



Test Report: RSP-320-13.5

320W Single Output With PFC Function

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection 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 : 82 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 12V ~15 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	11.03 V ~ 15.65 V / 230 VAC 11.03 V ~ 15.65 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 : 0.3%~ -0.3% (Max)	I/P : 100VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.05 %~ -0.05 %	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 : 1500 ms (Max) 115VAC : 3000 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 769 ms 115VAC/ 1410 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 : 8 ms (TYP) 115VAC : 8 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 23 ms 115VAC/ 18 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 : 1350 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)1120 mVp-p (2)930 mVp-p (3)910 mVp-p (4)740 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	61V~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) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.985 / 230 VAC PF= 0.997 / 115 VAC	P
4	EFFICIENCY	88 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	88.34 %	P
5	INPUT CURRENT	230V/ 2 A (TYP) 115V/ 4 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 1.61 A/ 230 VAC I = 3.32 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 40 A (TYP) 115V/ 20 A (TYP) COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 30 A/ 230 VAC I = 15 A/ 115 VAC	P
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.62 mA N-FG : 0.62 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	121%/ 230 VAC 121%/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 15.7V ~ 18.4V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	16.8V/ 230 VAC 16.8V/ 115 VAC	P
3	OVER TEMPERATURE PROTECTION	SPEC : TSW1 : 85 ± 5°C O.T.P. 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

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 : STP14NM50N 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) 392 V (2) 469 V (3) 417 V	P
2	Diode Peak Voltage	Q102 Rated : IRFB3607PBF 80A/75V Q104 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 (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 54.1 V (2) 49.7 V (3) 55.7 V (1) 66.6 V (2) 60.2 V (3) 67.4 V	P
3	Input Capacitor Voltage	C 5 Rated : 180u/400V 105°C 18*40 KMG (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) 401 V (2) 409 V (3) 417 V	P
4	Control IC Voltage Test	U 1 Rated : PWM FAN4800AUN 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) 19.1 V (2) 19.1 V (3) 18.1 V	P
5	Power Transistor (D to S) or (C to E) Peak Voltage	Q 2 Rated : STP19NM50N 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) 396 V (2) 392 V (3) 413 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 : 5.62 mA I/P-FG : 5.10 mA O/P-FG : 8.84 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 : 15.7 GΩ I/P-FG : 14.6 GΩ O/P-FG : 6.27 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	2 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-320-5 1. ROOM AMBIENT BURN-IN : 15 HRS I/P : 230VAC O/P : FULL LOAD Ta=31.9 °C 2. HIGH AMBIENT BURN-IN : 7 HRS I/P : 230VAC O/P : FULL LOAD Ta= 49.5 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>PART NUMBER</th> <th>ROOM AMBIENT Ta= 31.9 °C</th> <th>HIGH AMBIENT Ta=49.5 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>TR1021</td><td>43.9°C</td><td>65.3°C</td></tr> <tr><td>2</td><td>C10</td><td>105/450V 10% P=15 B32672P4</td><td>42.7°C</td><td>63.5°C</td></tr> <tr><td>3</td><td>BD1</td><td>10A/800V GLASS KBJ1008G</td><td>47.5°C</td><td>67.8°C</td></tr> <tr><td>4</td><td>D1</td><td>STTH8S06D 8A/600V TO220</td><td>45.2°C</td><td>65.6°C</td></tr> <tr><td>5</td><td>Q2</td><td>STP19NM50N 13A/500V TO220</td><td>43.8°C</td><td>64.4°C</td></tr> <tr><td>6</td><td>Q3</td><td>STP14NM50N 12A/500V TO220</td><td>44.6°C</td><td>66.1°C</td></tr> <tr><td>7</td><td>C5</td><td>180u/400V 105°C 18*40 KMG</td><td>34.7°C</td><td>55.5°C</td></tr> <tr><td>8</td><td>L1</td><td>TR1022</td><td>45.9°C</td><td>67.5°C</td></tr> <tr><td>9</td><td>U1</td><td>FAN4800AUN</td><td>35.9°C</td><td>57.0°C</td></tr> <tr><td>10</td><td>T2</td><td>TR1048</td><td>33.9°C</td><td>55.1°C</td></tr> <tr><td>11</td><td>C18</td><td>47u/50V L5Kh 6.3*11 YXF</td><td>37.0°C</td><td>57.9°C</td></tr> <tr><td>12</td><td>T1 COIL</td><td>TF2434</td><td>52.3°C</td><td>72.9°C</td></tr> <tr><td>13</td><td>TSW1</td><td>ST-22W-R0 85°C 100mm</td><td>43.7°C</td><td>64.2°C</td></tr> <tr><td>14</td><td>RTH2</td><td>5KΩ 5Φ TDC05C20J 5%</td><td>43.7°C</td><td>64.4°C</td></tr> <tr><td>15</td><td>Q201</td><td>TIP122 5A/100V TO220</td><td>50.3°C</td><td>70.7°C</td></tr> <tr><td>16</td><td>Q101</td><td>AP9963GP 160A/40V TO220</td><td>74.8°C</td><td>98.9°C</td></tr> <tr><td>17</td><td>Q104</td><td>AP9963GP 160A/40V TO220</td><td>56.8°C</td><td>79.1°C</td></tr> <tr><td>18</td><td>L100</td><td>TR1023</td><td>64.5°C</td><td>87.9°C</td></tr> <tr><td>19</td><td>C105</td><td>3300u/10V UL10Kh 12.5*20 ZLH</td><td>59.9°C</td><td>83.2°C</td></tr> <tr><td>20</td><td>C203</td><td>100u/25V L5Kh 6.3*11 KY</td><td>39.3°C</td><td>60.2°C</td></tr> </tbody> </table>	NO	Position	PART NUMBER	ROOM AMBIENT Ta= 31.9 °C	HIGH AMBIENT Ta=49.5 °C	1	LF1	TR1021	43.9°C	65.3°C	2	C10	105/450V 10% P=15 B32672P4	42.7°C	63.5°C	3	BD1	10A/800V GLASS KBJ1008G	47.5°C	67.8°C	4	D1	STTH8S06D 8A/600V TO220	45.2°C	65.6°C	5	Q2	STP19NM50N 13A/500V TO220	43.8°C	64.4°C	6	Q3	STP14NM50N 12A/500V TO220	44.6°C	66.1°C	7	C5	180u/400V 105°C 18*40 KMG	34.7°C	55.5°C	8	L1	TR1022	45.9°C	67.5°C	9	U1	FAN4800AUN	35.9°C	57.0°C	10	T2	TR1048	33.9°C	55.1°C	11	C18	47u/50V L5Kh 6.3*11 YXF	37.0°C	57.9°C	12	T1 COIL	TF2434	52.3°C	72.9°C	13	TSW1	ST-22W-R0 85°C 100mm	43.7°C	64.2°C	14	RTH2	5KΩ 5Φ TDC05C20J 5%	43.7°C	64.4°C	15	Q201	TIP122 5A/100V TO220	50.3°C	70.7°C	16	Q101	AP9963GP 160A/40V TO220	74.8°C	98.9°C	17	Q104	AP9963GP 160A/40V TO220	56.8°C	79.1°C	18	L100	TR1023	64.5°C	87.9°C	19	C105	3300u/10V UL10Kh 12.5*20 ZLH	59.9°C	83.2°C	20	C203	100u/25V L5Kh 6.3*11 KY	39.3°C	60.2°C		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 108 % 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	$\pm 0.03 \text{ } ^\circ\text{C}/^\circ\text{C} (0\text{-}50^\circ\text{C})$	I/P : 230 VAC O/P : FULL LOAD	$\pm 0.011 \text{ } \%/^\circ\text{C} (0\text{-}50^\circ\text{C})$	P																																																																																																									



320W Single Output With PFC Function

RSP-320 series

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
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-320-5: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=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) 395170HRS (2) 47085HRS (3) 125883HRS (4) 198983HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 206.5 KHRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C		P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2012/8/7	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2012/8/27	PRODUCT SAMPLE	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023