



Test Report: HRPG-200-7.5

200W 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 : 100 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 68.8 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 6.8 V ~ 9 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	6.364 V ~ 9.406 V / 230 VAC 6.332 V ~ 9.405 V / 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 2 % ~ -2 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL / MIN LOAD Ta : 25°C	V1 : 0.2 % ~ -0.2 %	P
4	LINE REGULATION	V1 : 0.5 % ~ -0.5 % (Max)	I/P : 100VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.08 % ~ -0.08 %	P
5	LOAD REGULATION	V1 : 1% ~ -1 % (Max)	I/P : 230 VAC O/P : FULL ~ MIN LOAD Ta : 25°C	V1 : 0.08 % ~ -0.08 %	P
6	SET UP TIME	230VAC : 1000 ms (Max) 115VAC : 2500 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 148 ms 115VAC/ 296 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/ 27 ms 115VAC/ 25 ms	P
8	HOLD UP TIME	230VAC : 16 ms (TYP) 115VAC : 16 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 46 ms 115VAC/ 38 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 : 750 mVp-p	I/P : 230 VAC O/P : FULL /Min LOAD 90%DUTY/ 1KHZ Ta : 25°C	432 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	64 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) 0.99 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.9573 / 230 VAC PF= 0.9960 / 115 VAC	P
4	EFFICIENCY	86 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	86.761 %	P
5	INPUT CURRENT	230V/ 1.1 A (TYP) 115V/ 2.2 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 1.018 A/ 230 VAC I = 1.997 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 70 A (TYP) 115V/ 35 A(TYP) COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 56 A/ 230 VAC I = 28 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.47 mA N-FG : 0.265 mA	P
8	NO LOAD POWER CONSUMPTION	< 0.5W	I/P : 240 VAC O/P : NO LOAD RC+/RC- SHORT Ta : 25°C	0.34 W	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	120.407 %/ 230 VAC 120.07 %/ 115 VAC Constant current limiting, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 9.4 V~ 10.9 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	9.999 V/ 230 VAC 9.841 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION (optional)	SPEC : TSW1 : 100 ± 5°C O.T.P. TSW1 : detect on heatsink 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 OFF 4 V~ 10V POWER ON	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	3.022 V~10 V POWER ON 2.617 V~0 V POWER OFF	P
2	5V STANDBY	5VSB : 5V@0.3A ; tolerance ±5%, ripple : 50mVp-p(max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	5VSB : 4.913 V / 0.3A Ripple : 14.3 mV	P
3.	Remote Sense	>0.5V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	➤ 0.5 V	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 : 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) 412 V (3) 418 V	P
2	Diode Peak Voltage	Q101 Rated : IRFB3607PBF 80A/75V	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) 59.2 V (2) 52.8 V (3) 52.8 V	P
3	Input Capacitor Voltage	C5 Rated : 100u/400V 105°C KMG	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) 371.6 V (2) 373.9 V (3) 373.8 V	P
4	Control IC Voltage Test	U1 Rated : FAN4801NY 10V~30V	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) 16.1618 V (2) 15.477 V (3) 15.567 V	P
5	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : IRFP460A 20A/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) 500 V (2) 388 V (3) 410 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 : 4.49 mA I/P-FG : 3.57 mA O/P-FG : 3.56 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 : 14.4 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	9 mΩ	P
4	APPROVAL	TUV : Certificate NO : R50176763 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 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:HRPG-200-5 TEST CONDITION: 100VAC FULL LOAD ROOM AMBIENT = 27℃ 94180001_101 (定點測溫) 134 121 100 95 82 69 56 43 30 17 4 121x, 87y 91.5℃ 180x, 65y 76.3℃ 250x, 72y 69.6℃ 260x, 99y 82.3℃ 300x, 109y 73.1℃ 300x, 122y 73.2℃ 239x, 165y 81.5℃ 231x, 129y 74.2℃ 222x, 110y 72.5℃ 199x, 187y 89.8℃ 150x, 150y 88.6℃ 143x, 168y 98.2℃ 90x, 126y 89.1℃ 98x, 191y 104.1℃ 72x, 159y 94180001_101 (定點測溫) 121x, 87y 91.5℃ 180x, 65y 76.3℃ 250x, 72y 69.6℃ 260x, 99y 82.3℃ 300x, 109y 73.1℃ 300x, 122y 73.2℃ 239x, 165y 81.5℃ 231x, 129y 74.2℃ 222x, 110y 72.5℃ 199x, 187y 89.8℃ 150x, 150y 88.6℃ 143x, 168y 98.2℃ 90x, 126y 89.1℃ 98x, 191y 104.1℃ 72x, 159y 94180001_101 (定點測溫) 121x, 87y 91.5℃ 180x, 65y 76.3℃ 250x, 72y 69.6℃ 260x, 99y 82.3℃ 300x, 109y 73.1℃ 300x, 122y 73.2℃ 239x, 165y 81.5℃ 231x, 129y 74.2℃ 222x, 110y 72.5℃ 199x, 187y 89.8℃ 150x, 150y 88.6℃ 143x, 168y 98.2℃ 90x, 126y 89.1℃ 98x, 191y 104.1℃ 72x, 159y 94180001_101 (定點測溫) 121x, 87y 91.5℃ 180x, 65y 76.3℃ 250x, 72y 69.6℃ 260x, 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199x, 187y 89.8℃ 150x, 150y 88.6℃ 143x, 168y 98.2℃ 90x, 126y 89.1℃ 98x, 191y 104.1℃ 72x, 159y 94180001_101 (定點測溫) 121x, 87y 91.5℃ 180x, 65y 76.3℃ 250x, 72y 69.6℃ 260x, 99y 82.3℃ 300x, 109y 73.1℃ 300x, 122y 73.2℃ 239x, 165y 81.5℃ 231x, 129y 74.2℃ 222x, 110y 72.5℃ 199x, 187y 89.8℃ 150x, 150y 88.6℃ 143x, 168y 98.2℃ 90x, 126y 89.1℃ 98x, 191y 104.1℃ 72x, 159y 94180001_101 (定點測溫) 121x, 87y 91.5℃ 180x, 65y 76.3℃ 250x, 72y 69.6℃ 260x, 99y 82.3℃ 300x, 109y 73.1℃ 300x, 122y 73.2℃ 239x, 165y 81.5℃ 231x, 129y 74.2℃ 222x, 110y 72.5℃ 199x, 187y 89.8℃ 150x, 150y 88.6℃ 143x, 168y 98.2℃ 90x, 126y 89.1℃ 98x, 191y 104.1℃ 72x, 159y 94180001_101 (定點測溫) 121x, 8			

3	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 125 % LOAD Ta : 25°C	TEST : OK	P
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 : 10min/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	HRPG-200-5 :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) 86373.7HRS (2) 25330.2HRS (3) 76218.8HRS	P
11	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 189.1K HRS			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/12/1	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/12/18	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2010/3/30	W1003A69	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023