



Test Report: HRPG-200-48

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 : 250 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 : 40.8 V ~ 55.2 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	38.55 V ~ 58.39 V / 230 VAC 38.52 V ~ 58.38 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 : 0.11 % ~ -0.11 %	P
4	LINE REGULATION	V1 : 0.2% ~ -0.2% (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 : 0.11 % ~ -0.11 %	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/ 128 ms 115VAC/ 256 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/ 8 ms 115VAC/ 8 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/ 42 ms 115VAC/ 35 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	825 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 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)	69 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°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= 0.961 / 230 VAC PF= 0.997 / 115 VAC	P
4	EFFICIENCY	89 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	89.83 %	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 = 1.02 A/ 230 VAC I = 2.01 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 = 60 A/ 230 VAC I = 30 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.88 mA N-FG : 0.38 mA	P
8	NO LOAD POWER CONSUMPTION	< 0.5W	I/P : 240 VAC O/P : NO LOAD RC+/RC- SHORT Ta : 25°C	0.33 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	123 %/ 230 VAC 123 %/ 115 VAC Constant current limiting recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 57.6 V~ 67.2 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	63.29 V/ 230 VAC 63.32 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION (optional)	SPEC : TSW1 : 95 ± 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	0 V~2.7 V POWER ON 2.8 V~10 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 : 4.914 V / 0.3A Ripple : 13 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	Q 3 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) 404 V (2) 456 V (3) 250 V	P
2	Diode Peak Voltage	Q101 Rated : FMX-12SL 10A/200V	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) 195 V (2) 190 V (3) 131 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) 392 V (2) 392 V (3) 390 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) 16.3 V (2) 13.8 V (3) 16.6 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) 404 V (2) 406 V (3) 400 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 : 5.18 mA I/P-FG : 4.28 mA O/P-FG : 3.83 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 : 27.8 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 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)/115(60HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ)/115(60HZ) 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°C	ROOM AMBIENT = 27°C		P			
			Position	Temp		VERDICT		
			P1	LF2		62.5	PASS	
			P2	BD1		91.5	PASS	
			P3	L3		76.3	PASS	
			P4	C5		69.6	PASS	
			P5	Q1		82.3	PASS	
			P6	D1		73.1	PASS	
			P7	T2		73.2	PASS	
			P8	U1		81.5	PASS	
			P9	C61		74.2	PASS	
			P10	D71		72.5	PASS	
			P11	T1coil		89.8	PASS	
			P12	T1core		88.6	PASS	
			P13	C105	98.2	PASS		
			P14	Q104	89.1	PASS		
			P15	L100	104.1	PASS		
2	TEMPERATURE RISE TEST	MODEL : HRP-200-24 1. ROOM AMBIENT BURN-IN : 3 HRS I/P : 230VAC O/P : FULL LOAD Ta= 26.3 °C 2. HIGH AMBIENT BURN-IN : 2.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 43.8 °C			P			
			NO	Position		P/N	ROOM AMBIENT Ta= 26.3 °C	HIGH AMBIENT Ta= 43.8 °C
			1	LF2		TR548-R2 R-22/14/8B(MA100) 8.8m	51.3°C	67.4°C
			2	BD1		6A/800V SILICON GBU608	75.9°C	90.7°C
			3	L3		TR872 CS234125E14 1.16u HRP-200	71.0°C	86.1°C
			4	Q1		IRFP460A 20A/500V TO247	65.0°C	80.3°C
			5	C5		100u/400V 105°C 18*25 KMG	62.2°C	76.4°C
			6	Q3		2SK4106 12A/500V TO220F	73.0°C	90.0°C
			7	T2		TR435-R4 R13x7x5A MA070 MS-300	63.4°C	77.1°C
			8	T1		TF2033 EER-35 HRP-200-24 B	84.7°C	100.9°C
			9	C150		100u/25V L5Kh 6.3*11 KY	64.1°C	79.4°C
			10	C61		100u/25V L5Kh 6.3*11 KY	64.5°C	78.2°C
			11	D1		BYC8-600 8A/600V TO220	64.2°C	79.9°C
			12	Q101		FME-220B 20A/150V TO220F	72.4°C	89.2°C
			13	L100		TR878 Ku090125-2*2 162u	84.3°C	99.3°C
			14	C105		1000u/35V L10Kh 12.5*25 KY	66.7°C	83.9°C
			15	T900		TF1593-R2	85.4°C	104.1°C
			16	ZD900		TVS ST02D-200 AX078 T-52mm	70.6°C	87.0°C
			17	U900		TNY275PN DIP-8C	77.9°C	97.1°C
			18	C911		22u/50V UL10Kh 5*11KY	75.5°C	92.8°C
			19	C956		47u/50V L5Kh 6.3*11 YXF	72.3°C	89.8°C
			20	TSW1		ST-22W-R0 170mm	82.0°C	98.9°C
			21	TSW2	ST-22W-R0 170mm	82.3°C	98.0°C	

3	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 122 % 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	± 0.006 %(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-200-24: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) 185942HRS (2) 67159HRS (3) 111374HRS	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