



# Test Report: PSD-45A-12

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45W 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 : 120 mVp-p (Max)	I/P : 12VDC O/P : FULL LOAD Ta : 25°C	V1 : 15.5 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 10.8 V ~ 13.2 V	I/P : 12 VDC O/P : MIN LOAD Ta : 25°C	10.18 V ~ 13.54 V / 12 VDC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 2 % - 2 % (Max)	I/P : 11 VDC ~ 18 VDC O/P : FULL / MIN LOAD Ta : 25°C	V1 : 0.93 % - 0.04 %	P
4	LINE REGULATION	V1 : 1 % - 1 % (Max)	I/P : 11 VDC ~ 18 VDC O/P : FULL LOAD Ta : 25°C	V1 : 0.04 % - 0.04 %	P
5	LOAD REGULATION	V1 : 1 % - 1 % (Max)	I/P : 12 VDC O/P : FULL ~ MIN LOAD Ta : 25°C	V1 : 0 % - 0 %	P
6	SET UP TIME	12VDC : 1000 ms (Max)	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	12VDC / 264.111 ms	P
7	RISE TIME	12VDC : 50 ms (Max)	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	12VDC / 36.341 ms	P
8	OVER/UNDERSHOOT TEST	< ± 5 %	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %	P
9	DYNAMIC LOAD	V1 : 1200 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) 177 mVp-p (2) 303 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	9 V-18V  TEST : OK	P
			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 )		
2	EFFICIENCY	78 % (TYP)	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	79.84 %	P
3	INPUT CURRENT	12VDC/ 3.5 A (TYP)	I/P : 12 VDC O/P : FULL LOAD Ta : 25°C	I = 3.172 A / 12VDC	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 160 %	I/P : 12 VDC O/P : TESTING Ta : 25°C	120.82 % / 12 VDC  Shut down Re-power ON	P
2	OVER VOLTAGE PROTECTION	CH1 : 13.8 V ~ 16.2 V	I/P : 12 VDC O/P : 10% LOAD Ta : 25°C	14.44 V / 12 VDC  Hiccup Mode	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 18 VDC O/P : FULL LOAD Ta : 25°C	NO DAMAGE  Shut down Re-power ON	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 : CEP50N06 : 60 V/ 50 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) 43.0 V (2) 39.4 V (3) 33.6 V	P
2	Diode Peak Voltage	D100 Rated : FMX12L :200V/ 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) 98.4 V (2) 100 V (3) 104 V	P
3	Input Capacitor Voltage	C5 Rated : 330u/100V 105°C 16*25 YXF	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) 21.7 V (3) 21.9 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) 13.2 V (2) 13.3 V (3) 14.1 V	P

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

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-FG: 1.5 KVAC/min I/P-O/P: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min EN 60950	I/P-FG: 1.8 KVAC/min I/P-O/P: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C	I/P-FG : 5.02 mA I/P-O/P : 5.26 mA O/P-FG : 5.90 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-FG: 500VDC>100MΩ I/P-O/P:500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-FG: 500 VDC I/P-O/P: 500 VDC O/P-FG: 500 VDC Ta : 25°C /70%RH	I/P-FG : >9999 MΩ I/P-O/P : >9999 MΩ O/P-FG : >9999 MΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ EN 60950	25A / 1min Ta:25°C	11 mΩ	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-45A-12 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 12VDC O/P : FULL LOAD Ta=26.2 °C 2. HIGH AMBIENT BURN-IN : 3.5 HRS I/P : 12VDC O/P : FULL LOAD Ta=39.7 °C			P
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 12 VDC O/P : 120.82 % LOAD Ta : 25°C	TEST : OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 18VDC/11VDC 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 40 °C NO DAMAGE	I/P : 18 VDC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H	TEST : OK	P
5	TEMPERATURE COEFFICIENT	± 0.05 % (0-50°C)	I/P : 12 VDC O/P : FULL LOAD	± 0.011 % (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 : -15°C~ +45°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-45A-12 :SUPPOSE C105 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=40 °C LIFE TIME (3) I/P : 12VDC O/P : 75% LOAD Ta=40 °C LIFE TIME		(1) 414879 HRS (2) 159390 HRS (3) 204585 HRS	P
10	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 329.3KHRS			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/06/23	PRODUCT SAMPLE	PASS	ZOULF	HOWAY

2009/08/04 A50-F023