



Test Report: GSM40B15-P1J

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°C | V1 : 63.2 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 : -0.583 %~ 0.623 % | 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 : -0.583 %~ 0.623 % | 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/ 424.550 ms 115VAC/ 1144.246 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/ 8.294 ms 115VAC/ 8.923 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/ 52.268 ms 115VAC/ 27.617 ms | P |
| 8 | OVER/UNDERSHOOT TEST | < ±5% | I/P : 230 VAC O/P : FULL LOAD Ta : 25°C | TEST : 0 % | P |
| 9 | DYNAMIC LOAD | V1 : 1500 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) 380 mVp-p (2) 324 mVp-p (3) 292 mVp-p (4) 268 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°C | 55.743V~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) | | |
| 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 | 88.5 % (TYP) | I/P : 230 VAC O/P : FULL LOAD Ta : 25°C | 90.54 % | 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°C | I = 0.341 A/ 230 VAC I = 0.730 A/ 115 VAC | P |
| 5 | INRUSH CURRENT | 230V/ 60 A (TYP) 115V/ 30 A (TYP) COLD START | I/P : 230 VAC O/P : FULL LOAD Ta : 25°C | I = 41.812 A/ 230 VAC I = 21.358 A/115VAC | P |
| 6 | LEAKAGE CURRENT | < 50 uA/ 264VAC | I/P : 264 VAC O/P : Min LOAD Ta : 25°C | FOR PATIENT 37.6 uA - | P |
| 7 | NO LOAD CONSUMPTION PS-ON SHORT | < 0.1 W | I/P : 240VAC O/P : NO LOAD Ta : 25°C | < 0.0653 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 | 128.1 %/ 230 VAC 135.2 %/ 115 VAC Protection type : Hiccup mode, recovers automatically after fault condition is removed | P |
| 2 | OVER VOLTAGE PROTECTION | CH1 : 15.7 V ~ 20.3 V | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 17.7 V/ 230 VAC 17.9 V/ 115 VAC Protection type : Shut down o/p voltage, re-power on to recover | P |
| 3 | OVER TEMPERATURE PROTECTION | SPEC : RTH2>70°C NO DAMAGE | I/P : 230 VAC O/P : FULL LOAD | O.T.P. Active Shut down Re-power ON | P |

| | | | | | |
|---|------------------|--|---|--------------------------|---|
| 4 | 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 $V \geq 87.6\%$ | I/P: 230 VAC/115VAC O/P:100/75/50/25/0% LOAD Ta:25°C | 230V 88.443% 115V 87.687% | 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) 618 V (2) 502 V (3) 610 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) 56.6 V (2) 45.4 V (3) 56.6 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) 368 V (2) 370 V (3) 374 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) 17.1 V (3) 15.6 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) 532 V (4) 440 V (3) 520 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 Ta : 25°C | I/P-O/P : 1.697 mA NO DAMAGE | P |
| 2 | ISOLATION RESISTANCE | I/P-O/P : 500VDC>100MΩ | I/P-O/P : 500 VDC Ta : 25°C/70% RH | I/P-O/P : 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), MSIP KN32 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), MSIP KN32 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 L-N : 1KV | 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 | <p>MODEL : GSM40B24-P1J</p> <p>1. ROOM AMBIENT BURN-IN : 1HRS I/P : 230VAC O/P : FULL LOAD Ta=21.8°C</p> <p>2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=47.4°C</p> <table border="1" data-bbox="662 425 1181 1025"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=21.8°C</th> <th>HIGH AMBIENT Ta=47.4°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>41.9°C</td><td>66.1°C</td></tr> <tr><td>2</td><td>LF2</td><td>49.0°C</td><td>72.3°C</td></tr> <tr><td>3</td><td>BD1</td><td>52.4°C</td><td>75.3°C</td></tr> <tr><td>4</td><td>C5</td><td>46.9°C</td><td>70.8°C</td></tr> <tr><td>5</td><td>D1</td><td>51.9°C</td><td>75.7°C</td></tr> <tr><td>6</td><td>D40</td><td>49.0°C</td><td>73.0°C</td></tr> <tr><td>7</td><td>C40</td><td>49.5°C</td><td>73.4°C</td></tr> <tr><td>8</td><td>T1coil</td><td>52.9°C</td><td>76.5°C</td></tr> <tr><td>9</td><td>T1core</td><td>49.2°C</td><td>72.8°C</td></tr> <tr><td>10</td><td>C105</td><td>45.3°C</td><td>69.3°C</td></tr> <tr><td>11</td><td>D100</td><td>60.3°C</td><td>82.6°C</td></tr> <tr><td>12</td><td>U1</td><td>45.5°C</td><td>69.3°C</td></tr> <tr><td>13</td><td>CASE</td><td>41.4°C</td><td>64.8°C</td></tr> <tr><td>14</td><td>Q1</td><td>48.6°C</td><td>72.3°C</td></tr> <tr><td>15</td><td></td><td></td><td></td></tr> </tbody> </table> | | NO | Position | ROOM AMBIENT Ta=21.8°C | HIGH AMBIENT Ta=47.4°C | 1 | LF1 | 41.9°C | 66.1°C | 2 | LF2 | 49.0°C | 72.3°C | 3 | BD1 | 52.4°C | 75.3°C | 4 | C5 | 46.9°C | 70.8°C | 5 | D1 | 51.9°C | 75.7°C | 6 | D40 | 49.0°C | 73.0°C | 7 | C40 | 49.5°C | 73.4°C | 8 | T1coil | 52.9°C | 76.5°C | 9 | T1core | 49.2°C | 72.8°C | 10 | C105 | 45.3°C | 69.3°C | 11 | D100 | 60.3°C | 82.6°C | 12 | U1 | 45.5°C | 69.3°C | 13 | CASE | 41.4°C | 64.8°C | 14 | Q1 | 48.6°C | 72.3°C | 15 | | | | P |
|----|---|---|--|--------------------|----------|---------------------------|---------------------------|---|-----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|--------|--------|--------|---|--------|--------|--------|----|------|--------|--------|----|------|--------|--------|----|----|--------|--------|----|------|--------|--------|----|----|--------|--------|----|--|--|--|---|
| NO | Position | ROOM AMBIENT Ta=21.8°C | HIGH AMBIENT Ta=47.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | LF1 | 41.9°C | 66.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | LF2 | 49.0°C | 72.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | BD1 | 52.4°C | 75.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | C5 | 46.9°C | 70.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | D1 | 51.9°C | 75.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | D40 | 49.0°C | 73.0°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | C40 | 49.5°C | 73.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | T1coil | 52.9°C | 76.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | T1core | 49.2°C | 72.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | C105 | 45.3°C | 69.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | D100 | 60.3°C | 82.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | U1 | 45.5°C | 69.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | CASE | 41.4°C | 64.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Q1 | 48.6°C | 72.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | OVER LOAD BURN-IN TEST | NO DAMAGE 1 HOUR (MIN) | I/P : 230 VAC O/P : 120% 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= -30°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°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 | <p>1. Thermal shock Temperature : -45°C~ +90°C</p> <p>2. Temperature change rate : 25°C / MIN</p> <p>3. Dwell time low and high temperature : 30 MIN/EACH</p> <p>4. Total test cycle : 5 CYCLE</p> <p>5. Input/Output condition : STATIC</p> | | OK | P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | THERMAL SHOCK TEST | <p>1. Thermal shock Temperature : -30°C~ +50°C</p> <p>2. Temperature change rate : 25°C / MIN</p> <p>3. Dwell time low and high temperature : 30 MIN/EACH</p> <p>4. Total test cycle : 10 CYCLE</p> <p>5. Input/Output condition : 230VAC/Fu11 Load AC ON/OFF TEST turn on 58sec ; turn off 2sec</p> | | OK | P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | VIBRATION TEST | <p>1 Carton & 1 Set</p> <p>(1) Waveform : Sine Wave</p> <p>(2) Frequency : 10-500Hz</p> <p>(3) Sweep Time : 12min/sweep cycle</p> <p>(4) Acceleration : 2G</p> <p>(5) Test Time : 60min in each axis (X.Y.Z)</p> <p>(6) Ta : 25°C</p> | | TEST : OK | P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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|----|-----------------------------|---|--|---|
| 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) 425630HRS (2) 84091HRS (3) 93247HRS (4) 144363HRS | P |
| 10 | MTBF | 3505.7K hrs min. Telcordia SR-332 (Bellcore) ; 719.4K hrs min. MIL-HDBK-217F (25°C) | | P |
| 11 | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ TA 50°C | | P |

| SAMPLE | TEST RESULT | TESTER | APPROVAL |
|----------------|-------------|--------|----------|
| PRODUCT SAMPLE | PASS | XUJ | WANGDZ |