



Test Report: GSM60B24-P1J

60W AC-DC Single Output Medical Adaptor

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control 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 : 150 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 64.4 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1 : -3 %~ +3 % (Max)	I/P : 80 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : -2.112 %~ 2.223 %	P
3	LINE REGULATION	V1 : -1 %~ +1 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0.122 %	P
4	LOAD REGULATION	V1 : -3 %~ +3 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -2.112 %~ 2.223 %	P
5	SET UP TIME	230VAC : 1000 ms (Max) 115VAC : 1500 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 457 ms 115VAC/ 843 ms	P
6	RISE TIME	230VAC : 30 ms (Max) 115VAC : 30 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 8.2 ms 115VAC/ 15.6 ms	P
7	HOLD UP TIME	230VAC : 50 ms (TYP) 115VAC : 15 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 60.8 ms 115VAC/ 16 ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : 0 %	P
9	DYNAMIC LOAD	V1 : 2400 mVp-p	I/P : 230 VAC (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) 318 mVp-p (2) 252 mVp-p (3) 232 mVp-p (4) 724 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	80VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C I/P : LOW-LINE-3V= 77 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	69.96 V~264V TEST : OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 80 VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK	P
3	EFFICIENCY	90 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	91.94 %	P
4	INPUT CURRENT	230V/ 1 A (TYP) 115V/ 1.4 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.502 A/ 230 VAC I = 0.92 A/ 115 VAC	P
5	INRUSH CURRENT	230V/ 60 A (TYP) 115V/ 30 A (TYP) COLD START	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 41.524 A/ 230 VAC I = 21.024 A/ 230 VAC	P
6	LEAKAGE CURRENT	< 50 uA / 264VAC <	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	FOR PATIENT 41.9 μA	P
7	NO LOAD CONSUMPTION PS-ON SHORT	< 0.1 W	I/P : 240VAC O/P : NO LOAD Ta : 25°C	< 0.058 W	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~160 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	143.7 %/ 230 VAC 139.8 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 25.2 V ~ 32.4 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	28.7 V/ 230 VAC 28.7 V/ 115 VAC Shut down Re- power ON	P

3	OVER TEMPERATURE PROTECTION	SPEC : RTH2>70℃ NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down Re-power ON	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25℃	NO DAMAGE Hiccup Mode	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	ERP STEP2 COMPLIANT	LEVEL $V \geq 88\%$	I/P: 230 VAC/115VAC O/P:100/75/50/25/0% LOAD Ta:25℃	230V 90.692% 115V 89.859%	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated : 700 V 10 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25℃	(1) 620 V (2) 524 V (3) 600 V	P
2	Diode Peak Voltage	D100 Rated : 120 V 30 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25℃	(1) 114 V (2) 87.2 V (3) 103 V	P
3	Input Capacitor Voltage	C 5 Rated : 120u /400V/105℃	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℃	(1) 376 V (2) 380 V (3) 380 V	P
4	Control IC Voltage Test	U 1 Rated : 28 V	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℃	(1) 16.7 V (2) 16.9 V (3) 15.0 V	P
5	CLAMP DIODE	D 1 Rated : 800 V 2 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25℃	(3) 450 V (4) 386 V (3) 452 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 : 4.2KVAC/min Ta : 25°C	I/P-O/P : 1.865 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 : 9999 MΩ NO DAMAGE	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 AIR : 15KV / Contact : 8KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 INPUT: 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 L-N : 1KV	I/P : 230 VAC/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: GSM60B24-P1J 1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta=21.5℃ 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta=47.1℃ <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=21.5℃</th><th>HIGH AMBIENT Ta=47.1℃</th></tr><tr><td>1</td><td>LF1</td><td>48.5℃</td><td>71.5℃</td></tr><tr><td>2</td><td>LF2</td><td>58.5℃</td><td>80.4℃</td></tr><tr><td>3</td><td>BD1</td><td>61.3℃</td><td>83.0℃</td></tr><tr><td>4</td><td>C5</td><td>54.4℃</td><td>77.4℃</td></tr><tr><td>5</td><td>D1</td><td>61.3℃</td><td>84.4℃</td></tr><tr><td>6</td><td>D40</td><td>54.8℃</td><td>78.2℃</td></tr><tr><td>7</td><td>RTH2</td><td>55.9℃</td><td>79.0℃</td></tr><tr><td>8</td><td>T1</td><td>58.0℃</td><td>80.8℃</td></tr><tr><td>9</td><td>C105</td><td>51.5℃</td><td>74.5℃</td></tr><tr><td>10</td><td>D100</td><td>61.2℃</td><td>83.8℃</td></tr><tr><td>11</td><td>C40</td><td>54.6℃</td><td>77.9℃</td></tr><tr><td>12</td><td>Q1</td><td>56.5℃</td><td>79.7℃</td></tr><tr><td>13</td><td>D42</td><td>50.3℃</td><td>73.2℃</td></tr><tr><td>14</td><td>U1</td><td>46.9℃</td><td>70.6℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta=21.5℃	HIGH AMBIENT Ta=47.1℃	1	LF1	48.5℃	71.5℃	2	LF2	58.5℃	80.4℃	3	BD1	61.3℃	83.0℃	4	C5	54.4℃	77.4℃	5	D1	61.3℃	84.4℃	6	D40	54.8℃	78.2℃	7	RTH2	55.9℃	79.0℃	8	T1	58.0℃	80.8℃	9	C105	51.5℃	74.5℃	10	D100	61.2℃	83.8℃	11	C40	54.6℃	77.9℃	12	Q1	56.5℃	79.7℃	13	D42	50.3℃	73.2℃	14	U1	46.9℃	70.6℃	p
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 120% 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%/℃ (0~50℃)	I/P : 230 VAC O/P : FULL LOAD	± 0.005%/℃ (0~50℃)	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℃~ +60℃ 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 C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta=25℃ LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta=40℃ LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=40℃ LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta=40℃ LIFE TIME	(1) 265888HRS (2) 82425HRS (3) 115744HRS (4) 182881HRS	p
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 720KHRS		p
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ TA 50℃		p

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	XUJ	WANGDZ