



Test Report: HRP-100-48

100W Single Output with PFC Function

■ 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 : 240 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 88 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 45.6V ~ 55.2V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	39.89 V ~ 59.1 V/ 230 VAC 39.89 V ~ 59.1 V/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 1.5 % ~ -1.5 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.13 % ~ -0.13 %	P
4	LINE REGULATION	V1 : 0.2 % ~ -0.2 % (Max)	I/P : VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.02 % ~ -0.02 %	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 : 2500 ms (Max) 115VAC : 2500 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 748 ms 115VAC/ 1496 ms	P
7	RISE TIME	230VAC : 50 ms (Max) 115VAC : 50 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 21 ms 115VAC/ 20 ms	P
8	HOLD UP TIME	230VAC : 50 ms (TYP) 115VAC : 20 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 63 ms 115VAC/ 25 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 : 4800 mVp-p	I/P : 230 VAC O/P : FULL /Min LOAD 90%DUTY/ 1KHZ Ta : 25°C	217 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°C	80 V~264V	P
			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)	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 85 VAC ~ 264 VAC O/P : FULL ~MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.95 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.97 / 230 VAC PF= 1 / 115 VAC	P
4	EFFICIENCY	90 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	90.39 %	P
5	INPUT CURRENT	230V/ 0.6 A (TYP) 115V/ 1.2 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.52 A/ 230 VAC I = 1.04 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 65 A (TYP) 115V/ 35 A(TYP) COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 31 A/ 230 VAC I = 16 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.39 mA N-FG : 0.24 mA	P
8	NO LOAD POWER CONSUMPTION	<0.5W	I/P : 240 VAC O/P : NO LOAD Ta : 25°C	0.38W	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 135 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	122 %/ 230 VAC 122 %/ 115 VAC Constant current limiting for Vo=50 ~ 100% of rated voltage, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 57.6 V~ 67.2V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	62.21 V/ 230 VAC 62.2 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION (optional)	SPEC : TSW1 : $85 \pm 5^{\circ}\text{C}$ O.T.P. TSW1 : detect on heatsink Q101 of power transistor NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage , recovers automatically after temperature goes down	P
4	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

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	REMOTE CONTROL	Rc+ / Rc- 0 V~ 0.8 V POWER ON 4 V~ 10V POWER OFF	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	0 V~1.8 V POWER ON 1.9 V~10 V POWER OFF	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q3 Rated : 2SK3673-01MR 10A/700V	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) 684 V (2) 668 V (3) 660 V	P
2	Diode Peak Voltage	Q101 Rated : STTH2003CT 20A/300V	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) 240 V (2) 228 V (3) 236 V	P
3	Clamp Diode Peak Voltage	D2 Rated : 3A/600V 1N5406	I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2) Full load continue Ta : 25°C	(1) 550 V (2) 550 V	P
4	Input Capacitor Voltage	C5 Rated : 100u/400V 105°C	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) 380 V (2) 382 V (3) 398.8 V	P
5	Control IC Voltage Test	U1 Rated : PFC FAN6921MR 30V(max) 7.8V(min) U101 Rated : TEA1761T 38V(max) 8.35V(min)	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) 24.62 V (2) 19.11 V (3) 24.9 V (1) 25.88 V (2) 20.02 V (3) 25.88 V	P
6	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 2SK4106 12A/500V	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) 442 V (2) 396 V (3) 458 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 : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 3.85 mA I/P-FG : 2.892 mA O/P-FG : 2.155 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	12 mΩ	P
4	APPROVAL	TUV : Certificate NO : R50171849 UL : File NO : E183223			P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2,-3 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.	THERMO TRACER TEST (ROOM AMBIENT)	MODEL:HRP-100-5 95020002.TRI (定點測溫) 116 107 92 80 70 69 59 50 40 30 21 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 測試時間: 序: 1 序: 206, 3 測試溫度: 25.1℃ (EO, 94) 測試時間: 10.94 測試溫度: 25.1℃ (EO, 94) 測試溫度: 20.0℃ 			

4	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -40 °C	TEST : OK	P
5	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 40°C HUMIDITY= 95 %R.H	TEST : OK	P
6	TEMPERATURE COEFFICIENT	± 0.04 %(0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0 %(0~50°C)	P
7	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
8.	THERMAL SHOCK TEST	1. Thermal shock Temperature : -40°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 : 230VAC/Full Load		OK	P
9	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P
10	CAPACITOR LIFE CYCLE	HRP-100-24:SUPPOSE C105 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= 40 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 40 °C LIFE TIME		(1) 303588.6HRS (2) 118301.4HRS (3) 167292.3HRS	P
11	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 295.7K HRS			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/11/4	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/11/27	RD SAMPLE(2)	PASS	SANFORD SU	VINCENT TSENG
2010/1/15	PRODUCT SAMPLE W0912D11	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023