

Demo Board Test Report for LD7932

--- 12.5W (5V, 2.5A) Adapter

Tested by	Reviewed by	Approved by
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III. EXECUTIVE SUMMARY

Office	Taipei
Model Name	LD7932-DemoBoard#01
Version	01
IC	LD7932RJGM(D/C:103605AM1)

TEST	Result	Comments
3. Green Mode Power Consumption	PASS	
4. Line Regulation	PASS	
. Load Regulation	PASS	
5. Turn On Delay Time	PASS	
6. Over Current Protection	PASS	
7. BNO-IN / BNO-OUT level	PASS	
8. Over Voltage Protection	PASS	
9. Efficiency Test	PASS	
10. Stress Voltage Test	PASS	
11. EMI conduction	PASS	
12. Surge For System	PASS	
13. ESD For System	PASS	
14. Thermal Test	PASS	

1. Input Voltage & Frequency

The unit shall be capable of operating as a universal AC input power supply accepting AC inputs. The power supply shall operate between the following voltages (from 90V to 264V). The supply will be designed to operate for a Table 1.

	Minimum	Normal	Maximum
Input Voltage	90Vac	110Vac	264Vac
Frequency	47HZ	60HZ	63HZ

Table 1.

2. Output Loads

The line and load regulation for each of the outputs are shown in Table. 2.

Parameter	Output Voltage			Output Current	
	Minimum	Typical	Maximum	Minimum	Maximum
+5V	4.5V	5V	5.5V	0A	2.5A
Line Regulation	-1%	/	+1%	/	2.5A
Load Regulation	-2%	/	+2%	0A	2.5A

Table 2.

3. Green Mode Power Consumption

The input power of power supply shall remain **less than 300mW** under output at no load condition.

Test Condition:

Input: 90Vac/110/Vac/230Vac/264Vac (60Hz)

Output: +5V=0~200mA

Ambient Temperature: 25°C

Test Result: PASS

$I_{out} \setminus V_{in}$	90Vac	110Vac	230Vac	264Vac
0 mA	29.09	33.48	88.69	113.6
6 mA	78.79	82.49	136.2	160
10 mA	111.5	114.8	167.1	191.5
20 mA	129	176.1	227.5	251.9
30 mA	243.6	244.9	296.6	221.5
100 mA	693.7	689.8	762.9	794.9
200 mA	1282	1297	1421	1460

Unit(mW)

Table 3.

4. Total Regulation

Line regulation is defined to be the percent change in output voltage versus the nominal output voltage due to a change in AC input. The supply shall maintain the specified regulation throughout its specified operating range. Line regulation is measured at Min. Nominal and Max input voltages.

Load regulation is defined to be the percent change in output voltage versus the nominal output voltage due to a change in load. The supply shall maintain the specified regulation throughout its specified operating range. Load regulation to be measured at Min. and Max output voltages.

Test Conditions:
Input: 90Vac/264Vac(60Hz)
Output: Min/Max Load
Ambient Temperature : 25°C

AMB	Output	90Vac	264Vac
25	2.5A	4.955	4.96
DEG.C	0A	5.02	5.02
Reading		1.29%	1.20%
SPEC		±2%	

Table 4.

5. Turn On Delay Time

Turn on delay time will be **less than 3 seconds** at full load. Turn on delay time is measured as the delay between input voltage being applied at 0° phase angle and when the outputs arrive within 10% of their operating value. Turn on delay time is measured using an input voltage of 90VAC(rms) and input frequency of 60Hz.

Test Conditions:

Input: 90Vac(60Hz)

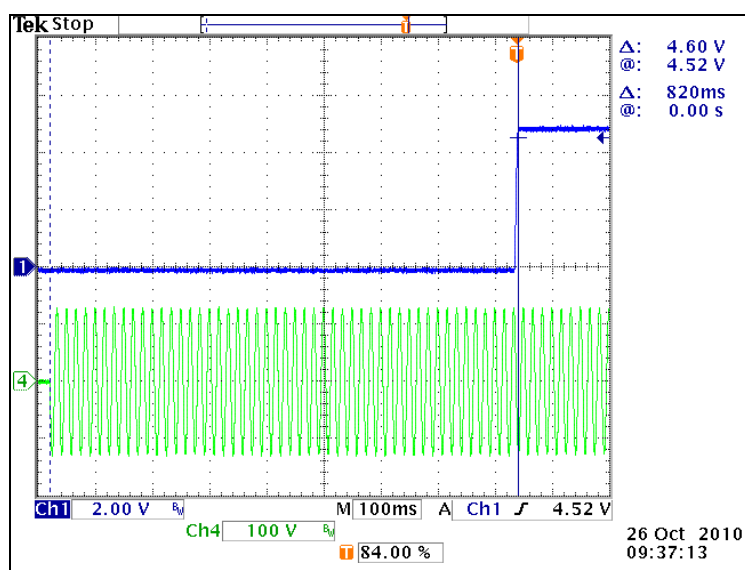
Output: +5V=2.5A

Ambient Temperature : 25°C

Test Result: PASS

Input	T _{turn on delay}
90Vac	820ms

Table 5.



Turn on Time Test

Fig.1

Vin: 90Vac/60Hz

O/P: +5V=2.5A

CH1: V_{O_+5V}

CH2: AC Input Voltage

Reading:**820ms**

6. Over Current Protection

The supply shall be designed with appropriate output over current protection. This protection shall be activated in the event of a short or long-term condition during which one or more of the output current load increases such that the primary current exceeds a predetermined limit. The primary shall limit the total power without inflicting any damage to any internal supply components and shall be reversible pending removal of the cause of the condition and without any user intervention. This protection shall be activated **within 130% to 180%** of maximum load.

Test Condition:
Input: 90/115/230/264Vac (60Hz)
Ambient Temperature: 25°C
Test Result: PASS

Input	OCP
90Vac	3.42A
115Vac	3.37A
230Vac	2.79A
264Vac	2.85A

Table 6.

7. BNO -In / BNO-OUT Level
Test Condition:
Input:

- BNO-IN : The AC voltage linearly increase from 50Vac to normal operation range.

- BNO-OUT : The AC voltage linearly decrease from normal operation range to 50Vac.

Output: +5V=2.5A
Check:

Survival: No component shall be damage electrically during the tests. The PSU shall continue to operate in a safe manner during abnormal operation.

Ambient Temperature: 25°C

	AC Voltage(V)
BNO IN	80.2Vac
BNO OUT	72.1Vac

Table 7

8. Over Voltage Protection

The supply shall be designed with appropriate output over voltage protection. This protection shall be activated in the event of a short or long-term condition during which one or more of the output open loop circuit happened. It shall limit the power supply without inflicting any damage to any internal supply components.

Test Condition:

Input: 90Vac/264Vac (60Hz)

Ambient Temperature: 25°C

Test Result: PASS

	Primary-side	Second-side
Vin(Vac)	Vcc Voltage(V)	+5Vout(V)
Vac=90V	26.3	10.1
Vac=264V	26.3	10.2

Table 8.

9. Efficiency Test

The efficiency of power supply shall be measured throughout its specified operating input range and at output maximum load conditions. It should remain **80% minimum**.

Test Condition:

Input: 115Vac/230Vac (60Hz)

Output: 25%、50%、75%、100% of Max Load(2.5A)

Ambient Temperature: 25°C

	115V		230V	
Po(W)	Pin(W)	Eff(%)	Pin(W)	Eff(%)
3.135	3.851	81.41%	3.954	79.29%
6.256	7.679	81.47%	7.791	80.30%
9.367	11.57	80.96%	11.6	80.75%
12.447	15.59	79.84%	15.39	80.88%
Result		80.92%		80.30%

Table 9.

10. Power Component Stress Voltage
Test Condition:

- Set the output loads at full load and ambient 25 °C.
- The PSU test on everyone voltage and frequency.

Check:

- Under Steady state the derating shall be below **95%**.
- Under Transient state the derating shall be below **100%**.
- Input line bulk capacitors limits are **100%** (continuous).

Result:
Input Voltage: 90Vac/264Vac (47/63Hz)

Output Power: Max Load/Short

No.	Location	Max. Rating(V)	Start-up(90V/47Hz)		Steady State(90V/47Hz)		Short(90V/47Hz)	
			Measurement	Derating(%)	Measurement	Derating(%)	Measurement	Derating(%)
1	Q1	700	354	50.57	352	50.29	350	50.00
2	D3	40	20.4	51.00	20.5	51.25	20.4	51.00

Table 10-1.

No.	Location	Max. Rating(V)	Start-up(264V/63Hz)		Steady State(264V/63Hz)		Short(264V/63Hz)	
			Measurement	Derating(%)	Measurement	Derating(%)	Measurement	Derating(%)
1	Q1	700	596	85.14	600	85.71	598	85.43
2	D3	40	37.4	93.50	36.6	91.50	37.4	93.50

Table 10-2.

11. EMI**Test Condition:**

The power supply should comply with FCC part15,EN 55022 and CISPR22 meeting Class B for conducted emissions with a 3dB margin. Tested unit should be connected to a pure resistor load (rated loding). The test condition shall be followed as:110 VAC(L and N),220VAC(L and N)

Test Result: PASS

Other detail please check the appendix.

12. Surge For System
Test Condition:

High Energy Transients are applied to the power supply once each 20 second period with 5 transients per test. The surge Test defines four levels of peak voltage.

Check:

Survival: No component shall be damage electrically during the tests. The PSU shall continue to operate in a safe manner during abnormal operation.

Result:

Input Voltage: 220V (60Hz)

Output Power: +5V=2.5A

Surge voltage	Coupling Mode	Test Level	Phase		Repetition	Test Result
1KV	Diff.	±1KV	0	L to N	5 pulses 20Sec	Pass
			90			Pass
			180			Pass
			270			Pass

Table 11-1.

Surge voltage	Coupling Mode	Test Level	Phase		Repetition	Test Result
2KV	COM..	±2KV	0	L to Earth GND N to Earth GND	5 pulses 20Sec	Pass
			90			Pass
			180			Pass
			270			Pass

Table 11-2.

13. ESD Test
Test Condition:

The voltage level is set initially at 2 kV, and increased to a maximum level of 4 kV for contact discharges and 8 kV for air discharges. Fifteen discharges for each polarity are made to each test point with a minimum time interval of 2 second between discharges.

Check:

Survival: No component shall be damage electrically during the tests. The PSU shall continue to operate in a safe manner during abnormal operation.

Polarity	Testing Mode	Test Level	Step Level	Repetition	Test Result
Positive & Negative	Contact	±2KV ↓ ±4KV	2KV	15 pulses	Pass
			2.5KV		Pass
			3KV		Pass
			4KV		Pass

Table 12-1.

Polarity	Testing Mode	Test Level	Step Level	Repetition	Test Result
Positive & Negative	Air	2KV ↓ 8KV	2KV	15 pulses	Pass
			4KV		Pass
			6KV		Pass
			8KV		Pass

Table 12-2.

14. Thermal Test
Test Condition:

- Set the output loads at full load and ambient **25°C**.
- The PSU test on everyone voltage and frequency.
- Born-In 2 hours

Check:

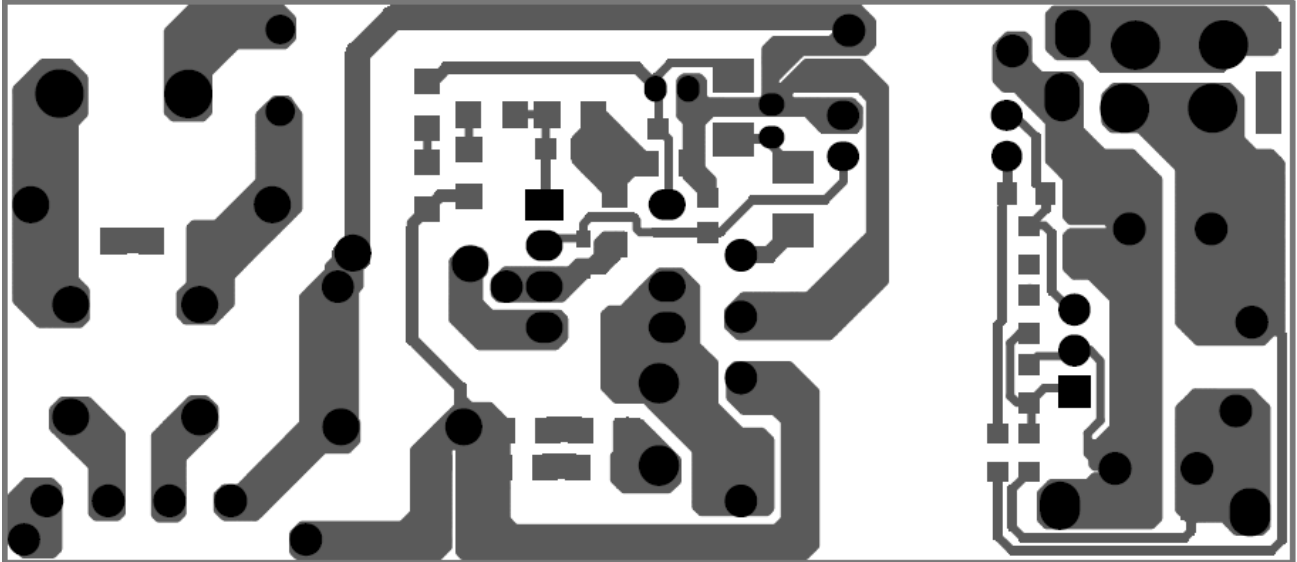
- All of component and magnetic device (transformer, Filter choke) shall NOT exceed 100°C.

Result:

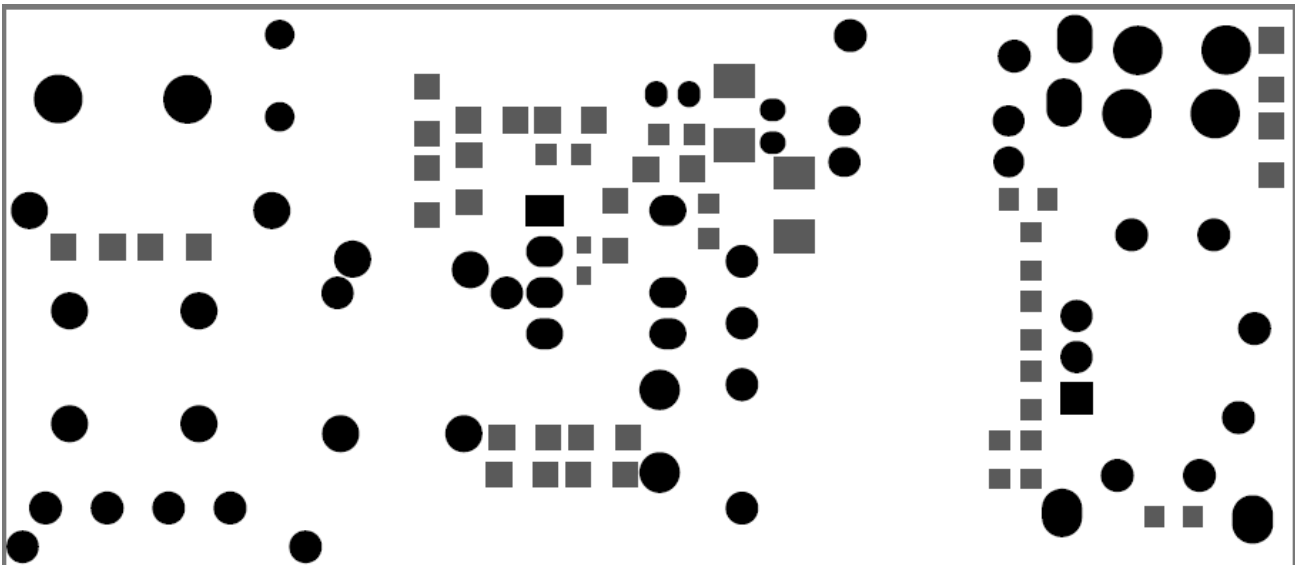
No.	Location	Max. Rating(°C.)	90V/47Hz(°C.)	264/63Hz(°C.)	Derating(%)	
					90V/47Hz	264/63Hz
1	BR1	125	53.1	41.3	42.48%	33.04%
2	D2	150	62	64.6	41.33%	43.07%
3	IC1(PIN5&6)	150	78.5	70.4	52.33%	46.93%
4	D3	150	70.4	73	46.93%	48.67%
5	T1 bobbin	130	68.4	68.3	52.62%	52.54%
6	R15	125	54.3	46.6	43.44%	37.28%
Ambient			25	25	--	--

Table 13. Key Parts for Thermal Test

Bottom Layer



Soldermask Bottom



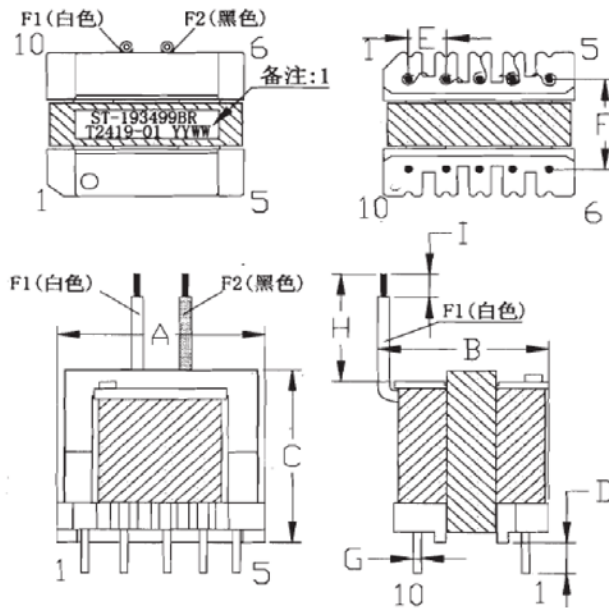
V. Transformer Specification:

朝電科技股份有限公司

Customer: 通嘉科技

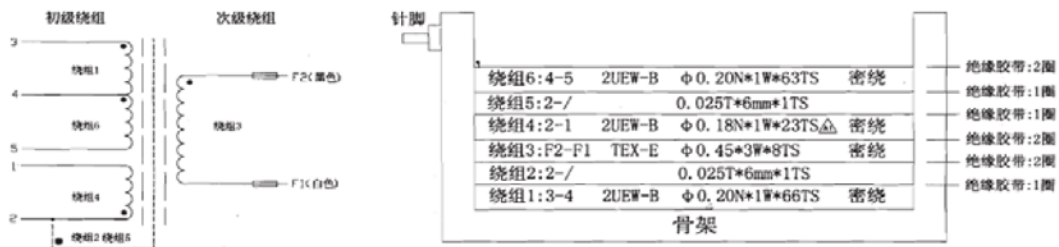
Descriptions: ST-193499BR

1. DIMENSION (UNIT: mm)



Unit : mm	
A	24.0 max
B	20.0 max
C	18.5 max
D	3.0 min
E	4.0±0.3
F	10.0±0.5
G	φ 0.8±0.1
H	25.0±3.0
I	10.0±2.0

2. CONNECTION



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朝電科技股份有限公司

Customer: 通嘉科技

Descriptions: ST-193499BR

3. ELECTRICAL CHARACTERISTICS (1.0 KHz/0.25V)

L(3-5): 1650uH±5%

DCR(1-9): 2.95Ω max

4. Hi-Pot Test:

AC 2500V/60Hz/5mA ; BETWEEN PRI TO SEC FOR 1 SECONDS.

AC 1500V/60Hz/5mA ; BETWEEN PRI TO CORE FOR 1 SECONDS.

AC 1500V/60Hz/5mA ; BETWEEN SEC TO CORE FOR 1 SECONDS.

5. Insulation Test:THE INSULATION RESISTANCE IS BETWEEN COIL TO COIL TO CORE
MEASURED BY DC 500V MUST BE OVER 100MΩ

Asatech Corp.

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