



TEST REPORT: RPS-200-15

200W Single Output Green Medical Type

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

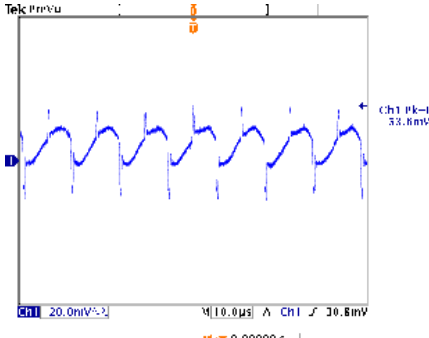
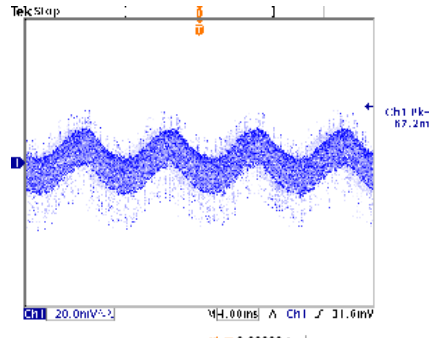
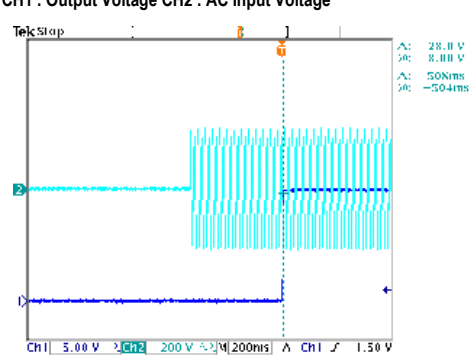
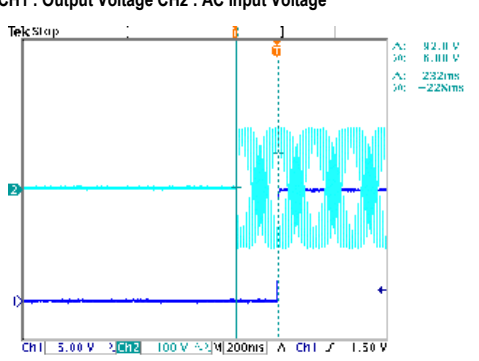
Safety Test

E.M.C. Test

■ RELIABILITY TEST

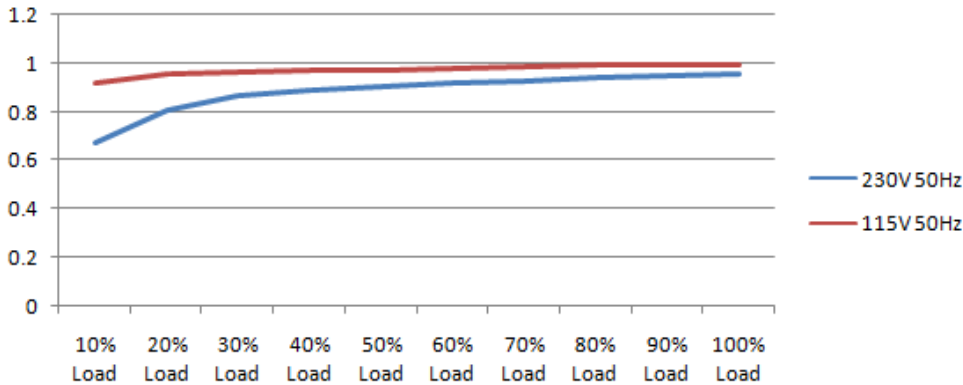
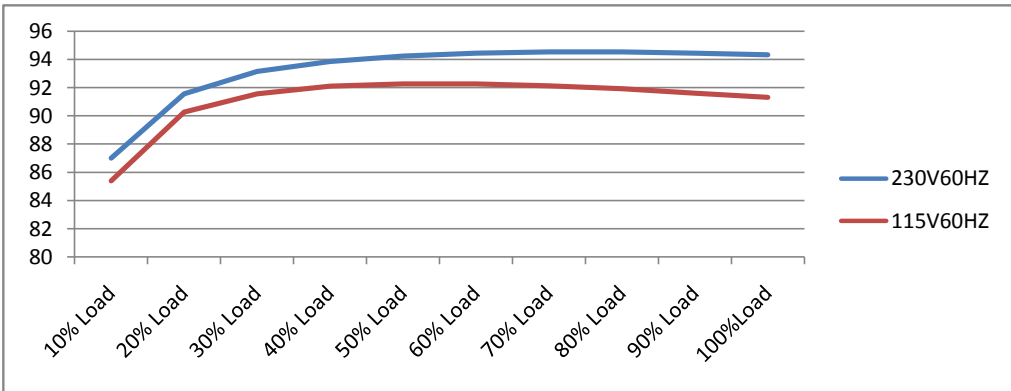
ENVIRONMENT TEST

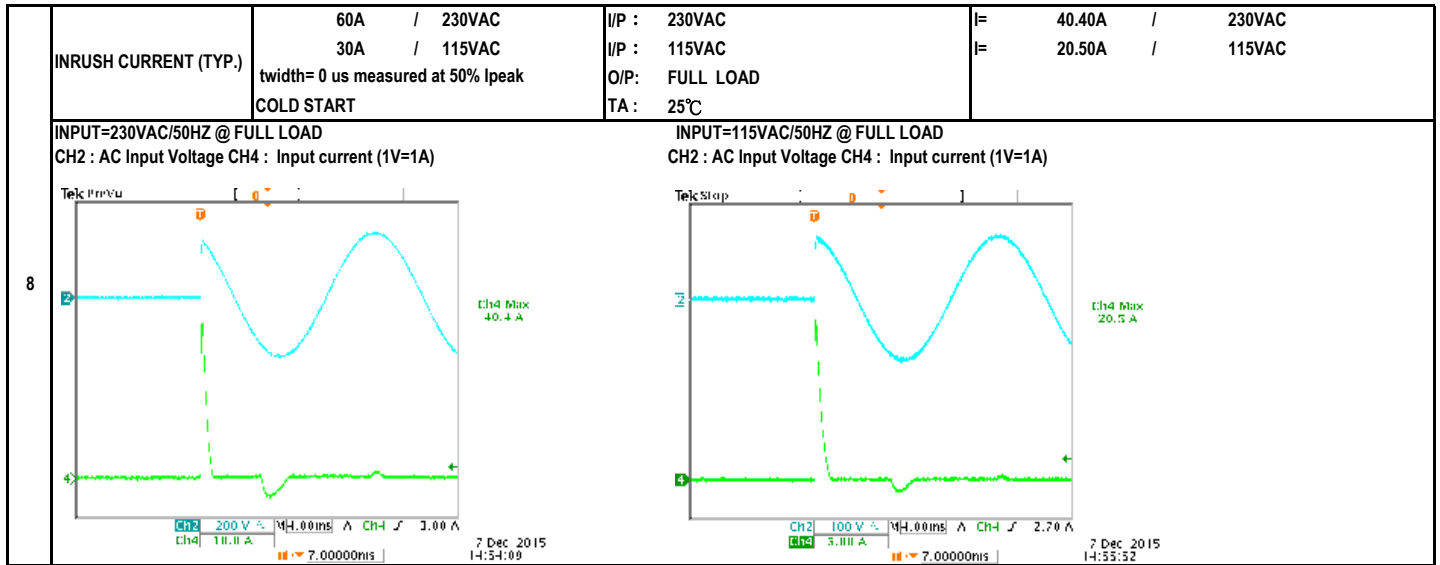
DESIGN VERIFY TEST OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 14.30V ~ 15.80V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 13.79V ~ 16.16V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.73% ~ 0.60%
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.00% ~ 0.00%
4	LOAD REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.07% ~ -0.07%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 2.649 %
6	RIPPLE & NOISE(Max)	V1 : 100 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 67.2 mVp-p
	high frequency : low frequency :			
				
7	SET UP TIME (MAX.)	230VAC : 700ms 115VAC : 700ms	I/P : 230VAC I/P : 115VAC	230VAC : 508ms 115VAC : 232ms
	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 : 4.8ms 115VAC : 4.6ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage	INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage		
9	HOLD UP TIME (TYP.)	230VAC : 12ms 115VAC : 12ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA: 25°C	230VAC : 21.0ms 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	(1). 956.0mv (2). 702.0mv unit:mVp-p
	FULL/Min LOAD 50%DUTY / 120HZ	FULL/Min 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	68.0VAC ~ 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.)	1.00A / 230VAC 2.00A / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	I= 0.98A / 230VAC I= 1.95A / 115VAC
4	LEAKAGE CURRENT	< 130uA Earth leakage current	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-FG 102 uA N-FG 103 uA
		< 40uA Touch leakage current	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-V-: 34 uA N-V-: 35 uA
5	NO LOAD POWER CONSUMPTION	< 0.50W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.3443 W
6	POWER FACTOR (TYP.)	0.94 / 230VAC 0.98 / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	PF= 0.956 / 230VAC PF= 0.993 / 115VAC
				
7	EFFICIENCY (TYP.)	93.0%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	94.333 %
				



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	110% ~ 140%	I/P: 264VAC I/P: 230VAC I/P: 115VAC O/P: TESTING TA : 25°C	123.4% 264VAC 123.4% 230VAC 123.4% 115VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	16.50V ~ 19.50V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD TA : 25°C	18.50V 264VAC 18.50V 230VAC 18.50V 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
4	OVER TEMPERATURE PROTECTION	Shut down Re- power ON	I/P: 264VAC I/P: 80VAC O/P: FULL LOAD	O.T.P. Active Shut down Re- power ON

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	AUXILIARY POWER	12V / 0.5A ripple & noise: * mv Tolerance: -15~15 %	I/P: 230VAC O/P: FULL LOAD TA : 25°C	11.532 V/ 0.4993 A ripple & noise: * mv Tolerance: -3.9 %

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q5 Rated : 500V 13.0A Q6 Rated : 500V 13.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	Q5 Q6 (1). 492.00V 494.00V (2). 492.00V 494.00V (3). 442.00V 454.00V
2	Input Capacitor	C5 Rated : 100uf 420V	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). 417.00V (2). 415.00V (3). 417.00V
3	Control IC	U1 Rated : 38.0V (max) 13.0V (min) U101 Rated : 24V (max) 6V (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 U101 (1). 33.70V 12.40V (2). 20.10V 2.48V (3). 20.10V 2.48V (4). 33.00V 13.60V (5). 25.50V 10.60V

4	O/P Diode (MOSFET)	Q101 Rated : 60V 100A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	Q101 (1). 36.30V (2). 11.90V (3). 36.10V	Q102 36.70V 13.20V 33.80V
		Q102 Rated : 60V 100A			
5	PFC Power Transistor	Q1 Rated : 600V 20.2A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1). 544.00V (2). 546.00V (3). 502.00V	
6	PFC Diode	D1 Rated : 600V 5.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Dynamic Load Full/Min Load 90%Duty/5KHz (4)Dynamic Load Full/Min Load 50%Duty/120Hz Ta : 25°C	(1). 500.00V (2). 490.00V (3). 494.00V (4). 506.00V	

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-FG : 2.000KVAC /min O/P-FG : 1.500KVAC /min	I/P-O/P: 4.400KVAC /min I/P-FG: 2.400KVAC /min O/P-FG: 1.800KVAC /min Ta : 25°C	I/P-O/P: 1.00mA I/P-FG: 1.38mA O/P-FG: 0.57mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ	I/P-O/P: 500VDC I/P-FG: 500VDC Ta : 25°C/70%RH	I/P-O/P: 9999MΩ I/P-FG: 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-200-12					
		1. ROOM AMBIENT BURN-IN : 1.0hrs					
		IP: 230VAC O/P: 100% LOAD TA= 18.5℃					
		2. HIGH AMBIENT BURN-IN : 1.0hrs					
		IP: 230VAC O/P: 100% LOAD TA= 49.3℃					
		NO.	Position	ROOM AMBIENT 18.5℃	HIGH AMBIENT Ta: 49.3℃		
		1	RTH1	66.8℃	84.9℃		
		2	LF1	46.5℃	70.3℃		
		3	LF2	40.3℃	62.2℃		
		4	L2	52.1℃	73.4℃		
		5	BD1	56.2℃	81.0℃		
		6	Q1	58.4℃	83.5℃		
		7	C5	53.4℃	73.4℃		
		8	C81	42.6℃	69.3℃		
		9	RTH2	50.6℃	75.2℃		
		10	T1 COIL	75.1℃	96.8℃		
		11	T1 BOB	62.4℃	81.9℃		
2	OVER LOAD BURN-IN TEST	NO DAMAGE	I/P : 230VAC	TEST : OK			
		1 HOUR (MIN)	O/P : 142.70% LOAD				
			Ta : 25℃				
		3	LOW TEMPERATURE TURN ON TEST		NO DAMAGE	I/P : 264VAC / 115VAC	TEST : OK
					1 HOUR (MIN)	O/P : FULL LOAD	
						Ta : -30.0℃	
					4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	
IN CHAMBER ON	O/P : FULL LOAD						
CONTROL 50℃	Ta : 50℃						
5	TEMPERATURE COEFFICIENT	NO DAMAGE	HUMIDITY= 95.0% RH	±0.0054% /(0℃~50℃)			
		±0.03% /(0℃~50℃)	I/P : 230VAC				
6	STORAGE TEMPERATURE TEST		O/P : FULL LOAD	TEST : OK			
		1. Thermal shock Temperature : -40℃ ~ +85℃					
		2. Temperature change rate : 25℃ / MIN					
		3. Dwell time low and high temperature : 30 MIN/EACH					
		4. Total test cycle : 5 CYCLE					
7	THERMAL SHOCK TEST	5. Input/Output condition : STATIC		TEST : OK			
		1. Thermal shock Temperature : -35℃ ~ +55℃					
		2. Temperature change rate : 25℃ / MIN					
		3. Dwell time low and high temperature : 30 MIN/EACH					
		4. Total test cycle : 10 CYCLE					
8	VIBRATION TEST	5. Input/Output condition : 230VAC Full Load AC ON/OFF test turn on 58sec ; turn off 2sec		TEST : OK			
		1 Carton & 1 Set					
		(1) Waveform : Sine Wave					
		(2) Frequency : 10~500Hz					
		(4) Acceleration : 2G					
9	CAPACITOR LIFE CYCLE	(5) Test Time : 60 min in each axis (X.Y.Z)		(1). 42029.9 HRS			
		(6) Ta : 25℃			(2). 11348.7 HRS		
		:SUPPOSE C105 IS THE MOST CRITICAL COMPONENT				(3). 68992 HRS	
		(1) I/P : 230VAC O/P : FULL LOAD Ta= 25.0℃ LIFE TIME					(4). 151383.7 HRS
		(2) I/P : 230VAC O/P : FULL LOAD Ta= 50.0℃ LIFE TIME					
10	MTBF	(3) I/P : 230VAC O/P : 75% LOAD Ta= 50.0℃ LIFE TIME					
		(4) I/P : 230VAC O/P : 50% LOAD Ta= 50.0℃ LIFE TIME					
		Conducted by Parts Stress Analysis Prediction					
		500.2K hrs min. MIL-HDBK-217F (25℃)					
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