



Test Report: GSM36U24

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 : 180 mVp-p (Max)	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	V1 : 80 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1 : 2 %~ -2 % (Max)	I/P : 85 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 1 %~ -1 %	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 : 2 %~ -2 % (Max)	I/P : 230VAC I/P : 115VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.7 %~ -0.7 %	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/ 160 ms 115VAC/ 330 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/ 14 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 : 2400 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)440 mVp-p /230V (2)452 mVp-p /230V (3)458 mVp-p /230V (4)408 mVp-p /230V (1)472 mVp-p /115V (2)470 mVp-p /115V (3)452 mVp-p /115V (4)436 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	87% (TYP)	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD Ta : 25°C	87.126 % /230V 87.186 % /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 = 0.351 A/ 230 VAC I = 0.621 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 = 40 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 : 43 uA N-FG : 43 uA	P
7	NO LOAD CONSUMPTION	< 0.1 W	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	< 0.04 W < 0.081 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	160 %/ 230 VAC 153%/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 25.2 V ~ 32.4 V	I/P : 230VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	31.5V/ 230 VAC 31V/ 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) 510 V (3) 508 V	P
2	Diode Peak Voltage	D100 Rated : 20A/200V	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) 180 V (2) 174 V (3) 180 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) 376 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) 14.8 V (2) 14 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 : 0.80 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 : 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	<div>MODEL : GSM36U12</div> <div>1. ROOM AMBIENT BURN-IN : 2 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 27.1℃</div> <div>2. HIGH AMBIENT BURN-IN : 2 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 46.1 ℃</div> <table><tr><td>NO</td><td>Position</td><td>ROOM AMBIENT Ta= 27.1℃</td><td>HIGH AMBIENT Ta= 46.1℃</td></tr><tr><td>1</td><td>LF1</td><td>67.7℃</td><td>80.6℃</td></tr><tr><td>2</td><td>BD1</td><td>79.0℃</td><td>92.0℃</td></tr><tr><td>3</td><td>Q1</td><td>96.1℃</td><td>110.6℃</td></tr><tr><td>4</td><td>D1</td><td>90.5℃</td><td>104.7℃</td></tr><tr><td>5</td><td>C5</td><td>69.2℃</td><td>82.3℃</td></tr><tr><td>6</td><td>C40</td><td>72.2℃</td><td>86.1℃</td></tr><tr><td>7</td><td>U1</td><td>71.9℃</td><td>85.6℃</td></tr><tr><td>8</td><td>T1</td><td>85.5℃</td><td>99.0℃</td></tr><tr><td>9</td><td>C105</td><td>72.7℃</td><td>87.3℃</td></tr><tr><td>10</td><td>D100</td><td>83.8℃</td><td>97.9℃</td></tr><tr><td>11</td><td>C110</td><td>63.5℃</td><td>76.7℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 27.1℃	HIGH AMBIENT Ta= 46.1℃	1	LF1	67.7℃	80.6℃	2	BD1	79.0℃	92.0℃	3	Q1	96.1℃	110.6℃	4	D1	90.5℃	104.7℃	5	C5	69.2℃	82.3℃	6	C40	72.2℃	86.1℃	7	U1	71.9℃	85.6℃	8	T1	85.5℃	99.0℃	9	C105	72.7℃	87.3℃	10	D100	83.8℃	97.9℃	11	C110	63.5℃	76.7℃		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230VAC I/P : 115VAC O/P : 155 % LOAD Ta : 25℃	TEST : OK	P																																																	
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -30 ℃	TEST : OK	P																																																	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 ℃ NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 40 ℃ HUMIDITY= 95 %R.H	TEST : OK	P																																																	
5	TEMPERATURE COEFFICIENT	±0.03 %/℃(0~40℃)	I/P : 230VAC O/P : FULL LOAD	± 0.023 %/℃(0~40℃)	P																																																	
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45℃~ +90℃ 2. Temperature change rate : 25℃ / 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℃~ +45℃ 2. Temperature change rate : 25℃ / 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																																																	

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℃	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) 99386HRS (2) 47723HRS (3) 76944HRS (4) 151689HRS	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℃		P

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

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