



TEST REPORT: RPS-200-12

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

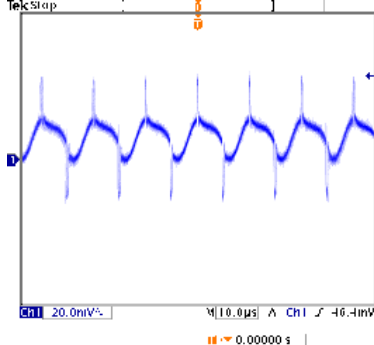
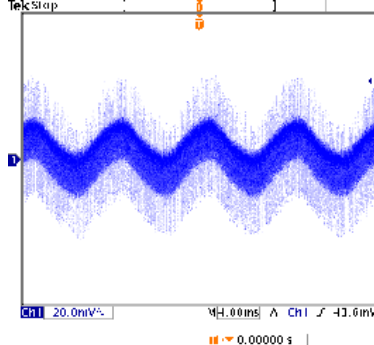
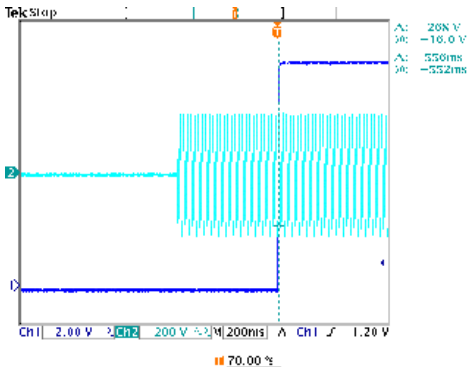
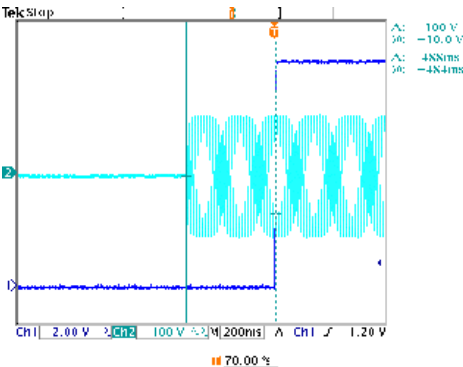
Safety Test

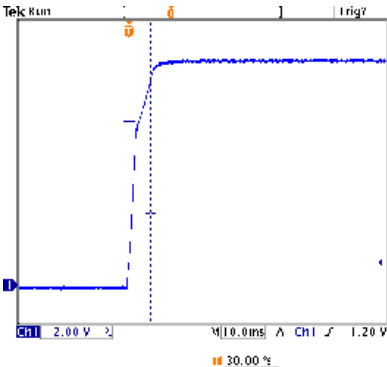
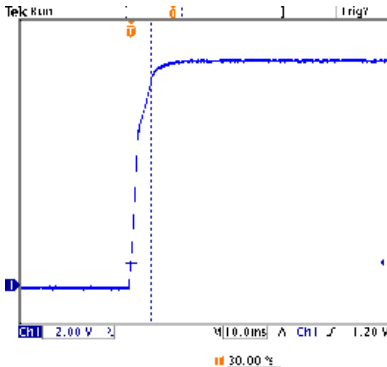
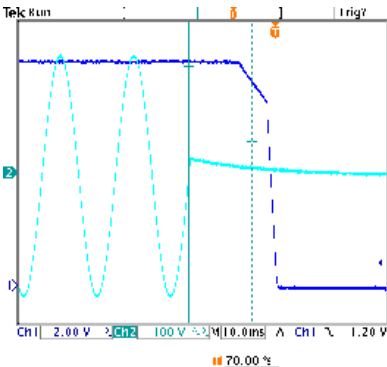
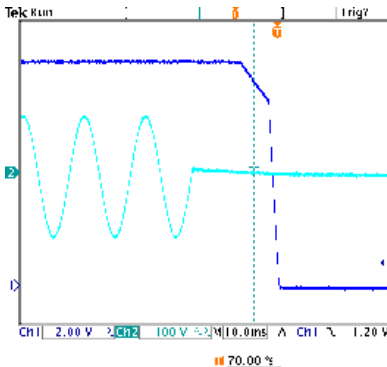
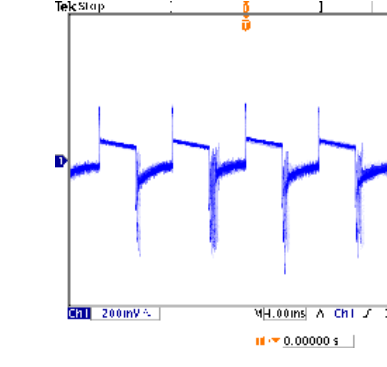
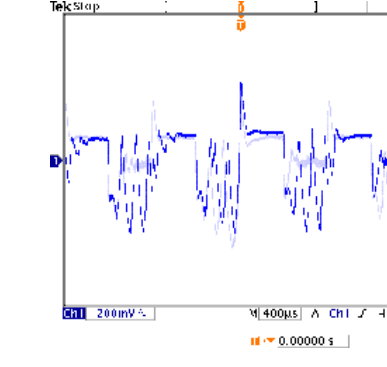
E.M.C. Test

■ RELIABILITY TEST

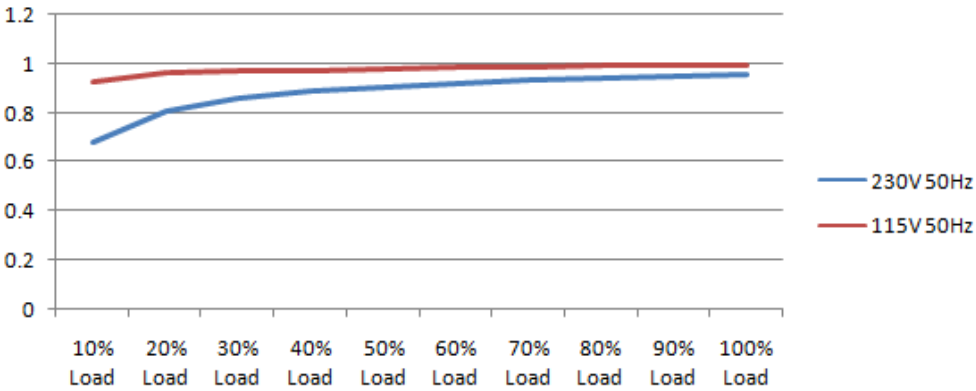
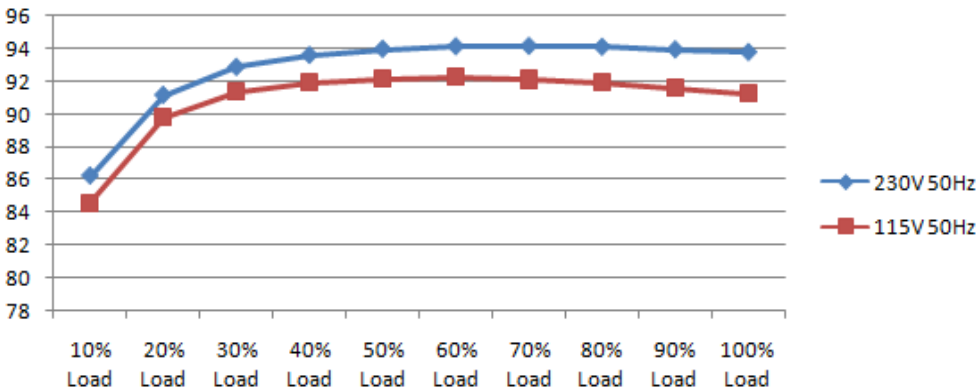
ENVIRONMENT TEST

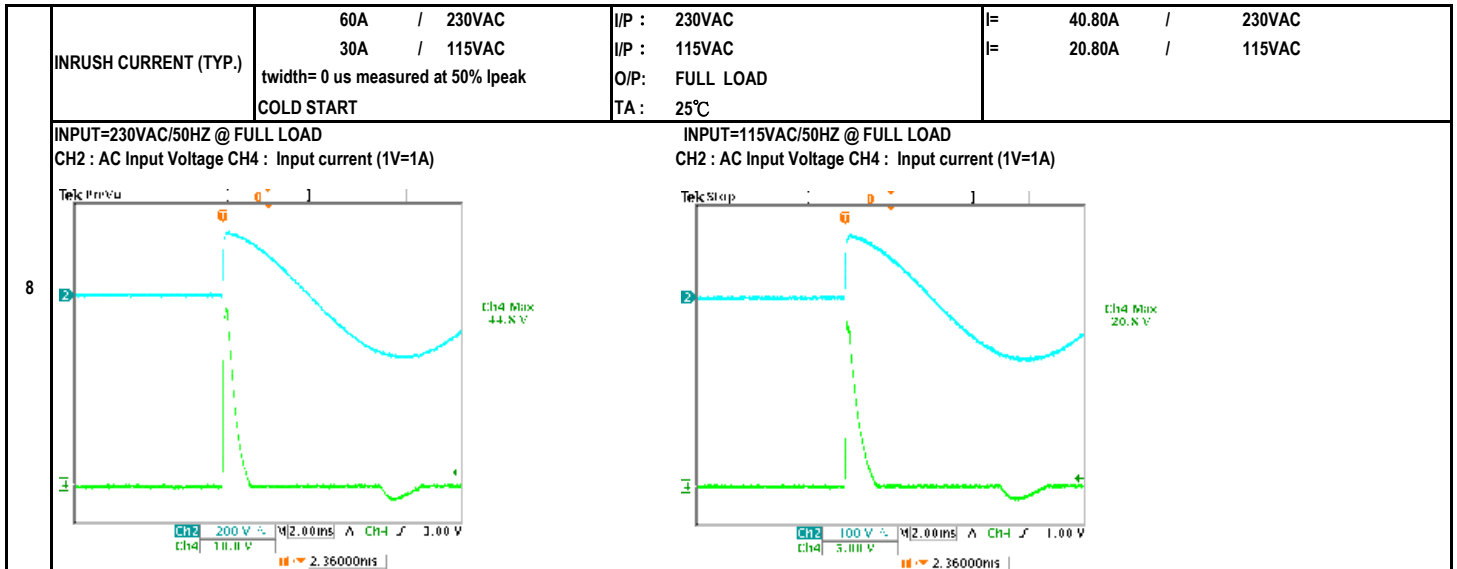
DESIGN VERIFY TEST OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 11.40V ~ 12.60V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 11.04V ~ 12.93V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.67% ~ 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% ~ 0.00%
4	LOAD REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.17% ~ -0.08%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 1.333 %
6	RIPPLE & NOISE(Max)	V1 : 100 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 91.6 mVp-p
	high frequency : low frequency :			
				
7	SET UP TIME (MAX.)	230VAC : 700ms 115VAC : 700ms	I/P : 230VAC I/P : 115VAC	230VAC : 556ms 115VAC : 488ms
	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 : 5.8ms 115VAC : 5.4ms
9	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage	
10	HOLD UP TIME (TYP.)	230VAC : 12ms 115VAC : 12ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA: 25°C	230VAC : 17.2ms 115VAC : 17.0ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	
	DYNAMIC LOAD	V1 : 1200 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). 844.0mv (2). 844.0mv 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= 0.99A / 230VAC I= 1.95A / 115VAC
4	LEAKAGE CURRENT	< 130uA Earth leakage current	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-FG 104 uA N-FG 103 uA
		< 40uA Touch leakage current	I/P : 264VAV O/P : MIN LOAD TA : 25°C	L-V-: 35 uA N-V-: 35 uA
5	NO LOAD POWER CONSUMPTION	< 0.50W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.3442 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= 0.9566 / 230VAC PF= 0.993 / 115VAC
				
7	EFFICIENCY (TYP.)	93.0%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	93.693 %
				



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	125.2% 264VAC 125.2% 230VAC 125.0% 115VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	13.20V ~ 15.60V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD TA : 25°C	14.50V 264VAC 14.60V 230VAC 14.50V 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	11.505 V/ 0.4997 A ripple & noise: * mv Tolerance: -4.125 %

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). 498.00V 492.00V (2). 486.00V 490.00V (3). 446.00V 446.00V
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). 418.00V (2). 417.00V (3). 418.00V

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 28.10V 20.10V 20.10V 29.40V 24.10V U101 12.50V 3.02V 3.08V 14.20V 11.40V
4	O/P Diode (MOSFET)	Q101 Rated : 40V 100A	Q102 Rated : 40V 100A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	Q101 30.40V 7.20V 29.60V Q102 31.40V 9.16V 30.20V
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). 550.00V (2). 550.00V (3). 550.00V
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). 514.00V (2). 462.00V (3). 504.00V (4). 502.00V

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: 1.39mA O/P-FG: 0.58mA 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°C		
		2. HIGH AMBIENT BURN-IN : 1.0hrs		
		IP: 230VAC O/P: 100% LOAD TA= 49.3°C		
			NO. Position ROOM AMBIENT 18.5°C HIGH AMBIENT Ta: 49.3°C	
			1 RTH1 66.8°C 84.9°C	
			2 LF1 46.5°C 70.3°C	
			3 LF2 40.3°C 62.2°C	
			4 L2 52.1°C 73.4°C	
			5 BD1 56.2°C 81.0°C	
			6 Q1 58.4°C 83.5°C	
			7 C5 53.4°C 73.4°C	
			8 C81 42.6°C 69.3°C	
			9 RTH2 50.6°C 75.2°C	
2	OVER LOAD BURN-IN TEST	NO DAMAGE	I/P : 230VAC	TEST : OK
		1 HOUR (MIN)	O/P : 142.70% LOAD Ta : 25°C	
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE	I/P : 264VAC / 115VAC	TEST : OK
		1 HOUR (MIN)	O/P : FULL LOAD Ta : -30.0°C	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50°C	I/P : 272VAC	TEST : OK
		NO DAMAGE	O/P : FULL LOAD Ta : 50°C HUMIDITY= 95.0% RH	
5	TEMPERATURE COEFFICIENT	±0.03% /(0°C~50°C)	I/P : 230VAC	±0.0054% /(0°C~50°C)
			O/P : FULL LOAD	
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°C ~ +85°C		TEST : OK
		2. Temperature change rate : 25°C / MIN		
7	THERMAL SHOCK TEST	3. Dwell time low and high temperature : 30 MIN/EACH		TEST : OK
		4. Total test cycle : 5 CYCLE		
8	VIBRATION TEST	5. Input/Output condition : STATIC		TEST : OK
		1 Carton & 1 Set		
9	CAPACITOR LIFE CYCLE	(1) Waveform : Sine Wave		
		(2) Frequency : 10~500Hz		
10	MTBF	(4) Acceleration : 2G		
		(5) Test Time : 60 min in each axis (X.Y.Z)		
11	DMTBF /Accelerated Life test	(6) Ta : 25°C		
		:SUPPOSE C105 IS THE MOST CRITICAL COMPONENT		
12		(1) I/P : 230VAC O/P : FULL LOAD Ta= 25.0°C LIFE TIME	(1). 42029.9 HRS	
		(2) I/P : 230VAC O/P : FULL LOAD Ta= 50.0°C LIFE TIME	(2). 11348.7 HRS	
13		(3) I/P : 230VAC O/P : 75% LOAD Ta= 50.0°C LIFE TIME	(3). 68992 HRS	
		(4) I/P : 230VAC O/P : 50% LOAD Ta= 50.0°C LIFE TIME	(4). 151383.7 HRS	
14		Conducted by Parts Stress Analysis Prediction		
		500.2K hrs min. MIL-HDBK-217F (25°C)		
15		Demonstration Mean Time Between Failure (Expected Life): Above	30000HRS @ TA 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014