



# Test Report: PSD-15B-12

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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 : 24VDC O/P : FULL LOAD Ta : 25°C	V1 : 35 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1 : 2 %~ -2 % (Max)	I/P : 18 VDC ~ 36 VDC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.25 %~ -0.25 %	P
3	LINE REGULATION	V1 : 1 %~ -1 % (Max)	I/P : 18 VDC ~ 36 VDC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0 %	P
4	LOAD REGULATION	V1 : 1 %~ -1 % (Max)	I/P : 24 VDC O/P : FULL ~ MIN LOAD Ta : 25°C	V1 : 0.21 %~ -0.21 %	P
5	SET UP TIME	24VDC : 2500 ms (Max)	I/P : 24 VDC O/P : FULL LOAD Ta : 25°C	24VDC/ 1593 ms	P
6	RISE TIME	24VDC : 25 ms (Max)	I/P : 24 VDC O/P : FULL LOAD Ta : 25°C	24VDC/ 5 ms	P
7	OVER/UNDERSHOOT TEST	< ± 5 %	I/P : 24 VDC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %	P
8	DYNAMIC LOAD	V1 : 1200 mVp-p	I/P : 24 VDC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 684 mVp-p (2) 997 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	18VDC~36VDC	I/P : TESTING O/P : FULL LOAD Ta : 25°C  I/P : LOW-LINE-0.2V=17.8 V HIGH-LINE+ 5%=37.8 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	17.8 V~36V  TEST : OK	P
2	EFFICIENCY	78 % (TYP)	I/P : 24 VDC O/P : FULL LOAD Ta : 25°C	78.24 %	P
3	INPUT CURRENT	24VDC/ 0.9 A (TYP)	I/P : 24 VDC O/P : FULL LOAD Ta : 25°C	I = 0.801 A/ 24 VDC	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 150 %	I/P : 24 VDC O/P : TESTING Ta : 25°C	131.27 %/ 24 VDC  Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 13.8 V ~ 16.2 V	I/P : 24 VDC O/P : No LOAD Ta : 25°C	15.4 V/ 24 VDC  Shut off o/p voltage, clamping by zener diode	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 36 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 : IRF640 : 200 V/ 18 A	I/P : High-Line +3V = 39 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 71.1 V (2) 95.5 V (3) 65.9 V	P
2	Diode Peak Voltage	D10 Rated : BYQ28X-200 :200V/ 10 A	I/P : High-Line +3V = 39 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 99.8 V (2) 94.4 V (3) 96.7 V	P
3	Input Capacitor Voltage	C3 Rated : 220u/63V 105°C 10*20 GL	I/P : High-Line +3V = 39 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) 40.4 V (2) 40.4 V (3) 40.4 V	P
4	Control IC Voltage Test	U 1 Rated : TL3845P: 30V (MAX)	I/P : High-Line +3V = 39 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) 12.8 V (2) 11.5 V (3) 12.7 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 : 0.68 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: 24 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: 24 VDC O/P:FULL LOAD Ta:25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 24 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-15B-5 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 24VDC O/P : FULL LOAD Ta=26.5 °C 2. HIGH AMBIENT BURN-IN : 3.5 HRS I/P : 24VDC O/P : FULL LOAD Ta=50.1 °C			P
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 24 VDC O/P : 130.05 % LOAD Ta : 25°C	TEST : OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 36VDC/ 18VDC 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 : 36 VDC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	P

5	TEMPERATURE COEFFICIENT	$\pm 0.05\%$ (0-50°C)	I/P : 24VDC O/P : FULL LOAD	$\pm 0.01\%$ (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 : 24VDC/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-15B-5 :SUPPOSE C11 IS THE MOST CRITICAL COMPONENT (1) I/P : 24VDC O/P : FULL LOAD Ta=25 °C LIFE TIME (2) I/P : 24VDC O/P : FULL LOAD Ta=50 °C LIFE TIME (3) I/P : 24VDC O/P : 75% LOAD Ta=50 °C LIFE TIME		(1) 126395.2 HRS (2) 23307.3 HRS (3) 32737.4 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