



Test Report: GSM25E05

25W 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 : 60 mVp-p (Max) | I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C | V1 : 56 mVp-p (Max) | P |
| 2 | OUTPUT VOLTAGE TOLERANCE | V1 : 6%~ -6% (Max) | I/P : 85 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C | V1 : 2.8%~ -2.8% | 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 : 2.8%~ -2.8% | 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/ 225 ms 115VAC/ 480 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/ 3 ms 115VAC/ 3.4 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/ 52 ms 115VAC/ 29 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 : 1000 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)380 mVp-p /230V (2)365 mVp-p /230V (3)345 mVp-p /230V (4)420 mVp-p /230V (1)380 mVp-p /115V (2)370 mVp-p /115V (3)350 mVp-p /115V (4)420 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 | 80 % (TYP) | I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C | 80.37 % /230V 80.07 % /115V | P |
| 4 | INPUT CURRENT | 230V/ 0.35 A (TYP) 115V/ 0.7 A (TYP) | I/P : 230VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | I = 0.221 A/ 230 VAC I = 0.389 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 = 44 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 : 45.9 uA N-FG : 45.9 uA | P |
| 7 | NO LOAD CONSUMPTION | < 0.1 W | I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C | < 0.039 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 | 166 %/ 230 VAC 160 %/ 115 VAC Hiccup Mode | P |
| 2 | OVER VOLTAGE PROTECTION | CH1 : 5.25 V ~ 7.5 V | I/P : 230VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 6.47 V/ 230 VAC 6.59 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 : 6A/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) 532 V (2) 560 V (3) 512 V | P |
| 2 | Diode Peak Voltage | D100 Rated : 20A/40V | 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) 38.8 V (2) 36.3 V (3) 33.2 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) 372 V (2) 384 V (3) 384 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) 18.4 V (2) 14 V (3) 16.8 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 : 0.80 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 : 15KV / Contact : 8KV | 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 : GSM25E05 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 28.8 °C 2. HIGH AMBIENT BURN-IN : 4 HRS I/P : 230VAC O/P : FULL LOAD Ta= 44.4 °C | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 28.8 °C</th> <th>HIGH AMBIENT Ta= 44.4 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>58.4 °C</td><td>70.7 °C</td></tr> <tr><td>2</td><td>BD1</td><td>67.0 °C</td><td>80.3 °C</td></tr> <tr><td>3</td><td>Q1</td><td>77.5 °C</td><td>93.8 °C</td></tr> <tr><td>4</td><td>D1</td><td>77.5 °C</td><td>92.4 °C</td></tr> <tr><td>5</td><td>C5</td><td>64.6 °C</td><td>76.8 °C</td></tr> <tr><td>6</td><td>C40</td><td>73.2 °C</td><td>84.3 °C</td></tr> <tr><td>7</td><td>U1</td><td>66.2 °C</td><td>78.3 °C</td></tr> <tr><td>8</td><td>T1</td><td>77.6 °C</td><td>88.8 °C</td></tr> <tr><td>9</td><td>C105</td><td>71.3 °C</td><td>82.4 °C</td></tr> <tr><td>10</td><td>D100</td><td>84.5 °C</td><td>95.0 °C</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta= 28.8 °C | HIGH AMBIENT Ta= 44.4 °C | 1 | LF1 | 58.4 °C | 70.7 °C | 2 | BD1 | 67.0 °C | 80.3 °C | 3 | Q1 | 77.5 °C | 93.8 °C | 4 | D1 | 77.5 °C | 92.4 °C | 5 | C5 | 64.6 °C | 76.8 °C | 6 | C40 | 73.2 °C | 84.3 °C | 7 | U1 | 66.2 °C | 78.3 °C | 8 | T1 | 77.6 °C | 88.8 °C | 9 | C105 | 71.3 °C | 82.4 °C | 10 | D100 | 84.5 °C | 95.0 °C | | P |
| NO | Position | ROOM AMBIENT Ta= 28.8 °C | HIGH AMBIENT Ta= 44.4 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | LF1 | 58.4 °C | 70.7 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | BD1 | 67.0 °C | 80.3 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Q1 | 77.5 °C | 93.8 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | D1 | 77.5 °C | 92.4 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | C5 | 64.6 °C | 76.8 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | C40 | 73.2 °C | 84.3 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | U1 | 66.2 °C | 78.3 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | T1 | 77.6 °C | 88.8 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | C105 | 71.3 °C | 82.4 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | D100 | 84.5 °C | 95.0 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | OVER LOAD BURN-IN TEST | NO DAMAGE 1 HOUR (MIN) | I/P : 230VAC O/P : 136 % 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= -35 °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 (0-50 °C) | I/P : 230VAC O/P : FULL LOAD | ± 0.02 %/°C (0-50 °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 | | | 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 | | | 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 | | P |
| 9 | CAPACITOR LIFE CYCLE | SUPPOSE C 105 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) 80296 HRS (2) 38805 HRS (3) 62565 HRS (4) 111280 HRS | P |
| 10 | MTBF | MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 796.7 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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