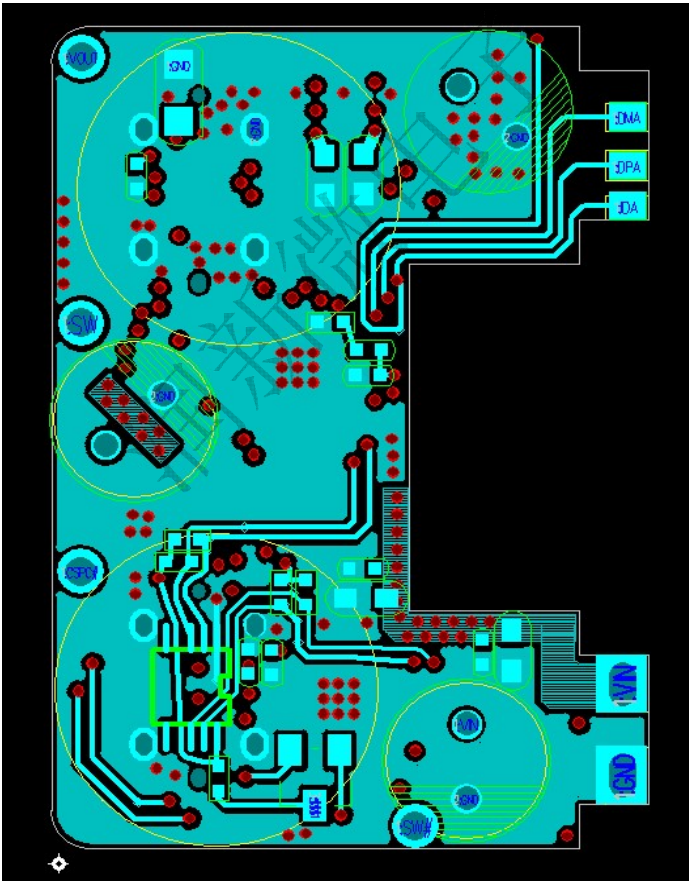
第二层布线图



第三层布线图



底层布线图



三 变压器设计

3.1 RM8变压器

润新微电子(大连)有限公司
技术 规 范
标 题: 开关变压器KT-RM8-001

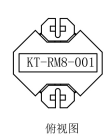
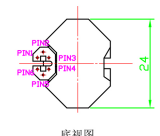
版本号: A
修改号: 01
第 2 页 共 2 页

6. 标签

6.1 标签纸可用透明印刷, 打印或是激光打印均可, 但应保证字体清晰可见, 且标贴纸的粘性良好, 能耐130° C不易脱落。

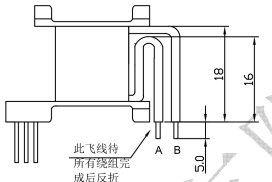
6.2 标签内容应包括以下内容:

KT-RM8-001

俯视图 底视图

8. 飞线成型示意图



此飞线待
所有绕阻完
成后反折

注:
1. 骨架规格: RM8 6*0*6PIN.
2. 要求外露磁芯包TAPE 2TS (宽度13mm)

7. 材料清单

序号	物料名称	规格描述	品牌指定或规范要求
1	骨架	PHENOLIC T375/T373J Minimum V-2 150 Degree C	QMFZ2
2	磁芯	RM8	使用PC96材质
3	铜线	2UEW 130°C	OBMW2
4	三层绝缘线	TIW-2/TEX-E/TEX-ECEW3/TEX-ELZ 130°C	OBJT2
5	胶带	1350-1, 1350F-1, 1351-1, PZ, CT, WF 130° C	OANZ2
6	凡立水	BC-359 130°C	UL认证
7	套管	TEFLON TUBE TFU/TF5-2/TF5-3/TF5-4/TURBO/TFE/TURBO/TFE TFE/SW-600	YDPU2
8	铜箔	0.025 x 12mm	不限

9. 包装要求
变压器包装采用泡沫包装以免变压器变形。

序号	版本	变更日期	变更内容
0			
1			
2			
3			

THIRD ANGLE PROJECTION 第三角法	颜色 COLOR	材料 MATERIAL	比例 SCALE	单位 UNIT	重量 WEIGHT	图框 FRAME	是否符合GBS MEASURE UP PART	表面处理 SURFACE PROCESSING
☉	-	-	1:1	mm	-	A4	YES	-

承认 APPROVED	确认 CHECKED	绘图 DRAWING	审核 REVIEW	公差 TOLERANCE	机种 MODEL	品名 NAME	日期 DATE	页次 PAGE
				公差 TOLERANCE	机种 MODEL	品名 NAME	日期 DATE	页次 PAGE
				0.1-0.30	Ag-10			2/3
				0.3-0.50	Ag-10			
				0.5-0.80	Ag-10			
				0.8-1.00	Ag-10			
				1.0-1.60	Ag-10			

润新微电子(大连)有限公司
技术 规 范
标 题: 开关变压器KT-RM8-001

版本号: A
修改号: 01
第 1 页 共 2 页

1. 电气特性

1.1 感量: PIN4-6 220uH±5%

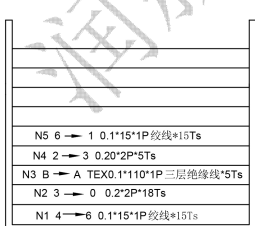
1.2 漏感: PIN4-6 20uH MAX
测试条件: 10KHz 0.25V, 短路其它PIN脚

1.3 高压测试

1.3.1 初级-次级 3750VAC 10mA MIN

1.3.3 次级-磁芯 3750VAC 10mA MIN

2. 绕线结构图

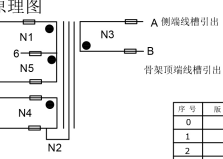


注:
<<注意事项>>
1. N3, N4绕组为多层三层绝缘线, 2. 气隙研磨中柱, 3. Pin1, 2, 3, 4, 6套TEFLON TUBE(1)固定磁芯用(6mm宽)的胶带包2TS, 然后磁芯方向包0.025mm*6mm自粘性铜箔1.1TS再涂线槽包0.025mm*6mm自粘性铜箔1.1TS, 两端留焊脚0.25mm引线(加套管)接至PIN3, 成品磁芯方向包12mm(宽)胶带2TS, 再涂线槽包13mm(宽)胶带2TS.
2) 成品需测试报告并在所用具体磁芯:
3) 产品需磨pin, 需点胶;
4) B端用白色套管, A端用黑色套管;
5) 在磁芯中柱气隙点涂胶。

4. 绕线描述

序号	位号	挡墙	绕线描述				挡墙	绝缘胶布层数	
			起点	终点	线径 mm	圈数			绕线方式
1	N1	mm	4	6	0.1*15*1P绞线	20	密绕	0mm	2TS
2	N2	mm	3	0	0.2*2P	18	密绕	0mm	2TS
3	N3	mm	B	A	TEX0.1*110*1P三层绝缘线	5	密绕	0mm	2TS
4	N4	mm	2	3	0.2*2P	5	居中密绕	0mm	2TS
5	N5	mm	6	1	0.1*15*1P绞线	10	密绕	0mm	2TS
6									
7									
8									
9									
10									
11									
12									

3. 原理图



THIRD ANGLE PROJECTION 第三角法	颜色 COLOR	材料 MATERIAL	比例 SCALE	单位 UNIT	重量 WEIGHT	图框 FRAME	是否符合GBS MEASURE UP PART	表面处理 SURFACE PROCESSING
☉	-	-	1:1	mm	-	A4	YES	-

承认 APPROVED	确认 CHECKED	绘图 DRAWING	审核 REVIEW	公差 TOLERANCE	机种 MODEL	品名 NAME	日期 DATE	页次 PAGE
				公差 TOLERANCE	机种 MODEL	品名 NAME	日期 DATE	页次 PAGE
				0.1-0.30	Ag-10			1/3
				0.3-0.50	Ag-10			
				0.5-0.80	Ag-10			
				0.8-1.00	Ag-10			
				1.0-1.60	Ag-10			

四 测试数据

4.1 测试工具

名称	品牌	型号
交流源	远方	DPS1020
功率仪	远方	PF9800
电子负载	艾德克斯 (ITECH)	IT8512A+
示波器	RIGOL	MD05204
万用表	FULKE	17B+

4.2 测试报告请见附件

序号	测试项目	测试结果
1	Turn on time 开机时间	PASS
2	Hold up time 关机保持时间	PASS
3	Input Current 输入电流	PASS
4	Power Factor 功率因素	PASS
5	Efficiency 效率	PASS
6	Power Consumption 待机功率	PASS
7	Inrush Current 倾入电流 (浪涌)	PASS
8	Rise time 输出上升时间	PASS
9	Overshoot&Undershoot 过充和欠充	PASS
10	Ripple voltage&noise 纹波和噪声	PASS
11	Line&Load Regulation 过载调整率	PASS
12	Over Current Protection 过流保护	PASS
13	Short Circuit Protection 短路保护	PASS
14	Over Voltage Protection 过压保护	PASS
15	Over Temperature Protection 温升	PASS
16	EMI	PASS
17	Components De-rating 器件降级	PASS

Turn On Time Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load

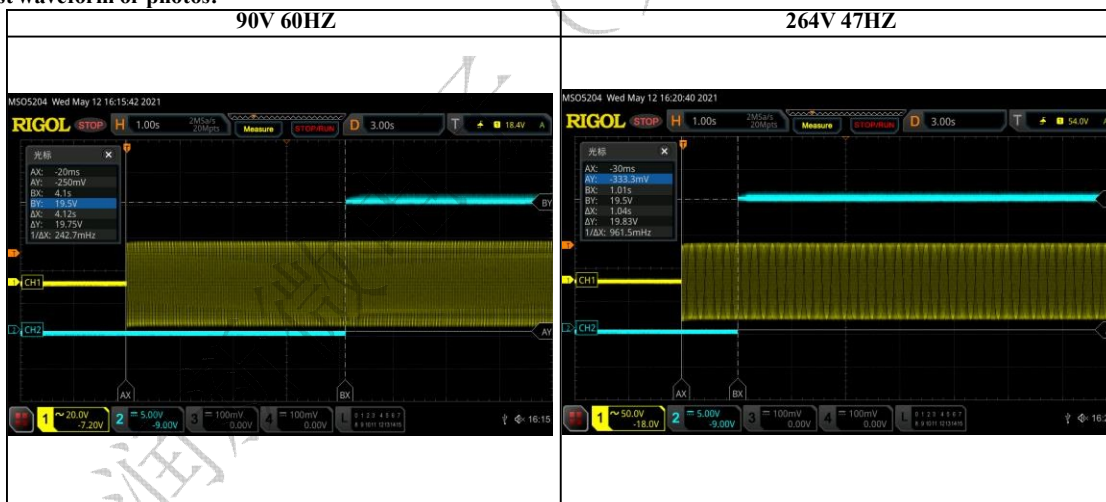
2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition		SPEC	Test result (ms)		Judge	Note
AC Input	DC Load		1#	2#	Pass/Fail	
90V	63Hz	10S	4.12S		PASS	
264V	47Hz		1.01S		PASS	

4. Test waveform or photos:



Hold up Time Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load

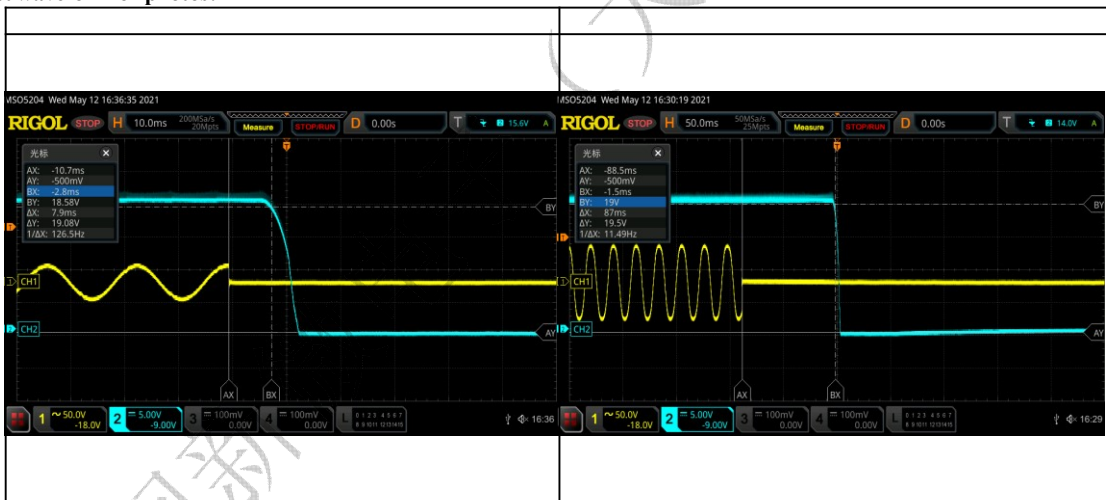
2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition			SPEC	Test result (ms)		Judge	Note
AC Input Vin	Fin	DC Load		1#	2#	Pass/Fail	
90V	47Hz	Full load	>6mS	7.9ms		PASS	
264V	63Hz			87ms		PASS	

4. Test waveform or photos:



Input Current Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac

Input frequency: 47Hz/63Hz

Ambient temperature: 25±5 °C

Output Load: Full Load

2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition			SPEC	Test result (A)		Judge	Note
AC Input	DC Load	1#		2#	Pass/Fail		
Vin		Fin					
90V	47Hz	Full load	<1.5A	1.34		PASS	
264V	63Hz			0.658		PASS	

Power Factor Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load

2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition		SPEC	Test result		Judge	Note
AC Input	DC Load		1#	2#	Pass/Fail	
Vin	Fin	<0.5				
90V	47Hz		0.558		PASS	
264V	63Hz		0.583		PASS	

Efficiency Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 115Vac/230Vac

Input frequency: 50Hz/60Hz

Ambient temperature: 25±5 °C

Output Load: 10%、25%、50%、75%、100%Full Load

2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

S/N	Input & Output		10%load	25%load	50%load	75%load	100%load	Average efficiency	Spec	Judge	Note
			0.325A	0.8125A	1.625A	2.4375A	3.25A			Pass/Fail	
1#	115Vac/60Hz	Input power	7.310W	17.700W	34.800W	52.000W	69.500W	92.95%	>89%	PASS	
		Output voltage	19.956V	19.955V	19.997V	19.960V	19.940V				
		Output power	6.486W	16.213W	32.495W	48.653W	64.805W				
		Efficiency	88.72%	91.60%	93.38%	93.56%	93.24%				
	230Vac/50Hz	Input power	7.740W	18.100W	35.200W	52.500W	69.600W	91.91%		PASS	
		Output voltage	19.951V	19.945V	20.020V	19.940V	19.940V				
		Output power	6.486W	16.205W	32.533W	48.604W	64.805W				
		Efficiency	83.79%	89.53%	92.42%	92.58%	93.11%				
		Efficiency	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!				

Power Consumption Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 115Vac/230Vac
 Input frequency: 50Hz/60Hz
 Ambient temperature: 25±5 °C
 Output Load: no Load

2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition			SPEC	Test result (W)			Judge	Note
AC Input		DC Load		1#	2#	3#	Pass/Fail	
Vin	Fin							
115V	60Hz	no load	<0.9W	0.58			PASS	
230V	50Hz			0.78			PASS	

Inrush current Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load

2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition		SPEC			Test result			Judge	Note	
AC Input		DC Load	Inrush Current(A)	Fuese I ² t (A ² S)	Bridge Rectifiers Ipeak (A&mS)	Inrush Current (A)	Fuse I ² t (A ² S)	Bridge Rectifiers Ipeak (A&mS)		Pass/Fail
Vin	Fin									
90V	63Hz	Full load	70A		200A@8.3mS	55.798		40A	PASS	
264V	47Hz		120A			99.707		67A	PASS	

4. Test waveform or photos:



Rise time Test

Tested By: AC6-2(XG65T230HS1A)

Test date: 2021/6/24

1. Test condition:

Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load

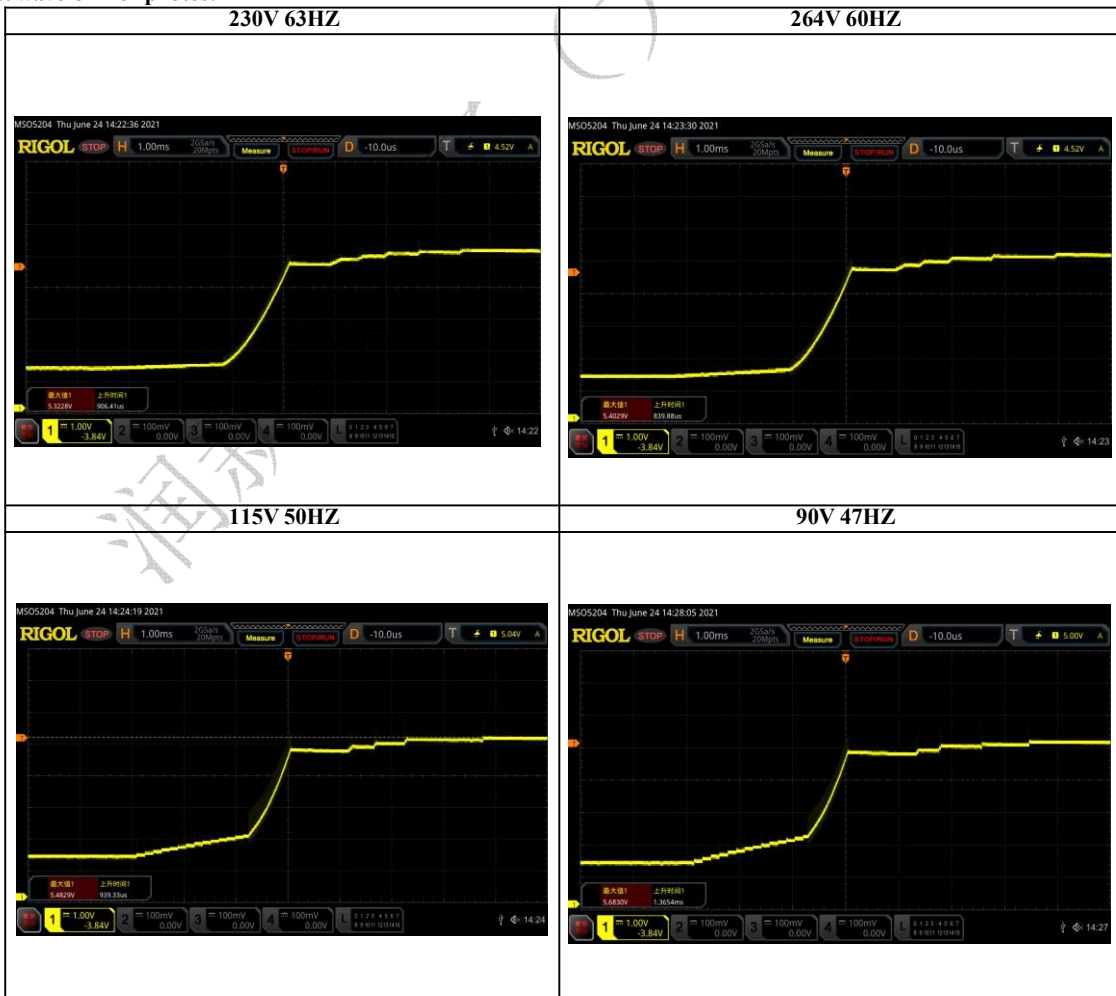
2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition			SPEC	Test result (ms)		Judge	Note
AC Input Vin	Fin	DC Load		1#	2#	Pass/Fail	
90V	63Hz	Full load	<1mS	1.3654ms		PASS	
115V	60Hz			0.939ms		PASS	
230V	50Hz	Full load	<1mS	0.908ms		PASS	
264V	47Hz			0.806ms		PASS	

4. Test waveform or photos:



Overshoot&Undershoot Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

 Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load


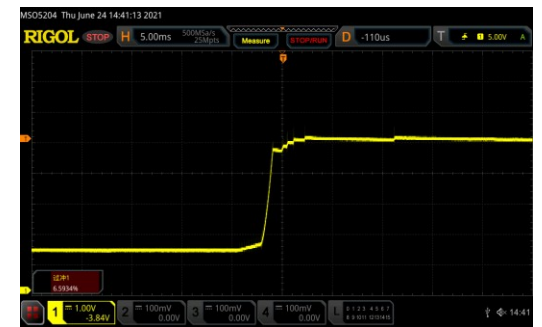


2. Test equipment:

AC Source:	DPS1020 V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test Items	Test condition			SPEC	Test result (%)		Judge	Note
	AC Input		DC Load		1#	2#		
	Vin	Fin					Pass/Fail	
Overshoot	90V	63Hz	Full load	<10%	6.06	PASS	FULL BANDWIDE	
	115V	60Hz			6.59	PASS		
	230V	50Hz		<10%	9.3	PASS		
	264V	47Hz		5.4	PASS			
Undershoot	90V	63Hz	Full load	10%	5.2631	PASS		
	115V	60Hz		10%	5.2631	PASS		
	230V	50Hz		5.2631	PASS			
	264V	47Hz		7.01	PASS			

4. Test waveform or photos:

Test Items	90V 63HZ	115V 60HZ
Overshoot		
	230V 50HZ	264V 47HZ
		

	90V 63HZ	115V 60HZ
Undershoot	<p>RIGOL MSOS204 Thu June 24 14:56:26 2021 STOP H 5.00ms 500kSps 25Mpts Measure STOP/PAUSE D -260us T + 4.04V A 1 = 1.00V -3.35V 2 = 100mV 0.00V 3 = 100mV 0.00V 4 = 100mV 0.00V L 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 5.2631%</p>	<p>RIGOL MSOS204 Thu June 24 14:55:43 2021 STOP H 5.00ms 500kSps 25Mpts Measure STOP/PAUSE D -260us T + 4.04V A 1 = 1.00V -3.35V 2 = 100mV 0.00V 3 = 100mV 0.00V 4 = 100mV 0.00V L 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 5.2631%</p>
	230V 50HZ	264V 47HZ
	<p>RIGOL MSOS204 Thu June 24 14:55:03 2021 STOP H 5.00ms 500kSps 25Mpts Measure STOP/PAUSE D -260us T + 4.04V A 1 = 1.00V -3.35V 2 = 100mV 0.00V 3 = 100mV 0.00V 4 = 100mV 0.00V L 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 5.2631%</p>	<p>RIGOL MSOS204 Thu June 24 14:54:38 2021 STOP H 5.00ms 500kSps 25Mpts Measure STOP/PAUSE D -260us T + 4.04V A 1 = 1.00V -3.35V 2 = 100mV 0.00V 3 = 100mV 0.00V 4 = 100mV 0.00V L 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 5.2631%</p>

润新微电子

Ripple voltage&noise Test

Tested By: AC6-2(XG65T230HS1A)

Test date: 2021/6/24

1. Test condition:

Input voltage: 90Vac/264Vac

Input frequency: 47Hz/63Hz

Ambient temperature: 25±5 °C

Output Load: Full Load

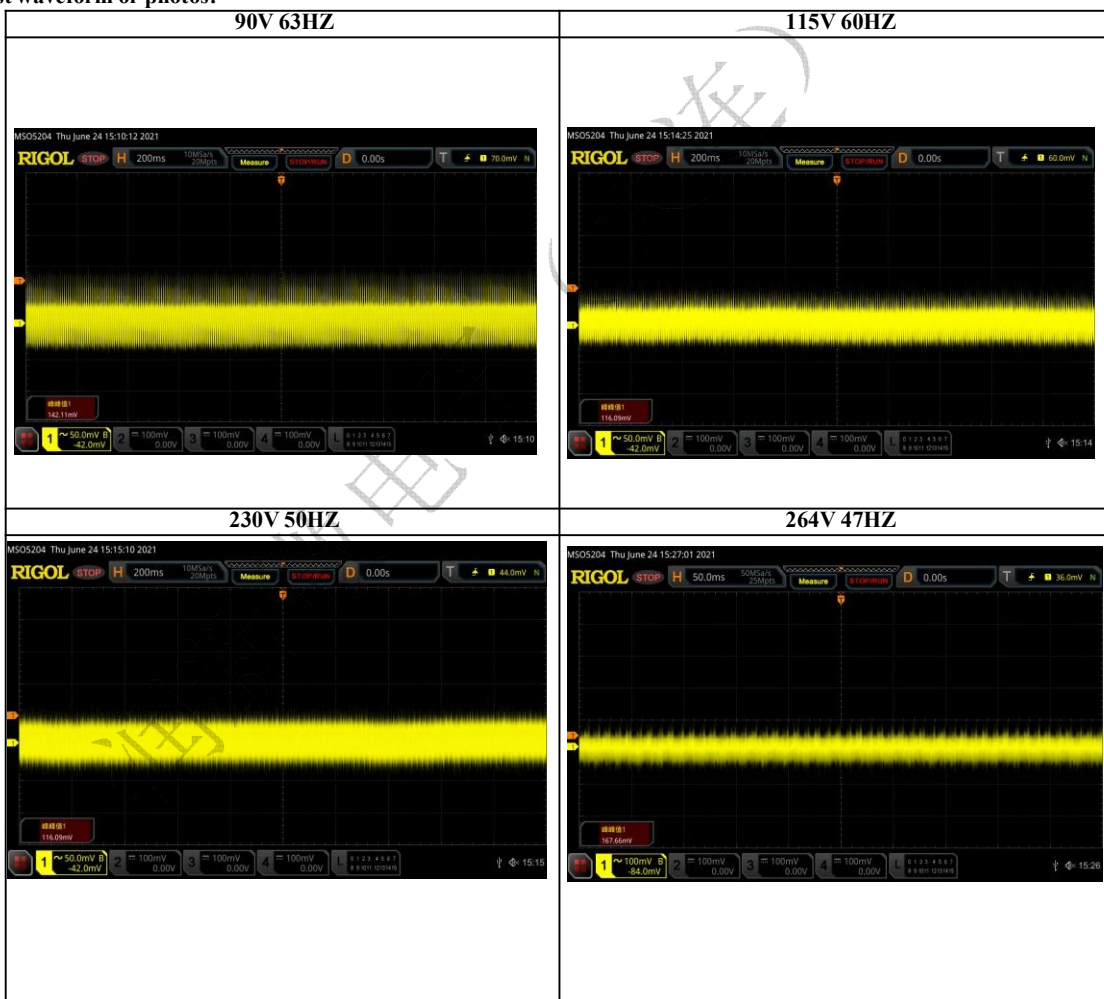
2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition		SPEC	Test result (mVp-p)		Judge	Note
AC Input Vin	DC Load Fin		1#	2#	Pass/Fail	
90V	63Hz	<200mV	142		PASS	
115V	60Hz		116		PASS	
230V	50Hz	<200mV	116		PASS	
264V	47Hz		167		PASS	

4. Test waveform or photos:



Line&Load Regulation Test

Tested By: AC6-2(XG65T230HS1A)

Test date: 2021/6/24

1. Test condition:

Input voltage: 90Vac/264Vac

Input frequency: 47Hz/63Hz

Ambient temperature: 25±5 °C

Output Load: Full Load

2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOLMSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Items S/N	Input Load	90Vac	100Vac	240Vac	264Vac	Max.	Min.	Line Regulation	SPEC			Judge Pass/ Fail
									Output voltage	Load Regulation	Line Regulation	
1#	0%	20.160V	20.160V	20.162V	20.162V	20.162	20.160	20.162	20.160V	19.125V~21V	19.56~20.6	PASS
	25%	20.080V	20.083V	20.082V	20.082V	20.83/	20.80/	20.84				
	50%	19.995V	19.993V	19.995V	19.997V	19.997	19.993	19.994				
	75%	19.910V	19.898V	19.910V	19.908V	19.910	19.898	19.90				
	100%	19.831V	19.822V	19.822V	19.820V	19.831	19.820	19.828				
	Min.	0.82%	0.86%	0.87%	0.89%	/	/	/				
	Max.	0.83%	0.84%	0.84%	0.83%	/	/	/				
	Load Regulation	0.89%				/	/	/				
2#	0%					/	/	/				
	25%					/	/	/				
	50%					/	/	/				
	75%					/	/	/				
	100%					####	####	#DIV/0!				
	Min.	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	/	/	/				
	Max.	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	/	/	/				
	Load Regulation	#DIV/0!				/	/	/				

Over Current Protection Test

Tested By: AC6-2(XG65T230HS1A)

Test date: 2021/6/24

1. Test condition:

Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25℃、40℃
 Output Load: 0A~OCP

2. Test equipment:

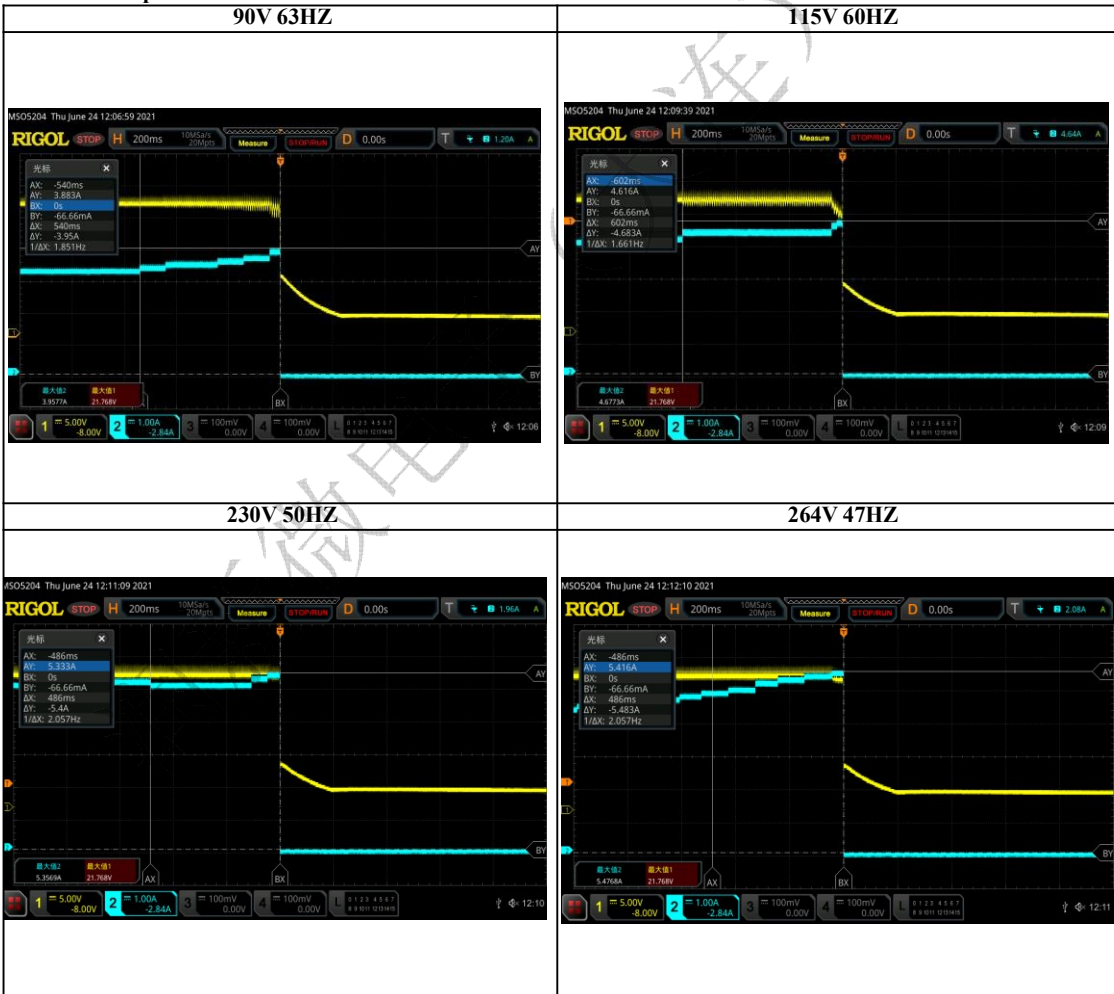
AC Source:	DPS1020 V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

3.1 25℃ Test

Test condition				SPEC	Test result				Judge	Note
AC Input		DC Load	1#		2#	1#	2#	Pass/Fail		
Vin	Fin									
90V	63Hz	0A~OCP	4.875	3.9577	Hiccup→Self-recovery			PASS		
115V	60Hz			4.683	Hiccup→Self-recovery			PASS		
230V	50Hz	0A~OCP	4.875	5.35	Hiccup→Self-recovery			PASS		
264V	47Hz			5.483	Hiccup→Self-recovery			PASS		

4. Test waveform or photos:



Short Circuit Protection Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac

Input frequency: 47Hz/63Hz

Ambient temperature: 25±5 °C

Output Load: Short

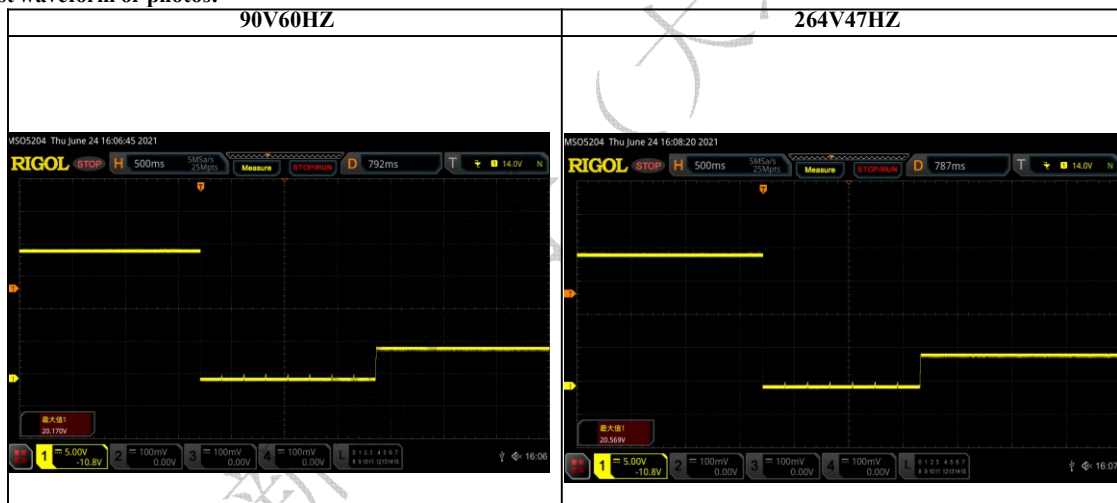
2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition			SPEC	Test result				Judge	Note
AC Input		DC Load		1#		2#		Pass/Fail	
Vin	Fin			Power (W)	Protection mode	Power (W)	Protection mode		
90V	47Hz	short	65W	Hiccup→Self-recovery	hiccup		PASS		
264V	63Hz		65W	Hiccup→Self-recovery	hiccup		PASS		

4. Test waveform or photos:



Over Voltage Protection Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load or No Load

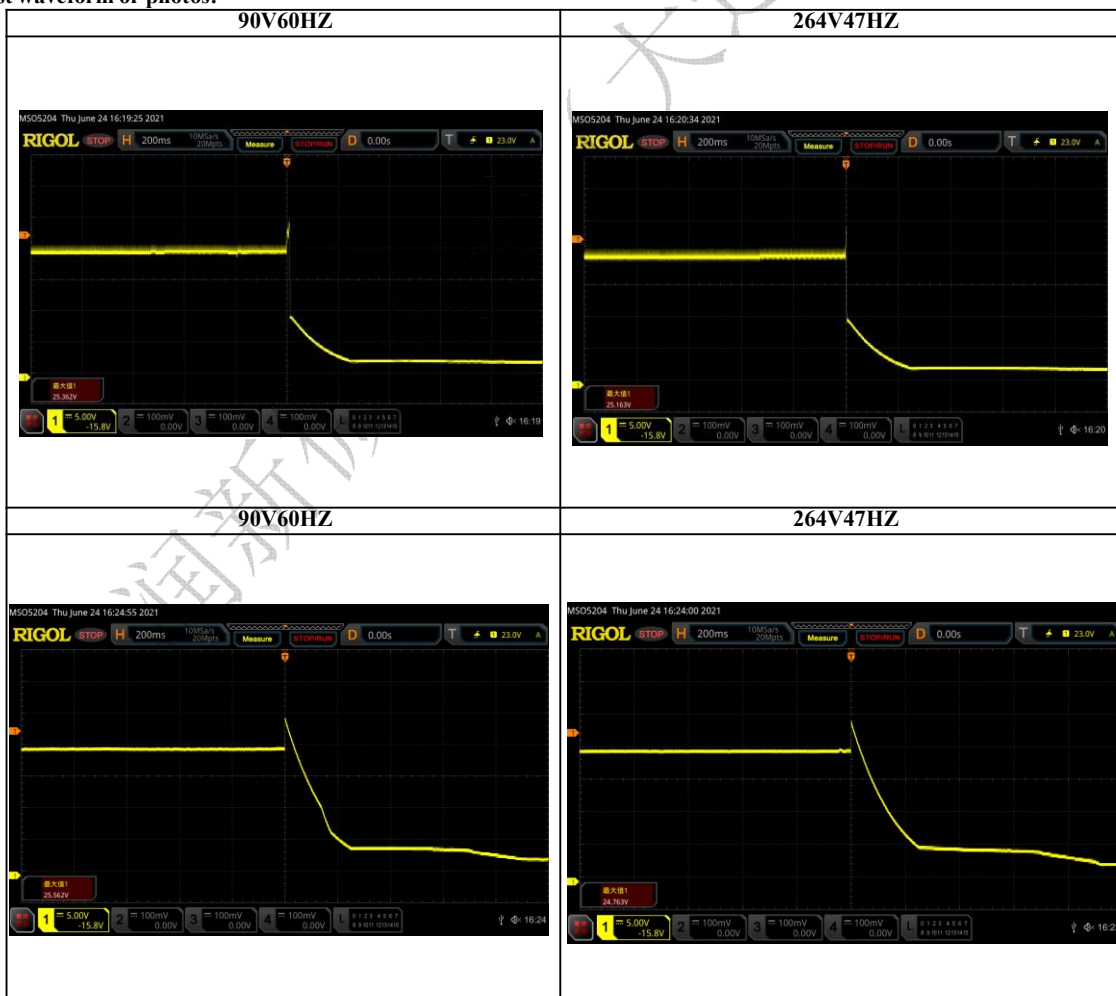
2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512A+	Power meter:	PF9800

3. Test result:

Test condition				Test result				Judge	Note
AC Input		DC Load	SPEC	1#		2#			
Vin	Fin			Output Voltage (V)	Protection mode	Output Voltage (V)	Protection mode	Pass/Fail	
90V	47Hz	Full Load	26V	25.362	Hiccup→Self-recovery		PASS		
264V	63Hz			25.163	Hiccup→Self-recovery		PASS		
90V	47Hz	no Load							
264V	63Hz								

4. Test waveform or photos:



Over Temperature Protection Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac

Input frequency: 47Hz/63Hz

Ambient temperature: Rated temperature → OTP

Output Load: Full Load

(During testing, the UUT needs to be wrapped by a blanket tightly and evenly.)

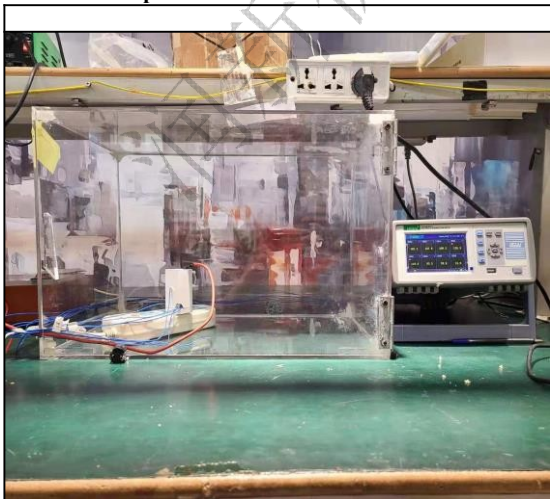
2. Test equipment:

AC Source:	DPS1020_V100	Temperature humidity chamber:	
DC Load:	IT8512A+	Thermograph:	

3. Test result:

Test condition	Input Voltage	90V	110V	230V	264V	Spec		Judge	Note
	Output Load	Full Load				Rated value	De-rating	Pass/Fail	
	Ambient temperature	31.0°C	29.3°C	29.4°C	30.6°C				
	Test Time	2H	2H	2H	2H				
Location	Description	Measure data(°C)							
Q1	XG65T230HS1B	104.7	93.6	91.5	98.1	130	120		
Q3	JMSL1006AG	102.1	93.7	92.9	97.5	130	120		
L3	0.32mm 120uH	100	89	79.1	82.8	150	130		
T2	线圈	113	102.8	100.7	106.5	150	120		
T2	磁芯	107.5	98.7	97.7	103.3	150	130		
外壳	贴片外壳面	80.2	73.6	71	74.5	85	81		
外壳	插件外壳面	81	74.8	71	75	85	81		

4. Test waveform or photos:



EMI Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

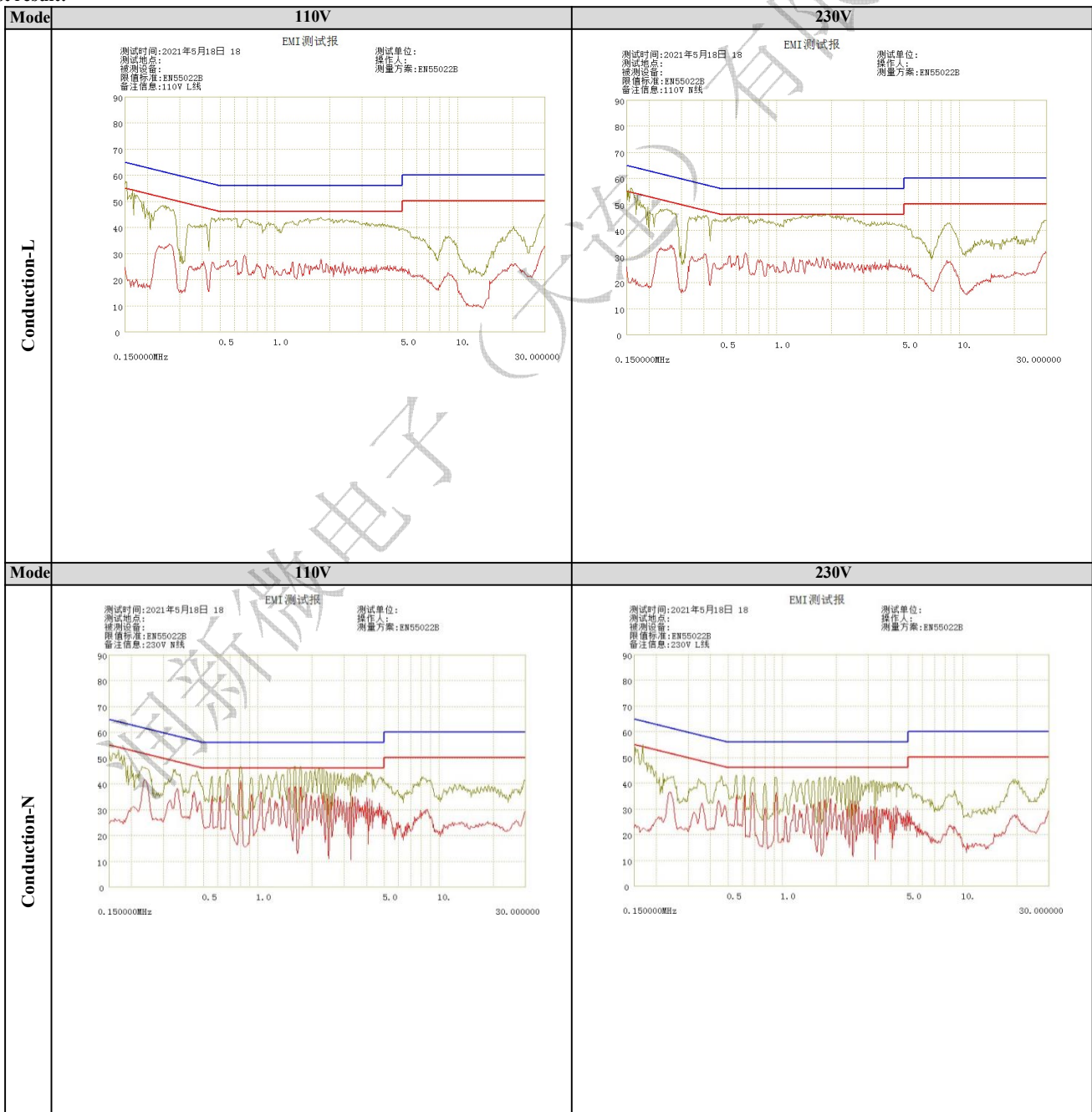
1. Test condition:

Input voltage: 115Vac/230Vac
 Input frequency: 50Hz/60Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load

2. Test equipment:

EMI equipment:			
DC Load:	cement resistor		

3. Test result:



Mode	110V	230V																																																												
Radiation-Horizontal	<p>Dongguan Precise Testing & Certification Corp., Ltd. Building 1, No. 6 Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China Http://www.ptc-testing.com Tel:0769-38808222</p> <p>Date: 145 File: E:\Test data 966\2021A\谐波孔特 EMI (156) Date: 2021.04.25</p> <p>Test Site : 3m chamber Dis./Ant : 3m ANT-RE-L Ant pol : HORIZONTAL Limit : EN55032 CLASS B EUT : MN : P01C1 Power Input : AC120V/50Hz Test Mode : Working Engineer : 张永强(张永强)</p> <p>Env./Ins. : Temp:24.5°C Humi:52% Press:101.3kPa</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Freq MHz</th> <th>Cable Loss dB</th> <th>ANT Factor dB/m</th> <th>Receiver Reading dBuV</th> <th>Preamp Factor dB</th> <th>Emission Level dBuV/m</th> <th>Limit dBuV/m</th> <th>Over Limit dB</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>201.390</td> <td>4.47</td> <td>11.05</td> <td>49.19</td> <td>30.04</td> <td>34.67</td> <td>40.00</td> <td>-5.33</td> <td>QP</td> </tr> </tbody> </table> <p>- 15 -</p>	No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	1.	201.390	4.47	11.05	49.19	30.04	34.67	40.00	-5.33	QP	<p>Dongguan Precise Testing & Certification Corp., Ltd. Building 1, No. 6 Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China Http://www.ptc-testing.com Tel:0769-38808222</p> <p>Date: 132 File: E:\Test data 966\2021A\谐波孔特 EMI (156) Date: 2021.04.25</p> <p>Test Site : 3m chamber Dis./Ant : 3m ANT-RE-L Ant pol : HORIZONTAL Limit : EN55032 CLASS B EUT : MN : P01C1 Power Input : AC230V/50Hz Test Mode : Working Engineer : YJW 电压350uH</p> <p>Env./Ins. : Temp:24.5°C Hum:52% Press:101.3kPa</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Freq MHz</th> <th>Cable Loss dB</th> <th>ANT Factor dB/m</th> <th>Receiver Reading dBuV</th> <th>Preamp Factor dB</th> <th>Emission Level dBuV/m</th> <th>Limit dBuV/m</th> <th>Over Limit dB</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>176.888</td> <td>4.25</td> <td>12.74</td> <td>48.60</td> <td>30.03</td> <td>35.56</td> <td>40.00</td> <td>-4.44</td> <td>QP</td> </tr> </tbody> </table> <p>- 2 -</p>	No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	1.	176.888	4.25	12.74	48.60	30.03	35.56	40.00	-4.44	QP																				
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No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark																																																					
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3.	218.309	4.61	11.59	47.35	30.10	33.45	40.00	-6.55	Peak																																																					

Components De-rating Test

Tested By: P01(XG65T230HS1A)

Test date: 2021/5/19

1. Test condition:

Input voltage: 90Vac/264Vac
 Input frequency: 47Hz/63Hz
 Ambient temperature: 25±5 °C
 Output Load: Full Load

2. Test equipment:

AC Source:	DPS1020_V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512+	Power meter:	PF9800

3. Test result:

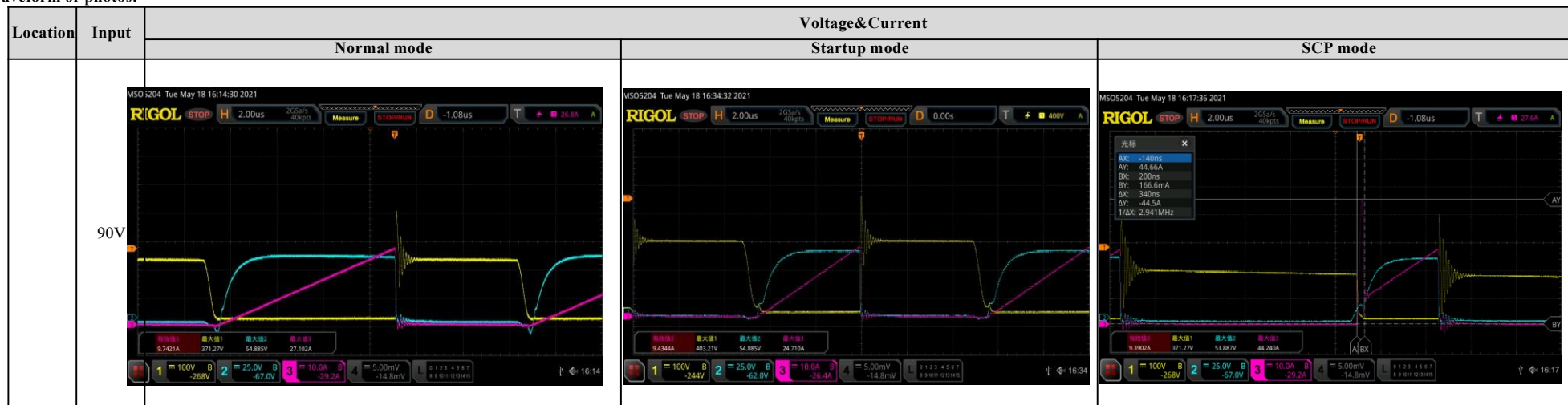
1). Input: 90Vac/47Hz

MOSFET			Component Spec				Test result											Judge	Note
							Voltage(Vmax)						ID(Arms)		Current				
Location	Model&Type	Supplier	Vds (V)	Vgs (V)	Id (A)	IDM (A)	Normal mode	De-rating	Startup mode	De-rating	SCP & OCP	De-rating	Normal mode	De-rating	Startup mode	De-rating	Pass/Fail		
	XG65T230HS1B		650	20	11	37	371.27	57.12%	403.21	62.03%		0.00%	9.7421	88.56%	24.71	66.78%	PASS		
								#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!			
								#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!			

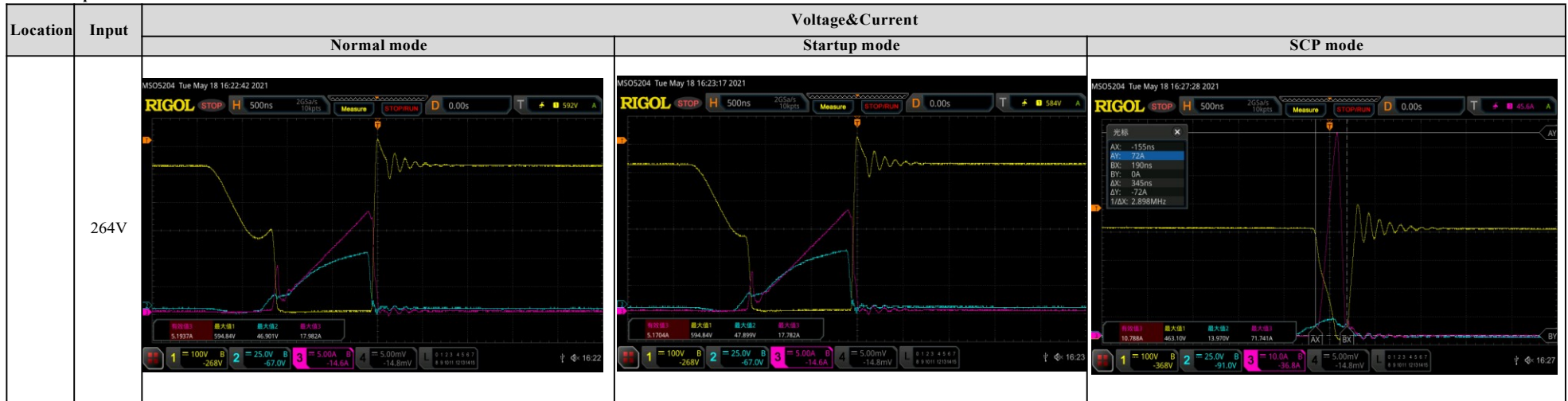
2). Input: 264Vac/63Hz

MOSFET			Component Spec				Test result												Judge	Note
							Voltage(Vmax)						Current Id(Arms) IdM(Amax)							
Location	Model&Type	Supplier	Vds (V)	Vgs (V)	Id (A)	IdM (A)	Normal mode	De-rating	Startup mode	De-rating	SCP & OCP	De-rating	Normal mode	De-rating	Startup mode	De-rating	Pass/Fail			
	XG65T230HS1B		650	20	11	37	594.84	91.51%	594.84	91.51%	463.1	71.25%	5.1937	47.22%	17.782	48.06%	PASS			
								#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!				

4. Test waveform or photos:



5. Test waveform or photos:



五、主要器件资料

5.1 氮化镓 MOS


RX65T300HS2A

650V GaN Power Transistor (FET)

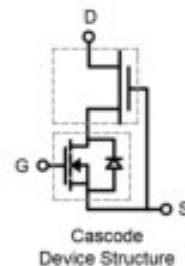
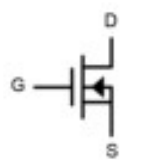
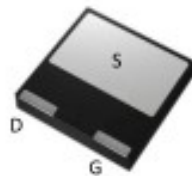
Features

- Easy to use, compatible with standard gate drivers
- Excellent $Q_G \times R_{DS(on)}$ figure of merit (FOM)
- Low Q_{RR} , no free-wheeling diode required
- Low switching loss
- RoHS compliant and Halogen-free

Product Summary		
V_{DSS}	650	V
$R_{DS(on), typ}$	240	m Ω
Q_G, typ	21.5	nC
Q_{RR}, typ	39	nC

Applications

- High efficiency power supplies
- High efficiency USB PD adapters
- Other consumer electronics




Packaging

Part Number	Package	Packaging	Base QTY
RX65T300HS2A	DFN 8 x 8	Tape and Reel	2500

Maximum ratings, at $T_C=25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter	Limit Value	Unit
I_D	Continuous drain current @ $T_C=25^\circ\text{C}$	9	A
	Continuous drain current @ $T_C=100^\circ\text{C}$	6	A
I_{DM}	Pulsed drain current @ $T_C=25^\circ\text{C}$ (pulse width: 10us)	31	A
	Pulsed drain current @ $T_C=150^\circ\text{C}$ (pulse width: 10us)	23	A
V_{DSS}	Drain to source voltage ($T_J = -55^\circ\text{C}$ to 150°C)	650	V
V_{TDSS}	Transient drain to source voltage ³	800	V
V_{GSS}	Gate to source voltage	± 20	V
P_D	Maximum power dissipation @ $T_C=25^\circ\text{C}$	38	W
T_C	Operating temperature	Case	-55 to 150
T_J		Junction	-55 to 150
T_S	Storage temperature	-55 to 150	$^\circ\text{C}$
T_{CSOLD}	Soldering peak temperature	260	$^\circ\text{C}$

5.2 SR 同步整流MOS



ALPHA & OMEGA
SEMICONDUCTOR

AONS62922

120V N-Channel AlphaSGT™

General Description

- Trench Power AlphaSGT™ technology
- Low $R_{DS(ON)}$
- Logic level Gate Drive
- Optimized for synchronous Rectifier
- RoHS and Halogen-Free Compliant


Applications

- Synchronous Rectification for Flyback Converters
- Charger for Mobile Devices
- USB-PD Adaptors

Product Summary


V_{DS}	120V
I_D (at $V_{GS}=10V$)	85A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 7m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 9m Ω

100% UIS Tested
100% Rg Tested



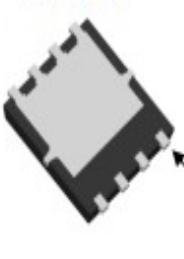
DFN5x6

Top View



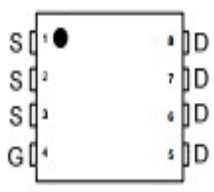
PIN1

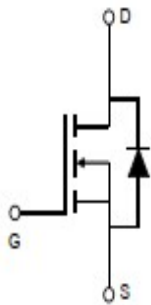
Bottom View



PIN1

Top View





Orderable Part Number	Package Type	Form	Minimum Order Quantity
AONS62922	DFN 5x6	Tape & Reel	3000

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^a	I_D	$T_C=25^\circ\text{C}$	A
		$T_C=100^\circ\text{C}$	
Pulsed Drain Current ^c	I_{DM}	250	A
Continuous Drain Current	I_{DSM}	$T_A=25^\circ\text{C}$	A
		$T_A=70^\circ\text{C}$	
Avalanche Current ^c	I_{AR}	60	A

5.3 PWM控制芯片



MK2697

MK2697 -宽供电高频 QR PWM 控制器

DESCRIPTION

MK2697 是专为PD/快充应用优化的QR PWM 控制器。其很宽的 VCC 工作电压范围(10V-90V) 可以使其覆盖 PD/PPS 从 3.3V-23V 的输出范围而不需要使用额外的绕组或者线性降

FEATURES

- 宽范围 VCC 工作电压(9V-90V)
- 最高可达 260KHz 的开关频率
- 针对于不同输出电压和负载的多模式控制

5.4 SR制芯片



MP6908

**Fast Turn-Off Intelligent Rectifier
with No Need for Auxiliary Winding**

DESCRIPTION

The MP6908 is a low-drop diode emulator IC that, when combined with an external switch, replaces Schottky diodes in high-efficiency flyback converters. The MP6908 regulates the forward drop of an external synchronous rectifier (SR) MOSFET to about 40mV, which switches off once the voltage becomes negative.

The MP6908 can generate its own supply voltage for battery charging applications with potential low output voltage, and at short circuit output condition, or for high-side SR configuration. Programmable ringing detection circuitry prevents the MP6908 from turning on falsely at Vds oscillations during discontinuous conduction mode (DCM) and quasi-resonant operation.

The MP6908 is available in a space-saving TSOT23-6 package.

FEATURES

- Wide Output Range down to 0V, No Short Circuit Current Flows through Body Diode
- No Need for Auxiliary Winding for High-Side or Low-Side Rectification
- Ringing Detection Prevents False Turn-On during DCM and Quasi-Resonant Operations
- Works with Standard and Logic Level SR MOSFETS
- Compatible with Energy Star
- ~30ns Fast Turn-Off and Turn-On Delay
- ~100µA Quiescent Current
- Supports DCM, CCM, and Quasi-Resonant Operations
- Supports both High-Side and Low-Side Rectification
- TSOT23-6 Package Available

APPLICATIONS

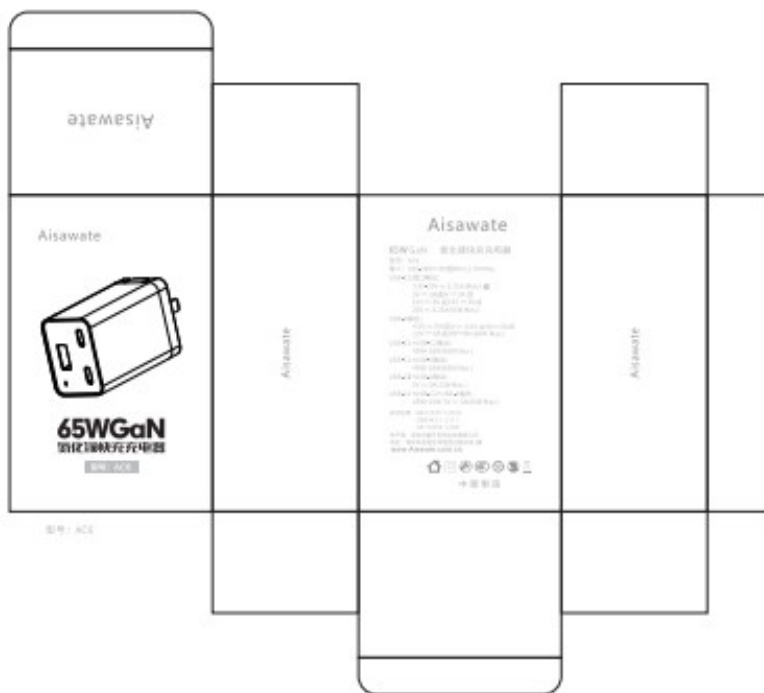
- USB PD Quick Chargers
- Adaptors
- Flyback Power Supplies with Very Low and/or Variable Output Voltage

六、说明书和包装

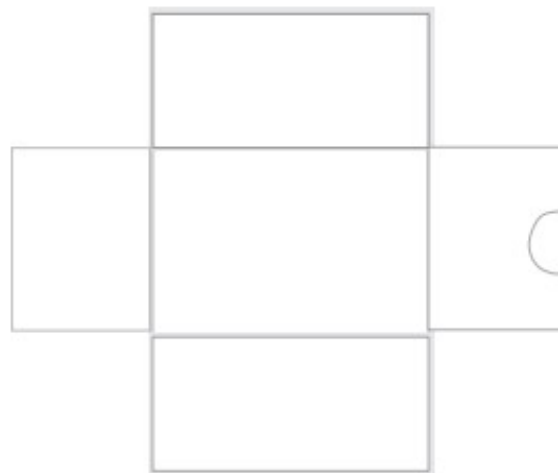
6.1 说明书

<p>产品规格/PRODUCT SPECIFICATION</p> <p>产品名称 / NAME 65W GaN 氮化镓快充充电器</p> <p>输入: 100-240V~50/60Hz, 1.5A Max. USB-C1(默认)输出: 3.3V-20V \leq 3.25A(Max.) 或 5V \leq 3A或9V \leq 3A或 12V \leq 3A或15V \leq 3A或 20V \leq 3.25A(65W Max.)</p> <p>产品型号 / MODEL AC6</p> <p>USB-A输出: 4.5V \leq 5A或5V \leq 4.5A或9V \leq 3A或 12V \leq 3A或20V \leq 3A(60W Max.)</p> <p>产品尺寸 / SIZE 31.5X41X96(mm)</p> <p>产品重量 / WEIGHT \approx 125g</p> <p>USB-C1+USB-C2输出: 45W+18W(63W Max.)</p> <p>USB-C1+USB-A输出: 45W+18W(63W Max.)</p> <p>USB-C2+USB-A输出: 5V \leq 3A(15W Max.)</p> <p>USB-C1+USB-C2+USB-A输出: 45W+15W 5V \leq 3A(60W Max.)</p>	<p>产品结构/PRODUCT STRUCTURE</p>  <p>USB-C1/USB-C Interface</p> <p>指示灯 / Indicator</p> <p>USB-A/USB-A Interface</p> <p>电源插头 / Power Plug</p>	<p>使用说明/DIRECTION FOR USE</p> <ol style="list-style-type: none"> 1. 将数据线连接到充电器 / Connect the data cable to the charger. 2. 将充电器插入100V~240V的电源插座 / Plug the charger into a 100V~240V power outlet. 3. 连接电源后, 充电器指示灯亮起 / After connecting to the power supply, the indicator light of the charger lights up. 4. 将数据线连接到手机或其他电子设备, 充电器将开始为您的电子设备充电 / connect the data cable to the mobile phone or other electronic device, and the charger will start charging your electronic devices. 5. 电量充满后, 从电源插座上取下充电器 / When the battery is fully charged, remove the charger from the power outlet. 	<p>使用说明/DIRECTION FOR USE</p> <ol style="list-style-type: none"> 1. 此适配器适用于符合USB-A及Type-C协议的线材 / The adapter is suitable for wire conforming to USB-A & Type-C protocol. 2. 儿童必须在成人的监护下使用 / The children must be supervised by the adult when using the ADAPTOR. 3. 仅针对可充电电池设备进行充电, 若对不可充电类型的电池进行充电可能会导致爆炸, 电池破裂或漏液, 人身伤害或财产损失 / It can be only used to charge the rechargeable batteries or device. And charging a non-rechargeable battery may cause explosion, battery rupture or leakage, personal injury or property damage. 4. 请勿拆解或组装适配器, 否则会对人体产生伤害, 或引起触电或火灾 / Do not disassemble or assemble the adapter, or it may cause injury to human body or electric shock or fire. 5. 请勿使适配器落地或将重物置于其上 / Do not land the adapter or place heavy objects on it. <ol style="list-style-type: none"> 6. 请勿在使用时, 将产品放置在阳光直射, 发热设备旁或其他高温场所 / Do not place the product in direct sunlight, beside heating equipment or other high temperature places when using it. 7. 请勿将产品存放在高温环境中, 以免产生爆炸 / Do not store the product in a high temperature environment to avoid explosion. 8. 不正确使用适配器则有触电的危险 / Improper use of the adapter may lead to electric shock. 9. 使用前请仔细阅读产品参数并妥善保管和储存 / Please read the product parameters carefully before use and keep and store them properly. 10. 当电量充满时, 立即从插座上取下充电器 / When charging is completed, remove the charger from the socket immediately. 																								
<p>使用说明/DIRECTION FOR USE</p> <ol style="list-style-type: none"> 1. 仅在-10℃~+35℃温度范围内使用 / The adapter is suitable for wire conforming to USB-A & Type-C protocol. 2. 仅可用于室内充电, 请勿暴露于雨雪中 / The children must be supervised by the adult when using the ADAPTOR. 3. 储存环境温度: -20℃~+80℃ / Storage environment temperature: -20℃~+80℃ 4. 仅适用于海拔5000m以下的地区 / Only applicable to areas below 5000m above sea level. 	<p>保修卡</p> <p>为了保障您的权益, 请认真填写, 并妥善保管, 作为您维权的凭证</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">经销商信息</td> </tr> <tr> <td>产品名称</td> <td>产品型号</td> </tr> <tr> <td>经销商名称</td> <td>经销商名称</td> </tr> <tr> <td colspan="2">用户信息</td> </tr> <tr> <td>产品型号</td> <td>产品型号</td> </tr> <tr> <td>通讯地址</td> <td>联系电话</td> </tr> <tr> <td colspan="2">保修内容</td> </tr> <tr> <td colspan="2">保修日期</td> </tr> <tr> <td colspan="2">产品售后服务中心信息</td> </tr> <tr> <td>产品类型</td> <td>保修时间</td> <td>服务方式</td> </tr> <tr> <td>充电器类</td> <td>12个月保修</td> <td>客户送修</td> </tr> </table> <p>注: 配件不在保修范围内</p>	经销商信息		产品名称	产品型号	经销商名称	经销商名称	用户信息		产品型号	产品型号	通讯地址	联系电话	保修内容		保修日期		产品售后服务中心信息		产品类型	保修时间	服务方式	充电器类	12个月保修	客户送修	<p>Aisawate</p> <p>尊敬的客户:</p> <p>您好!</p> <p>非常感谢您使用(Aisawate)产品, 为您提供优质的产品和售后服务, 充分保障您的消费者权益是我们应尽的义务。因此, 我公司根据国家有关规定, 实施以下标准保修服务条款。</p> <p>一、保修条件</p> <p>需要保修时, 请出示保修卡, 并详细填写相关内容。本公司向性能用户提供免费服务(注: 发生性能故障, 外观与包装无破损, 配件齐全的前提下, 提供免费服务), 亦可委托经销商进行保修服务。</p> <p>二、以下原因造成的损坏, 恕不提供保修服务。</p> <ol style="list-style-type: none"> 1. 产品序列号标签有涂改、替换外观等现象, 或产品没有序列号, 质保凭证上的产品型号、编号与产品实物不相符的。 2. 产品在规定的保修期限内。 3. 非正常使用本产品导致外表破损。 4. 外包装及内附的赠品, 销售人未承诺的产品之外的服务及赠品。 5. 不当存储: 如产品长时间暴露在非正常的工作温度、湿度环境中造成的性能故障。 6. 未按操作说明, 人为滥用使用, 擅自改装造成的产品损坏。 <p>三、购买者保留此保修卡及有效凭证, 作为保修服务必备证件。请勿擅自修改内容, 否则视为作废。</p> <p>四、本公司保留对该产品售后服务条款的解释权。</p>	<p>65W GaN 氮化镓快充充电器 使用说明书</p> <p>65W GaN Charger AN INSTRUCTION MANUAL</p> <p>Aisawate</p>
经销商信息																											
产品名称	产品型号																										
经销商名称	经销商名称																										
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通讯地址	联系电话																										
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保修日期																											
产品售后服务中心信息																											
产品类型	保修时间	服务方式																									
充电器类	12个月保修	客户送修																									

6.2 包装



盒子



内托