



Test Report: EPS-15-7.5

15W Single Output Switching Power Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control 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 : 80 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 42 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 7.13 V ~ 8.25 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	6.78 V ~ 8.572 V/ 230 VAC 6.78 V ~ 8.572 V/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : -2 %~ +2 % (Max)	I/P : 85 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : -0.252 %~ 0.079 %	P
4	LINE REGULATION	V1 : -0.5 %~ +0.5 % (Max)	I/P : 100VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : -0.079 %~ 0 %	P
5	LOAD REGULATION	V1 : -1 %~ +1 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -0.159 %~ 0.079 %	P
6	SET UP TIME	230VAC : 1000 ms (Max) 115VAC : 2000 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 605 ms 115VAC/ 1456 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/ 4.99 ms 115VAC/ 4.95 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/ 87.99 ms 115VAC/ 18.17 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : 1.6 %	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 90%DUTY/ 3KHZ (3).O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 236 mVp-p (2) 126 mVp-p (3) 138 mVp-p (4) 258 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)	54.7 V~264V TEST : OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 85 VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25℃	TEST : OK	P
3	EFFICIENCY	81 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25℃	82.3 %	P
4	INPUT CURRENT	230V/ 0.2 A (TYP) 115V/ 0.4 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	I = 0.15 A/ 230 VAC I = 0.23 A/ 115 VAC	P
5	INRUSH CURRENT	230V/ 45 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25℃	I = 41.26 A/ 230 VAC	P
6	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25℃	L-FG : 0.25 mA N-FG : 0.23 mA	P
7	NO LOAD CONSUMPTION	< 0.3 W	I/P : 240VAC O/P : NO LOAD Ta : 25℃	< 0.131 W	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	115 % ~ 150 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25℃	133 %/ 230 VAC 134 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 8.63 V ~10.1 V	O/P : MIN LOAD Ta : 25℃	9.1 V shut down clamping by zener diode	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25℃	NO DAMAGE Hiccup Mode	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	PEAK LOAD	16.5W@10SEC	I/P: 230VAC/115VAC O/P:PEAK LOAD Ta:25℃	16.5W@10SEC /230V 16.5W@10SEC /115V	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated : 600 V 4 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25℃	(1) 546 V (2) 484 V (3) 542 V	P
2	Diode Peak Voltage	D100 Rated : 45 V 30 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25℃	(1) 35.8 V (2) 34.4 V (3) 28.2 V	P
3	Clamp Diode Peak Voltage	D 1 Rated : 800 V 2 A	I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25℃	(1) 492 V (2) 494 V	P
4	Input Capacitor Voltage	C5 Rated : 33 u /400V/105℃	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℃	(1) 364 V (2) 364 V (3) 366 V	P
5	Control IC Voltage Test	U1 Rated : 28 V	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℃	(1) 18.4 V (2) 16.8 V (3) 18.5 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 : 2 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 3.6 KVAC/min I/P-FG : 2.4KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 1.19 mA I/P-FG : 0.68 mA O/P-FG : 0.25 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 : 9999 MΩ I/P-FG : 9999 MΩ O/P-FG : 9999 MΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	3 mΩ	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	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-15-05 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=13.3℃ 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 49.8℃ <table><tr><th>NO</th><th>Position</th><th>PART NUMBER</th><th>ROOM AMBIENT Ta= 13.3℃</th><th>HIGH AMBIENT Ta= 49.8℃</th></tr><tr><td>1</td><td>BD1</td><td>BD 2A/800V GLASS KBP208G</td><td>40.9℃</td><td>76.1℃</td></tr><tr><td>2</td><td>LF1</td><td>LF LF510-R2 UU9.8 0.4A 27mH B</td><td>43.0℃</td><td>79.1℃</td></tr><tr><td>3</td><td>C5</td><td>C/E 33u/400V 105℃ 12.5*20 KMG</td><td>35.9℃</td><td>70.4℃</td></tr><tr><td>4</td><td>Q1</td><td>FET NDF04N60ZG 4A/600V TO220F</td><td>56.7℃</td><td>91.2℃</td></tr><tr><td>5</td><td>T1(COIL)</td><td>MT TF5166-R0 EI-22 EPS-15-5 B</td><td>77.6℃</td><td>112.4℃</td></tr><tr><td>6</td><td>D100</td><td>SBD STPS30S45CT 30A/45V TO220</td><td>79.7℃</td><td>115.1℃</td></tr><tr><td>7</td><td>L100</td><td>DR-COIL DR011C-R2 6*8 0.55Φ 1uH</td><td>52.2℃</td><td>87.3℃</td></tr><tr><td>8</td><td>C102</td><td>C/E 1000u/16V UL8Kh 8*20 ZLH</td><td>50.0℃</td><td>84.5℃</td></tr><tr><td>9</td><td>C101</td><td>C/E 1000u/16V UL8Kh 8*20 ZLH</td><td>59.5℃</td><td>93.8℃</td></tr><tr><td>10</td><td>U1</td><td>PWM NCP1250BSN65T1G TOSP-6</td><td>43.2℃</td><td>77.6℃</td></tr></table>			NO	Position	PART NUMBER	ROOM AMBIENT Ta= 13.3℃	HIGH AMBIENT Ta= 49.8℃	1	BD1	BD 2A/800V GLASS KBP208G	40.9℃	76.1℃	2	LF1	LF LF510-R2 UU9.8 0.4A 27mH B	43.0℃	79.1℃	3	C5	C/E 33u/400V 105℃ 12.5*20 KMG	35.9℃	70.4℃	4	Q1	FET NDF04N60ZG 4A/600V TO220F	56.7℃	91.2℃	5	T1(COIL)	MT TF5166-R0 EI-22 EPS-15-5 B	77.6℃	112.4℃	6	D100	SBD STPS30S45CT 30A/45V TO220	79.7℃	115.1℃	7	L100	DR-COIL DR011C-R2 6*8 0.55Φ 1uH	52.2℃	87.3℃	8	C102	C/E 1000u/16V UL8Kh 8*20 ZLH	50.0℃	84.5℃	9	C101	C/E 1000u/16V UL8Kh 8*20 ZLH	59.5℃	93.8℃	10	U1	PWM NCP1250BSN65T1G TOSP-6	43.2℃	77.6℃	P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 128 % LOAD Ta : 25℃	TEST : OK	P																																																							
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -30 ℃	TEST : OK	P																																																							
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃ NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50 ℃ HUMIDITY= 95 %R.H	TEST : OK	P																																																							
5	TEMPERATURE COEFFICIENT	± 0.03 %/℃ (0~50℃)	I/P : 230 VAC O/P : FULL LOAD	± 0.005 %/℃ (0~50℃)	P																																																							
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40℃~ +85℃ 2. Temperature change rate : 25℃ / 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 : -30℃~ +70℃ 2. Temperature change rate : 25℃ / 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-15-05 SUPPOSE C 102 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) 240859 HRS (2) 40143 HRS (3) 68832 HRS (4) 125767 HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 824.6 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
2012.9.18	RD SAMPLE	PASS	Shenym	Wangdz
2012.11.21	PRODUCT SAMPLE (Y1211B629)	PASS	Shenym	Wangdz

2007/03/20 A50-S014