



# Test Report: PLP-45-24

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45W Single Output LED Power Supply

## ■ 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
1	RIPPLE & NOISE	V1 : 3.8 Vp-p (Max )	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 2.28 Vp-p (Max )
2	CURRENT ADJUST RANGE	CH1 : 1.425 A ~ 1.9A	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	1.101 A ~ 2.134 A / 230 VAC 1.104 A ~ 2.135 A / 115 VAC
3	OUTPUT VOLTAGE TOLERANCE	V1 : 10 %~ -10 % (Max)	I/P : 90 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.34 %~ -0.34 %
4	LINE REGULATION	V1 : 3 %~ -3 % (Max)	I/P : 90VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.16 %~ -0.16 %
5	LOAD REGULATION	V1 : 5 %~ -5 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.34 %~ -0.34 %
6	SET UP TIME	230VAC : 500 ms (Max) 115VAC : 1200 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 388 ms 115VAC/ 800 ms
7	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P : TESTNG O/P : FULL LOAD Ta : 25°C	59 V~264V
			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 )	TEST : OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P : 90 VAC ~ 264 VAC O/P : FULL~MN LOAD Ta : 25°C	TEST : OK
3	POWER FACTOR	0.9 / 230 VAC(TYP)  0.9 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : O/P : 75%~100% LOAD Ta : 25°C	230V: PF= 0.902 / 100% Load PF= 0.94 / 75% Load
				115V: PF= 0.958 / 100% Load PF= 0.943 / 75% Load
4	EFFICIENCY	89% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	90 %
5	INPUT CURRENT	230V/ 0.3 A (TYP)	I/P : 230 VAC	I = 0.22 A/ 230 VAC
		115V/ 0.6 A (TYP)	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 0.44 A/ 115 VAC
6	INRUSH CURRENT	230V/ 30 A (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 24 A/ 230 VAC
7	LEAKAGE CURRENT	< 0.75 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.1 mA
				N-FG : 0.34 mA

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	100%~ 110%	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	109%/ 230 VAC 110%/ 115 VAC Constant Current Limiting
2	OVER VOLTAGE PROTECTION	CH1 : 28 V~ 35 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	32V/ 230 VAC 32V/ 115 VAC Shut down Re- power ON
4	SHORT PROTECTION	NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup mode, recovers automatically after fault condition is removed

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	Power Transistor ( D to S) or (C to E) Peak Voltage	Q 1 Rated : 10A/600V	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) 599 V (2) 498 V (3) 524 V
2	Diode Peak Voltage	D100 Rated : 20A/200V	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) 179 V (2) 112 V (3) 138 V
3	Clamp Diode Peak Voltage	D2 Rated : 2A/800V	I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2) Full load continue Ta : 25°C	(1) 676 V (2) 516 V
4	Control IC Voltage Test	U 1 Rated : 10.5V~18V	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) 15.625 V (2) 12.212 V (3) 12.234 V

■ SAFETY & E.M.C. TEST

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.75 KVAC/min I/P-FG : 2 KVAC/min O/P-FG : 1.5KVAC/min	I/P-O/P : 4KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 1.8 KVAC/min Ta : 25°C	I/P-O/P : 3.16 mA I/P-FG : 2.218 mA O/P-FG : 1.392 mA NO DAMAGE
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 : 30 GΩ I/P-FG : 30 GΩ O/P-FG : 30 GΩ NO DAMAGE

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A CLASS C	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS
2	CONDUCTION	EN55015 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.FT	EN61000-4-4 LIGHT INDUSTRY INPUT : 1KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N : 1KV LN-PE : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																								
1	TEMPERATURE RISE TEST	MODEL : PLP-45-24 1. ROOM AMBIENT BURN-IN : 6 HRS I/P : 230VAC O/P : FULL LOAD Ta= 26.3 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 62.6 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 26.3 °C</th> <th>HIGH AMBIENT Ta= 62.6 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>47.5 °C</td><td>81.5 °C</td></tr> <tr><td>2</td><td>C51</td><td>55.0 °C</td><td>86.6 °C</td></tr> <tr><td>3</td><td>T1</td><td>58.5 °C</td><td>89.7 °C</td></tr> <tr><td>4</td><td>C106</td><td>50.8 °C</td><td>82.2 °C</td></tr> <tr><td>5</td><td>Q1</td><td>55.6 °C</td><td>88.0 °C</td></tr> <tr><td>6</td><td>D100</td><td>58.1 °C</td><td>89.3 °C</td></tr> <tr><td>7</td><td>C101</td><td>45.1 °C</td><td>77.1 °C</td></tr> <tr><td>8</td><td>L1</td><td>58.0 °C</td><td>90.9 °C</td></tr> <tr><td>9</td><td>BD1</td><td>60.0 °C</td><td>93.0 °C</td></tr> <tr><td>10</td><td>C8</td><td>55.2 °C</td><td>88.4 °C</td></tr> <tr><td>11</td><td>D2</td><td>73.8 °C</td><td>105.5 °C</td></tr> <tr><td>12</td><td>U1</td><td>61.3 °C</td><td>91.0 °C</td></tr> <tr><td>13</td><td>C1</td><td>37.0 °C</td><td>73.0 °C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 26.3 °C	HIGH AMBIENT Ta= 62.6 °C	1	LF2	47.5 °C	81.5 °C	2	C51	55.0 °C	86.6 °C	3	T1	58.5 °C	89.7 °C	4	C106	50.8 °C	82.2 °C	5	Q1	55.6 °C	88.0 °C	6	D100	58.1 °C	89.3 °C	7	C101	45.1 °C	77.1 °C	8	L1	58.0 °C	90.9 °C	9	BD1	60.0 °C	93.0 °C	10	C8	55.2 °C	88.4 °C	11	D2	73.8 °C	105.5 °C	12	U1	61.3 °C	91.0 °C	13	C1	37.0 °C	73.0 °C	
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : O/P SHORT Ta : 25 °C	TEST : OK																																																								
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : LED=23V Ta= -35 °C	TEST : OK																																																								
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 62.6 °C NO DAMAGE	I/P : 272 VAC O/P : LED=23V Ta=62.6 °C HUMIDITY= 95 %R.H	TEST : OK																																																								
5	TEMPERATURE COEFFICIENT	± 0.03 % (0~50 °C)	I/P : 230 VAC O/P : FULL LOAD	± 0.02 % (0~50 °C)																																																								
6	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																																																								
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35 °C ~ +65 °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		OK																																																								



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
9	CAPACITOR LIFE CYCLE	PLP-45-24 SUPPOSE C106 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= 60 °C LIFE TIME	(1) 566416.5HRS (2) 70363.8HRS
10	MTBF	MIL-HDBK-217F NOTICES 2 PARTS COUNT TOTAL FAILURE RATE : 586.5K HRS	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure : Above 20,000 hours @ TA 60°C	

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/7/31	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/10/7	PRODUCT SAMPLE W0908C39	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023