



# Test Report: GSM40A18

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40W AC-DC Reliable Green Medical Adaptor

## ■ DESIGN VERIFY TEST

- Output Function Test
- Input Function Test
- Protection Function Test
- Control 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 TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 120 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 66.5 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1 : -3 %~ +3 % (Max)	I/P : 80 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : -0.42 %~ 0.39 %	P
3	LINE REGULATION	V1 : -1 %~ +1 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0 %	P
4	LOAD REGULATION	V1 : -3 %~ +3 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -0.42 %~ 0.35 %	P
5	SET UP TIME	230VAC : 1000 ms (Max) 115VAC : 1500 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 640 ms 115VAC/ 1128 ms	P
6	RISE TIME	230VAC : 30 ms (Max) 115VAC : 30 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 10.3 ms 115VAC/ 10.7 ms	P
7	HOLD UP TIME	230VAC : 50 ms (TYP) 115VAC : 24 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 70.9 ms 115VAC/ 40.6 ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %	P
9	DYNAMIC LOAD	V1 : 1800 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3).O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 262 mVp-p (2) 218 mVp-p (3) 205 mVp-p (4) 320 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
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1	INPUT VOLTAGE RANGE	80VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	59.8 V~264V  TEST : OK	P
			I/P : LOW-LINE-3V= 77 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )		
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 80 VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK	P
3	EFFICIENCY	89.5% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	90.1 %	P
4	INPUT CURRENT	230V/ 0.5 A (TYP)	I/P : 230 VAC	I = 0.34 A/ 230 VAC	P
		115V/ 1 A (TYP)	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.64 A/ 115 VAC	
5	INRUSH CURRENT	230V/ 60 A (TYP)	I/P : 230 VAC/115VAC	I = 41.5 A/ 230 VAC	P
		115V/ 30 A (TYP) COLD START	O/P : FULL LOAD Ta : 25°C	I = 22.4 A/ 115VAC	
6	LEAKAGE CURRENT	< 90 uA/ for earth leakage current	I/P: 264 VAC O/P:Min LOAD Ta:25°C	L-FG 83.5 uA N-FG 83.5 uA	P
		< 90 uA/ for touch leakage current	I/P: 264 VAC O/P:Min LOAD Ta:25°C	L-V- 84.9 uA N-V- 84.9 uA	
7	NO LOAD CONSUMPTION	< 0.1 W	I/P : 240VAC O/P : NO LOAD Ta : 25°C	< 0.0496 W	P

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~160 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	137.2 %/ 230 VAC 138.3 %/ 115 VAC Protection type : Hiccup mode, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 18.9 V ~ 24.3 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	21.5 V/ 230 VAC 21.5 V/ 115 VAC Protection type : Shut down o/p voltage, re-power on to recover	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup Mode	P

**CONTROL FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	ERP STEP2 COMPLIANT	LEVEL V	I/P: 230 VAC/115VAC O/P:100/75/50/25% LOAD Ta:25°C	230V 89.4% 115V 88.8%	P

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated : 700 V 10 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 620 V (2) 488 V (3) 608 V	P
2	Diode Peak Voltage	D100 Rated : 100 V 20 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 68.2 V (2) 55.2 V (3) 67.6 V	P
3	Input Capacitor Voltage	C 5 Rated : 120u /400V/105°C	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 372 V (2) 373 V (3) 372 V	P
4	Control IC Voltage Test	U 1 Rated : 28 V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 17.2 V (2) 17.2 V (3) 15.3 V	P
5	CLAMP DIODE	D 1 Rated : 800 V 2 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(3) 516 V (4) 428 V (3) 514 V	P

**■ SAFETY & E.M.C. TEST**

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 4 KVAC/min I/P-FG: 2KVAC	I/P-O/P : 4.2KVAC/min I/P-FG: 2.1KVAC Ta : 25°C	I/P-O/P : 1.685 mA I/P-FG : 1.487 mA NO DAMAGE	P

2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC Ta : 25°C / 70%RH	I/P-O/P : 9999 MΩ I/P-FG : 9999 MΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70% RH	11 mΩ	P

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	BS EN/EN61000-3-2 CLASS A	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS	P
2	CONDUCTION	BS EN/EN55011 (CISPR11), FCC PART 15 / CISPR22, CAN ICES-3(B)/NMB-3(B) CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	BS EN/EN55011 (CISPR11), FCC PART 15 / CISPR22, CAN ICES-3(B)/NMB-3(B) CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	BS EN/EN61000-4-2 AIR:15KV / Contact:8KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	BS EN/EN61000-4-4 INPUT: 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	BS EN/EN61000-4-5 INDUSTRY L-N :1KV L,N-FG:2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

■ **RELIABILITY TEST**

**ENVIRONMENT TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : GSM40A24 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 15.3 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 48.3 °C			P

		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>PART NUMBER</th> <th>ROOM AMBIENT Ta= 15.3°C</th> <th>HIGH AMBIENT Ta= 48.3°C</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>LF1</td> <td>TR1082 6-L2012-W902 18.9m GS</td> <td>38.2°C</td> <td>68.3°C</td> </tr> <tr> <td>2</td> <td>LF2</td> <td>TR1083 W620 52~85m GSM60</td> <td>40.6°C</td> <td>71.2°C</td> </tr> <tr> <td>3</td> <td>BD1</td> <td>BD 4A/800V GLASS UD4KB80</td> <td>44.4°C</td> <td>74.2°C</td> </tr> <tr> <td>4</td> <td>C5</td> <td>120u/400V 105°C 18*31.5 VZ EPT</td> <td>39.0°C</td> <td>69.5°C</td> </tr> <tr> <td>5</td> <td>D1</td> <td>RD 2A/800V GP20K T-52mm</td> <td>49.3°C</td> <td>79.8°C</td> </tr> <tr> <td>6</td> <td>C40</td> <td>C/E 33u/50V UL10Kh 6.3*11 YXM</td> <td>44.2°C</td> <td>74.9°C</td> </tr> <tr> <td>7</td> <td>D40</td> <td>RD 1A/1KV 1N4007GP T-52mm</td> <td>43.9°C</td> <td>74.7°C</td> </tr> <tr> <td>8</td> <td>T1coil</td> <td>MT TF2495-R0 PQ-2620 GSM40-24 B</td> <td>48.4°C</td> <td>78.2°C</td> </tr> <tr> <td>9</td> <td>T1core</td> <td>MT TF2495-R0 PQ-2620 GSM40-24 B</td> <td>45.9°C</td> <td>75.7°C</td> </tr> <tr> <td>10</td> <td>D100</td> <td>SBD STPS20120CT 20A/120V TO220</td> <td>53.3°C</td> <td>82.4°C</td> </tr> <tr> <td>11</td> <td>C105</td> <td>C/E 470u/35V UL7Kh 10*20 KY</td> <td>43.7°C</td> <td>73.6°C</td> </tr> <tr> <td>12</td> <td>U1</td> <td>PWM FAN6756MRMY SOIC-8</td> <td>39.4°C</td> <td>70.0°C</td> </tr> <tr> <td>13</td> <td>D42</td> <td>SMD SFRD US1M 1A/1KV SMA t=2</td> <td>39.1°C</td> <td>69.5°C</td> </tr> <tr> <td>14</td> <td>Q1</td> <td>FET 2SK3673-01MR 10A/700V TO220F</td> <td>46.5°C</td> <td>78.5°C</td> </tr> </tbody> </table>			NO	Position	PART NUMBER	ROOM AMBIENT Ta= 15.3°C	HIGH AMBIENT Ta= 48.3°C	1	LF1	TR1082 6-L2012-W902 18.9m GS	38.2°C	68.3°C	2	LF2	TR1083 W620 52~85m GSM60	40.6°C	71.2°C	3	BD1	BD 4A/800V GLASS UD4KB80	44.4°C	74.2°C	4	C5	120u/400V 105°C 18*31.5 VZ EPT	39.0°C	69.5°C	5	D1	RD 2A/800V GP20K T-52mm	49.3°C	79.8°C	6	C40	C/E 33u/50V UL10Kh 6.3*11 YXM	44.2°C	74.9°C	7	D40	RD 1A/1KV 1N4007GP T-52mm	43.9°C	74.7°C	8	T1coil	MT TF2495-R0 PQ-2620 GSM40-24 B	48.4°C	78.2°C	9	T1core	MT TF2495-R0 PQ-2620 GSM40-24 B	45.9°C	75.7°C	10	D100	SBD STPS20120CT 20A/120V TO220	53.3°C	82.4°C	11	C105	C/E 470u/35V UL7Kh 10*20 KY	43.7°C	73.6°C	12	U1	PWM FAN6756MRMY SOIC-8	39.4°C	70.0°C	13	D42	SMD SFRD US1M 1A/1KV SMA t=2	39.1°C	69.5°C	14	Q1	FET 2SK3673-01MR 10A/700V TO220F	46.5°C	78.5°C
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 129 % LOAD Ta : 25°C	TEST : OK	P																																																																										
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -34 °C	TEST : OK	P																																																																										
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50.2°C HUMIDITY= 95 %R.H	TEST : OK	P																																																																										
5	TEMPERATURE COEFFICIENT	± 0.03%/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.01%/°C (0~50°C)	P																																																																										
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°C~ +85°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		OK	P																																																																										
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30°C~ +60°C 2. Temperature change rate : 25°C / 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		OK	P																																																																										



8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK	P
9	CAPACITOR LIFE CYCLE	SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25°C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50°C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50°C LIFE TIME	(1) 531677HRS (2) 66459HRS (3) 90703 HRS (4) 115626 HRS	P
10	MTBF	3613.2K hrs min. Telcordia SR-332 (Bellcore) ; 740.7K hrs min. MIL-HDBK-217F (25°C)		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C		P

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	Shenym	WANGDZ

2007/3/20 A50-S014