



# Test Report: GSM60B15-P1J

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60W AC-DC Reliable Green 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 : 100 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 63.2 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 : -0.5432 %~ 0.6229 %	P
3	LINE REGULATION	V1 : -1 %~ +1 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : -0.04 %~ 0.04 %	P
4	LOAD REGULATION	V1 : -3%~ +3 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -0.5432 %~ 0.6229 %	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/ 441.635 ms 115VAC/ 1111.166 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/ 7.532 ms 115VAC/ 8.949 ms	P
7	HOLD UP TIME	230VAC : 50 ms (TYP) 115VAC : 16 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 54.077 ms 115VAC/ 16.220 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 : 1500 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) 462 mVp-p (2) 454 mVp-p (3) 436 mVp-p (4) 760 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
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1	INPUT VOLTAGE RANGE	80VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	55.737 V~264V	P
			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 )		
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	88.5% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	91.218 %	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 = 0.496 A/ 230 VAC I = 1.012 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 = 40.726 A/ 230 VAC I = 20.425 A/ 230 VAC	P
6	LEAKAGE CURRENT	< 50 $\mu$ A/ 264VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	FOR PATIENT 39 $\mu$ A	P
7	NO LOAD CONSUMPTION PS-ON SHORT	< 0.1 W	I/P : 240VAC O/P : NO LOAD Ta : 25°C	< 0.0573 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	138.7 %/ 230 VAC 135.5 %/ 115 VAC Protection type : Hiccup mode, recovers automatically after fault condition is removed	P
2	OVER VOLTAGE PROTECTION	CH1 : 15.7 V ~ 20.3 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	18.1 V/ 230 VAC 18.1 V/ 115 VAC Protection type : Shut down o/p voltage, re-power on to recover	P
3	OVER TEMPERATURE PROTECTION	SPEC : RTH2>70°C NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage, re-power on to recover	P



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# GSM60B series

4	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
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## 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°C	230V 89.817% 115V 88.648%	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°C	(1) 622 V (2) 514 V (3) 598 V	P
2	Diode Peak Voltage	D100 Rated : 100 V 20 A	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) 68.0 V (2) 54.0 V (3) 64.0 V	P
3	Input Capacitor Voltage	C 5 Rated : 120u /400V/105°C	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) 360 V (2) 360 V (3) 360 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°C	(1) 17.8 V (2) 18.2 V (3) 16.6 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°C	(3) 516 V (4) 440 V (3) 498 V	P

## ■ SAFETY & E.M.C. TEST

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
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1	WITHSTAND VOLTAGE	I/P-O/P : 4 KVAC/min	I/P-O/P : 4.2KVAC/min Ta : 25°C	I/P-O/P : 1.689 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	BS EN/EN61000-3-2 CLASS A	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS	P
2	CONDUCTION	BS EN/EN55011 (CISPR11), FCC PART 15 /CISPR22, CAN ICES-3(B)/NMB-3(B) CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	BS EN/EN55011 (CISPR11), FCC PART 15 /CISPR22, CAN ICES-3(B)/NMB-3(B) CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	BS EN/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	BS EN/EN61000-4-4 INPUT: 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	BS EN/EN61000-4-5 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
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1	TEMPERATURE RISE TEST	<p>MODEL: GSM60B24-P1J</p> <p>1. ROOM AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta=21.5°C</p> <p>2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta=47.1°C</p> <table border="1" data-bbox="662 481 1181 1041"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=21.5°C</th> <th>HIGH AMBIENT Ta=47.1°C</th> </tr> </thead> <tbody> <tr><td>1</td><td><b>LF1</b></td><td>48.5°C</td><td>71.5°C</td></tr> <tr><td>2</td><td><b>LF2</b></td><td>58.5°C</td><td>80.4°C</td></tr> <tr><td>3</td><td><b>BD1</b></td><td>61.3°C</td><td>83.0°C</td></tr> <tr><td>4</td><td><b>C5</b></td><td>54.4°C</td><td>77.4°C</td></tr> <tr><td>5</td><td><b>D1</b></td><td>61.3°C</td><td>84.4°C</td></tr> <tr><td>6</td><td><b>D40</b></td><td>54.8°C</td><td>78.2°C</td></tr> <tr><td>7</td><td><b>RTH2</b></td><td>55.9°C</td><td>79.0°C</td></tr> <tr><td>8</td><td><b>T1</b></td><td>58.0°C</td><td>80.8°C</td></tr> <tr><td>9</td><td><b>C105</b></td><td>51.5°C</td><td>74.5°C</td></tr> <tr><td>10</td><td><b>D100</b></td><td>61.2°C</td><td>83.8°C</td></tr> <tr><td>11</td><td><b>C40</b></td><td>54.6°C</td><td>77.9°C</td></tr> <tr><td>12</td><td><b>Q1</b></td><td>56.5°C</td><td>79.7°C</td></tr> <tr><td>13</td><td><b>D42</b></td><td>50.3°C</td><td>73.2°C</td></tr> <tr><td>14</td><td><b>U1</b></td><td>46.9°C</td><td>70.6°C</td></tr> </tbody> </table>		NO	Position	ROOM AMBIENT Ta=21.5°C	HIGH AMBIENT Ta=47.1°C	1	<b>LF1</b>	48.5°C	71.5°C	2	<b>LF2</b>	58.5°C	80.4°C	3	<b>BD1</b>	61.3°C	83.0°C	4	<b>C5</b>	54.4°C	77.4°C	5	<b>D1</b>	61.3°C	84.4°C	6	<b>D40</b>	54.8°C	78.2°C	7	<b>RTH2</b>	55.9°C	79.0°C	8	<b>T1</b>	58.0°C	80.8°C	9	<b>C105</b>	51.5°C	74.5°C	10	<b>D100</b>	61.2°C	83.8°C	11	<b>C40</b>	54.6°C	77.9°C	12	<b>Q1</b>	56.5°C	79.7°C	13	<b>D42</b>	50.3°C	73.2°C	14	<b>U1</b>	46.9°C	70.6°C	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°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 (0-50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.005%/°C (0-50°C)	p																																																											
6	STORAGE TEMPERATURE TEST	<p>1. Thermal shock Temperature : -45°C~ +90°C</p> <p>2. Temperature change rate : 25°C / MIN</p> <p>3. Dwell time low and high temperature : 30 MIN/EACH</p> <p>4. Total test cycle : 5 CYCLE</p> <p>5. Input/Output condition : STATIC</p>		OK	p																																																											
7	THERMAL SHOCK TEST	<p>1. Thermal shock Temperature : -30°C~ +60°C</p> <p>2. Temperature change rate : 25°C / MIN</p> <p>3. Dwell time low and high temperature : 30 MIN/EACH</p> <p>4. Total test cycle : 10 CYCLE</p> <p>5. Input/Output condition : 230VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec</p>		OK	p																																																											



# 60W AC-DC Reliable Green Medical Adaptor

# GSM60B 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 C105 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) 265888HRS (2) 82425HRS (3) 115744HRS (4) 182881HRS	p
10	MTBF	3491.2K hrs min. Telcordia SR-332 (Bellcore) ; 694.3K hrs min. MIL-HDBK-217F (25°C)		p
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 50,000 hours @ TA 50°C		p

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	XUJ	WANGDZ