



TEST REPORT: GSM120A15-R7B

105W 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

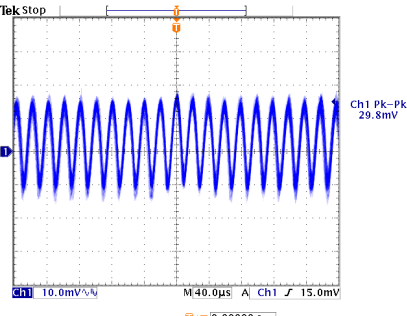
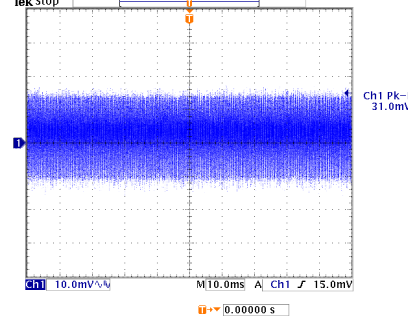
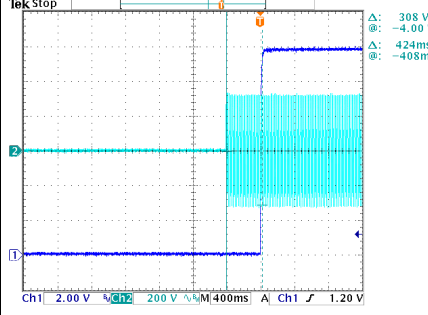
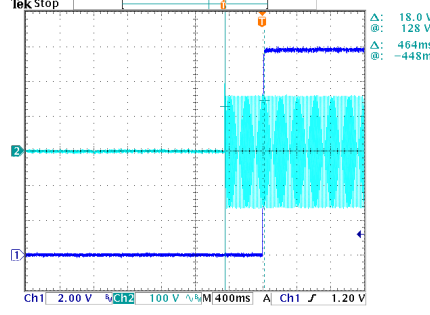
Safety Test

E.M.C. Test

■ RELIABILITY TEST

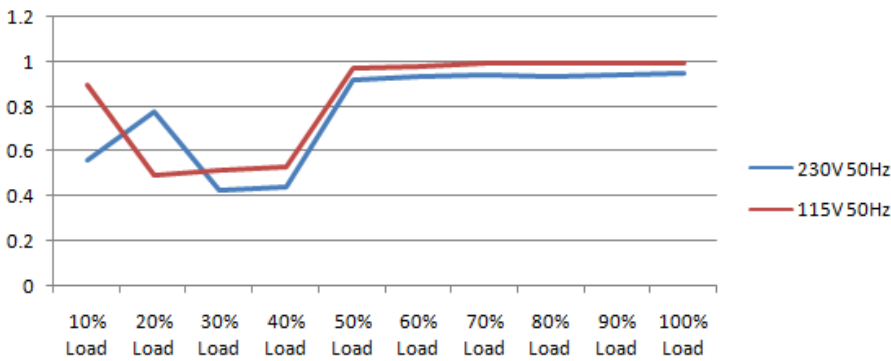
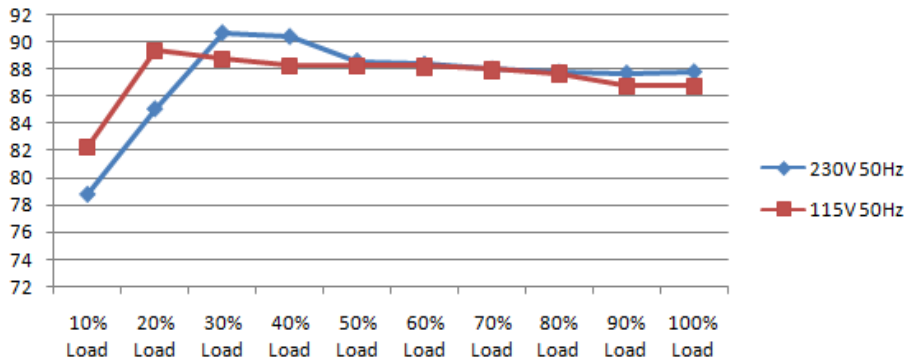
ENVIRONMENT TEST

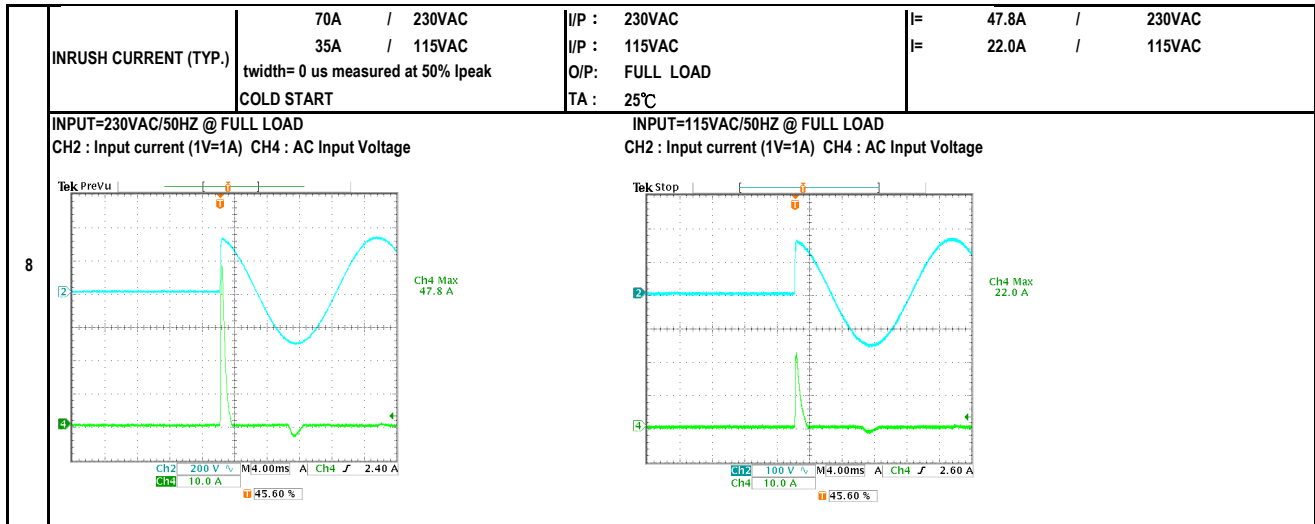
DESIGN VERIFY TEST OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE RANGE	CH1: 14.25V ~ 15.75V	I/P : 230VAC O/P: MIN LOAD TA : 25°C	CH1: 14.98V
2	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 5.0% ~ -5.0%	I/P : 100VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.99% ~ -1.16%
3	LINE REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 100VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.08% ~ 0.00%
4	LOAD REGULATION (MAX.)	V1 : 5.0% ~ -5.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.99% ~ -1.16%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 3.4 %
6	RIPPLE & NOISE(Max)	V1 : 120 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 31 mVp-p
		high frequency:		low frequency :
				
7	SET UP TIME (MAX.)	230VAC : 1500ms 115VAC : 2000ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 424ms 115VAC : 464ms
		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 : 10.2ms 115VAC : 9.0ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage	INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage		
9	HOLD UP TIME (TYP.)	230VAC : 20ms 115VAC : 20ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 36.4ms 115VAC : 25.6ms
		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 : 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). 1060mv (2). 848mv 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 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)	56.0VAC ~ 264VAC 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= 0.402 / 230VAC I= 0.7832 / 115VAC
4	LEAKAGE CURRENT	< 0.10mA for earth leakage current	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-FG: 0.086 mA N-FG: 0.088 mA
		< 0.10mA for touch leakage current	I/P : 264VAC O/P : MIN LOAD TA : 25°C	L-V-: 0.087 mA N-V-: 0.088 mA
5	NO LOAD POWER CONSUMPTION	< 0.15W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.0805 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= 0.9547 / 230VAC PF= 0.9905 / 115VAC
				
7	EFFICIENCY (TYP.)	89.0%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	89.243 %
				



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	135% 264VAC 135% 230VAC 127% 100VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	15.75V ~ 20.25V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD TA : 25°C	19.60V 264VAC 19.80V 230VAC 19.70V 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	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). 584.00V (2). 588.00V (3). 580.00V
2	O/P Diode (MOSFET)	Q102 Rated : 100V 65A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	Q102 VDS : (1). 90.80V (2). 89.60V (3). 89.20V
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). 406.00V (2). 394.00V (3). 406.00V

4	Control IC	U2 Rated : 28V (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	U2 U101 (1). 18.60V 15.90V (2). 15.10V 1.50V (3). 17.20V 14.10V (4). 22.90V 19.50V (5). 11.80V 15.70V
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	VIN: 267VAC VDS: (1). 458.00V (2). 426.00V (3). 424.00V
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). 420.00V (2). 400.00V (3). 443.00V (4). 421.00V
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). 524.00V (2). 516.00V

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: 2.20mA I/P-FG: 1.41mA O/P-FG: 2.81mA 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 : GSM120A12-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. Position ROOM AMBIENT 19.1℃ HIGH AMBIENT Ta: 38.3℃	
			1 RTH1 77.8℃ 80.2℃	
			2 LF1 58.8℃ 72.4℃	
			3 LF2 55.8℃ 71.8℃	
			4 LF3 54.8℃ 71.3℃	
			5 L1 58.9℃ 75.0℃	
			6 L2 60.1℃ 76.6℃	
			7 C5 62.5℃ 78.7℃	
			8 C52 66.6℃ 83.2℃	
			9 T1 65.5℃ 82.8℃	
			10 BD1 58.8℃ 74.7℃	
			11 Q31 61.7℃ 79.3℃	
			12 D1 61.1℃ 77.8℃	
			13 Q32 68.8℃ 85.6℃	
			14 Q102 62.6℃ 80.4℃	
			15 Q101 61.3℃ 78.4℃	
			16 C110 59.0℃ 76.9℃	
			17 C113 63.5℃ 81.4℃	
			18 LF100 63.4℃ 81.5℃	
			19 U2 56.9℃ 75.5℃	
			20 RTH30 63.0℃ 80.6℃	
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230VAC O/P : 134.1% 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℃~40℃)	I/P : 230VAC O/P : FULL LOAD	±0.0082% /(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 C113 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). 95381.1 HRS (2). 36890.4 HRS (3). 97177.8 HRS (4). 222071.2 HRS	
10	MTBF	MIL-HDBK-217F TOTAL FAILURE RATE : 372 KHR		
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

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