



# Test Report: GSM36U07

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36W AC-DC Single Output Medical Type

## ■ 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 : 70 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 : 2.0 %~ -2.0 %	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 : 2.0 %~ -2.0 %	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/ 227 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/ 4 ms 115VAC/ 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/ 20 ms 115VAC/ 20 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 : 1400 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)405 mVp-p /230V (2)380 mVp-p /230V (3)360 mVp-p /230V (4)420 mVp-p /230V  (1)400 mVp-p /115V (2)375 mVp-p /115V (3)360 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  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 )	66.2 V~264V  TEST : OK	P
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	83 % (TYP)	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	83.188 % /230V 83.015 % /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 = 0.324 A/ 230 VAC I = 0.551 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 = 26 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 : 42 uA N-FG : 42 uA	P
7	NO LOAD CONSUMPTION	< 0.1 W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	< 0.028 W < 0.052 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	141%/ 230 VAC 136%/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 7.88 V ~ 10.5 V	I/P : 230VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	10.1V/ 230 VAC 9.87 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) 512 V (2) 528 V (3) 496 V	P
2	Diode Peak Voltage	D100 Rated : 30A/60V	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 V (2) 51.2 V (3) 55.2 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) 384 V (2) 390 V (3) 376 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) 15.8 V (2) 13.4 V (3) 15.4 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 : 0.69 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 : GSM36U05 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
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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																																																



# 36W AC-DC Single Output Medical Type

# GSM36U series

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

13.11.25 A50-F031