



## Test Report: HP25-S12

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### ■ 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

# ZOYGO® 25W Single Output Switching Power Supply HP25-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:	120	mVp-p (Max)	P
2	输出可调范围 (OUTPUT VOLTAGE ADJUST RANGE)	CH1: /	I/P: 230 VAC I/P: 115 VAC 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: 85 VAC /264 VAC O/P: FULL/ MIN LOAD Ta: 25°C		1.25	%	P
4	线性调节率 (LINE REGULATION)	V1: -1%~ +1% (Max)	100VAC ~ 264 VAC@FULL LOAD Ta: 25°C		0.1	%	P
5	负载调节率 (LOAD REGULATION)	V1: -1%~ +1% (Max)	I/P: 230 VAC@FULL ~MIN LOAD Ta: 25°C		0.082	%	P
6	启动时间 (SET UP TIME)	230VAC:1000 ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC	290	ms	P
		115VAC:2000 ms(max)	115 VAC@FULL LOAD Ta: 25°C	115VAC	900	ms	
7	上升时间 (RISE TIME)	230VAC:1000 ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC	10	ms	P
		115VAC:2000 ms(max)	115 VAC@FULL LOAD Ta: 25°C	115VAC	10	ms	
8	输出保持时间 (HOLD UP TIME)	230VAC:1000 ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC	50	ms	P
		115VAC:2000 ms(max)	115 VAC@FULL LOAD Ta: 25°C	115VAC	12	ms	
9	过冲欠冲 OVER/UNDERSHOOT TEST	< +5%Vo	230 VAC@ NO LOAD Ta: 25°C		0.41	%	P
			230 VAC@FULL LOAD Ta: 25°C		0.41	%	
10	动态测试 (DYNAMIC LOAD)	V1: 1000 mVp-p	230 AC@FULL /Min LOAD Ta: 25°C	90%DUTY/ 1KHZ	168	mV	P
				50%DUTY/120HZ	166	mV	
11	瞬态恢复时间 (TRANSIENT RECOVERY TIME)	1000ms	230VAC@40% LOAD CHANGE 50%DUTY/120HZ 1.25A/us		192	ms	N/A
12	容性负载测试 (Capacity load test)	680uF	85-305VAC@FULL LOAD Ta: 25°C		680	uF	

## 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)	85VAC~305 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-3V= 82 V	305	P
				HIGH-LINE+15%=308V		
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	85 VAC ~ 305 VAC@FULL-MIN LOAD Ta: 25°C		OK	P
3	EFFICIENCY	84% (TYP)	230 VAC@FULL LOAD Ta: 25°C		88.5	% P
4	输入电流 (INPUT CURRENT)	230Vac 0.3 A (TYP)	230 VAC@FULL LOAD Ta: 25°C		0.276	A P
		115V/ 0.5 (TYP)			0.451	A
5	冲击电流 INRUSH CURRENT (COLD START)	115VAC@FULL LOAD: 20 A (TYP)	115VAC@FULL LOAD Ta: 25°C		7.2	A P
		230VAC@FULL LOAD: 40 A (TYP)	230 VAC@FULL LOAD Ta: 25°C		36	A
6	漏电流 LEAKAGE CURRENT	< 1 mA/240 VAC	264 VAC@Min LOAD Ta: 25°C	L-FG		mA
				N-FG		mA
7	空载功耗 NO LOAD CONSUMPTIO	< 0.2 W	I/P: 230VAC O/P: NO LOAD Ta: 25°C		0.18	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)	130%~ 250%	230VAC@out shoot,10s,Ta : 25°C	Hiccup Mode 166%	P
			115VAC@out shoot,10s,Ta : 25°C	Hiccup Mode 140%	
2	输出过压保护 (OVER VOLTAGE PROTECTION)	/	O/P: MIN LOAD Ta: 25°C	无	P
3	短路保护 (SHORT PROTECTION)	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	305VAC@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 : 600V/ 4 A	High-Line +3V=308V, Ta : 25°C	Full Load Turn on	616 V	P
				OutputShort	480 V	
				Full load continue	496 V	
2	Diode Peak Voltage	D30 Rated: 100V /5A	High-Line +3V=308V, Ta : 25°C	Full Load Turn on	82	P
				OutputShort	96 V	
				Full load continue	96	
3	Input Capacitor Voltage	C1/C2 Rated: 33uF /450V/105°C	High-Line +3V=308V, Ta: 25°C	Full Load Turn on /Off	V	P
				Min load Turn on /Off	430 V	
				Full Load /Min load Change	V	
4	PWM控制芯片供电电压测试 (Control IC Voltage Test)	U21 Rated: 0-35V	High-Line +3V = 308 V , Ta: 25°C	(1)Full Load Turn on /Off	V	P
				(2) Min load Turn on /Off	12.78 V	
				Full Load /Minoad Change	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-O/P : 3 KVAC/min Ta : 25°C	I/P-O/P : 3000VAC0.64 mA	P
		I/P-FG : 1.5 KVAC/min	I/P-FG : 1.5 KVAC/min	I/P-FG : mA	
		O/P-FG : 0.5 KVAC/min	O/P-FG : 0.5 KVAC/min	O/P-FG : mA	
2	绝缘电阻 ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P : 500 VDC	> 1999 MΩ	P
		I/P-FG : -----	I/P-FG : 500 VDC	/ MΩ	
		O/P-FG : -----	O/P-FG : 500 VDC Ta : 25°C/70%RH	/ 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	OK	P

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	OK	P
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	OK	P
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: HP25-S12 1. HIGH AMBIENT BURN-IN: 2 HRS 2. HIGH AMBIENT BURN-IN: 2 HRS 3. HIGH AMBIENT BURN-IN: 2 HRS 4. HIGH AMBIENT BURN-IN: 2 HRS						
				I/P: 90VAV	O/P: 100% LOAD	Ta=50.16°C		
				I/P: 115VAC	O/P: FULL LOAD	Ta=50.09°C		
				I/P: 230VAC	O/P: FULL LOAD	Ta=50.93°C		
				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	C1	88.88	79.86	75.23	75.69
		CH2	共模电感	NF	72.34	68.62	70	70.16
		CH3	桥堆	BD	84.67	78.5	76.31	76.59
		CH4	压敏电阻	MOV	69.09	65.99	66.6	66.74
		CH5	MOS管	Q21	94.48	86.8	86.22	88.42
		CH6	Y电容	CY	84.43	80.72	82.22	83.28
		CH7	光耦	U22	79.77	76.54	76.33	76.05
		CH8	二极管	D30	95.78	92.98	105.86	108.1
		CH9	变压器磁芯	T20	87.62	84.39	85.12	85.8
CH10	整流二极管	D24	95.58	89.3	90.52	92.03		
CH11	电阻	R213	93.18	85.92	84.4	85.68		
CH12	变压器线包	T20	85.97	83.31	92.68	93.72		
CH13	输出电容	C31	89.11	88.17	87.05	88.27		
CH15	电阻	R211	94.03	86.27	94.12	95.99		
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/100VAC 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: 272 VAC 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