



Test Report: EPS-35-15

35W 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 : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 72.8 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 13.5V ~ 16.5 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	13.08 V ~ 17.38 V/ 230 VAC 13.08 V ~ 17.38 V/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : -1%~ 1 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.12 %~ -0.12 %	P
4	LINE REGULATION	V1 : -0.5%~ 0.5 % (Max)	I/P : 100VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0 %	P
5	LOAD REGULATION	V1 : -0.5 %~ 0.5 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.12 %~ -0.12 %	P
6	SET UP TIME	230VAC : 1000 ms (Max) 115VAC : 1000 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 564 ms 115VAC/ 570 ms	P
7	RISE TIME	230VAC : 30 ms (Max) 115VAC : 30 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 8.2 ms 115VAC/ 8.6 ms	P
8	HOLD UP TIME	230VAC : 50 ms (TYP) 115VAC : 16 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 96 ms 115VAC/ 19 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %	P
10	DYNAMIC LOAD	V1 : 1500 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1)224 mVp-p (2)388 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	85VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25℃ I/P : LOW-LINE-3V=82 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	58.6V~264V TEST : OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 100VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25℃	TEST : OK	P
3	EFFICIENCY	88% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25℃	88.185 %	P
4	INPUT CURRENT	230V/ 0.5 A (TYP) 115V/ 0.75 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	I = 0.35 A/ 230 VAC I = 0.64 A/ 115 VAC	P
5	INRUSH CURRENT	230V/ 40 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25℃	I = 32 A/ 230 VAC	P
6	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25℃	L-FG : 0.2 mA N-FG : 0.41 mA	P
7	NO LOAD CONSUMPTION	< 0.3 W	I/P : 240VAC O/P : NO LOAD Ta : 25℃	< 0.2 W	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	115% ~ 160 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	133.5 %/230VAC 135.4 %/115VAC Hiccup mode ,recover automatically after fault condition is removed.	P
2	OVER VOLTAGE PROTECTION	CH1 : 17.25V ~ 20.25V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	19.257V/230VAC 19.214V/115VAC Shut down Re- power ON	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC 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 : STF6N62K3 5.5A/620V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 558 V (2) 514 V (3) 556 V	P
2	Diode Peak Voltage	D100 Rated : PFR30L100CT 30A/100V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 66.8 V (2) 51 V (3) 65.8 V	P
3	Clamp Diode Peak Voltage	D1 Rated : 2A/800V GP20K	I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25°C	(1) 496 V (2) 496 V	P
4	Input Capacitor Voltage	C5 Rated : 82u/400V 105°C 18*25 VZ	I/P : High-Line +3V = 267 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) 375.15 V (2) 377.66 V (3) 376.07 V	P
5	Control IC Voltage Test	U1 Rated : LD7750R 11V~25V	I/P : High-Line +3V = 267 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) 15.258 V (2) 13.405 V (3) 15.237 V	P

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3 KVAC/min I/P-FG : 1.5 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 3.6 KVAC/min I/P-FG : 1.8 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 1.008 mA I/P-FG : 1.819 mA O/P-FG : 0.248 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C / 70%RH	I/P-O/P : 30 GΩ I/P-FG : 30 GΩ O/P-FG : 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	13 mΩ	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS D	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ 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 : EPS-35-5 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta=28 °C 2. HIGH AMBIENT BURN-IN : 5 HRS I/P : 230VAC O/P : FULL LOAD Ta=49.5 °C <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 28 °C</th><th>HIGH AMBIENT Ta= 49.5 °C</th></tr><tr><td>1</td><td>LF1</td><td>LF901</td><td>57.3°C</td><td>73.9°C</td></tr><tr><td>2</td><td>C1</td><td>474/275VAC 20% P=15 R.46</td><td>51.7°C</td><td>69.0°C</td></tr><tr><td>3</td><td>BD1</td><td>4A/800V SILICON UR4KB80</td><td>60.7°C</td><td>77.1°C</td></tr><tr><td>4</td><td>Q1</td><td>STF6N62K3 5.5A/620V TO220FP</td><td>75.4°C</td><td>94.0°C</td></tr><tr><td>5</td><td>C5</td><td>82u/400V 105°C 18*25 VZ</td><td>54.2°C</td><td>72.2°C</td></tr><tr><td>6</td><td>D1</td><td>2A/800V GP20K T-52mm</td><td>74.9°C</td><td>93.5°C</td></tr><tr><td>7</td><td>D40</td><td>1A/1KV 1N4007 T-52mm</td><td>76.0°C</td><td>93.3°C</td></tr><tr><td>8</td><td>C40</td><td>33u/50V L5Kh 6.3*11 KY</td><td>56.4°C</td><td>74.1°C</td></tr><tr><td>9</td><td>T1</td><td>TF2397 PQ-2020 EPS-35-5 B</td><td>76.7°C</td><td>94.3°C</td></tr><tr><td>10</td><td>U1</td><td>LD7750R</td><td>72.6°C</td><td>89.9°C</td></tr><tr><td>11</td><td>D100</td><td>PFR30L45CT 30A/45V TO220</td><td>77.8°C</td><td>98.0°C</td></tr><tr><td>12</td><td>C105</td><td>1500u/6.3V C 10*10 FV</td><td>83.0°C</td><td>102.2°C</td></tr><tr><td>13</td><td>C106</td><td>1000u/16V UL10Kh 10*16 ZLH</td><td>62.9°C</td><td>82.8°C</td></tr></table>			NO	Position	P/N	ROOM AMBIENT Ta= 28 °C	HIGH AMBIENT Ta= 49.5 °C	1	LF1	LF901	57.3°C	73.9°C	2	C1	474/275VAC 20% P=15 R.46	51.7°C	69.0°C	3	BD1	4A/800V SILICON UR4KB80	60.7°C	77.1°C	4	Q1	STF6N62K3 5.5A/620V TO220FP	75.4°C	94.0°C	5	C5	82u/400V 105°C 18*25 VZ	54.2°C	72.2°C	6	D1	2A/800V GP20K T-52mm	74.9°C	93.5°C	7	D40	1A/1KV 1N4007 T-52mm	76.0°C	93.3°C	8	C40	33u/50V L5Kh 6.3*11 KY	56.4°C	74.1°C	9	T1	TF2397 PQ-2020 EPS-35-5 B	76.7°C	94.3°C	10	U1	LD7750R	72.6°C	89.9°C	11	D100	PFR30L45CT 30A/45V TO220	77.8°C	98.0°C	12	C105	1500u/6.3V C 10*10 FV	83.0°C	102.2°C	13	C106	1000u/16V UL10Kh 10*16 ZLH	62.9°C	82.8°C	P
NO	Position	P/N	ROOM AMBIENT Ta= 28 °C	HIGH AMBIENT Ta= 49.5 °C																																																																							
1	LF1	LF901	57.3°C	73.9°C																																																																							
2	C1	474/275VAC 20% P=15 R.46	51.7°C	69.0°C																																																																							
3	BD1	4A/800V SILICON UR4KB80	60.7°C	77.1°C																																																																							
4	Q1	STF6N62K3 5.5A/620V TO220FP	75.4°C	94.0°C																																																																							
5	C5	82u/400V 105°C 18*25 VZ	54.2°C	72.2°C																																																																							
6	D1	2A/800V GP20K T-52mm	74.9°C	93.5°C																																																																							
7	D40	1A/1KV 1N4007 T-52mm	76.0°C	93.3°C																																																																							
8	C40	33u/50V L5Kh 6.3*11 KY	56.4°C	74.1°C																																																																							
9	T1	TF2397 PQ-2020 EPS-35-5 B	76.7°C	94.3°C																																																																							
10	U1	LD7750R	72.6°C	89.9°C																																																																							
11	D100	PFR30L45CT 30A/45V TO220	77.8°C	98.0°C																																																																							
12	C105	1500u/6.3V C 10*10 FV	83.0°C	102.2°C																																																																							
13	C106	1000u/16V UL10Kh 10*16 ZLH	62.9°C	82.8°C																																																																							
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 144 % LOAD Ta : 25°C	TEST : OK	P																																																																						
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -35 °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 : 272 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	P																																																																						
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.00 %(0~50°C)	P																																																																						
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°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 : -35°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 : 230VAC/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 : 60min in each axis (X.Y.Z) (6) Ta : 25℃	TEST : OK	P
9	CAPACITOR LIFE CYCLE	EPS-35-5: SUPPOSE C106 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta=25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta=50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 85881HRS (2) 16965HRS (3) 31216HRS (4) 47653HRS	P
10	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 649.1 KHRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50℃		P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2012/2/3	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023