



# Test Report: ERP-350-24

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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 : 150 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 60 mVp-p (Max)	PASS
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 21.6 V ~26.4 V	I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	20.39 V ~ 27.45 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 : -0.18 % ~ 0.91 %	PASS
4	LINE REGULATION	V1 : -0.5 % ~ 0.5 % (Max)	I/P : 200VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : -0.02 % ~ 0 %	PASS
5	LOAD REGULATION	V1 : -0.5 % ~ 0.5 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : -0.18 % ~ 0.16 %	PASS
7	SET UP TIME	230VAC : 1500 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1036.189 ms	PASS
8	RISE TIME	230VAC : 50 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 6.259 ms	PASS
9	HOLD UP TIME	230VAC : 20 ms (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 25.325 ms	PASS
10	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : ±1.240 %	PASS
11	DYNAMIC LOAD	V1 : 2400 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). 1200 mVp-p (2). 1440 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	172V~264V	PASS
			I/P : LOW-LINE-3V= 177 V HIGH-LINE=264 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	89% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	90.03 %	PASS
4	INPUT CURRENT	230V/ 4.0 A (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 3.237 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 = 88.312 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 : 0.469 mA N-FG : 0.473 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	128.84%/ 230 VAC 127.61%/ 200 VAC Hiccup Mode	PASS
2	OVER VOLTAGE PROTECTION	CH1 : 27.6 V~ 32.4 V	I/P : 230 VAC I/P : 180 VAC O/P : MIN LOAD Ta : 25°C	29.419V/ 230 VAC 29.472V/ 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) 402 V (2) 420 V (3) 386 V	PASS
2	Diode Peak Voltage	D100 Rated 150 V / 30 A  D102 Rated 200 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) 116 V (2) 95.6 V (3) 116 V  (1) 162 V (2) 154 V (3) 162 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) 384 V (2) 382 V (3) 382 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) 20.3 V (2) 20.2 V (3) 20.2 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 : 2 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 3.6 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 2.692 mA I/P-FG : 2.466 mA O/P-FG : 2.025 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	8 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-350-24 1. ROOM AMBIENT BURN-IN : 1.0 HRS I/P : 230VAC O/P : 100%LOAD Ta=34.9 °C 2. HIGH AMBIENT BURN-IN : 1.0 HRS I/P : 230VAC O/P : 100%LOAD Ta=46.2 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 34.9 °C</th> <th>HIGH AMBIENT Ta= 46.2 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>C5</td><td>82.1°C</td><td>94.2°C</td></tr> <tr><td>2</td><td>D5</td><td>87.0°C</td><td>100.6°C</td></tr> <tr><td>3</td><td>D6</td><td>86.4°C</td><td>100.0°C</td></tr> <tr><td>4</td><td>Q1</td><td>93.3°C</td><td>107.4°C</td></tr> <tr><td>5</td><td>Q2</td><td>93.0°C</td><td>107.2°C</td></tr> <tr><td>6</td><td>R17</td><td>99.3°C</td><td>113.1°C</td></tr> <tr><td>7</td><td>U1</td><td>80.1°C</td><td>92.8°C</td></tr> <tr><td>8</td><td>C35</td><td>80.2°C</td><td>92.7°C</td></tr> <tr><td>9</td><td>C36</td><td>84.2°C</td><td>97.2°C</td></tr> <tr><td>10</td><td>D30</td><td>89.9°C</td><td>102.9°C</td></tr> <tr><td>11</td><td>T1</td><td>92.6°C</td><td>105.4°C</td></tr> <tr><td>12</td><td>D100</td><td>89.5°C</td><td>103.0°C</td></tr> <tr><td>13</td><td>D101</td><td>88.0°C</td><td>101.2°C</td></tr> <tr><td>14</td><td>D102</td><td>95.7°C</td><td>109.0°C</td></tr> <tr><td>15</td><td>D103</td><td>95.7°C</td><td>108.3°C</td></tr> <tr><td>16</td><td>L100</td><td>92.8°C</td><td>107.0°C</td></tr> <tr><td>17</td><td>C106</td><td>72.1°C</td><td>85.2°C</td></tr> <tr><td>18</td><td>TSW1</td><td>79.4°C</td><td>92.3°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 34.9 °C	HIGH AMBIENT Ta= 46.2 °C	1	C5	82.1°C	94.2°C	2	D5	87.0°C	100.6°C	3	D6	86.4°C	100.0°C	4	Q1	93.3°C	107.4°C	5	Q2	93.0°C	107.2°C	6	R17	99.3°C	113.1°C	7	U1	80.1°C	92.8°C	8	C35	80.2°C	92.7°C	9	C36	84.2°C	97.2°C	10	D30	89.9°C	102.9°C	11	T1	92.6°C	105.4°C	12	D100	89.5°C	103.0°C	13	D101	88.0°C	101.2°C	14	D102	95.7°C	109.0°C	15	D103	95.7°C	108.3°C	16	L100	92.8°C	107.0°C	17	C106	72.1°C	85.2°C	18	TSW1	79.4°C	92.3°C		PASS
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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	± 0.004% (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-350-24: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 (3) I/P : 230VAC O/P : 75% LOAD Ta=40 °C LIFE TIME		(1) 165116.1 HRS (2) 51497.9 HRS (3) 90333.7 HRS	PASS																																																																												



8	MTBF	Conducted by Parts Stress Analysis Prediction 2396.7K hrs min. Telcordia SR-332 (Bellcore) ; 321K hrs min. MIL-HDBK-217F (25°C)	PASS
9	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ TA 40°C	PASS

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

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