

MODEL : HRP-300-15

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 150 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25°C	V1: 85 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 13.5 V~ 18 V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	12.42 V~ 19.06 V/ 230 VAC 12.42 V~ 19.05 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: 0.3 %~ -0.3 %	P
4	LINE REGULATION	V1: 0.3%~ -0.3 % (Max)	I/P: 100 VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C	V1: 0.04 %~ -0.04 %	P
5	LOAD REGULATION	V1: 0.5 %~ -0.5 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.21 %~ -0.21 %	P
6	SET UP TIME	230VAC: 1000 ms (Max) 115 VAC: 2500 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 129 ms 115VAC/ 358 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/ 9 ms 115VAC/ 10 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/ 26 ms 115VAC/ 22 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	414 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	71 V~264V	P
			I/P: LOW-LINE-3V= 97 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: 100 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= 0.982 / 230 VAC PF= 0.996 / 115 VAC	P
4	EFFICIENCY	88% (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	88.1 %	P
5	INPUT CURRENT	230V/ 2.5 A (TYP) 115V/ 4.5 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 1.66 A/ 230 VAC I = 3.35 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 = 70 A/ 230 VAC I = 35 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 1.2 mA / 240 VAC	I/P: 264 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.95 mA N-FG: 0.55 mA	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	112%/ 230 VAC 112%/ 115 VAC Constant current limiting, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1: 18.8V~ 21.8V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	20.95V/ 230 VAC 20.92V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: TSW1: 90 ± 5°C detect on heatsink of power transistor TSW2: 95 ± 5°C detect on O/P CHOCK 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 Constant current limiting, recovers automatically after fault condition is removed	P

### CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	DC OK SIGNAL	PSU turn on : 3.3 ~ 5.6V ; PSU turn off : 0 ~ 1V	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	PSU turn on : 5.18 V PSU turn off : 0 V	P
2	REMOTE SENSE	>0.5V	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	>0.5	P
3	FAN ON/OFF control test	----	I/P: 230 VAC O/P: TESTING Ta: 25°C	> 27.3 %LOAD FAN ON < 27.1 %LOAD FAN OFF	P

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : HRP-300-5 1. ROOM AMBIENT BURN-IN : 1 HRS I/P: 230VAC O/P: FULL LOAD Ta= 31.8 °C 2. HIGH AMBIENT BURN-IN : 5.5 HRS I/P: 230VAC O/P: FULL LOAD Ta= 52.9 °C			P
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P: 230 VAC O/P: 120 % LOAD Ta: 25°C	TEST : OK	P
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 VAC O/P: 100 % LOAD Ta= -40 °C	TEST : OK	P
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P: 272 VAC O/P: FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	P
5	TEMPERATURE COEFFICIENT	± 0.03 % (0~50°C)	I/P: 230 VAC O/P: 120 % LOAD Ta: 25°C	TEST : OK	P

  

NO	Position	P/N	ROOM AMBIENT Ta= 31.8 °C	HIGH AMBIENT Ta= 52.9 °C
1	U1	FAN4801NY	56.2°C	81.6°C
2	C5	100u/400V 105°C KMG	42.4°C	65.9°C
3	Q1	IRFP460A 20A/500V	44.7°C	67.2°C
4	D1	BYC8-600 8A/600V	42.0°C	63.5°C
5	L3	TR838	41.4°C	63.9°C
6	BD1	10A/800V US10KB80R	43.3°C	65.9°C
7	Q101	STP85N3LH5 80A/30V	75.2°C	103.0°C
8	T1 COIL	TF1867	83.1°C	112.0°C
9	L100	TR840	56.7°C	83.6°C
10	C106	4700u/10V 10Kh ZLH	41.1°C	66.1°C
11	TSW1	ST-22 90°C	44.2°C	66.5°C
12	TSW2	ST-22 100°C	70.0°C	97.2°C
13	C152	47u/25V UL10Kh 5*11 YXM	57.5°C	84.1°C
14	D22	SBYV26C 1A/600V	68.2°C	95.9°C



6	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:1 hour in each axis (X.Y.Z) (6) Ta:25°C	TEST : OK	P
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### 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: 6.26 mA I/P-FG: 5.18 mA O/P-FG: 4.11 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: 27.5 GΩ O/P-FG: 23.7 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25°C / 70%RH	13 mΩ	p
4	APPROVAL	TUV: Certificate NO : R 50156798 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				

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

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	HRP-300-5 :SUPPOSE C106 IS THE MOST CRITICAL COMPONENT	I/P: 230VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 917137 HRS I/P: 230VAC O/P:FULL LOAD Ta= 50 °C LIFE TIME= 157735 HRS I/P: 230VAC O/P:75% LOAD Ta= 50 °C LIFE TIME= 265188 HRS I/P: 230VAC O/P:50% LOAD Ta= 50 °C LIFE TIME= 404784HRS		P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 176K HRS			P

### COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q4 Rated 2SK4106 : 12A/500V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Output Short Ta:25°C	(1) 474 V (2) 464 V	P
2	Diode Peak Voltage	Q101 Rated FDP3632 : 80A/100V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2)Output Short Ta:25°C	(1) 90.8 V (2) 93.2 V	P
		Q103 Rated FDP3632 : 80A/100V		(1) 92 V (2) 88 V	
3	Input Capacitor Voltage	C5 Rated 100u/400V 105°C PEAK 450V	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) 380.8 V (2) 372.8 V (3) 372.4 V	P
4	Control IC Voltage Test	U1 Rated FAN4801NY:9.3V~ 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) 13.089 V (2) 15.350 V (3) 15.384 V	P
5	P.F.C 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 Ta:25°C	(1) 488 V (2) 420 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/4/29	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/6/12	PRODUCT SAMPLE W0905B34	PASS	SANFORD SU	VINCENT TSENG
2009/9/1	PRODUCT SAMPLE W0908B05	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023