



TEST REPORT: RPS-45-15

45W Single Output Medical Type

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

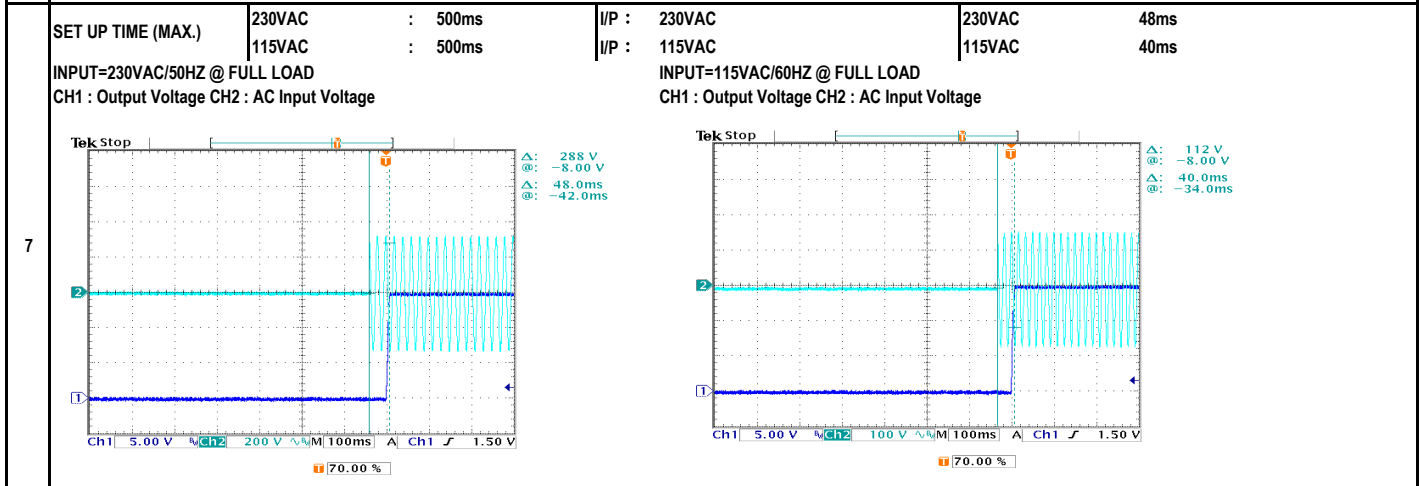
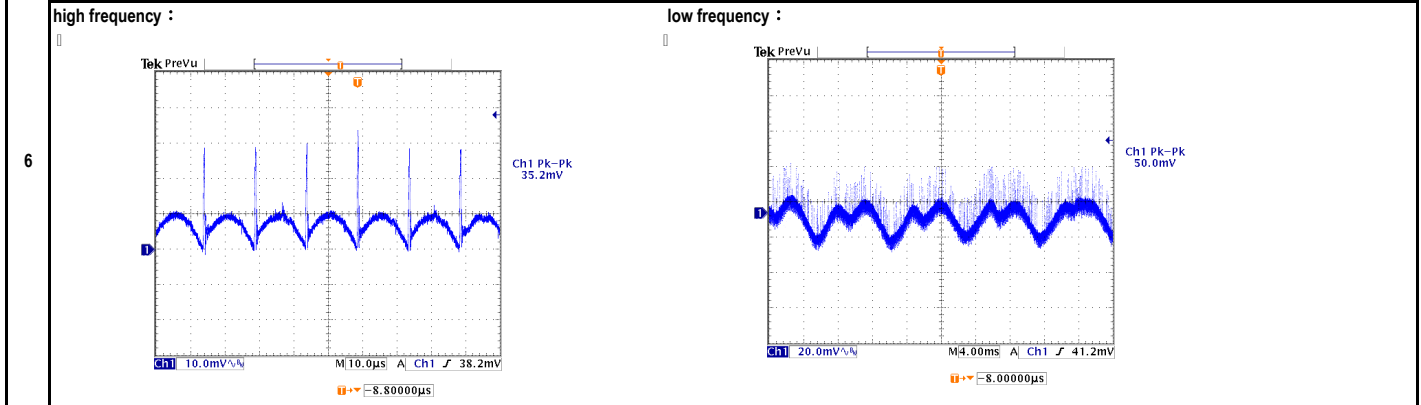
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

DESIGN VERIFY TEST
OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 13.50V ~ 16.50V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 13.13V ~ 16.89V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.25% ~ -0.37%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.04% ~ 0.00%
4	LOAD REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.25% ~ -0.37%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 2.685 %
	RIPPLE & NOISE(Max)	V1 : 100 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 50 mVp-p

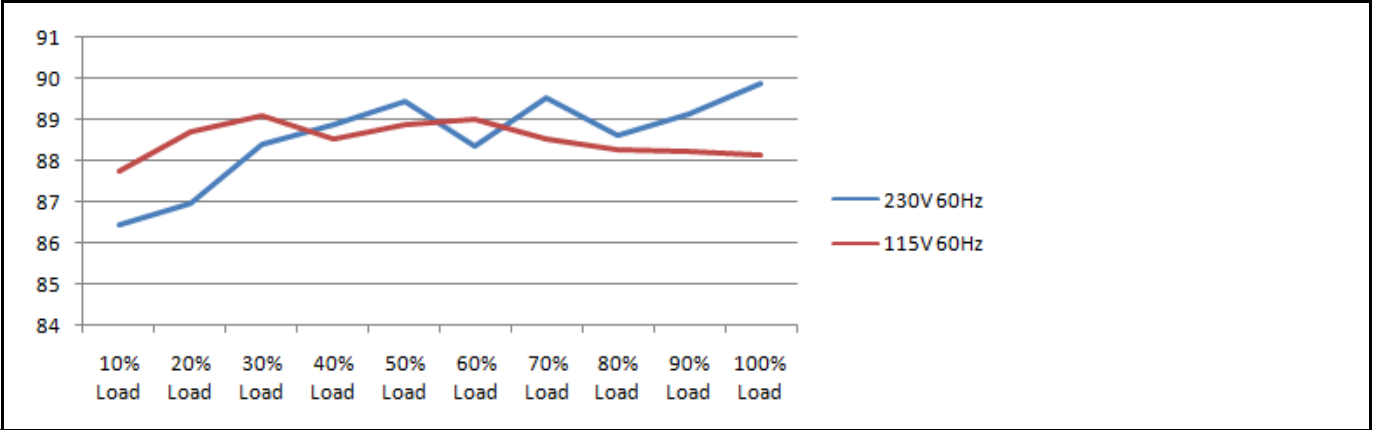


8	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 6.0ms 115VAC : 6.6ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage	INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage		
9	HOLD UP TIME (TYP.)	230VAC : 30ms 115VAC : 12ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 66.4ms 115VAC : 20.8ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		
10	DYNAMIC LOAD	V1 : 1500 mVp-p	I/P : 230VAC O/P: (1) Full/Min load 50% duty/120HZ (2) Full/Min load 50% duty/1KHZ TA : 25°C	V1: (1). 490.0mv (2). 234.0mv unit:mVp-p
	FULL /50% LOAD 50%DUTY / 120HZ	FULL /50% LOAD 50%DUTY / 1KHZ		

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	80VAC ~ 264VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	68.5VAC ~ 264VAC
			I/P : LOW-LINE = 77VAC HIGH-LINE = 300VAC O/P : FULL/MIN LOAD ON:30 Sec ; OFF:30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST : OK
2	INPUT FREQUENCY RANGE	47HZ ~ 63HZ NO DAMAGE	I/P : 115VAC ~ 264VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK
3	INPUT CURRENT (TYP.)	1 / 230VAC 1.2 / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	I= 0.417 / 230VAC I= 0.616 / 115VAC
4	LEAKAGE CURRENT	< 100uA Touch current	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-FG: 84 uA N-FG: 85 uA
5	NO LOAD POWER CONSUMPTION	< 0.10W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.061 W
	EFFICIENCY (TYP.)	89.0%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	89.89 %

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7	INRUSH CURRENT (TYP.)	60A / 230VAC 30A / 115VAC twidh= 0 us measured at 50% Ipeak COLD START	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	I= 27.20A / 230VAC I= 26.90A / 115VAC
	INPUT=230VAC/50HZ @ FULL LOAD CH2 : Input current (1V=1A) CH4 : AC Input Voltage		INPUT=115VAC/50HZ @ FULL LOAD CH2 : Input current (1V=1A) CH4 : AC Input Voltage	

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	115% ~ 150%	I/P: 264VAC I/P: 230VAC I/P: 115VAC O/P: TESTING Ta: 25°C	135.5% 264VAC 140.0% 230VAC 139.0% 115VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	17.25V ~ 20.30V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD Ta: 25°C	19.15V 264VAC 19.15V 230VAC 19.15V 80VAC Shut down Re- power ON
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 80VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup Mode

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q1 Rated : 600V 9.0A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	VIN: 267VAC VDS: (1). 528.00V (2). 480.00V (3). 524.00V
2	Input Capacitor	C5 Rated : 100uf 400V	I/P : 267VAC O/P : (1)Full Load Turn on /Off (2)Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1). 360.00V (2). 364.00V (3). 360.00V
3	Control IC	U1 Rated : 28.0V (max) -0.3V (min)	I/P : 267VAC O/P : (1)Full Load (2)Output Short (3)O.L.P (4)O.V.P (5)Low Line No Load Vo(min) Ta : 25°C	U1 (1). 19.60V (2). 10.80V (3). 19.60V (4). 20.20V (5). 18.80V
4	O/P Diode	D100 Rated : 100V 20.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1). 75.00V (2). 66.00V (3). 76.00V
5	Clamp Diode	D5 Rated : 800V 2.0A	I/P : 267VAC O/P : (1)Full load continue Ta : 25°C	(1). 500.00V

SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P : 4.000KVAC /min	I/P-O/P: 4.400KVAC /min Ta : 25°C	I/P-O/P: 1.41mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P: 500VDC Ta : 25°C/70%RH	I/P-O/P: 9999MΩ NO DAMAGE

E.M.C. TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	PASS
2	CONDUCTION	EN55011 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD / 50% LOAD Ta : 25°C	PASS Test by certified Lab

3	RADIATION	EN55011 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 MEDICAL AIR: 15KV / Contact: 8KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 MEDICAL INPUT: 2KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 MEDICAL L-N:2KV;L/N-PE: 4KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A

RELIABILITY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																				
1	TEMPERATURE RISE TEST	MODEL : RPS-45-7.5 1. ROOM AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 31.3°C 2. HIGH AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 44.6°C	<table border="1"> <thead> <tr> <th>NO.</th> <th>Positio</th> <th>ROOM AMBIENT</th> <th>31.3°C</th> <th>HIGH AMBIENT Ta:</th> <th>44.6°C</th> </tr> </thead> <tr> <td>1</td> <td>LF1</td> <td>47.1°C</td> <td></td> <td>61.5°C</td> <td></td> </tr> <tr> <td>2</td> <td>LF2</td> <td>46.4°C</td> <td></td> <td>59.4°C</td> <td></td> </tr> <tr> <td>3</td> <td>BD1</td> <td>70.2°C</td> <td></td> <td>83.4°C</td> <td></td> </tr> <tr> <td>4</td> <td>Q1</td> <td>76.3°C</td> <td></td> <td>89.5°C</td> <td></td> </tr> <tr> <td>5</td> <td>C5</td> <td>56.0°C</td> <td></td> <td>69.6°C</td> <td></td> </tr> <tr> <td>6</td> <td>C40</td> <td>65.4°C</td> <td></td> <td>79.4°C</td> <td></td> </tr> <tr> <td>7</td> <td>T1</td> <td>68.1°C</td> <td></td> <td>79.5°C</td> <td></td> </tr> <tr> <td>8</td> <td>D100</td> <td>90.6°C</td> <td></td> <td>103.7°C</td> <td></td> </tr> <tr> <td>9</td> <td>C105</td> <td>70.0°C</td> <td></td> <td>82.3°C</td> <td></td> </tr> <tr> <td>10</td> <td>C106</td> <td>63.6°C</td> <td></td> <td>75.0°C</td> <td></td> </tr> <tr> <td>11</td> <td>C107</td> <td>51.2°C</td> <td></td> <td>62.2°C</td> <td></td> </tr> <tr> <td>12</td> <td>L100</td> <td>53.2°C</td> <td></td> <td>64.7°C</td> <td></td> </tr> <tr> <td>13</td> <td>U1</td> <td>59.2°C</td> <td></td> <td>73.0°C</td> <td></td> </tr> </table>	NO.	Positio	ROOM AMBIENT	31.3°C	HIGH AMBIENT Ta:	44.6°C	1	LF1	47.1°C		61.5°C		2	LF2	46.4°C		59.4°C		3	BD1	70.2°C		83.4°C		4	Q1	76.3°C		89.5°C		5	C5	56.0°C		69.6°C		6	C40	65.4°C		79.4°C		7	T1	68.1°C		79.5°C		8	D100	90.6°C		103.7°C		9	C105	70.0°C		82.3°C		10	C106	63.6°C		75.0°C		11	C107	51.2°C		62.2°C		12	L100	53.2°C		64.7°C		13	U1	59.2°C		73.0°C		
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230VAC O/P : 132% LOAD Ta : 25°C	TEST : OK																																																																																				
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 264VAC / 115VAC O/P : FULL LOAD Ta : -30.0°C	TEST : OK																																																																																				
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50°C NO DAMAGE	I/P : 272VAC O/P : FULL LOAD Ta : 50°C HUMIDITY= 95.0% RH	TEST : OK																																																																																				
5	TEMPERATURE COEFFICIENT	±0.03% /°C(0~50°C)	I/P : 230VAC O/P : FULL LOAD	±0.0100% /°C(0~50°C)																																																																																				
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°C ~ +85°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		TEST : OK																																																																																				
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		TEST : OK																																																																																				
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK																																																																																				



9	CAPACITOR LIFE CYCLE	:SUPPOSE C105 IS THE MOST CRITICAL COMPONENT					
		(1) I/P : 230VAC	O/P : FULL LOAD	Ta= 25.0°C	LIFE TIME	(1).	104779.8 HRS
		(2) I/P : 230VAC	O/P : FULL LOAD	Ta= 50.0°C	LIFE TIME	(2).	19866.9 HRS
		(3) I/P : 230VAC	O/P : 75% LOAD	Ta= 50.0°C	LIFE TIME	(3).	51275.1 HRS
		(4) I/P : 230VAC	O/P : 50% LOAD	Ta= 50.0°C	LIFE TIME	(4).	97762.8 HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 726.2 KHRS					
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above				30000HRS @ TA 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

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