



# Test Report: GSM18E09

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18W 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 : 72 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/ 170 ms 115VAC/ 450 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/ 12 ms 115VAC/ 10 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/ 100 ms 115VAC/ 40 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)452 mVp-p /230V (2)360 mVp-p /230V (3)345 mVp-p /230V (4)450 mVp-p /230V  (1)464 mVp-p /115V (2)365 mVp-p /115V (3)350 mVp-p /115V (4)450 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	84.696 % /230V 85.582 % /115V	P
4	INPUT CURRENT	230V/ 0.25 A (TYP) 115V/ 0.5 A (TYP)	I/P : 230VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.191 A/ 230 VAC I = 0.326 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 = 45 A/ 230 VAC I = 25 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 uA N-FG : 44 uA	P
7	NO LOAD CONSUMPTION	< 0.1 W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	< 0.046 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	158 %/ 230 VAC 145%/ 115 VAC Hiccup Mode	F
2	OVER VOLTAGE PROTECTION	CH1 : 9.45 V ~ 13 V	I/P : 230VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	11.97V/ 230 VAC 11.9 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) 536 V (2) 496 V (3) 528 V	P
2	Diode Peak Voltage	D100 Rated : 20A/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) 71.2 V (2) 65.6 V (3) 70 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) 384 V (2) 390 V (3) 380 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) 15.4 V (2) 13.6 V (3) 15 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 : 0.65 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 : GSM18E05 1. ROOM AMBIENT BURN-IN : 3 HRS I/P : 230VAC O/P : FULL LOAD Ta= 33.3 °C 2. HIGH AMBIENT BURN-IN : 75 HRS I/P : 230VAC O/P : FULL LOAD Ta= 40 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=33.3 °C</th> <th>HIGH AMBIENT Ta= 40°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>52.5°C</td><td>60.0°C</td></tr> <tr><td>2</td><td>BD1</td><td>60.1°C</td><td>67.5°C</td></tr> <tr><td>3</td><td>Q1</td><td>73.1°C</td><td>80.1°C</td></tr> <tr><td>4</td><td>D1</td><td>70.5°C</td><td>77.3°C</td></tr> <tr><td>5</td><td>C5</td><td>59.0°C</td><td>65.5°C</td></tr> <tr><td>6</td><td>C40</td><td>67.4°C</td><td>73.3°C</td></tr> <tr><td>7</td><td>U1</td><td>61.7°C</td><td>68.1°C</td></tr> <tr><td>8</td><td>T1</td><td>74.9°C</td><td>80.5°C</td></tr> <tr><td>9</td><td>C105</td><td>68.1°C</td><td>73.5°C</td></tr> <tr><td></td><td>D100</td><td>78.2°C</td><td>83.7°C</td></tr> <tr><td></td><td>C110</td><td>58.0°C</td><td>63.5°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=33.3 °C	HIGH AMBIENT Ta= 40°C	1	LF1	52.5°C	60.0°C	2	BD1	60.1°C	67.5°C	3	Q1	73.1°C	80.1°C	4	D1	70.5°C	77.3°C	5	C5	59.0°C	65.5°C	6	C40	67.4°C	73.3°C	7	U1	61.7°C	68.1°C	8	T1	74.9°C	80.5°C	9	C105	68.1°C	73.5°C		D100	78.2°C	83.7°C		C110	58.0°C	63.5°C		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230VAC O/P : 124 % 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	± 0.029 %/°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																																																



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) 187878HRS (2) 72727 HRS (3) 114905 HRS (4) 199999HRS	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

13.10.19 A50-F031