



TEST REPORT: RPS-30-24

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

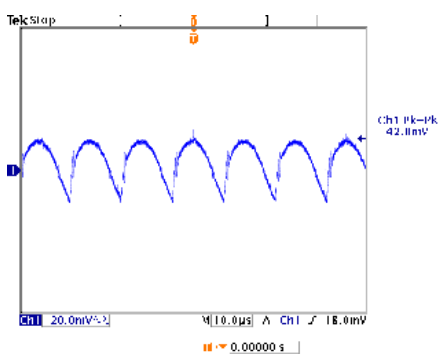
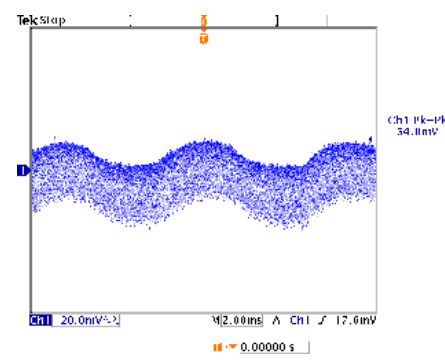
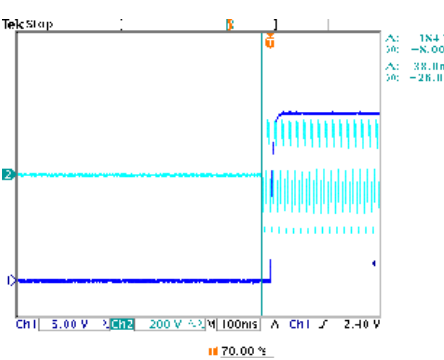
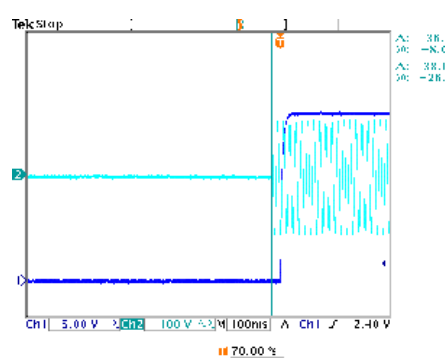
Safety Test

E.M.C. Test

■ RELIABILITY TEST

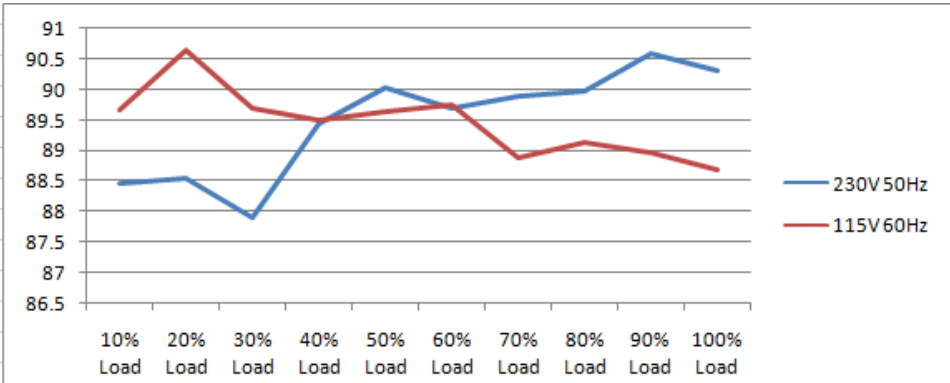
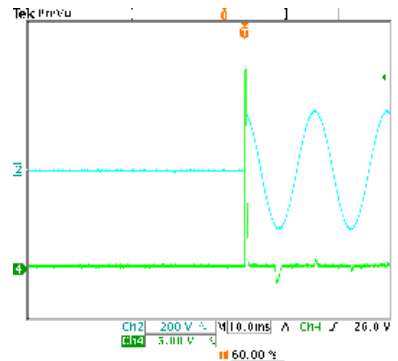
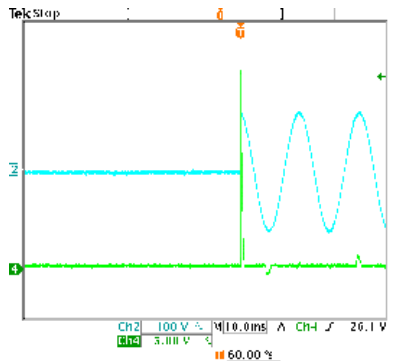
ENVIRONMENT TEST

DESIGN VERIFY TEST OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 22.80V ~ 27.60V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 21.72V ~ 28.31V	
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 1.0% ~ -1.0%	I/P : 115VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.21% ~ -0.57%	
3	LINE REGULATION (MAX.)	V1 : 0.5% ~ -0.5%	I/P : 115VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.00% ~ -0.07%	
4	LOAD REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.21% ~ -0.57%	
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 1.250 %	
6	RIPPLE & NOISE(Max)	V1 : 150 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 54 mVp-p	
		high frequency :		low frequency :	
					
7	SET UP TIME (MAX.)	230VAC : 200ms 115VAC : 200ms	I/P : 230VAC I/P : 115VAC	230VAC 38ms 115VAC 38ms	
	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 : 12.2ms 115VAC : 12.0ms
	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 : 35.2ms 115VAC : 22.4ms
10	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	
11	DYNAMIC LOAD	V1 : 2400 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). 242.0mv (2). 170.0mv unit:mVp-p
	FULL /50% LOAD 50%DUTY / 120HZ		FULL /50% LOAD 50%DUTY / 1KHZ	
12				

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= 0.279 / 230VAC I= 0.468 / 115VAC
4	LEAKAGE CURRENT	< 80uA	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-FG: 54 uA N-FG: 55 uA
5	NO LOAD POWER CONSUMPTION	< 0.10W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.0717 W
6	EFFICIENCY (TYP.)	89.5%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	90.33 %
				
7	INRUSH CURRENT (TYP.)	60A / 230VAC 30A / 115VAC twitd= 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		
7				
		INPUT=115VAC/50HZ @ FULL LOAD CH2 : Input current (1V=1A) CH4 : AC Input Voltage		
7				

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	125.6% 264VAC 129.6% 230VAC 126.2% 115VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	28.40V ~ 32.40V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD Ta: 25°C	30.20V 264VAC 30.20V 230VAC 30.20V 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). 508.00V (2). 472.00V (3). 506.00V
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). 348.00V (2). 350.00V (3). 350.00V
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). 22.30V (2). 11.80V (3). 16.10V (4). 26.20V (5). 17.80V
4	O/P Diode	D101 Rated : 200V 20.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1). 159.00V (2). 151.00V (3). 151.00V
5	Clamp Diode	D5 Rated : 800V 2.0A	I/P : 267VAC O/P : (1)Full load continue Ta : 25°C	(1). 476.00V

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: 1.13mA 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℃						
		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℃					
2	OVER LOAD BURN-IN TEST	NO DAMAGE						
		1 HOUR (MIN)						
		I/P : 230VAC						
		O/P : 116% LOAD						
		Ta : 25℃						
		TEST : OK						
		3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE				
				1 HOUR (MIN)				
				I/P : 264VAC / 100VAC				
				O/P : FULL LOAD				
				Ta : -30.0℃				
				TEST : OK				
				4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS		
						IN CHAMBER ON		
CONTROL 50℃								
NO DAMAGE								
I/P : 272VAC								
O/P : FULL LOAD								
Ta : 50℃								
HUMIDITY= 95.0% RH								
TEST : OK								
5	TEMPERATURE COEFFICIENT	±0.03% /℃(0~50℃)						
		I/P : 230VAC						
		O/P : FULL LOAD						
		±0.0480% /℃(0~50℃)						
		6	STORAGE TEMPERATURE TEST			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				
				5. Input/Output condition : STATIC				
				TEST : OK				
				7	THERMAL SHOCK TEST	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		
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℃						
		TEST : OK						



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 KHR					
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

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