



Test Report: ERP-350-48

350W Single Output Switching Power Supply

■ 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 : 240 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 130 mVp-p (Max)	PASS
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 43.2 V ~ 52.8 V	I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	41.82 V ~ 54.06 V/ 230 VAC	PASS
3	OUTPUT VOLTAGE TOLERANCE	V1 : -1.0 % ~ 1.0 % (Max)	I/P : 200 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : -0.416 % ~ 0.456 %	PASS
4	LINE REGULATION	V1 : -0.5 % ~ 0.5 % (Max)	I/P : 200VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : -0.019 % ~ 0.104 %	PASS
5	LOAD REGULATION	V1 : -0.5 % ~ 0.5 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -0.300 % ~ 0.273 %	PASS
7	SET UP TIME	230VAC : 1500 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1072.475 ms	PASS
8	RISE TIME	230VAC : 50 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 7.619 ms	PASS
9	HOLD UP TIME	230VAC : 20 ms (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 26.190 ms	PASS
10	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : ±1.688 %	PASS
11	DYNAMIC LOAD	V1 : 4800 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1). 1520 mVp-p (2). 2300 mVp-p	PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	177 V~ 264 V	PASS
			I/P : LOW-LINE-3V= 177 V HIGH-LINE=295 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 180 VAC ~ 264 VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK	PASS
3	EFFICIENCY	90% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	90.51 %	PASS
4	INPUT CURRENT	230V/ 4.0 A (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 3.352 A/ 230 VAC	PASS
5	INRUSH CURRENT	230V/ 90 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 87.156 A/ 230 VAC	PASS
6	LEAKAGE CURRENT	< 1.0 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.5263 mA N-FG : 0.5306 mA	PASS

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110 %~ 140 %	I/P : 230 VAC I/P : 200 VAC O/P : TESTING Ta : 25°C	126.58 %/ 230 VAC 125.34 %/ 200 VAC Hiccup Mode	PASS
2	OVER VOLTAGE PROTECTION	CH1 : 57.6 V~ 67.2 V	I/P : 230 VAC I/P : 180 VAC O/P : MIN LOAD Ta : 25°C	62.49 V/ 230 VAC 62.33 V/ 180 VAC Hiccup Mode	PASS
3	OVER TEMPERATURE PROTECTION	SPEC : O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage , recovers automatically after temperature goes down	PASS
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	PASS

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q2 Rated 600 V / 20A	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) 390 V (2) 586 V (3) 366 V	PASS
2	Diode Peak Voltage	D100 Rated 300 V / 20 A D102 Rated 400 V / 20 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue 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) 220 V (2) 256 V (3) 218 V (1) 366 V (2) 320 V (3) 348 V	PASS
4	Input Capacitor Voltage	C5 Rated :150 u / 400 V 105 °C / HS Series	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 Ta : 25°C	(1) 374 V (2) 378 V (3) 378 V	PASS
5	Control IC Voltage Test	U1 Rated 30 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 Ta : 25°C	(1) 20.6 V (2) 20.1 V (3) 20.8 V	PASS

SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	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 : 3.6 KVAC/min I/P-FG : 1.8 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 2.747 mA I/P-FG : 2.533 mA O/P-FG : 2.010 mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C / 70%RH	I/P-O/P : >9999 MΩ I/P-FG : >9999 MΩ O/P-FG : >9999 MΩ NO DAMAGE	PASS
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	6 mΩ	PASS

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CONDUCTION	EN55022 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	PASS
2	RADIATION	EN55022 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	PASS
3	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	PASS
4	Test by certified Lab & Test Report Prepare				

RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																												
1	TEMPERATURE RISE TEST	MODEL : ERP-350-48 1. ROOM AMBIENT BURN-IN : 1.0 HRS I/P : 230VAC O/P : 100%LOAD Ta=35.0 °C 2. HIGH AMBIENT BURN-IN : 1.0 HRS I/P : 230VAC O/P : 100%LOAD Ta=46.3 °C <table><thead><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 35.0 °C</th><th>HIGH AMBIENT Ta= 46.3 °C</th></tr></thead><tbody><tr><td>1</td><td>C5</td><td>81.3°C</td><td>92.4°C</td></tr><tr><td>2</td><td>T2</td><td>84.7°C</td><td>96.9°C</td></tr><tr><td>3</td><td>D5</td><td>87.4°C</td><td>99.6°C</td></tr><tr><td>4</td><td>D6</td><td>86.2°C</td><td>98.5°C</td></tr><tr><td>5</td><td>Q1</td><td>97.2°C</td><td>110.4°C</td></tr><tr><td>6</td><td>Q2</td><td>95.1°C</td><td>107.7°C</td></tr><tr><td>7</td><td>R17</td><td>95.9°C</td><td>108.5°C</td></tr><tr><td>8</td><td>U1</td><td>79.5°C</td><td>90.9°C</td></tr><tr><td>9</td><td>C35</td><td>77.8°C</td><td>89.1°C</td></tr><tr><td>10</td><td>C36</td><td>81.0°C</td><td>92.8°C</td></tr><tr><td>11</td><td>D30</td><td>85.6°C</td><td>97.4°C</td></tr><tr><td>12</td><td>T1</td><td>91.0°C</td><td>102.4°C</td></tr><tr><td>13</td><td>D100</td><td>83.0°C</td><td>95.1°C</td></tr><tr><td>14</td><td>D101</td><td>83.3°C</td><td>95.2°C</td></tr><tr><td>15</td><td>D102</td><td>92.5°C</td><td>103.2°C</td></tr><tr><td>16</td><td>L100</td><td>91.0°C</td><td>104.4°C</td></tr><tr><td>17</td><td>C107</td><td>68.8°C</td><td>79.8°C</td></tr><tr><td>18</td><td>TW1</td><td>75.2°C</td><td>86.7°C</td></tr></tbody></table>			NO	Position	ROOM AMBIENT Ta= 35.0 °C	HIGH AMBIENT Ta= 46.3 °C	1	C5	81.3°C	92.4°C	2	T2	84.7°C	96.9°C	3	D5	87.4°C	99.6°C	4	D6	86.2°C	98.5°C	5	Q1	97.2°C	110.4°C	6	Q2	95.1°C	107.7°C	7	R17	95.9°C	108.5°C	8	U1	79.5°C	90.9°C	9	C35	77.8°C	89.1°C	10	C36	81.0°C	92.8°C	11	D30	85.6°C	97.4°C	12	T1	91.0°C	102.4°C	13	D100	83.0°C	95.1°C	14	D101	83.3°C	95.2°C	15	D102	92.5°C	103.2°C	16	L100	91.0°C	104.4°C	17	C107	68.8°C	79.8°C	18	TW1	75.2°C	86.7°C	PASS
NO	Position	ROOM AMBIENT Ta= 35.0 °C	HIGH AMBIENT Ta= 46.3 °C																																																																														
1	C5	81.3°C	92.4°C																																																																														
2	T2	84.7°C	96.9°C																																																																														
3	D5	87.4°C	99.6°C																																																																														
4	D6	86.2°C	98.5°C																																																																														
5	Q1	97.2°C	110.4°C																																																																														
6	Q2	95.1°C	107.7°C																																																																														
7	R17	95.9°C	108.5°C																																																																														
8	U1	79.5°C	90.9°C																																																																														
9	C35	77.8°C	89.1°C																																																																														
10	C36	81.0°C	92.8°C																																																																														
11	D30	85.6°C	97.4°C																																																																														
12	T1	91.0°C	102.4°C																																																																														
13	D100	83.0°C	95.1°C																																																																														
14	D101	83.3°C	95.2°C																																																																														
15	D102	92.5°C	103.2°C																																																																														
16	L100	91.0°C	104.4°C																																																																														
17	C107	68.8°C	79.8°C																																																																														
18	TW1	75.2°C	86.7°C																																																																														
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/200VAC O/P : 100% LOAD Ta= -30°C	TEST : OK	PASS																																																																												
3	TEMPERATURE COEFFICIENT	+ 0.05 %(0~50°C)	I/P : 230 VAC O/P : 100% LOAD	+ 0.016%(0~50°C)	PASS																																																																												
4	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -35°C ~ +90°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		OK	PASS																																																																												
5	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C ~ +45°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/100% Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	PASS																																																																												
6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 4G (5) Test Time : 90min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	PASS																																																																												
7	CAPACITOR LIFE CYCLE	ERP-350-48:SUPPOSE C107 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		(1) 201392.1 HRS (2) 7272.2 HRS (3) 101392.2 HRS	PASS																																																																												

		(3) I/P : 230VAC O/P : 75% LOAD Ta=40 °C LIFE TIME		
8	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 321.04KHRS		PASS
9	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 40°C		PASS

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	ZHUOKB/ZOULF	LIUWY

2009/08/04 A50-G058