Test Report: GSM40A12

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： 100 mVp-p (Max)	I/P： 230VAC O/P：FULL LOAD Ta：25℃	V1： 52.5 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℃	V1： -0.73 %~ 0.63 %	P
3	LINE REGULATION	V1： -1 %~ +1 % (Max)	I/P：100 VAC ~ 264 VAC O/P：FULL LOAD Ta：25℃	V1： 0 %~ 0.05 %	P
4	LOAD REGULATION	V1： -3 %~ +3 % (Max)	I/P： 230 VAC O/P：FULL ~MIN LOAD Ta：25℃	V1： -0.63 %~ 0.63 %	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℃	230VAC/ 555 ms 115VAC/ 1144 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℃	230VAC/ 9.2 ms 115VAC/ 11.3 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℃	230VAC/ 57 ms 115VAC/ 28 ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	TEST： <5 %	P
9	DYNAMIC LOAD	V1： 1200 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℃	(1) 236 mVp-p (2) 213 mVp-p (3) 206 mVp-p (4) 428 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT

1	INPUT VOLTAGE RANGE	80VAC~264 VAC	I/P：TESTING O/P：FULL LOAD Ta：25℃	59.8 V~264V	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)	TEST： OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P： 80 VAC ~ 264 VAC O/P：FULL~MIN LOAD Ta：25℃	TEST： OK	P
3	EFFICIENCY	88 % (TYP)	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	88.8 %	P
4	INPUT CURRENT	230V/ 0.5 A (TYP) 115V/ 1 A (TYP)	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I = 0.38 A/ 230 VAC I = 0.71 A/ 115 VAC	P
5	INRUSH CURRENT	230V/ 60 A (TYP) 115V/ 30 A (TYP) COLD START	I/P： 230 VAC/115VAC O/P：FULL LOAD Ta：25℃	I = 41.7 A/ 230 VAC I = 22.3 A/ 115 VAC	P
6	LEAKAGE CURRENT	< 90 uA/ for earth leakage current	I/P: 264 VAC O/P:Min LOAD Ta:25℃	L-FG 86.5 uA N-FG 86.5 uA	P
		< 90 uA/ for touch leakage current	I/P: 264 VAC O/P:Min LOAD Ta:25℃	L-V- 86.9 uA N-V- 86.9 uA	
7	NO LOAD CONSUMPTION	< 0.1 W	I/P：240VAC O/P：NO LOAD Ta：25℃	< 0.0515 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℃	135.9 %/ 230 VAC 141.3 %/ 115 VAC Protection type : Hiccup mode, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1： 12.6 V ~ 16.2 V	I/P： 230 VAC I/P： 115 VAC O/P：MIN LOAD Ta：25℃	14.1 V/ 230 VAC 14.3 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℃	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℃	230V 88.376% 115V 87.894%	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℃	(1) 608 V (2) 532 V (3) 580 V	P
2	Diode Peak Voltage	D100 Rated：80 V 30 A	I/P：High-Line +3V = 267 V O/P： (1)Full Load Turn on (2)Output Short (3)Full load continue Ta：25℃	(1) 60.6 V (2) 49.4 V (3) 55.8 V	P
3	Input Capacitor Voltage	C 5 Rated：120u /400V/105℃	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℃	(1) 376 V (2) 376 V (3) 376 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℃	(1) 17.3 V (2) 17.4 V (3) 15.2 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℃	(3) 508 V (4) 448 V (3) 496 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-O/P：4.2KVAC/min	I/P-O/P： 1.744 mA	P

		I/P-FG : 2KVAC	I/P-FG : 2.1KVAC Ta : 25℃	I/P-FG : 1.354 mA NO DAMAGE	
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℃ / 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℃ / 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℃	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℃	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℃	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℃	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℃	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℃	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT

<table>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL： GSM40A12
1. ROOM AMBIENT BURN-IN：2 HRS
I/P： 230VAC O/P： FULL LOAD Ta= 15.4 ℃
2. HIGH AMBIENT BURN-IN： 2 HRS
I/P： 230VAC O/P： FULL LOAD Ta= 50.5 ℃
<table>
<tr><th>NO</th><th>Position</th><th>PART NUMBER</th><th>ROOM AMBIENT
Ta= 15.4℃</th><th>HIGH AMBIENT
Ta= 50.5℃</th></tr>
<tr><td>1</td><td>LF1</td><td>TR1082 6-L2012-W902 18.9m GS</td><td>40.1℃</td><td>69.0℃</td></tr>
<tr><td>2</td><td>LF2</td><td>TR1083 W620 52~85m GSM60</td><td>42.7℃</td><td>72.6℃</td></tr>
<tr><td>3</td><td>BD1</td><td>BD 4A/800V GLASS UD4KB80</td><td>47.6℃</td><td>76.4℃</td></tr>
<tr><td>4</td><td>C5</td><td>120u/400V 105℃ 18*31.5 VZ EPT</td><td>43.2℃</td><td>72.6℃</td></tr>
<tr><td>5</td><td>D1</td><td>RD 2A/800V GP20K T-52mm</td><td>53.7℃</td><td>82.7℃</td></tr>
<tr><td>6</td><td>C40</td><td>C/E 33u/50V UL10Kh 6.3*11 YXM</td><td>49.0℃</td><td>78.2℃</td></tr>
<tr><td>7</td><td>D40</td><td>RD 1A/1KV 1N4007GP T-52mm</td><td>47.8℃</td><td>77.3℃</td></tr>
<tr><td>8</td><td>T1coil</td><td>MT TF2492-R0 PQ-2620 GSM40-12 B</td><td>50.4℃</td><td>79.3℃</td></tr>
<tr><td>9</td><td>T1core</td><td>MT TF2492-R0 PQ-2620 GSM40-12 B</td><td>47.3℃</td><td>76.2℃</td></tr>
<tr><td>10</td><td>D100</td><td>SBD FMEN-2308 30A/80V TO220F</td><td>64.5℃</td><td>92.2℃</td></tr>
<tr><td>11</td><td>C105</td><td>C/E 1500u/16V UL10Kh 10*20 ZLH</td><td>48.4℃</td><td>77.4℃</td></tr>
<tr><td>12</td><td>U1</td><td>PWM FAN6756MRMY SOIC-8</td><td>41.7℃</td><td>71.5℃</td></tr>
<tr><td>13</td><td>D42</td><td>SMD SFRD US1M 1A/1KV SMA t=2</td><td>41.9℃</td><td>71.5℃</td></tr>
<tr><td>14</td><td>Q1</td><td>FET 2SK3673-01MR 10A/700V TO220F</td><td>45.5℃</td><td>73.0℃</td></tr>
</table></td><td>P</td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P： 230 VAC
O/P： 126 % LOAD
Ta：25℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>3</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P： 264VAC/100VAC
O/P： 100 % LOAD
Ta= -34 ℃</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 50 ℃
NO DAMAGE</td><td>I/P： 272 VAC
O/P：FULL LOAD
Ta= 50.7℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td><td>P</td></tr>
<tr><td>5</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03%/℃(0~50℃)</td><td>I/P： 230 VAC
O/P：FULL LOAD</td><td>± 0.009%/℃(0~50℃)</td><td>P</td></tr>
<tr><td>6</td><td>STORAGE TEMPERATURE TEST</td><td colspan="2">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</td><td>OK</td><td>P</td></tr>
<tr><td>7</td><td>THERMAL SHOCK TEST</td><td colspan="2">1. Thermal shock Temperature： -30℃~ +60℃
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</td><td>OK</td><td>P</td></tr>
</table>

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℃	TEST：OK	P
9	CAPACITOR LIFE CYCLE	SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta= 25℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta= 50℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta= 50℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta= 50℃ LIFE TIME	(1) 667912 HRS (2) 84389 HRS (3) 102068 HRS (4) 154830 HRS	P
10	MTBF	3613.2K hrs min. Telcordia SR-332 (Bellcore) ; 740.7K hrs min. MIL-HDBK-217F (25℃)		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50℃		P

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	Shenym	WANGDZ

2007/3/20 A50-S014