

PS00505-05

SGP400 5.2V/1A

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General Specification

Specification	Min	Max	Units
Input			
Voltage	90	264	Vac
Frequency	47	63	Hz
Output			
Output Voltage 1	3.9	6.5	V
Output Current 1	0	1	A
Total Output Power			
Full-load Output Power	0	5	W
Peak Output Power			W

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Test Model	PS00505-05
Test Date	May.18, 2007
Test Temperature	Ambient
Test Equipment	AC source: 6220 AC POWER SOURCE Electronic load: Chroma 63030 Power meter: WT210 Oscilloscope: LeCroy 424
Test Items	<ol style="list-style-type: none"> 1 Input Current 2 Input wattage at no load condition 3 Turn on time 4 DC output rising time 5 Line & load regulation 6 Efficiency 7 Output ripple & noise 8 Step response 9 Over current protection 10 Hold up time 11 Short circuit protection 12 Brownout test 13 Vdd voltage level 14 Voltage stress on MOSFET & rectifiers 15 CC. CV 16 EMI test 17 Surge Test 18 ESD test

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1 Input current

1.1 Test condition

Measure the AC input current at maximum loading

1.2 Test result

Input Voltage	Input current (A)	Spec.
90V/60Hz	104.5m	
264V/50Hz	55.3m	

2 Input wattage at no-load condition

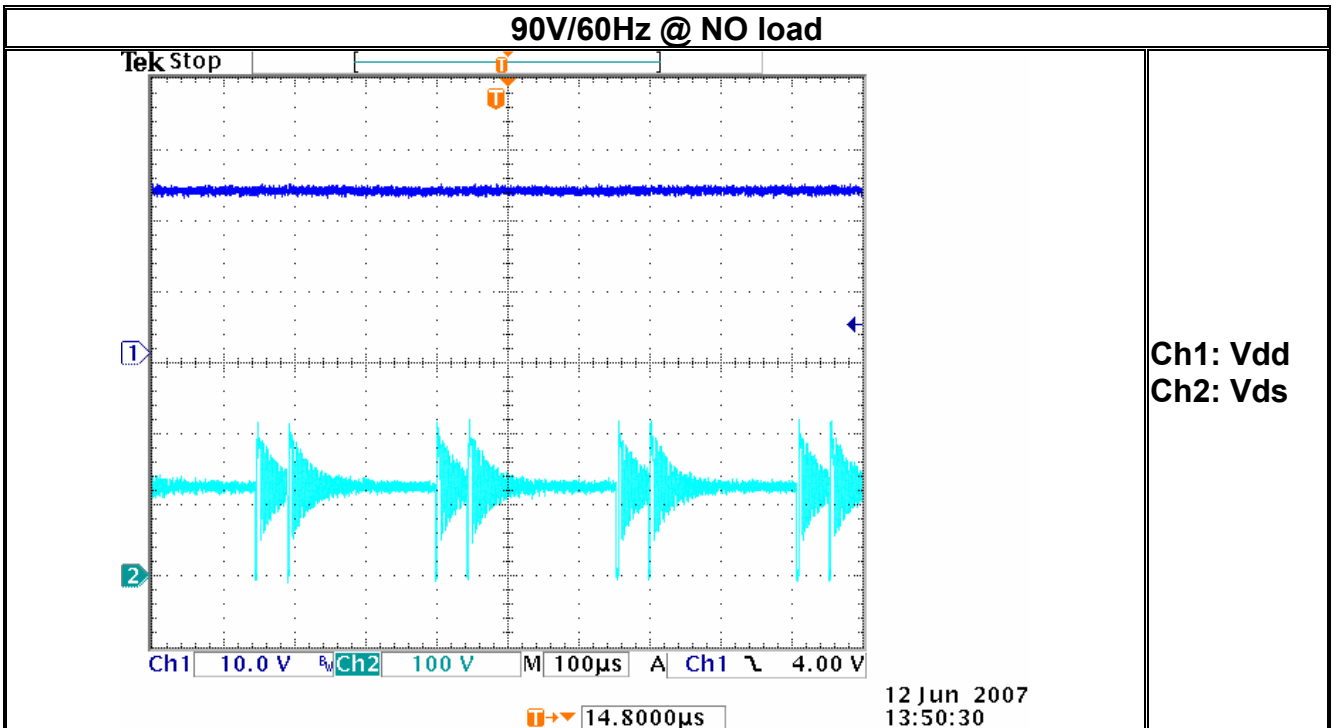
2.1 Test condition

Measure the input wattage and output voltage at no load

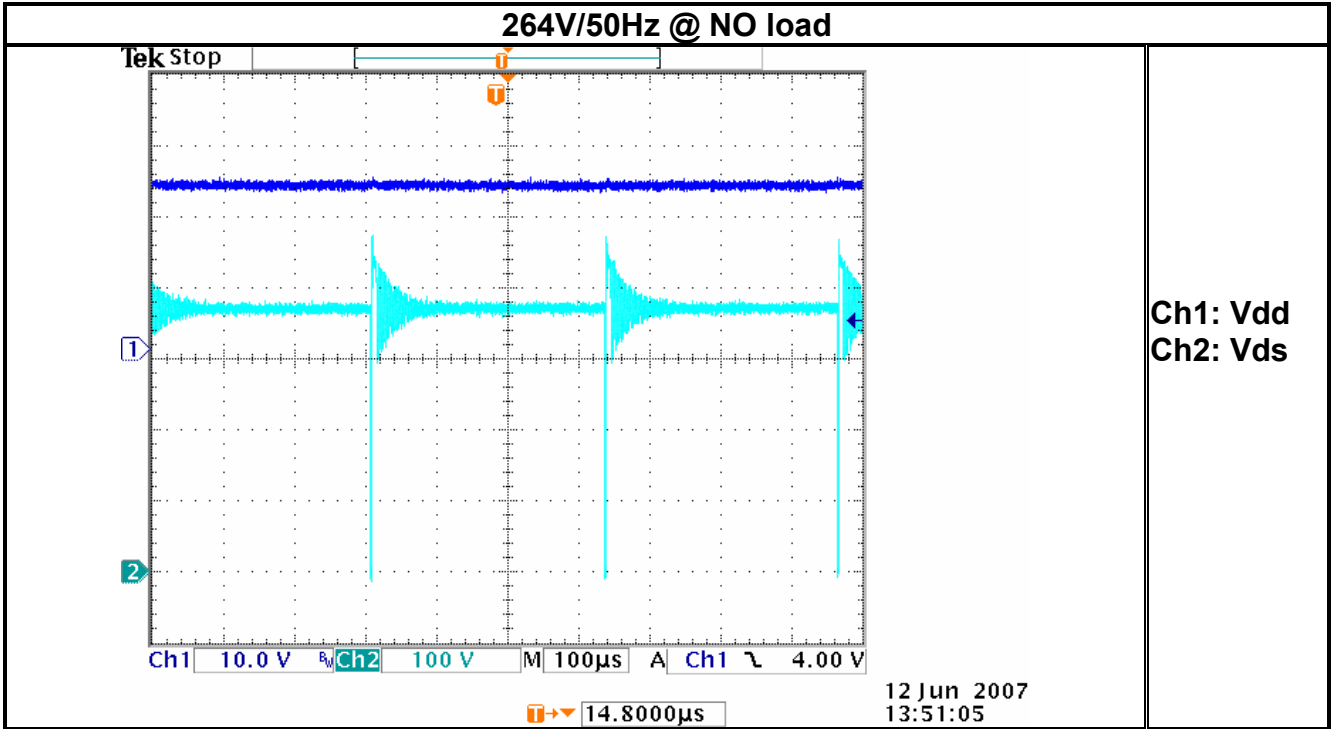
2.2 Test result

Input Voltage	Input wattage(W)	Output voltage(V)	Spec.
90V/60Hz	0.180	6.388	
115V/60Hz	0.185	6.360	
230V/50Hz	0.224	6.286	
264V/50Hz	0.246	6.270	

2.3 Measured waveform



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3 Turn on time

3.1 Test condition

Set output at maximum loading. Measure the interval between AC plug-in and stable output.

3.2 Test result

Input Voltage	Turn on time (Sec)	Spec.
90V/60Hz	2.21	
264V/50Hz	0.73	

4 DC output rising time

4.1 Test condition

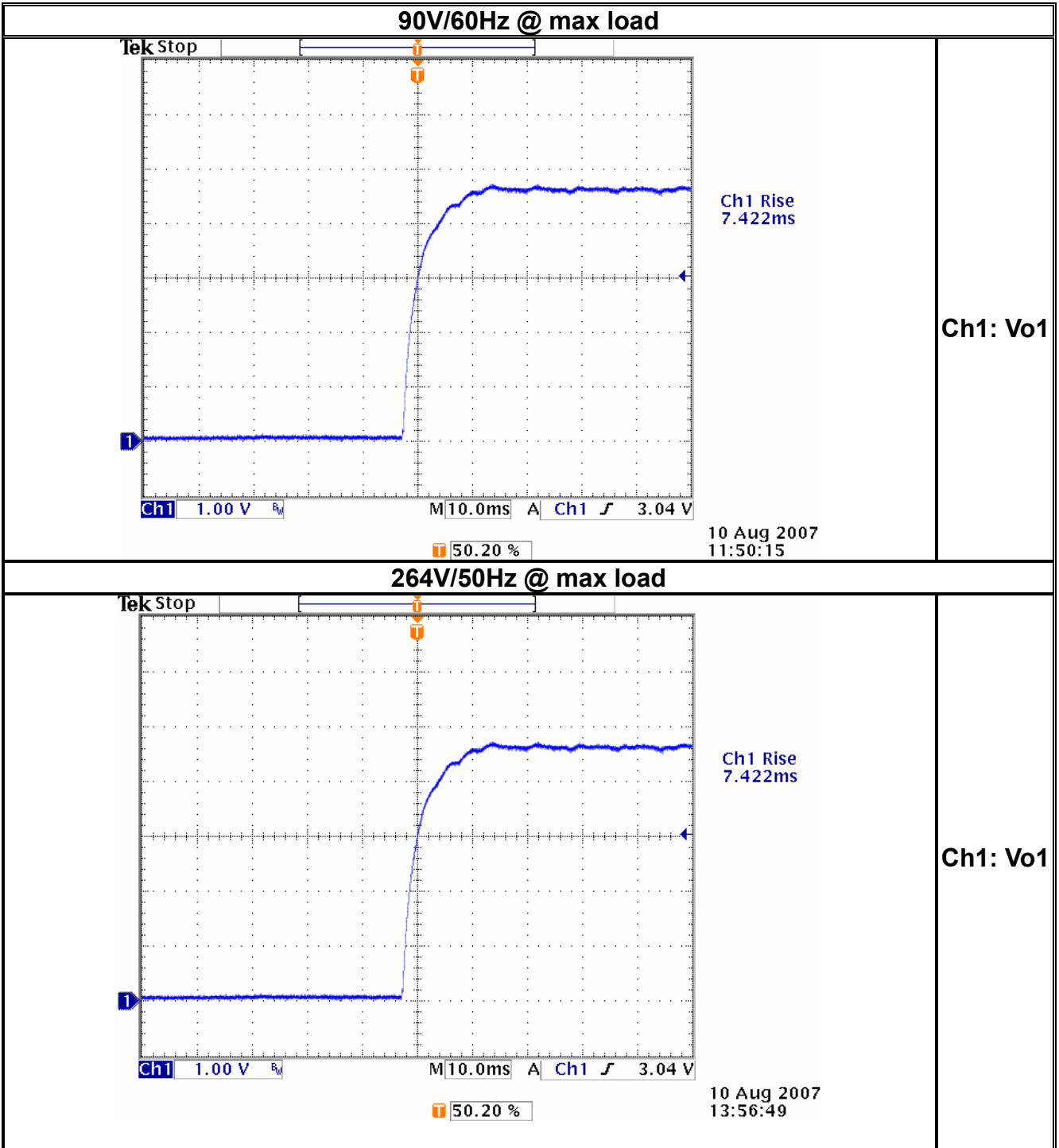
Set output at maximum loading and no loading. Measure the time interval between 10% to 90% output during startup.

4.2 Test result

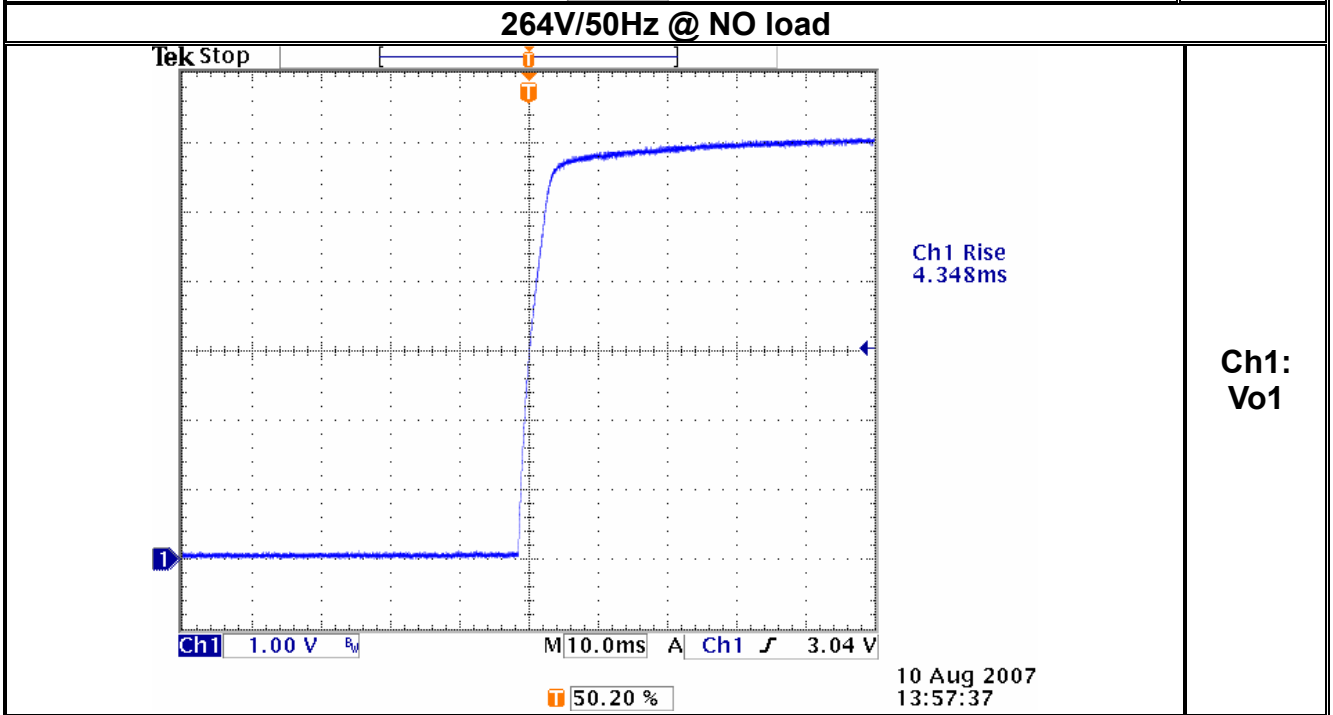
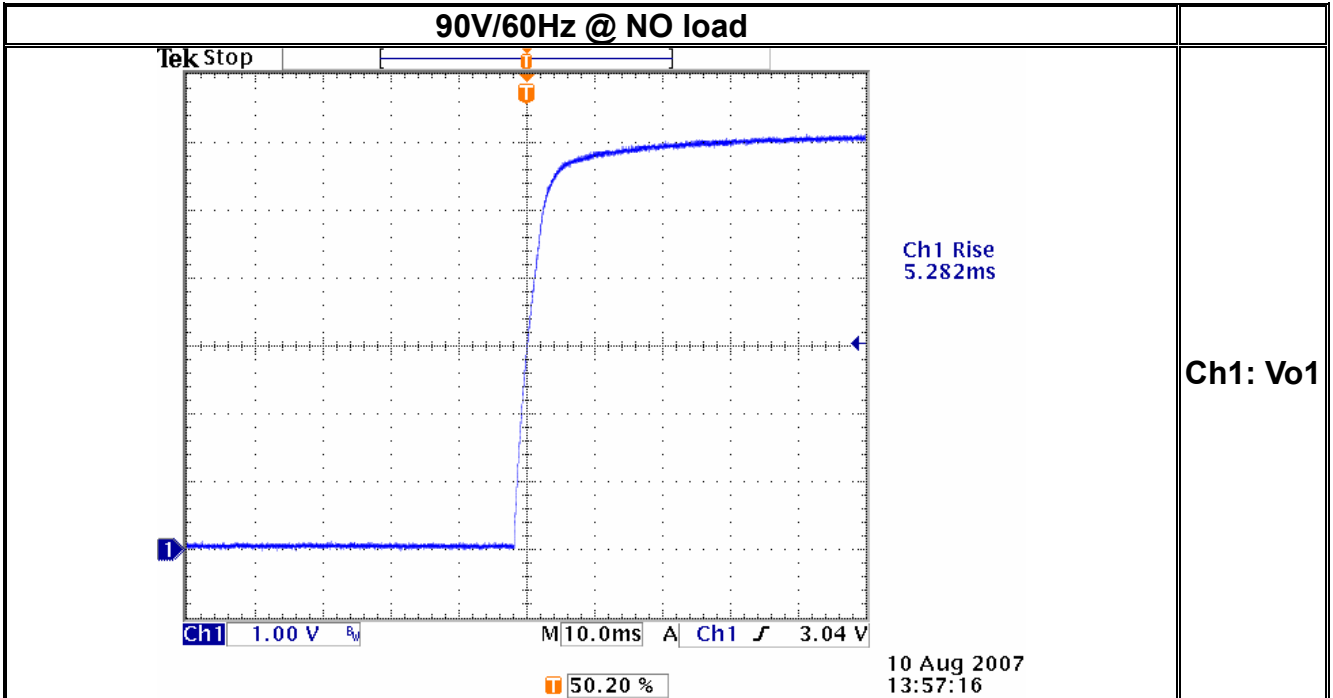
Input Voltage	Max load(mS)	No load(mS)	Spec.
90V/60Hz	7.422	5.282	
264V/50Hz	7.581	4.348	

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4.3 Measured waveform



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5 Line & load regulation

5.1 Test condition

Measure line & load regulation according to below table

5.2 Test result

Input Voltage	Output V at Max. load(V)	Output V at Min. load(V)	Load regulation(%)	Spec.
90V/60Hz	4.400	6.352	37.53	VO
115V/60Hz	4.574	6.340	33.96	
132V/60Hz	4.602	6.331	33.25	
180V/50Hz	4.642	6.300	31.88	
230V/50Hz	4.664	6.288	31.23	
264V/50Hz	4.668	6.282	31.04	
Line regulation	5.15	1.35		

6 Efficiency

6.1 Test condition

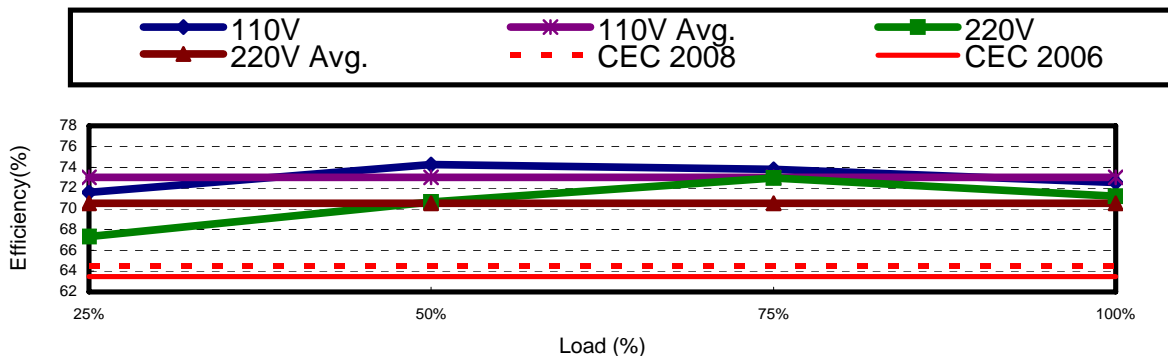
Output at max. load

6.2 Test result

Input Voltage	Input Wattage(W)	Output Wattage(W)	Efficiency (%)	Spec.
90V/60Hz	5.90	4.18	70.84	
115V/60Hz	5.67	4.12	72.66	
132V/60Hz	5.59	4.07	72.92	
180V/50Hz	5.66	4.15	73.32	
230V/50Hz	6.08	4.42	72.69	
264V/50Hz	6.43	4.61	71.69	

6.3 Test result

Input Voltage	Efficiency(%)					Spec.90
	25% Load	50% Load	75% Load	100% Load	Avg	
110V/60Hz	71.58	74.26	73.80	72.55	73.05	Avg> 64.48% (2008)
220V/50Hz	67.32	70.65	72.96	71.22	70.54	



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7 Output ripple & noise

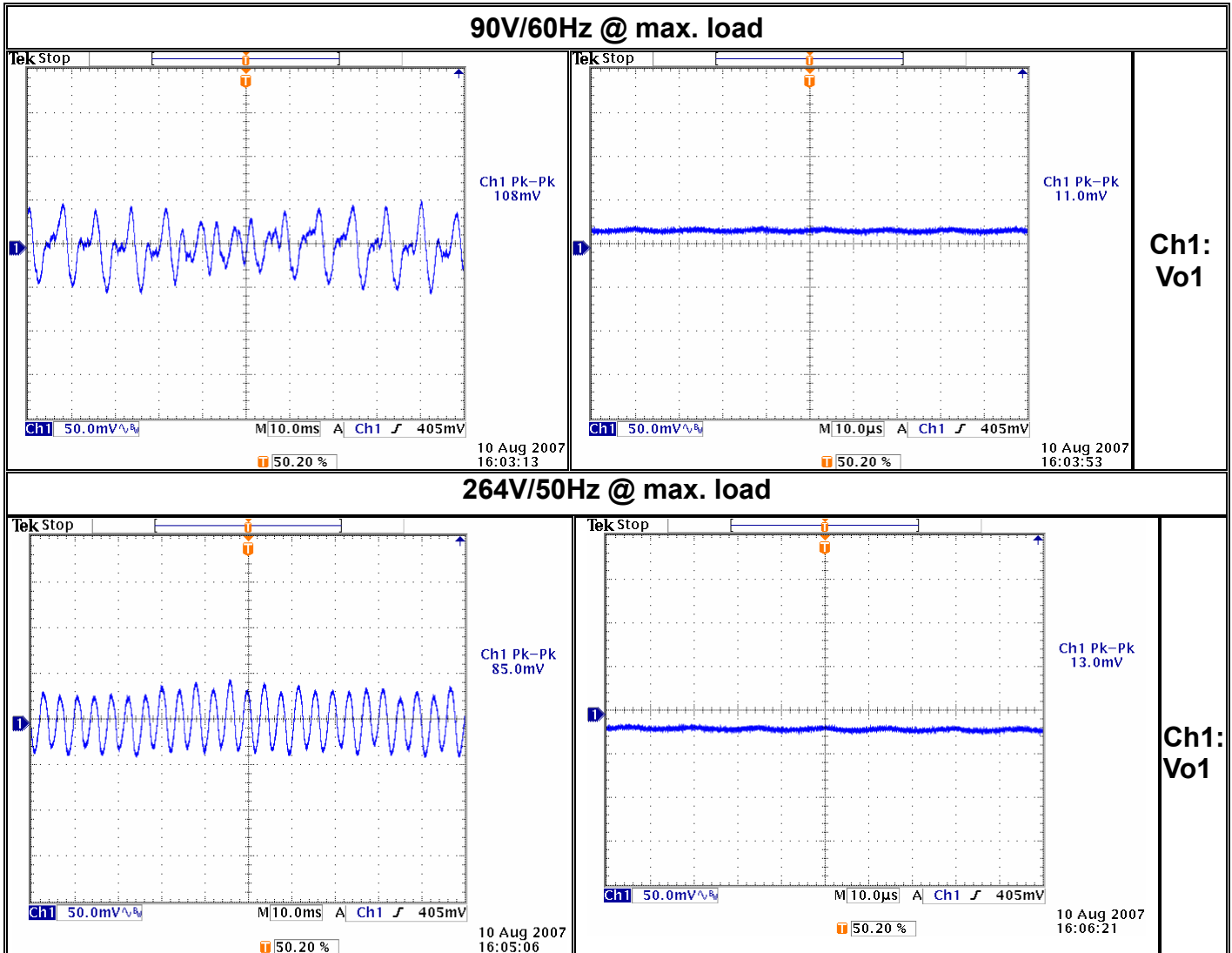
7.1 Test condition

Ripple & noise are measured by using 20MHz bandwidth limited oscilloscope with a 10uF capacitor paralleled with a high-frequency 0.1uF capacitor across each output.

7.2 Test result

Input Voltage	Max. load(mV)	Min. load(mV)	Spec.
90V/60Hz	108	14	
115V/60Hz	107	11	
230V/50Hz	74	11	
264V/50Hz	85	8	

7.3 Measured waveform



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8 Step response

8.1 Test condition

Dynamic loading (20%~80% of the full load, 5msec duty cycle, 2.5 A/usec rise/fall time)

8.2 Test result

Input Voltage	Over shoot (mV)	Under shoot (mV)	Spec.
115V/60Hz	208	240	
230V/50Hz	180	272	

8.3 Measured waveform



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9 Over Power Protection

9.1 Test condition

Increase output loading gradually.

9.2 Test result

Input Voltage	Output Power(W)	Spec
90V/60Hz	4.18	
115V/60Hz	4.13	
230V/50Hz	4.40	
264V/50Hz	4.60	

10 Hold-up time

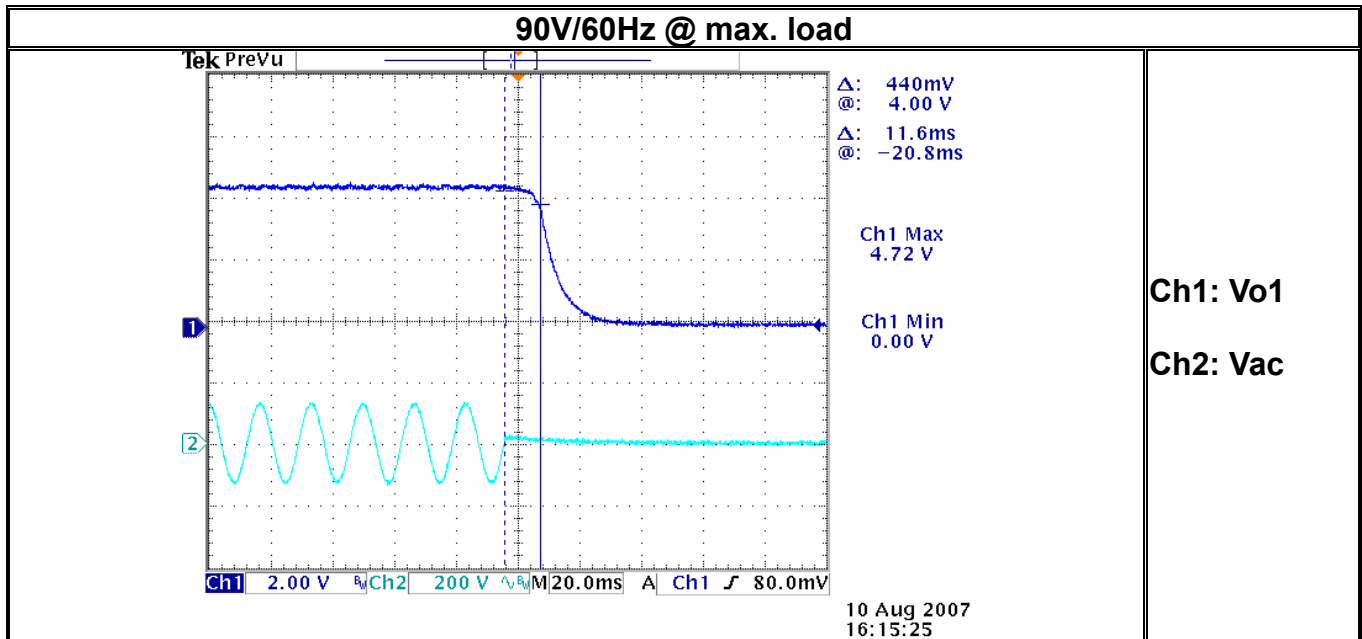
10.1 Test condition

Set output at maximum load. Measure the time interval between AC off and output voltage falling to lower limit of rated value. The AC waveform should be off at zero degree.

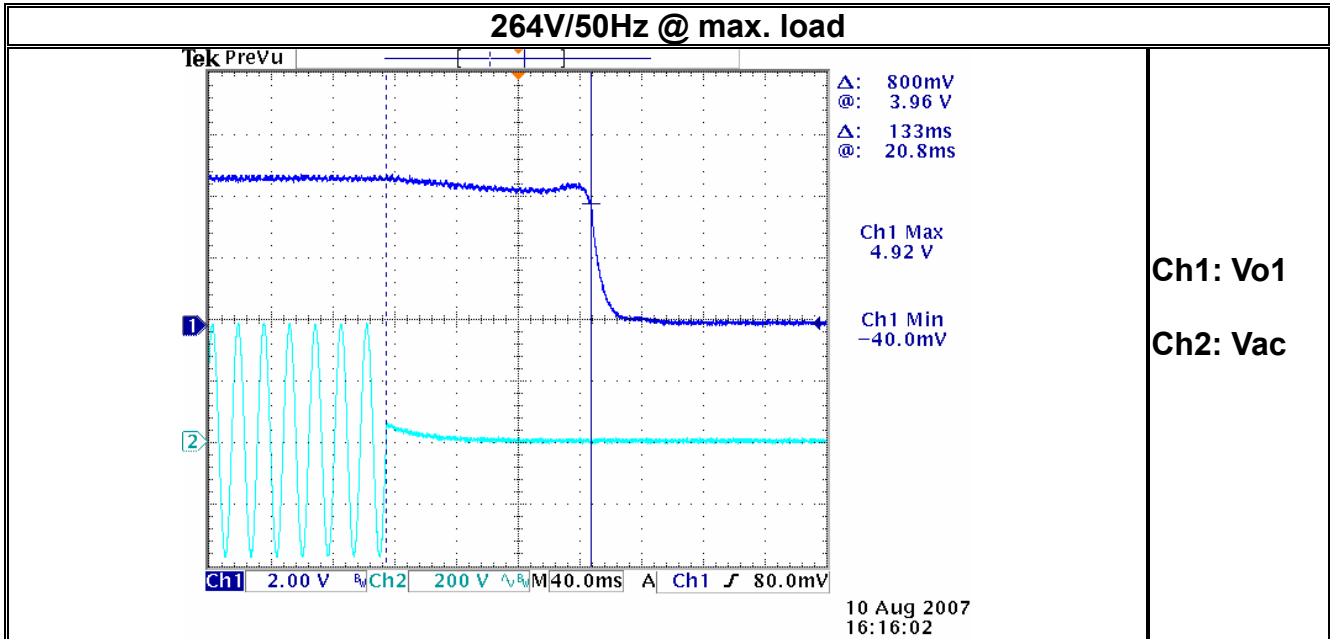
10.2 Test result

Input Voltage	Hold-up time (mSec)	Spec.
90V/60Hz	11.4	
115V/60Hz	21.2	
230V/50Hz	96.3	
264V/50Hz	133	

10.3 Measured waveform



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11 Short circuit protection

11.1 Test condition

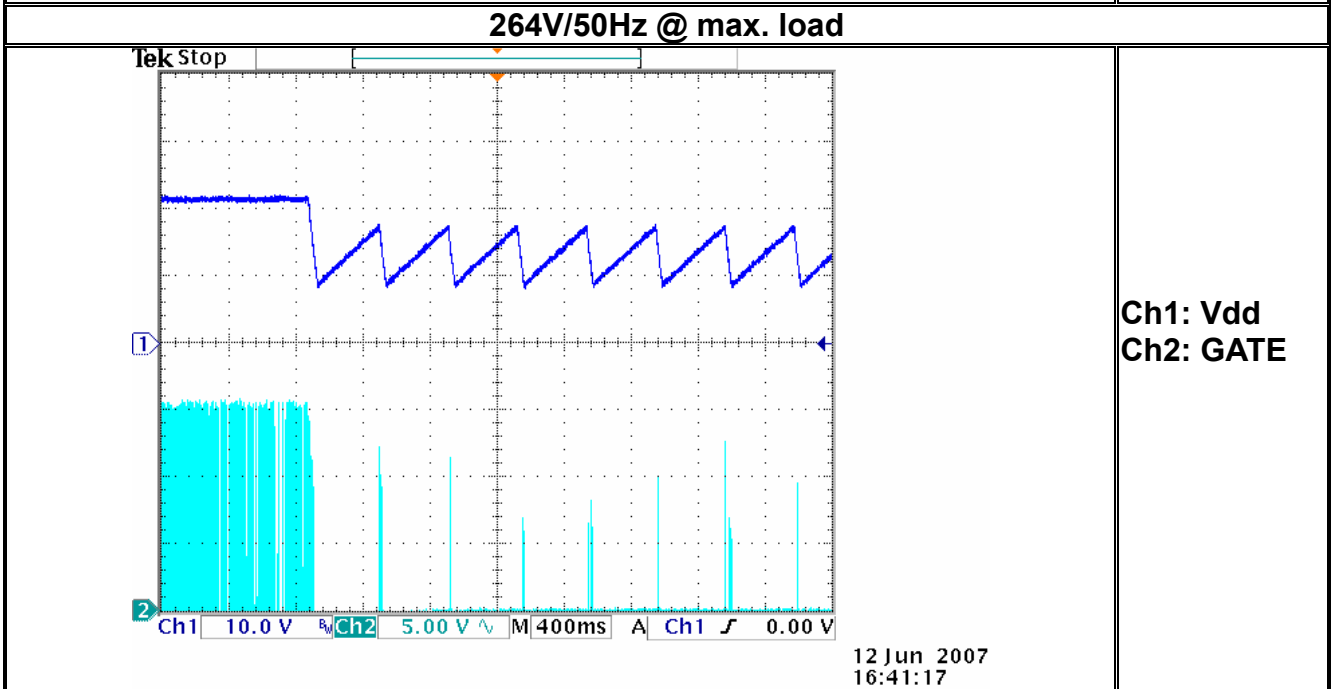
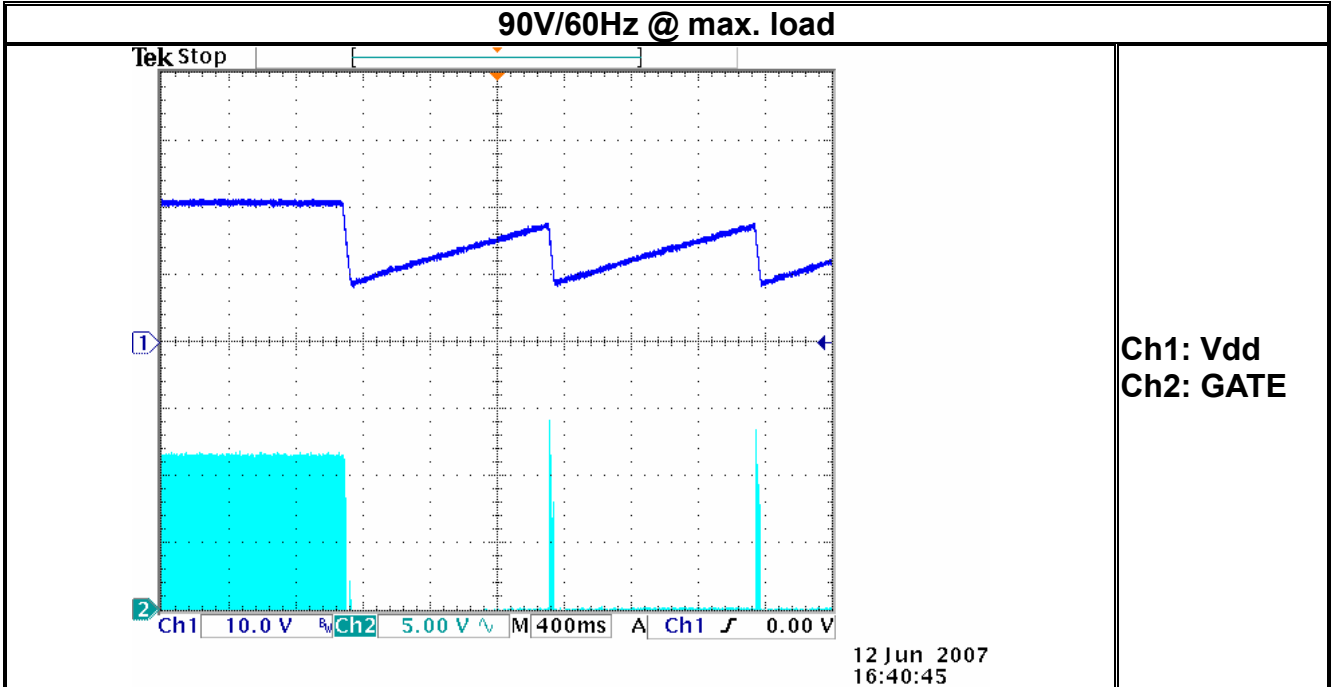
Short the output of the power supply. The power supply should enter hiccup mode protection with less than 2W input voltage.

11.2 Test result

Input Voltage	Input wattage at maximum loading(W)	Input wattage at minimum loading(W)	Spec.
90V/60Hz	0.088	0.089	
264V/50Hz	0.464	0.469	

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11.3 Measured waveform



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12 Brown out test

12.1 Test condition

Set output at maximum loading. Decrease input voltage with 5VAC step. Record input wattage and output voltage. After the output is off, increase the AC voltage gradually and record the recovery voltage.

12.2 Test result

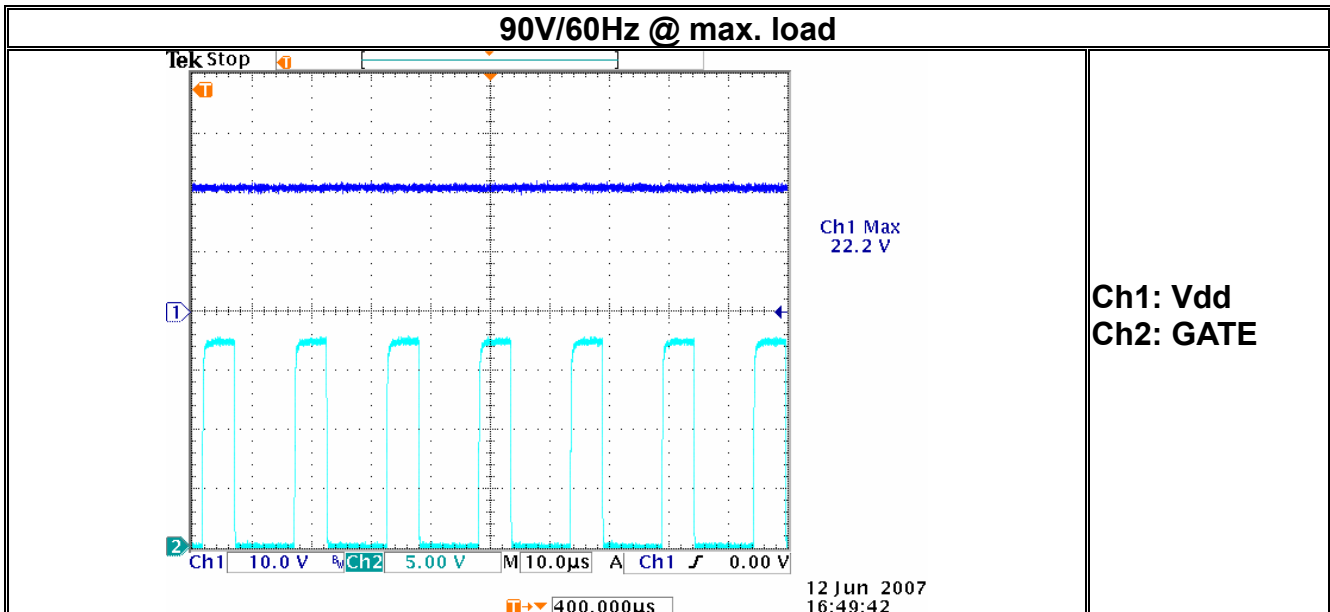
Input voltage	Input Wattage (W)	Output voltage(V)
90V/60Hz	5.86	4.15
85V/60Hz	5.86	4.13
80V/60Hz	5.83	4.03
75V/60Hz	5.72	3.94
70V/60Hz	5.59	3.80
65V/60Hz	5.41	3.62
60V/60Hz	5.15	3.37
55V/60Hz	4.91	3.13
50V/60Hz	4.65	2.85
45V/60Hz	4.22	2.48
40V/60Hz	3.62	2.06
35V/60Hz	3.04	1.66
30V/60Hz	2.46	1.27
25V/60Hz	2.01	0.97
20V/60Hz	1.60	0.70
15V/60Hz	0	0

13 Vdd voltage level

13.1 Test result

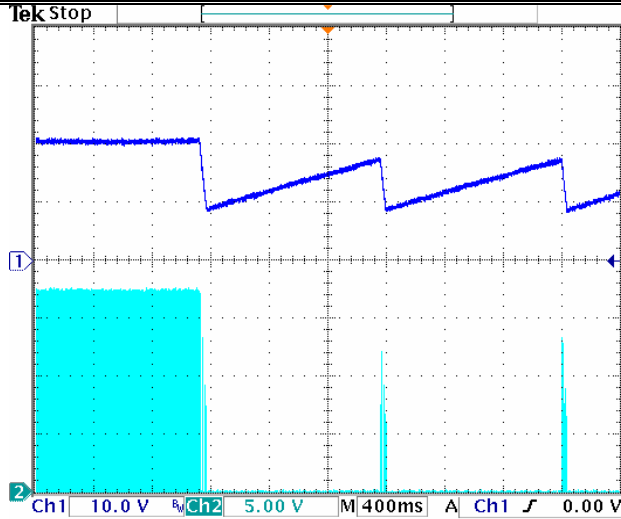
	Min. load(V)	Max. load(V)	Near OPP(V)	Output S.C. (max value) (V)	Spec
90V/60Hz	23.8	22.2	21.8	21.2	
264V/50Hz	23.8	23.0	22.8	22.4	

13.2 Measured waveform



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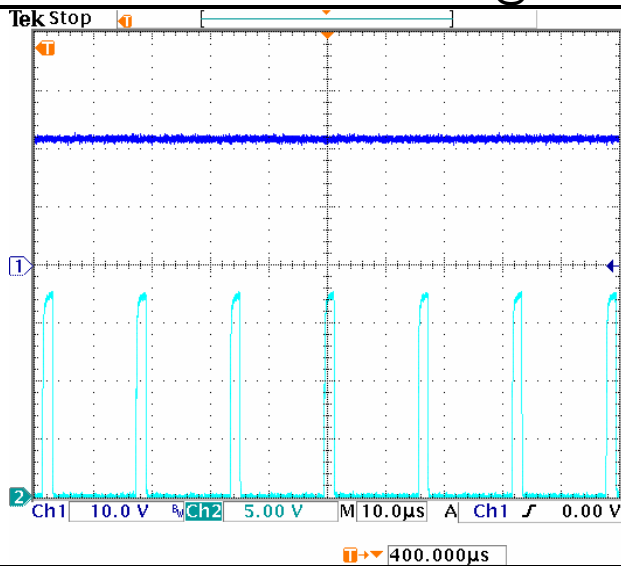
90V/60Hz @ output short-circuited



12 Jun 2007
16:50:40

Ch1: Vdd
Ch2: Sense

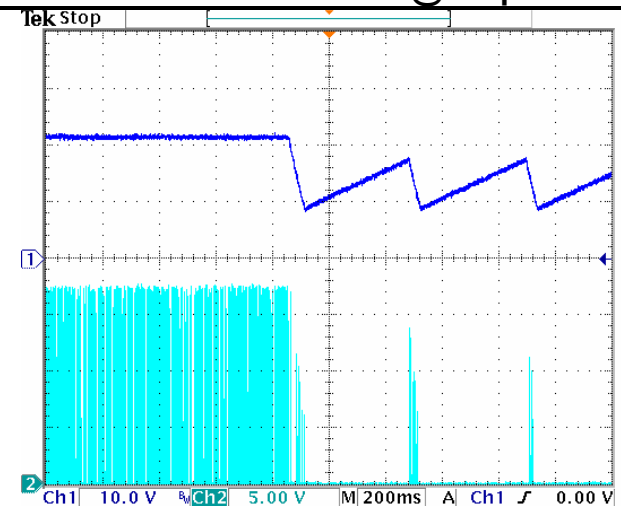
264V/50Hz @ max. load



12 Jun 2007
16:51:24

Ch1: Vdd
Ch2: GATE

264V/50Hz @ output short-circuited



12 Jun 2007
16:52:17

Ch1: Vdd
Ch2: Sense

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14 Voltage stress on MOSFET & rectifiers

14.1 Test condition

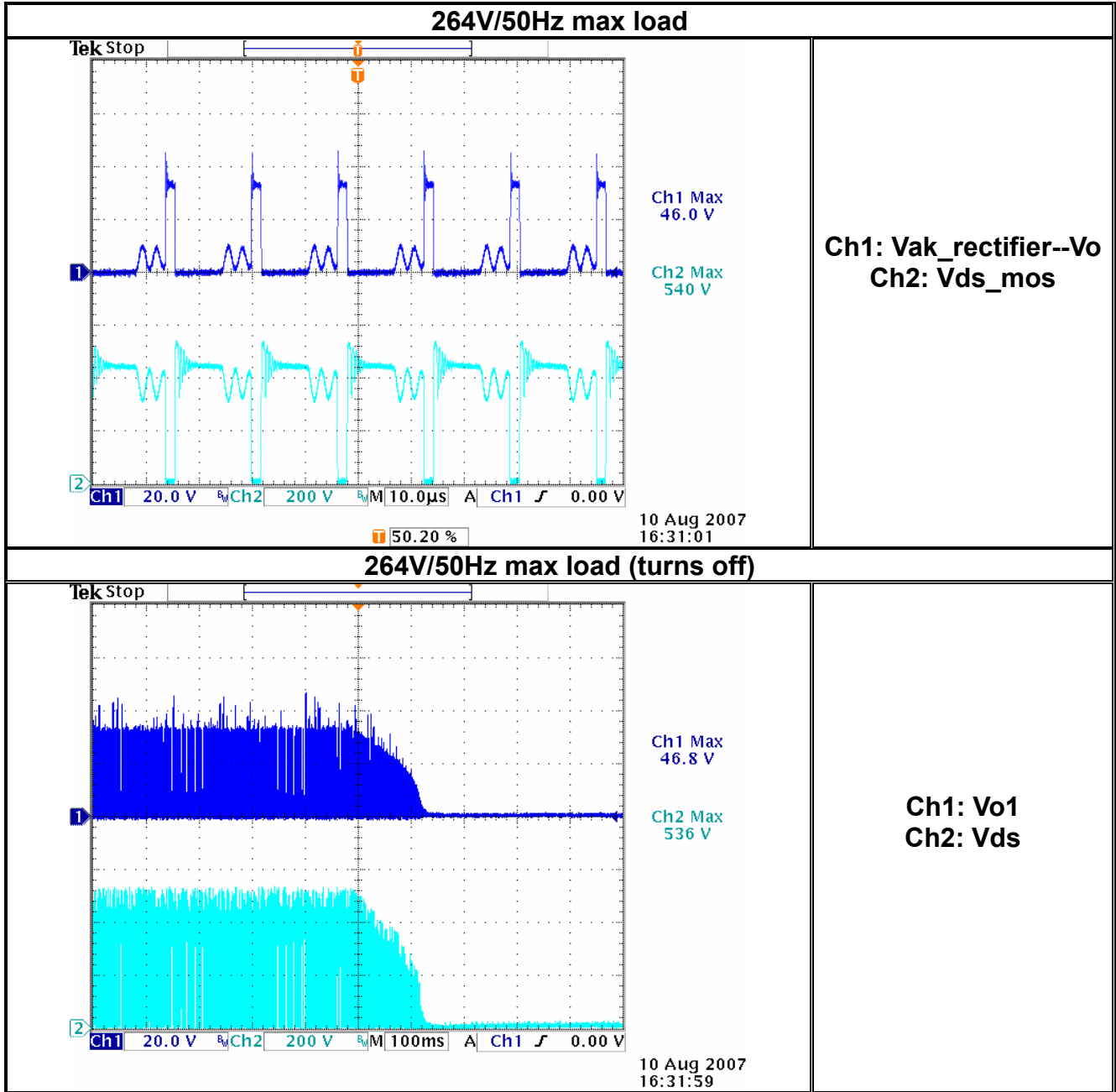
Measure the voltage stress on MOSFET and secondary rectifiers under below specified condition

14.2 Test result

	Stress on MOSFET	Rating	Stress on output rectifier	Rating
90V/60Hz, max. load	280	600V	21.2	60V
90V/60Hz, max. load, startup	276		21.2	
90V/60Hz, max. load, output short	280		20.0	
264V/50Hz, max. load	540		46.0	
264V/50Hz, max. load, startup	532		46.0	
264V/50Hz, max. load, output short	536		46.0	
264V/50Hz, max. load turns off	536		46.8	

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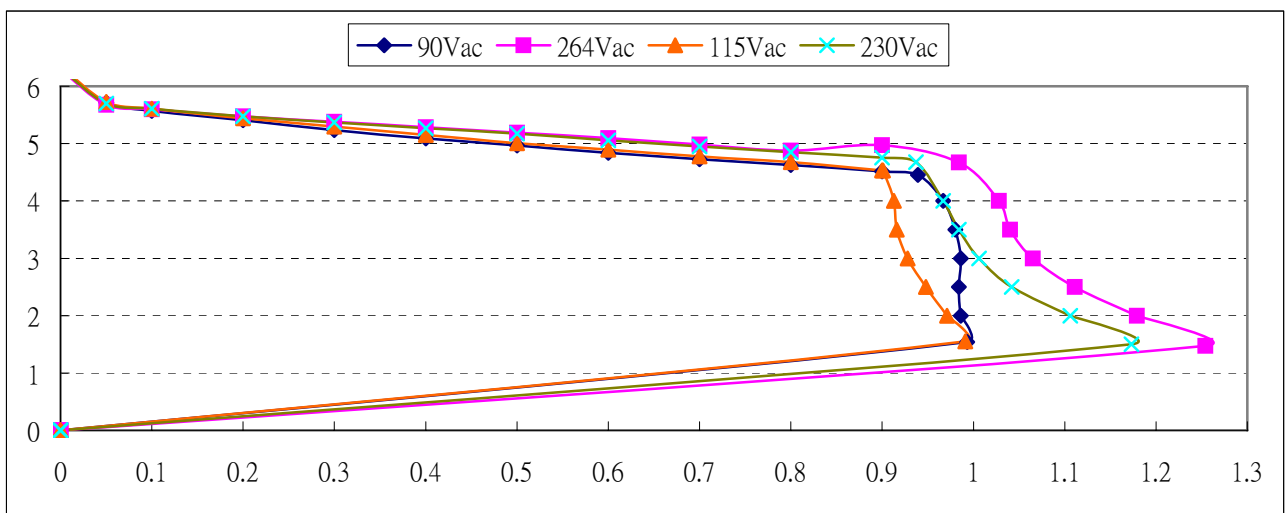
14.3 Measured waveform



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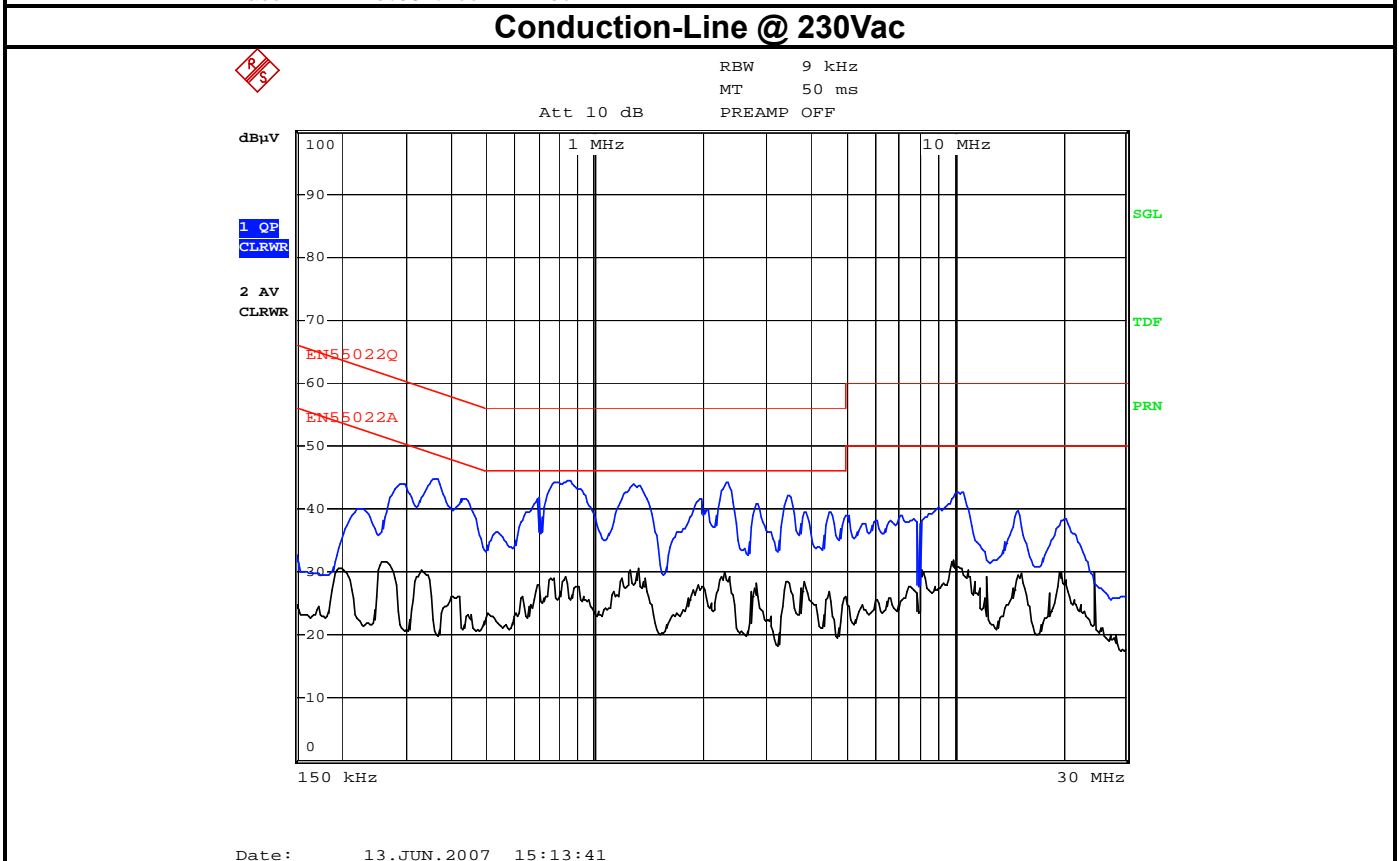
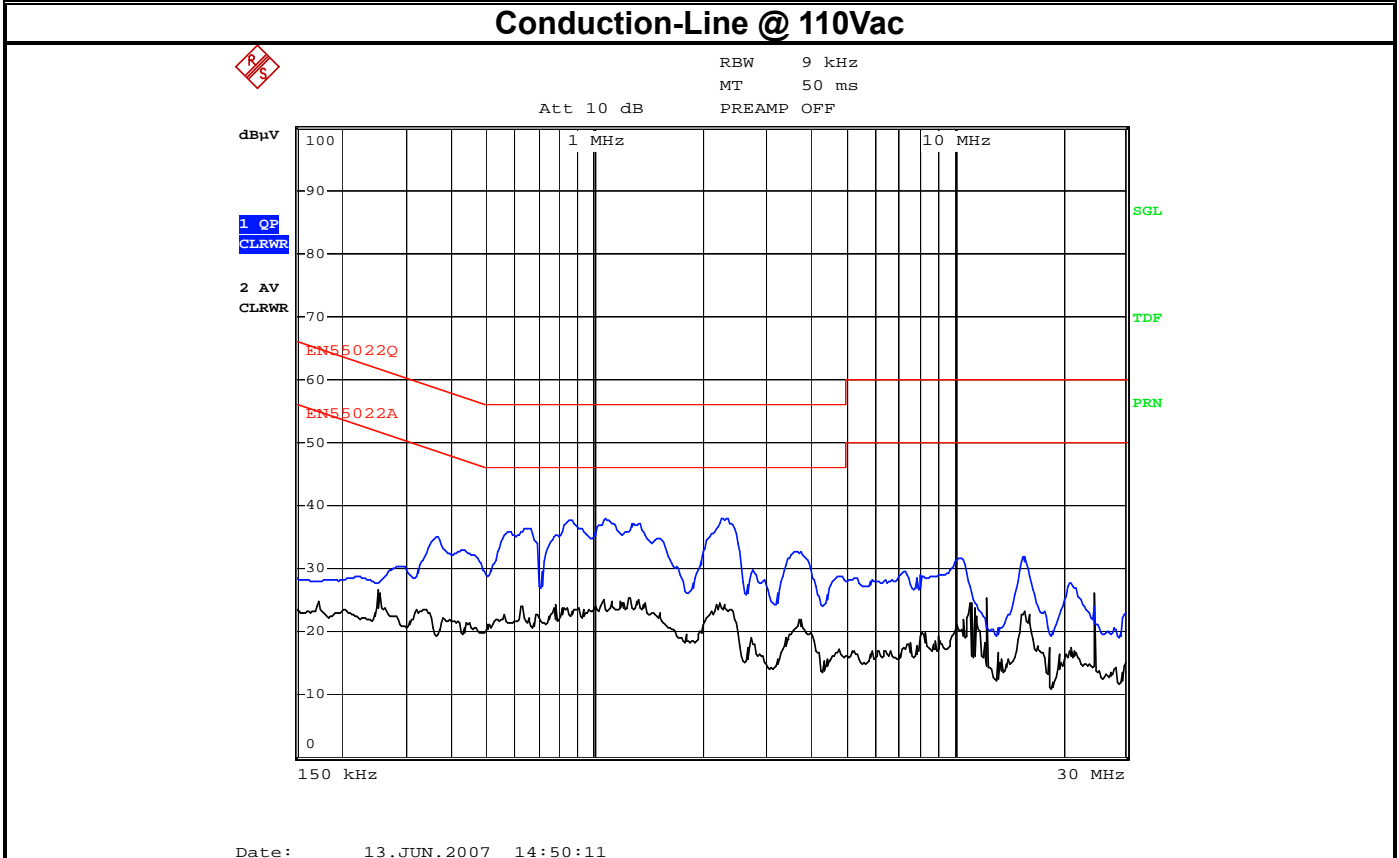
15 CC CV

Vin=90V		Vin=115		Vin=230		Vin=264	
I _o	V _o	I _o	V _o	I _o	V _o	I _o	V _o
0	6.298	0	6.350	0	6.306	0	6.286
0.05	5.714	0.05	5.728	0.05	5.700	0.05	5.676
0.1	5.568	0.1	5.608	0.1	5.612	0.1	5.600
0.2	5.406	0.2	5.442	0.2	5.478	0.2	5.478
0.3	5.234	0.3	5.298	0.3	5.370	0.3	5.378
0.4	5.088	0.4	5.150	0.4	5.270	0.4	5.286
0.5	4.968	0.5	5.008	0.5	5.172	0.5	5.190
0.6	4.840	0.6	4.894	0.6	5.054	0.6	5.094
0.7	4.730	0.7	4.780	0.7	4.948	0.7	4.984
0.8	4.628	0.8	4.676	0.8	4.848	0.8	4.880
0.9	4.516	0.9	4.530	0.9	4.754	0.9	4.972
0.939	4.454	0.901	4.534	0.937	4.678	0.984	4.674
0.967	4	0.913	4	0.967	4	1.028	4
0.980	3.5	0.916	3.5	0.984	3.5	1.040	3.5
0.986	3	0.928	3	1.006	3	1.065	3
0.984	2.5	0.948	2.5	1.042	2.5	1.111	2.5
0.986	2	0.971	2	1.106	2	1.179	2
0.993	1.542	0.991	1.550	1.173	1.500	1.254	1.476
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0



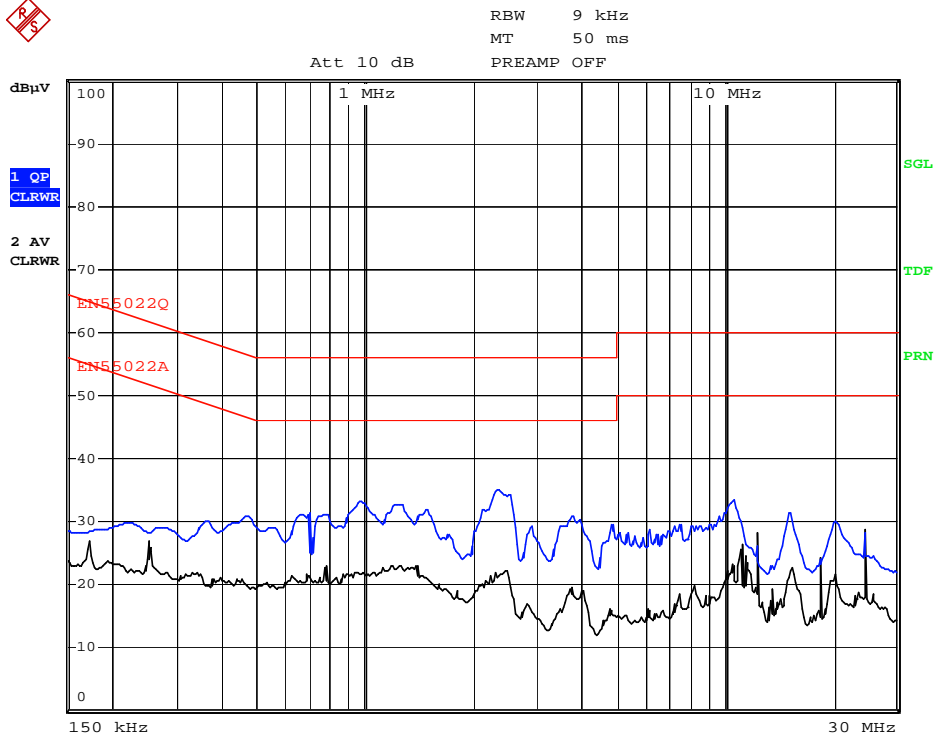
Doc.Title	PS00505-05 Functional Check Report	Instituted by	Wemin
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16 EMI test(output with 1.8M cable wire)



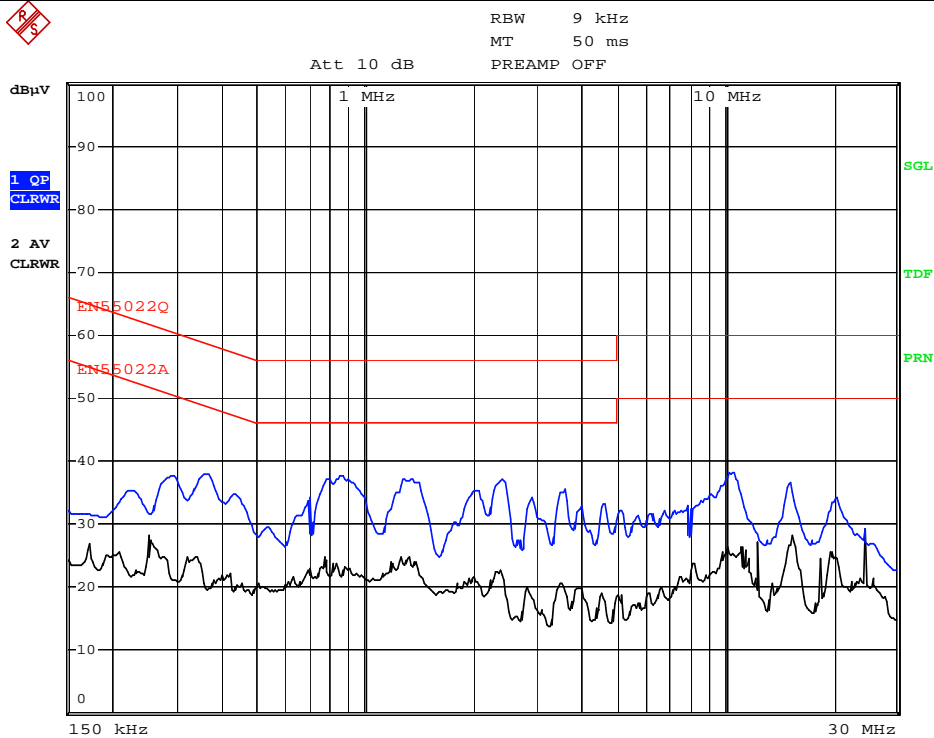
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Conduction-Neutral @ 110Vac



Date: 13.JUN.2007 14:58:24

Conduction-Neutral @ 230Vac



Date: 13.JUN.2007 15:05:54

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17 Surge test

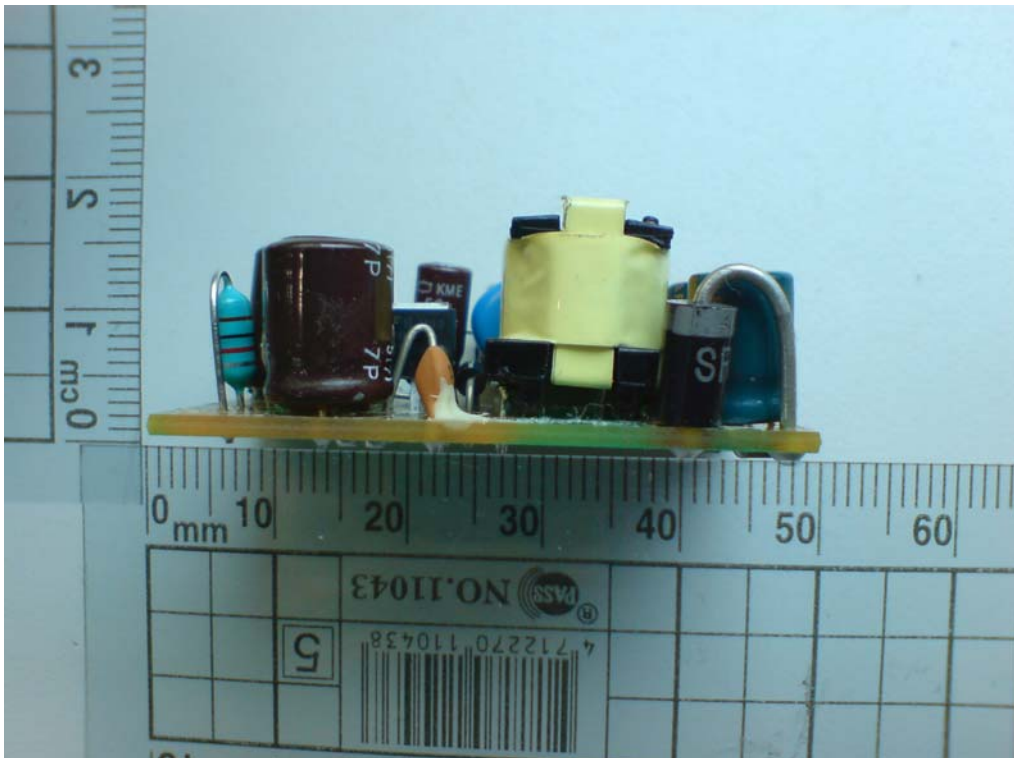
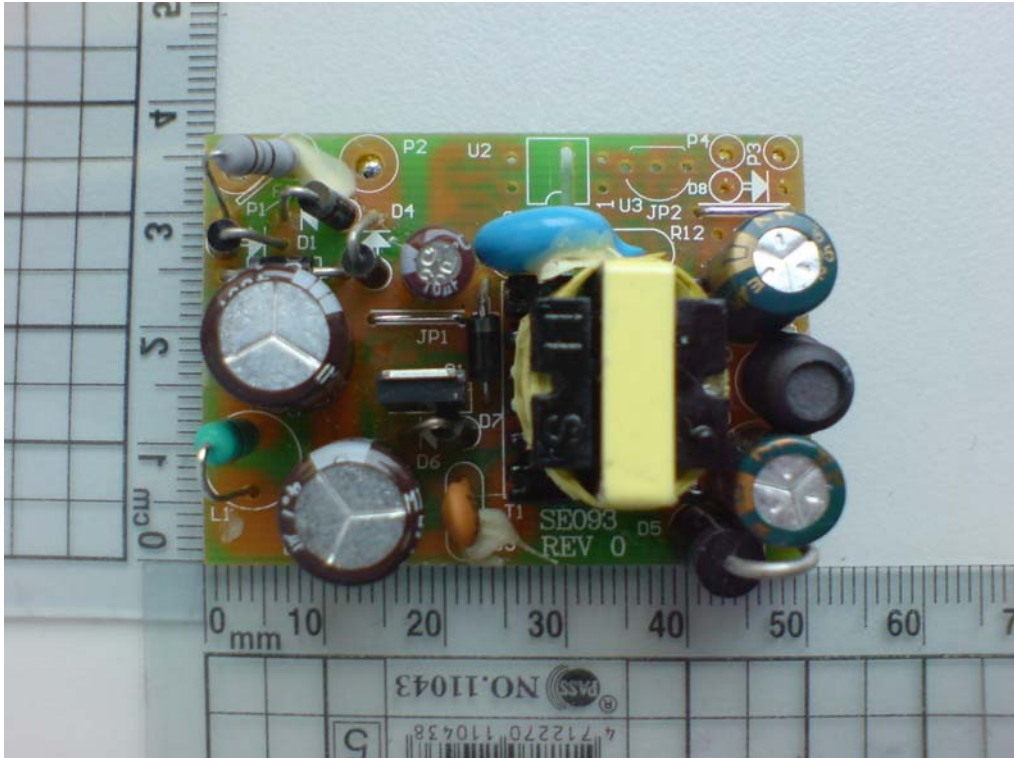
Mode	Polarity	Phase	Voltage	Condition
L-PE	+/-	0°	2KV	Pass
	+/-	90°		Pass
	+/-	180°		Pass
	+/-	270°		Pass
N-PE	+/-	0°	2KV	Pass
	+/-	90°		Pass
	+/-	180°		Pass
	+/-	270°		Pass

18 ESD test

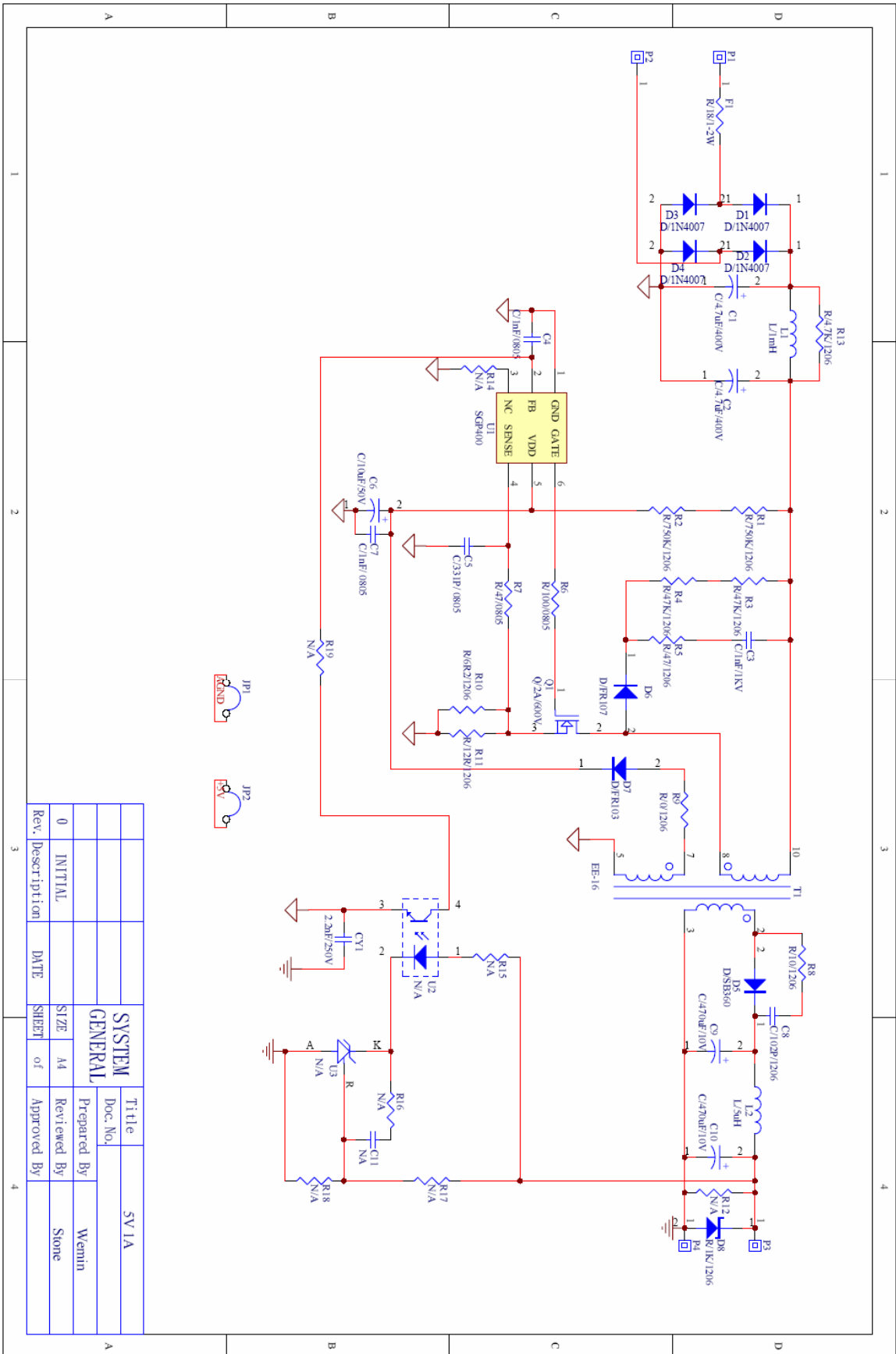
Air Discharge (8KV)		Contact Discharge (4KV)	
Pass	Pass	Pass	Pass

Doc. Title	PS00505-05 Photograph	Instituted by	Wemin
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Photograph



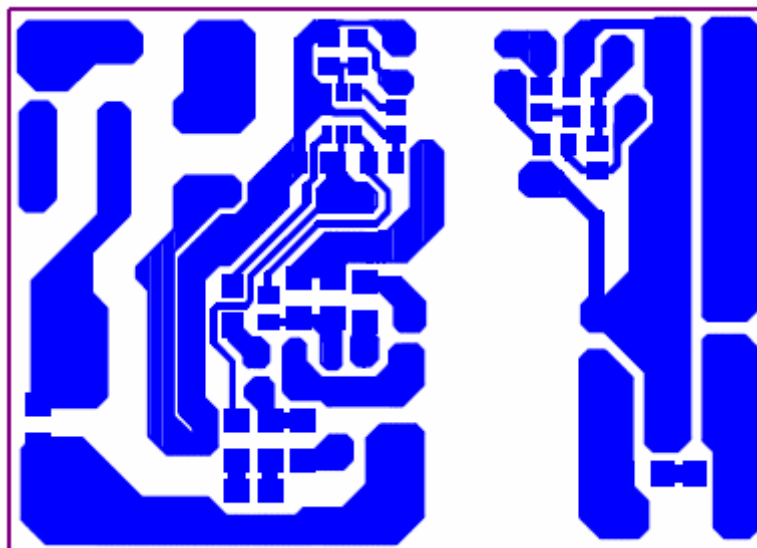
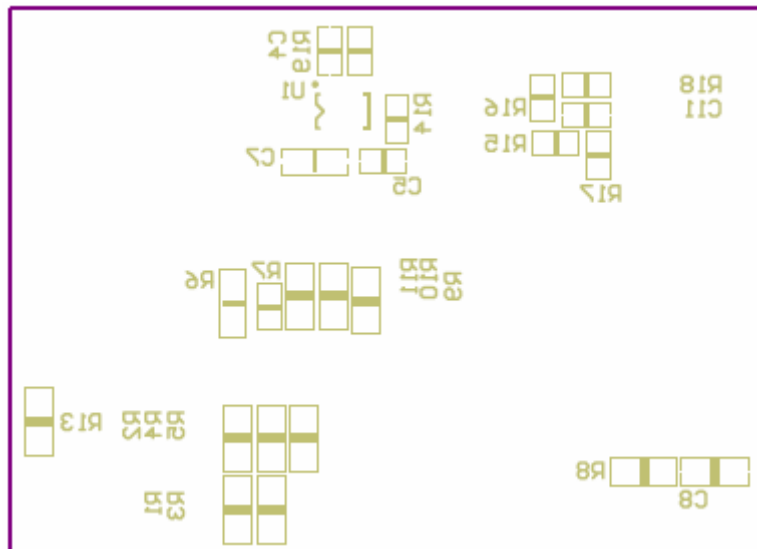
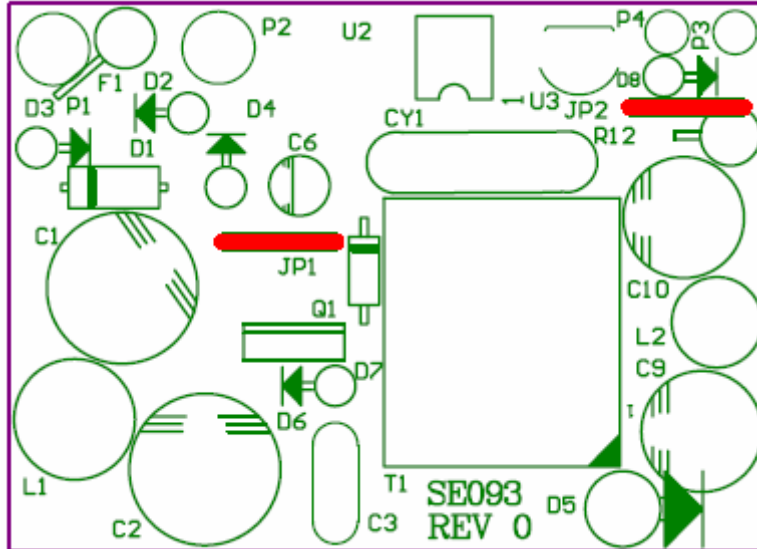
Doc. Title	PS00505-05 Schematic	Instituted by	Wemin
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Rev.	Description	DATE	SHEET	of	Approved By
0	INITIAL		44		Wemin
			Title: SV 1A		
			Doc. No.:		
			Prepared By:		
			Reviewed By:		
			Stone		

Doc. Title	PS00505-05 PCB Layout	Instituted by	Wemin
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PCB: Layout Picture



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Component	Q'ty	Part No.	Manufacturer	Reference
JUMPER WIRE 0.8ψ(mm)	2			JP1 JP2
Non-Inductive WireWound Resistor 1/2W 18Ω +/-5%	1			R1
Carbon Film Resistor 1/4W 1KΩ+/-5%	1			D8
SMD Resistor 0805 47Ω +/- 5%	1			R7
SMD Resistor 0805 100Ω +/- 5%	1			R6
SMD Resistor 1206 0Ω +/- 5%	1			R9
SMD Resistor 1206 6Ω2 +/- 5%	1			R10
SMD Resistor 1206 10Ω +/- 5%	1			R8
SMD Resistor 1206 13Ω+/- 5%	1			R11
SMD Resistor 1206 47Ω +/- 5%	1			R5
SMD Resistor 1206 4K7Ω +/- 5%	1			R13
SMD Resistor 1206 47KΩ +/- 5%	2			R3 R4
SMD Resistor 1206 750KΩ +/- 5%	2			R1 R2
0805 MLCC X7R +/-10% 103P 50V	2			C4 C7
0805 MLCC X7R +/-10% 331P 50V	1			C5
1206 MLCC X7R+/-10% 102P 100V	1			C8
Y1 Capacitor 222P 250V +/-20%	1			CY1
Ceramic Capacitor 102P/1KV+80/-20% Z5V	1			C3
Electrolytic Capacitor 10u 50V 105°C	1		JACKCON	C6
Electrolytic Capacitor 4u7 400V 105°C	2		JACKCON	C1 C2
Electrolytic Capacitor 470u 10V 105°C	2		JACKCON	C9 C10
FIXED INDUCTORS 1mH +/-10%	1			L1
TRN0216 (Inductor)	1			L2
TRN0220 (Transformer)	1			T1
Diode 1A/1000V	4	1N4007		D1,D2,D3,D4
Fast Diode 1A/200V	1	FR103		D7
Fast Diode 1A/1000V	1	FR107		D6
Schottky Rectifiers 3A/60V	1	SR360	CENTRAL	D5
MOSFET 1A/600V TO-251	1	FQU1N60C	Fairchild	Q1
PCB SE093 REV0	1			
SGP400TZ	1	SG400TZ_3B	SG	U1

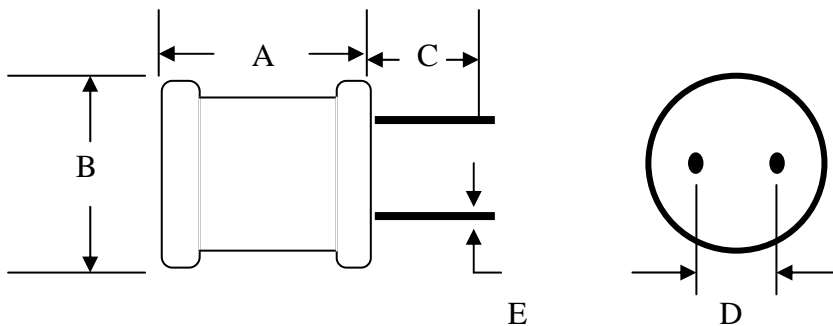
Doc.Title	Inductor Spec. Approval	Instituted by	勝輝
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SPECIFICATION APPROVAL

Customer	SYSTEM GENERAL CORP.		P/N:	TRN-0216
DATE	05/22/2007	版本	A 版	頁數 第 1/1 頁共 1 頁

1.DIMENSION :

UNIT : mm



A	11 max
B	9.0 max
C	10 (REF)
D	3.0±1
E	φ0.65

2.ELECTRICAL SPECIFICATION : at 1KHz,0.3V

- 2.1 INDUCTANCE : 5 uH min
- 2.2 DC RESISTANCE : 28.mOhm max
- 2.3 TURN & WIRE : φ0.55x16.5TS(ref)

MATERIALS LIST :

COMPONENT	MAT'L	MANUFACTURE	UL FILE NO.
1.CORE	S6,SGB or equal	Ferrite core DRWW 6x8 Jaw Shiang.	
2.WIRE	UEW-B	Chuen Yih wire co.,ltd	E154709(S)
	UEW-2	Jung Shing wire co.,ltd	E79029(S)
	UEW	Tai-l electric wire & cable co.,ltd	E85640(S)
3.TUBE	KUHS-225	Korea unichenm co.,ltd	E157822(S)
	811	Sunmitomo electric industries co.,ltd	E48762(S)
4.TERMINALS	Tin coated- Copper wire	Will fore special wire corp	

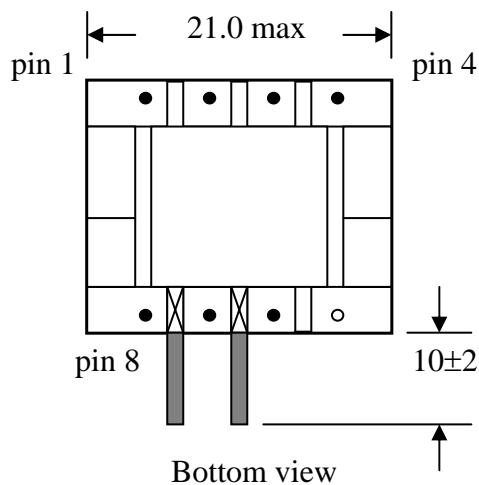
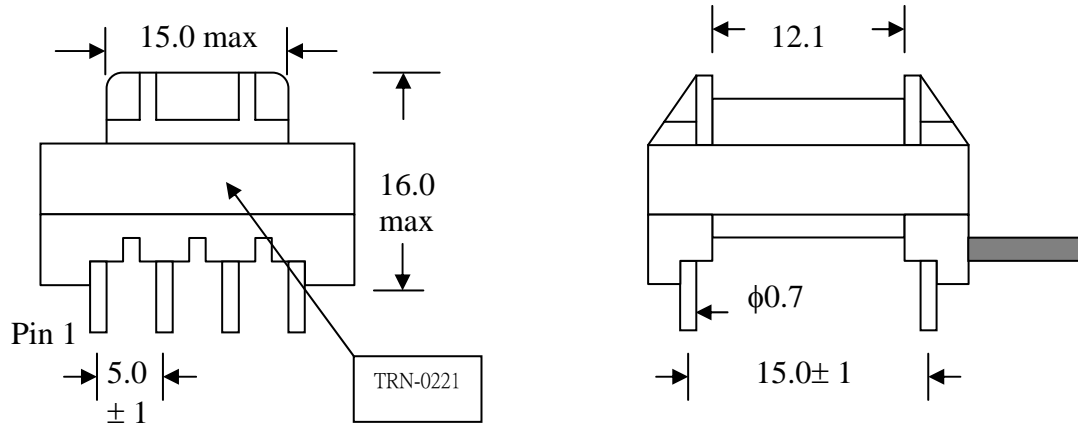
UNIT	m/m	DRAWN	CHECK	TITLE	
TEL	(02)2944-7647 (02)2947-9127	陳啟文	黃國隆	IDENT N O.	TRN-0216 REV : 1.0
FAX	(02)2941-5742	勝輝興業有限公司		D W G N O.	I0033
台北縣新店市安康路 2 段 341 巷 9 號		SEN HUEI INDUSTRIAL CO.,LTD.			

Doc.Title	Transformer Spec. Approval	Instituted by	勝輝
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SPECIFICATION APPROVAL

Customer	SYSTEM GENERAL CORP.		P/N:	TRN-0221
DATE	09/05/2007	版本	A 版	頁數 第 1/4 頁共 4 頁

1.DIMENSION : Unit : mm



NOTES :

1.Pin 5 NO.

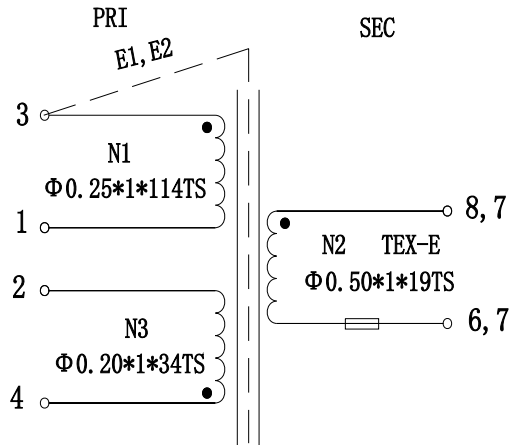
UNIT	m/m	DRAWN	CHECK	TITLE	TRANS
TEL	(02)2215-8302	陳啟文	黃國隆	IDENT N O.	TRN-0221 SH
FAX	(02)2215-8293	勝輝興業有限公司		DWG N O.	I2004
台北縣新店市安康路 2 段 341 巷 9 號		SEN HUEI INDUSTRIAL CO.,LTD.			

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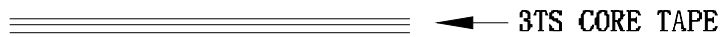
Customer	SYSTEM GENERAL CORP.		P/N:	TRN-0221
DATE	09/05/2007	版本	A 版	頁數 第 2/4 頁共 4 頁

2.SCHEMATIC :



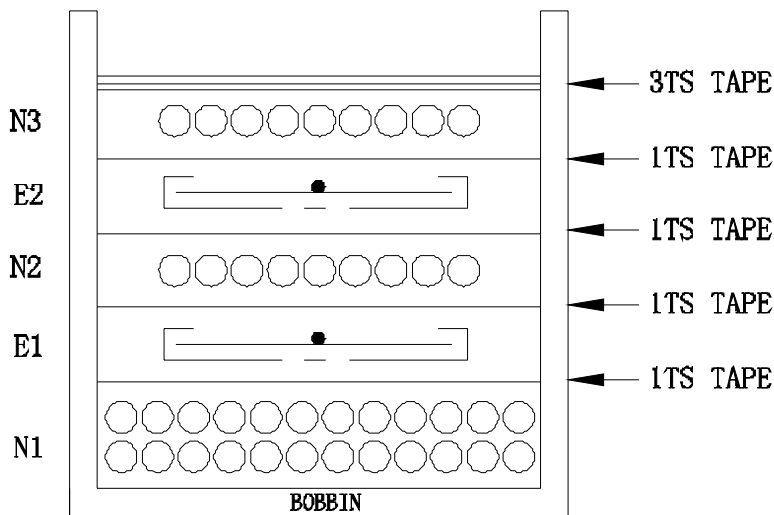
" • "STAND OF START, " □ "STAND OF TUBE

2.1SCHEMATIC



PIN1-4

PIN5-8



UNIT	m/m	DRAWN	CHECK	TITLE	TRANS
TEL	(02)2215-8302	陳啟文	黃國隆	IDENT NO.	TRN-0221
FAX	(02)2215-8293	勝輝興業有限公司 SEN HUEI INDUSTRIAL CO.,LTD.		DWG NO.	I2004
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3.ELECTRICAL SPECIFICATION :

3.1 Inductance test : at 100KHz ,1V (HP-4276A)

P(3-1) : 1.40Mh-1.70mH

3.2 DC Resistance test at 25 ° C

P(3-1) : 2.87mhmo max

P(4-2) : 854 mOhmomax

P(S-F) : 89.7 mOhmo max

3.3 Hi-pot test :

AC 1.0KV /60Hz/5mA/3sec hi-pot for one minute between pri to sec.

AC 0.5KV /60Hz/5mA/3sec hi-pot for one minute between pri to core.

AC 0.5KV /60Hz/5mA/3sec hi-pot for one minute between sec to core.

3.4 Insulation test :

The insulation resistance is between pri to sec and windings to core measured by DC 500V, must Be over 100 MOhm.

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FAX	(02)2215-8293	勝輝興業有限公司		D W G N O.	I2004
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MATERIALS LIST : (UL: E196468)

COMPONENTM	MAT'L	MANUFACTURE	FILE NO.
1.Bobbin	Phenolic 94V-0,T373J,150°C	EF-20 Chang Chun plastics co. ltd.	E59481(S)
2.Core	PC-40,BH2,2E6 3C85,NC-2H,	Ferrite core EF-20 TDK,Tokin.Tomita.Philip.Nicera.	
3.Wire	UEWE 130°C	Tai-I electric wire & cable co ltd.	E85640 (S)
	UEW-2 130°C	Jung Shing wire co.,ltd	E174837
	UEW-B 130°C	Chuen Yih wire co.,ltd	E154709 (S)
4.Varnish	BC-346A 180°C	John C Dolph co.,itd.	E51047 (M)
	468-2FC 130°C	Ripley resin engineering co inc.	E81777 (N)
5.Tape	31CT 130°C	Nitto denk corp	E34833 (M)
	Polyester 3M #1350(b) 130°C	Minnesota mining & MFG co.,ltd. CTI material group II	E17385 (N)
6.Tube	Teflon tube TFL 150V,200°C	Great holding industriat co.,ltd.	E156256 (S)
7.Terminals	Tin coated- Copper wire	Will fore special wire corp	
8.Shield	Copper foil	Hitachi cable ltd. (copper foil : 0.025tx10mm+TAPE)	

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