

MODEL : RPSG-160-24

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 : 30 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 22 V~ 27 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	21.27 V~ 27.99 V/ 230 VAC 21.27 V~ 27.99 V/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 2 %~ -2 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.08 %~ -0.08 %	P
4	LINE REGULATION	V1 : 0.5 %~ -0.5 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.03 %~ -0.03 %	P
5	LOAD REGULATION	V1 : 1 %~ -1 % (Max)	I/P : 230 VAC O/P : FULL /MIN LOAD Ta : 25°C	V1 : 0.08 %~ -0.08 %	P
7	SET UP TIME	230VAC : 1200 ms (Max) 115VAC : 2500 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 628 ms 115VAC/ 1256 ms	P
8	RISE TIME	230VAC : 30 ms (Max) 115VAC : 30 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 8.3 ms 115VAC/ 8.3 ms	P
9	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/ 32 ms 115VAC/ 24 ms	P
10	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %	P
11	DYNAMIC LOAD	V1 : 2400 mVp-p	I/P : 230 VAC O/P : FULL /Min LOAD 90%DUTY/ 1KHZ Ta : 25°C	251 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	75V-264V	P
			I/P : LOW-LINE-3V= 97V 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	0.93 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.962 /230 VAC PF= 1 /115 VAC	P
4	EFFICIENCY	87% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	88.2%	P
5	INPUT CURRENT	230V/ 1.1 A (TYP) 115V/ 2 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.82 A/230 VAC I = 1.63 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 = 59 A/230 VAC I = 30 A/ 115 VAC	P
7	LEAKAGE CURRENT	EARTH LEAKAGE CURRENT<300 uA  PATIENT LEAKAGE CURRENT<100 uA	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	FOR EARTH : L-FG : 153 uA N-FG : 150 uA  FOR PATIENT L-FG : 80 uA N-FG : 80 uA	P
8	No load power consumption	<0.75W/240VAC	I/P : 264 VAC O/P : NO LOAD PS/ON -GND SHORT Ta : 25°C	0.3 W/240VAC	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	128%/ 230 VAC 126%/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 27.6 V~ 32.4 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	29.41 V/ 230 VAC 29.49 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC : TSW1 : 105 ± 5°C O.T.P. NO DAMAGE TSW2 : 90 ± 5°C O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active TSW1:Shut down o/p voltage · recovers automatically after temperature goes down  TSW2:Shut down Re-power ON	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	POWER GOOD SIGNAL	DELAY 10ms ~ 500ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	91 ms/ 230 VAC 91 ms/ 115 VAC	P
2	POWER FAIL SIGNAL	> 1ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	2.8 ms/ 230 VAC 2.8 ms/ 115 VAC	P
3	PS-ON INPUT SIGNAL	Power on : PS-ON="Hi" or ">2V" Power off : PS-ON="Low" or "<0.5V"	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	PS-ON= 1.5 V PS-ON= 1.4 V	P
4	REMOTE SENSE	>0.3V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	>0.3V	P

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																																														
1	TEMPERATURE RISE TEST	MODEL : RPSG-160-24 NO FAN TEST 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 32.6 °C 2. HIGH AMBIENT BURN-IN : 3 HRS I/P : 230VAC O/P : FULL LOAD Ta=46.7 °C			P																																																																																																														
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>P/N</th> <th>ROOM AMBIENT Ta= 32.6 °C</th> <th>HIGH AMBIENT Ta=46.7 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>4A/800V US4KB80R</td><td>67.0°C</td><td>76.2°C</td></tr> <tr><td>2</td><td>L3</td><td>TF1669-R2</td><td>64.2°C</td><td>74.6°C</td></tr> <tr><td>3</td><td>LF2</td><td>TR865</td><td>56.0°C</td><td>64.9°C</td></tr> <tr><td>4</td><td>Q1</td><td>IRFP460A 20A/500V</td><td>69.2°C</td><td>77.7°C</td></tr> <tr><td>5</td><td>Q4</td><td>2SK3568 12A/500V</td><td>76.3°C</td><td>85.3°C</td></tr> <tr><td>6</td><td>T2</td><td>TR816-R1</td><td>68.1°C</td><td>76.8°C</td></tr> <tr><td>7</td><td>D1</td><td>BYC10X-600 10A/600V</td><td>70.4°C</td><td>78.8°C</td></tr> <tr><td>8</td><td>U1</td><td>CM6800GIP</td><td>59.6°C</td><td>67.4°C</td></tr> <tr><td>9</td><td>T1</td><td>TF1674-R1 EI-33</td><td>79.8°C</td><td>87.8°C</td></tr> <tr><td>10</td><td>Q101</td><td>IRFP460A 20A/500V</td><td>92.6°C</td><td>100.8°C</td></tr> <tr><td>11</td><td>C5</td><td>120u/420V 105°C PT</td><td>68.0°C</td><td>75.6°C</td></tr> <tr><td>12</td><td>C105</td><td>680u/35V UL10Kh ZLH</td><td>78.5°C</td><td>86.7°C</td></tr> <tr><td>13</td><td>L100</td><td>TR766</td><td>111.2°C</td><td>118.9°C</td></tr> <tr><td>14</td><td>C61</td><td>22u/50V L5Kh KY</td><td>60.1°C</td><td>68.2°C</td></tr> <tr><td>15</td><td>ZD901</td><td>TVS ST02D-200</td><td>78.7°C</td><td>90.4°C</td></tr> <tr><td>16</td><td>U903</td><td>TNY275PN DIP-8C</td><td>83.0°C</td><td>97.0°C</td></tr> <tr><td>17</td><td>C911</td><td>10u/50V L5Kh 5*11 YXF</td><td>66.8°C</td><td>77.6°C</td></tr> <tr><td>18</td><td>C955</td><td>220U/25V ZLH</td><td>61.9°C</td><td>71.1°C</td></tr> <tr><td>19</td><td>C956</td><td>100U/25V KY</td><td>54.7°C</td><td>63.8°C</td></tr> <tr><td>20</td><td>TSW1</td><td>ST-22 105°C</td><td>60.4°C</td><td>70.2°C</td></tr> <tr><td>21</td><td>TSW2</td><td>ST-22 90°C</td><td>83.9°C</td><td>91.3°C</td></tr> </tbody> </table>				NO	Position	P/N	ROOM AMBIENT Ta= 32.6 °C	HIGH AMBIENT Ta=46.7 °C	1	BD1	4A/800V US4KB80R	67.0°C	76.2°C	2	L3	TF1669-R2	64.2°C	74.6°C	3	LF2	TR865	56.0°C	64.9°C	4	Q1	IRFP460A 20A/500V	69.2°C	77.7°C	5	Q4	2SK3568 12A/500V	76.3°C	85.3°C	6	T2	TR816-R1	68.1°C	76.8°C	7	D1	BYC10X-600 10A/600V	70.4°C	78.8°C	8	U1	CM6800GIP	59.6°C	67.4°C	9	T1	TF1674-R1 EI-33	79.8°C	87.8°C	10	Q101	IRFP460A 20A/500V	92.6°C	100.8°C	11	C5	120u/420V 105°C PT	68.0°C	75.6°C	12	C105	680u/35V UL10Kh ZLH	78.5°C	86.7°C	13	L100	TR766	111.2°C	118.9°C	14	C61	22u/50V L5Kh KY	60.1°C	68.2°C	15	ZD901	TVS ST02D-200	78.7°C	90.4°C	16	U903	TNY275PN DIP-8C	83.0°C	97.0°C	17	C911	10u/50V L5Kh 5*11 YXF	66.8°C	77.6°C	18	C955	220U/25V ZLH	61.9°C	71.1°C	19	C956	100U/25V KY	54.7°C	63.8°C	20	TSW1	ST-22 105°C	60.4°C	70.2°C	21	TSW2	ST-22 90°C	83.9°C	91.3°C
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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 : -25 °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 : FULL LOAD	± 0.003 % (0-50°C)	P																																																																																																														
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°C		TEST : OK	P																																																																																																														

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 4 KVAC/min I/P-FG : 1.5 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 4.4 KVAC/min I/P-FG : 1.8 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 1.847 mA I/P-FG : 2.399 mA O/P-FG : 0.214 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 : 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	7 mΩ	P
4	APPROVAL	TUV : Certificate NO : TA50147896 UL : File NO : E227340			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 EN55011 CLASS B	I/P : 230 VAC (50HZ)115V/60HZ O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 EN55011 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 MEDICAL AIR : 8KV / Contact : 6KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 MEDICAL INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 MEDICAL 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				

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

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	RPSG-160-24 NO FAN TEST : SUPPOSE C106 IS THE MOST CRITICAL COMPONENT I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME= 97344 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME=26972 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 230.5 k HRS			P
3	ORT (Ongoing Reliability test)	RPSG-160-24:I/P : 230VAC O/P : 70% LOAD TA=50°C Sample=5pcs TEST TIME=2208HRS			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 2SK3568 12A/500V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short Ta : 25°C	(1) 454 V (2) 472 V	P
2	Diode Peak Voltage	Q101 Rated SF20NC15M 20A/150V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short Ta : 25°C	(1) 145 V (2) 145 V	P
3	PFC Transistor (D to S) or (C to E) Peak Voltage	Q 1 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) 492 V	P
4	Input Capacitor Voltage	C 5 Rated 120u/420V 105°C	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) 382 V (2) 383 V (3) 408 V	P
5	Control IC Voltage Test	U 1 Rated FAN4801 : 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) 14.39 V (2) 13.5 V (3) 14.4 V	P
6	Boost Diode Voltage	D 1 Rated BYC10X-600 : 10A/600V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Dynamic Load 90% Duty/ 1Khz Ta : 25°C	(1) 406 V (2) 412 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2008/9/17	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/3/11	PRODUCT SAMPLE W0810A12	PASS	SANFORD SU	VINCENT TSENG
2009/3/11	PRODUCT SAMPLE W0901A22	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023