



# Test Report: SD-15C-5

---

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 : 48VDC O/P : FULL LOAD Ta : 25°C	V1 : 35 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 4.75 V ~ 5.5 V	I/P : 48 VDC O/P : MIN LOAD Ta : 25°C	4.525 V ~ 5.864 V / 48 VDC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 2 % ~ -2 % (Max)	I/P : 36 VDC ~ 72 VDC O/P : FULL / MIN LOAD Ta : 25°C	V1 : 0.24 % ~ -0.12 %	P
4	LINE REGULATION	V1 : 0.5 % ~ -0.5 % (Max)	I/P : 36 VDC ~ 72 VDC O/P : FULL LOAD Ta : 25°C	V1 : 0.12 % ~ 0 %	P
5	LOAD REGULATION	V1 : 0.5 % ~ -0.5 % (Max)	I/P : 48 VDC O/P : FULL ~ MIN LOAD Ta : 25°C	V1 : 0.12 % ~ -0.12 %	P
6	SET UP TIME	48VDC : 2500 ms (Max)	I/P : 48 VDC O/P : FULL LOAD Ta : 25°C	48VDC / 1852 ms	P
7	RISE TIME	48VDC : 25 ms (Max)	I/P : 48 VDC O/P : FULL LOAD Ta : 25°C	48VDC / 4 ms	P
8	OVER/UNDERSHOOT TEST	< ± 10 %	I/P : 48 VDC O/P : FULL LOAD Ta : 25°C	TEST : < 10 %	P
9	DYNAMIC LOAD	V1 : 1000 mVp-p	I/P : 48 VDC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 149 mVp-p (2) 615 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	36VDC~72VDC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	35.8 V~72V	P
			I/P : LOW-LINE-0.2V=35.8 V HIGH-LINE+ 5%=75.6 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	TEST : OK	
2	EFFICIENCY	75 % (TYP)	I/P : 48 VDC O/P : FULL LOAD Ta : 25°C	77.92 %	P
3	INPUT CURRENT	48VDC/ 0.45 A (TYP)	I/P : 48 VDC O/P : FULL LOAD Ta : 25°C	I = 0.407 A/ 48 VDC	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 160 %	I/P : 48 VDC O/P : TESTING Ta : 25°C	131.90 %/ 48 VDC  Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 5.75 V ~ 6.75 V	I/P : 48 VDC O/P : 10% LOAD Ta : 25°C	6.25 V/ 48 VDC  Shut off o/p voltage, clamping by zener diode	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 72 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 : IRF740 : 400 V/ 10 A	I/P : High-Line +3V = 75 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 315 V (2) 289 V (3) 311 V	P
2	Diode Peak Voltage	D10 Rated : YG865C10R :100V/ 20 A	I/P : High-Line +3V = 75 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 87.9 V (2) 79.8 V (3) 85.6 V	P
3	Input Capacitor Voltage	C5 Rated : 100u/100V 105°C 10*20 GS	I/P : High-Line +3V = 75 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) 77.8 V (2) 72.2 V (3) 77.5 V	P
4	Control IC Voltage Test	U 1 Rated : TL3845P: 30V (MAX)	I/P : High-Line +3V = 75 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) 13.8 V (2) 12.6 V (3) 13.8 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 : 3.38 mA I/P-O/P : 0.62 mA O/P-FG : 0.289 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	40 A / 1min Ta:25°C	6 mΩ	P

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
3	RADIATION	EN55022 CLASSB	I/P: 48 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: 48 VDC O/P:FULL LOAD Ta:25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 48 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 : SD-15C-5 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 48VDC O/P : FULL LOAD Ta=24.5 °C 2. HIGH AMBIENT BURN-IN : 3.5 HRS I/P : 48VDC O/P : FULL LOAD Ta=41.2 °C			P
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 48 VDC O/P : 131.90 % LOAD Ta : 25°C	TEST : OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 72VDC/ 36VDC 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 : 72 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 : 48 VDC O/P : FULL LOAD	± 0.012 % (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 ~ +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 : 48VDC/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	SD-15C-5 :SUPPOSE C11 IS THE MOST CRITICAL COMPONENT (1) I/P : 48VDC O/P : FULL LOAD Ta=25 °C LIFE TIME (2) I/P : 48VDC O/P : FULL LOAD Ta=40 °C LIFE TIME (3) I/P : 48VDC O/P : 75% LOAD Ta=40 °C LIFE TIME		(1) 156005.9 HRS (2) 42707.2 HRS (3) 57089.6 HRS	P
10	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 653.5KHRS			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2005/09/03	PRODUCT SAMPLE	PASS	LIUWY	WANGDZ

2003/08/04 A50-G058