



# Test Report: RSP-150-24

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150W 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 : 150 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 74 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 22.8 V ~ 26.4V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	19.640 V ~ 27.462 V / 230 VAC 19.659 V ~ 27.462 V / 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 1 %~ -1% (Max)	I/P : 100VAC / 264 VAC O/P : FULL / MIN LOAD Ta : 25°C	V1 : -0.05 %~ 0.05 %	P
4	LINE REGULATION	V1 : 0.5%~ -0.5 % (Max)	I/P : 100 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 : -0.05 %~ 0.05 %	P
6	SET UP TIME	230VAC : 600 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 412 ms	P
7	RISE TIME	230VAC : 30 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 13 ms	P
8	HOLD UP TIME	230VAC : 16 ms (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 31 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 : 2400 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3).O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 1010 mVp-p (2) 888 mVp-p (3) 632 mVp-p (4) 1840 mVp-p	P

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	100VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C  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 )	69 V~264V  TEST : OK	P
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	0.93 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.965 / 230 VAC PF= 0.996 / 115 VAC	P
4	EFFICIENCY	89% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	89.06 %	P
5	INPUT CURRENT	230V/ 0.8 A (TYP) 115V/ 1.6 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.768 A/ 230 VAC I = 1.52 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 40 A (TYP)  COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 35 A/ 230 VAC	P
7	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P : 240VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.52 mA N-FG : 0.52 mA	P

## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 150 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	120.6 %/ 230 VAC 121.1 %/ 115 VAC Constant current limiting, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 26.4 V ~32.4 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	30.047 V/ 230 VAC 30.102 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	Shut down o/p voltage · recovers automatically after temperature goes down	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

## 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 : 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) 408 V (2) 394 V (3) 398 V	P
2	Diode Peak Voltage	Q103 Rated : 20A/150V	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) 142 V (2) 145 V (3) 140 V	P
3	Input Capacitor Voltage	C 5 Rated : 100u/400V (SURGE VOLTAGE 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) 388 V (2) 384 V (3) 414 V	P
4	Control IC Voltage Test	U 1 Rated : 12V~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) 16.6 V (2) 15.9 V (3) 16.2 V	P
5	Power Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated : 13A/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) 402 V (2) 392 V (3) 396 V	P

## ■ SAFETY & E.M.C. TEST

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 4 KVAC/min I/P-FG : 2 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 4.4 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 5.28 mA I/P-FG : 4.62 mA O/P-FG : 2.226 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 : 25.7 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

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 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) 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				

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																								
1	TEMPERATURE RISE TEST	MODEL : RSP-150-24 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=27 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 39.2 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 27°C</th> <th>HIGH AMBIENT Ta= 39.2 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>55.5°C</td><td>63.0°C</td></tr> <tr><td>2</td><td>Q1</td><td>67.5°C</td><td>75.5°C</td></tr> <tr><td>3</td><td>C5</td><td>56.4°C</td><td>63.8°C</td></tr> <tr><td>4</td><td>L1</td><td>83.6°C</td><td>91.2°C</td></tr> <tr><td>5</td><td>C61</td><td>56.9°C</td><td>71.2°C</td></tr> <tr><td>6</td><td>C10</td><td>68.6°C</td><td>75.6°C</td></tr> <tr><td>7</td><td>Q3</td><td>54.0°C</td><td>60.0°C</td></tr> <tr><td>8</td><td>T1</td><td>89.8°C</td><td>96.4°C</td></tr> <tr><td>9</td><td>U1</td><td>62.8°C</td><td>69.7°C</td></tr> <tr><td>10</td><td>C202</td><td>58.6°C</td><td>68.8°C</td></tr> <tr><td>11</td><td>C18</td><td>62.0°C</td><td>72.6°C</td></tr> <tr><td>12</td><td>TSW</td><td>72.4°C</td><td>82.0°C</td></tr> <tr><td>13</td><td>Q101</td><td>68.4°C</td><td>77.2°C</td></tr> <tr><td>14</td><td>L100</td><td>80.1°C</td><td>86.6°C</td></tr> <tr><td>15</td><td>C105</td><td>55.7°C</td><td>63.2°C</td></tr> <tr><td>16</td><td>R5</td><td>72.5°C</td><td>79.3°C</td></tr> <tr><td>17</td><td>D5</td><td>60.7°C</td><td>67.6°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 27°C	HIGH AMBIENT Ta= 39.2 °C	1	BD1	55.5°C	63.0°C	2	Q1	67.5°C	75.5°C	3	C5	56.4°C	63.8°C	4	L1	83.6°C	91.2°C	5	C61	56.9°C	71.2°C	6	C10	68.6°C	75.6°C	7	Q3	54.0°C	60.0°C	8	T1	89.8°C	96.4°C	9	U1	62.8°C	69.7°C	10	C202	58.6°C	68.8°C	11	C18	62.0°C	72.6°C	12	TSW	72.4°C	82.0°C	13	Q101	68.4°C	77.2°C	14	L100	80.1°C	86.6°C	15	C105	55.7°C	63.2°C	16	R5	72.5°C	79.3°C	17	D5	60.7°C	67.6°C		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 119 % LOAD Ta : 25°C	TEST : OK	P																																																																								
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -35 °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 %/°C (0-50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.007 %/°C (0-50°C)	P																																																																								
6	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																																																																								



# 150W Single Output With PFC Function

# RSP-150 series

7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C~ +55°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 AC ON/OFF TEST turn on 58sec ; turn off 2sec	OK	P
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK	P
9	CAPACITOR LIFE CYCLE	RSP-150-24: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= 50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 419889 HRS (2) 102754 HRS (3) 139449 HRS (4) 185245 HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 290.7 KHRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C		P

SAMPLE	TESTER	REVIEW	APPROVAL
PRODUCT SAMPLE	DANIEL GAO	SANFORD SU	VINCENT ZENG

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