



Test Report: ZPR15-S12R2

■ 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

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:	36	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		0.13	%	P
4	线性调节率 (LINE REGULATION)	V1: -1 %~ +1 % (Max)	100VAC ~ 264 VAC@FULL LOAD Ta: 25°C		0.02	%	P
5	负载调节率 (LOAD REGULATION)	V1: -1 %~ +1 % (Max)	I/P: 230 VAC@FULL ~MIN LOAD Ta: 25°C		0.12	%	P
6	启动时间 (SET UP TIME)	230VAC:1000 ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC	44	ms	P
		115VAC:2000 ms(max)	115 VAC@FULL LOAD Ta: 25°C	115VAC	60	ms	
7	上升时间 (RISE TIME)	230VAC:1000 ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC	7.2	ms	P
		115VAC:2000 ms(max)	115 VAC@FULL LOAD Ta: 25°C	115VAC	6.4	ms	
8	输出保持时间 (HOLD UP TIME)	230VAC:1000 ms (max)	230 VAC@FULL LOAD Ta: 25°C	230VAC	49	ms	P
		115VAC:2000 ms(max)	115 VAC@FULL LOAD Ta: 25°C	115VAC	13	ms	
9	过冲欠冲 OVER/UNDERSHOOT TEST	< +5%Vo	230 VAC@ NO LOAD Ta: 25°C		1.6	%	P
			230 VAC@FULL LOAD Ta: 25°C		0.83	%	
10	动态测试 (DYNAMIC LOAD)	V1: 1000 mVp-p	230 AC@FULL /Min LOAD Ta: 25°C	90%DUTY/ 1KHZ	540	mV	P
				50%DUTY/120HZ	540	mV	
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)	3000uF	85-305VAC@FULL LOAD Ta: 25°C		3000	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 HIGH-LINE+15%=308V	OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	85 VAC ~ 305 VAC@FULL~MIN LOAD Ta: 25°C		OK	P
3	EFFICIENCY	85 % (TYP)	230 VAC@FULL LOAD Ta: 25°C	89.87	%	P
4	输入电流 (INPUT CURRENT)	230Vac 0.2 A (TYP)	230 VAC@FULL LOAD Ta: 25°C	0.12	A	P
		115V/ 0.4 (TYP)	115 VAC@FULL LOAD Ta: 25°C	0.25	A	
5	冲击电流 INRUSH CURRENT (COLD START)	115VAC@FULL LOAD: 20 A (TYP)	115VAC@FULL LOAD Ta: 25°C	3.68	A	P
		230VAC@FULL LOAD: 30 A (TYP)	230 VAC@FULL LOAD Ta: 25°C	2.4	A	
6	漏电流 LEAKAGE CURRENT	< 1 mA/240 VAC	264 VAC@Min LOAD Ta: 25°C	L-FG		N/A
				N-FG		
7	空载功耗 NO LOAD CONSUMPTIO	< 0.1 W	I/P: 240VAC O/P: NO LOAD Ta: 25°C	0	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℃	Hiccup Mode	280%	P
			115VAC@out shoot,10s,Ta : 25℃	Hiccup Mode	288%	
2	输出过压保护 (OVER VOLTAGE PROTECTION)	18V	O/P: 230VAC MIN LOAD Ta: 25℃	17.76V		P
3	短路保护 (SHORT PROTECTION)	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	305VAC@FULL LOAD Ta: 25℃	NO DAMAGE Hiccup Mode		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	U21(内置MOS) Rated : 700V/ 4 A	High-Line +3V=308V, Ta : 25℃	Full Load Turn on	624 V	P
				OutputShort	512 V	
				Full load continue	604 V	
2	Diode Peak Voltage	D30 Rated: 45 V /4 A	High-Line +3V=308V, Ta : 25℃	Full Load Turn on	70.4	P
				OutputShort	59.2 V	
				Full load continue	70.4	
3	Input Capacitor Voltage	C1/C2 Rated: 8.2uF /450V/105℃	High-Line +3V=308V, Ta: 25℃	Full Load Turn on /Off	V	N/A
				Min load Turn on /Off	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: 0-7.5V	High-Line +3V = 308 V , Ta: 25℃	(1)Full Load Turn on /Off	5.13 V	P
				(2) Min load Turn on /Off	4.99 V	
				Full Load /Minoad Change	5.13 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℃	I/P-O/P : 3000VAC 0.56	mA	P
		I/P-FG : -----		I/P-FG : NC	mA	
		O/P-FG : ----		O/P-FG : NC	mA	
2	绝缘电阻 ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25℃/70%RH	>1999	MΩ	P
		I/P-FG : - - - - -		/	MΩ	
		O/P-FG : -----		/	MΩ	
3	接地 GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A /2min Ta : 25℃ /70%RH	NC		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℃	---- (≤75W忽略此项)	N/A
2	CONDUCTION	EN55022 CLASS B	230 VAC/50HZ@FULL LOAD Ta : 25℃	PASS Test by certified Lab	P

3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	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	CRITERIA A	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	CRITERIA A	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	CRITERIA A	P
7	Test by certified Lab & TestReportPrepare				

七、可靠性测试 (RELIABILITY TEST)

ENVIRONMENT TEST

NO	测 试 项 (TEST ITEM)	规格(SPECIFICATION)	测试条件 (TEST CONDITION)	测试结果(RESULT)	VERDICT				
1	TEMPERATURE RISE TEST	MODEL: ZPR15-S12R2 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: 90VAC O/P: FULL LOADTa=50.55℃ I/P: 115VAC O/P: FULL LOAD Ta=50.13℃ I/P: 230VAC O/P: FULL LOAD Ta=50.93℃ I/P: 264VAC O/P: FULL LOAD Ta=50.52℃			
		NO	Compone nt temperatu re limit standard (℃)	Position	PART NUMBER	HIGH AMBIENT Ta= 50.55℃	HIGH AMBIENT Ta= 50.13℃	HIGH AMBIENT Ta= 50.93℃	HIGH AMBIENT Ta= 50.52℃
		CH1	105	输入电容	C1	84.84	77.53	74.38	74.79
		CH3	120	桥堆	BD	82.35	75.48	72.26	72.57
		CH5	120	输入电感	L1	84.5	77.02	72.68	72.86
		CH6	125	Y电容	CY	89.22	81.21	78.47	79.48
		CH7	100	光耦	U22	87.75	80.48	79.66	80.93
		CH8	120	二极管	D30	掉线	掉线	掉线	掉线
		CH11	110	变压器磁芯	T20	89.53	82.87	81.95	82.99
		CH4	130	整流二极管	D24	98.51	87.64	84.82	86.84
		CH10	110	变压器线包	T20	87.4	81.13	80.24	81.18
		CH9	105	输出电容	C31	掉线	掉线	掉线	掉线
		CH2	120	电阻	R211	103.67	90.33	87.37	89.91
		CH12	130	PCB底部（最 热位置）	/	90.66	83.59	83.69	85.2
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)		I/P: 230 VAC O/P: 133 %LOAD Ta: 25℃	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 ℃	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