

TEST REPORT: GSM120A24-R7B

120W AC-DC High Reliability Medical Adaptor

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

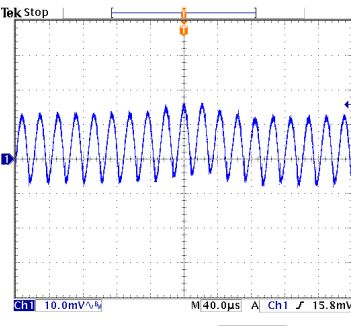
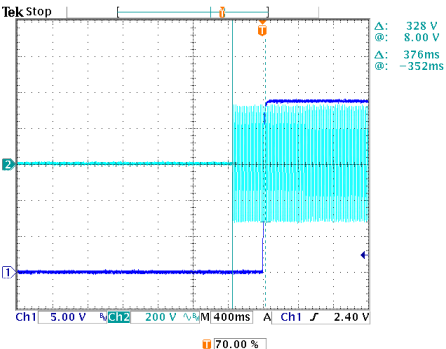
Safety Test

E.M.C. Test

■ RELIABILITY TEST

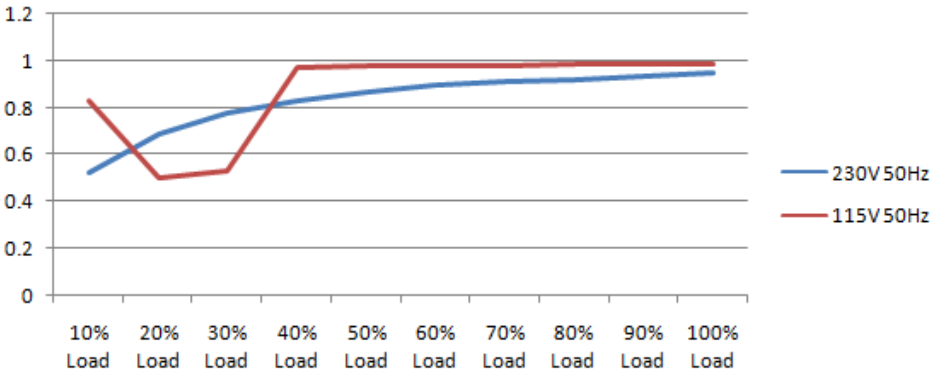
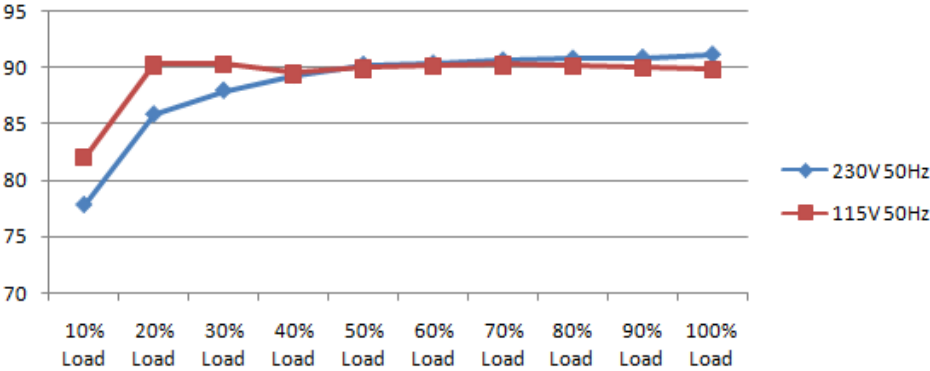
ENVIRONMENT TEST

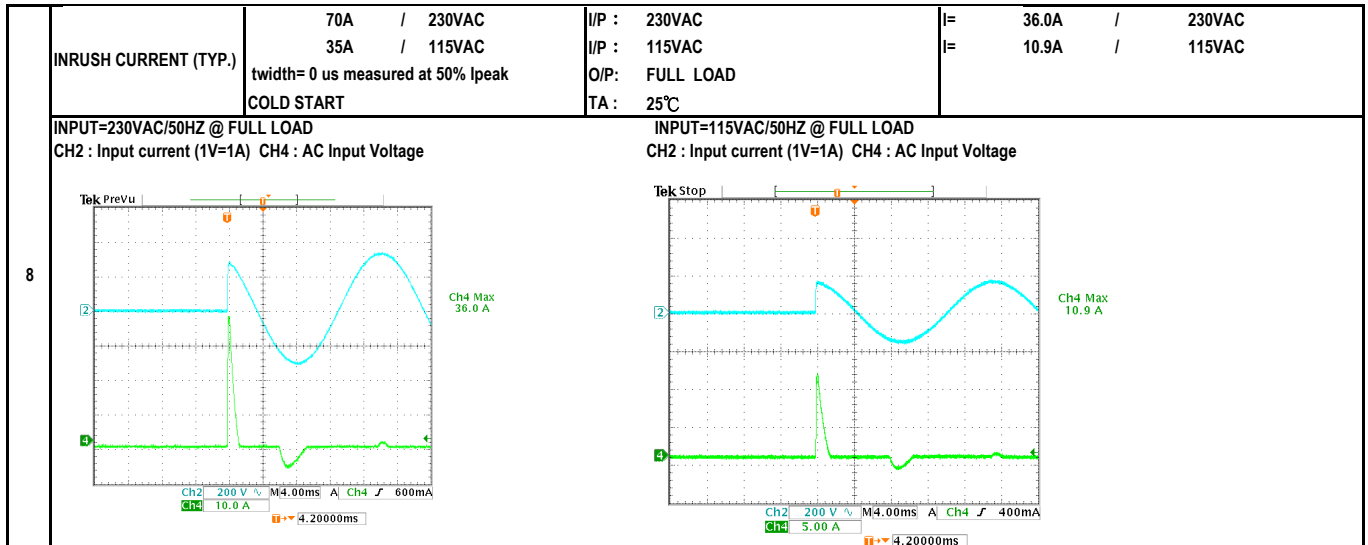
DESIGN VERIFY TEST OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE RANGE	CH1: 23.28V ~ 24.72V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 24.04V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 3.0% ~ -3.0%	I/P : 100VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.29% ~ -0.54%
3	LINE REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 100VAC / 264VAC O/P: FULL LOAD TA: 25°C	V1: 0.04% ~ 0.00%
4	LOAD REGULATION (MAX.)	V1 : 3.0% ~ -3.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA: 25°C	V1: 0.42% ~ -0.42%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA: 25°C	TEST< 1.7 %
6	RIPPLE & NOISE(Max)	V1 : 180 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 25.8 mVp-p
		high frequency : 		
7	SET UP TIME (MAX.)	230VAC : 1500ms 115VAC : 2000ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA: 25°C	230VAC : 376ms 115VAC : 296ms
		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 		
	RISE TIME (MAX.)	230VAC : 30ms 115VAC : 30ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA: 25°C	230VAC : 19.8ms 115VAC : 20.0ms

8	<div> <div> INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage </div> <div> </div> </div> <div> <div> INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage </div> <div> </div> </div>
---	---

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	65.0VAC ~ 264VAC
			I/P : LOW-LINE = 97VAC 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 : 100VAC ~ 264VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK
3	INPUT CURRENT (TYP.)	0.7 / 230VAC 1.4 / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	I= 0.6056 / 230VAC I= 1.1721 / 115VAC
4	LEAKAGE CURRENT	< 0.10mA for earth leakage current	I/P : 115VAC O/P : MIN LOAD TA : 25°C	L-FG: 0.08 mA N-FG: 0.081 mA
		< 0.10mA for touch leakage current	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-V-: 0.079 mA N-V-: 0.079 mA
5	NO LOAD POWER CONSUMPTION	< 0.15W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.1057 W
6	POWER FACTOR (TYP.)	0.93 / 230VAC 0.97 / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	PF= 0.945 / 230VAC PF= 0.987 / 115VAC
				
7	EFFICIENCY (TYP.)	90.0%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	91.364 %
				



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105% ~ 160%	I/P: 264VAC I/P: 230VAC I/P: 100VAC O/P: TESTING TA : 25°C	137% 264VAC 137% 230VAC 128.80% 100VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	25.20V ~ 32.40V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD TA : 25°C	28.10V 264VAC 28.10V 230VAC 28.00V 80VAC Shut down Re- power ON
3	OVER TEMPERATURE PROTECTION	Shut down Re- power ON	I/P: 264VAC I/P: 80VAC O/P: FULL LOAD TA : 25°C	O.T.P. Active Shut down Re- power ON
4	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	Q32 Rated : 700V 11.0A	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). 602.00V (2). 508.00V (3). 592.00V
2	O/P Diode (MOSFET)	Q102 Rated : 150V 104A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	Q102 VDS : (1). 104.00V (2). 72.00V (3). 95.20V
3	Input Capacitor	C5 Rated : 120uf 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). 416.00V (2). 416.00V (3). 418.00V

4	Control IC	U2 Rated : 28V (max) -0.3V (min)	U101 Rated : 38V (max) -0.4V (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	U2 U101 (1). 17.80V 24.70V (2). 14.90V 1.20V (3). 14.90V 23.10V (4). 20.20V 29.00V (5). 12.10V 24.30V
5	PFC Power Transistor	Q31 Rated : 600V 16.0A		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). 436.00V (2). 428.00V (3). 444.00V
6	PFC Diode	D1 Rated : 600V 9.0A		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	267VAC (1). 428.00V (2). 416.00V (3). 424.00V (4). 424.00V
8	Clamp Diode	D30 Rated : 800V 3.0A		I/P : 267VAC O/P : (1)Dynamic Load Full/Min Load 90%Duty/1KHz (2)Full load continue Ta : 25°C	(1). 540.00V (2). 536.00V

SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
		I/P-O/P : 4.000KVAC /min I/P-FG : 2.000KVAC /min O/P-FG : 1.000KVAC /min Ta : 25°C	I/P-O/P: 4.400KVAC /min I/P-FG: 2.400KVAC /min O/P-FG: 1.200KVAC /min Ta : 25°C	I/P-O/P: 2.34mA I/P-FG: 1.53mA O/P-FG: 2.92mA 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:1KV;L/N-PE: 2KV	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 : GSM120A24-R7B			
		1. ROOM AMBIENT BURN-IN : 1.0hrs			
		IP: 230VAC O/P: 100% LOAD TA= 19.1℃			
		2. HIGH AMBIENT BURN-IN : 1.0hrs			
		IP: 230VAC O/P: 100% LOAD TA= 38.3℃			
		NO.	Positio	ROOM AMBIENT 19.1℃	HIGH AMBIENT Ta, 38.3℃
		1	RTH1	87.2℃	87.4℃
		2	LF1	63.0℃	75.7℃
		3	LF2	59.1℃	74.0℃
		4	LF3	58.1℃	73.4℃
		5	L1	60.5℃	75.8℃
		6	L2	61.8℃	77.1℃
		7	C5	63.8℃	78.6℃
		8	C52	67.9℃	83.0℃
		9	T1	68.7℃	84.0℃
		10	BD1	60.7℃	75.5℃
		11	Q31	62.1℃	78.5℃
		12	D1	62.4℃	78.2℃
		2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230VAC O/P : 124.8% LOAD Ta : 25℃
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 40℃ NO DAMAGE	I/P : 272VAC O/P : FULL LOAD Ta : 40℃ HUMIDITY= 95.0% RH	TEST : OK	
5	TEMPERATURE COEFFICIENT	±0.03% /(0℃~40℃)	I/P : 230VAC O/P : FULL LOAD	±0.0063% /(0℃~40℃)	
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℃ ~ +45℃ 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 : 60 min in each axis (X.Y.Z) (6) Ta : 25℃		TEST : OK	
9	CAPACITOR LIFE CYCLE	:SUPPOSE C110 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25.0℃ LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 40.0℃ LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 40.0℃ LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 40.0℃ LIFE TIME	(1). 110534.6 HRS (2). 49494.7 HRS (3). 100427.6 HRS (4). 200085.6 HRS		
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 372 KHRS			
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above 30000HRS @ TA 40℃			

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ

2007/3/20 A50-S014