

# **SMD731-12W Adapter TEST REPORT**

**Input voltage range: 90~264Vac**

**Output voltage & current :12V/1A**

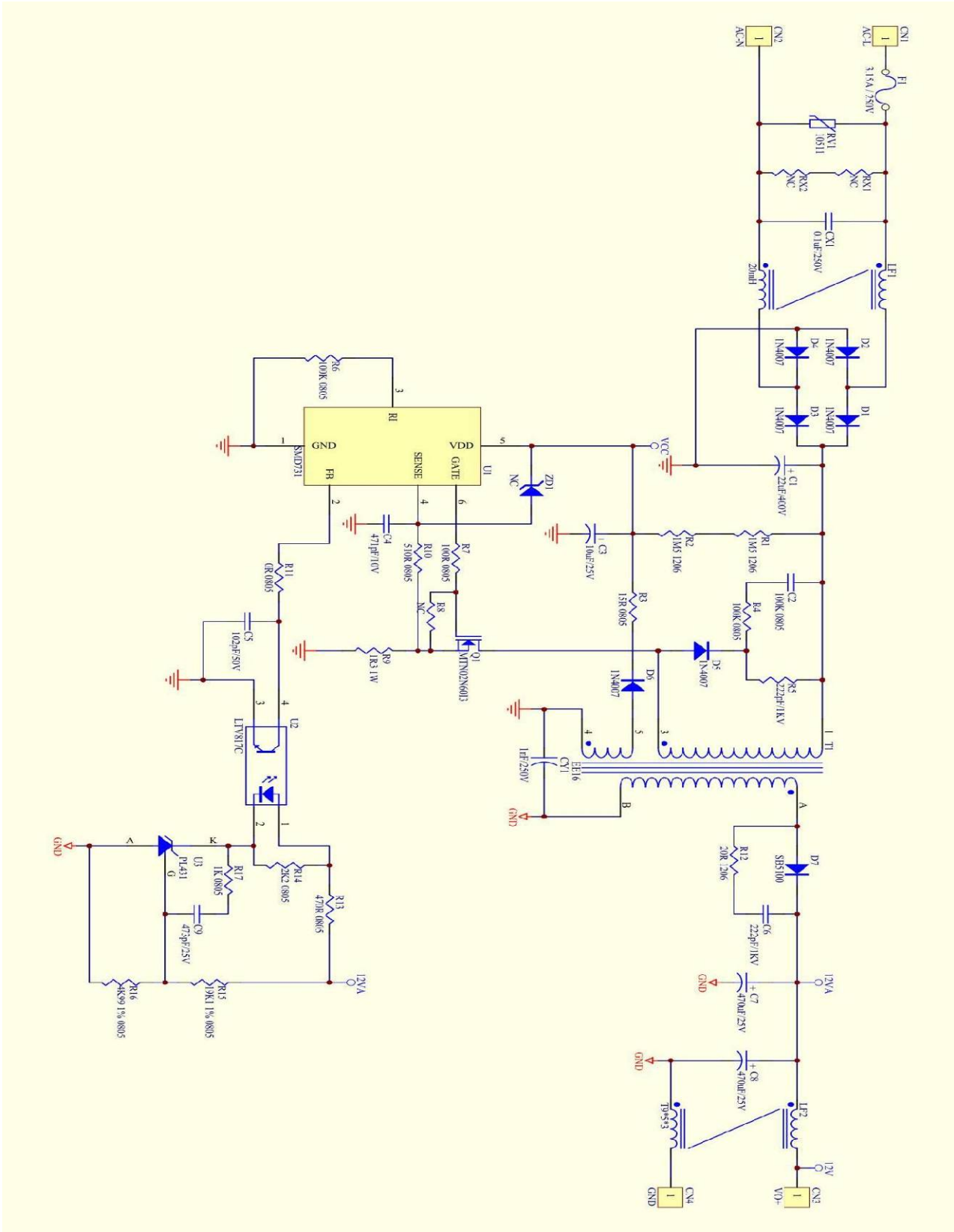
**Date(s) of Test: 2011/12/07**

<b>APPROVED BY:</b>	<b>CHECKED BY:</b>	<b>PAPERED BY:</b>
		<i><b>LIVIAN YUAN</b></i>

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## 1. Schematic Circuit

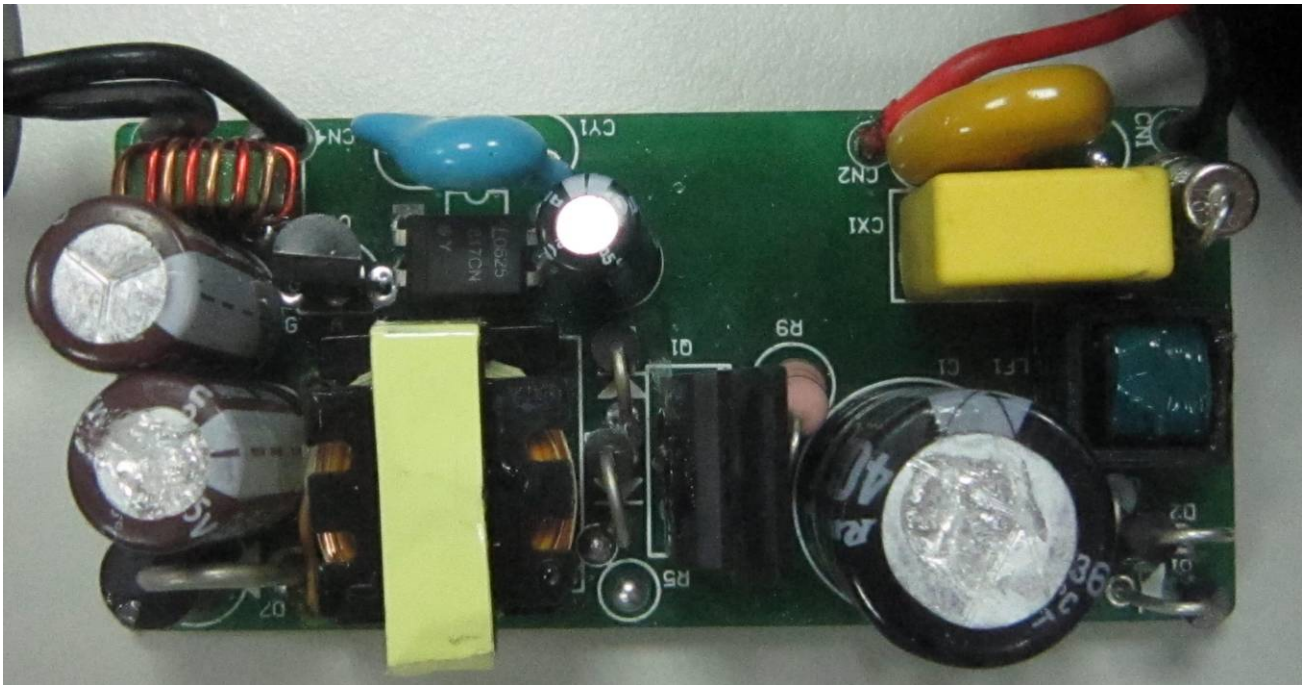


# MODEL

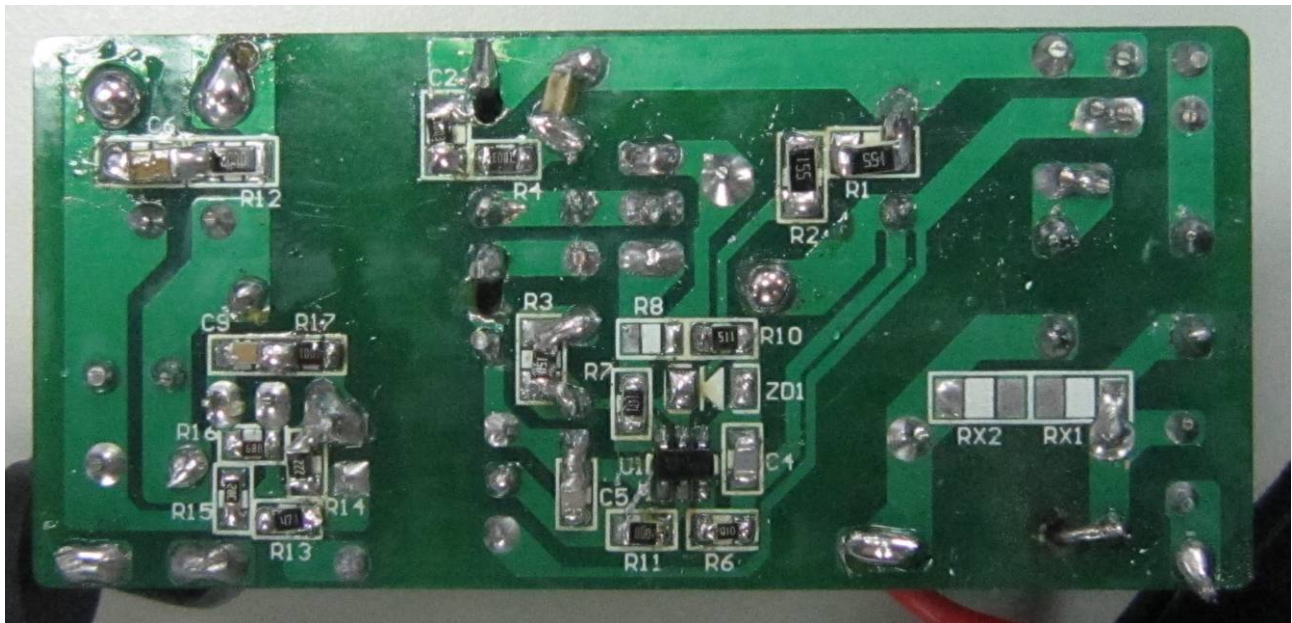
# Adapter 12V/1A

## 2. Circuit Board Photograph

TOP 1

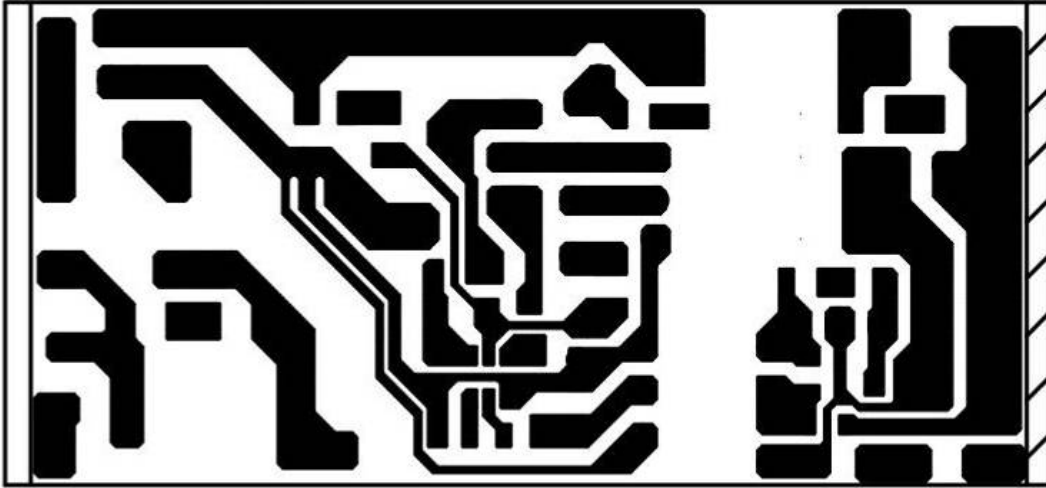


BOTTOM

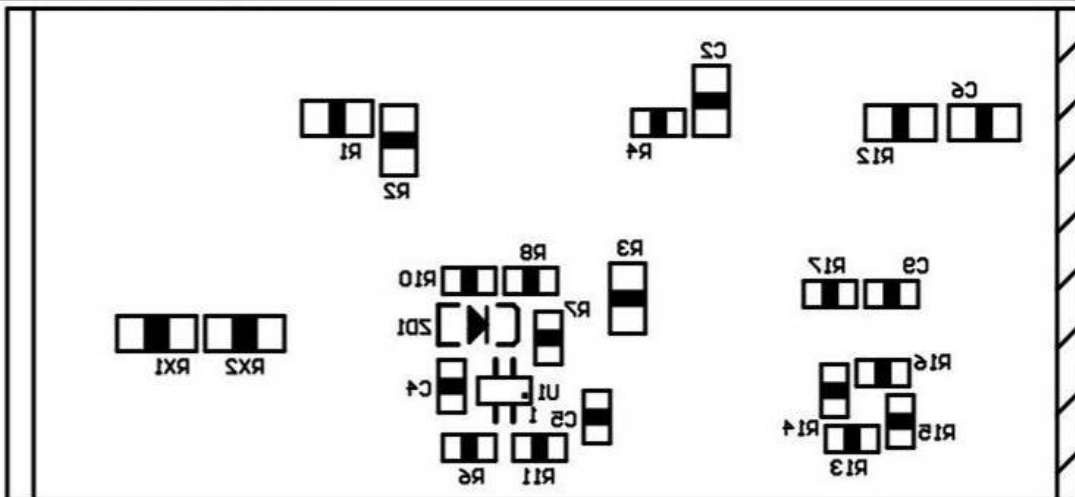


## 3. PCB Layout

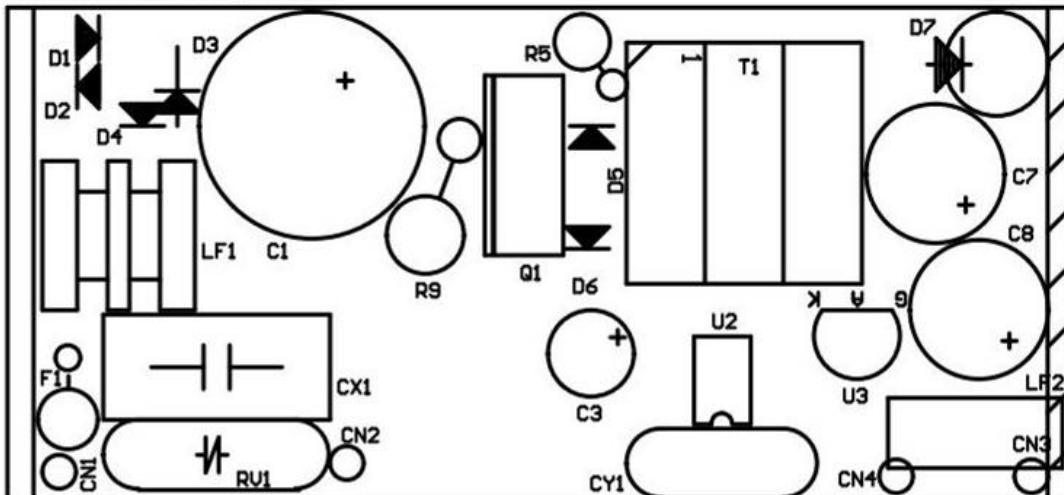
BOTTOM LAAyer



BOTTOM SILKSCREEN OVERLAY



TOP SILKSCREEN OVERLAY



## 4. Bill of Material

NO	Location	Part Value	Specifications
1	C1	22uF/400V	12.5x21mm- Elec Capacitor
2	C2	100K 0805	SMD-0805- Resistance
3	C3	10uF/50V	5X11mm- Elec Capacitor
4	C4	471pF/10V	SMD-0805- Capacitor
5	C5	102pF/50V	SMD-0805- Capacitor
6	C6	222pF/1KV	SMD-1206- Capacitor
7	C7	470uF/25V	8X20mm- Elec Capacitor
8	C8	470uF/25V	8X20mm- Elec Capacitor
9	C9	473pF/25V	SMD-0805- Capacitor
10	CX1	0.1uF/250V	5x13x11MM- X2 Capacitor
11	CY1	1nF/250V	2.2nF/250V- Y type Capacitor
13	D1	1N4007	1000V/1A-Surface Mount Silicon Rectifiers
14	D2	1N4007	1000V/1A-Surface Mount Silicon Rectifiers
15	D3	1N4007	1000V/1A-Surface Mount Silicon Rectifiers
16	D4	1N4007	1000V/1A-Surface Mount Silicon Rectifiers
17	D5	1N4007	1000V/1A-Surface Mount Silicon Rectifiers
18	D6	1N4007	1000V/1A-Surface Mount Silicon Rectifiers
	D7	SB5100	100V/5A-Schottky DO-210
19	F1	3.15A / 250V	3.15A/250V –FUSE
20	LF1	20mH	EE8.3- 20mH
21	LF2	T9*5*3	9x5x3
22	Q1	MTN02N60I3	600V/2A-TO220-MOSFET
23	R1	1M5	SMD-1206- Resistance
24	R2	1M5	SMD-1206- Resistance

# MODEL

# Adapter 12V/1A

25	R3	15R	SMD-0805- Resistance
26	R4	100K	SMD-0805- Resistance
27	R5	222pF/1KV	SMD-0805- Capacitor
28	R6	100K	SMD-0805- Resistance
29	R7	100R	SMD-0805- Resistance
30	R9	1R3	R-1/2W
31	R10	510R	SMD-0805- Resistance
32	R11	0R	SMD-0805- Resistance
33	R12	20R	SMD-1206- Resistance
34	R13	470R	SMD-0805- Resistance
35	R14	2K2	SMD-0805- Resistance
36	R15	19K1	SMD-0603- Resistance 1%
37	R16	4K99	SMD-0603- Resistance 1%
38	R17	1K	SMD-0805- Resistance
39	T1	EE16	2mH- 174:23:31
40	U1	SMD731	PWM Controller IC
41	U2	LTV817C	Package Dimensions- Photocoupler
42	U3	SMD601	Dual Operational Amplifier And Voltage Reference

## 5. Transformer Drawing

BOBBIN :EE-16

CORE : 3C90 , PC40

感量 : PIN3-PIN1 = 2.0mH

N4 : 2S - 1F	0.21mm X 1C X 69T 密繞
N3 : 4S - 5F	0.15mm X 1C X 31T 密繞
N2 : AF - BF	0.45mm X 1C X 23T (三層絕緣線)
N1 : 3S - 2F	0.21mm X 1C X 105T 密繞



## 1. Power consumption stand by & No load

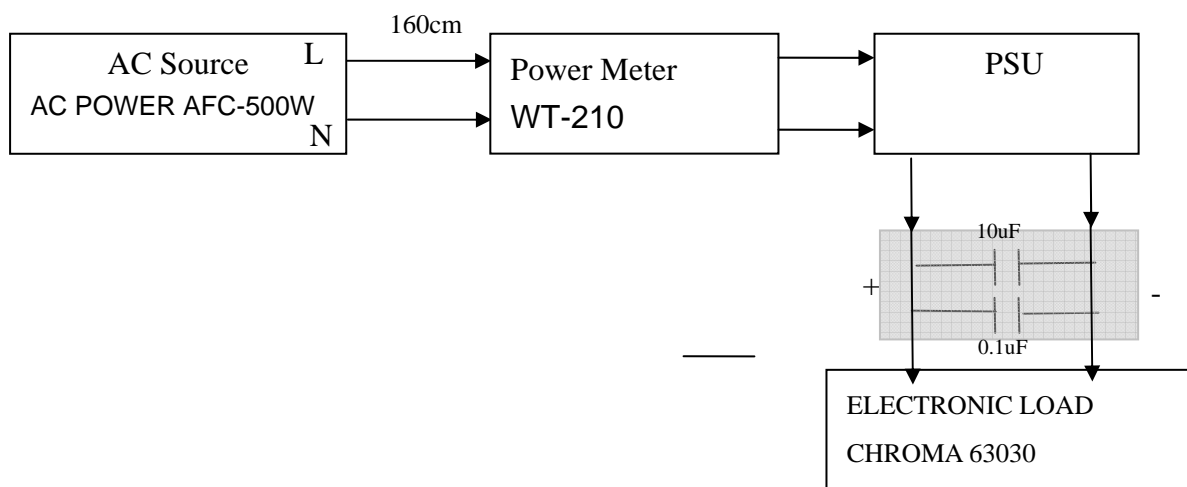
### Test Condition:

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/0A
Ambient Temperature	25°C

### Setup Diagram:



### Test Result:

Power consumption no load				
Input Voltage	Output Load	Measured (W)	Spec.	Pass/Fail
90V/60Hz	0A	0.088	-----	-----
115V/60Hz	0A	0.088	≅ 0.3W	Pass
230V/50Hz	0A	0.093		Pass
264V/50Hz	0A	0.104	-----	-----

## 2. Line Regulation & Load Regulation

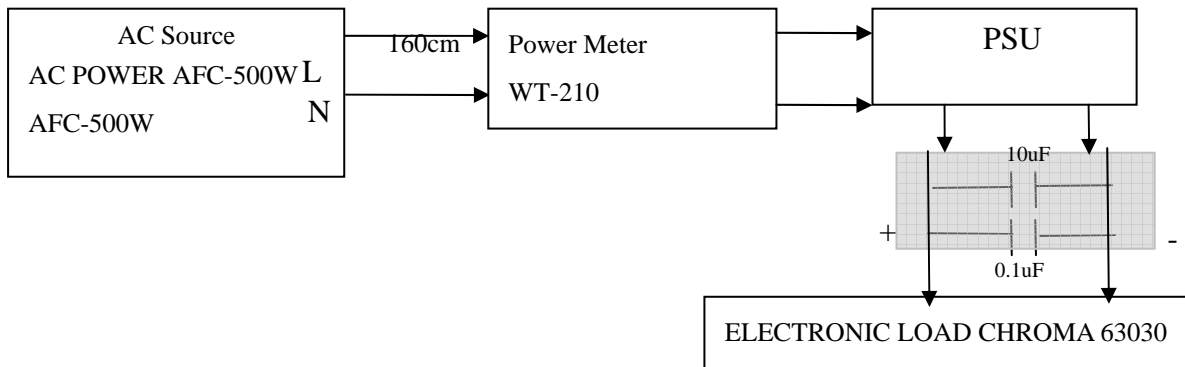
### Test Condition:

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	Line Regulation =12V/1A , Load Regulation=12V/0A~1A
Ambient Temperature	25°C

### Setup Diagram:



### Test Result:

Line Regulation				
Input Voltage	Output Load	Measured (V)	Spec.	Pass/Fail
90V/60Hz	0A	12.053	Highest Minus lowest divide by 12 < 1%	Pass
115V/60Hz	0A	12.053		Pass
230V/50Hz	0A	12.053		Pass
264V/50Hz	0A	12.053		Pass

Load Regulation				
Input Voltage	Output Load	Measured (V)	Spec.	Pass/Fail
90V/60Hz	0A	12.053	11.4~12.6	Pass
	1A	11.860		Pass
115V/60Hz	0A	12.053		Pass
	1A	11.860		Pass
230V/50Hz	0A	12.053		Pass
	1A	11.858		Pass
264V/50Hz	0A	12.053		Pass
	1A	11.854		Pass

## 3. Efficiency

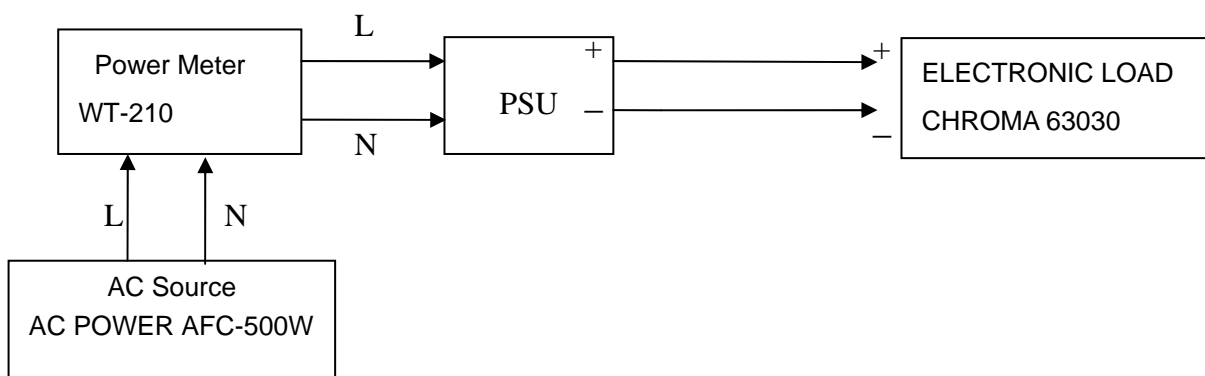
### Test Condition:

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/1A、12V/0.75A、12V/0.5A、12V/0.25A
Ambient Temperature	25°C

### Setup Diagram:



### Test Result:

Low Power Efficiency							
		0.25W	0.5W	1W	Spec.	Pass/Fail	
115V/60Hz	In(W)	0.429W	0.725W	1.287W	-----	-----	
	Eff	61.07%	68.83%	78.01%		-----	
230V/50Hz	In(W)	0.457W	0.760W	1.360W		-----	-----
	Eff	51.33%	65.66%	73.28%		-----	-----

Average Efficiency						
90V/60Hz	100%	75%	50%	25%	Spec.	Pass/Fail
Input(W)	14.490	/			$\geq 80\%$	Pass
Output(W)	11.857					
Eff(%)	81.83%					
115V/60Hz	100%	75%	50%	25%		Pass
Input(W)	14.210	10.590	7.072	3.528		
Output(W)	11.857	8.940	5.982	2.999		
Eff(%)	83.44%	84.42%	84.36%	85.01%		
Average(%)	84.31%					
230V/50Hz	100%	75%	50%	25%		Pass
Input(W)	14.020	10.550	7.090	3.610		
Output(W)	11.855	8.939	5.981	2.999		
Eff(%)	84.56%	84.73%	84.36%	83.07%		
Average(%)	84.18%					
264V/50Hz	100%	75%	50%	25%	Pass	
Input(W)	14.160	/				
Output(W)	11.854					
Eff(%)	83.71%					

## 4. Ripple And Noise

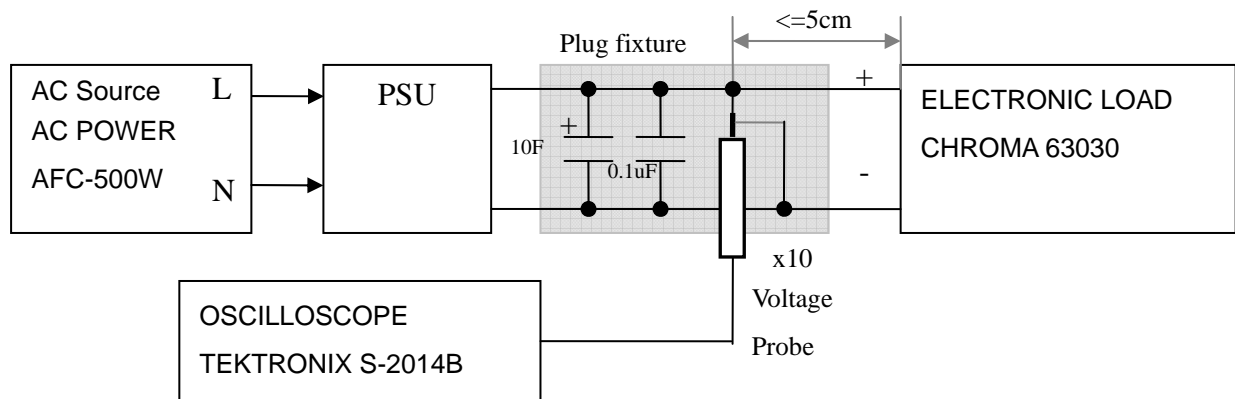
### Test Condition:

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/1A(output with parallel 10uF and 0.1uF capacitor)
Ambient Temperature	25°C

### Setup Diagram:

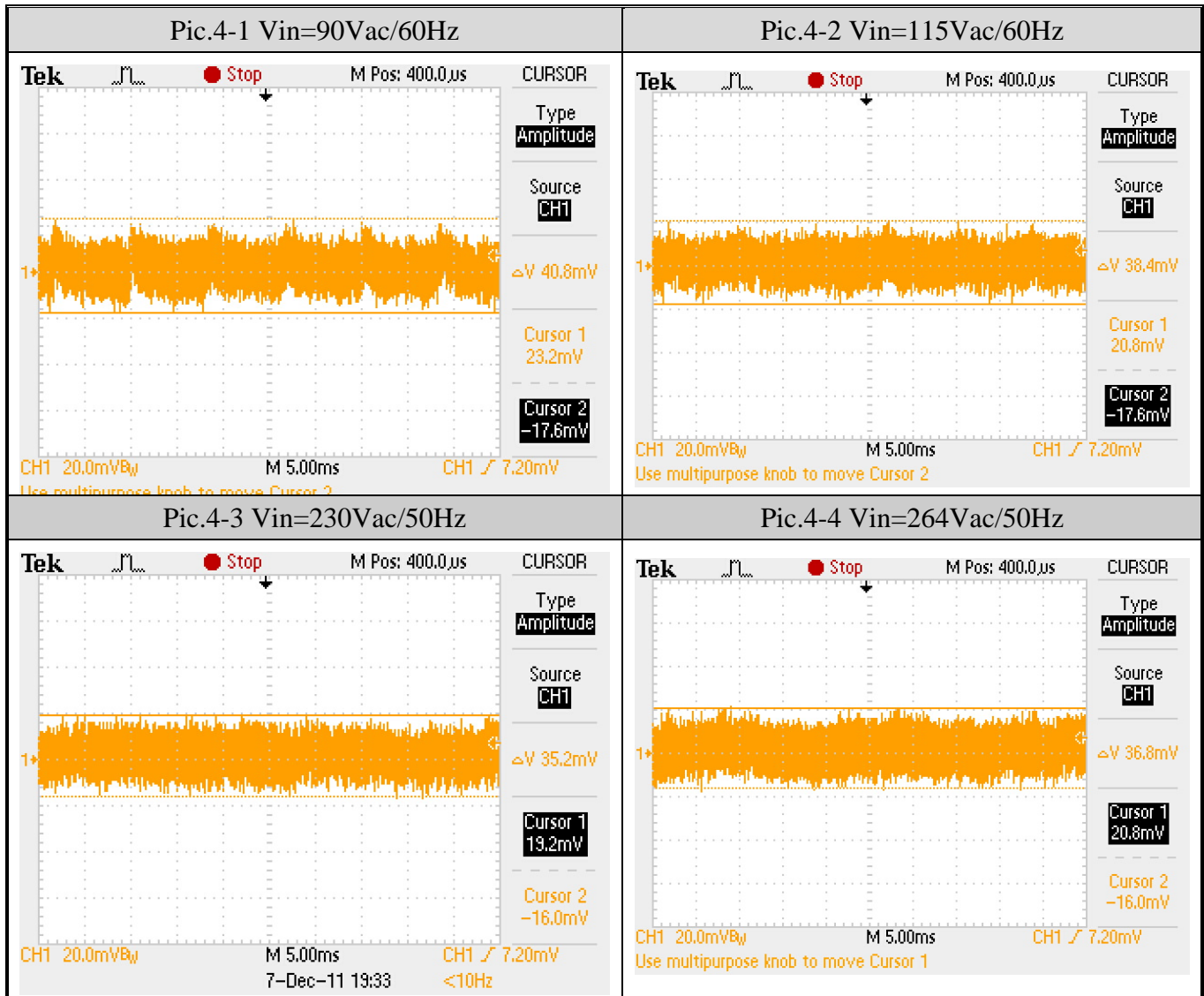


### Test Result:

Test Picture	Input Voltage	Measured (mVp-p)	Required	Pass/Fail
Pic.4-1	90V/60Hz	<b>40.8</b>	< 100mVp-p	PASS
Pic.4-2	115V/60Hz	<b>38.4</b>		PASS
Pic.4-3	230V/50Hz	<b>35.2</b>		PASS
Pic.4-4	264V/50Hz	<b>36.8</b>		PASS

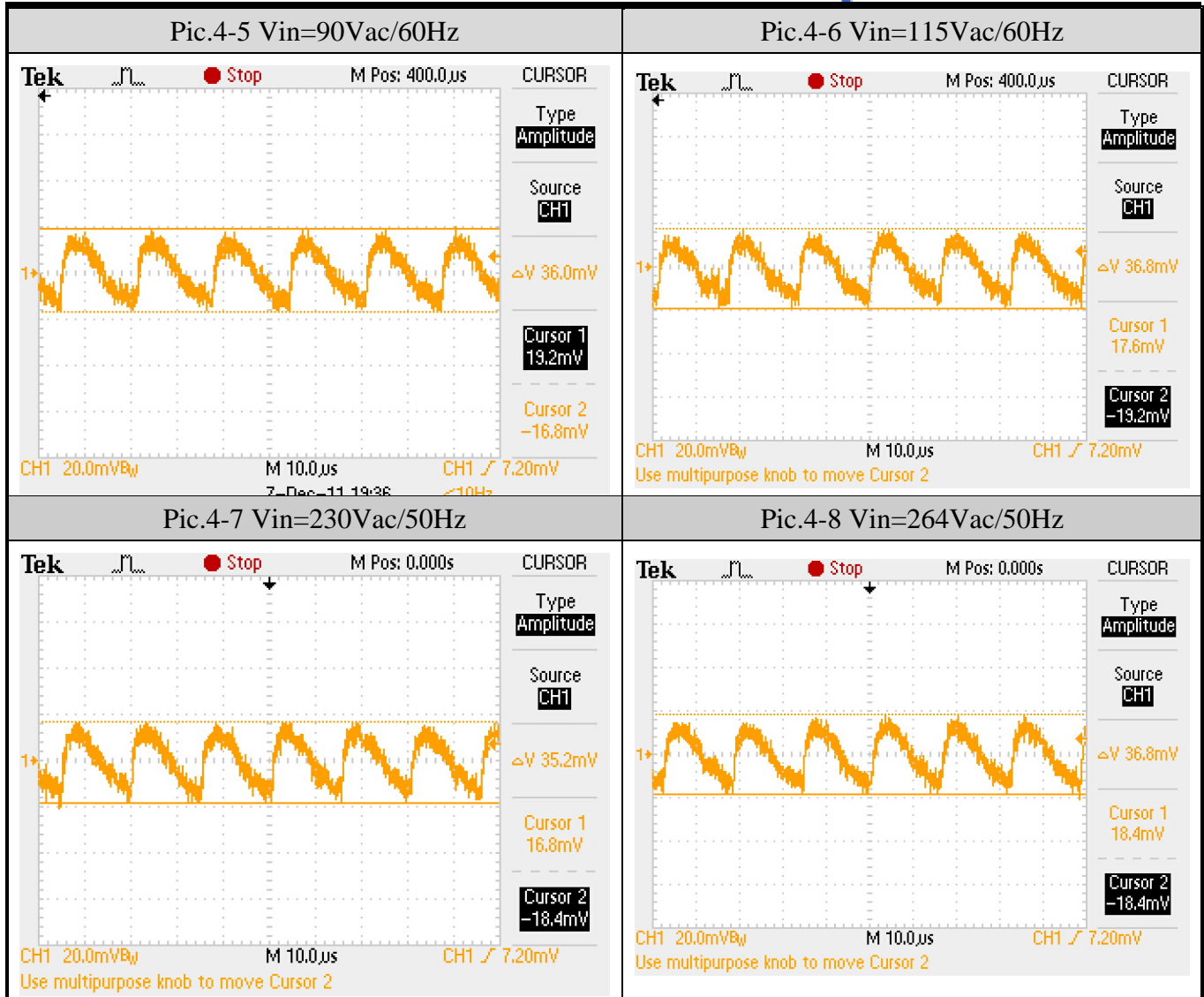
Test Picture	Input Voltage	Measured (mVp-p)	Required	Pass/Fail
Pic.4-5	90V/60Hz	<b>36.0</b>	< 100mVp-p	PASS
Pic.4-6	115V/60Hz	<b>36.8</b>		PASS
Pic.4-7	230V/50Hz	<b>35.2</b>		PASS
Pic.4-8	264V/50Hz	<b>36.8</b>		PASS

## Test Waveform:



# MODEL

# Adapter 12V/1A



## 5. Dynamic Load Response

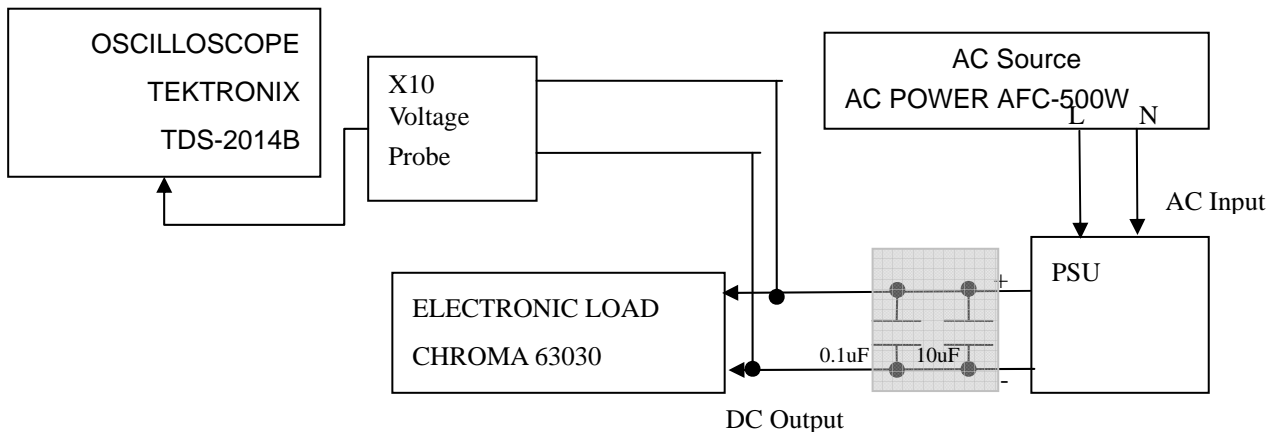
### Test Condition:

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/1 5msec~12V/0.2A 5msec
Load change rate	0.25A/us
Ambient Temperature	25°C

### Setup Diagram:

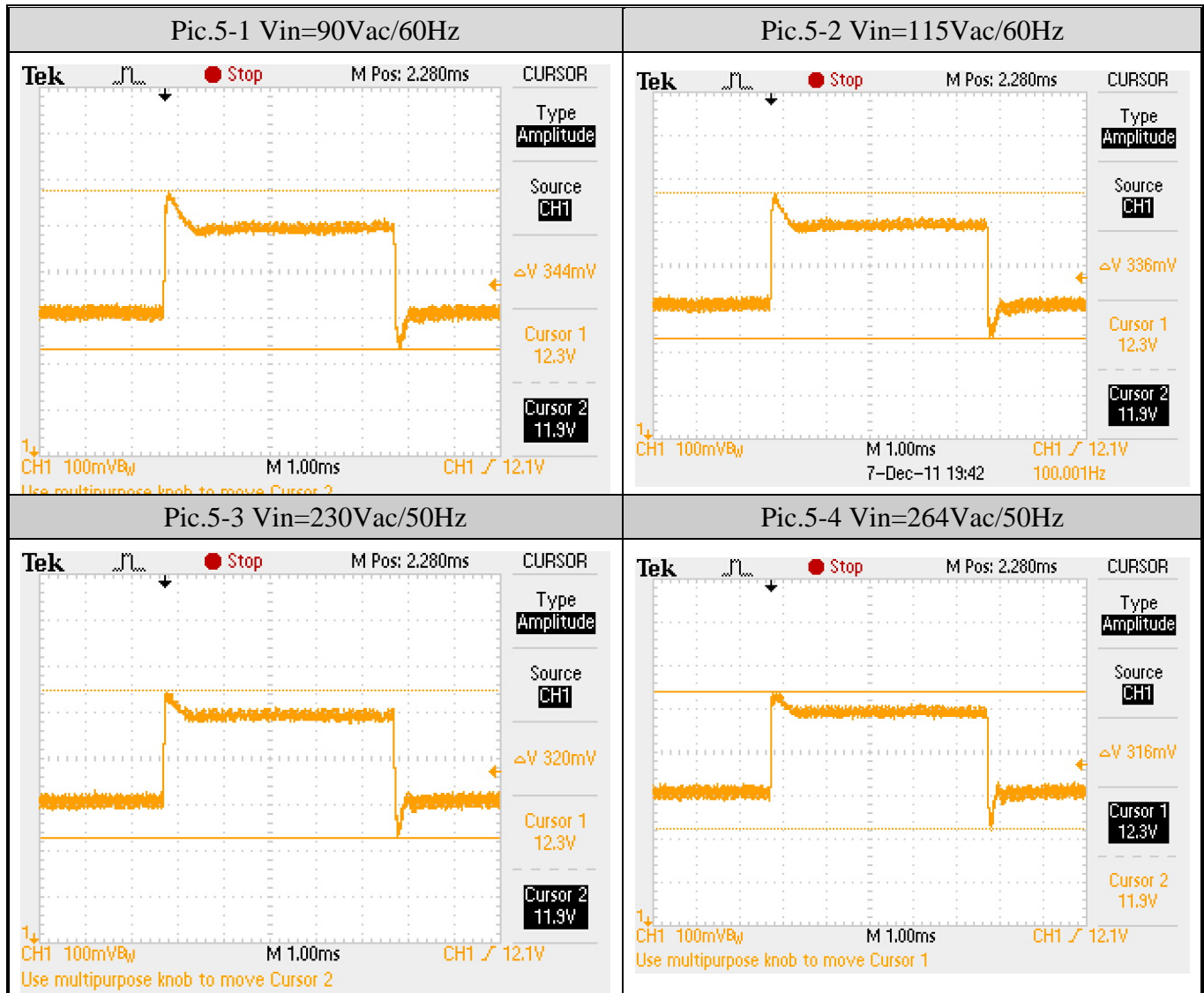


### Test Result:

Test Picture	Input Voltage	Measured ( Vmax )	Measured ( Vmin )	Measured ( Vp-p )	Required	Pass/Fail
Pic.5-1	90V/60Hz	12.3	11.9	344	11.4V~12.6V	PASS
Pic.5-2	115V/60Hz	12.3	11.9	336		PASS
Pic.5-3	230V/50Hz	12.3	11.9	320		PASS
Pic.5-4	264V/50Hz	12.3	11.9	316		PASS



## Test Waveform:



## 6. Over Shoot & Rise Time

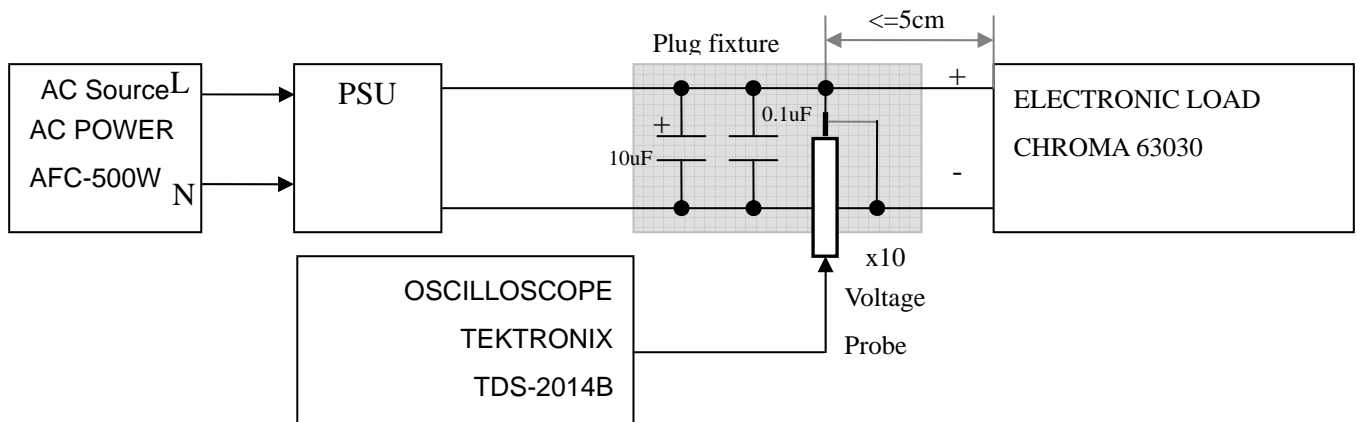
### Test Condition:

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/1A
Ambient Temperature	25°C

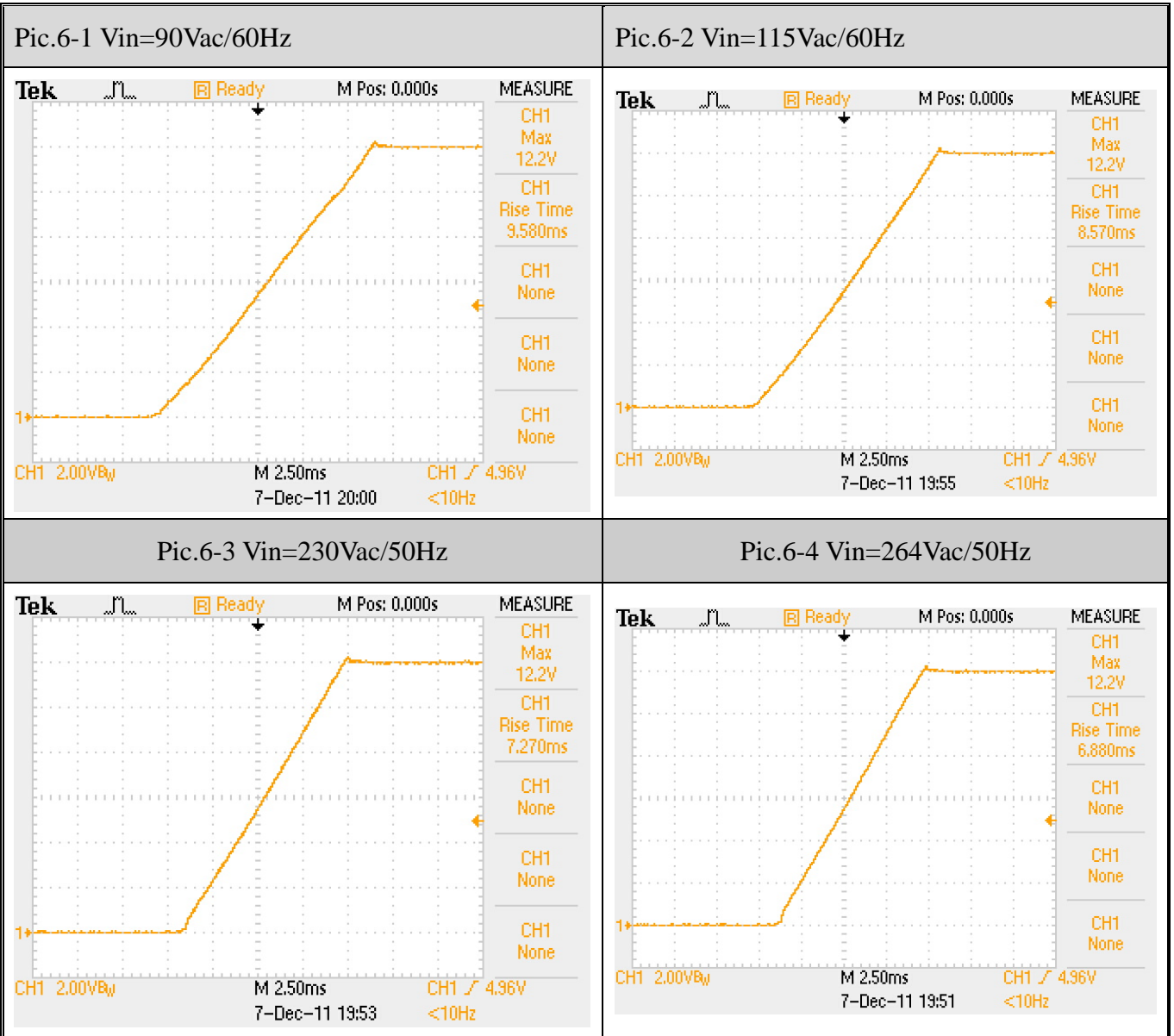
### Setup Diagram:



### Test Result:

Test Picture	Input Voltage	Over shoot ( V )	Rise time( ms )	Required	Pass/Fail
Pic.6-1	90V/60Hz	12.2	9.58	Over shoot under 12.6V, Rise time less 10 mS.	Pass
Pic.6-2	115V/60Hz	12.2	8.57		Pass
Pic.6-3	230V/50Hz	12.2	7.27		Pass
Pic.6-4	264V/50Hz	12.2	6.88		Pass

## Test Waveform:



## 7. Turn-On Delay Time

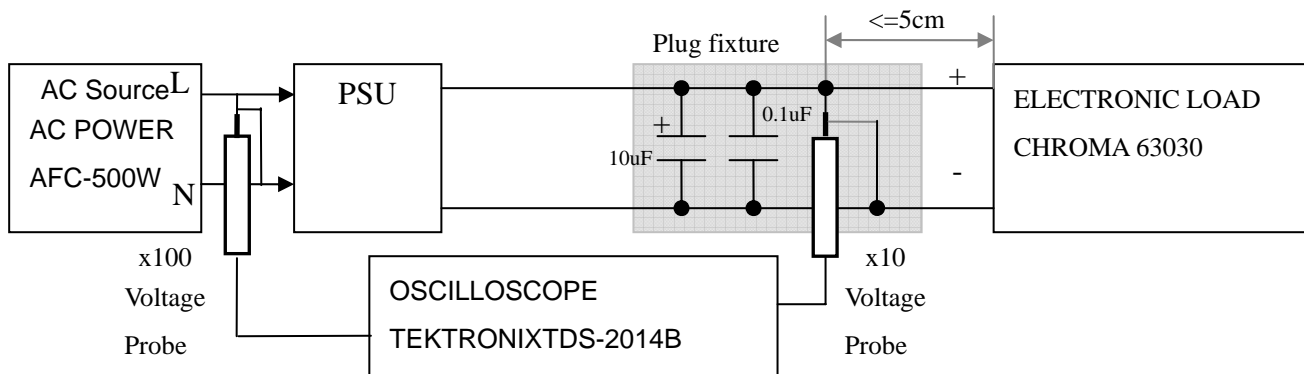
### Test Condition:

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	115/230V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/1A
Ambient Temperature	25°C

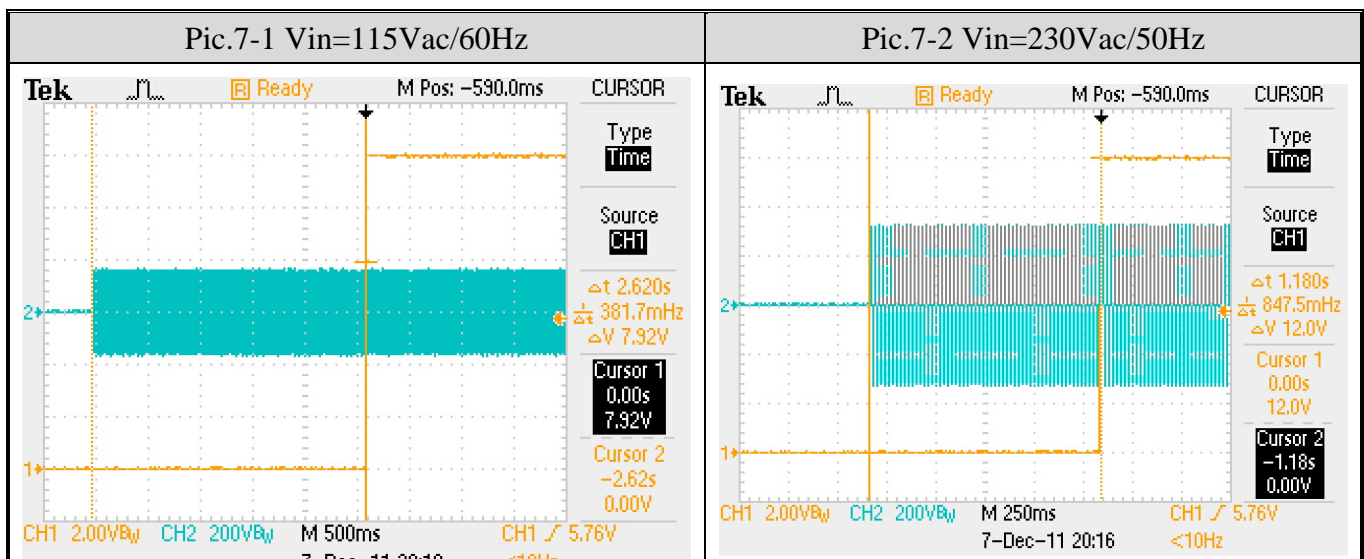
### Setup Diagram:



### Test Result:

Test Picture	Input Voltage	Measured ( s )	Required	Pass/Fail
Pic.7-1	115V/60Hz	2.62	<3S	PASS
Pic.7-2	230V/50Hz	1.18		PASS

### Test Waveform:



## 8. Hold Up Time

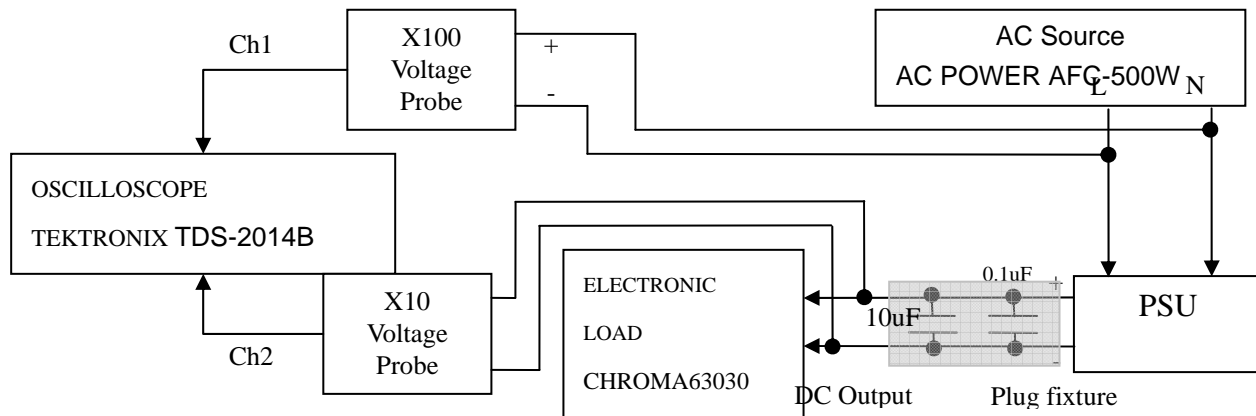
**Test Condition:**

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	115/230V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/1A
Ambient Temperature	25°C

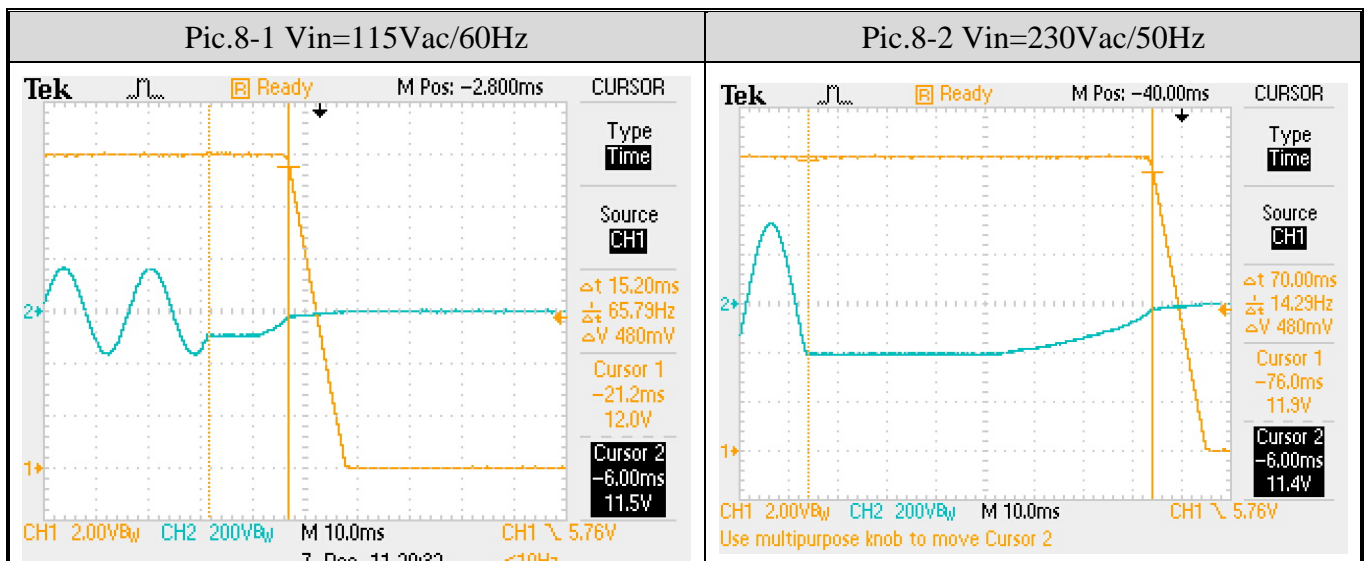
### Setup Diagram:



### Test Results:

Test Picture	Input Voltage	Measured ( ms)	Spec	Pass/Fail
Pic.8-1	115V/60Hz	15.20	>10ms	PASS
Pic.8-2	230V/50Hz	70.00	>20ms	PASS

### Test Waveform:



## 9. O.V.P. (Over voltage protection)

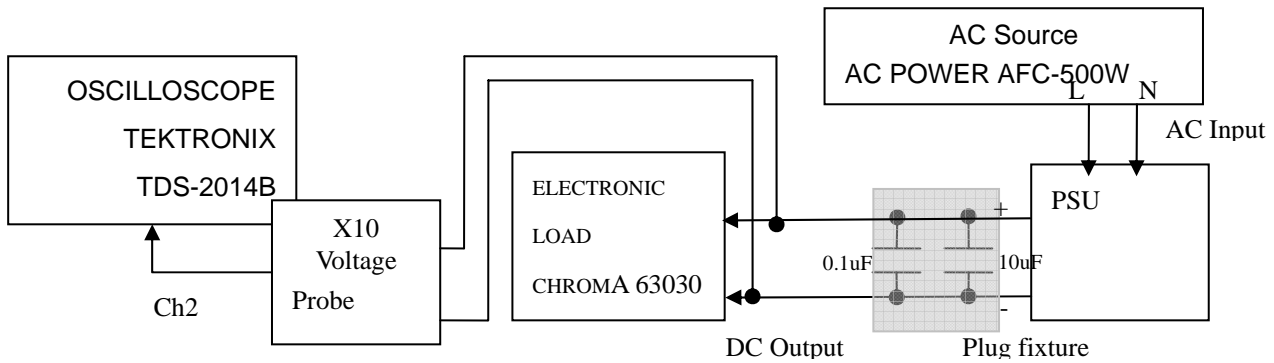
**Test Condition:**

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/0A
Ambient Temperature	25°C

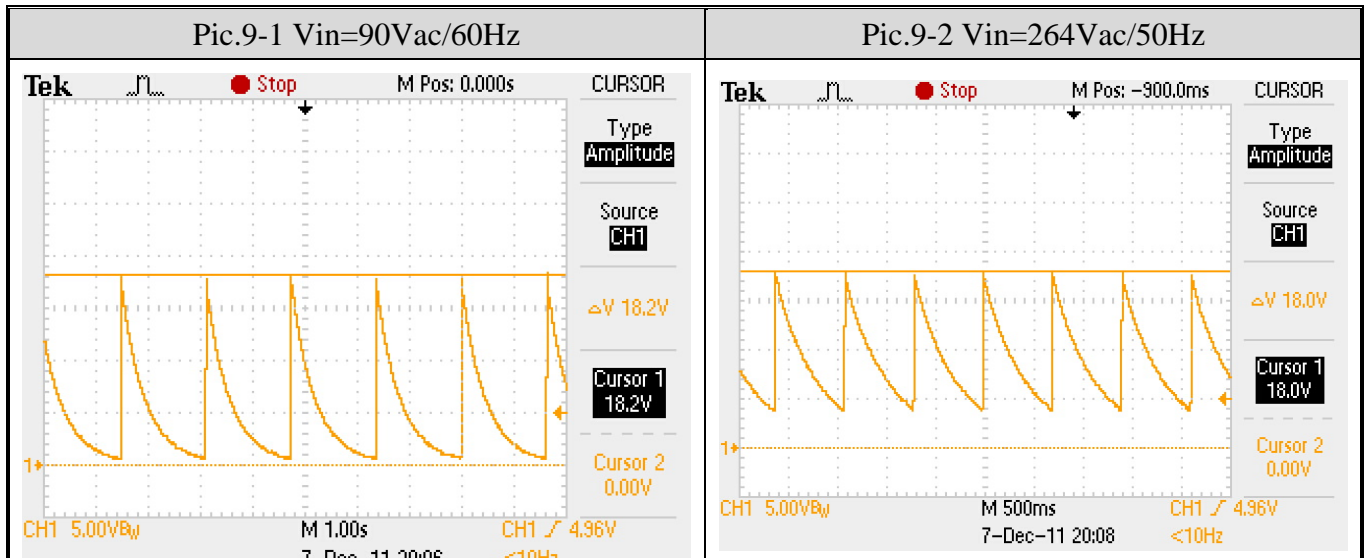
### Setup Diagram:



### Test Results:

Test Picture	Input Voltage	Output Load	Measured ( Vmax )	Required	Pass/Fail
Pic.9-1	90V/60Hz	0A	18.2	<25V	PASS
Pic.9-2	264/550Hz	0A	18.0		PASS

### Test Waveform:



## 10. O.C.P. (Over current protection)

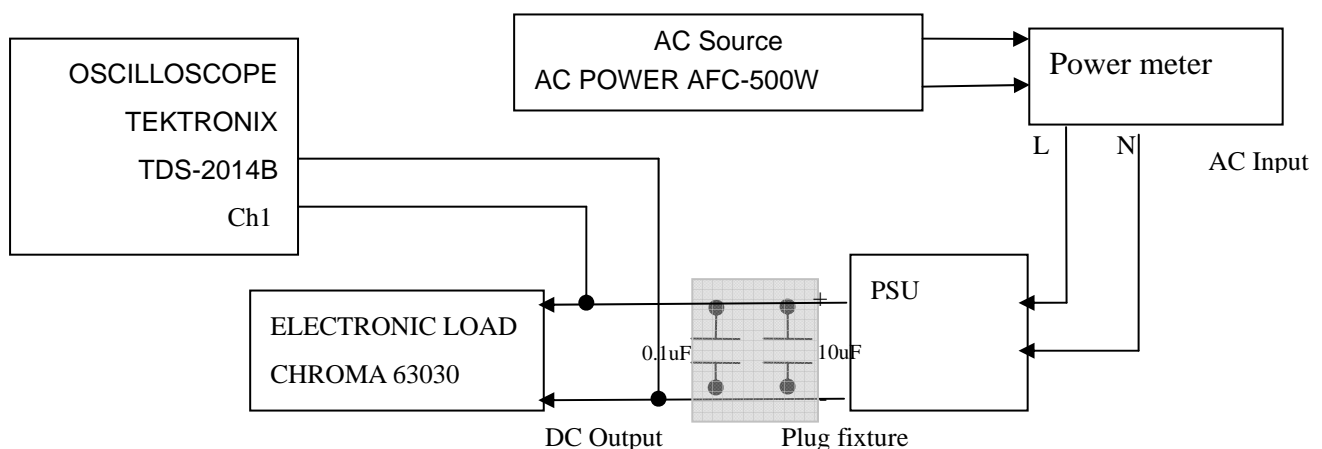
**Test Condition:**

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/1A
Ambient Temperature	25°C

### Setup Diagram:



### Test Results:

Input Voltage	Measured ( A )	Required	Pass/Fail
90V/60Hz	1.75	150%~250%	Pass
115V/60Hz	1.75		Pass
230V/50Hz	2.33		Pass
264V/50Hz	2.33		Pass

## 11. Short Circuit Protection

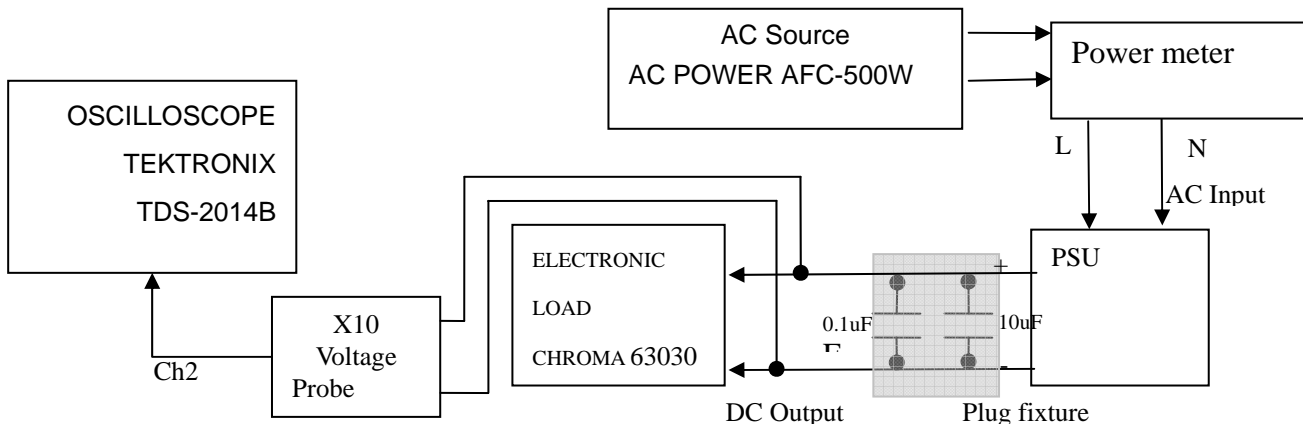
### Test Condition:

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/115/230/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	SHORT
Ambient Temperature	25°C

### Setup Diagram:



### Test Results:

Input Voltage	Auto-recovery	Required	Pass/Fail
90V/60Hz	Yes	Electric characteristic satisfied. No damage to this PSU and can auto-recovery after short	PASS
115V/60Hz	Yes		PASS
230V/50Hz	Yes		PASS
264V/50Hz	Yes		PASS



## 12. Voltage Derating

### Test Condition:

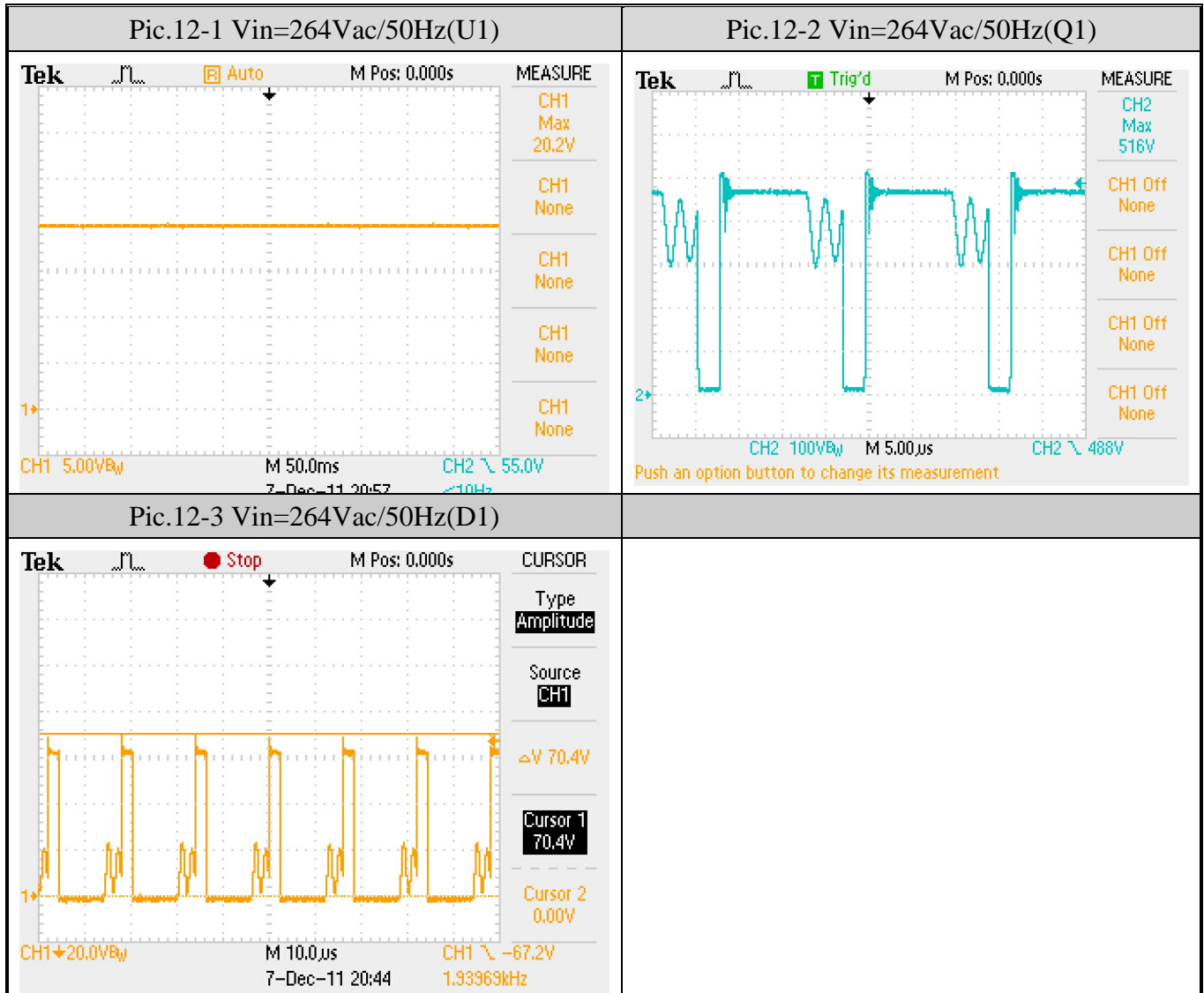
TEST BY: LIVIANTEST DATE: 2011/12/07

Input Voltage	264V <sub>AC</sub>
Input Frequency	50Hz
Output Load	12V/1A
Ambient Temperature	25°C

### Test Results:

Test Picture	Part No.	Rating	Measurement Value	Rating (%)	SPEC	Pass/Fail
Pic.12-1	U1	Max rating: 30V	20.2	67.33%	90%	Pass
Pic.12-2	Q1	Max rating: 600V	516	86.00%	90%	Pass
Pic.12-3	D1	Max rating: 100V	70.4	70.40%	90%	Pass

## Test Waveform:



### 13. Temperature Rise Test

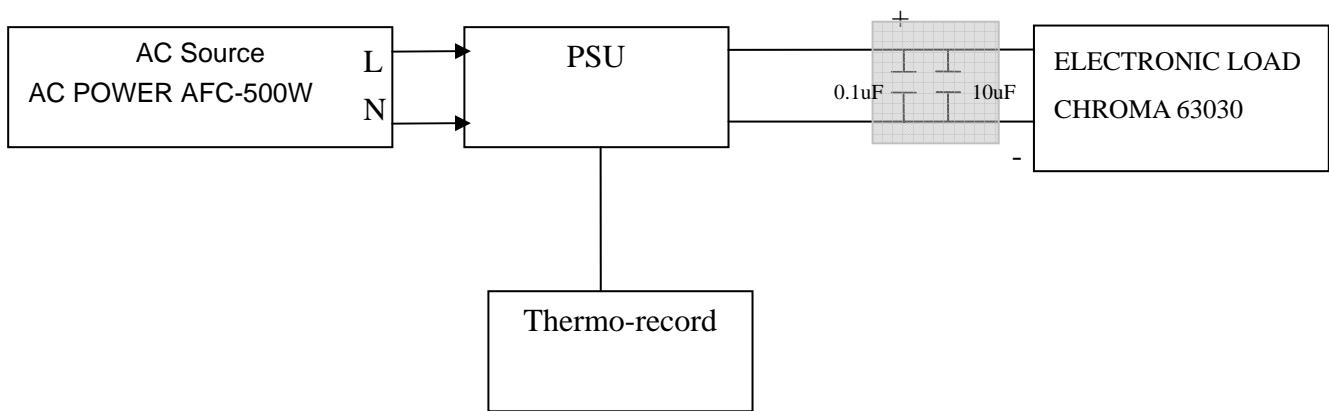
**Test Condition:**

TEST BY: LIVIAN

TEST DATE: 2011/12/07

Input Voltage	90/264V <sub>AC</sub>
Input Frequency	60/50Hz
Output Load	12V/1A
Ambient Temperature	25°C

**Setup Diagram:**



**Test Results:**

No	Location	Description	2HR (25°C )			
			90Vac (°C)	264Vac (°C)	Specifications (°C)	Pass/Fail
1	U1	SMD731	61.3	55.0	150	Pass
2	Q1	2N60	86.7	74.9	150	Pass
3	T1-CORE	EE16	86.4	84.1	110	Pass
4	T1-WIRE	EE16	84.1	81.7	110	Pass
5	T1	EE16	89.8	87.0	110	Pass
6	D7	SRL5100	85.9	86.5	150	Pass
7	C1	22uF/400V	63.8	51.3	105	Pass
8	C7	470uF/25V	66.7	66.2	105	Pass
9	LF1	20mH	69.2	45.7	110	Pass
	殼內溫度	-----	50.5	47.2	-----	-----