无锡市芯茂微电子有限公司

WUXI CHIP HOPE MICRO-ELECTRONICS LTD.

BASIC ELECTRICAL CONTRAST TESTS

QC3.0（LP8773+LP20R100S)测试报告

NO	Revised Date	Description	Issued

DATE:2017-10-24

TEST BY:LGH　　CHECKED BY :　　APPROVED BY :

Test Equipment

No.	Instrument	Manufacturer	Model No
1	Ac Source	HY	HY-001
2	Dc Source	HONGSHENG	DPS-305CM
3	Oscilloscope	TEKTRONIX	TDS3012C
4	Thermograph	JINKO	JK-8/16
5	Current Probe	CYBERTEK	CP8030
6	Electronic Load	CHROMA	63030
7	Multimeter	FLUKE	17B
8	Power Analyzer	HYP	PM6803A

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ESTIMATE TEST SHEET

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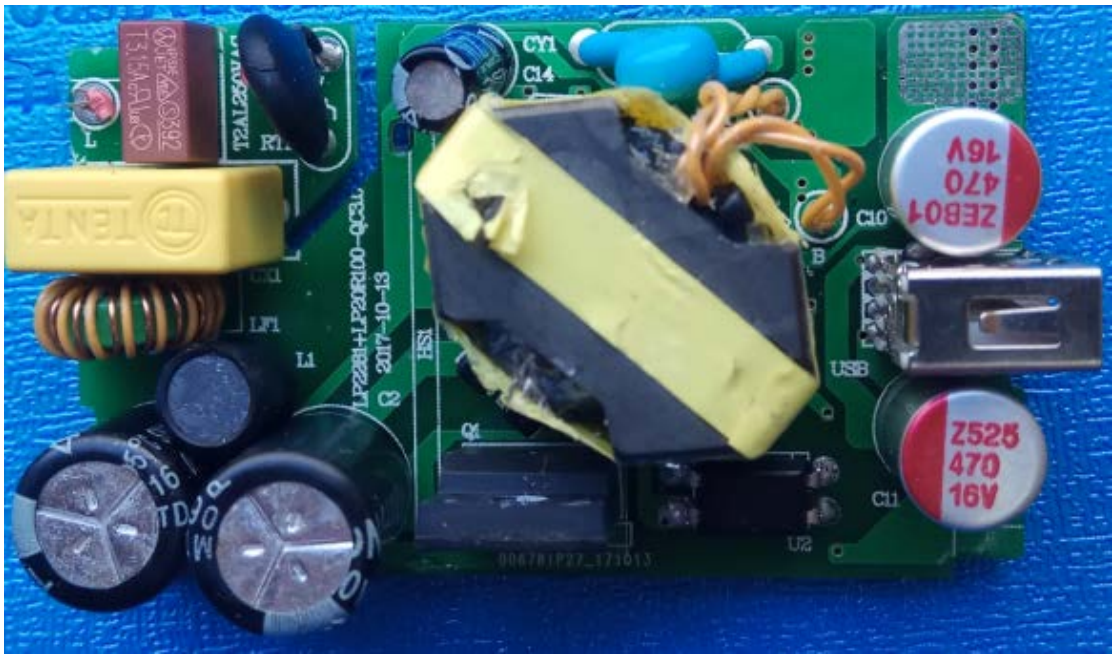
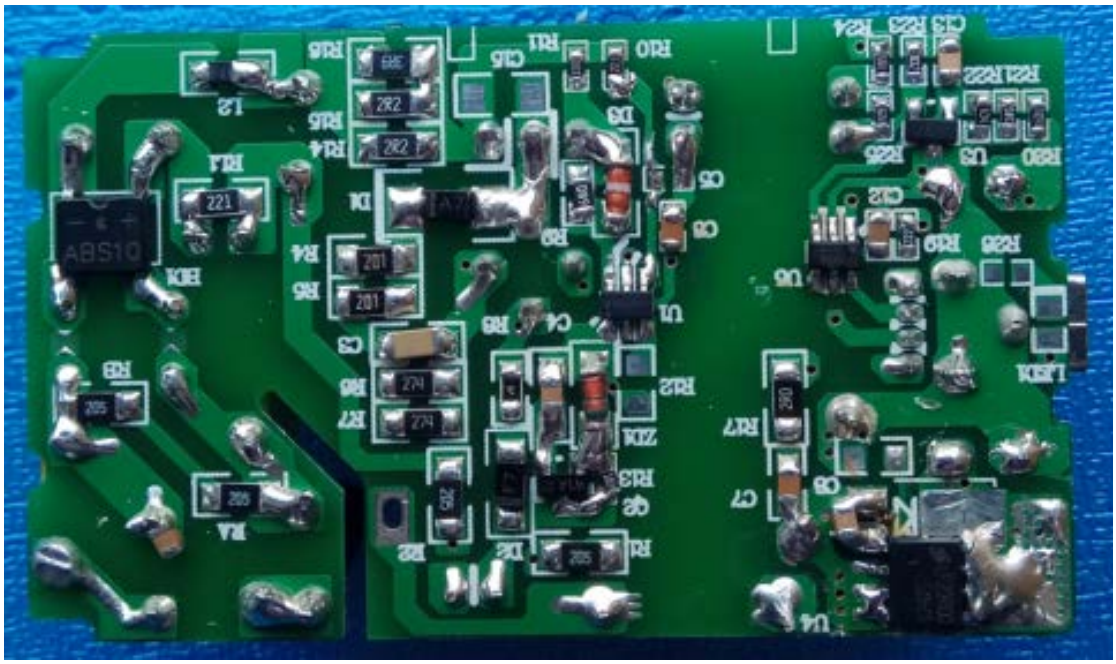

CY1
C14
ZEB01
470
16V
C10
USB
Z525
470
16V
C11
U2
LF1
L1
TENTA

PCB A


ABS10
U1
U3
U4
U5
U6

PCB B

1-1. Regulation， Efficiency Measurement

*Note：output voltage is measured at end of Output Line

5V3A For Output Line：

LP8773+LP20R100S 5.0V-3.0A 带转接头来测试的板端效率							
Vin (Vac)	Pin (W)	Vout (V)	Iout (A)	Pout (W)	η (%)	OCP (A)	Average η (%)
90V	0.132	5.12	0.000	0.000		4.233	85.40
	1.936	5.13	0.300	1.539	79.49		
	4.475	5.13	0.750	3.848	85.98		
	8.883	5.12	1.500	7.680	86.46		
	13.470	5.12	2.250	11.520	85.52		
	18.330	5.11	3.000	15.330	83.63		
115V	0.132	5.12	0.000	0.000	0.00	4.310	86.31
	1.948	5.13	0.300	1.539	79.00		
	4.464	5.13	0.750	3.848	86.19		
	8.814	5.12	1.500	7.680	87.13		
	13.250	5.12	2.250	11.520	86.94		
	18.043	5.11	3.000	15.330	84.96		
230V	0.174	5.12	0.000	0.000	0.00	4.500	85.53
	2.105	5.13	0.300	1.539	73.11		
	4.625	5.13	0.750	3.848	83.19		
	8.928	5.12	1.500	7.680	86.02		
	13.336	5.12	2.250	11.520	86.38		
	17.720	5.11	3.000	15.330	86.51		
264V	0.184	5.12	0.000	0.000	0.00	4.522	85.29
	2.157	5.13	0.300	1.539	71.35		
	4.678	5.13	0.750	3.848	82.25		
	8.973	5.12	1.500	7.680	85.59		
	13.300	5.12	2.250	11.520	86.62		
	17.680	5.11	3.000	15.330	86.71		

9V2A For Output Line:

LP8773+LP20R100S 9.0V-2.0A 带转接头来测试的板端效率							
Vin (Vac)	Pin (W)	Vout (V)	Iout (A)	Pout (W)	η (%)	OCP (A)	Average η (%)
90V	0.324	9.14	0.000	0.000			84.35
	2.452	9.16	0.200	1.832	74.71		
	5.632	9.18	0.500	4.590	81.50		
	10.875	9.18	1.000	9.180	84.41		
	16.090	9.18	1.500	13.770	85.58		
	21.395	9.19	2.000	18.380	85.91		
115V	0.317	9.14	0.000	0.000	0.00		85.36
	2.465	9.15	0.200	1.830	74.24		
	5.579	9.15	0.500	4.575	82.00		
	10.700	9.15	1.000	9.150	85.51		
	15.770	9.16	1.500	13.740	87.13		
	21.080	9.15	2.000	18.300	86.81		
230V	0.340	9.14	0.000	0.000	0.00		85.15
	2.615	9.15	0.200	1.830	69.98		
	5.691	9.15	0.500	4.575	80.39		
	10.678	9.15	1.000	9.150	85.69		
	15.810	9.15	1.500	13.725	86.81		
	20.838	9.14	2.000	18.280	87.72		
264V	0.360	9.14	0.000	0.000	0.00		84.37
	2.681	9.15	0.200	1.830	68.26		
	5.798	9.15	0.500	4.575	78.91		
	10.800	9.15	1.000	9.150	84.72		
	15.820	9.15	1.500	13.725	86.76		
	20.990	9.14	2.000	18.280	87.09		

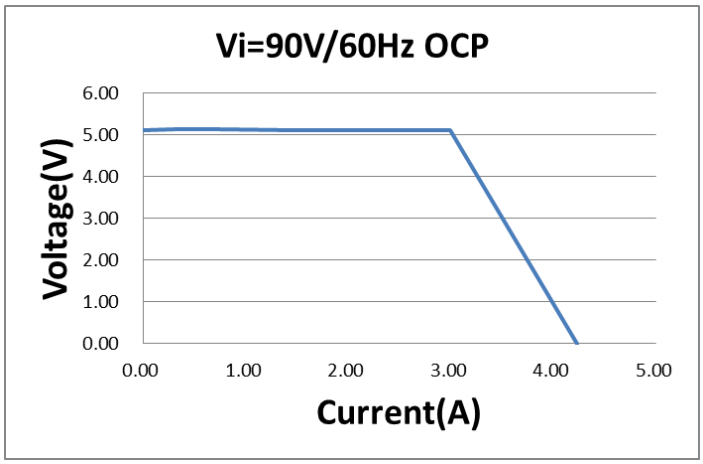
12V1.5A For Output Line:

LP8773+LP20R100S 12V-1.5A 带转接头来测试的板端效率							
Vin (Vac)	Pin (W)	Vout (V)	Iout (A)	Pout (W)	η (%)	OCP (A)	Average η (%)
90V	0.620	12.21	0.000	0.000			82.23
	2.771	12.22	0.150	1.833	66.15		
	5.833	12.22	0.375	4.583	78.56		
	11.194	12.22	0.750	9.165	81.87		
	16.375	12.22	1.125	13.748	83.95		
	21.680	12.22	1.500	18.330	84.55		
115V	0.583	12.17	0.000	0.000	0.00		83.35
	2.747	12.21	0.150	1.832	66.67		
	5.794	12.21	0.375	4.579	79.03		
	11.030	12.21	0.750	9.158	83.02		
	16.135	12.21	1.125	13.736	85.13		
	21.245	12.21	1.500	18.315	86.21		
230V	0.574	12.18	0.000	0.000	0.00		83.10
	2.876	12.18	0.150	1.827	63.53		
	5.919	12.18	0.375	4.568	77.17		
	11.041	12.18	0.750	9.135	82.74		
	16.006	12.18	1.125	13.703	85.61		
	21.012	12.17	1.500	18.255	86.88		
264V	0.587	12.18	0.000	0.000	0.00		82.60
	2.941	12.19	0.150	1.829	62.17		
	6.012	12.19	0.375	4.571	76.04		
	11.130	12.19	0.750	9.143	82.14		
	15.998	12.18	1.125	13.703	85.65		
	21.090	12.17	1.500	18.255	86.56		

1-2.Output VI Characteristics

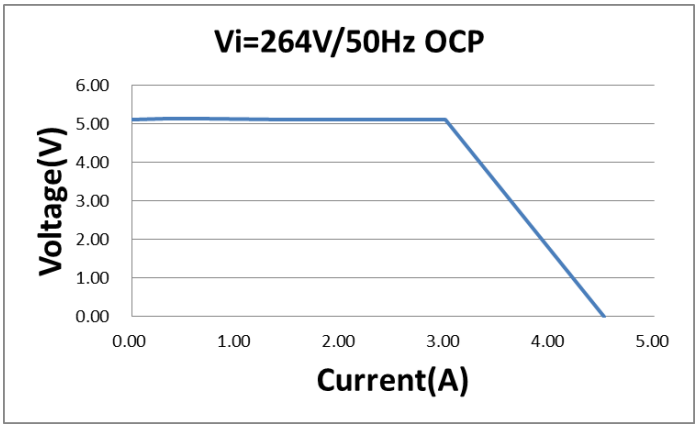
5V3A 90V/60HZ

Vi=90V/60Hz	
Voltage	Current
5.12	0.00
5.13	0.30
5.13	0.75
5.12	1.50
5.12	2.25
5.11	3.00
0.00	4.23



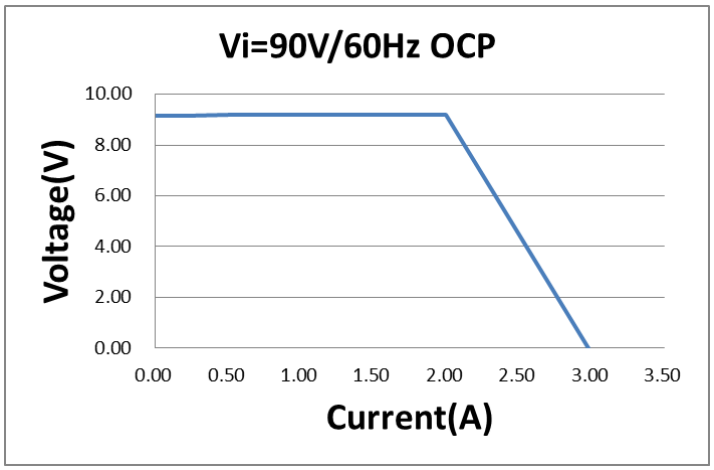
5V3A 264V/50HZ

Vi=264V/50Hz	
Voltage	Current
5.12	0.00
5.13	0.30
5.13	0.75
5.12	1.50
5.12	2.25
5.11	3.00
0.00	4.52



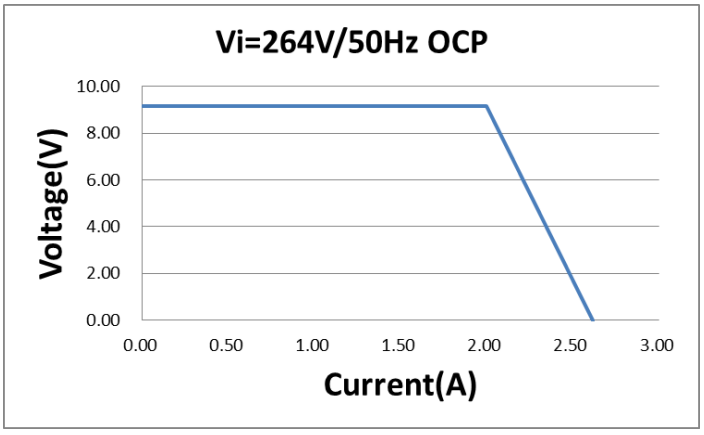
9V2A 90V/60HZ

Vi=90V/60Hz	
Voltage	Current
9.14	0.00
9.16	0.20
9.18	0.50
9.18	1.00
9.18	1.50
9.19	2.00
0.00	2.98



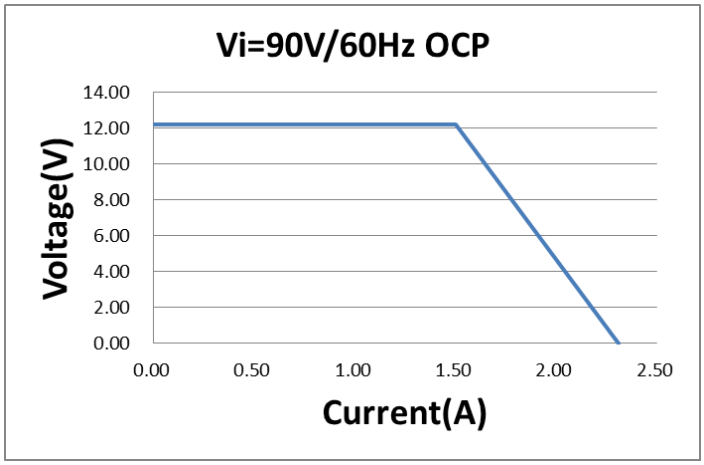
9V2A 264V/50HZ

Vi=264V/50Hz	
Voltage	Current
9.14	0.00
9.15	0.20
9.15	0.50
9.15	1.00
9.15	1.50
9.14	2.00
0.00	2.62



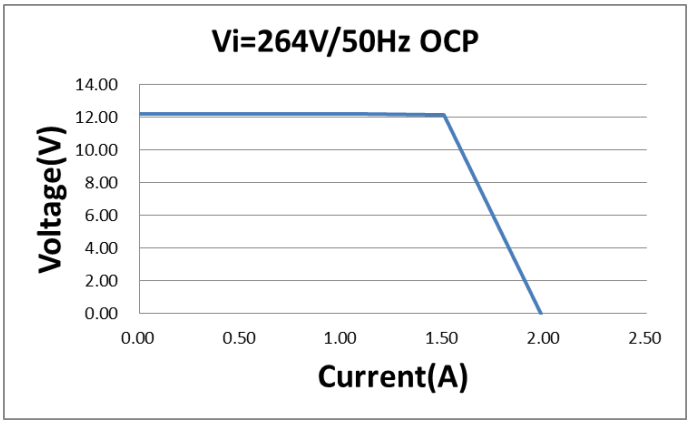
12V1.5A 90V/60HZ

Vi=90V/60Hz	
Voltage	Current
12.21	0.00
12.22	0.15
12.22	0.38
12.22	0.75
12.22	1.13
12.22	1.50
0.00	2.31



12V1.5A 264V/50HZ

Vi=264V/50Hz	
Voltage	Current
12.18	0.00
12.19	0.15
12.19	0.38
12.19	0.75
12.18	1.13
12.17	1.50
0.00	1.98



1-3.Line Regulation AND Load Regulation

1-3.1 TEST CONDITION:

1..AC Input:90V/60Hz - 264V/50Hz

2.Output Load: 5V3A　9V2A　12V1.5A

3..Ta: 25℃

5V0A

a. Line Regulation

S/N	O/P Voltage:5V						
Load	0A						
Vin	Vdc1	Vdc2	Vdc3	Vdc4	Linear adjust rate	SPEC	Conclusion
	90Vac	115Vac	230Vac	264Vac	0.00%	±3%	OK
Vout	5.12	5.12	5.12	5.12			

9V0A

a. Line Regulation

S/N	O/P Voltage:9V						
Load	0A						
Vin	Vdc1	Vdc2	Vdc3	Vdc4	Linear adjust rate	SPEC	Conclusion
	90Vac	115Vac	230Vac	264Vac	0.00%	±3%	OK
Vout	9.14	9.14	9.14	9.14			

12V0A

a. Line Regulation

S/N	O/P Voltage:12V						
Load	0A						
Vin	Vdc1	Vdc2	Vdc3	Vdc4	Linear adjust rate	SPEC	Conclusion
	90Vac	115Vac	230Vac	264Vac	0.33%	±3%	OK
Vout	12.21	12.17	12.18	12.18			

b.Load Regulation

5V3A

SPEC	Output Voltage:5V				
Iout	0A	3A	Load adjust rate	SPEC	Conclusion
90Vac	5.12	5.11	-0.20%	±5%	OK
115Vac	5.12	5.11	-0.20%		
230Vac	5.12	5.11	-0.20%		
264Vac	5.12	5.11	-0.20%		

9V2A

S/N	Load Regulation				
SPEC	Output Voltage:9V				
Iout	0A	2A	Load adjust rate	SPEC	Conclusion
90Vac	9.14	9.19	0.55%	±5%	OK
115Vac	9.14	9.15	0.11%		
230Vac	9.14	9.14	0.00%		
264Vac	9.14	9.14	0.00%		

12V1.5A

S/N	Load Regulation				
SPEC	Output Voltage:12V				
Iout	0A	1.5A	Load adjust rate	SPEC	Conclusion
90Vac	12.21	12.22	0.10%	±5%	OK
115Vac	12.17	12.21	0.33%		
230Vac	12.18	12.17	-0.10%		
264Vac	12.18	12.17	-0.10%		

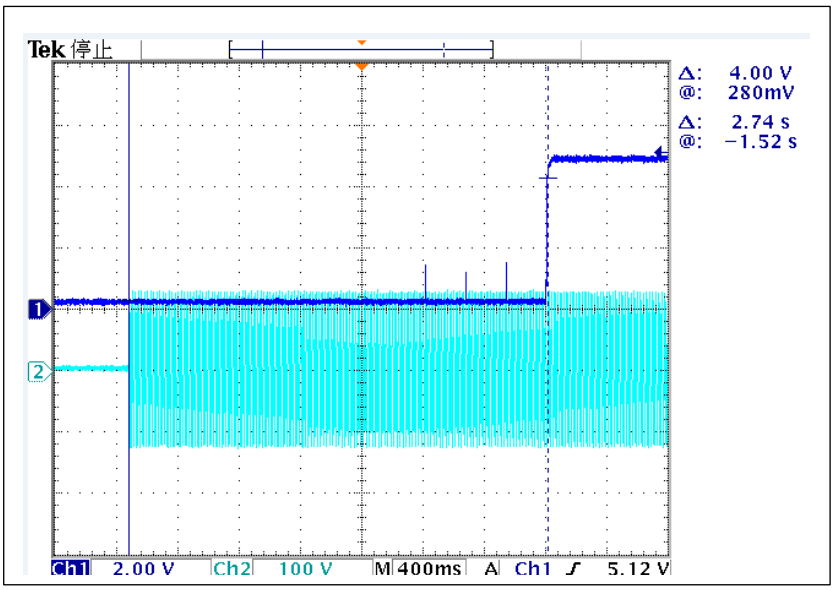
2-1.Turn-on Delay Time AND Hold Up Time

2-1. TEST CONDITION:

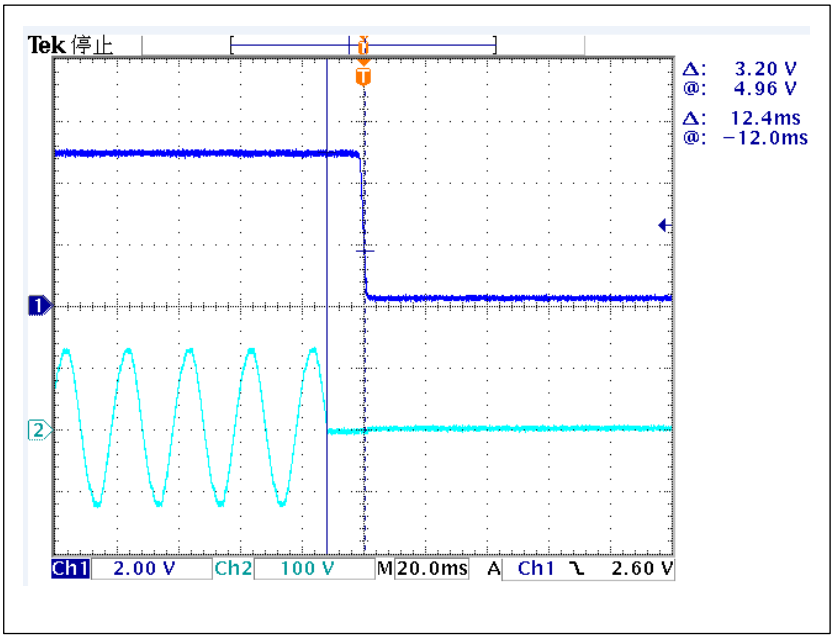
1..AC Input:90V/60Hz

2.Output Load:5V/3A

3..Ta: 25℃



90Vac， Full Load Tst_delay：2.74S



90Vac，Full Load Hold Up Time：12.4mS

2-2.Vds Waveform

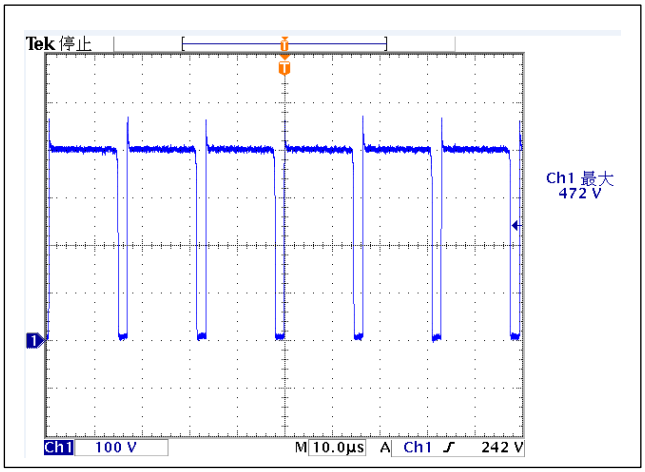
2-2. TEST CONDITION:

1..AC Input:264V/50Hz

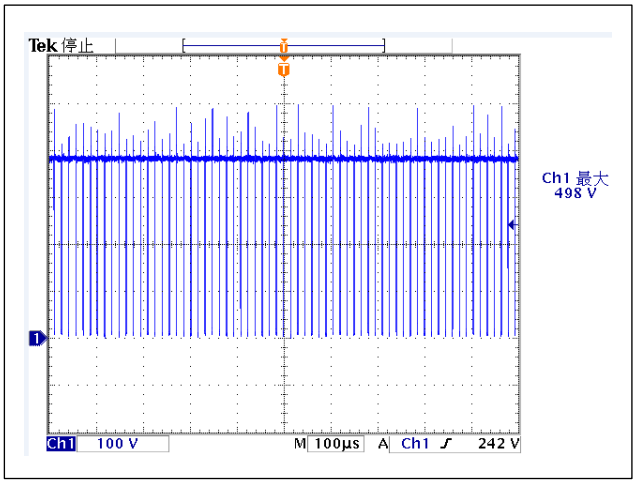
2.Output Load:5V3A　9V2A　12V1.5A

3..Ta: 25℃

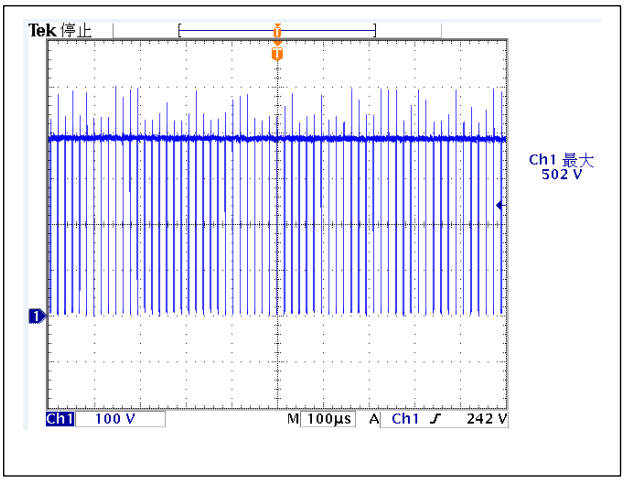
5V3A



264Vac，Full Load Vds(max)：472V

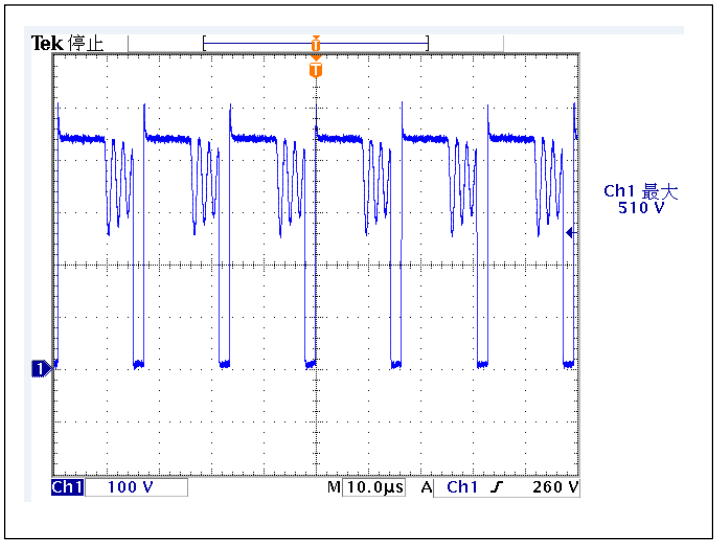


Short output Vds(max)：498V



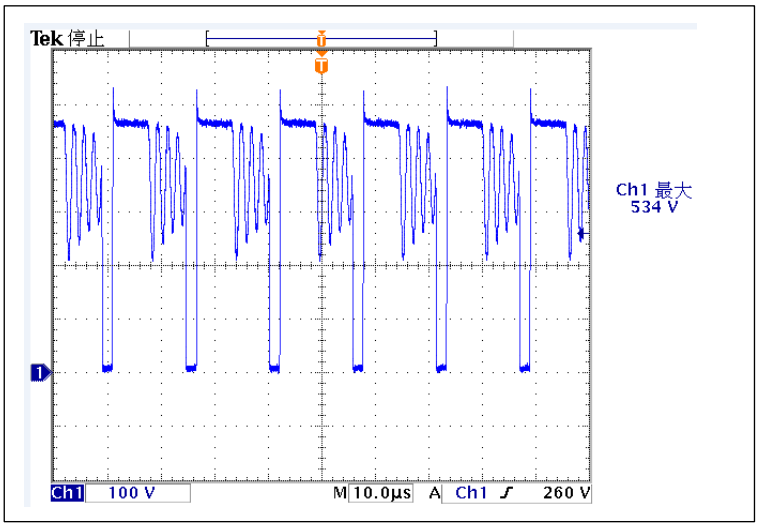
264Vac，OCP　Vds(max)：502V

9V2A



264Vac，Full Load Vds(max): 510V

12V1.5A



264Vac，Full Load Vds(max): 534V

2-3.Ripple AND Noise

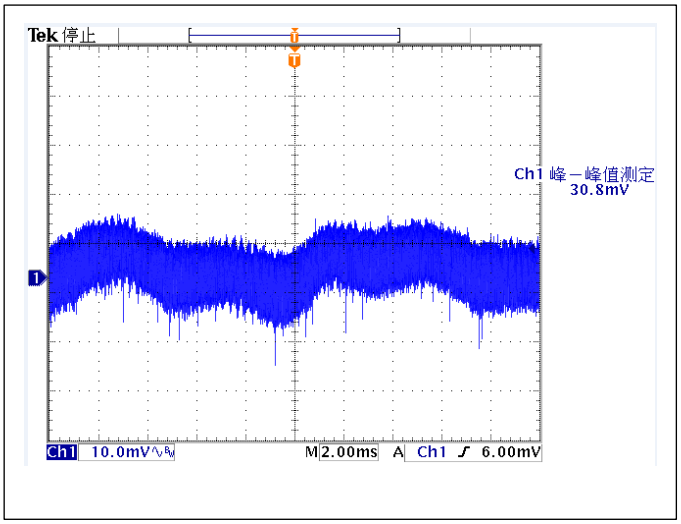
2-3.1 TEST CONDITION:

1..AC Input:90V/60Hz - 264V/50Hz

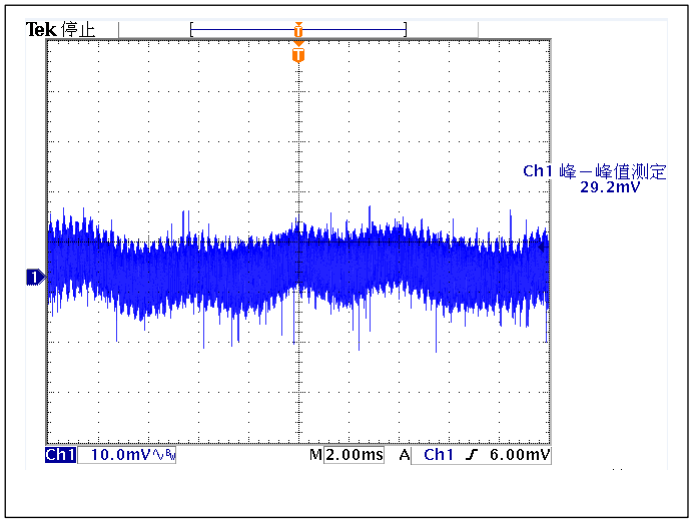
2.Output Load:5V3A　9V2A　12V1.5A

3.Ta: 25℃

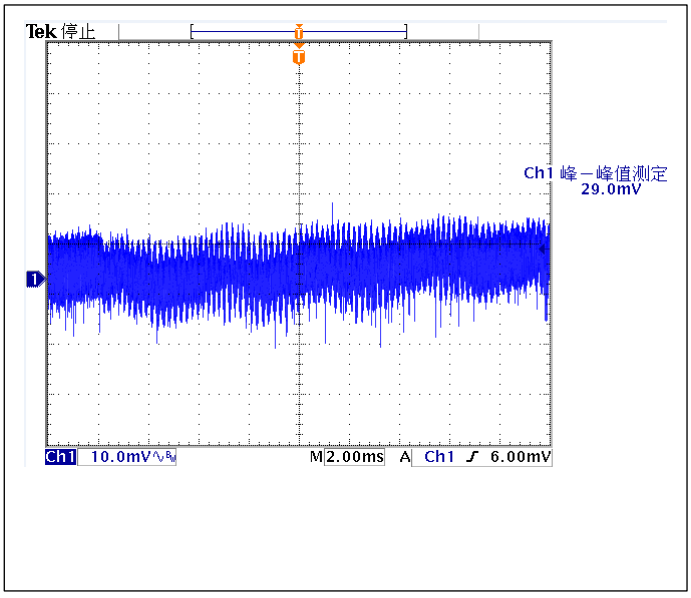
5V3A



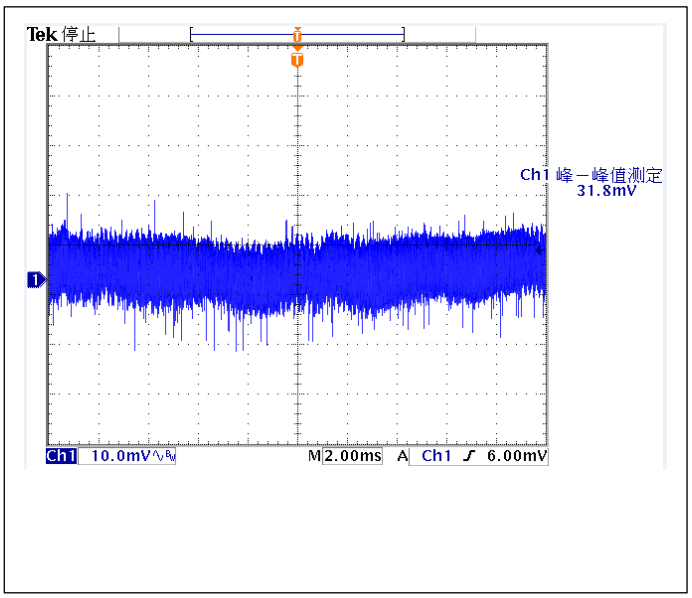
90Vac Full Load Ripple: 30.8mv



115Vac Full Load Ripple: 29.2mv

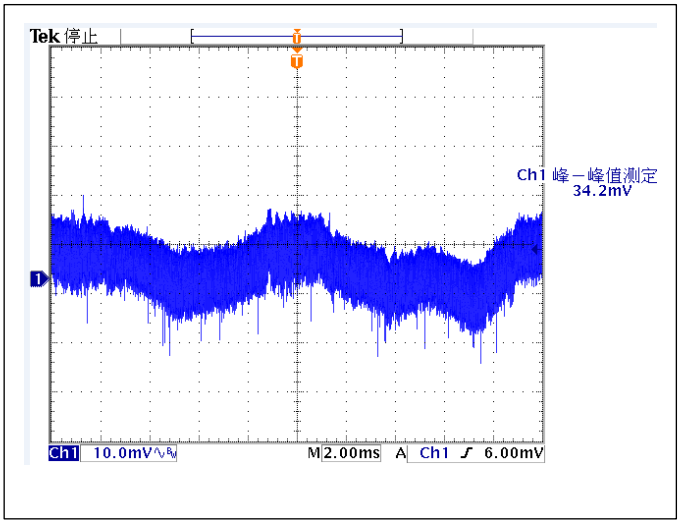


230Vac Full Load Ripple:29mv

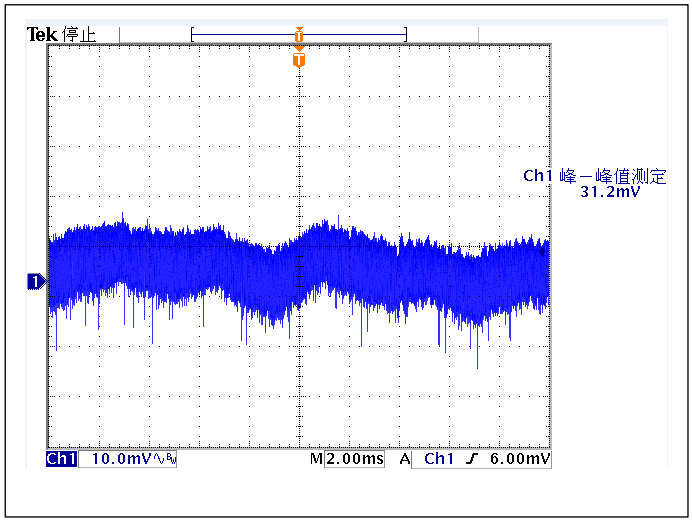


264Vac Full Load Ripple: 31.8mv

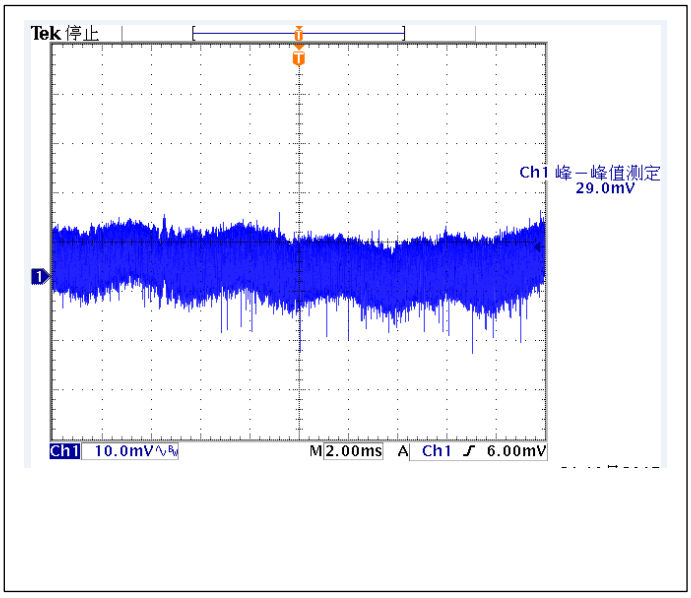
9V2A



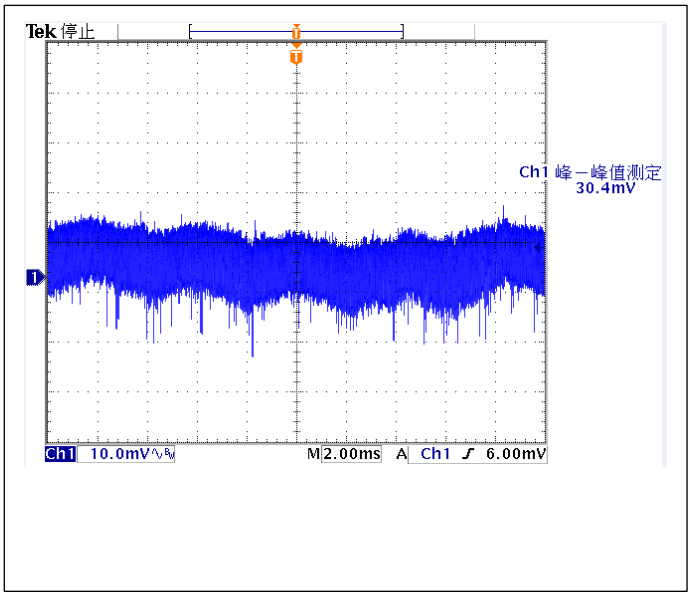
90Vac Full Load Ripple: 34.2mv



115Vac Full Load Ripple: 31.2mv

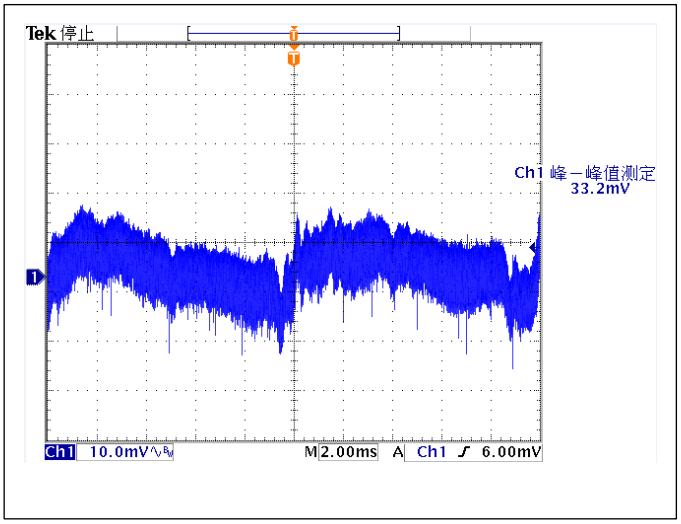


230Vac Full Load Ripple:29mv

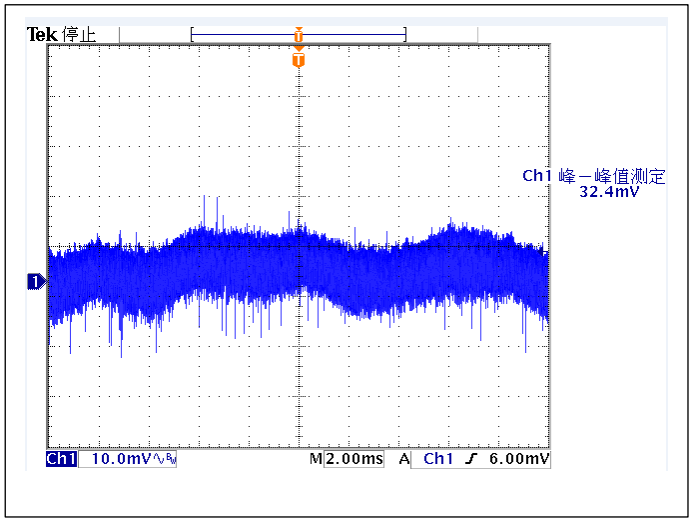


264Vac Full Load Ripple: 30.4mv

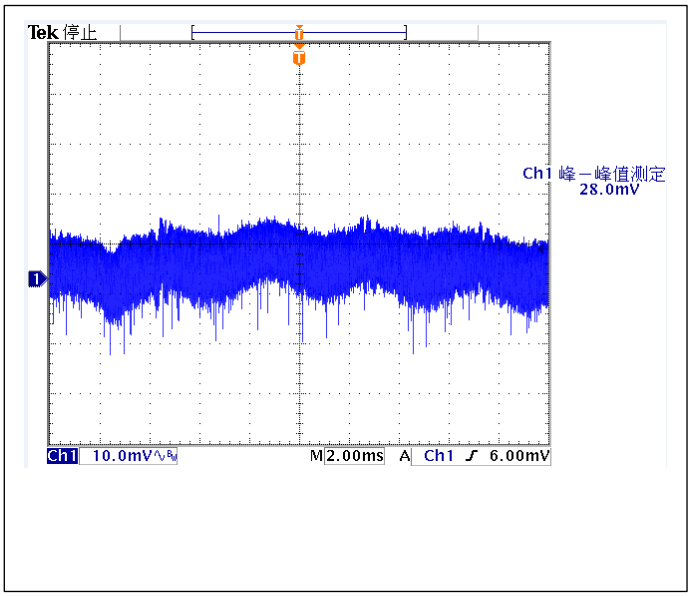
12V1.5A



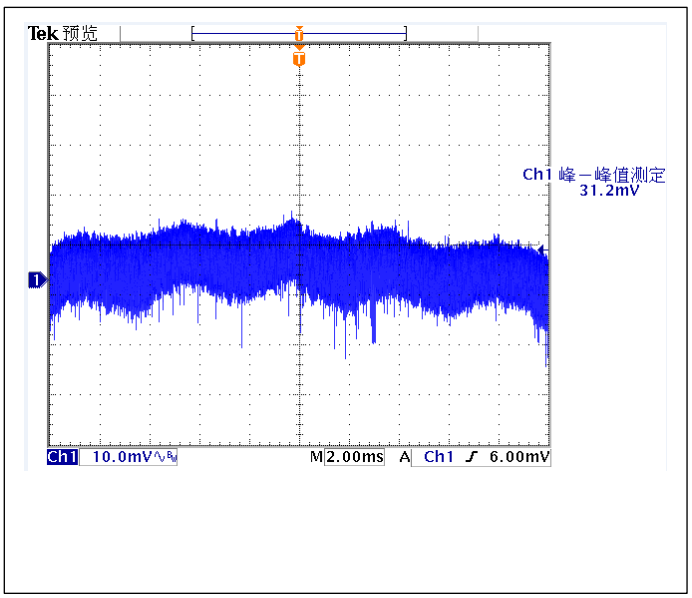
90Vac Full Load Ripple:33.2mv



115Vac Full Load Ripple: 32.4mv



230Vac Full Load Ripple:28mv



264Vac Full Load Ripple: 31.2mv

2-4.Output Diode's Voltage

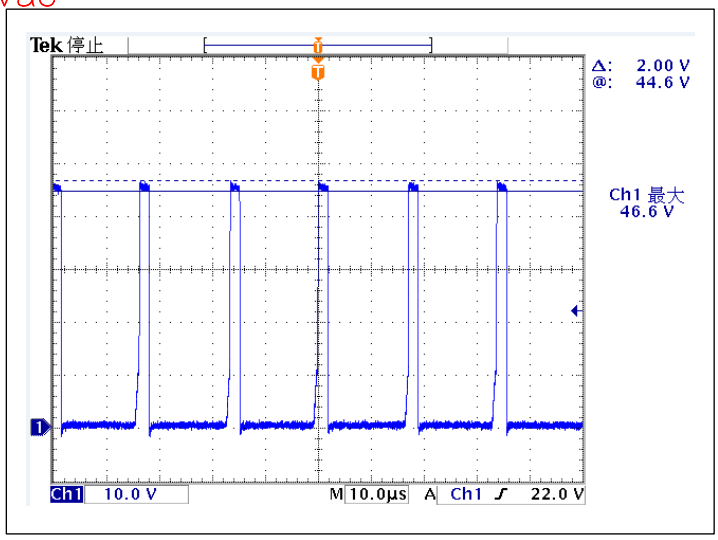
2-4. TEST CONDITION:

1..AC Input:264V/50Hz

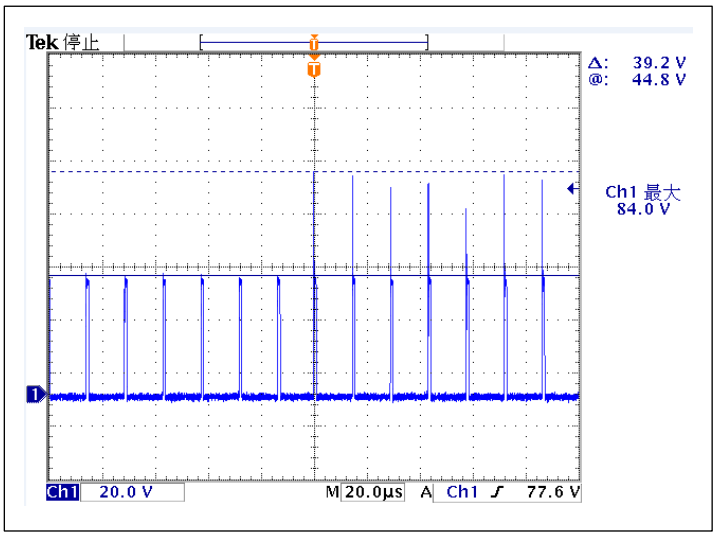
2..Output Load:5V3A　9V2A　12V1.5A

3..Ta: 25℃

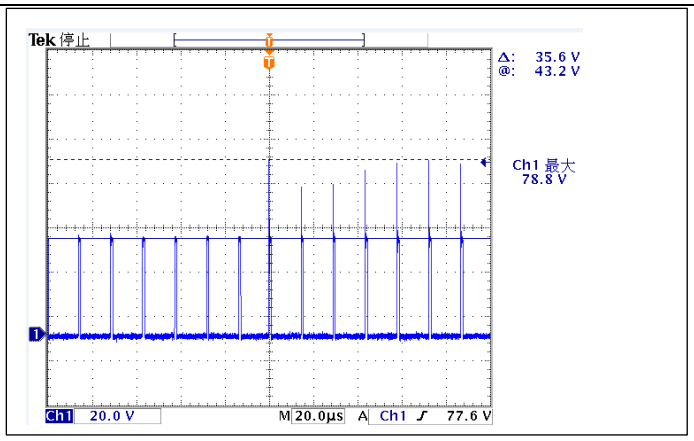
5V3A　264 Vac



264Vac，Full Load Diode`s Voltage:46.6V　正常工作尖刺电压：2V

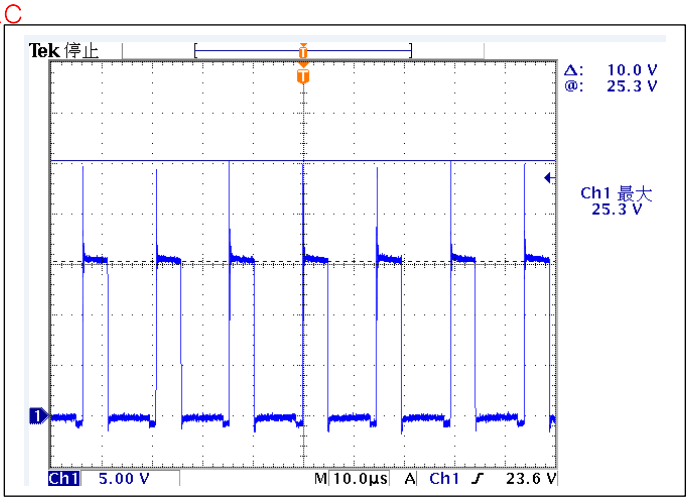


264Vac Short output Diode`s Voltage：84V 短路保护尖刺电压：39.2V

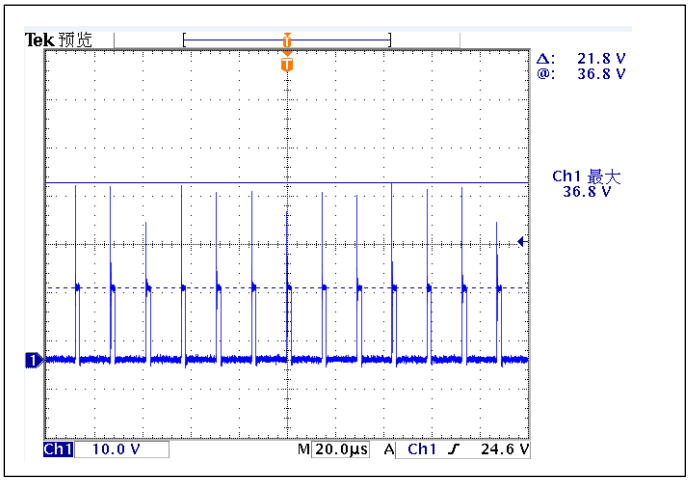


264Vac　OCP Diode`s Voltage：78. 8V 过流保护尖刺电压：35.6V

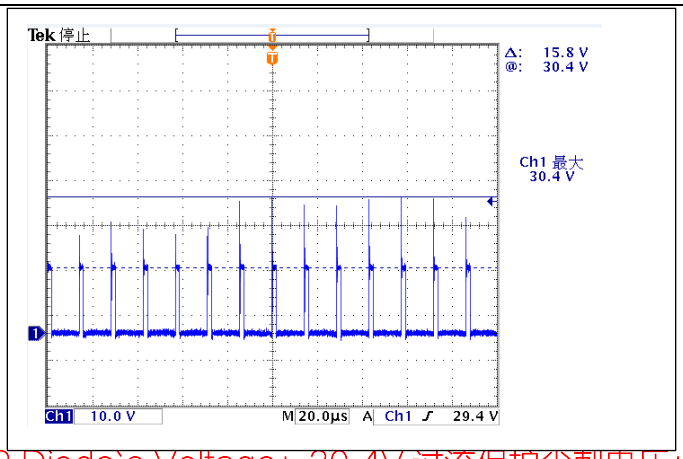
5V3A　90Vac



90Vac，Full Load Diode`s Voltage:25.3V　正常工作尖刺电压：10V

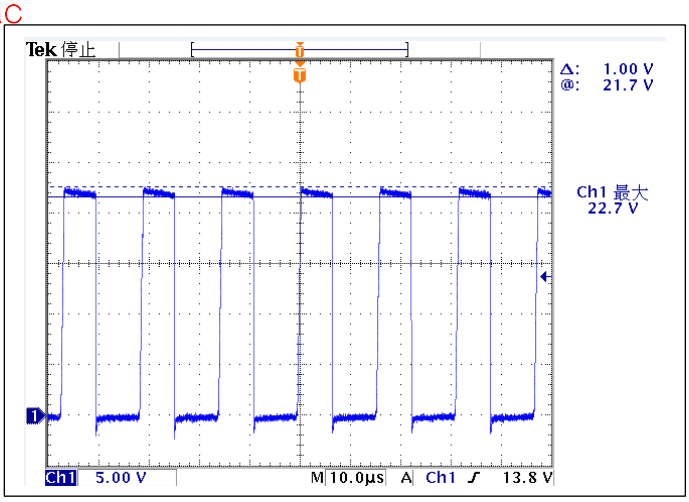


90Vac Short output Diode`s Voltage：36.8V 短路保护尖刺电压：21.8V



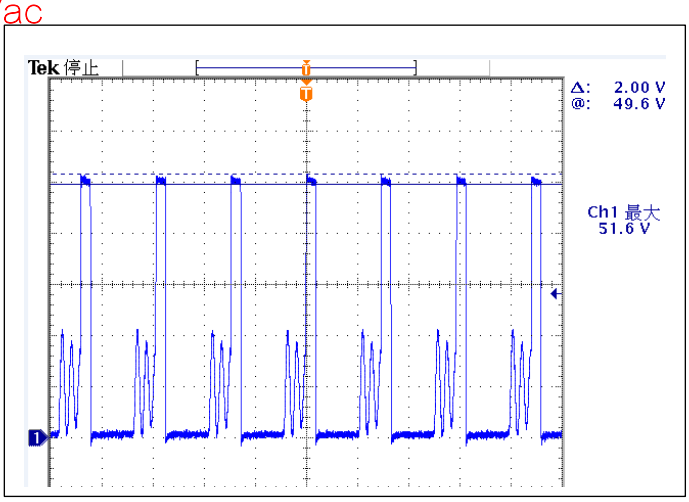
90Vac　OCP Diode`s Voltage：30.4V 过流保护尖刺电压：15.8V

9V2A　90Vac



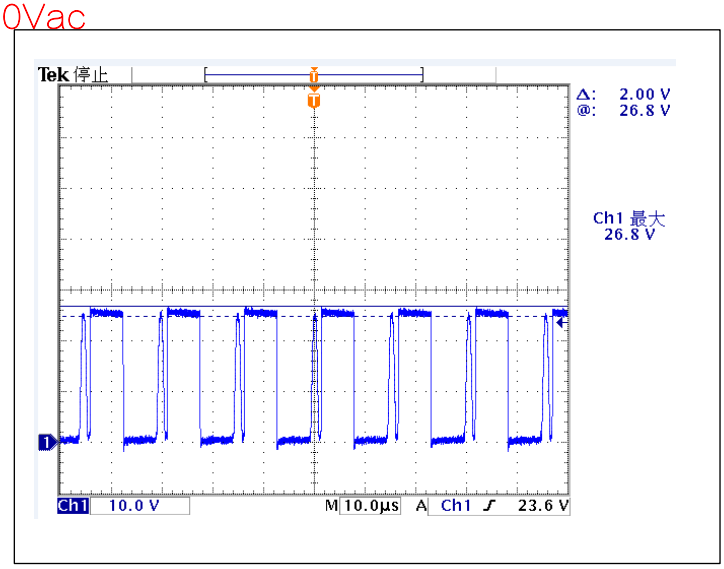
90Vac，Full Load Diode`s Voltage:22.7V　正常工作尖刺电压：1V

9V2A　264Vac



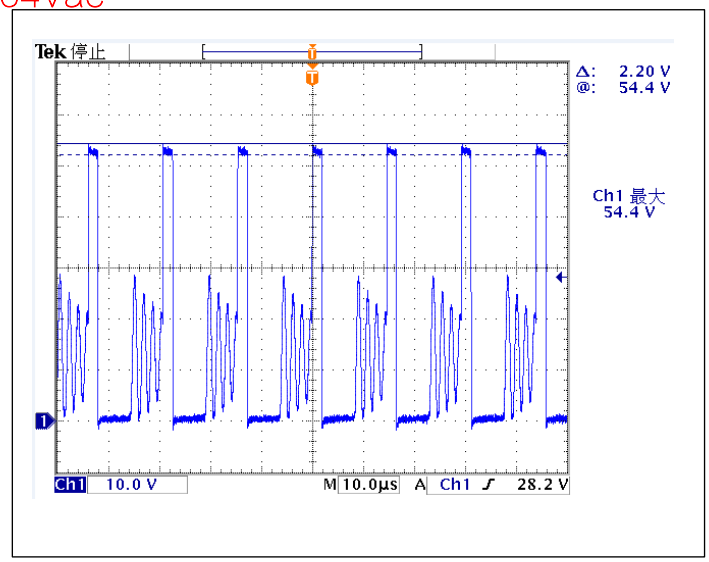
264Vac，Full Load Diode`s Voltage:51.6V　正常工作尖刺电压：2V

12V1.5A 90Vac



90Vac，Full Load Diode`s Voltage:26.8V 正常工作尖刺电压：2V

12V1.5A 264Vac



264Vac，Full Load Diode`s Voltage:54.4V 正常工作尖刺电压：2.2V

2-5. Transformer Flux Density

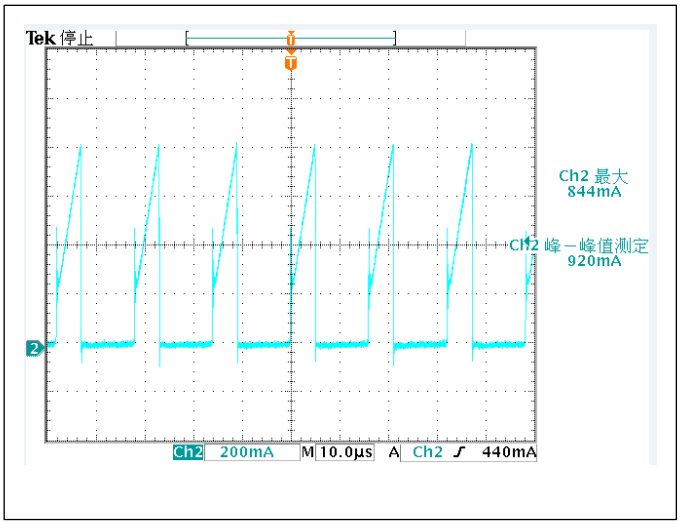
2-5. TEST CONDITION:

1..AC Input:90V/60Hz - 264V/50HZ

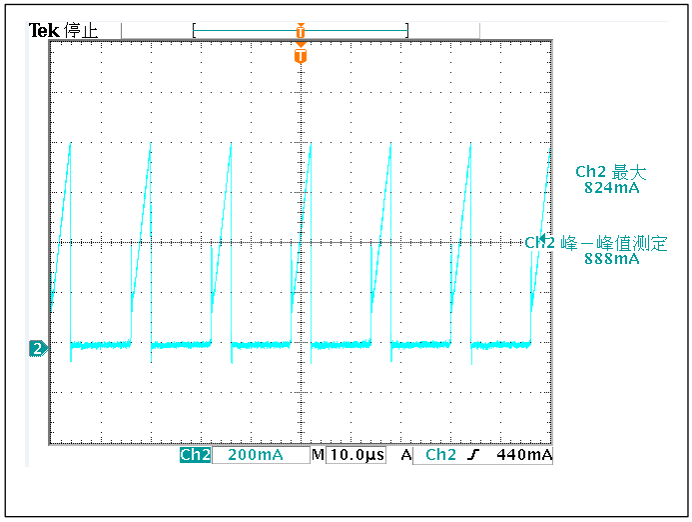
2..Output Load:5V3A　9V2A　12V1.5A

3..Ta: 25℃

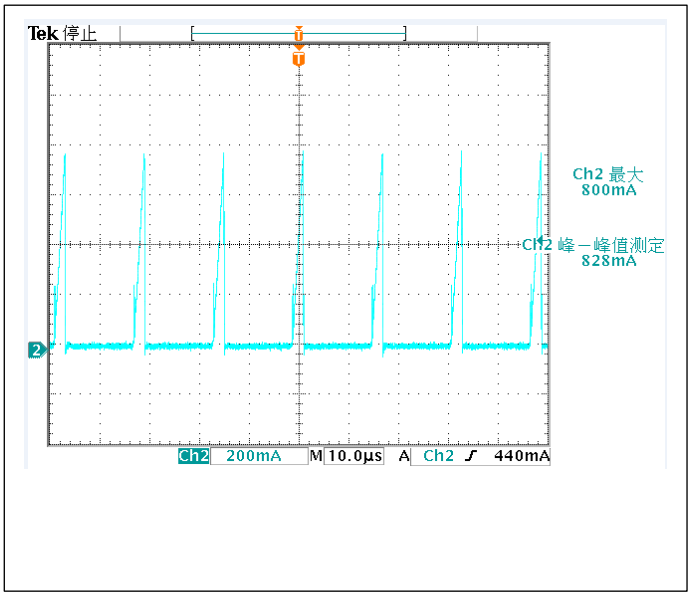
5V3A



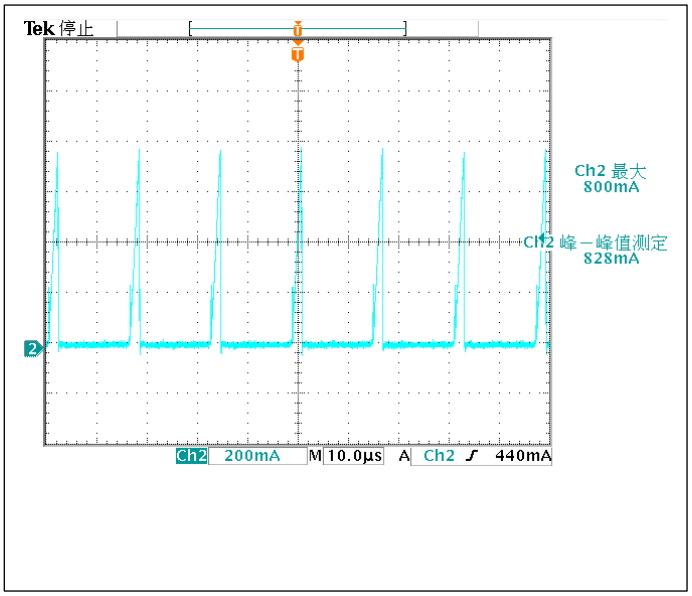
90Vac　Ids　max : 0.844A



115Vac　Ids　max : 0.824A

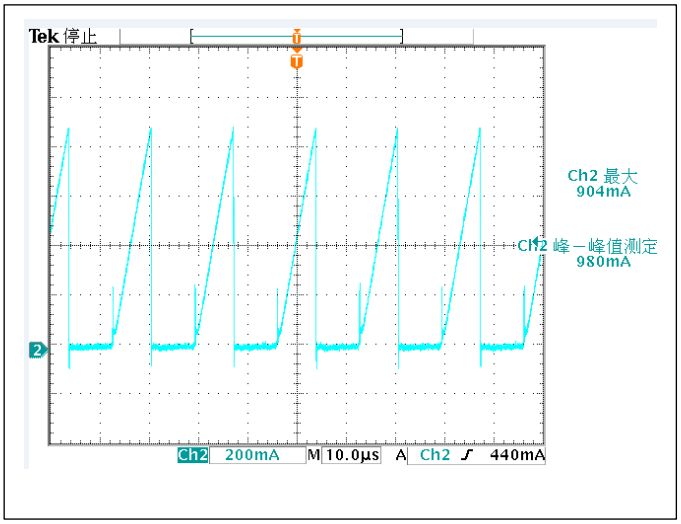


230Vac　Ids　max : 0.8A

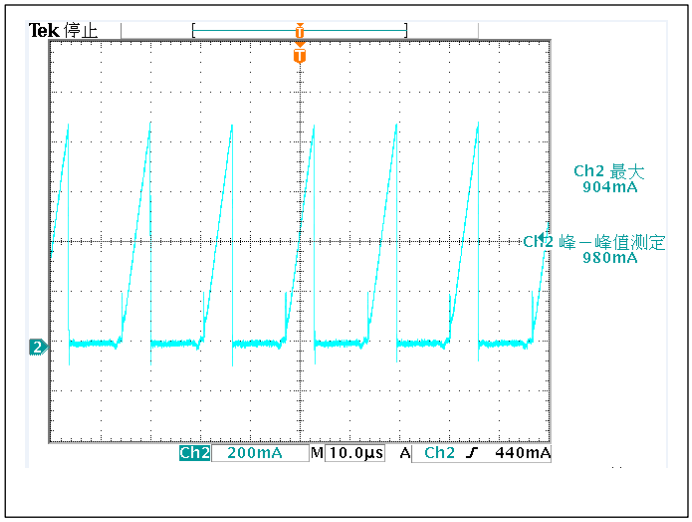


264Vac　Ids　max :0.8A

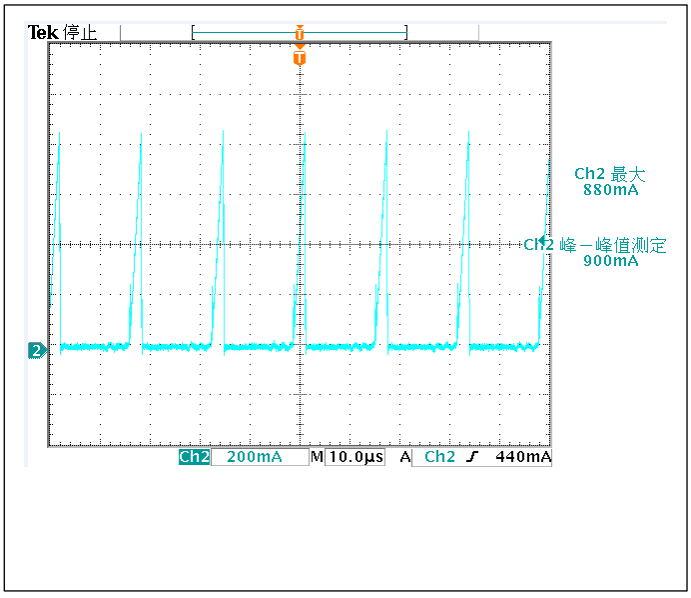
9V2A



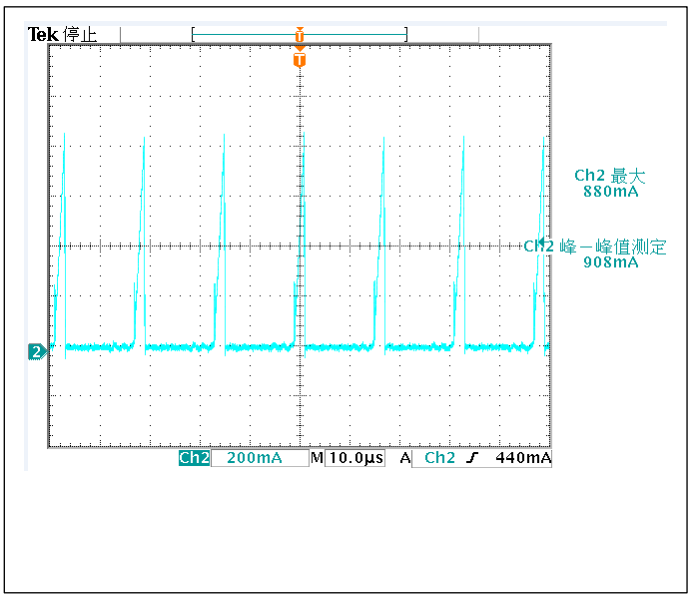
90Vac Ids max : 0.904A



115Vac Ids max : 0.904A

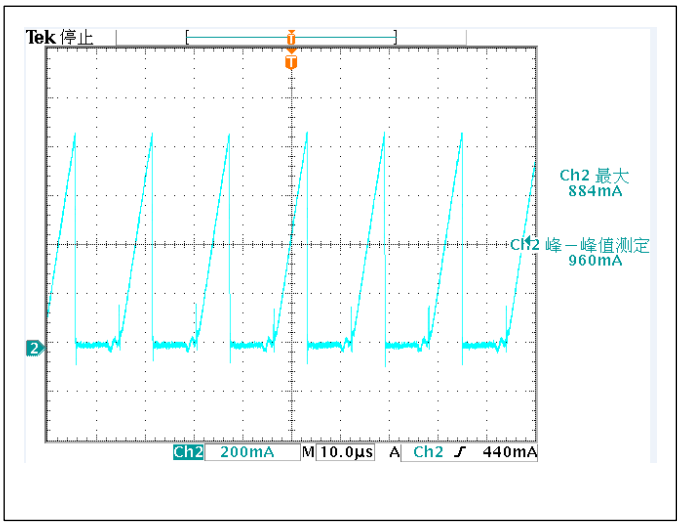


230Vac Ids max : 0.88A

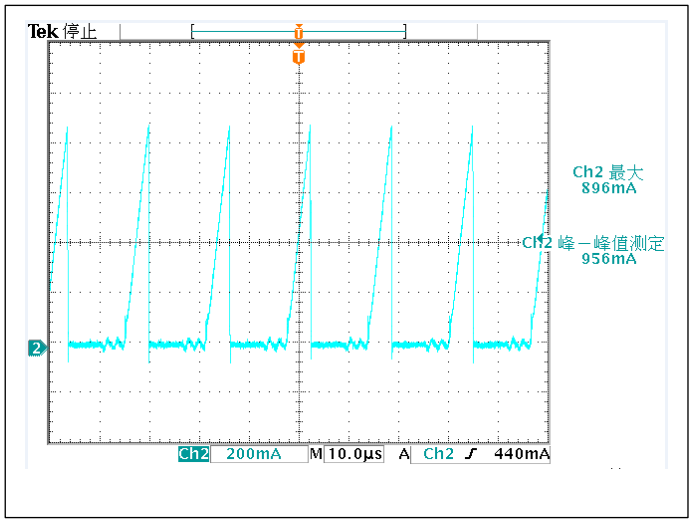


264Vac Ids max : 0.88A

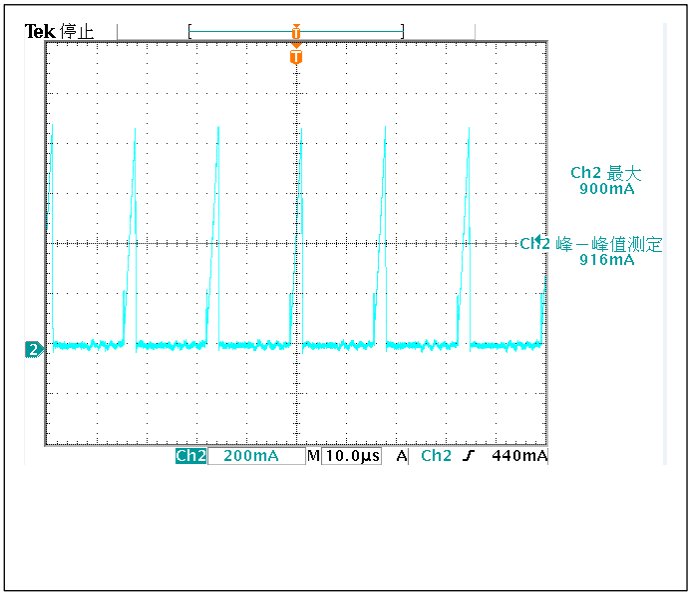
12V1.5A



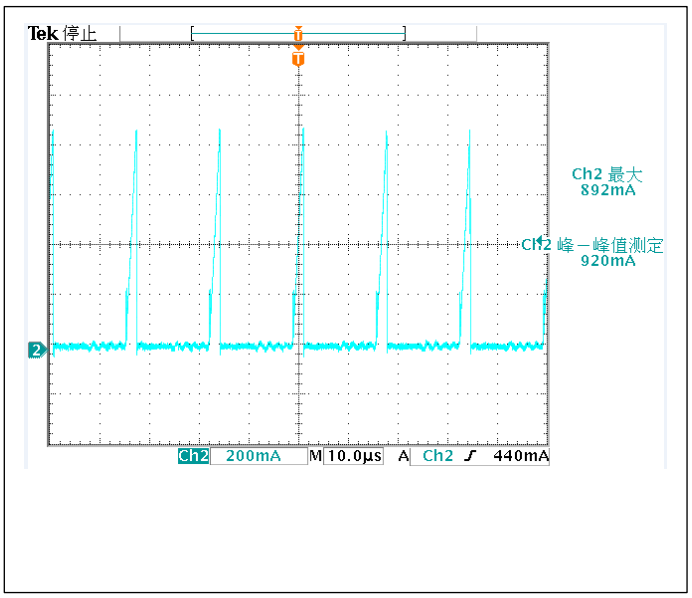
90Vac Ids max : 0.884A



115Vac Ids max : 0.896A



230Vac Ids max : 0.9A



264Vac Ids max :0.892A

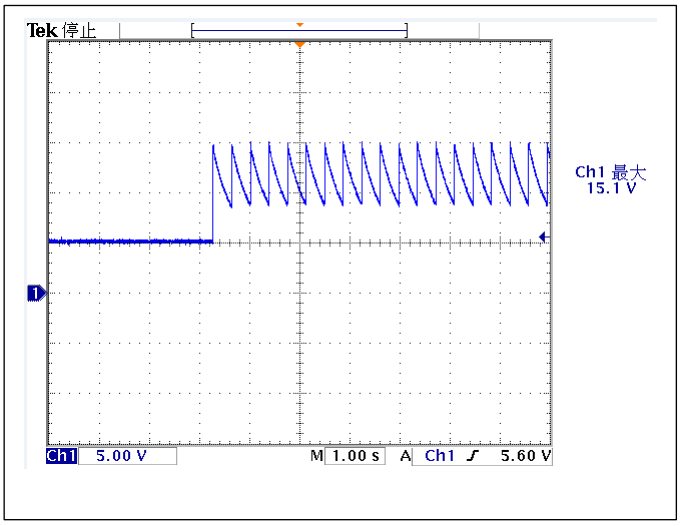
2-6.Over-Voltage Protection

2-6. TEST CONDITION:

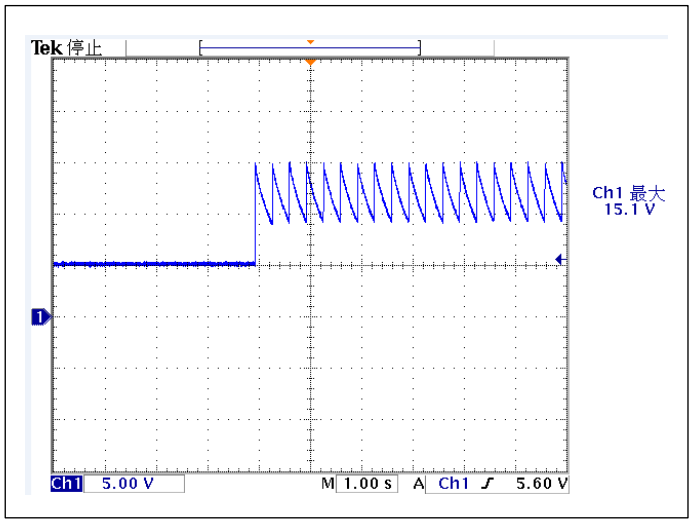
1..AC Input:90V/60Hz 264V/50Hz

2..Output Load:5V/0A

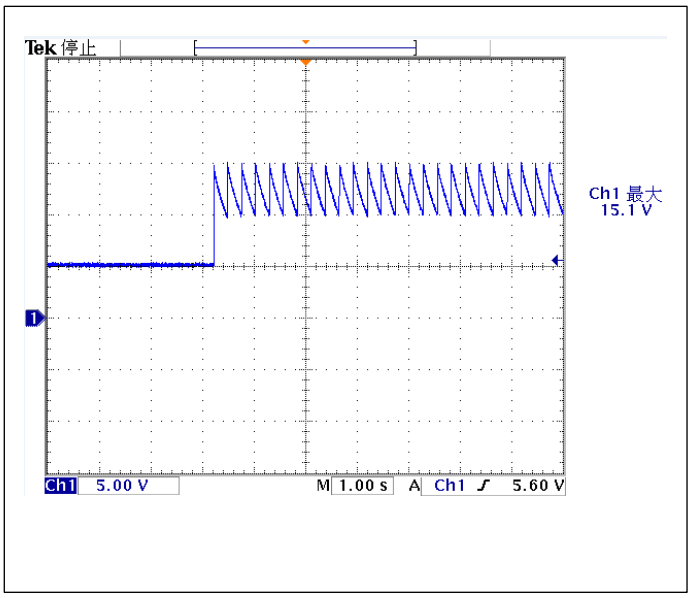
3..Ta: 25℃



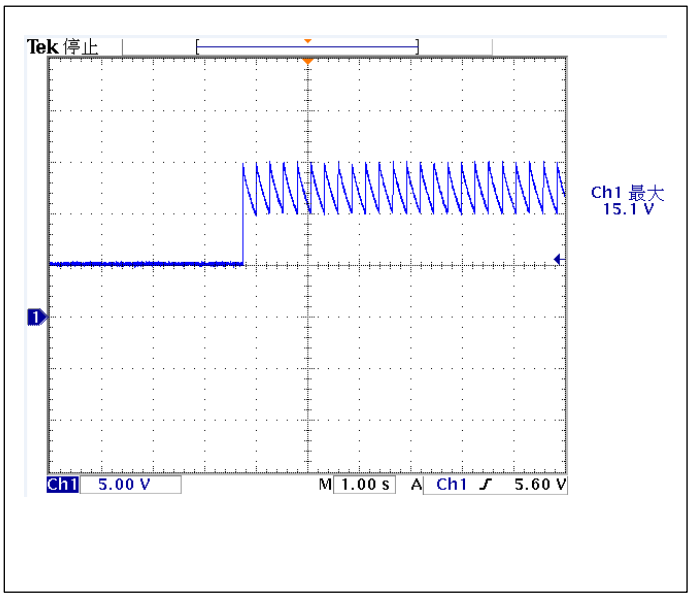
90Vac OVP Vo _pk : 15.1V



115Vac OVP Vo _pk : 15.1V



230Vac OVP Vo _pk : 15.1V



264Vac OVP Vo _pk : 15.1V

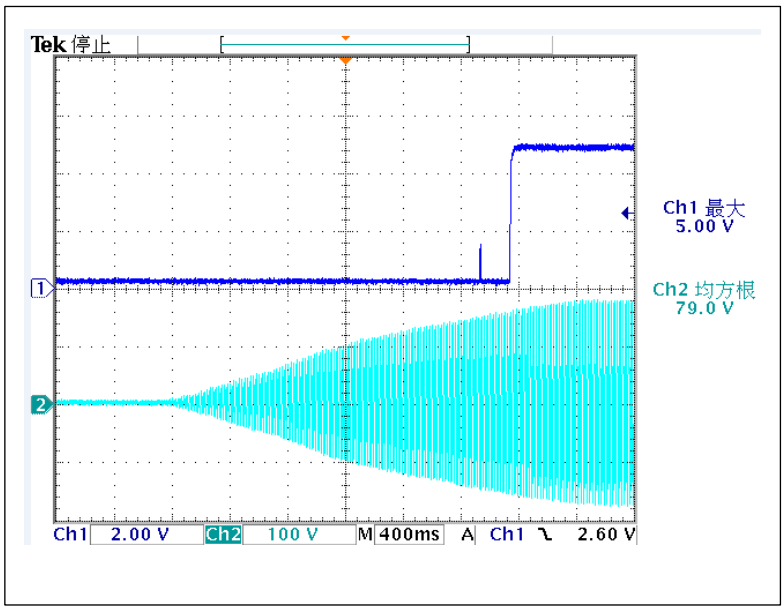
2-7.AC Startup Voltage Characteristic

2-7. TEST CONDITION:

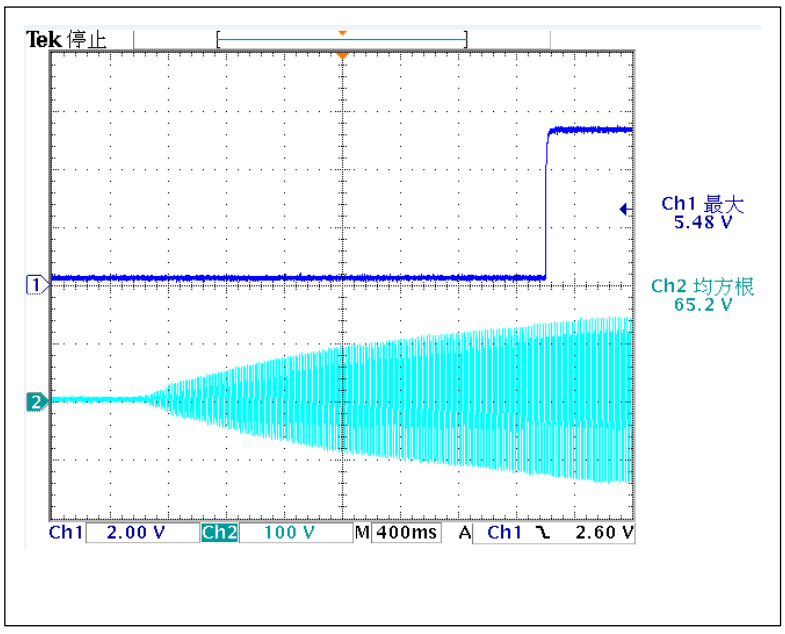
1..AC Input:

2..Output

Load:5V/3A



Full Load Vin Turn up; 79V



No Load Vin Turn up; 65.2V

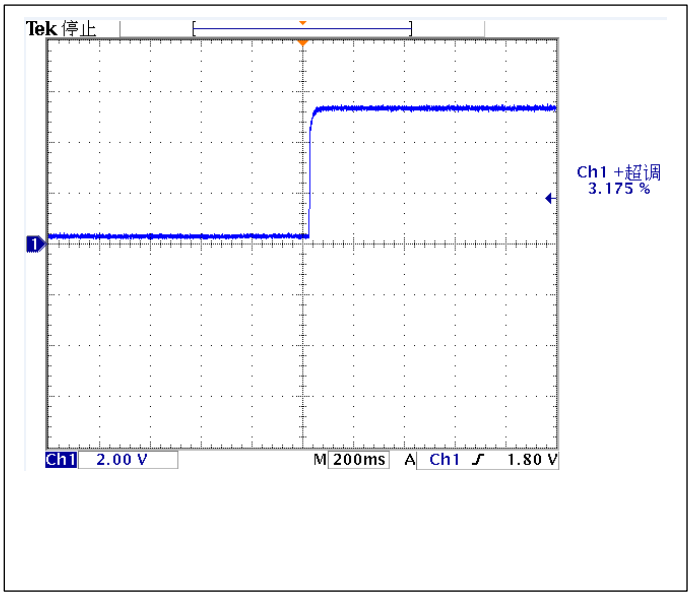
2-8. Overshoot

2-8. TEST RADIATION:

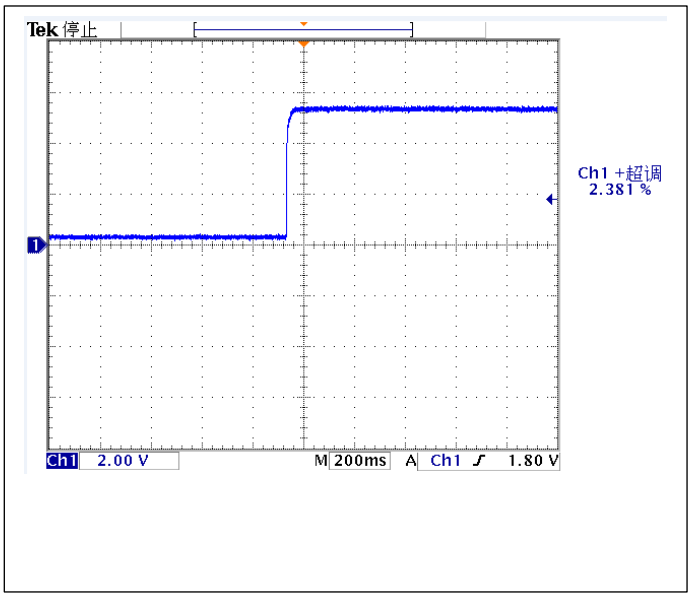
1..AC Input:90V/60Hz 110V/60Hz 220V/50HZ 264V/50Hz

2..Output Load:5V/0A,≤10%;

3..Ta: 25℃

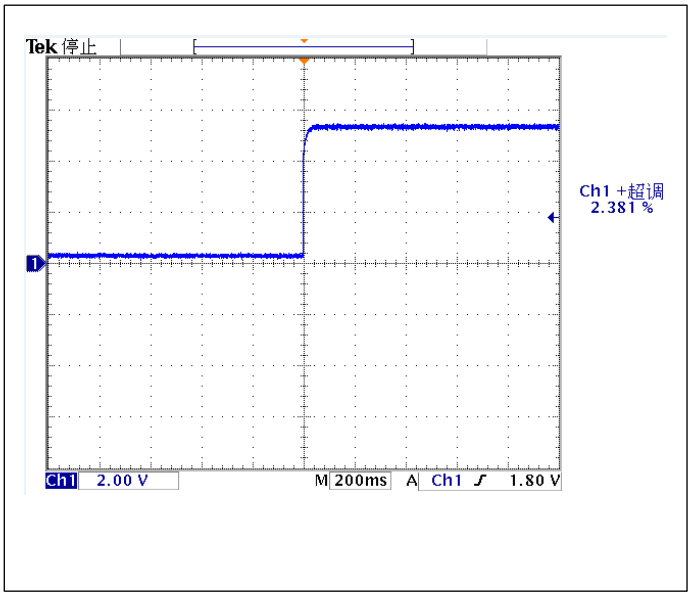


90V;3.175%

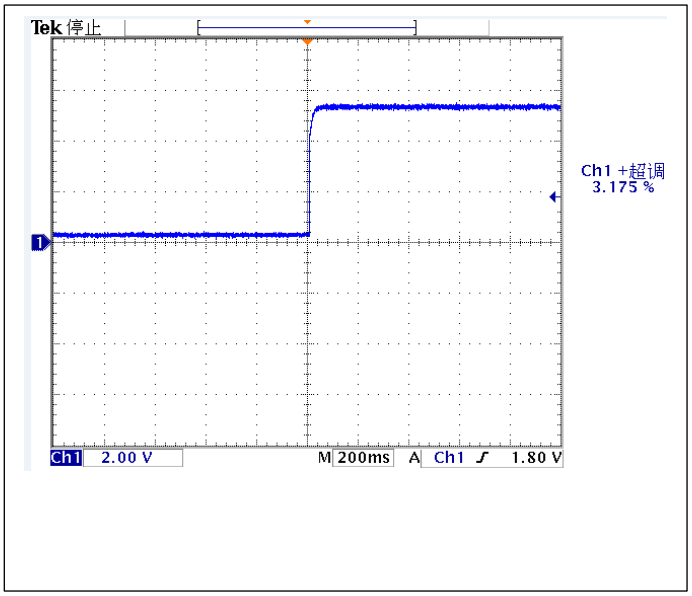


115V;2.381%

115V



230V; 2.381%



264V;3.175%

3.Thermal Test for Critical Component

3-1. TEST CONDITION:

1..AC Input:90V/60Hz 264V/50HZ

2..Output Load:5V3A 9V2A 12V1.5A

3..Ta: 40℃

4..Shell Ta: ℃

5V3A

Item	Output:3000mA	
	Vin=90Vac	Vin=264Vac
	T(℃)	T(℃)
Transformer core(T1)	85.8	85.2
Transformer coil(T1)	81.5	84.2
U4(LP20R100S)	99.5	100
Q1(SVF 7N65CF)	92.8	94.2
SHELL	NA	NA
Ambient Temperatuer	40	40

9V2A

Item	Output:2000mA	
	Vin=90Vac	Vin=264Vac
	T(℃)	T(℃)
Transformer core(T1)	94.5	92.1
Transformer coil(T1)	92.6	90
U4(LP20R100S)	104.6	100.8
Q1(SVF 7N65CF)	104.7	98.5
SHELL	NA	NA
Ambient Temperatuer	40	40

12V1.5A

Item	Output:1500mA	
	Vin=90Vac	Vin=264Vac
	T(℃)	T(℃)
Transformer core(T1)	92.5	94.7
Transformer coil(T1)	91.2	93.4
U4(LP20R100S)	95.8	96.8
Q1(SVF 7N65CF)	103.2	104.4
SHELL	NA	NA
Ambient Temperatuer	40	40

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4.EMI TEST REPORT

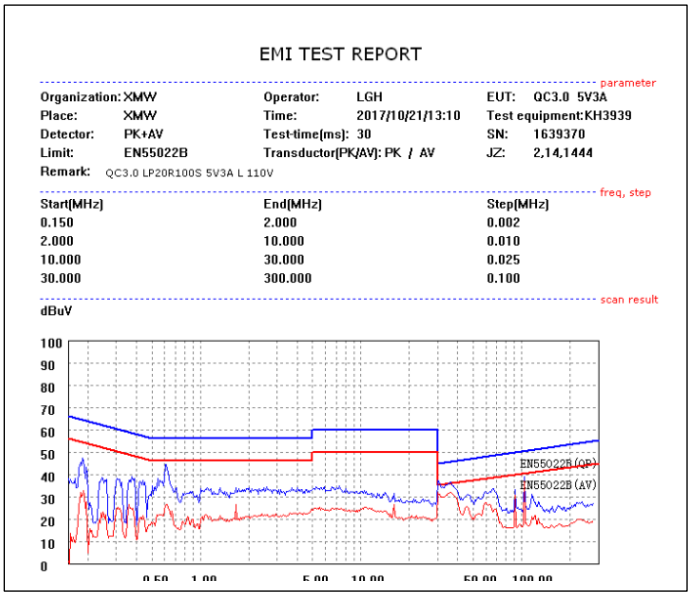
4-1.1 TEST CONDITION:

1..AC Input:110V/60Hz 220V/50HZ

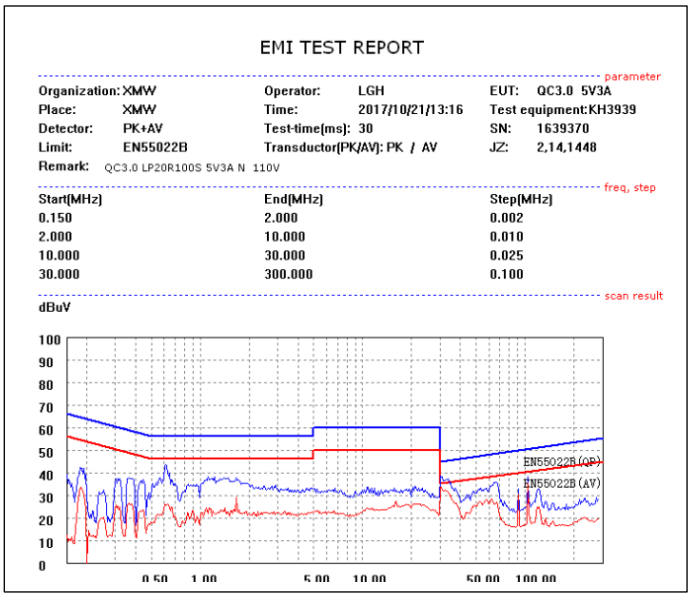
2..Output Load:5V3A　9V2A　12V1.5A

3..Ta: 25℃

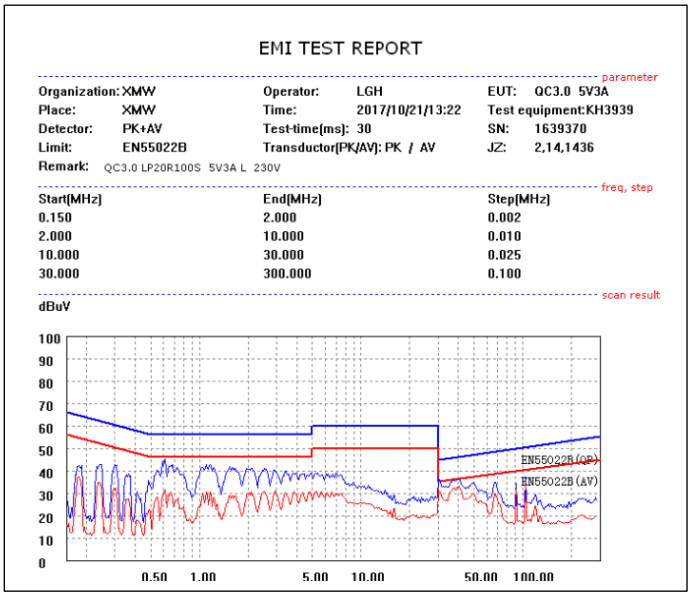
5V3A



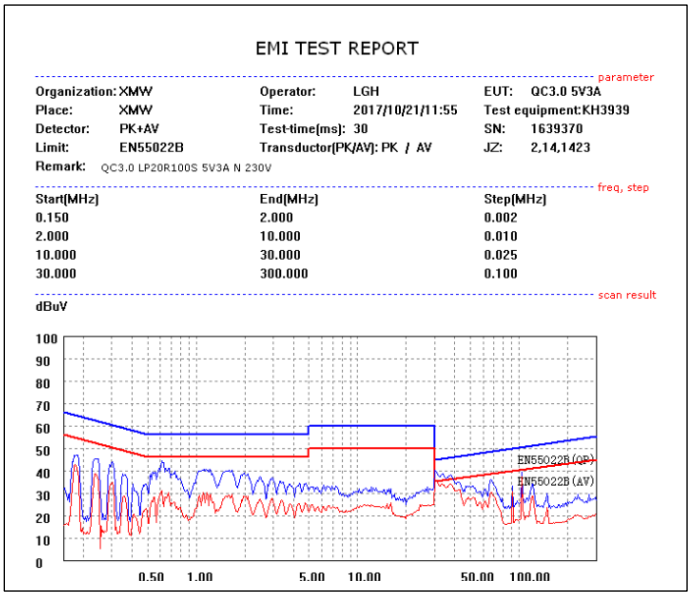
110V　L



110V　N



230V　L



230V　N

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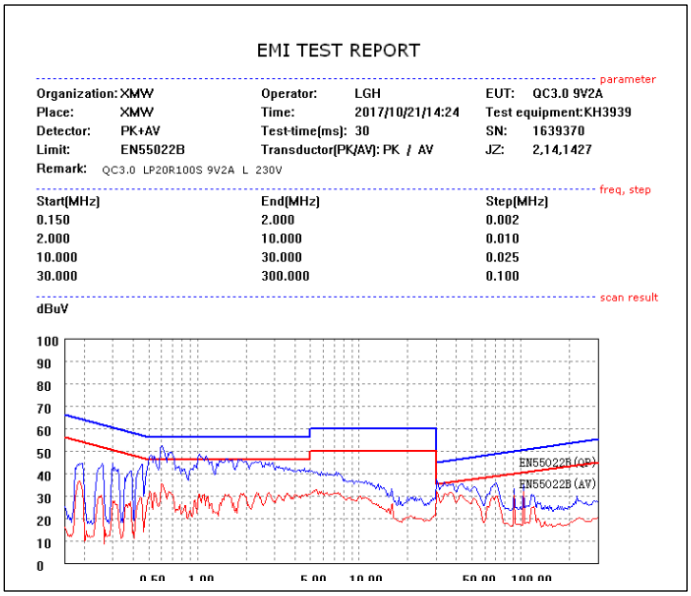
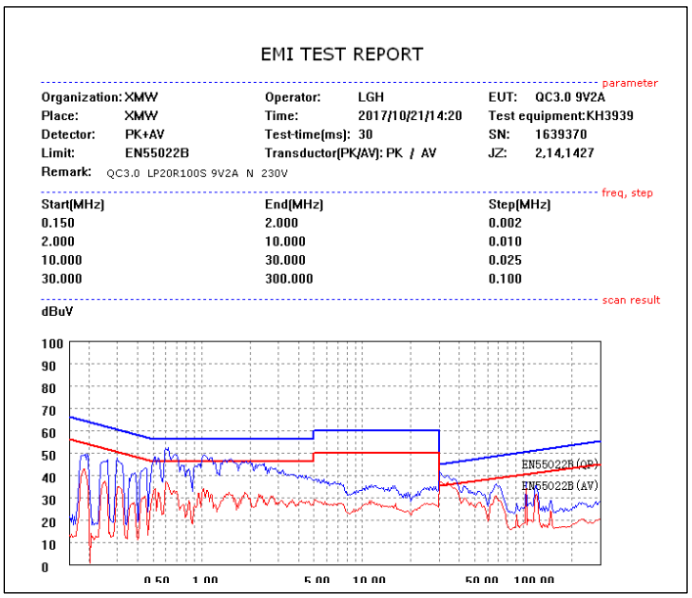
9V2A

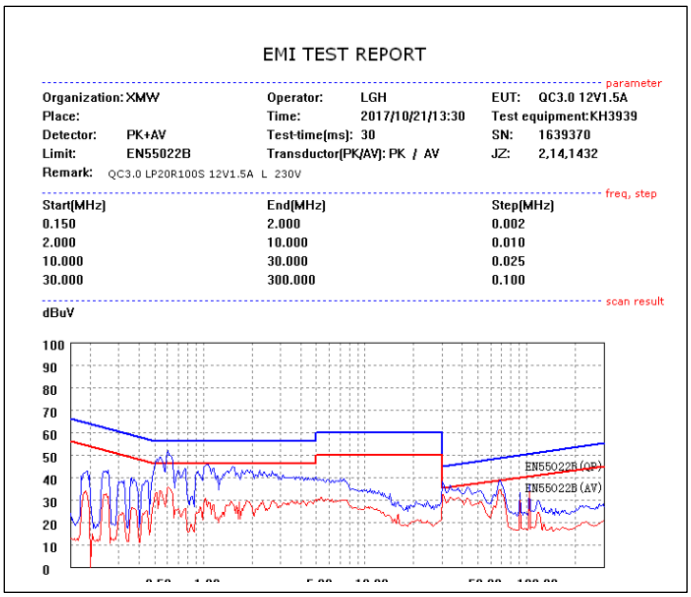


230V L

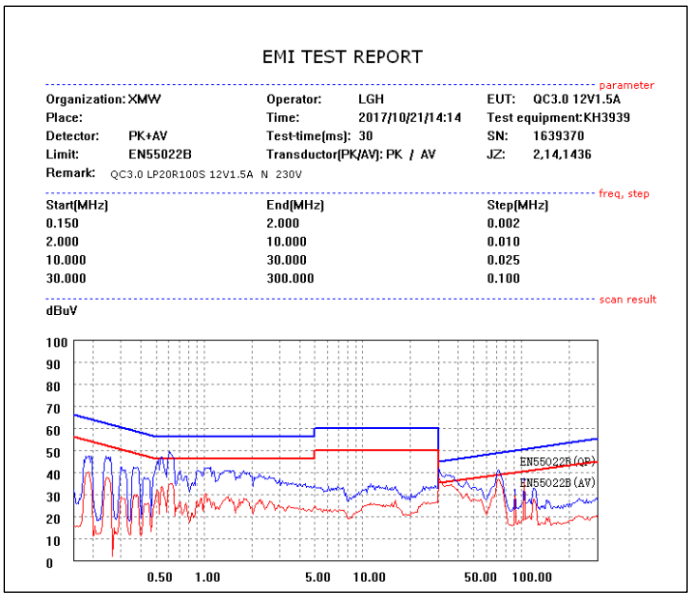


230V N

12V1.5A



230V L



230V N

5. Output Dynamic Response Test

5-TEST CONDITION:

1..AC Input: 220V/50HZ

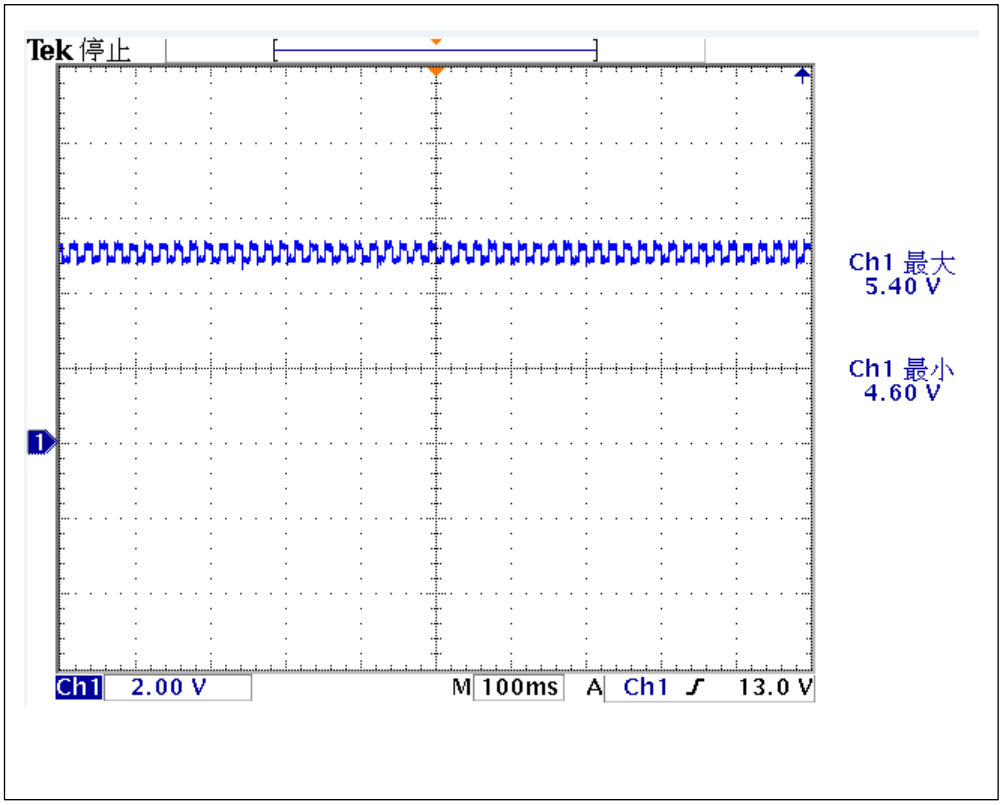
2..Output

Load:5V/0.3~2.7A,10m S

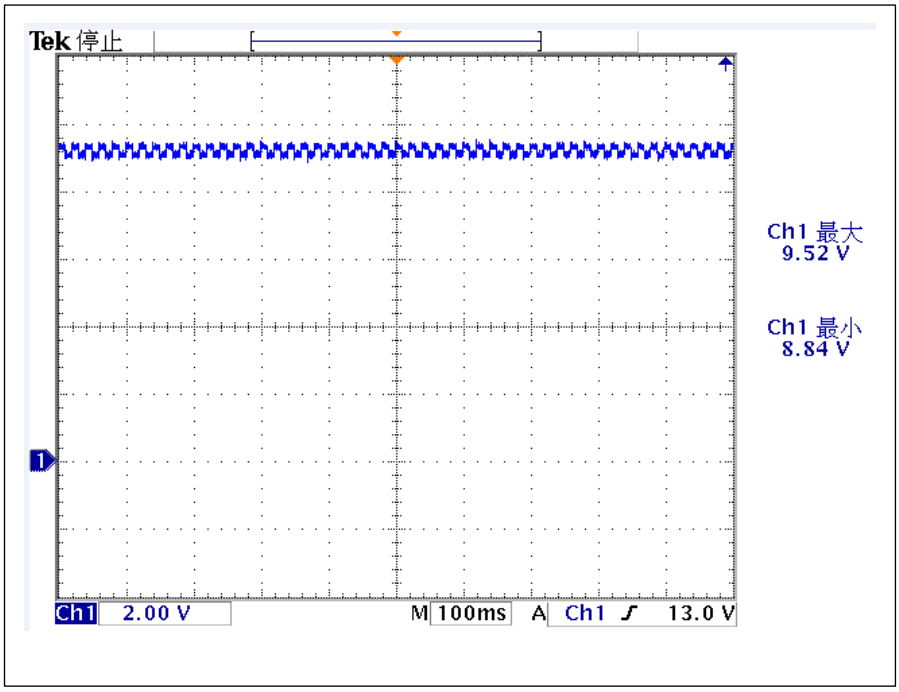
Load:9V/0.2~1.8A,10m S

Load:12V/0.15~1.35A,10m S

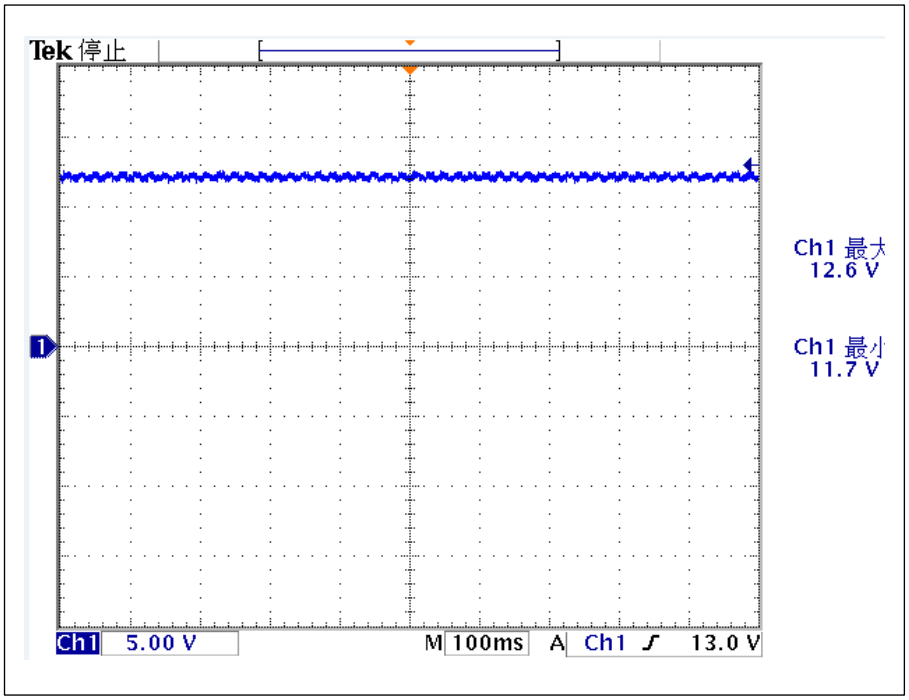
3..Ta: 25℃



5V 0.3~2.7A,10m S

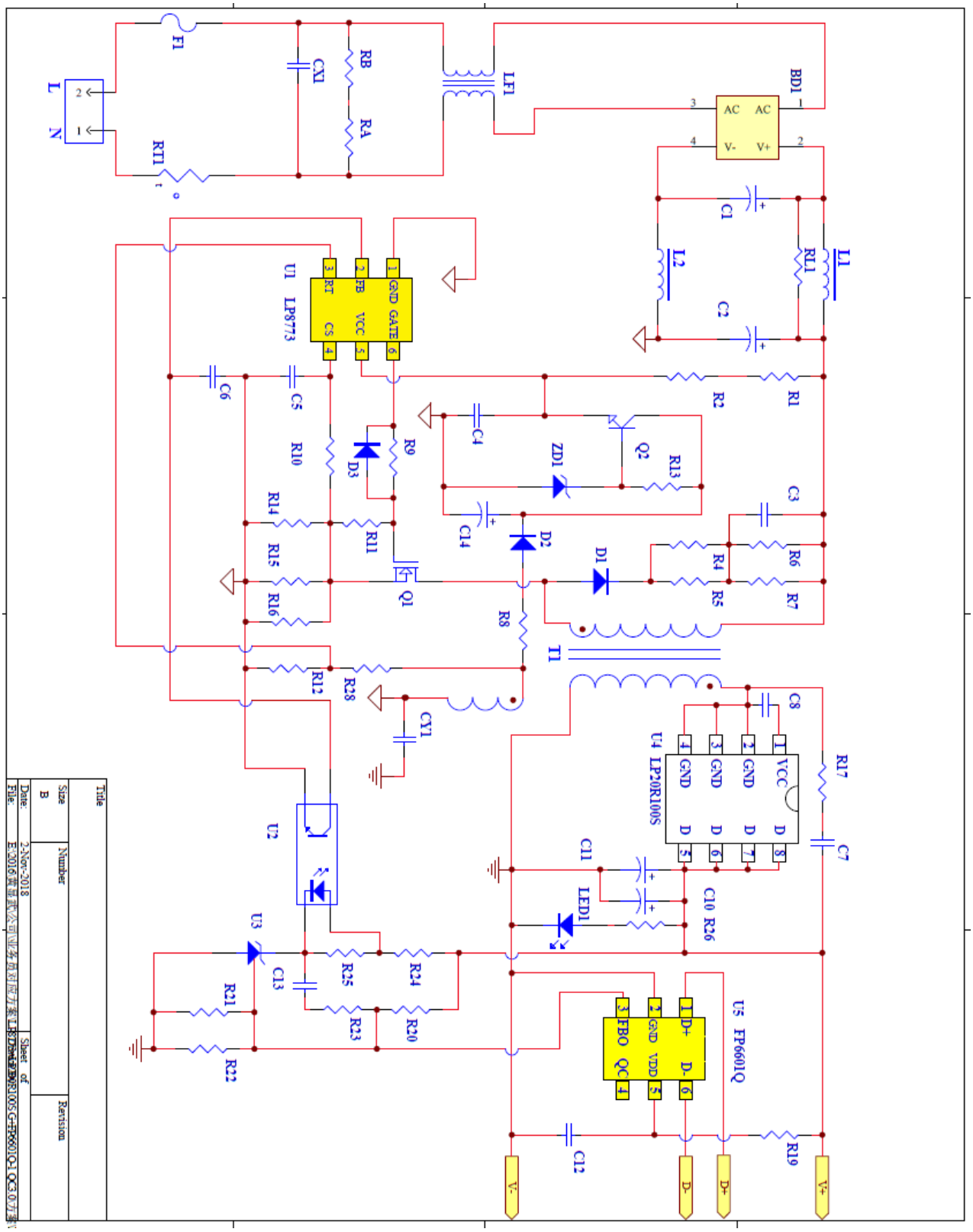


9V 0.2~1.8A,10m S



12V 0.15~1.35A,10m S

6. 原理图


F1
CX1
RB
RA
LF1
BD1
AC
AC
V-
V+
RT1
L
N
C1
L2
RL1
L1
C2
U1
LP8773
RT
FB
VCC
CS
GND
GATE
C6
C5
R10
R9
D3
C4
ZD1
Q2
R13
R2
R1
C3
C14
D2
D1
R14
R15
R16
R11
Q1
R8
R4
R5
R6
R7
T1
R12
R28
CY1
U4
LP20R100S
GND
VCC
D
C8
R17
C7
C11
C10
R26
LED1
U2
U3
R25
R24
C13
R21
R23
R20
R22
U5
FP6601Q
FBO
QC
GND
VDD
D+
D-
C12
R19
V-
D-
D+
V+
Title
Size
B
Number
Revision
Date:
2-Nov-2018
Sheet of
File:

7. PCB BOM

编号	材料名称	型号规格	单位	位置符号	用量
1	贴片电阻	2 M/ 1206-5%	PCS	R1,R2,RA,RB	4
2	贴片电阻	220R/ 1206-5%	PCS	R4,R5,RL1	3
3	贴片电阻	270K/ 1206-5%	PCS	R6,R7	2
4	贴片电阻	4.7R 0805-5%	PCS	R8	1
5	贴片电阻	68R/ 0805-5%	PCS	R9	1
6	贴片电阻	220R/0603-5%	PCS	R10	1
7	贴片电阻	10K/0603-5%	PCS	R11 R13	2
8	贴片电阻	18K 0805-5%	PCS	R12	1
9	贴片电阻	2.2R/ 1206-1%	PCS	R14,R15	2
10	贴片电阻	1.6R/ 1206-1%	PCS	R16	1
11	贴片电阻	10R/ 1206-1%	PCS	R17	1
12	贴片电阻	2.2K/0603-5%	PCS	R19	1
13	贴片电阻	100K/0603-1%	PCS	R20	1
14	贴片电阻	1.8M/0603-1%	PCS	R21	1
15	贴片电阻	100K/0603-1%	PCS	R22	1
16	贴片电阻	1K/0603-5%	PCS	R23	1
17	贴片电阻	220R/ 1206-5%	PCS	RL1	1
18	贴片电阻	1.2K/0603-5%	PCS	R24	1
19	贴片电阻	3.3K/0603-5%	PCS	R25	1
20	贴片电阻	270K 0805-5%	PCS	R28	1
21	贴片电容	2.2nF/1000V-1206	PCS	C3	1
22	贴片电容	4.7UF/25V-0805	PCS	C4,C8	2
23	贴片电容	220PF/50V-0805	PCS	C5	1
24	贴片电容	1nF/50V-0603	PCS	C6	1
25	贴片电容	1nF/250V-0805	PCS	C7	1
26	贴片电容	0.1UF/25V-0805	PCS	C12	1
27	贴片电容	100nF/50V-0603	PCS	C13	1
28	电解电容	15UF/400V-10*12mm	PCS	C1	1
29	电解电容	22UF/400V-10*16mm	PCS	C2	1
30	固态电容	470UF/16V -8.2*11mm	PCS	C10,C11	2
31	电解电容	4.7uF/50V-5*11mm	PCS	C14	1
32	贴片二极管	M7 DO-214	PCS	D1	1
33	贴片二极管	F7(FR107) SOD-123	PCS	D2	1
34	贴片二极管	1N4148 LL-34	PCS	D3	1
35	稳压二极管	24V1W LL-34	PCS	ZD1	1
36	MOS管	7N65 TO-220	PCS	Q1	1
37	贴片三极管	3904 SOT-23	PCS	Q2	1
38	集成贴片IC	LP8773/SOT23-6	PCS	U1	1
39	光耦	B0913 817C	PCS	U2	1
40	贴片稳压IC	431 SOT-23	PCS	U3	1
41	集成贴片IC	LP20R100S/SOP-8	PCS	U4	1
42	贴片IC	FP6601Q	PCS	U5	1
43	贴片整流桥	ABS210	PCS	BD1	1
44	保险丝电阻	T3.15A/250V	PCS	F1	1
45	工字电感	1mH -6*8 0.17*190TS	PCS	L1	1
46	贴片电感	4.7uH 1206	PCS	L2	1
47	共模电感	T9*5*3 0.35*2 14.5TS 1mH	PCS	LF1	1
48	X电容	104K 275V	PCS	CX1	1
49	热敏电阻	5D-9	PCS	F1	1
50	变压器	RM8 6+0 L= 800UH	PCS	T1	1
51	Y电容	102M 400V	PCS	CY1	1
52	PCB板	58.7*34.5	PCS		1
53	AC输入线	红，黑，小短线	PCS	L,N	2
54	USB	USB 侧插	PCS	USB1	1
55	总计				65
QC3.0					