



# Test Report: ELP-75-5

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75W Single Output with PFC Function

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection 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 : 80 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 25 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 4.75 V ~ 5.5 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	4.645 V ~ 5.808 V / 230 VAC 4.644 V ~ 5.808 V / 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 2% ~ -2% (Max)	I/P : 100 VAC / 264 VAC O/P : FULL / MIN LOAD Ta : 25°C	V1 : 0.87 % ~ -0.87 %	P
4	LINE REGULATION	V1 : 0.5% ~ -0.5% (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.12 % ~ -0.12 %	P
5	LOAD REGULATION	V1 : 1.5% ~ -1.5% (Max)	I/P : 230 VAC O/P : FULL ~ MIN LOAD Ta : 25°C	V1 : 0.86 % ~ -0.86 %	P
6	SET UP TIME	230VAC : 2500 ms (Max) 115VAC : 2500 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 933 ms 115VAC / 1966 ms	P
7	RISE TIME	230VAC : 50 ms (Max) 115VAC : 50 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 15 ms 115VAC / 46 ms	P
8	HOLD UP TIME	230VAC : 20 ms (TYP) 115VAC : 20 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC / 84 ms 115VAC / 77 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %	P
10	DYNAMIC LOAD	V1 : 1000 mVp-p	I/P : 230 VAC O/P : FULL / Min LOAD 90%DUTY/ 1KHZ Ta : 25°C	388 mVp-p	P

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C  I/P : LOW-LINE-3V= 87 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	79 V~264V  TEST : OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 100 VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.95 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.97 / 230 VAC PF= 0.99 / 115 VAC	P
4	EFFICIENCY	82% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	85.15 %	P
5	INPUT CURRENT	230V/ 1 A (TYP) 115V/ 1.8 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.39 A/ 230 VAC I = 0.78 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 60 A (TYP)  COLD START	I/P : 230 VAC I O/P : FULL LOAD Ta : 25°C	I = 39 A/ 230 VAC	P
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.42 mA N-FG : 0.42 mA	P
8	NO LOAD CONSUMPTION	< 0.5W /230V < 0.5W /115V	I/P : 230VAC I/P : 115VAC O/P : Min LOAD Ta : 25°C	< 0.36 W < 0.27 W	P

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105% ~ 135 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	124 %/ 230 VAC 124 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 5.6 V ~ 6.75 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	6.05 V/ 230 VAC 6.04V/ 115 VAC Shut down Re- power ON	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup Mode	P

### COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) Peak Voltage	Q 3 Rated : 2SK3679 9A/900V	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) 764 V (2) 684 V (3) 760 V	P
2	Diode Peak Voltage	Q101 Rated : IRF1405Z 75A/55V	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) 54 V (2) 54 V (3) 39 V	P
3	Clamp Diode Peak Voltage	D 2 Rated : 1A/1000V BYV26EGP	I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2)Full load continue Ta : 25°C	(1) 684 V (2) 688 V	P
4	Input Capacitor Voltage	C5 Rated : 100u/420V 105°C 18*30 PAG	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 Change Ta : 25°C	(1) 393.7 V (2) 380.8 V (3) 380.3 V	P
5	Control IC Voltage Test	U1 Rated : PFC FAN6921MR 11V~30V	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 Change Ta : 25°C	(1) 21.33 V (2) 18.63 V (3) 18.62 V	P
6	Power Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated : 2SK4106 12A/500V	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) 468 V (2) 408 V (3) 426 V	P

**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 : 4.95 mA I/P-FG : 3.72 mA O/P-FG : 7.81 mA NO DAMAGE	P
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 : 90 GΩ I/P-FG : 30 GΩ O/P-FG : 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	11 mΩ	P
4	APPROVAL	TUV : Certificate NO : R50175193 UL : File NO : E183223			P

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS C	I/P : 230/240/220 VAC/50HZ O/P : 100/75/50/25% LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P : 230 V (50HZ)/115V(60HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P : 230 V (50HZ)/115V(60HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
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	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	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 & Test Report Prepare				

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																															
1.	THERMO TRACER TEST (ROOM AMBIENT)	MODEL:ELP-75-12	TEST CONDITION: 85V FULL LOAD ROOM AMBIENT = 26.3 °C	<table border="1"> <thead> <tr> <th>Position</th> <th>P/N</th> <th>Temp</th> <th>VERDICT</th> </tr> </thead> <tbody> <tr><td>1.</td><td>LF1</td><td>TR790</td><td>55.2</td><td>PASS</td></tr> <tr><td>2.</td><td>LF2</td><td>TR929</td><td>51.6</td><td>PASS</td></tr> <tr><td>3.</td><td>BD1</td><td>GBU408</td><td>63.3</td><td>PASS</td></tr> <tr><td>4.</td><td>L3</td><td>TF2083</td><td>55.9</td><td>PASS</td></tr> <tr><td>5.</td><td>L1</td><td>TR928</td><td>61.1</td><td>PASS</td></tr> <tr><td>6.</td><td>D1</td><td>MUR460</td><td>68.2</td><td>PASS</td></tr> <tr><td>7.</td><td>R28</td><td>0.27R</td><td>64.9</td><td>PASS</td></tr> <tr><td>8.</td><td>D2</td><td>GP20K</td><td>77.8</td><td>PASS</td></tr> <tr><td>9.</td><td>T1</td><td>TF2086</td><td>66.3</td><td>PASS</td></tr> <tr><td>10.</td><td>T1</td><td>TF2086</td><td>60.9</td><td>PASS</td></tr> <tr><td>11.</td><td>Q1</td><td>2SK4106</td><td>57.7</td><td>PASS</td></tr> <tr><td>12.</td><td>Q3</td><td>STP10NK70ZFP</td><td>65.2</td><td>PASS</td></tr> <tr><td>13.</td><td>Q101</td><td>IRFB3607</td><td>51.6</td><td>PASS</td></tr> <tr><td>14.</td><td>C111</td><td>470U/25V</td><td>55.6</td><td>PASS</td></tr> <tr><td>15.</td><td>L100</td><td>RB019</td><td>51.2</td><td>PASS</td></tr> </tbody> </table>	Position	P/N	Temp	VERDICT	1.	LF1	TR790	55.2	PASS	2.	LF2	TR929	51.6	PASS	3.	BD1	GBU408	63.3	PASS	4.	L3	TF2083	55.9	PASS	5.	L1	TR928	61.1	PASS	6.	D1	MUR460	68.2	PASS	7.	R28	0.27R	64.9	PASS	8.	D2	GP20K	77.8	PASS	9.	T1	TF2086	66.3	PASS	10.	T1	TF2086	60.9	PASS	11.	Q1	2SK4106	57.7	PASS	12.	Q3	STP10NK70ZFP	65.2	PASS	13.	Q101	IRFB3607	51.6	PASS	14.	C111	470U/25V	55.6	PASS	15.	L100	RB019	51.2	PASS	P
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2	TEMPERATURE RISE TEST	MODEL : ELP-75-5 PCB ONLY	1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 28.9 °C 2. HIGH AMBIENT BURN-IN : 2.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 53.2 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>P/N</th> <th>ROOM AMBIENT Ta= 28.9 °C</th> <th>HIGH AMBIENT Ta= 53.2 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>TR929</td><td>44.3°C</td><td>67.6°C</td></tr> <tr><td>2</td><td>L3</td><td>TF2083</td><td>54.1°C</td><td>75.7°C</td></tr> <tr><td>3</td><td>L1</td><td>TR928</td><td>57.2°C</td><td>80.3°C</td></tr> <tr><td>4</td><td>T1</td><td>TF2085</td><td>84.1°C</td><td>107.8°C</td></tr> <tr><td>5</td><td>Q1</td><td>2SK4106 12A/500V</td><td>68.1°C</td><td>91.2°C</td></tr> <tr><td>6</td><td>Q3</td><td>STP10NK70ZFP 10A/700V</td><td>72.1°C</td><td>96.8°C</td></tr> <tr><td>7</td><td>D1</td><td>MUR460 4A/600V</td><td>74.7°C</td><td>96.4°C</td></tr> <tr><td>8</td><td>D2</td><td>2A/800V GP20K 175°C</td><td>102.1°C</td><td>125.9°C</td></tr> <tr><td>9</td><td>C5</td><td>100u/420V 105°C 18*30 PAG</td><td>64.8°C</td><td>87.3°C</td></tr> <tr><td>10</td><td>C61</td><td>56u/50V L5Kh 6.3*11 KY</td><td>74.3°C</td><td>98.1°C</td></tr> <tr><td>11</td><td>C105</td><td>2200u/16V UL10Kh 12.5*20 ZLH</td><td>76.7°C</td><td>101.2°C</td></tr> <tr><td>12</td><td>Q102</td><td>IRF1405Z 75A/55V</td><td>81.9°C</td><td>107.8°C</td></tr> <tr><td>13</td><td>BD1</td><td>4A/800V GLASS GBU408</td><td>61.0°C</td><td>83.8°C</td></tr> <tr><td>14</td><td>U1</td><td>PFC FAN6921MR</td><td>77.8°C</td><td>100.4°C</td></tr> </tbody> </table>	NO	Position	P/N	ROOM AMBIENT Ta= 28.9 °C	HIGH AMBIENT Ta= 53.2 °C	1	LF2	TR929	44.3°C	67.6°C	2	L3	TF2083	54.1°C	75.7°C	3	L1	TR928	57.2°C	80.3°C	4	T1	TF2085	84.1°C	107.8°C	5	Q1	2SK4106 12A/500V	68.1°C	91.2°C	6	Q3	STP10NK70ZFP 10A/700V	72.1°C	96.8°C	7	D1	MUR460 4A/600V	74.7°C	96.4°C	8	D2	2A/800V GP20K 175°C	102.1°C	125.9°C	9	C5	100u/420V 105°C 18*30 PAG	64.8°C	87.3°C	10	C61	56u/50V L5Kh 6.3*11 KY	74.3°C	98.1°C	11	C105	2200u/16V UL10Kh 12.5*20 ZLH	76.7°C	101.2°C	12	Q102	IRF1405Z 75A/55V	81.9°C	107.8°C	13	BD1	4A/800V GLASS GBU408	61.0°C	83.8°C	14	U1	PFC FAN6921MR	77.8°C	100.4°C	P				
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		MODEL : ELP-75-5 WITH CASE	1. ROOM AMBIENT BURN-IN : 12 HRS I/P : 230VAC O/P : FULL LOAD Ta= 27.1 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 51.1 °C																																																																																	

		NO	Position	P/N	ROOM AMBIENT	HIGH AMBIENT		
					Ta= 27.1 °C	Ta= 51.1 °C		
		1	LF2	TR929	47.6°C	67.0°C		
		2	L3	TF2083	57.9°C	78.6°C		
		3	L1	TR928	51.0°C	71.3°C		
		4	T1	TF2085	86.2°C	108.9°C		
		5	Q1	2SK4106 12A/500V	63.2°C	85.3°C		
		6	Q3	STP10NK70ZFP 10A/700V	71.2°C	93.9°C		
		7	D1	MUR460 4A/600V	70.4°C	91.6°C		
		8	D2	2A/800V GP20K 175°C	107.2°C	129.2°C		
		9	C5	100u/420V 105°C 18*30 PAG	60.3°C	82.4°C		
		10	C61	56u/50V L5Kh 6.3*11 KY	66.7°C	89.4°C		
		11	C105	2200u/16V UL10Kh 12.5*20 ZLH	83.2°C	105.1°C		
		12	Q102	IRF1405Z 75A/55V	82.3°C	106.4°C		
		13	BD1	4A/800V GLASS GBU408	56.5°C	77.6°C		
		14	U1	PFC FAN6921MR	77.2°C	98.3°C		
3	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )		I/P : 230 VAC O/P : 120 % LOAD Ta : 25°C	TEST : OK			P
4	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR		I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -25 °C	TEST : OK			P
5	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 53.2 °C NO DAMAGE		I/P : 272 VAC O/P : FULL LOAD Ta= 53.2 °C HUMIDITY= 95 %R.H	TEST : OK			P
6	TEMPERATURE COEFFICIENT	± 0.03 % (0~50°C)		I/P : 230 VAC O/P : FULL LOAD	± 0.008 % (0~50°C)			P
7	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°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			P
8.	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30°C ~ +40°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			OK			P
9	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C			TEST : OK			P

10	CAPACITOR LIFE CYCLE	<p>ELP-75-5 PCB ONLY</p> <p>SUPPOSE C105 IS THE MOST CRITICAL COMPONENT</p> <p>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME</p> <p>(2) I/P : 230VAC O/P : FULL LOAD Ta= 40 °C LIFE TIME</p> <p>(3) I/P : 230VAC O/P : 75% LOAD Ta= 40 °C LIFE TIME</p> <p>ELP-75-5 WITH CASE</p> <p>SUPPOSE C105 IS THE MOST CRITICAL COMPONENT</p> <p>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME</p> <p>(2) I/P : 230VAC O/P : FULL LOAD Ta= 40 °C LIFE TIME</p> <p>(3) I/P : 230VAC O/P : 75% LOAD Ta= 40 °C LIFE TIME</p>	<p>(1) 85803HRS</p> <p>(2) 48285HRS</p> <p>(3) 104895HRS</p> <p>(1) 58164HRS</p> <p>(2) 23754HRS</p> <p>(3) 74703HRS</p>	P
11	MTBF	<p>MIL-HDBK-217F NOTICES2 PARTS COUNT</p> <p>TOTAL FAILURE RATE : 345.3K HRS</p>		P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/12/17	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2010/1/21	PRODUCT SAMPLE W1001A26	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023