



Test Report: SP90-220S48

■ 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

ZOEGO[®] 90W Single Output Switching Power Supply SP90-SXX series

一、设计验证试验 (DESIGN VERIFY TEST)

NO	测试项目 (TEST ITEM)	规格 (SPECIFICATION)	测试条件 (TEST CONDITION)	测试结果 (RESULT)			VERDICT
1	纹波与噪声 (RIPPLE & NOISE)	V1: 100 mVp-p (Max)	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	V1:	144 (33UF100V)	mVp-p (Max)	P
2	输出可调范围 (OUTPUT VOLTAGE ADJUST RANGE)	CH1: /	I/P: 230 VAC I/P: 165VAC O/P: MIN LOAD Ta: 25°C		/	V	N/A
3	输出电压精度 (OUTPUT VOLTAGE TOLERANCE)	V1: -1%~ +1% (Max)	I/P: 165VAC /264 VAC O/P: FULL/ MIN LOAD Ta: 25°C		0.45	%	P
4	线性调节率 (LINE REGULATION)	V1: -1%~ +1% (Max)	165VAC ~ 264 VAC@FULL LOAD Ta: 25°C		0	%	P
5	负载调节率 (LOAD REGULATION)	V1: -1%~ +1% (Max)	I/P: 230 VAC@FULL ~MIN LOAD Ta: 25°C		0.2	%	P
6	启动时间 (SET UP TIME)	230VAC:2000ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC	1160	ms	P
		165VAC:2000 ms(max)	165 VAC@FULL LOAD Ta: 25°C	165VAC	1300	ms	
7	上升时间 (RISE TIME)	230VAC:20 ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC		ms	P
		165VAC:50 ms(max)	165VAC@FULL LOAD Ta: 25°C	165VAC		ms	
8	输出保持时间 (HOLD UP TIME)	230VAC:40 ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC	50	ms	P
		165VAC:30 ms(max)	165VAC@FULL LOAD Ta: 25°C	165VAC	20	ms	
9	过冲欠冲 OVER/UNDERSHOOT TEST	< +5%Vo	230 VAC@ NO LOAD Ta: 25°C		0	%	P
			230 VAC@FULL LOAD Ta: 25°C		0	%	
10	动态测试 (DYNAMIC LOAD)	V1: 1000 mVp-p	230 AC@FULL /Min LOAD Ta: 25°C	90%DUTY/ 1KHZ 50%DUTY/120HZ		mV mV	P
11	瞬态恢复时间 (TRANSIENT RECOVERY TIME)	1000ms	230VAC@40% LOAD CHANGE 50%DUTY/120HZ 1.25A/us		/	ms	N/A
12	容性负载测试 (Capacity load test)	2200uF	85-305VAC@FULL LOAD Ta: 25°C		100	uF	P

二、输入测试 (INPUT FUNCTION TEST)

NO	测试项目 (TEST ITEM)	规格 (SPECIFICATION)	测试条件 (TEST CONDITION)	测试结果 (RESULT)	VERDICT	
1	输入电压测试 (INPUT VOLTAGE RANGE)	165VAC~264 VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C ON: 30 Sec. OFF: 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	LOW-LINE 165V HIGH-LINE 264V OK 90-165V 65W OK	P	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	165VAC~264 VAC@FULL~MIN LOAD Ta: 25°C	OK	P	
3	EFFICIENCY	92% (TYP)	230 VAC@FULL LOAD Ta: 25°C	92.3 %	P	
4	输入电流 (INPUT CURRENT)	230Vac 0.8A (TYP)	230 VAC@FULL LOAD Ta: 25°C	0.707	A	P
		165Vac 1A (TYP)		0.93	A	
5	冲击电流 INRUSH CURRENT (COLD START)	165VAC@FULL LOAD: 20 A (TYP)	165VAC@FULL LOAD Ta: 25°C		A	P
		230VAC@FULL LOAD: 40 A (TYP)	230 VAC@FULL LOAD Ta: 25°C		A	
6	漏电流 LEAKAGE CURRENT	< 1 mA/240 VAC	264 VAC@Min LOAD Ta: 25°C	L-FG /	mA	N/A
				N-FG /	mA	
7	空载功耗 NO LOAD CONSUMPTIO	< 0.35 W	I/P: 230VAC O/P: NO LOAD Ta: 25°C	0.31	W	P

三、保护功能测试 (PROTECTION FUNCTION TEST)

NO	测试项目 (TEST ITEM)	规格 (SPECIFICATION)	测试条件 (TEST CONDITION)	测试结果 (RESULT)		VERDICT
1	过载保护 (OVER LOAD PROTECTION)	110%~ 180%	230VAC@out shoot,10s,Ta : 25°C	Hiccup Mode	124%	P
			165VAC@out shoot,10s,Ta : 25°C	Hiccup Mode	118%	
2	输出过压保护 (OVER VOLTAGE PROTECTION)	56-63V	O/P: 230VAC MIN LOAD Ta: 25°C	58.4		P
3	短路保护 (SHORT PROTECTION)	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	264VAC@FULL LOAD Ta : 25°C	OK		P

四、关键元件测试 (COMPONENT STRESS TEST)

NO	测试项目 (TEST ITEM)	规格 (SPECIFICATION)	测试条件 (TEST CONDITION)	测试结果 (RESULT)		VERDICT	
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q21 Rated : 650V/ 11 A	High-Line +3V=267V, Ta : 25°C	Full Load Turn on	480	V	P
				OutputShort	504	V	
				Full load continue	536	V	
2	Diode Peak Voltage	D30 Rated: 600V /5A	High-Line +3V=267V, Ta : 25°C	Full Load Turn on	312	V	P
				OutputShort	300	V	
				Full load continue	256	V	
3	Input Capacitor Voltage	C1 Rated: 100uF /400V/105°C	High-Line +3V=267V, Ta: 25°C	Full Load Turn on /Off	378	V	P
				Min load Turn on /Off	378	V	
				Full Load /Min load Change	378	V	
4	PWM控制芯片供电电压测试 (Control IC Voltage Test)	U21 Rated: 0-52V	High-Line +3V = 267V , Ta: 25°C	(1)Full Load Turn on /Off	16.85	V	P
				(2) Min load Turn on /Off	16.85	V	
				Full Load /Minoad Change	16.85	V	
						V	

五、安全与电磁兼容测试 (SAFETY & E.M.C. TEST)

NO	测试项目 (TEST ITEM)	规格 (SPECIFICATION)	测试条件 (TEST CONDITION)	测试结果 (RESULT)		VERDICT
1	耐压测试 WITHSTAND VOLTAGE	I/P-O/P : 3 KVAC/min I/P-FG : 1.5 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 3 KVAC/min Ta : 25°C I/P-FG : O/P-FG :	I/P-O/P : 3000VAC0.89 mA I/P-FG : O/P-FG :	mA mA mA	P
2	绝缘电阻 ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : - - - - - O/P-FG : - - - - -	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C /70%RH	> 1999	MΩ	P
				/	MΩ	
				/	MΩ	
3	接地GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A /2min Ta : 25°C /70%RH			N/A

六、M.C TEST

NO	测试项目 (TEST ITEM)	规格 (SPECIFICATION)	测试条件 (TEST CONDITION)	测试结果 (RESULT)	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	230 VAC/50HZ@FULL LOAD Ta : 25°C	/	N/A
2	CONDUCTION	EN55022 CLASS B	230 VAC/50HZ@FULL LOAD Ta : 25°C	/	N/A

3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	/	N/A
4	E. S.D	EN61000-4-2 INDUSTRY AIR : 8KV /Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	/	N/A
5	E.F.T 脉冲	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	/	N/A
6	SURGE 浪涌	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	/	N/A
7	Test by certified Lab & TestReportPrepare				

七、可靠性测试 (RELIABILITY TEST)

ENVIRONMENT TEST

NO	测试项目 (TEST ITEM)	规格(SPECIFICATION)	测试条件 (TEST CONDITION)	测试结果(RESULT)	VERDICT				
1	TEMPERATURE RISE TEST	MODEL: \							
		1. HIGH AMBIENT BURN-IN: 2 HRS	I/P: 90VAC	O/P: 100% LOAD	Ta=50.16°C				
		2. HIGH AMBIENT BURN-IN: 2 HRS	I/P: 115VAC	O/P: FULL LOAD	Ta=50.09°C				
		3. HIGH AMBIENT BURN-IN: 2 HRS	I/P: 230VAC	O/P: FULL LOAD	Ta=50.93°C				
		4. HIGH AMBIENT BURN-IN: 2 HRS	I/P: 264VAC	O/P: 70%LOAD	Ta=50.52°C				
			NO	Position	PART NUMBER	HIGH AMBIENT Ta= 50.16°C	HIGH AMBIENT Ta= 50.09°C	HIGH AMBIENT Ta= 50.93°C	HIGH AMBIENT Ta= 50.52°C
			CH1	输入电容					
			CH2	共模电感					
			CH3	桥堆					
			CH4	压敏电阻					
			CH5	MOS管					
			CH6	Y电容					
			CH7	光耦					
			CH8	二极管					
			CH9	变压器磁芯					
	CH10	整流二极管							
	CH11	电阻							
	CH12	变压器线包							
	CH13	输出电容							
	CH15	电阻							
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P: 230 VAC O/P: 133 %LOAD Ta: 25°C	TEST: OK					
3	低温启动 (LOW TEMPERATURE TURN ON TEST)	TURN ON AFTER 2 HOUR	I/P: 264VAC/165VAC O/P: 100 %LOAD Ta= -30 °C	TEST: OK					

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4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P: 267VAC O/P: FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST: OK	
5	TEMPERATURE COEFFICIENT	+ 0.03 %/°C(0~50°C)	I/P: 230 VAC O/P: FULL LOAD	TEST: OK	P
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature: -40°C~ +85°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		TEST: OK	P
7	THERMAL SHOCK TEST	1. Thermal shock Temperature: -30°C~ +70°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		TEST: 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	EPS-15-24 SUPPOSE C 102 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=50 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 50 °C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= 50 °C LIFE TIME		TEST: OK	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE: 220----- KHRS			P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C			N/A