



# 设计参考手册

## Design Reference Manual

**GaN 氮化镓**  
**PD100W-1C 快充设计参考手册**  
(VER: 1.0)

	签 名	日 期
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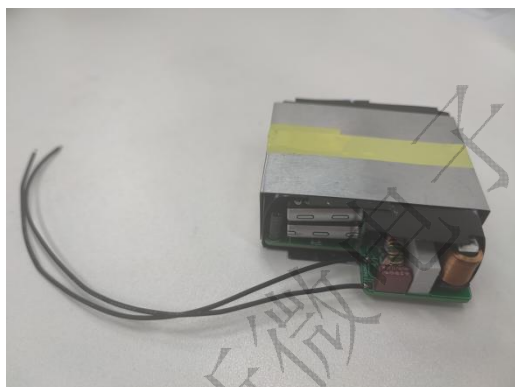
GaN 氮化镓 PD 快充设计参考手册	版本:A1
	PD100W20V5A-1C-V1.0
	文档版本: VER: 1.0

基于**氮化镓**设计的 PD100W-1C 单C六级能效快充电源成品外

观图(外型尺寸: L\*W\*H/68\*68\*31mm)



PCBA 图



主要特性:

- 1、 整机采用高效率电路架构: PFC+QR电路模式, 单 C 口满功率输出可达93.22%以上超高效率;
- 2、 全电压输入设计, 工作电压范围  $90V_{AC} \sim 264V_{AC}$ ;
- 3、 C 口 ( 最大 100W 输出 功率 ) , 兼 容 : PPS/PD/QC3.0/QC4.0+/AFC/FCP/SCP/PE/IP2.4/D CP1.5/三星 5V2A 协议, 固定输出电压:  $5V_{DC}/3.0A$ 、 $9V_{DC}/3.0A$ 、 $12V_{DC}/3.0A$ 、 $15V_{DC}/3.0A$ 、 $20V_{DC}/5A$ ;
- 4、 具有输出过流保护、短路保护、过温保护等功能;

- 5、 C 口输出符合“DOE&COC” 6 级能效标准；
- 6、 通过 GB4943 EN55022 ClassB 的 EMI 测试标准
- 7、 通过 EFT 4KV 测试标准；
- 8、 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 DEMO 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	230	264	Vac	单相输入
输入频率范围	$F_{LINE}$	47	50/60	63	Hz	
待机功耗	$P_{stb}$		180		mW	
二，输出特性 (220V 输入时测试)						
1, C 口工作 (最大输出功率 100W)						
1.1 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 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 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 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 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)	$I_{OUT}$		5	6	A	

## 三，性能描述

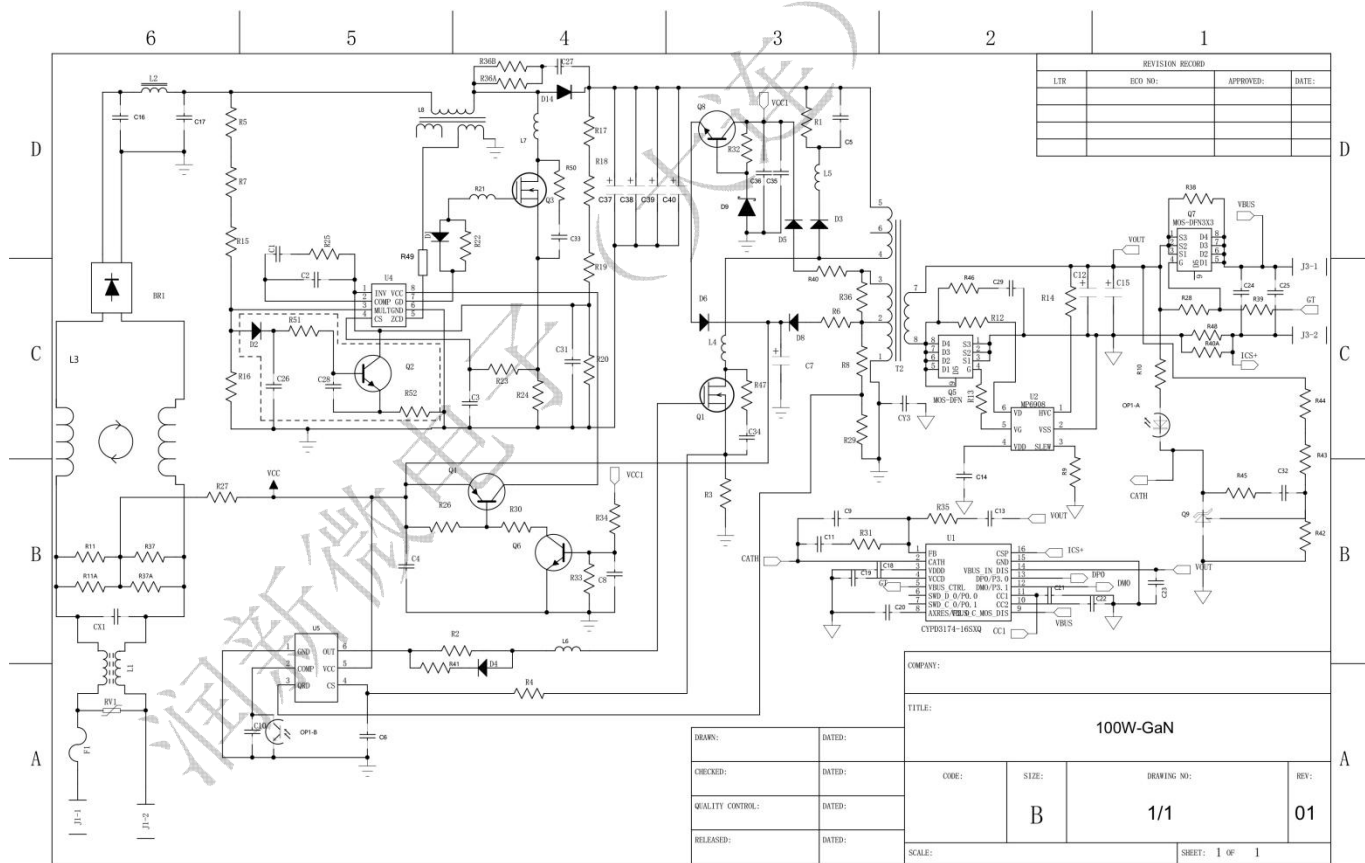
## 3.1 性能描述

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	$\eta$		93.22		%	@230V <sub>AC</sub>
C口 20V 输出, 平均效率	$\eta$		90.88		%	25/50/75/100% @230V <sub>AC</sub>
C口 12V 输出, 100%负载效率	$\eta$		92.8		%	V <sub>o</sub> =12V@230V <sub>AC</sub>
C口 12V 输出, 平均效率	$\eta$		91.6		%	25/50/75/100% @230V <sub>AC</sub>
电压调整率				±3	%	
负载调整率				±3	%	
C口电压纹波与噪声	V <sub>R0N</sub>		96.19/ 104.71		mV	20V 满载
启动时间	T <sub>ST_DELAY</sub>		<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	°C	
工作湿度		20%		90%	R. H.	
储存温度		-40		60	°C	
储存湿度		0%		95%	R. H.	
外部尺寸	W*H*L	68*68*31			MM	
单只产品重量	Weight	184.2			g	

## 二 电源结构

### 2.1 电原理图

有限公司





## 2.2 材料清单

### 润新微电子（大连）有限公司 初始BOM物料清单

2022.11.09

层次	物料名称	规格型号	单位	用量	位置号	备注	厂家
一	成品	20V5A 100W 氮化镓电源适配器 产品型号:	PCS	1		无	
二	装配件	20V5A 100W 氮化镓电源适配器 产品型号:	PCS	1		无	
1							
2							
3							
4							
5							
三	插件件	20V5A 100W 氮化镓电源适配器 产品型号:	PCS	1		无	
2	电解电容	10uF 50V 105°C Φ5*11mm PIN距2.0mm 脚长3.4±0.2mm GF系列 品牌:中元	PCS	2	C7, C4		中元
3	固态电容	680uF 25V 105°C Φ6*14mm PIN距2.0mm脚长3.4±0.3mm 品牌:柏瑞凯	PCS	1	C15		威迪-13828899258
4	固态电容	680uF 25V 105°C Φ6*14mm PIN距2.0mm脚长4.5±0.3mm 品牌:柏瑞凯	PCS	1	C12	注:脚长必须留4.5mm,预留焊接散热片	威迪-13828899258
5	金属薄膜电容	CBB21 450V/474J P=15MM 尺寸L17*W5.5*H14mm品牌:威迪	PCS	2	C16, C17		威迪-13828899258
6	变压器	KT-ATQ2516-001 260uH±5% 骨架4+4 磁芯材质:PC96 品牌:	PCS	1	T2		13632921161
7	PFC电感	KT-ATQ2516-001 300uH±5% T9*5*3 400uH MI φ0.45mm*1P*9.5TS φ0.45mmTWL-B*1P*9.5TS 双线并绕 锰锌材质 品牌: 格瑞安	PCS	1	L8		13632921161
8	共模电感	HCM-1515-12mH 0.15*1.5*49TS 尺寸L21.5*W11.5*H19.5H mm 脚距8*10mm 品牌: 昊华科科技	PCS	1	L1		格瑞安-15899789503
9	共模电感	CS112125 210uH 0.5*62T 铁硅铝 立式 套管管 品牌:	PCS	1	L3		格瑞安-15899789503
10	差模电感	CS112125 210uH 0.5*62T 铁硅铝 立式 套管管 品牌:	PCS	1	L2		15899789503
11	Y电容	332M/400VAC PIN=10mm Y5V 125°C 脚长3.4±0.2mm 品牌:威迪	PCS	1	CY3		威迪-13828899258
12	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
12	X电容	MPX 0.33uF 334K 310V X1 P=15.8*5.8*12mm 品牌:威迪	PCS	1	CX1		威迪-13828899258
三	电容板	20V5A 100W 氮化镓电源适配器 产品型号:	PCS	1		无	
2	电解电容	27uF 400V 105°C Φ8*20mm PIN距3.5mm 脚长3.4±0.2mm GF系列 品牌:中元	PCS	4	C37, C38, C39, C40		中元
五	贴片件小板	20V5A 100W 氮化镓电源适配器 产品型号:	PCS	0		无	
1	贴片电容	330pF ±10% 50V X7R 0603 331K品牌:国巨	PCS	3	C22, C21, C23		
2	贴片电容	2.2nF ±10% 50V X7R 0603 222K品牌:国巨	PCS	1	C13		
3	贴片电容	220pF ±10% 50V X7R 0603 221K品牌:国巨	PCS	1	C9		
4	贴片电容	1uF ±10% 50V X7R 0603 105K品牌:国巨	PCS	3	C18, C19, C20		
5	贴片电容	220pF ±10% 50V X7R 0603 221K品牌:国巨	PCS	1	C11		
6	贴片电阻	4.7KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R31		
7	贴片电阻	1KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R35		
8	贴片电阻	10KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R39		
9	贴片电阻	510KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R28		
10	贴片MOS管	贴片MOS管 VS3508AE	PCS	1	Q7		
11	贴片IC	协议芯片CYPD3174 S016	PCS	1	U1		
12	PCB板	FR-4 S/S 10ZCu 94V-0 双面板 松香19*15.3*1.0mm 双面绿油 品牌:	PCS	1			
六	贴片件大板	20V5A 100W 氮化镓电源适配器 产品型号:	PCS	1		无	
1	贴片电阻	750Ω ±1% 0805 1/10W 品牌:国巨	PCS	1	R23		国巨
2	贴片电阻	20KΩ ±1% 0603 1/10W 品牌:国巨	PCS	2	R25, R30		
3	贴片电阻	12KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R20		
4	贴片电阻	560Ω ±1% 0603 1/10W 品牌:国巨	PCS	1	R2		
4	贴片电阻	560Ω ±1% 0805 1/8W 品牌:国巨	PCS	1	R22		
5	贴片电阻	47KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R26		
	贴片电阻	51KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R52		

6	贴片电阻	68KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R32		
7	贴片电阻	3KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R10		
8	贴片电阻	15KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R33		
9	贴片电阻	1.6MΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R34		
10	贴片电阻	30KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R16		
10	贴片电阻	82KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R51		
12	贴片电阻	200KΩ ±1% 0603 1/10W 品牌:国巨	PCS	2	R8, R9		
13	贴片电阻	680Ω ±1% 0603 1/10W 品牌:国巨	PCS	1	R4		
14	贴片电阻	330Ω ±1% 0603 1/10W 品牌:国巨	PCS	1	R12		
14	贴片电阻	68Ω ±1% 0603 1/10W 品牌:国巨	PCS	1	R14		
15	贴片电阻	2Ω ±1% 0603 1/10W 品牌:国巨	PCS	1	R13		
16	贴片电阻	10Ω ±1% 0603 1/10W 品牌:国巨	PCS	1	R41		
18	贴片电阻	36KΩ ±1% 0603 1/10W 品牌:国巨	PCS	1	R29		
19	贴片电阻	30KΩ ±5% 0805 1/8W 品牌:国巨	PCS	1	R49		国巨
20	贴片电阻	510KΩ ±5% 0805 1/8W 品牌:国巨	PCS	1	R27		国巨
21	贴片电阻	910KΩ ±5% 0805 1/8W 品牌:国巨	PCS	1	R15		
22	贴片电阻	22Ω ±5% 0805 1/8W 品牌:国巨	PCS	1	L5		
22	贴片电阻	10Ω ±5% 0805 1/8W 品牌:国巨	PCS	1	R46		
23	贴片电阻	5.1Ω ±5% 0805 1/8W 品牌:国巨	PCS	2	R6, R40		
25	贴片电阻	1MΩ ±5% 1206 1/4W 品牌:国巨	PCS	2	R5, R7		国巨
	贴片电阻	2MΩ ±5% 1206 1/4W 品牌:国巨	PCS	4	R11, R11A, R37, R37A		
26	贴片电阻	510KΩ ±1% 1206 1/4W 品牌:国巨	PCS	3	R17, R18, R19		
27	贴片电阻	200KΩ ±5% 1206 1/4W 品牌:国巨	PCS	1	R1		
28	贴片电阻	10Ω ±5% 1206 1/4W 品牌:国巨	PCS	1	R50		
29	合金电阻	10mΩ ±5% 1206 1/4W 品牌:国巨	PCS	2	R48, R40A		
30	合金电阻	200mΩ ±1% 2512 2W 颜色:白面 品牌:萨特	PCS	1	R3		
31	合金电阻	250mΩ ±1% 2512 2W 颜色:白面 品牌:萨特	PCS	1	R24		
32	贴片磁珠	600Ω Bead0603S601A20T 宝仁弘	PCS	2	R21, L6		
33	贴片磁珠	600Ω 1206 Bead0603S601A40T 宝仁弘 IDC:4A max	PCS	2	L7, L4		
34	贴片电容	1nF ±10% 200V X7R 1206 J02K 品牌:国巨	PCS	1	C29		国巨
35	贴片电容	2.2nF ±10% 1000V X7R 1206 222K 品牌:国巨	PCS	1	C5		
36	贴片电容	100nF ±10% 50V X7R 0805 104K 品牌:国巨	PCS	2	C24, C25		
37	贴片电容	6.8uF ±10% 100V X7R 1206 685K 品牌:国巨	PCS	2	C35, C36		
38	贴片电容	100nF ±10% 50V X7R 0603 104K 品牌:国巨	PCS	1	C2		国巨
39	贴片电容	2.2uF ±10% 50V X7R 0603 225K 品牌:国巨	PCS	2	C1, C14		
41	贴片电容	470pF ±10% 50V X7R 0603 471K 品牌:国巨	PCS	1	C3		
42	贴片电容	330pF ±10% 50V X7R 0603 331K 品牌:国巨	PCS	1	C6		
43	贴片电容	220pF ±10% 50V X7R 0603 221K 品牌:国巨	PCS	1	C28		
44	贴片电容	1nF ±10% 50V X7R 0603 102K 品牌:国巨	PCS	3	C10, C26, C8		
45	贴片电容	150pF ±10% 1000V X7R 1206 151J 品牌:国巨	PCS	1	C33		
46	贴片二极管	1N4148W 150mA 75V SOD-123 品牌:长电	PCS	4	D1, D4, D2, D6		长电
47	贴片二极管	FRT07 DFR1M SOD-123F 平伟	PCS	2	D8, D5		
48	贴片二极管	RS2MF (FR207) SOD-123 平伟	PCS	1	D3		
49	贴片三极管	2N2907 600mA 60V SOT-23 品牌:时科	PCS	1	Q4		
51	贴片三极管	MMBT5551 SOT-23 NPN-Transistor 品牌:长电	PCS	1	Q8		
52	贴片三极管	BC817 SOT23 品牌:长电	PCS	2	Q2, Q6		
53	贴片稳压二极	12V 500mW SOD-123 (BZT52C12W) 品牌:	PCS	1	D9		
54	贴片IC	MP6908A SOT23-6 品牌:MPS	PCS	1	U2		
55	贴片IC	MK2697 SOT23-6 频率200KHZ 品牌:茂睿芯	PCS	1	U5		茂睿芯
56	贴片IC	MP44014GS SOIC8 品牌:MPS	PCS	1	U4		
57	贴片光耦	EL1018 SOP-4 本体黑色 品牌:亿光	PCS	1	OP1		
58	贴片桥堆	TSB807 8A 1000V VF=1.05 品牌:乐山	PCS	1	BR1		南丰
59	氮化镓MOS	RX65T300HS2A DFN 8×8 650V 9A 品牌:润新微	PCS	2	Q1, Q3		润新微
60	贴片二极管	ES5J 5A 600V SMC 长电	PCS	1	D14		
61	贴片MOS管	JMG044V10D 100V 140A DFN5X6-8L 品牌:捷捷微	PCS	1	Q5		
62	PCB板	FR-4 S/S 20ZCu 94V-0 四层板 松香62.4*59.4*1.2mm 双面绿油 品牌:	PCS	1			

编制:

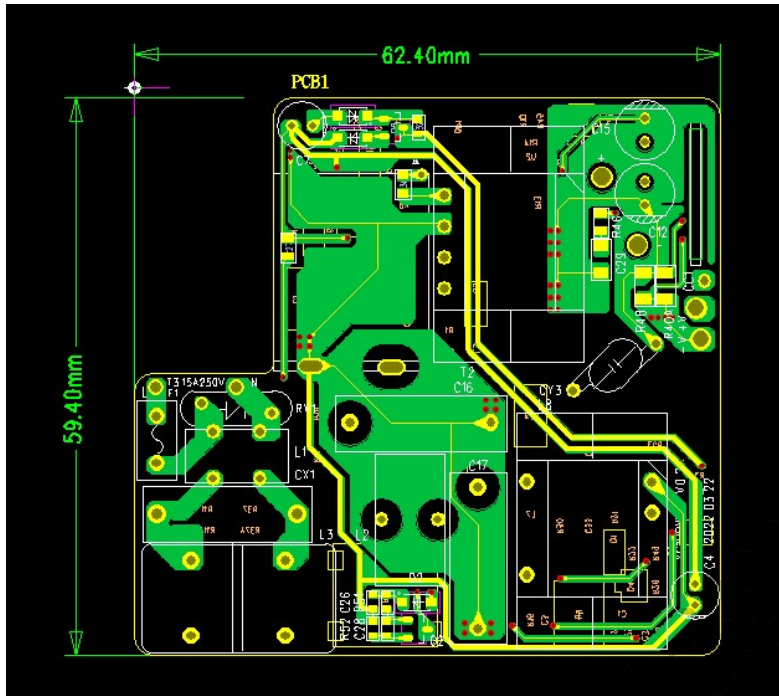
电子工程师审核

结构工程师审核

## 2.3 Demo 板 PCB 结构示意图

### 2.3.1 主板 PCB 结构示意图

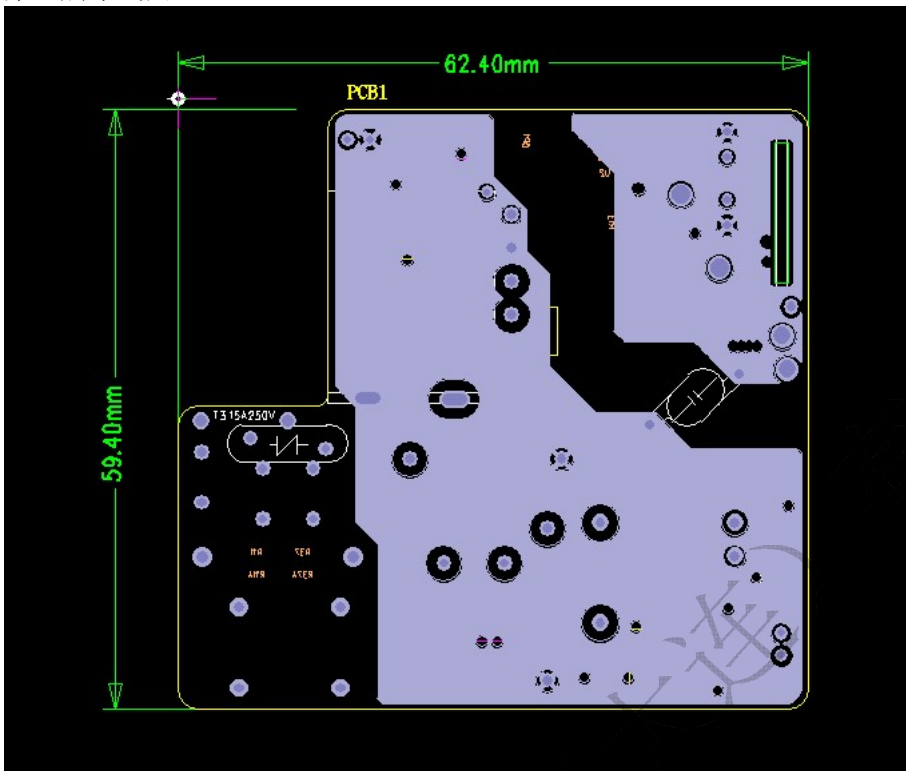
顶层布线图



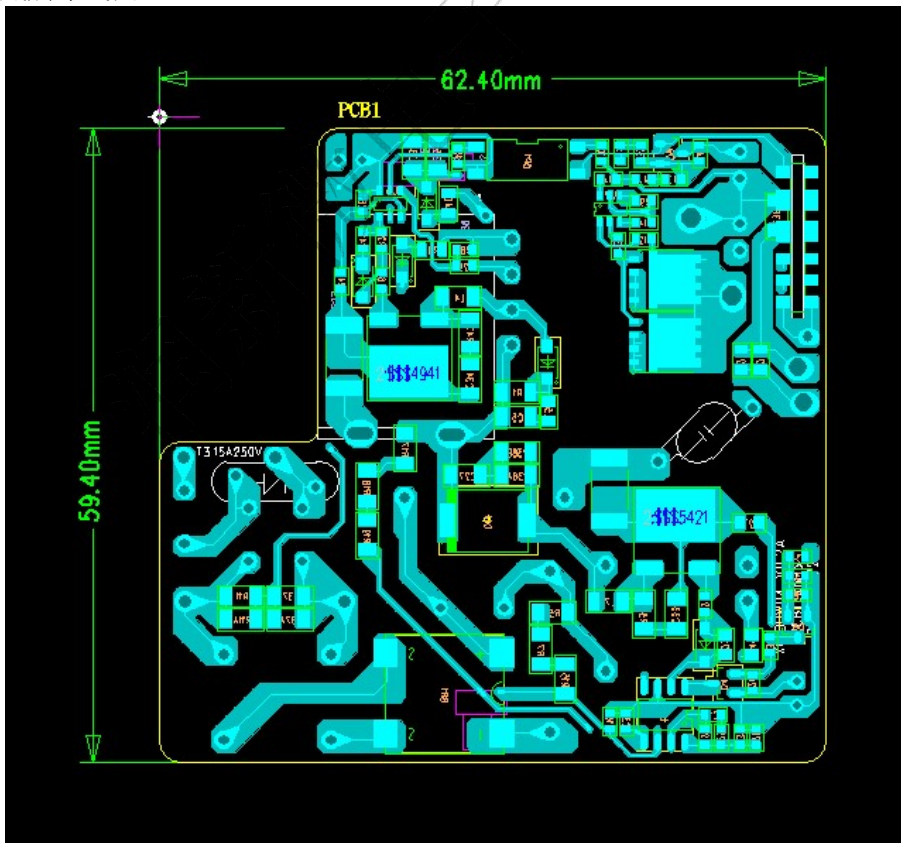
第二层布线图



第三层布线图

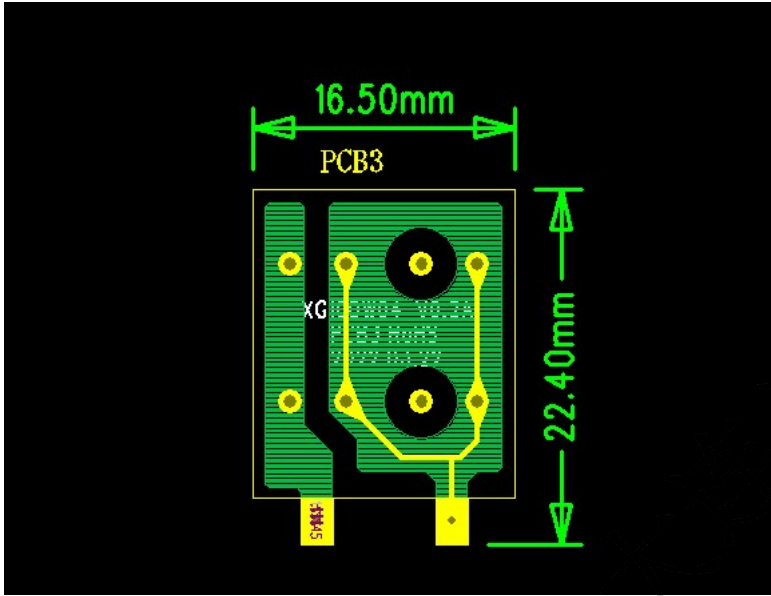


底层布线图

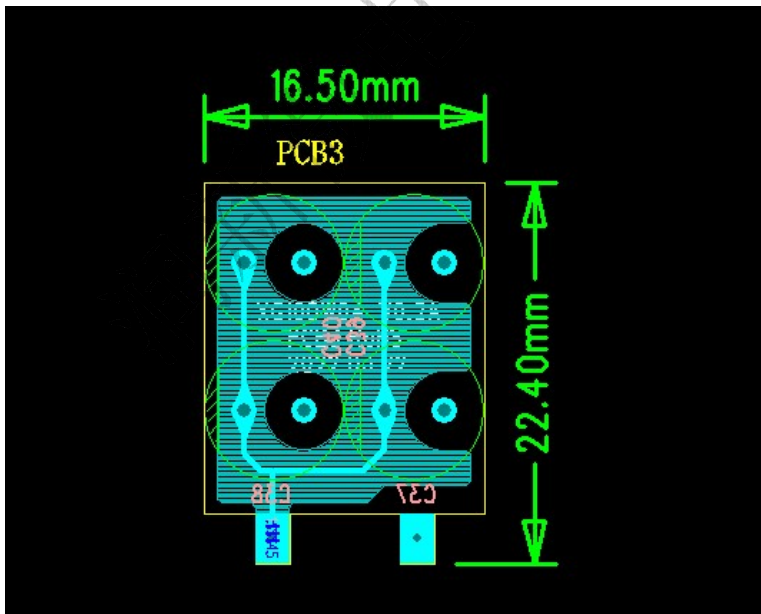


### 2.3.2 电容板 PCB 结构示意图

顶层布线图

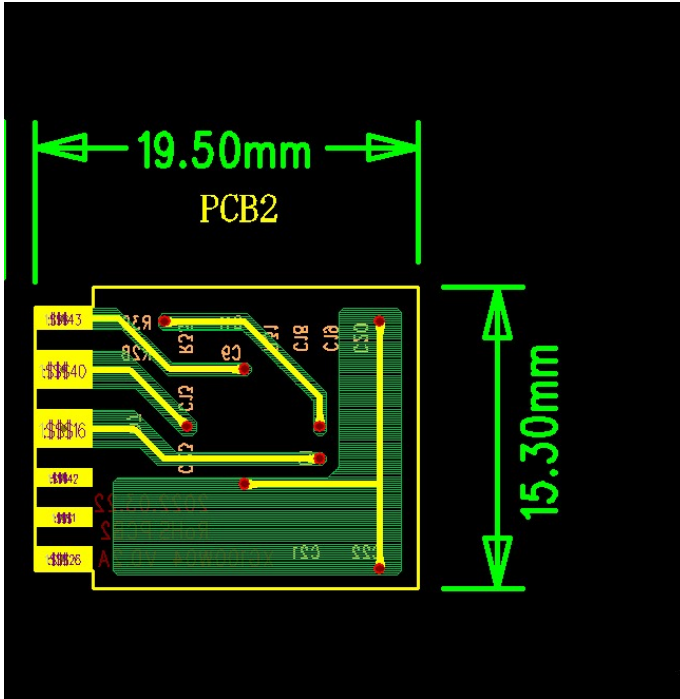


底层布线图

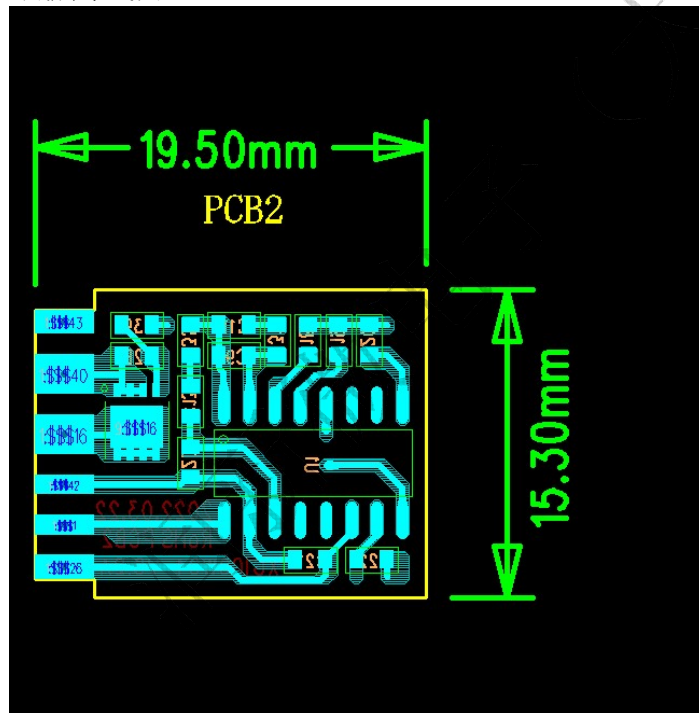


### PD小板PCB结构示意图

### 顶层布线图



底层布线图



### 三 变压器设计

#### 3.1 ATQ2516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-ATQ2516-001

版本号: A  
修改号: 03  
第 1 页 共 2 页

#### 1. 电气特性

1.1 感量: PIN3-4 260uH±5%  
1.2 漏感: PIN3-4 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  
1.3.2 次级-磁芯 3750VAC 10mA MIN

#### 2. 绕线结构图

N5 F → 4 0.1\*15\*1P 绞线\*7Ts  
N4 C → 1 0.2\*1P\*7Ts  
N4 1 → 2 0.2\*1P\*4Ts  
N3 A → B TEX0.1\*120\*1P 三层绝缘线\*4Ts  
N2 2 → 0 0.15\*2P\*15Ts  
N1 3 → F 0.1\*15\*1P 绞线\*20Ts

#### 3. 原理图

#### 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 m/m	圈数			绕线方式
1	N1	mm	3	F	0.1*15*1P 绞线	20	密绕	0mm	2TS
2	N2	mm	2	0	0.15*2P	15	密绕	0mm	2TS
3	N3	mm	A	B	TEX0.1*120*1P 三层绝缘线	4	密绕	0mm	2TS
4	N4	mm	1	2	0.2*1P	4	密绕	0mm	2TS
5	N5	mm	C	1	0.2*1P	7	密绕	0mm	2TS
6	N6	mm	F	4	0.1*15*1P 绞线	7	密绕	0mm	2TS
7									
8									
9									
10									

**注:**  
 <<注意事项>>  
 1. N3绕组为多层三层绝缘线。 2. 气隙研磨中柱。 3. Pin1,2,3,4. 套TEFLON TUBE。 4. N1绕组(F)为抽头穿套管预留线作业,不剪断。待成品烧完后折入线内用胶带包2圈  
 1) 在磁芯正面钻0.025mm\*10mm宽\*长20mm自粘性铝箔焊脚0.20mm引线(加套管)接至PIN2, 然后沿线圈方向包0.025mm\*5mm自粘性铝箔1.1Ts焊脚0.20mm引线(加套管)接至PIN2。  
 2) 成品需附测试报告并告知所用具体磁芯。  
 3) 产品需附RoHS, 需合投。  
 4) A端用白色套管, B端用黑色套管。  
 5) 在磁芯中柱气隙点40胶。  
 6) 次级磁芯需反包胶布

THIRD ANGLE PROJECTION 第三角法	颜色 COLOR	材料 MATERIAL	比例 SCALE	单位 UNIT	重量 WEIGHT	图版 PLATE	是否符合RoHS 是否符合RoHS (REACH) (IF APPLICABLE)	表面处理 SURFACE PROCESSING
			1:1	mm	-	A4	YES	-

序号	版本	变更时间	变更内容	承认 APPROVED	确认 CHECKED	检图 CHECKED	制图 DRAWING	范围 RANGE	公差 TOLERANCE	机种 MODEL	品名 DWG. NO.	日期 DATE
0								范围	公差	100W GaN HKY	页次 PAGE	1/3
1								公差	公差			
2								公差	公差			
3								公差	公差			

润新微电子(大连)有限公司  
**技术 规 范**  
标题: 开关变压器KT-ATQ2516-001

版本号: A  
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#### 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, 且标签纸的特性良好, 能耐130° C不易脱落。  
6.2 标签内容应包括以下内容:

#### 7. 材料清单

序号	物料名称	规格描述	品牌指定或安规要求
1	骨架	PHENOLIC T375J/T373J Minimum V-2 150 Degree C	QMF72
2	磁芯	ATQ2516	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 TFF/TFS/21-TFF/54/RT/RB0117E/TURB0117E/TFE-SW-600	YDPU2
8	铜箔	0.025 x 12mm	不限

#### 9. 包装要求

变压器包装要采用泡沫包装以免变压器变形。

**注:**  
1. 骨架规格: ATQ2516 4+4=8PIN。  
2. 次级磁芯不能外露

序号	版本	变更时间	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	图版 PLATE	是否符合RoHS 是否符合RoHS (REACH) (IF APPLICABLE)	表面处理 SURFACE PROCESSING
			1:1	mm	-	A4	YES	-

承认 APPROVED	确认 CHECKED	检图 CHECKED	制图 DRAWING	范围 RANGE	公差 TOLERANCE	机种 MODEL	品名 DWG. NO.	日期 DATE
				范围	公差	100W GaN HKY	页次 PAGE	2/3
				公差	公差			
				公差	公差			
				公差	公差			

### 3.2 PFC电感

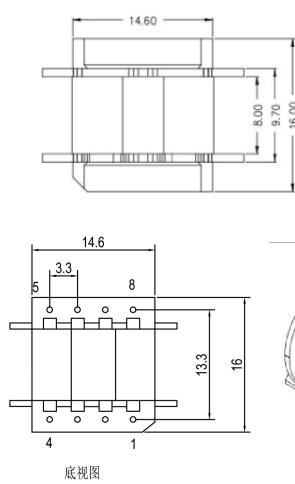
## 润新微电子(大连)有限公司

### 技术规范

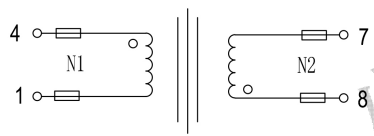
标题: (240W)PFC电感HL-ATQ2516-002

版本号: A  
 修改号: 01  
 第 1 页 共 2 页

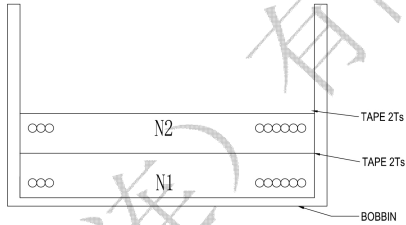
#### 1. Mechanical Dimension (Unit: mm)




#### 2. Schematic



#### 3. Winding Construction



THIRD ANGLE PROJECTION 第三角法		颜色 COLOR	材质 MATERIAL	比例 SCALE	单位 UNIT	重量 WEIGHT	图版 PLATE	是否符合GBS MEASURE UP ROPS	表面处理 SURFACE PROCESSING																																																																		
		-	-	1:1	mm	-	A4	YES	-																																																																		
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## 润新微电子(大连)有限公司

### 技术规范

标题: (240W)PFC电感HL-ATQ2516-002

版本号: A  
 修改号: 01  
 第 2 页 共 2 页

#### 4. 绕制方法

Test Terminal	Test Condition	L (uH)	Lk (mH)	Turns	Wire Gauge	密绕	HI-POT Test 60Hz, 60s
N1 PIN4~1	1KHz 0.3V	380uH±10%		33	40*Ø0.1 mm(2UEW)	密绕	Pri to Sec 1500Vac
N1 PIN8~7				4	2*Ø0.2 mm(2UEW)	居中密绕	

#### 5. 磁性材料:

- CORE SIZE: ATQ2516 骨架4+4立式
- CORE MATERIAL: 要求PC96或同等材质

#### 6. 其他要求:

- 在磁芯正面贴0.025mm\*10mm宽\*长20mm自粘性铜箔焊接0.20mm引线(加套管)接至PIN8  
固定磁芯用18mm(宽)的胶带包2Ts,然后沿线槽方向包0.025mm\*5mm自粘性铜箔1.1Ts焊接0.20mm引线(加套管)接至PIN8
- 成品需附测试报告和并告知所用具体磁芯;
- 产品需磨gap, 需含浸。
- PIN2,3,5,6拔取处理。
- 在磁芯中柱气隙点AB胶。

THIRD ANGLE PROJECTION 第三角法		颜色 COLOR	材质 MATERIAL	比例 SCALE	单位 UNIT	重量 WEIGHT	图版 PLATE	是否符合GBS MEASURE UP ROPS	表面处理 SURFACE PROCESSING																																																																	
		-	-	1:1	mm	-	A4	YES	-																																																																	
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## 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:** PD100W

**Test date:** 2021/12/11

### 1. Test condition:

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

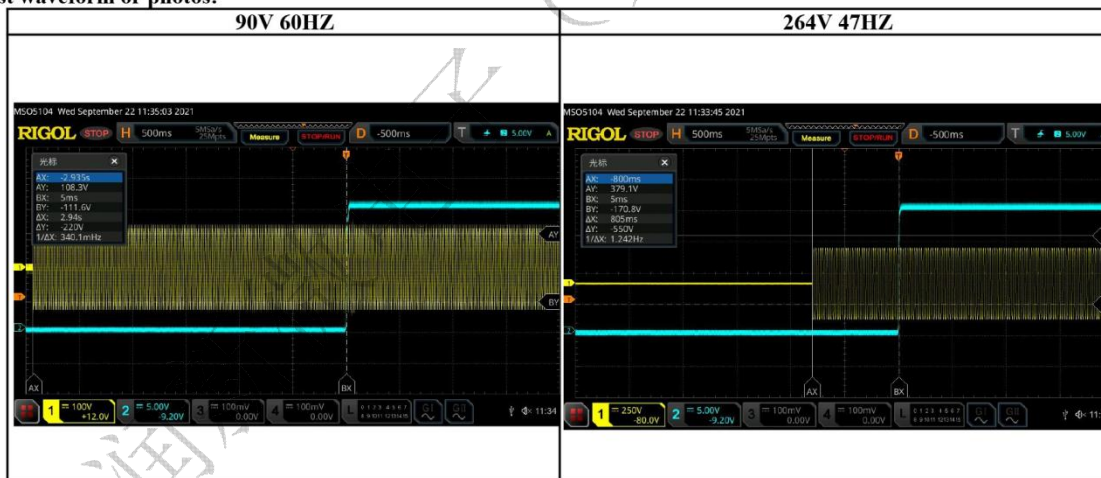
### 2. Test equipment:

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

### 3. Test result:

Test condition		SPEC	Test result (S)		Judge	Note
AC Input Vin	DC Load Fin		1#	2#	Pass/Fail	
90V	63Hz	Full load	5S	2.944		Pass
264V	47Hz			0.805		Pass

### 4. Test waveform or photos:



## Hold up Time Test

**Tested By: PD100W**
**Test date: 2021/12/11**
**1. Test condition:**

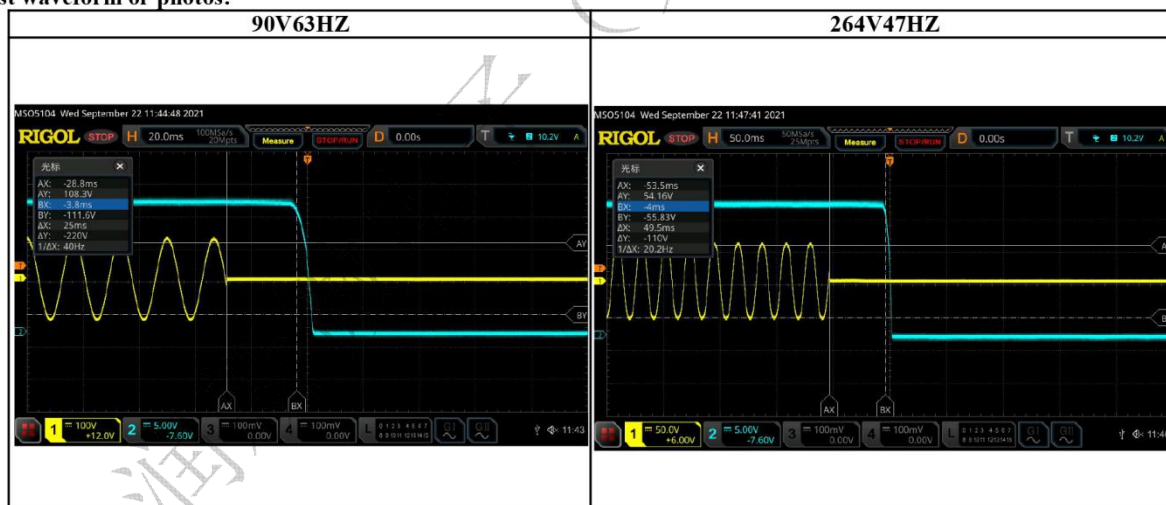
Input voltage: 90Vac/264Vac  
 Input frequency: 47Hz/63Hz  
 Ambient temperature: 25±5℃  
 Output Load: Full Load

**2. Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3. Test result:**

Test condition		SPEC	Test result (ms)		Judge	Note
AC Input	DC Load		1#	2#	Pass/Fail	
Vin	Fin					
90V	63Hz	Full load	>10mS	25		Pass
264V	47Hz			49.5		Pass

**4. Test waveform or photos:**


## Input Current Test

**Tested By:** PD100W

**Test date:** 2021/12/11

### 1. Test condition:

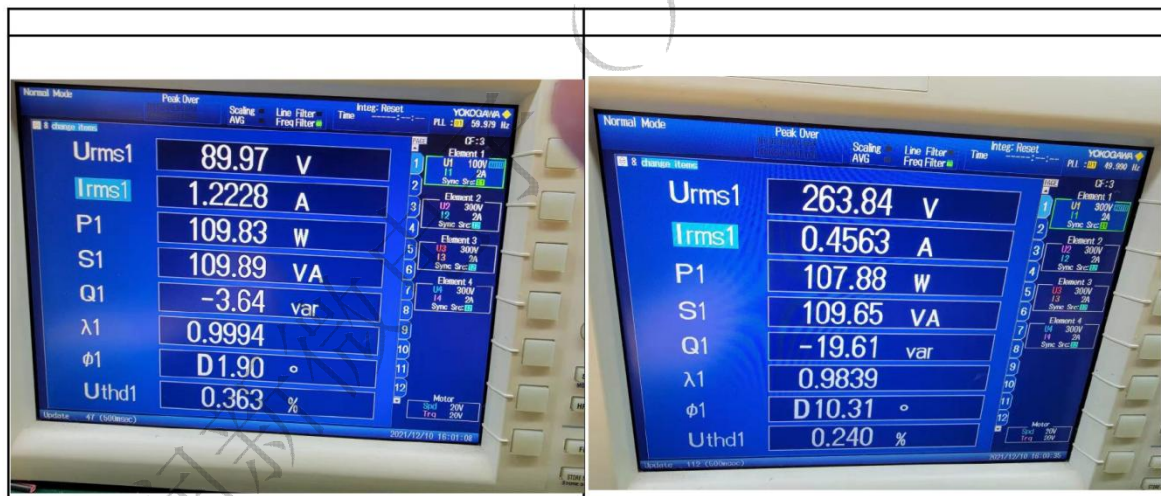
Input voltage: 90Vac/264Vac  
 Input frequency: 47Hz/63Hz  
 Ambient temperature: 25±5℃  
 Output Load: Full Load

### 2. Test equipment:

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

### 3. Test result:

Test condition		SPEC	Test result (A)		Judge	Note
AC Input Vin	DC Load Fin		1#	2#	Pass/Fail	
90V	63Hz	<1.5A	1.24		Pass	
264V	47Hz		0.45		Pass	



## Power Factor Test

**Tested By: PD100W**
**Test date: 2021/12/11**
**1. Test condition:**

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

**2. Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3. Test result:**

Test condition		DC Load	SPEC	Test result		Judge	Note
AC Input Vin	Fin			1#	2#	Pass/Fail	
90V	63Hz	Full load	>0.9	0.992		Pass	
264V	47Hz			0.946		Pass	

## Efficiency Test

**Tested By: PD100W**
**Test date: 2021/12/11**
**1. Test condition:**

Input voltage: 115Vac/230Vac  
 Input frequency: 50Hz/60Hz  
 Ambient temperature: 25±5℃  
 Output Load: 10%、25%、50%、75%、100%Full Load

**2. Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3. Test result:**

S/N	Input & Output		10%load	25%load	50%load	75%load	100%load	Average efficiency	Spec	Judge	Note
			0.3A	0.75A	1.5A	2.25A	3A			Pass/Fail	
5V	115Vac/60Hz	Input power	1.730W	4.230W	8.350W	12.480W	16.640W	91.66%		Pass	
		Output voltage	5.120V	5.120V	5.110V	5.110V	5.100V				
		Output power	1.536W	3.840W	7.665W	11.498W	15.300W				
		Efficiency	88.79%	90.78%	91.80%	92.13%	91.95%				
	230Vac/50Hz	Input power	1.890W	4.440W	8.660W	12.810W	16.940W	89.11%		Pass	
		Output voltage	5.130V	5.140V	5.130V	5.130V	5.120V				
		Output power	1.530W	3.855W	7.695W	11.543W	15.360W				
		Efficiency	80.95%	86.82%	88.86%	90.11%	90.67%				
9V	115Vac/60Hz	Input power	3.070W	7.460W	14.760W	22.100W	29.440W	92.34%		Pass	
		Output voltage	9.110V	9.110V	9.100V	9.100V	9.090V				
		Output power	2.733W	6.833W	13.650W	20.475W	27.270W				
		Efficiency	89.02%	91.59%	92.48%	92.65%	92.63%				
	230Vac/50Hz	Input power	3.240W	7.700W	14.980W	22.270W	29.540W	91.03%		Pass	
		Output voltage	9.110V	9.100V	9.100V	9.100V	9.100V				
		Output power	2.733W	6.825W	13.650W	20.475W	27.300W				
		Efficiency	84.35%	88.64%	91.12%	91.94%	92.42%				
12V	115Vac/60Hz	Input power	4.080W	9.910W	19.610W	29.360W	39.200W	92.25%		Pass	
		Output voltage	12.110V	12.100V	12.080V	12.080V	12.080V				
		Output power	3.633W	9.075W	18.120W	27.180W	36.240W				
		Efficiency	89.04%	91.57%	92.40%	92.57%	92.45%				
	230Vac/50Hz	Input power	4.290W	10.120W	19.800W	29.440W	39.050W	91.60%		Pass	
		Output voltage	12.110V	12.100V	12.090V	12.080V	12.080V				
		Output power	3.633W	9.075W	18.135W	27.180W	36.240W				
		Efficiency	84.69%	89.67%	91.59%	92.32%	92.80%				
15V	115Vac/60Hz	Input power	5.120W	12.360W	24.500W	36.750W	49.100W	92.23%		Pass	
		Output voltage	15.120V	15.110V	15.110V	15.100V	15.100V				
		Output power	4.536W	11.333W	22.665W	33.975W	45.300W				
		Efficiency	88.59%	91.69%	92.51%	92.45%	92.26%				
	230Vac/50Hz	Input power	5.350W	12.530W	24.540W	36.600W	48.600W	91.98%		Pass	
		Output voltage	15.080V	15.070V	15.070V	15.070V	15.060V				
		Output power	4.536W	11.303W	22.605W	33.908W	45.180W				
		Efficiency	84.79%	90.20%	92.11%	92.64%	92.96%				

S/N	Input & Output		10%load	25%load	50%load	75%load	100%load	Average efficiency	Spec	Judge	Note
			0.5A	1.25A	2.5A	3.75A	5A			Pass/Fail	
20V	115Vac/60Hz	Input power	12.220W	28.390W	55.370W	82.400W	109.500W	90.50%		Pass	
		Output voltage	20.070V	20.070V	20.070V	20.060V	20.080V				
		Output power	10.040W	25.090W	50.180W	75.230W	100.400W				
		Efficiency	82.16%	88.38%	90.63%	91.30%	91.69%				
	230Vac/50Hz	Input power	13.170W	28.930W	55.200W	81.430W	107.700W	90.88%		Pass	
		Output voltage	20.010V	20.090V	20.090V	20.080V	20.080V				
		Output power	10.050W	25.120W	50.225W	75.300W	100.400W				
		Efficiency	76.31%	86.83%	90.99%	92.47%	93.22%				

## Power Consumption Test

**Tested By: PD100W**
**Test date: 2021/12/11**
**1. Test condition:**

Input voltage: 115Vac/230Vac

Input frequency: 50Hz/60Hz

Ambient temperature: 25±5°C

Output Load: no Load

**2. Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3. Test result:**

Test condition		DC Load	SPEC	Test result (W)			Judge	Note
AC Input	Fin			1#	2#	3#	Pass/Fail	
115V	60Hz	no load	<0.21W	0.03			Pass	
230V	50Hz			0.18			Pass	

## Inrush current Test

**Tested By:** PD100W

**Test date:** 2021/12/11

### 1. Test condition:

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

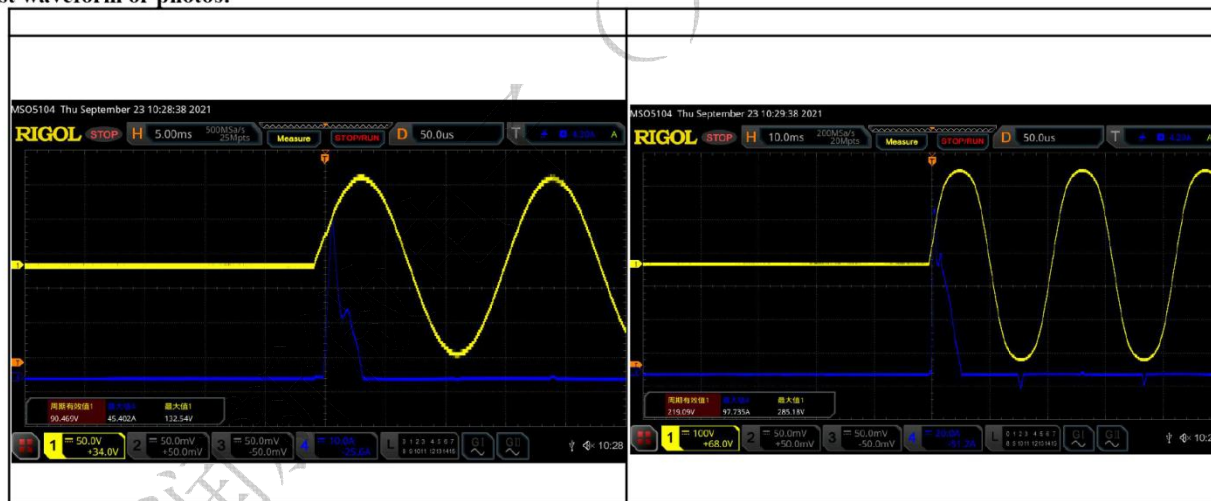
### 2. Test equipment:

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

### 3. Test result:

Test condition		SPEC			Test result			Judge	Note
AC Input	DC Load	Inrush Current(A)	Fuse I <sup>2</sup> t (A <sup>2</sup> S)	Bridge Rectifiers Ipeak (A&mS)	Inrush Current (A)	Fuse I <sup>2</sup> t (A <sup>2</sup> S)	Bridge Rectifiers Ipeak (A&mS)	Pass/Fail	
Vin	Fin								
90V	63Hz	Full load	45.402A	200A@8.3mS				Pass	
264V	47Hz		97.35A					Pass	

### 4. Test waveform or photos:





## Rise time Test

**Tested By:** PD100W

**Test date:** 2021/12/11

### 1. Test condition:

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

### 2. Test equipment:

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

### 3. Test result:

Test condition		SPEC	Test result (ms)		Judge	Note	
AC Input	DC Load		1#	2#	Pass/Fail		
Vin	Fin	Full load	<20mS				
90V	63Hz			18.172ms		Pass	
264V	47Hz			5.964ms		Pass	

### 4. Test waveform or photos:



## Overshoot&Undershoot Test

Tested By: PD100W

Test date: 2021/12/11

**1.Test condition:**

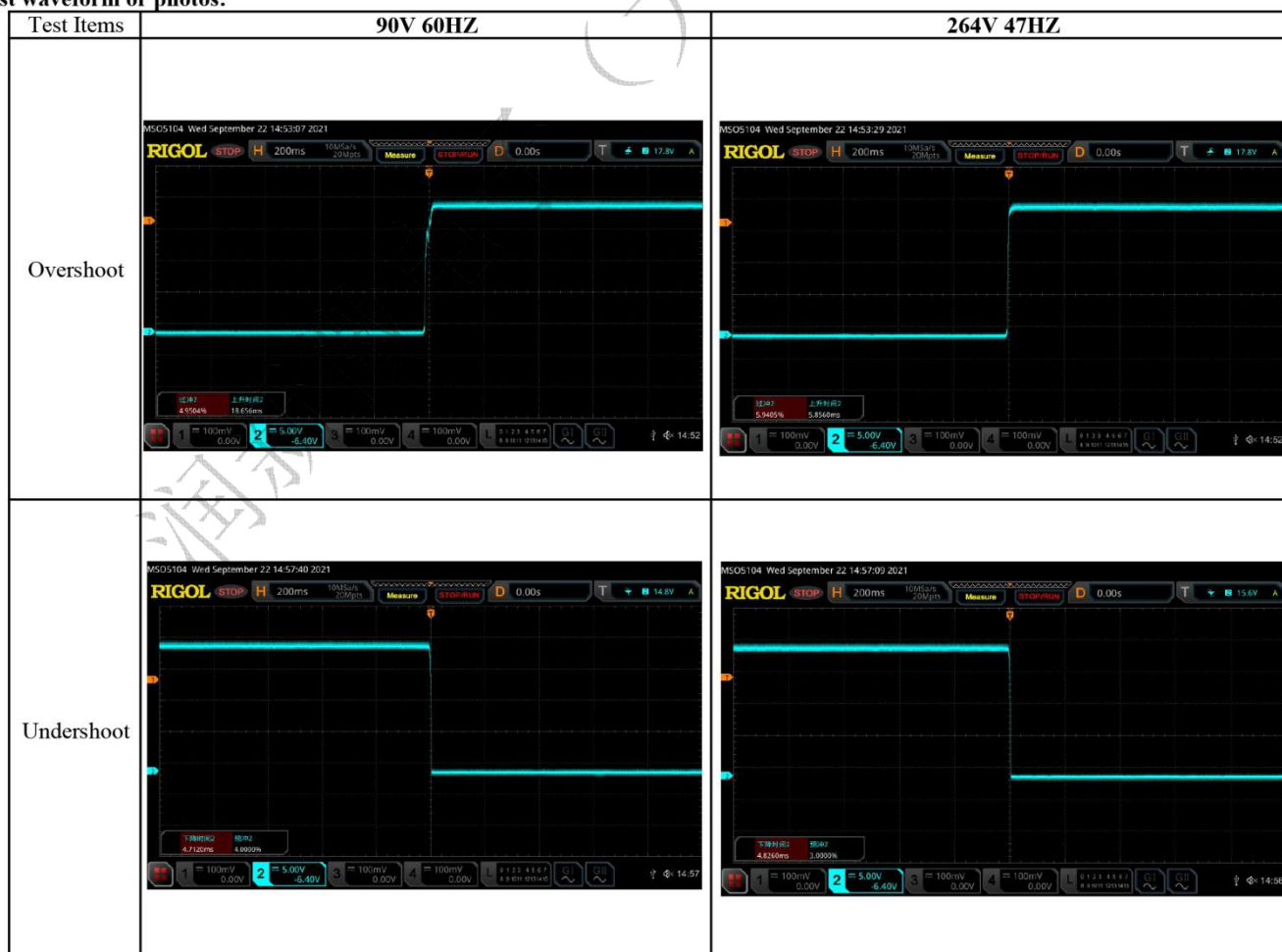
Input voltage: 90Vac/264Vac  
 Input frequency: 47Hz/63Hz  
 Ambient temperature: 25±5℃  
 Output Load: Full Load

**2.Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3.Test result:**

Test Items	Test condition		SPEC	Test result (%)		Judge	Note
	AC Input			1#	2#		
	Vin	Fin				Pass/Fail	
Overshoot	90V	63Hz	<10%	4.9504		Pass	
	264V	47Hz		5.9405		Pass	
Undershoot	90V	63Hz	<10%	4		Pass	
	264V	47Hz		3		Pass	

**4.Test waveform or photos:**


## Ripple voltage&noise Test

**Tested By: PD100W**
**Test date: 2021/12/11**
**1. Test condition:**

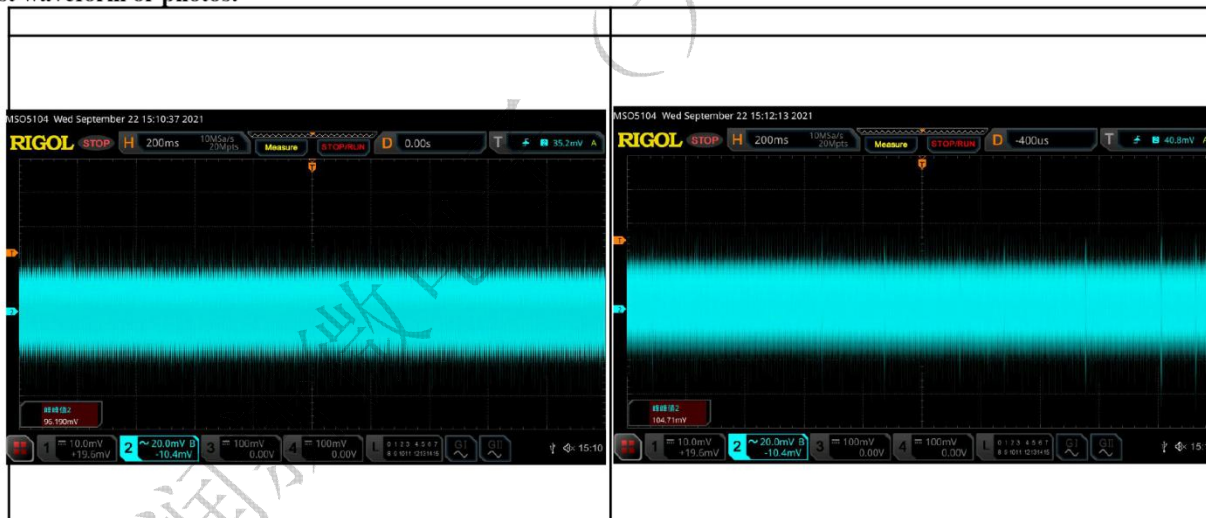
Input voltage: 90Vac/264Vac  
 Input frequency: 47Hz/63Hz  
 Ambient temperature: 25±5°C  
 Output Load: Full Load

**2. Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3. Test result:**

Test condition		SPEC	Test result (mVp-p)		Judge	Note
AC Input	DC Load		1#	2#	Pass/Fail	
Vin	Fin	Full load	<200mV			
90V	63Hz			96.19		Pass
264V	47Hz			104.71		Pass

**4. Test waveform or photos:**


## Line&Load Regulation Test

**Tested By: 20V5A**
**Test date: 2021/9/22**
**1.Test condition:**

Input voltage: 90Vac/264Vac

Input frequency: 47Hz/63Hz

Ambient temperature: 25±5℃

Output Load: Full Load

**2.Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3.Test result:**

Items S/N	Input Load	90Vac	100Vac	240Vac	264Vac	Max.	Min.	Line Regulation	SPEC			Judge
									Output voltage	Load Regulation	Line Regulation	Pass/Fail
1#	0%	20.036V	20.036V	20.036V	20.036V	/	/	/	20.036			
	25%	19.940V	19.940V	19.941V	19.940V	/	/	/				
	50%	19.846V	19.845V	19.846V	19.848V	/	/	/				
	75%	19.752V	19.750V	19.752V	19.753V	/	/	/				
	100%	19.655V	19.656V	19.656V	19.656V	0.00%	0.01%	0.01%				
	Min.	0.96%	0.95%	0.96%	0.97%	/	/	/				
	Max.	0.96%	0.96%	0.96%	0.95%	/	/	/				
	<b>Load Regulation</b>	0.97%										

润新微电子

## Over Current Protection Test

**Tested By: PD100W**
**Test date: 2021/12/11**
**1. Test condition:**

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

**2. Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	PF9800

**3. Test result:**

## 3.1 25°C Test

Test condition			SPEC	Test result				Judge	Note
AC Input		DC Load		1#		2#			
Vin	Fin			Current (A)	Protection mode	Current (A)	Protection mode	Pass/Fail	
90V	63Hz	0A~OCP	7A	6.066	Hiccup→Self-recovery			Pass	
264V	47Hz		5.966	Hiccup→Self-recovery			Pass		

**4. Test waveform or photos:**


## Short Circuit Protection Test

**Tested By: PD100W**
**Test date: 2021/12/11**
**1. Test condition:**

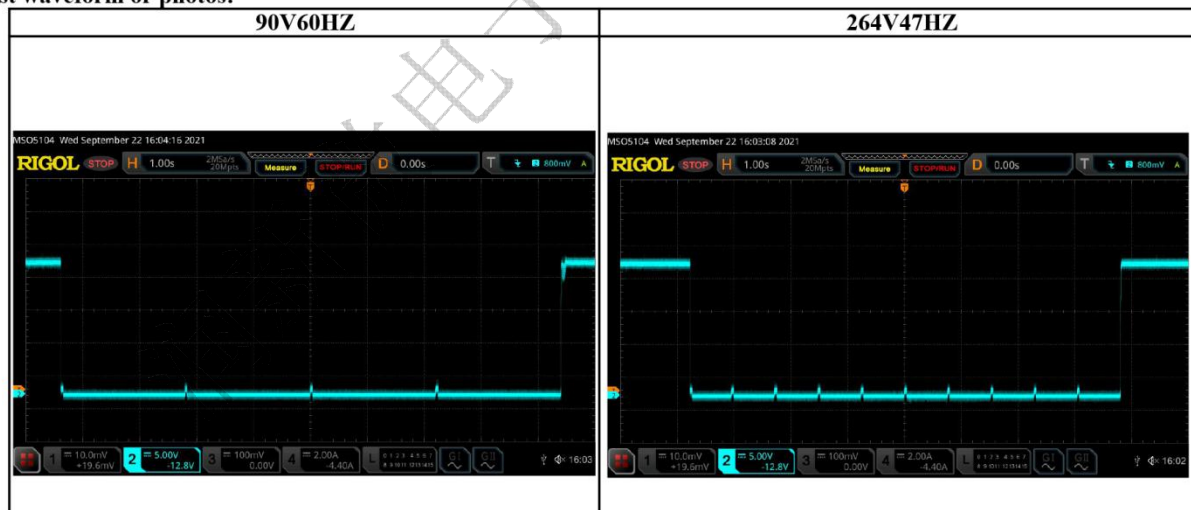
Input voltage: 90Vac/264Vac  
 Input frequency: 47Hz/63Hz  
 Ambient temperature: 25±5℃  
 Output Load: Short

**2. Test equipment:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3. Test result:**

Test condition			SPEC	Test result				Judge	Note
AC Input		DC Load		1#		2#			
Vin	Fin			Power (W)	Protection mode	Power (W)	Protection mode	Pass/Fail	
90V	63Hz	short	100W	Hiccup→Self-recovery			Pass		
264V	47Hz		100W	Hiccup→Self-recovery			Pass		

**4. Test waveform or photos:**


## Over Voltage Protection Test

**Tested By:** PD100W

**Test date:** 2021/12/11

**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:**

<b>AC Source:</b>	DPS1020 V100	<b>Oscilloscope:</b>	RIGOL MSO5204
<b>DC Load:</b>	IT8512A+	<b>Power meter:</b>	YOKOGAWA WT1800

**3. Test result:**

Test condition			SPEC	Test result				Judge	Note
AC Input		DC Load		1#		2#			
Vin	Fin			Output Voltage (V)	Protection mode	Output Voltage (V)	Protection mode	Pass/Fail	
90V	63Hz	Full Load	26	25.558	Hiccup→Self-recovery			Pass	
264V	47Hz			25.159	Hiccup→Self-recovery			Pass	

**4. Test**


## Over Temperature Protection Test

**Tested By: PD100W**
**Test date: 2021/12/11**
**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:**

<b>AC Source:</b>	DPS1020 V100	<b>Temperature humidity chamber:</b>	
<b>DC Load:</b>	IT8512A+	<b>Thermograph:</b>	KEYSIGHT 34970A

**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	23.7°C	29.3°C	29.4°C	30.6°C				
	Test Time	2H	2H	2H	2H				
Location	Description	Measure data(°C)							
Q1	XG65T230	94.63	88.71	85.4	86.4				灌胶双组分3W导热胶
Q3	XG65T230	92.58	84.77	79.2	81.12				
Q5	GOV44N100	93.83	88.2	84.3	85.3				
BR1	TSB807	93.9	85.5	76.4	77.01				
L1	共模电感	77.98	71.57	64.12	64.84				
CX1	0.33uF 310V	77.04	70.9	63.36	64.13				
L3	共模电感	89.44	81.1	70.85	71.35				
L2	差模电感	90.67	83.46	75.55	76.24				
L8	PFC线圈	87.75	81.31	74.91	75.43				
L8	PFC磁芯	88.6	82.1	75.61	76.29				
T2	变压器线圈	94.07	88.9	84.62	85.59				磁芯品牌: 冠达
T2	变压器磁芯	89.21	83.79	79.1	79.94				
CY3	Y电容	91.66	85.64	80.57	81.35				
C2	输入电容	87.81	82.6	78.07	79.01				
A	外壳顶	75.8	71.8	67.68	69.1				
B	外壳底	74.1	70	64.5	65.21				



## EMI Test

Tested By: PD100W

Test date: 2021/12/11

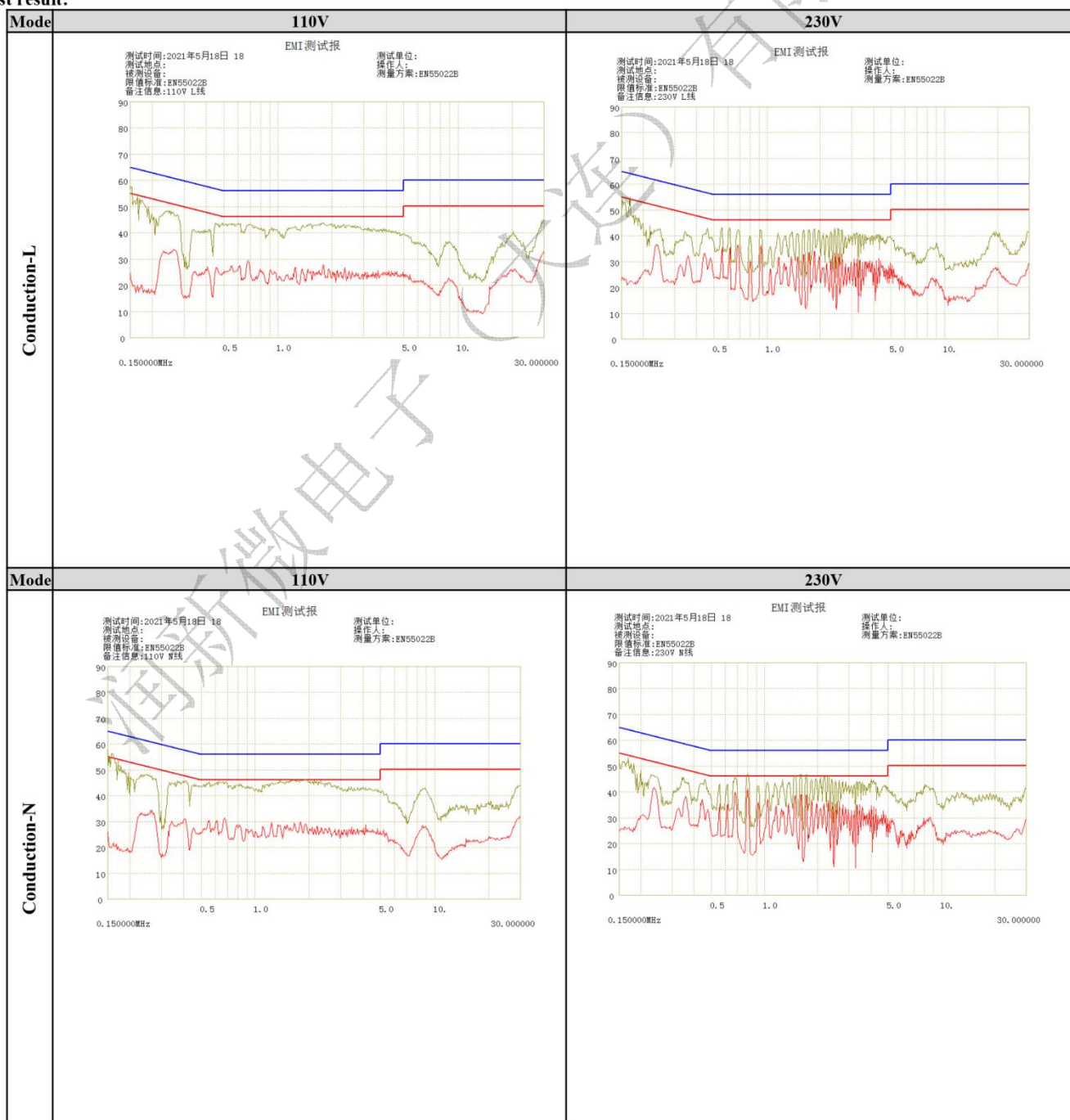
### 1. Test condition:

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

### 2. Test equipment:

<b>EMI equipment:</b>		
<b>DC Load:</b>	cement resistor	

### 3. Test result:



Mode	120V	230V																																																																		
Radiation-Horizontal	<p><b>ANC1</b> 东莞市安融检测技术有限公司/东莞市松山湖总部2路11号A栋1-2层 1-2 Floor, Building A, No. 11, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.</p> <p><b>Radiated Emission Measurement</b> File: 1 Date: #164 Date: 2022/3/21 Time: 10:28:53</p> <p>Site LAB Limit: EN55032 3m Class B Radiation (QP) Polarization: <b>Horizontal</b> Temperature: 24.3 EUT: Adapter Power: AC 115V/50Hz Humidity: 53.2 % M/N: 20V/5A 100W Distance: 3m Mode: Full load Note:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Mk.</th> <th>Freq. MHz</th> <th>Reading dBuV</th> <th>Correct Factor dB</th> <th>Measurement dBuV/m</th> <th>Limit dB</th> <th>Over dB</th> <th>Antenna Height cm</th> <th>Table Degree</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>*</td> <td>85.5977</td> <td>36.41</td> <td>-14.37</td> <td>22.04</td> <td>40.00</td> <td>-17.96</td> <td>peak</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>*</td> <td>116.1321</td> <td>40.87</td> <td>-12.95</td> <td>27.92</td> <td>40.00</td> <td>-12.08</td> <td>peak</td> <td></td> <td></td> </tr> </tbody> </table> <p>*Maximum data x Over limit f over margin (Reference Only) File: /Data: #164 Page: 1 Engineer Signature: Luffy</p>	No.	Mk.	Freq. MHz	Reading dBuV	Correct Factor dB	Measurement dBuV/m	Limit dB	Over dB	Antenna Height cm	Table Degree	Comment	1	*	85.5977	36.41	-14.37	22.04	40.00	-17.96	peak			2	*	116.1321	40.87	-12.95	27.92	40.00	-12.08	peak			<p><b>ANC1</b> 东莞市安融检测技术有限公司/东莞市松山湖总部2路11号A栋1-2层 1-2 Floor, Building A, No. 11, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.</p> <p><b>Radiated Emission Measurement</b> File: 1 Date: #163 Date: 2022/3/21 Time: 10:27:09</p> <p>Site LAB Limit: EN55032 3m Class B Radiation (QP) Polarization: <b>Horizontal</b> Temperature: 24.3 EUT: Adapter Power: AC 230V/50Hz Humidity: 53.2 % M/N: 20V/5A 100W Distance: 3m Mode: Full load Note:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Mk.</th> <th>Freq. MHz</th> <th>Reading Level dBuV</th> <th>Correct Factor dB</th> <th>Measurement dBuV/m</th> <th>Limit dB</th> <th>Over dB</th> <th>Antenna Height cm</th> <th>Table Degree</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>*</td> <td>114.1138</td> <td>49.76</td> <td>-12.58</td> <td>37.18</td> <td>40.00</td> <td>-2.82</td> <td>peak</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>*</td> <td>185.7882</td> <td>40.76</td> <td>-11.96</td> <td>28.83</td> <td>40.00</td> <td>-11.17</td> <td>peak</td> <td></td> <td></td> </tr> </tbody> </table> <p>*Maximum data x Over limit f over margin (Reference Only) File: /Data: #163 Page: 1 Engineer Signature: Luffy</p>	No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dB	Over dB	Antenna Height cm	Table Degree	Comment	1	*	114.1138	49.76	-12.58	37.18	40.00	-2.82	peak			2	*	185.7882	40.76	-11.96	28.83	40.00	-11.17	peak		
	No.	Mk.	Freq. MHz	Reading dBuV	Correct Factor dB	Measurement dBuV/m	Limit dB	Over dB	Antenna Height cm	Table Degree	Comment																																																									
1	*	85.5977	36.41	-14.37	22.04	40.00	-17.96	peak																																																												
2	*	116.1321	40.87	-12.95	27.92	40.00	-12.08	peak																																																												
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dB	Over dB	Antenna Height cm	Table Degree	Comment																																																										
1	*	114.1138	49.76	-12.58	37.18	40.00	-2.82	peak																																																												
2	*	185.7882	40.76	-11.96	28.83	40.00	-11.17	peak																																																												
Radiation-Vertical	<p><b>ANC1</b> 东莞市安融检测技术有限公司/东莞市松山湖总部2路11号A栋1-2层 1-2 Floor, Building A, No. 11, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.</p> <p><b>Radiated Emission Measurement</b> File: 1 Date: #165 Date: 2022/3/21 Time: 12:30:30</p> <p>Site LAB Limit: EN55032 3m Class B Radiation (QP) Polarization: <b>Vertical</b> Temperature: 24.3 EUT: Adapter Power: AC 115V/50Hz Humidity: 53.2 % M/N: 20V/5A 100W Distance: 3m Mode: Full load Note:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Mk.</th> <th>Freq. MHz</th> <th>Reading Level dBuV</th> <th>Correct Factor dB</th> <th>Measurement dBuV/m</th> <th>Limit dB</th> <th>Over dB</th> <th>Antenna Height cm</th> <th>Table Degree</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>*</td> <td>85.2980</td> <td>43.04</td> <td>-14.44</td> <td>28.60</td> <td>40.00</td> <td>-11.40</td> <td>peak</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>*</td> <td>149.4857</td> <td>41.11</td> <td>-14.88</td> <td>26.23</td> <td>40.00</td> <td>-13.77</td> <td>peak</td> <td></td> <td></td> </tr> </tbody> </table> <p>*Maximum data x Over limit f over margin (Reference Only) File: /Data: #165 Page: 1 Engineer Signature: Luffy</p>	No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dB	Over dB	Antenna Height cm	Table Degree	Comment	1	*	85.2980	43.04	-14.44	28.60	40.00	-11.40	peak			2	*	149.4857	41.11	-14.88	26.23	40.00	-13.77	peak			<p><b>ANC1</b> 东莞市安融检测技术有限公司/东莞市松山湖总部2路11号A栋1-2层 1-2 Floor, Building A, No. 11, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.</p> <p><b>Radiated Emission Measurement</b> File: 1 Date: #162 Date: 2022/3/21 Time: 13:23:53</p> <p>Site LAB Limit: EN55032 3m Class B Radiation (QP) Polarization: <b>Vertical</b> Temperature: 24.3 EUT: Adapter Power: AC 230V/50Hz Humidity: 53.2 % M/N: 20V/5A 100W Distance: 3m Mode: Full load Note:</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Mk.</th> <th>Freq. MHz</th> <th>Reading Level dBuV</th> <th>Correct Factor dB</th> <th>Measurement dBuV/m</th> <th>Limit dB</th> <th>Over dB</th> <th>Antenna Height cm</th> <th>Table Degree</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>*</td> <td>117.3603</td> <td>49.26</td> <td>-13.17</td> <td>36.09</td> <td>40.00</td> <td>-3.91</td> <td>peak</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>*</td> <td>147.0214</td> <td>48.34</td> <td>-14.87</td> <td>33.47</td> <td>40.00</td> <td>-6.53</td> <td>peak</td> <td></td> <td></td> </tr> </tbody> </table> <p>*Maximum data x Over limit f over margin (Reference Only) File: /Data: #162 Page: 1 Engineer Signature: Luffy</p>	No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dB	Over dB	Antenna Height cm	Table Degree	Comment	1	*	117.3603	49.26	-13.17	36.09	40.00	-3.91	peak			2	*	147.0214	48.34	-14.87	33.47	40.00	-6.53	peak		
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### Components De-rating Test

Tested By: PD100W

Test date: 2021/12/11

**1. Test condition:**

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

**2. Test equipment:**

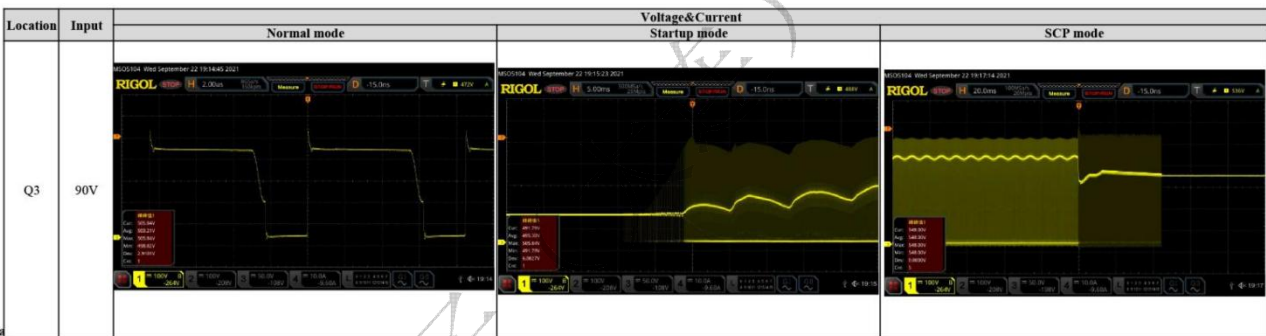
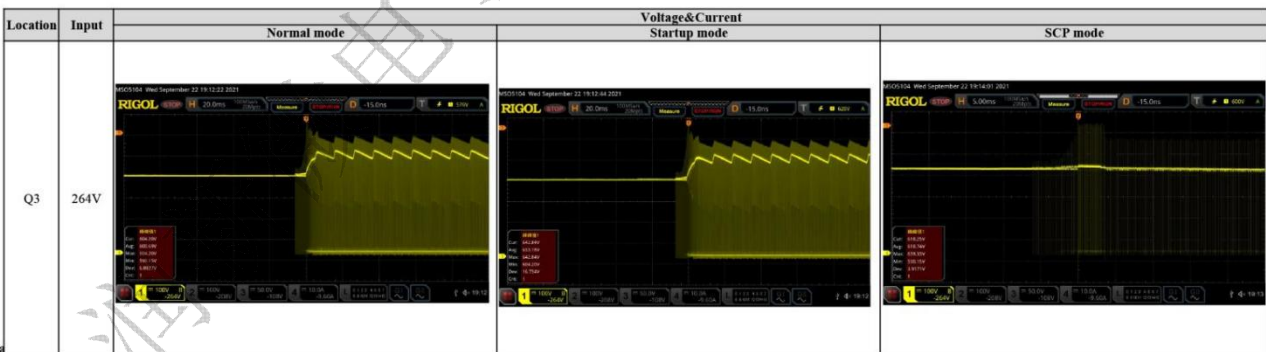
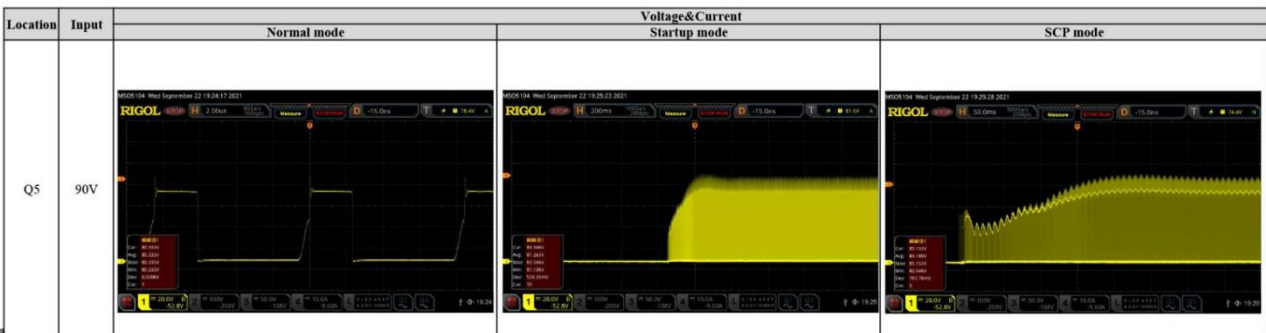
AC Source:	DPS1020 V100	Oscilloscope:	RIGOL MSO5204
DC Load:	IT8512+	Power meter:	YOKOGAWA WT1800

**3. Test result:**
**1). Input: 90Vac/47Hz**

MOSFET			Component Spec				Test result						Judge	Note				
Location	Model&Type	Supplier	Vds (V)	Vgs (V)	Id (A)	IDM (A)	Voltage(Vmax)				Current							
							Normal mode	De-rating	Startup mode	De-rating	SCP & OCP	De-rating	Normal mode	De-rating	Startup mode	De-rating		
	XG65T230HS1B		650	20	11	37	371.27	57.12%	403.21	62.03%		0.00%	9.7421	88.50%	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				
Location	Model&Type	Supplier	Vds (V)	Vgs (V)	Id (A)	IDM (A)	Voltage(Vmax)				Current							
							Normal mode	De-rating	Startup mode	De-rating	SCP & OCP	De-rating	Normal mode	De-rating	Startup mode	De-rating		
	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!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		

**4. Test wa**

**5. Test wa**

**6. Test wa**


Location	Input	Voltage&Current		
		Normal mode	Startup mode	SCP mode
7.Test wa	Q5 264V			

Location	Input	Voltage&Current	
		Normal mode	Startup mode
4.Test wa	90V		

Location	Input	Voltage&Current	
		Normal mode	Startup mode
5.Test wa	264V		

## 五、主要器件资料

### 5.1 氮化镓 MOS 650V GaN Power Transistor (FET)

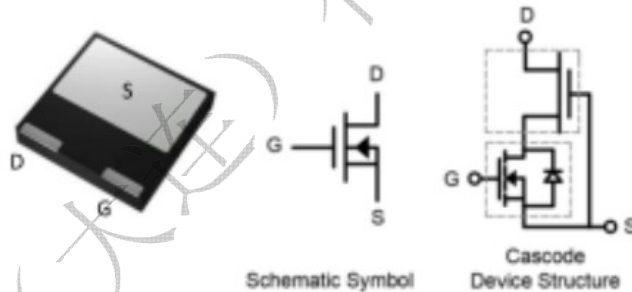
#### Features

- 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 $\Omega$
$Q_G, typ$	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 $150^\circ\text{C}$ )	650	V
$V_{TDSS}$	Transient drain to source voltage <sup>a</sup>	800	V
$V_{GSS}$	Gate to source voltage	$\pm 20$	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 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

## 5.3 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