

**Quality Engineering Test Report**

V1 : 15 V/ 60A/ 900 W

AC-DC

Single Output Switching Power Supply

**OUTPUT FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 150 mVp-p (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	V1: 48 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 13.5 V~ 18 V (TYP)	I/P: 230 VAC O/P:MIN LOAD Ta:25°C	12.6V~ 19.3V/ 230 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: + 2 %~ - 2 % (Max)	I/P: 180 VAC / 264 VAC O/P:FULL/ 0 % LOAD Ta:25°C	V1: +0.17 %~ -0.17 %	P
4	LINE REGULATION	V1: + 0.3 %~ - 0.3 % (Max)	I/P: 180 VAC ~ 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: +0.17 %~ -0.17 %	P
6	SET UP TIME	230VAC/ 1500 ms (Max) 115 VAC/ 1500 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 413 ms 115 VAC/ 790 ms	P
7	RISE TIME	230VAC/ 50 ms (Max) 115 VAC/ 50 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 11.6 ms 115 VAC/ 25.1 ms	P
8	HOLD UP TIME	230VAC/ 15 ms (Max) 115 VAC/1.5 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 36.7 ms 115 VAC/ 36 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 O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C	1060 mVp-p	P
11	TRANSIENT RECOVERY TIME	V1: 600 mVp-p	I/P: 230 VAC O/P:40% LOAD CHANGE 50%DUTY/120HZ 1.25A/us	432 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180 VAC~264 VAC (Typ)	I/P:TESTING O/P:FULL LOAD Ta:25°C	84V~ 264 V	P
			I/P: LOW-LINE-3V= 177 V HIGH-LINE+15%= 300 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	TEST: OK	
2	INPUT FREQUENCY RANGE	47 HZ ~ 63 HZ (Typ) NO DAMAGE OSC	I/P: 180 VAC ~ 264 VAC O/P:FULL-MIN LOAD Ta:25°C	TEST: OK	P
3	POWER FACTOR	0.95/ 230 VAC(TYP) 0.95/ 115 VAC(TYP)	I/P: 230 VAC I/P:115 VAC O/P:FULL LOAD Ta:25°C	PF= 0.97/ 230 VAC PF= 0.97/ 115 VAC	P
4	EFFICIENCY	84 % (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	85.1%	P
5	INPUT CURRENT	230 V/ 7 A (Max) 115 V/ 14 A (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 4.8A/ 230 VAC I = 8.4A/ 115 VAC	P
6	INRUSH CURRENT	230 V/ 70 A (Max) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 36A/ 230 VAC	P
7	LEAKAGE CURRENT	< 2 mA/ 240 VAC	I/P: 240 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.82 mA N-FG: 0.82 mA	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	115 %~ 140 % (Typ)	I/P: 230 VAC I/P: 180 VAC O/P: TESTING Ta: 25°C	127%/ 230 VAC 127%/ 180 VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1: 15.5 V~ 18.2 V (Typ)	I/P: 230 VAC I/P: 115 VAC O/P: MIN LOAD Ta: 25°C	19.5V/ 230 VAC 19.5V/ 115 VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: TSW1 > 95 °C O.T.P. NO DAMAGE	I/P: 230 VAC O/P: FULL LOAD	O.T.P. Active NO DAMAGE Shunt down Recovery automatically After temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 267 VAC O/P: 100% LOAD Ta: 25°C	NO DAMAGE Constant Current Limiting	P

**CONTROL FUNCTION TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
3	REMOTE CONTROL	Rc+ / Rc- 0 V~ 0.8 V POWER ON 4 V~ 10 V POWER OFF	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	0V ~ 2.1 V POWER ON 2.8V ~ 10 V POWER OFF	P
6	CURRENT SHARING	PSU1-PSU2 < 80W	I/P: 230 VAC O/P: FULL/50% LOAD Ta: 25°C	PSU1-PSU2 < 80W	P

**ENVIRONMENT TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT	
1	TEMPERATURE RISE TEST	MODEL : PSP-1000- 5V 1. ROOM AMBIENT BURN-IN : 15 HRS I/P: 230 VAC O/P: 100% LOAD Ta= 29 °C 2. HIGH AMBIENT BURN-IN : 14.5 HRS I/P: 230 VAC O/P: 100% LOAD Ta= 41.5 °C			<b>P</b>	
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P: 230 VAC O/P: 115% Ta:25°C	TEST : OK	<b>P</b>	
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 VAC O/P: 100%LOAD Ta= -10 °C	TEST : OK	<b>P</b>	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 25 °C NO DAMAGE	I/P: 272 VAC O/P: FULL LOAD Ta= 25 °C HUMIDITY= 95 %R.H	TEST : OK	<b>P</b>	
5	TEMPERATURE COEFFICIENT	± 0.03 % (0~50°C)	I/P: 230 VAC O/P: FULL LOAD	± 0.01 % (0~50°C)	<b>P</b>	
6	VIBRATION TEST	1 Carton & 1 Set Operating at I/P: 230 VAC NO LOAD (1) Waveform: Sine Wave (2) Frequency: 10~500Hz (3) Sweep Time: 10min/sweep cycle (4) Acceleration: 3G (5) Test Time: 1 hour in each axis (X.Y.Z) (6) Ta: 25°C		TEST : OK	<b>P</b>	

**SAFETY TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.6 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: 7.49 mA I/P-FG: 5.54 mA O/P-FG: 30.52 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	I/P-O/P: 2.3G Ω I/P-FG: 2.2G Ω O/P-FG: 1.5G Ω NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	30 A / 2min Ta:25°C	16 mΩ	P
4	APPROVAL	TUV: Certificate NO : R50011970 UL: File NO : E183223			

**E.M.C TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 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 LIGHT 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 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

**M.T.B.F & LIFE CYCLE CALCULATION**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SUPPOSE C 64 IS THE MOST CRITICAL COMPONENT I/P: 230 VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 308753 HRS I/P: 230 VAC O/P:FULL LOAD Ta= 40 °C LIFE TIME= 190047 HRS			<b>P</b>
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 59666 HRS			<b>P</b>

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q 1 Rated IRFP460 : 500 V 20 A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 250 V (2) 428 V (3) 486 V	<b>P</b>
2	Diode <b>Peak Voltage</b>	D 63 Rated KCH30A10 : 100 V 30 A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25°C	(1) 70.4 V (2) 68.2 V (3) 70.4 V	<b>P</b>

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2003/08/13	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN

2003/7/14 A50-F023