



# Test Report: PSD-15A-24

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15W DC-DC Single Output Switching Power Supply

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

## ■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

**OUTPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 100 mVp-p (Max)	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	V1 : 38 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1 : 2 % - 2 % (Max)	I/P : 9.2 VDC ~ 18 VDC O/P : FULL / MIN LOAD Ta : 25°C	V1 : 0.05 % - 0.05 %	P
3	LINE REGULATION	V1 : 0.5 % - 0.5 % (Max)	I/P : 9.2 VDC ~ 18 VDC O/P : FULL LOAD Ta : 25°C	V1 : 0.03 % - 0.03 %	P
4	LOAD REGULATION	V1 : 0.5 % - 0.5 % (Max)	I/P : 12 VDC O/P : FULL ~ MIN LOAD Ta : 25°C	V1 : 0.03 % - 0.03 %	P
5	SET UP TIME	12VDC : 2500 ms (Max)	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	12VDC / 599 ms	P
6	RISE TIME	12VDC : 25 ms (Max)	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	12VDC / 16 ms	P
7	OVER/UNDERSHOOT TEST	< ± 5 %	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %	P
8	DYNAMIC LOAD	V1 : 2400 mVp-p	I/P : 12 VDC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 780 mVp-p (2) 1154 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	9.2VDC-18VDC	I/P : TESTING O/P : FULL LOAD Ta : 25°C  I/P : LOW-LINE-0.2V=9 V HIGH-LINE+ 5%=18.9 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	9 V-18V  TEST : OK	P
2	EFFICIENCY	78 % (TYP)	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	78.10 %	P
3	INPUT CURRENT	12VDC/ 1.9 A (TYP)	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	I = 1.621 A / 12 VDC	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 150 %	I/P : 12 VDC O/P : TESTING Ta : 25°C	127.18 % / 12 VDC  Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 27.6 V ~ 32.4 V	I/P : 12 VDC O/P : NO LOAD Ta : 25°C	30.2 V / 12 VDC  Shut off o/p voltage, clamping by zener diode	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 18 VDC O/P : FULL LOAD Ta : 25°C	NO DAMAGE  Hiccup Mode	P

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : IRF540N : 100 V/ 33 A	I/P : High-Line +3V = 21 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 57.4 V (2) 51.2 V (3) 41.9 V	P
2	Diode Peak Voltage	D10 Rated : FCF10A40 :400V/ 10 A	I/P : High-Line +3V = 21 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 171 V (2) 164 V (3) 167 V	P
3	Input Capacitor Voltage	C3 Rated : 220u/63V 105°C 10*20 GL	I/P : High-Line +3V = 21 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 21.5 V (2) 21.5 V (3) 21.5 V	P
4	Control IC Voltage Test	U 1 Rated : TL3845P: 30V (MAX)	I/P : High-Line +3V = 21 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 13.3 V (2) 11.5 V (3) 13.0 V	P

**SAFETY & E.M.C. TEST**

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 2.0 KVAC/min EN 60950	I/P-O/P: 2.4 KVAC/min Ta:25°C	I/P-O/P : 0.96 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta : 25°C /70%RH	I/P-O/P : >9999 MΩ NO DAMAGE	P

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
3	RADIATION	EN55022 CLASSB	I/P: 12 VDC O/P: FULL LOAD Ta:25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 12 VDC O/P:FULL LOAD Ta:25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 12 VDC O/P:FULL LOAD Ta:25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

**RELIABILITY TEST**

**ENVIRONMENT TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																												
1	TEMPERATURE RISE TEST	MODEL : PSD-15A-5 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 12VDC O/P : FULL LOAD Ta=25.5 °C 2. HIGH AMBIENT BURN-IN : 3.5 HRS I/P : 12VDC O/P : FULL LOAD Ta=50.7 °C			P																																																												
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 12 VDC O/P : 138.2 % LOAD Ta : 25°C	TEST : OK	P																																																												
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 18VDC/9.2VDC O/P : FULL LOAD Ta= -5°C	TEST : OK	P																																																												
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 18 VDC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	P																																																												

5	TEMPERATURE COEFFICIENT	± 0.05 % (0-50°C)	I/P : 12VDC O/P : FULL LOAD	± 0.015 % (0-50°C)	P
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -25°C ~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		OK	P
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -5°C ~ +55°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 12VDC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	P
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P
9	CAPACITOR LIFE CYCLE	PSD-15A-5 : SUPPOSE C11 IS THE MOST CRITICAL COMPONENT (1) I/P : 12VDC O/P : FULL LOAD Ta=25 °C LIFE TIME (2) I/P : 12VDC O/P : FULL LOAD Ta=50 °C LIFE TIME (3) I/P : 12VDC O/P : 75% LOAD Ta=50 °C LIFE TIME		(1) 119590.6 HRS (2) 20414.0 HRS (3) 31397.9 HRS	P
10	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 740.4KHRS			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2005/07/10	PRODUCT SAMPLE	PASS	LIUWY	WANGDZ

2003/08/04 A50-G058