Test Report: RSP-2000-48

2000W Power Supply with Single Output

■ 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: 300 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25℃	V1: 90.4 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 42 V~ 56 V	I/P: 230 VAC I/P: 180 VAC O/P:MIN LOAD Ta:25℃	40.560 V~ 57.72 V/ 230 VAC 40.580 V~ 57.74 V/ 180 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 1%~ -1 % (Max)	I/P: 180VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25℃	V1: 0.06 %~ -0.06 %	P
4	LINE REGULATION	V1:0.5 %~ -0.5% (Max)	I/P:180 VAC ~ 264 VAC O/P:FULL LOAD Ta:25℃	V1: 0.012 %~ -0.012 %	P
5	LOAD REGULATION	V1: 0.5 %~ -0.5 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: 0.06 %~ -0.06 %	P
6	SET UP TIME	230VAC: 1500 ms (Max)	I/P: 230 VAC @ FULL LOAD Ta:25℃	230VAC/ 1151 ms	P
7	RISE TIME	230VAC: 60 ms (Max)	I/P: 230 VAC @ FULL LOAD Ta:25℃	230VAC/ 32.6 ms	P
8	HOLD UP TIME	230VAC: 10 ms (TYP) 230VAC: 16 ms (TYP)	I/P: 230 VAC @ FULL LOAD I/P: 230 VAC @75% LOAD Ta:25℃	230VAC/ 18.4 ms 230VAC/ 21.7 ms	p
9	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	TEST: <5 %	p
10	DYNAMIC LOAD	V1: 4800 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25℃	808 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180VAC~264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	127 V~264V	P
			I/P: LOW-LINE-3V= 177V 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	I/P: 180 VAC ~ 264 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST: OK	P
3	POWER FACTOR	0.98 / 230 VAC(TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	PF= 0.988 / 230 VAC	P
4	EFFICIENCY	92% (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	92.12%	P
5	INPUT CURRENT	230V/ 10 A (TYP) 115V/ 16 A (TYP)	I/P: 230 VAC @ full load I/P: 115 VAC @ 80% load Ta:25℃	I = 9.68 A/ 230 VAC I = 15.78 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 50 A (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	I = 42 A/ 230 VAC	P
7	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P: 240 VAC O/P:Min LOAD Ta:25℃	L-FG: 1 mA N-FG 1 mA :	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %~ 125 %	I/P: 230 VAC I/P: 180 VAC O/P:TESTING Ta:25℃	112 %/ 230 VAC 112 %/ 180 VAC Constant Current Limiting, unit will shut down o/p voltage after 5 sec ,re-power on to recover.	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℃	62.39 V/ 230 VAC 62.44 V/ 115 VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: 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℃	NO DAMAGE Constant Current Limiting, unit will shut down o/p voltage after 5 sec ,re-power on to recover.	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	AUX ILIARY POWER (AUX)	5V @ 0.3A (4.5V~ 5.5V) 12V @ 0.8A (10.6V~13.2V)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	5.175V 11.468V	P
2	REMOTE ON/OFF	ON/OFF/+5V-AUX SHORT : POWER OFF ON/OFF/+5V-AUX OPEN : POWER ON	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	SHORT : POWER OFF OPEN : POWER ON	P
3	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.5V	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	>0.5 V	P
4	DC OK Signal	HIGH:VOUT≦80±6%Vout LOW:VOUT≧80±6%Vout	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	HIGH : 5.338 V, VO≦ 80 %Vout LOW: 0V, VO≧ 84 %Vout	P
5	OUTPUT VOLTAGE PROGRAMMABLE(PV)	DC<0.4V Vo/p=100%±3% DC=1V Vo/p=40%±3% DC=2V Vo/p=60%±3% DC=3V Vo/p=80%±3% DC=4V Vo/p=100%±3% DC=4.7V Vo/p=115%±3%	I/P: 230 VAC PV= / <0.4V / 1V / 2V / 3V / 4V / 4.7V Vout= / 100.2% / 41.66% / 59.10% / 78.56% / 99.97% / 115.8% LOAD / 0~100% load / 0~100% load / 0~100% load / 0~100% load / 0~100% load / 0~85.7% load Ta:25℃		P
6	OVER TEMP WARNING	T-ALARM TSW1 & TSW2 short(0~0.5V) TSW1 or TSW2 open(4.5V~5.5V)	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	TSW1 & TSW2 short： 0 V TSW1 or TSW2 open： 5.346 V	P
7	FAN SPEED CONTROL	Fan Speed / Load / PWM Duty LOW / 0% / 10% ± 5% HIGH / 100% / 90% ± 5%	I/P: 230 VAC O/P:TESTING Ta:25℃	Fan Speed / Load / PWM Duty LOW / 0% / 10.12% HIGH / 100% / 90%	P
8	CURRENT SHARING	PSU1-PSU2 < 10%	I/P： 230 VAC O/P：100%/50% LOAD Ta：25℃	O/P：100% LOAD PSU1： 42A PSU2： 42A PSU3： 42A PSU4： 42A O/P：50% LOAD PSU1： 20.4A PSU2： 21.5A PSU3： 21.1A PSU4： 21.1A	P

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL：RSP-2000-24
1. ROOM AMBIENT BURN-IN：3.5HRS
I/P: 230VAC O/P: FULL LOAD Ta=33.3℃
2. HIGH AMBIENT BURN-IN：3HRS
I/P: 230VAC O/P: FULL LOAD Ta=52.4℃

<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT
Ta= 33.3℃</th><th>HIGH AMBIENT
Ta= 52.4℃</th></tr>
<tr><td>1</td><td>BD1</td><td>56.2°C</td><td>76.0°C</td></tr>
<tr><td>2</td><td>Q603</td><td>45.1°C</td><td>62.3°C</td></tr>
<tr><td>3</td><td>L1</td><td>41.5°C</td><td>58.5°C</td></tr>
<tr><td>4</td><td>C5</td><td>42.9°C</td><td>61.2°C</td></tr>
<tr><td>5</td><td>U1</td><td>43.8°C</td><td>63.0°C</td></tr>
<tr><td>6</td><td>Q903</td><td>50.9°C</td><td>71.9°C</td></tr>
<tr><td></td><td>T1</td><td>55.0°C</td><td>73.4°C</td></tr>
<tr><td>8</td><td>T2</td><td>67.5°C</td><td>87.0°C</td></tr>
<tr><td>9</td><td>U2</td><td>49.4°C</td><td>69.5°C</td></tr>
<tr><td>10</td><td>Q101</td><td>52.4°C</td><td>71.5°C</td></tr>
<tr><td>11</td><td>Q105</td><td>63.1°C</td><td>83.1°C</td></tr>
<tr><td>12</td><td>D110</td><td>61.1°C</td><td>80.7°C</td></tr>
<tr><td>13</td><td>Q533</td><td>58.2°C</td><td>78.4°C</td></tr>
<tr><td>14</td><td>C73</td><td>44.7°C</td><td>63.6°C</td></tr>
<tr><td>15</td><td>T3</td><td>48.8°C</td><td>71.7°C</td></tr>
<tr><td>16</td><td>C320</td><td>48.0°C</td><td>67.0°C</td></tr>
<tr><td>17</td><td>RG300</td><td>47.3°C</td><td>66.3°C</td></tr>
<tr><td>18</td><td>C325</td><td>49.0°C</td><td>68.4°C</td></tr>
<tr><td>19</td><td>C301</td><td>46.3°C</td><td>65.4°C</td></tr>
<tr><td>20</td><td>L100</td><td>58.4°C</td><td>79.1°C</td></tr>
<tr><td>21</td><td>C110</td><td>57.0°C</td><td>77.0°C</td></tr>
<tr><td>22</td><td>C115</td><td>52.6°C</td><td>72.4°C</td></tr>
<tr><td>23</td><td>TSW8</td><td>54.4°C</td><td>73.7°C</td></tr>
<tr><td>24</td><td>TSW9</td><td>51.5°C</td><td>68.6°C</td></tr>
</table></td><td>P</td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P: 230 VAC
O/P: 108 % LOAD
Ta:25℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P: 230 VAC
O/P: 100% LOAD
Ta= -35℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 50 ℃
NO DAMAGE</td><td>I/P: 272 VAC
O/P:FULL LOAD
Ta= 50℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>5</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03 %(0~50℃)</td><td>I/P: 230 VAC
O/P:FULL LOAD</td><td>± 0.003 %(0~50℃)</td><td>P</td></tr>
</table>

6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency:10~500Hz (3) Sweep Time:10min/sweep cycle (4) Acceleration:2G (5) Test Time:1 hour in each axis (X.Y.Z) (6) Ta:25℃	TEST：OK	P

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℃	I/P-O/P: 12.60 mA I/P-FG: 10.20 mA O/P-FG: 11.32 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℃	I/P-O/P: 21.4 GΩ I/P-FG: 18.2 GΩ O/P-FG: 26 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25℃	6 mΩ	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS A	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25℃	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℃	CRITERIA A	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	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℃	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	RSP-2000-24 : SUPPOSE C110 IS THE MOST CRITICAL COMPONENT I/P: 230VAC O/P:FULL LOAD Ta= 25 ℃ LIFE TIME=595726 HRS I/P: 230VAC O/P:FULL LOAD Ta= 50 ℃ LIFE TIME=98887 HRS I/P: 230VAC O/P:75% LOAD Ta= 50 ℃ LIFE TIME=173473 HRS I/P: 230VAC O/P:50% LOAD Ta= 50 ℃ LIFE TIME=259367 HRS			P
2	MTBF	Conducted by Parts Stress Analysis Prediction 159K hrs min. Telcordia SR-332 (Bellcore) ; 46.3K hrs min. MIL-HDBK-217F (25℃)			P
3	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure : Above 50,000 hours @ TA 50℃			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) **Peak Voltage**	Q900 Rated 22A/600V	I/P：High-Line +3V = 267 V O/P： (1)Full Load Turn on (2) Output Short (3)Full load continue Ta：25℃	(1) 460 V (2) 454 V (3) 444 V	P
2	Diode Peak **Voltage**	Q100 Rated 65A/200V	I/P：High-Line +3V = 267 V O/P： (1)Full Load Turn on (2) Output Short (3)Full load continue Ta：25℃	(1) 198 V (2) 147 V (3) 198 V	P
		Q103 Rated 65A/200V	I/P：High-Line +3V = 267 V O/P： (1)Full Load Turn on (2) Output Short (3)Full load continue Ta：25℃	(1) 198 V (2) 106 V (3) 161 V	P
3	**Input Capacitor Voltage**	C5 Rated 330u/400V	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℃	(1) 377.64 V (2) 378.56 V (3) 386.24 V	P
4	**Control IC Voltage Test**	U2 Rated 8.4V~14.5V	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℃	(1) 13.051 V (2) 11.868 V (3) 13.204 V	P
5	Power Transistor (D to S) or (C to E) **Peak Voltage**	Q603 Rated 22A/650V	I/P：High-Line +3V = 267 V O/P： (1)Full Load Turn on (2) Output Short (3)Full load continue Ta：25℃	(1) 464 V (2) 456 V (3) 442 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2011/8/22	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2011/9/6	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2011/10/19	PRODUCT SAMPLE W1110B21	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023