



# Test Report: PLC-45-12

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45W Single Output LED 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
1	RIPPLE & NOISE	V1 : 2 Vp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 950 mVp-p (Max)
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 11.5V ~ 13V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	11.168 V ~ 14.387 V / 230 VAC 11.169 V ~ 14.381 V / 115 VAC
3	OUTPUT VOLTAGE TOLERANCE	V1 : -10% ~ 10% (Max)	I/P : 100VAC / 264VAC O/P : FULL / MIN LOAD Ta : 25°C	V1 : -2.1% ~ 2.1%
4	LINE REGULATION	V1 : -3% ~ 3% (Max)	I/P : 100VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : -0.84% ~ 0.84%
5	LOAD REGULATION	V1 : -5% ~ 5% (Max)	I/P : 230 VAC O/P : FULL ~ MIN LOAD Ta : 25°C	V1 : -1.51% ~ 1.51%
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 / 435 ms 115VAC / 805 ms
9	OVER/UNDERSHOOT TEST	< ±10%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 10%
10	CONSTANT CURRENT OPERATION VOLTAGE	9V ~ 12V	I/P : 230 VAC I/P : 115 VAC O/P : CV MODE Ta : 25°C	230VAC / 6.53V~12V V 115VAC / 6.59V~12V V

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90 VAC~ 264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	54V~264V
			I/P : LOW-LINE-3V= 87V 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 -MIN LOAD Ta : 25°C	TEST : OK
3	POWER FACTOR	0.9 / 230 VAC(TYP)	I/P : 230 VAC	PF= 0.94 / 100%
		0.92 / 115 VAC(TYP)	I/P : 115VAC O/P : 100% LOAD Ta : 25°C	PF= 0.99 / 100%
4	EFFICIENCY	83.5 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	84.2 %
5	INPUT CURRENT	230V/ 0.25 A	I/P : 230 VAC	I= 0.24 A/ 230 VAC
		115V/ 0.55 A	I/P : 115VAC O/P : FULL LOAD Ta : 25°C	I= 0.45 A/ 230 VAC
6	INRUSH CURRENT	230V/ 35 A (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I= 36 A/ 230 VAC
		COLD START		
7	LEAKAGE CURRENT	< 0.75 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.34 mA N-FG : 0.34 mA

## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	95 %~ 110 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	102%/ 230 VAC 102%/ 115 VAC Constant Current Limiting
2	OVER VOLTAGE PROTECTION	CH1 : 13.8 V~ 16 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	15.21 V/ 230 VAC 15.12V/ 115 VAC Shut down Re- power ON
3	OVER TEMPERATURE PROTECTION	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
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

## CONTROL FUNCTION TEST

1	CURRENT ADJ. RANGE	3 % ~ -25 %	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	2.533 A~ 4.438 A/230VAC 2.528 A~ 4.436 A/115 VAC
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## 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) 588 V (2) 556 V (3) 574 V
2	Diode Peak Voltage	D100 Rated : 20A/120V	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) 94.8 V (2) 66.4 V (3) 74.4 V
3	Clamp Diode Peak Voltage	D 2 Rated : 2A/800V	I/P : High-Line +3V = 267 V O/P : (1)Full load continue Ta : 25°C	(1) 476 V
4	Control IC Voltage Test	U1 Rated : 10.5V~ 22 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 Change Ta : 25°C	(1) 17.054 V (2) 14.153 V (3) 14.156 V

## ■ SAFETY & E.M.C. TEST

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.75KVAC/min I/P-FG : 2KVAC/min O/P-FG : 1.5 KVAC/min	I/P-O/P : 4.2 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 1.8 KVAC/min Ta : 25°C	I/P-O/P : 4.85 mA I/P-FG : 4.15 mA O/P-FG : 2.279 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 : 18.8 GΩ O/P-FG : 30 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	41 mΩ

### 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 : 100% LOAD Ta : 25°C	PASS
2	CONDUCTION	EN55015 CLASS B	I/P : 230 VAC (50HZ) O/P : 95% LOAD /50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P : 230 VAC (50HZ) O/P : 95% 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 : 95% LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : 95% LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 1KV L,N-PE : 2KV	I/P : 230 VAC/50HZ O/P : 95% LOAD Ta : 25°C	CRITERIA A

## ■ RELIABILITY TEST

## ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT		
1	TEMPERATURE RISE TEST	MODEL : PLN-45-12				
		1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 27.9 °C				
		2. HIGH AMBIENT BURN-IN : 4 HRS I/P : 230VAC O/P : FULL LOAD Ta= 43 °C				
			NO	Position	ROOM AMBIENT Ta= 27.9 °C	HIGH AMBIENT Ta= 43 °C
			1	BD1	61.9°C	72.3°C
			2	Q1	73.9°C	84.4°C
			3	L1	67.6°C	77.7°C
			4	D2	90.9°C	101.4°C
			5	C46	67.8°C	78.3°C
			6	T1 COIL	73.9°C	84.0°C
			7	D100	72.9°C	83.7°C
			8	C106	71.4°C	81.9°C
			9	TSW1	65.5°C	75.8°C
	10	U1	70.9°C	81.2°C		
	11	C8	72.9°C	82.8°C		
	12	CASE	52.9°C	63.6°C		
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : FULL LOAD 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 : 100 % LOAD Ta= -30 °C	TEST : OK		
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta= 40 °C HUMIDITY= 95 %R.H	TEST : OK		
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.015 %(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~ +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/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		



# 45W Single Output LED Power Supply

# PLC-45 series

9	CAPACITOR LIFE CYCLE	PLN-45-12 : 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= 40 °C LIFE TIME	(1) 151729.5HRS (2) 73869.9HRS
10	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 497.8K HRS	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 20,000 hours @ Tcase 70°C; 50,000 hours @ Tcase 55°C	

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/10/7	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/11/10	PRODUCT SAMPLE W0910C56	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023