



TEST REPORT: GSM220A12

220W AC-DC Reliable Green Medical Adaptor

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

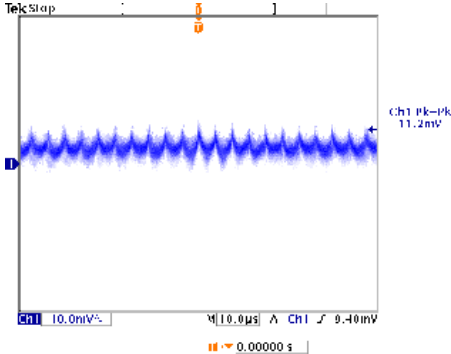
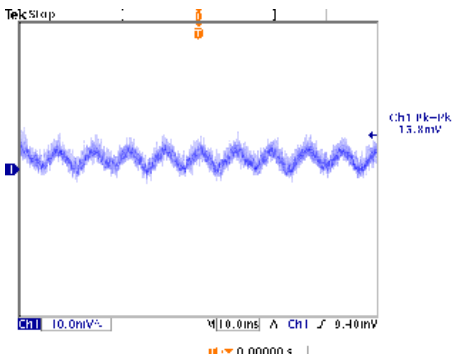
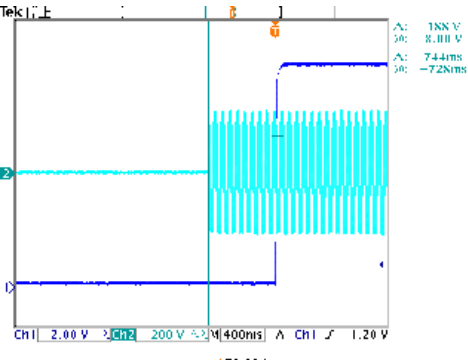
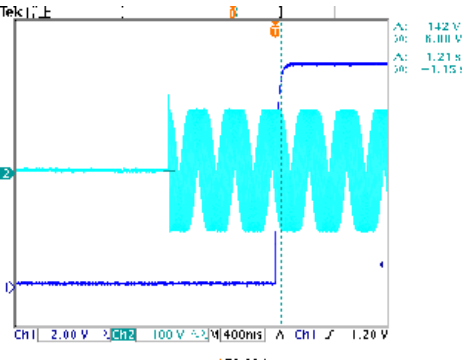
Safety Test

E.M.C. Test

■ RELIABILITY TEST

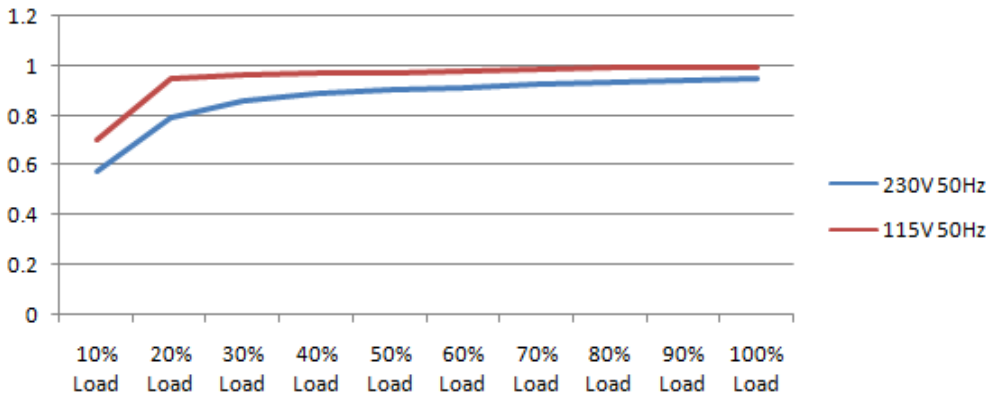
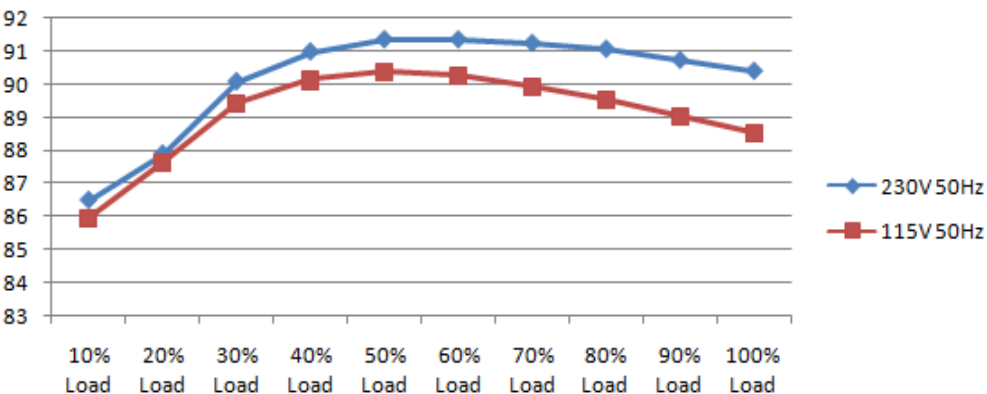
ENVIRONMENT TEST

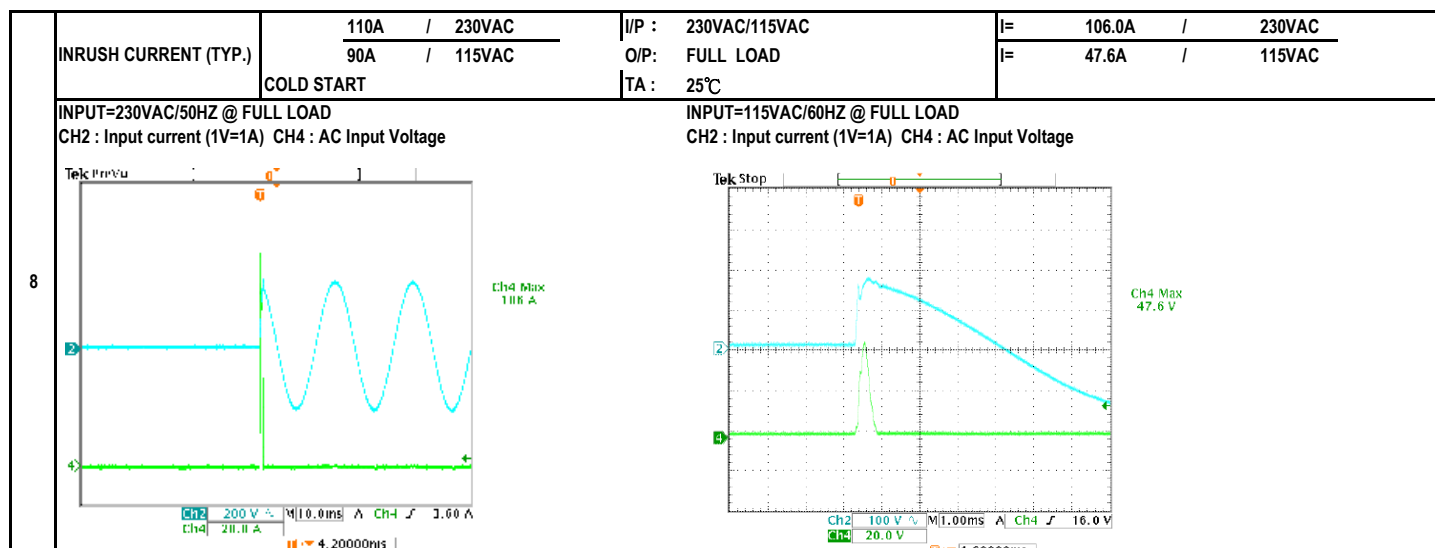
DESIGN VERIFY TEST OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 5.0% ~ -5.0%	I/P : 100VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 1.33% ~ -2.42%
2	LINE REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 100VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.00% ~ 0.00%
3	LOAD REGULATION (MAX.)	V1 : 5.0% ~ -5.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 2.18% ~ -1.60%
4	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 1.0 %
5	RIPPLE & NOISE(Max)	V1 : 80 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 15.8 mVp-p
		high frequency : 		low frequency : 
6	SET UP TIME (MAX.)	230VAC : 2000ms 115VAC : 2000ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 744ms 115VAC : 1208ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage	
				

7	RISE TIME (MAX.)	230VAC : 50ms 115VAC : 50ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 13.6ms 115VAC : 14.8ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage			
8	HOLD UP TIME (TYP.)	230VAC : 20ms 115VAC : 20ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 30.8ms 115VAC : 28.8ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage			
9	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). 658mv (2). 640mv 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	58.0VAC ~ 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.)	2.0A / 230VAC 4.0A / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	I= 0.8774A / 230VAC I= 1.7226A / 115VAC
4	LEAKAGE CURRENT	<115uA for earth leakage	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-FG: 63 uA N-FG: 65 uA
		<100uA for touch leakage		L-V-: 71 uA N-V-: 73 uA
5	NO LOAD POWER CONSUMPTION	< 0.15W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.0892 W
6	POWER FACTOR (TYP.)	0.91 / 230VAC 0.98 / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	PF= 0.9523 / 230VAC PF= 0.9939 / 115VAC
				
7	EFFICIENCY (TYP.)	90.0%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	90.628 %
				



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105% ~ 135%	I/P : 264VAC I/P : 230VAC I/P : 100VAC O/P : TESTING TA : 25°C	122.5% 264VAC 122.5% 230VAC 122.5% 100VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	12.60V ~ 16.20V	I/P : 264VAC I/P : 230VAC I/P : 80VAC O/P : MIN LOAD TA : 25°C	14.30V 264VAC 14.30V 230VAC 14.30V 80VAC Shut down Re- power ON
3	OVER TEMPERATURE PROTECTION	Shut down o/p voltage, recovers automatically after temperature goes down	I/P : 264VAC I/P : 80VAC O/P : FULL LOAD TA : 25°C	O.T.P. Active Shut down o/p voltage, recovers automatically after temperature goes down
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	Q5 Rated : 600V 18.0A Q6 Rated : 600V 18.0A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	Q5 Q6 VIN: 267VAC 267VAC (1). 500.00V 468.00V (2). 500.00V 522.00V (3). 442.00V 442.00V
		Q101 Rated : 40V 120A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue (4)Burst mode Ta : 25°C	Q101 Q102 VDS : VDS : (1). 29.30V 28.60V (2). 14.10V 12.30V (3). 29.20V 28.00V (4). 29.90V 29.80V
3	Input Capacitor	C5 Rated : 220uf 450V	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	C5 (1). 442.00V (2). 444.00V (3). 430.00V

4	Control IC	U1	Rated :	38V	(max)	I/P :	267VAC	U1	U101
				-0.4V	(min)	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	(1).	26.00V 12.20V (2). 20.00V 2.86V (3). 23.40V 10.60V (4). 28.40V 13.20V (5). 25.10V 12.00V
5	PFC Power Transistor	U101	Rated :	26V	(max)				
				-0.3V	(min)				
6	PFC Diode	Q1	Rated :	600V	15.8A	I/P :	267VAC	Q1	Q2
						VDS :		VIN:	267VAC 267VAC
						O/P :	(1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1).	514.00V 524.00V (2). 516.00V 514.00V (3). 482.00V 478.00V
		Q2	Rated :	600V	15.8A				
		D2	Rated :	600V	15.0A	I/P :	267VAC	D2	
						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).	450.00V (2). 460.00V (3). 448.00V (4). 446.00V

SAFETY & E.M.C. TEST

SAFETY 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	I/P-O/P: 1.53mA
		I/P-FG :	2.000KVAC	/min	I/P-FG: 2.400KVAC	/min	I/P-FG: 1.03mA
		O/P-FG :	0.500KVAC	/min	O/P-FG: 0.600KVAC	/min	O/P-FG: 2.05mA
					Ta : 25°C	NO DAMAGE	
2	ISOLATION RESISTANCE	I/P-O/P :		500VDC>100MΩ	I/P-O/P: 600VDC	I/P-O/P: 9999MΩ	
				Ta : 25°C/70%RH	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 AIR: 15KV / Contact: 8KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INPUT: 2KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	EN61000-4-5 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 : GSM220A12		
		1. ROOM AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 18.0℃		
		2. HIGH AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 41.7℃		
			NO. Position ROOM AMBIENT 18.0℃ HIGH AMBIENT Ta: 41.7℃	
			1 LF1 48.0℃	91.3℃
			2 LF2 46.7℃	94.1℃
			3 L2 50.5℃	99.1℃
			4 BD1 52.0℃	99.0℃
			5 L1 51.1℃	95.1℃
			6 Q1 50.9℃	95.7℃
			7 Q2 52.1℃	95.3℃
			8 D2 53.2℃	95.7℃
			9 C5 55.3℃	92.7℃
			10 TSW1 51.1℃	85.1℃
			11 C83 58.0℃	93.0℃
			12 RTH2 54.5℃	88.8℃
			13 T1 COIL 77.9℃	107.8℃
			14 C109 67.7℃	96.6℃
			15 Q102 68.7℃	98.6℃
			16 Q101 69.5℃	98.6℃
			17 LF101 82.4℃	110.6℃
			18 Q5 54.5℃	92.6℃
			19 Q6 54.4℃	90.5℃
			20 U1 63.2℃	98.1℃
			21 D3 50.4℃	92.2℃
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230VAC O/P : 116.66% 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 40℃ NO DAMAGE	I/P : 272VAC O/P : FULL LOAD Ta : 40℃ HUMIDITY= 95.0% RH	TEST : OK
5	TEMPERATURE COEFFICIENT	±0.03% /(0℃~50℃)	I/P : 230VAC O/P : FULL LOAD	±0.0109% /(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℃ ~ +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 C109 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). 72386.2 HRS (2). 17808.6 HRS (3). 80698.5 HRS (4). 160843.8 HRS



10	MTBF	MIL-HDBK-217F
		TOTAL FAILURE RATE : 210.79 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