



TEST REPORT: RPS-30-15

30W Single Output Medical Type

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

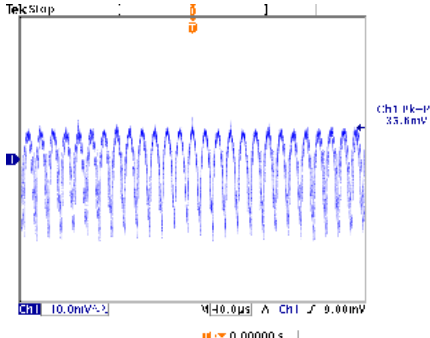
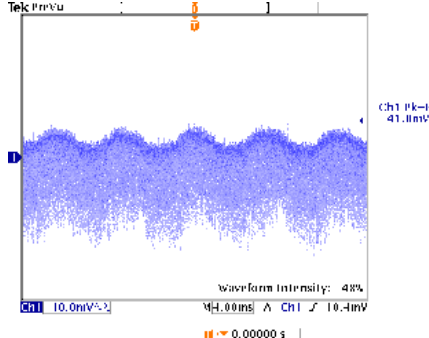
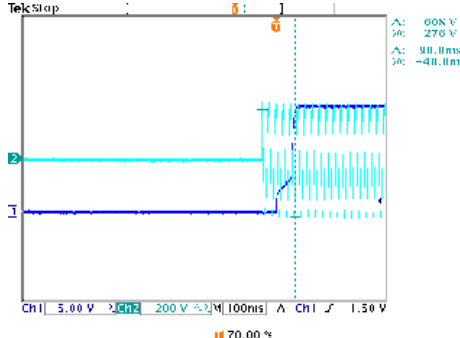
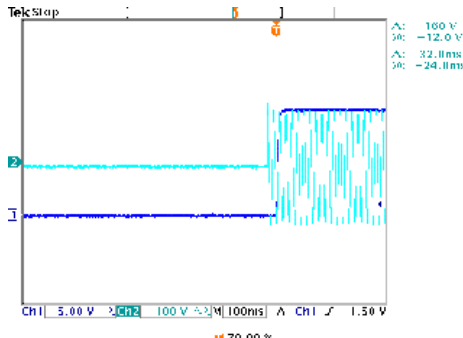
Safety Test

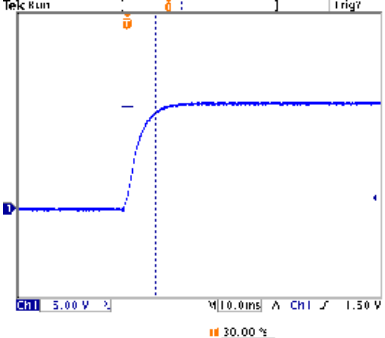
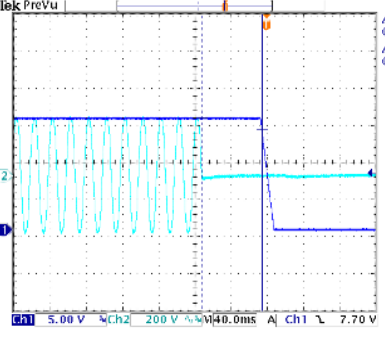
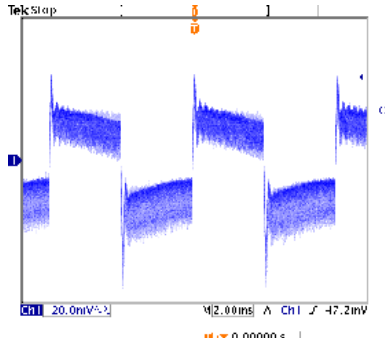
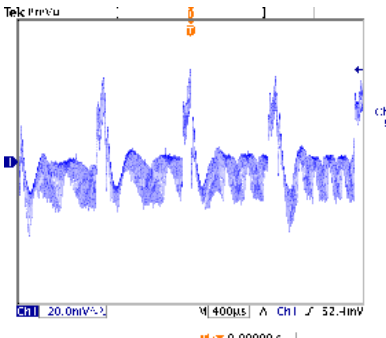
E.M.C. Test

■ RELIABILITY TEST

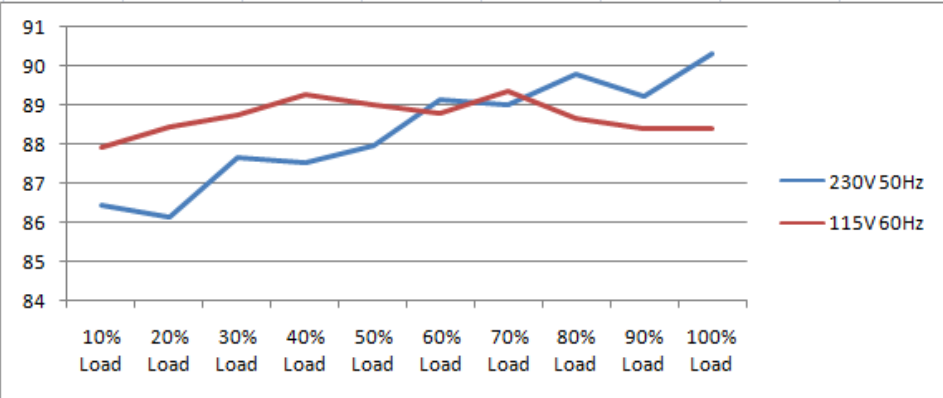
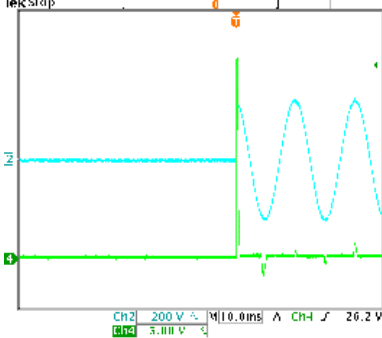
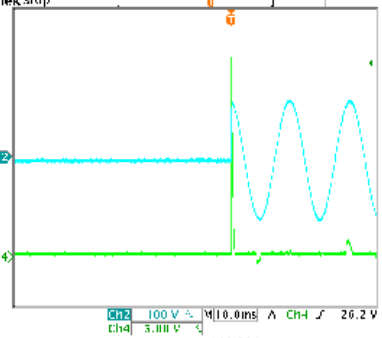
ENVIRONMENT TEST

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: 12.93V ~ 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% ~ -0.42%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.00% ~ -0.17%
4	LOAD REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.25% ~ -0.42%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 1.987 %
6	RIPPLE & NOISE(Max)	V1 : 100 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 41 mVp-p
		high frequency :		low frequency :
				
7	SET UP TIME (MAX.)	230VAC : 200ms 115VAC : 200ms	I/P : 230VAC I/P : 115VAC	230VAC 90ms 115VAC 32ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	
				

8	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 7.8ms 115VAC : 7.8ms
	INPUT=230VAC/50HZ @ 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 : 22.4ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 			
10	DYNAMIC LOAD	V1 : 1500.0mv mVp-p	I/P : 230VAC O/P: (1)Full/Min load 50% duty/120HZ (2)Full/Min load 50% duty/1KHZ TA : 25°C	(1). 120.0mv (2). 98.4mv 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	68.1VAC ~ 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.)	0.5 / 230VAC 1 / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	I= 0.271 / 230VAC I= 0.459 / 115VAC
4	LEAKAGE CURRENT	< 80uA Touch current	I/P : 264VAC O/P : MIN LOAD Ta : 25°C	L-FG: 53 uA N-FG: 54 uA
5	NO LOAD POWER CONSUMPTION	< 0.10W	I/P : 230VAC O/P : MIN LOAD Ta : 25°C	< 0.0601 W
6	EFFICIENCY (TYP.)	89.0%	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	90.30%
				
7	INRUSH CURRENT (TYP.)	60A / 230VAC 30A / 115VAC twidth= 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= 27.00A / 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	130.50% 264VAC 132.00% 230VAC 129.00% 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	19.16V 264VAC 19.18V 230VAC 19.19V 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 7.0A	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). 494.00V (2). 460.00V (3). 490.00V
2	Input Capacitor	C5 Rated : 68uf 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). 346.00V (2). 348.00V (3). 348.00V
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). 21.50V (2). 11.80V (3). 19.10V (4). 24.50V (5). 16.70V
4	O/P Diode	D101 Rated : 120V 30.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1). 109.00V (2). 91.60V (3). 108.00V
5	Clamp Diode	D5 Rated : 800V 2.0A	I/P : 267VAC O/P : (1)Full load continue Ta : 25°C	(1). 462.00V

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: 1.24mA 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-30-12																																																										
		1. ROOM AMBIENT BURN-IN : 1.0hrs																																																										
		IP: 230VAC O/P: 100% LOAD TA= 27.0℃																																																										
		2. HIGH AMBIENT BURN-IN : 1.0hrs																																																										
		IP: 230VAC O/P: 100% LOAD TA= 45.8℃																																																										
		<table><tr><td>NO.</td><td>Position</td><td>ROOM AMBIENT 27.0℃</td><td>HIGH AMBIENT Ta: 45.8℃</td></tr><tr><td>1</td><td>LF1</td><td>41.2℃</td><td>58.3℃</td></tr><tr><td>2</td><td>LF2</td><td>38.4℃</td><td>56.3℃</td></tr><tr><td>3</td><td>BD1</td><td>47.8℃</td><td>65.5℃</td></tr><tr><td>4</td><td>Q1</td><td>75.1℃</td><td>89.8℃</td></tr><tr><td>5</td><td>C5</td><td>48.9℃</td><td>65.7℃</td></tr><tr><td>6</td><td>C40</td><td>42.0℃</td><td>58.6℃</td></tr><tr><td>7</td><td>T1 COIL</td><td>60.9℃</td><td>77.8℃</td></tr><tr><td>8</td><td>D101</td><td>78.5℃</td><td>95.2℃</td></tr><tr><td>9</td><td>C105</td><td>58.3℃</td><td>75.0℃</td></tr><tr><td>10</td><td>C106</td><td>54.3℃</td><td>71.1℃</td></tr><tr><td>11</td><td>C107</td><td>43.3℃</td><td>59.4℃</td></tr><tr><td>12</td><td>L100</td><td>42.9℃</td><td>60.1℃</td></tr><tr><td>13</td><td>U1</td><td>48.5℃</td><td>65.0℃</td></tr></table>			NO.	Position	ROOM AMBIENT 27.0℃	HIGH AMBIENT Ta: 45.8℃	1	LF1	41.2℃	58.3℃	2	LF2	38.4℃	56.3℃	3	BD1	47.8℃	65.5℃	4	Q1	75.1℃	89.8℃	5	C5	48.9℃	65.7℃	6	C40	42.0℃	58.6℃	7	T1 COIL	60.9℃	77.8℃	8	D101	78.5℃	95.2℃	9	C105	58.3℃	75.0℃	10	C106	54.3℃	71.1℃	11	C107	43.3℃	59.4℃	12	L100	42.9℃	60.1℃	13	U1	48.5℃	65.0℃
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2	OVER LOAD BURN-IN TEST	NO DAMAGE	I/P : 230VAC	TEST : OK																																																								
		1 HOUR (MIN)	O/P : 116% LOAD																																																									
			Ta : 25℃																																																									
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE	I/P : 264VAC / 100VAC	TEST : OK																																																								
		1 HOUR (MIN)	O/P : FULL LOAD																																																									
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS	I/P : 272VAC	TEST : OK																																																								
		IN CHAMBER ON	O/P : FULL LOAD																																																									
		CONTROL 50℃	Ta : 50℃																																																									
5	TEMPERATURE COEFFICIENT	NO DAMAGE	HUMIDITY= 95.0% RH																																																									
		±0.03% /℃(0~50℃)	I/P : 230VAC																																																									
6	STORAGE TEMPERATURE TEST		O/P : FULL LOAD																																																									
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -40℃ ~ +85℃		TEST : OK																																																								
		2. Temperature change rate : 25℃ / MIN																																																										
8	VIBRATION TEST	3. Dwell time low and high temperature : 30 MIN/EACH		TEST : OK																																																								
		4. Total test cycle : 5 CYCLE																																																										
9		5. Input/Output condition : STATIC		TEST : OK																																																								
10		1. Thermal shock Temperature : -35℃ ~ +55℃		TEST : OK																																																								
		2. Temperature change rate : 25℃ / MIN																																																										
11		3. Dwell time low and high temperature : 30 MIN/EACH		TEST : OK																																																								
		4. Total test cycle : 10 CYCLE																																																										
12		5. Input/Output condition :		TEST : OK																																																								
		230VAC Full Load AC ON/OFF test turn on 58sec ; turn off 2sec																																																										
13		1 Carton & 1 Set		TEST : OK																																																								
		(1) Waveform : Sine Wave																																																										
14		(2) Frequency : 10~500Hz		TEST : OK																																																								
		(4) Acceleration : 2G																																																										
15		(5) Test Time : 60min in each axis (X.Y.Z)		TEST : OK																																																								
		(6) Ta : 25℃																																																										



9	CAPACITOR LIFE CYCLE	:SUPPOSE C105 IS THE MOST CRITICAL COMPONENT					
		(1) I/P : 230VAC	O/P : FULL LOAD	Ta= 25.0℃	LIFE TIME	(1).	307137 HRS
		(2) I/P : 230VAC	O/P : FULL LOAD	Ta= 50.0℃	LIFE TIME	(2).	62813.9 HRS
		(3) I/P : 230VAC	O/P : 75% LOAD	Ta= 50.0℃	LIFE TIME	(3).	107153.6 HRS
		(4) I/P : 230VAC	O/P : 50% LOAD	Ta= 50.0℃	LIFE TIME	(4).	164041.9 HRS
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 628.7 KHRS					
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above 30000HRS @ TA 50℃					

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014