



Test Report: GSM90B12

90W AC-DC Single Output Medical Type

■ 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 : 120 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 85 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1 : -5 %~ +5 % (Max)	I/P : 80 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : -1.19 %~ 1.29 %	P
3	LINE REGULATION	V1 : -1 %~ +1 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0.05 %	P
4	LOAD REGULATION	V1 : -5 %~ +5 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -1.24 %~ 1.24 %	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/ 391 ms 115VAC/ 426 ms	P
6	RISE TIME	230VAC : 50 ms (Max) 115VAC : 50 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 17.5 ms 115VAC/ 17.3 ms	P
7	HOLD UP TIME	230VAC : 20 ms (TYP) 115VAC : 20 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 36.2 ms 115VAC/ 24.5 ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %	P
9	DYNAMIC LOAD	V1 : 1200 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) 1080 mVp-p (2) 1120 mVp-p (3) 1090 mVp-p (4) 1120 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)	67 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	POWER FACTOR	0.91/230 VAC(TYP) 0.95/ 115 VAC(TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	PF= 0.956 230VAC PF= 0.989 115VAC	P
4	EFFICIENCY	88 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	88.795 %	P
5	INPUT CURRENT	230V/ 0.6 A (TYP) 115V/ 1.3 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.407 A/ 230 VAC I = 0.806 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 60 A (TYP) 115V/ 30 A (TYP) COLD START	I/P : 230 VAC/115VAC O/P : FULL LOAD Ta : 25°C	I = 42.906 A/ 230 VAC I = 22.013 A/115 VAC	P
7	LEAKAGE CURRENT	< 100 uA/ 264VAC For Touch	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-V-: 68.6 μA N-V-: 68.5 μA	P
8	NO LOAD CONSUMPTION	< 0.15 W	I/P : 240VAC O/P : NO LOAD Ta : 25°C	< 0.0531 W	P
9	ERP STEP2 COMPLIANT	LEVEL VI	I/P: 230 VAC/115VAC O/P:100/75/50/25% Ta:25°C	230V 89.276 % 115V 88.494 %	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110 % ~150 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	134.6 %/ 230 VAC 128.6 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 12.6 V ~ 16.2 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	14.433 V/ 230 VAC 14.467 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	Shut down o/p voltage, re-power on to recover	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage, re-power on to recover	P
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

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q32 Rated : 650 V 10.6 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) 616 V (2) 525 V (3) 608 V	P
2	Diode Peak Voltage	Q101 Rated : 120 V 75 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue (4)NO Load Turn on Ta : 25°C	(1) 69.6 V (2) 59.8 V (3) 68.8 V (4) 72.1 V	P
3	Input Capacitor Voltage	C 5 Rated : 100u /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) 388 V (2) 384 V (3) 389 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) 18.3 V (2) 17.9 V (3) 18.4 V	P
5	CLAMP DIODE	D 3 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	(1) 556 V (2) 445 V (3) 545 V	P
6	Power Transistor (D to S) or (C to E) Peak Voltage	Q31 Rated : 500V 19 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) 423 V (2) 388 V (3) 400 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 : 1.872 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 B	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 MEDICAL	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 MEDICAL	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 MEDICAL	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 : GSM90B12 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 21.9℃ 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 39.6℃	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 21.9℃</th> <th>HIGH AMBIENT Ta= 39.6℃</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>57.3℃</td><td>74.4℃</td></tr> <tr><td>2</td><td>BD1</td><td>62.1℃</td><td>79.1℃</td></tr> <tr><td>3</td><td>LF1</td><td>60.7℃</td><td>76.8℃</td></tr> <tr><td>4</td><td>L2</td><td>67.6℃</td><td>86.1℃</td></tr> <tr><td>5</td><td>LF3</td><td>65.6℃</td><td>84.1℃</td></tr> <tr><td>6</td><td>Q31</td><td>68.5℃</td><td>86.4℃</td></tr> <tr><td>7</td><td>Q32</td><td>70.3℃</td><td>88.1℃</td></tr> <tr><td>8</td><td>D1</td><td>74.2℃</td><td>93.0℃</td></tr> <tr><td>9</td><td>C5</td><td>67.5℃</td><td>87.5℃</td></tr> <tr><td>10</td><td>D30</td><td>82.3℃</td><td>100.8℃</td></tr> <tr><td>11</td><td>Q101</td><td>75.3℃</td><td>92.7℃</td></tr> <tr><td>12</td><td>C52</td><td>74.9℃</td><td>92.7℃</td></tr> <tr><td>13</td><td>C101</td><td>63.5℃</td><td>85.2℃</td></tr> <tr><td>14</td><td>RTH30</td><td>70.8℃</td><td>88.1℃</td></tr> <tr><td>15</td><td>LF101</td><td>66.8℃</td><td>81.4℃</td></tr> <tr><td>16</td><td>U2</td><td>69.9℃</td><td>86.9℃</td></tr> <tr><td>17</td><td>D33</td><td>79.2℃</td><td>96.6℃</td></tr> <tr><td>18</td><td>T1</td><td>73.8℃</td><td>92.1℃</td></tr> <tr><td>19</td><td>C11</td><td>63.9℃</td><td>81.7℃</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 21.9℃	HIGH AMBIENT Ta= 39.6℃	1	LF2	57.3℃	74.4℃	2	BD1	62.1℃	79.1℃	3	LF1	60.7℃	76.8℃	4	L2	67.6℃	86.1℃	5	LF3	65.6℃	84.1℃	6	Q31	68.5℃	86.4℃	7	Q32	70.3℃	88.1℃	8	D1	74.2℃	93.0℃	9	C5	67.5℃	87.5℃	10	D30	82.3℃	100.8℃	11	Q101	75.3℃	92.7℃	12	C52	74.9℃	92.7℃	13	C101	63.5℃	85.2℃	14	RTH30	70.8℃	88.1℃	15	LF101	66.8℃	81.4℃	16	U2	69.9℃	86.9℃	17	D33	79.2℃	96.6℃	18	T1	73.8℃	92.1℃	19	C11	63.9℃	81.7℃		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 130% 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= -35℃	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	± 0.02%/℃ (0-50℃)	P																																																																																
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40℃~ +85℃ 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°C~ +60°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
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 C 101 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) 154456HRS (2) 41472HRS (3) 95256HRS (4) 129168HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 405.6 KHRS		P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 40°C		P

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	shenym	wangdz

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