



Test Report: GSM36B09

36W AC-DC Single Output 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 TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|--------------------------|--|--|--|---------|
| 1 | RIPPLE & NOISE | V1 : 80 mVp-p (Max) | I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C | V1 : 68 mVp-p (Max) | P |
| 2 | OUTPUT VOLTAGE TOLERANCE | V1 : 5%~ -5% (Max) | I/P : 85 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C | V1 : 2%~ -2% | P |
| 3 | LINE REGULATION | V1 : 1%~ -1% (Max) | I/P : 85 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C | V1 : 0%~ -0% | P |
| 4 | LOAD REGULATION | V1 : 5%~ -5% (Max) | I/P : 230VAC I/P : 115VAC O/P : FULL ~MIN LOAD Ta : 25°C | V1 : 3%~ -3% | P |
| 5 | SET UP TIME | 230VAC : 500 ms (Max) 115VAC : 1000 ms(Max) | I/P : 230VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 168 ms 115VAC/ 180 ms | P |
| 6 | RISE TIME | 230VAC : 30 ms (Max) 115VAC : 30 ms (Max) | I/P : 230VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 8 ms 115VAC/ 8 ms | P |
| 7 | HOLD UP TIME | 230VAC : 16 ms (TYP) 115VAC : 16 ms (TYP) | I/P : 230VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | 230VAC/ 80 ms 115VAC/ 30 ms | P |
| 8 | OVER/UNDERSHOOT TEST | < ±5% | I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C | TEST : <5% TEST : <5% | P |
| 9 | DYNAMIC LOAD | V1 : 1800 mVp-p | I/P : 230VAC I/P : 115VAC (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)390 mVp-p /230V (2)360 mVp-p /230V (3)355 mVp-p /230V (4)395 mVp-p /230V (1)390 mVp-p /115V (2)365 mVp-p /115V (3)355 mVp-p /115V (4)395 mVp-p /115V | P |

INPUT FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-----------------------|---|---|--|---------|
| 1 | INPUT VOLTAGE RANGE | 85 VAC~264 VAC | I/P : TESTING O/P : FULL LOAD Ta : 25°C | 66.2 V~264V | P |
| | | | I/P : LOW-LINE -3V= 82 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN (POWER ON/OFF NO DAMAGE) | TEST : OK | |
| 2 | INPUT FREQUENCY RANGE | 47HZ ~63 HZ NO DAMAGE OSC | I/P : 85 VAC ~ 264 VAC O/P : FULL -MIN LOAD Ta : 25°C | TEST : OK | P |
| 3 | EFFICIENCY | 84% (TYP) | I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C | 84.527 % /230V 84.112 % /115V | P |
| 4 | INPUT CURRENT | 230V/ 0.45 A (TYP) 115V/ 0.9 A (TYP) | I/P : 230VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | I = 0.306 A/ 230 VAC I = 0.608 A/ 115 VAC | P |
| 5 | INRUSH CURRENT | 230V/ 55 A (TYP) 115V/ 30 A(TYP) COLD START | I/P : 230VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | I = 46 A/ 230 VAC I = 28 A/ 115 VAC | P |
| 6 | LEAKAGE CURRENT | < 50 uA / 264 VAC TOUCH CURRENT | I/P : 264 VAC O/P : Min LOAD Ta : 25°C | L-FG : 40 uA N-FG : 40 uA | P |
| 7 | NO LOAD CONSUMPTION | < 0.1 W | I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C | < 0.048 W < 0.065 W | P |

PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|-------------------------|--|--|---|---------|
| 1 | OVER LOAD PROTECTION | 105 % ~ 170 % | I/P : 230VAC I/P : 115 VAC O/P : TESTING Ta : 25°C | 151 %/ 230 VAC 137%/ 115 VAC Hiccup Mode | P |
| 2 | OVER VOLTAGE PROTECTION | CH1 : 9.45 V ~ 13 V | I/P : 230VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 12.1V/ 230 VAC 11.8 V/ 115 VAC Shut down Re- power ON | 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 |

COMPONENT STRESS TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|---|-----------------------|--|--------------------------------------|---------|
| 1 | Power Transistor (D to S) or (C to E) Peak Voltage | Q 1 Rated : 10A/600V | 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) 504 V (2) 512 V (3) 515 V | P |
| 2 | Diode Peak Voltage | D100 Rated : 30A/100V | 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) 64.8 V (2) 65.6 V (3) 65 V | P |
| 3 | Input Capacitor Voltage | C5 Rated : 56u/400V | 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) 382 V (2) 390 V (3) 385 V | P |
| 4 | Control IC Voltage Test | U1 Rated : 10V~27V | 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) 16.5 V (2) 15.4 V (3) 16 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 : 4.4 KVAC/min Ta : 25°C | I/P-O/P : 0.71 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 : 30 GΩ NO DAMAGE | P |

E.M.C TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT | VERDICT |
|----|---|---|---|-------------------------------|---------|
| 1 | HARMONIC | EN61000-3-2 CLASS A | I/P:240VAC/230VAC/220VACVAC/60HZ O/P:100%,75%,50%,25%LOAD Ta:25°C | PASS | P |
| 2 | CONDUCTION | EN55011 CLASS B | I/P : 230VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C | PASS Test by certified Lab | P |
| 3 | RADIATION | EN55011 CLASS B | I/P : 230VAC (50HZ) O/P : FULL LOAD Ta : 25°C | PASS Test by certified Lab | P |
| 4 | E.S.D | EN61000-4-2 MEDICAL AIR : 8KV / Contact : 6KV | I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C | CRITERIA A | P |
| 5 | E.F.T | EN61000-4-4 MEDICAL INPUT : 2KV | I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C | CRITERIA A | P |
| 6 | SURGE | EN61000-4-5 MEDICAL L-N : 1KV L,N-PE : 2KV | I/P : 230VAC /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 : GSM36B05 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 27.1°C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 46.1 °C | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 27.1°C</th> <th>HIGH AMBIENT Ta= 46.1°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>60.2°C</td><td>70.4°C</td></tr> <tr><td>2</td><td>BD1</td><td>65.9°C</td><td>76.6°C</td></tr> <tr><td>3</td><td>Q1</td><td>80.5°C</td><td>91.5°C</td></tr> <tr><td>4</td><td>D1</td><td>77.4°C</td><td>89.5°C</td></tr> <tr><td>5</td><td>C5</td><td>63.7°C</td><td>76.3°C</td></tr> <tr><td>6</td><td>C40</td><td>68.8°C</td><td>81.1°C</td></tr> <tr><td>7</td><td>U1</td><td>67.1°C</td><td>79.7°C</td></tr> <tr><td>8</td><td>T1</td><td>79.1°C</td><td>92.4°C</td></tr> <tr><td>9</td><td>C105</td><td>58.7°C</td><td>72.7°C</td></tr> <tr><td>10</td><td>D100</td><td>81.5°C</td><td>95.8°C</td></tr> <tr><td>11</td><td>C110</td><td>59.4°C</td><td>73.4°C</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta= 27.1°C | HIGH AMBIENT Ta= 46.1°C | 1 | LF1 | 60.2°C | 70.4°C | 2 | BD1 | 65.9°C | 76.6°C | 3 | Q1 | 80.5°C | 91.5°C | 4 | D1 | 77.4°C | 89.5°C | 5 | C5 | 63.7°C | 76.3°C | 6 | C40 | 68.8°C | 81.1°C | 7 | U1 | 67.1°C | 79.7°C | 8 | T1 | 79.1°C | 92.4°C | 9 | C105 | 58.7°C | 72.7°C | 10 | D100 | 81.5°C | 95.8°C | 11 | C110 | 59.4°C | 73.4°C | | P |
| NO | Position | ROOM AMBIENT Ta= 27.1°C | HIGH AMBIENT Ta= 46.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | LF1 | 60.2°C | 70.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | BD1 | 65.9°C | 76.6°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Q1 | 80.5°C | 91.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | D1 | 77.4°C | 89.5°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | C5 | 63.7°C | 76.3°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | C40 | 68.8°C | 81.1°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | U1 | 67.1°C | 79.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | T1 | 79.1°C | 92.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | C105 | 58.7°C | 72.7°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | D100 | 81.5°C | 95.8°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | C110 | 59.4°C | 73.4°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | OVER LOAD BURN-IN TEST | NO DAMAGE 1 HOUR (MIN) | I/P : 230VAC I/P : 115VAC O/P : 140 % 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 40 °C NO DAMAGE | I/P : 272 VAC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H | TEST : OK | P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | TEMPERATURE COEFFICIENT | ± 0.03 %/°C (0~40°C) | I/P : 230VAC O/P : FULL LOAD | ± 0.023 %/°C (0~40°C) | P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | STORAGE TEMPERATURE TEST | 1. Thermal shock Temperature : -45°C~ +90°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~ +45°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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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|----|-----------------------------|---|--|---|
| 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 C110 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= 40 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 40 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 40 °C LIFE TIME | (1) 107374HRS (2) 53687HRS (3) 65180HRS (4) 103713HRS | P |
| 10 | MTBF | MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 657.4 KHRS | | P |
| 11 | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 40°C | | P |

| SAMPLE | TESTER | REVIEW | APPROVAL |
|----------------|------------|------------|---------------|
| PRODUCT SAMPLE | DANIEL GAO | SANFORD SU | VINCENT TSENG |

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