45W Single Output LED Power Supply

PLP-45 series

Features :

- Universal AC input / Full range
- Protections: Short circuit / Overload / Over voltage
- Built-in active PFC function
- Cooling by free air convection
- Output current level adjustable
- 100% full load burn-in test
- High reliability
- Suitable for built-in applications of LED lighting
- 2 years warranty

SELV

SPECIFICATION

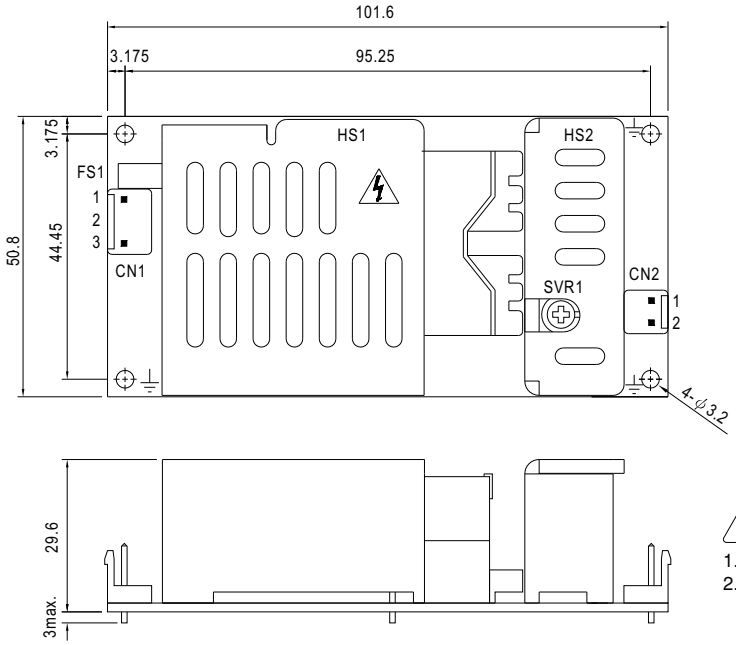
MODEL		PLP-45-12	PLP-45-24	PLP-45-48
OUTPUT	DC VOLTAGE	12V	24V	48V
	CONSTANT CURRENT OPERATION VOLTAGE Note.5	9 ~ 12V	18 ~ 24V	36 ~ 48V
	RATED CURRENT	3.8A	1.9A	0.95A
	CURRENT RANGE	0 ~ 3.8A	0 ~ 1.9A	0 ~ 0.95A
	RATED POWER	45.6W	45.6W	45.6W
	RIPPLE & NOISE (max.) Note.2	4.2Vp-p	3.8Vp-p	4.8Vp-p
	CURRENT ADJ. RANGE	2.85 ~ 3.8A	1.425 ~ 1.9A	0.715 ~ 0.95A
	VOLTAGE TOLERANCE Note.3	±10%		
	LINE REGULATION	±3.0%		
	LOAD REGULATION	±5.0%		
	SETUP TIME	1000ms / 230VAC 2000ms / 115VAC at full load		
INPUT	VOLTAGE RANGE Note.4	90 ~ 264VAC 127 ~ 370VDC		
	FREQUENCY RANGE	47 ~ 63Hz		
	POWER FACTOR	PF≧0.9 at 75 ~ 100% load, 115VAC / 230VAC		
	EFFICIENCY(Typ.)	86%	89%	89%
	AC CURRENT	0.6A/115VAC 0.3A/230VAC		
	INRUSH CURRENT(max.)	42A/230VAC		
	LEAKAGE CURRENT	<0.75mA / 240VAC		
PROTECTION	OVER CURRENT Note.5	100 ~ 110%		
		Protection type : Constant current limiting, recovers automatically after fault condition is removed		
	SHORT CIRCUIT	Protection type : Hiccup mode, recovers automatically after fault condition is removed		
	OVER VOLTAGE	15 ~ 18V	28 ~ 35V	57 ~ 63V
		Protection type : Shut down o/p voltage, re-power on to recover		
ENVIRONMENT	WORKING TEMP.	-30 ~ +70℃ (Refer to output load derating curve)		
	WORKING HUMIDITY	20 ~ 95% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-40 ~ +80℃, 10 ~ 95% RH		
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)		
	VIBRATION	10 ~ 500Hz, 2G 12min./1cycle, period for 72min. each along X, Y, Z axes		
SAFETY & EMC	SAFETY STANDARDS	TUV EN61347-1, EN61347-2-13 approved ; design refer to UL60950-1		
	WITHSTAND VOLTAGE	I/P-O/P:3.75KVAC I/P-FG:1.88KVAC O/P-FG:0.5KVAC		
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH		
	EMI CONDUCTION & RADIATION	Compliance to EN55015		
	HARMONIC CURRENT	Compliance to EN61000-3-2 Class C(≧75% load); EN61000-3-3		
	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024,EN61547, light industry level, criteria A		
OTHERS	MTBF	586.5Khrs min. MIL-HDBK-217F (25℃)		
	DIMENSION	101.6*50.8*29.6mm (L*W*H)		
	PACKING	0.16Kg; 96pcs/16.4Kg/0.89CUFT		

NOTE

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor, direct connecting to LED's is not suggested for models with "RIPPLE & NOISE" > ±10% and using additional drivers is highly recommended.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Derating may be needed under low input voltage. Please check the static characteristics for more details.
5. Constant current operation region is within 75% ~100% rated output voltage. This is the suitable operation region for LED related applications, but please reconfirm special electrical requirements for some specific system design.
6. Heat sink HS1,HS2 can not be shorted.
7. Heat sink HS1 must have safety isolation distance with system case.
8. The power supply is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC Directive on the complete installation again.

■ Mechanical Specification

Unit:mm



1.HS1,HS2 can not be shorted.
2.HS1 must have safety isolation distance with system case.

AC Input Connector (CN1) : JST B3P-VH or equivalent

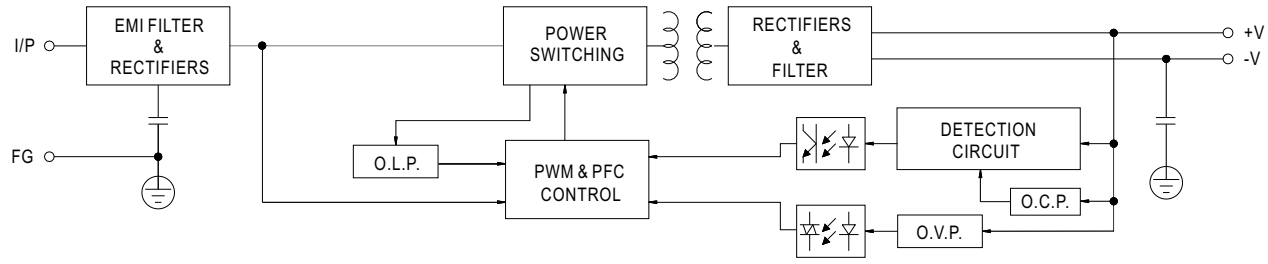
Pin No.	Assignment	Mating Housing	Terminal
1	AC/L	JST VHR or equivalent	JST SVH-21T-P1.1 or equivalent
2	No Pin		
3	AC/N		

DC Output Connector (CN2) : JST B2P-VH or equivalent

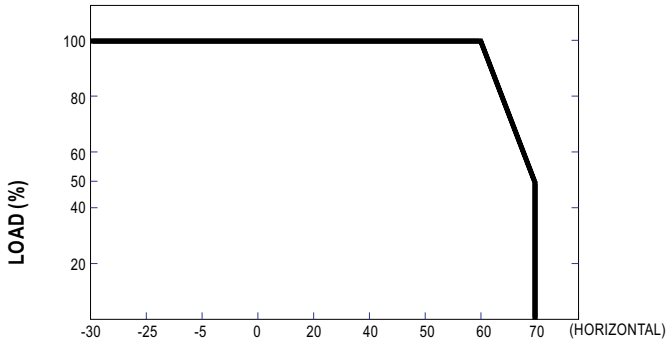
Pin No.	Assignment	Mating Housing	Terminal
1	+V	JST VHR or equivalent	JST SVH-21T-P1.1 or equivalent
2	-V		

■ Block Diagram

fosc : 90KHz(115VAC)
120KHz(230VAC)

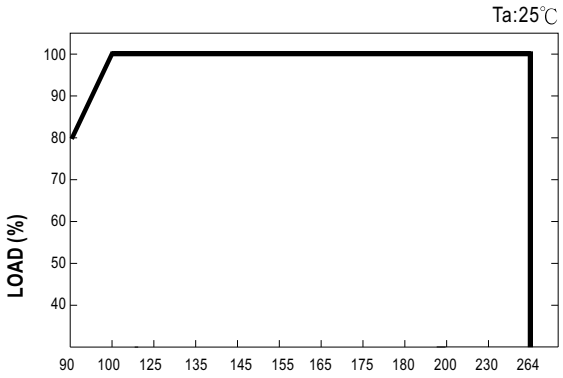


■ Derating Curve



AMBIENT TEMPERATURE (℃)

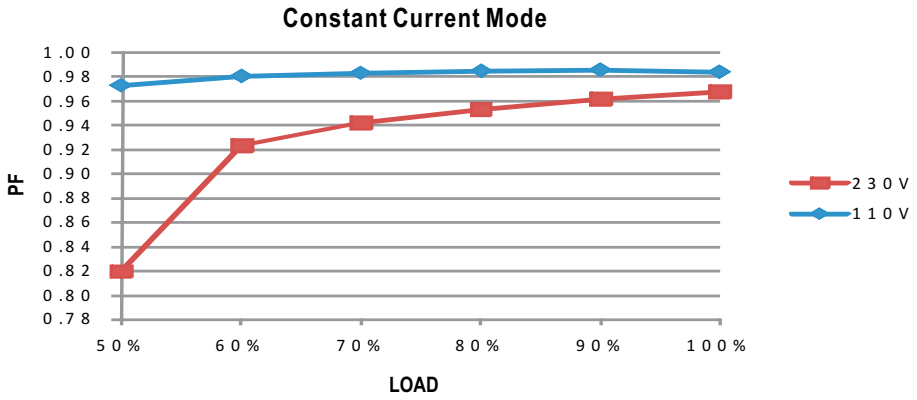
■ Static Characteristics



INPUT VOLTAGE (V) 60Hz

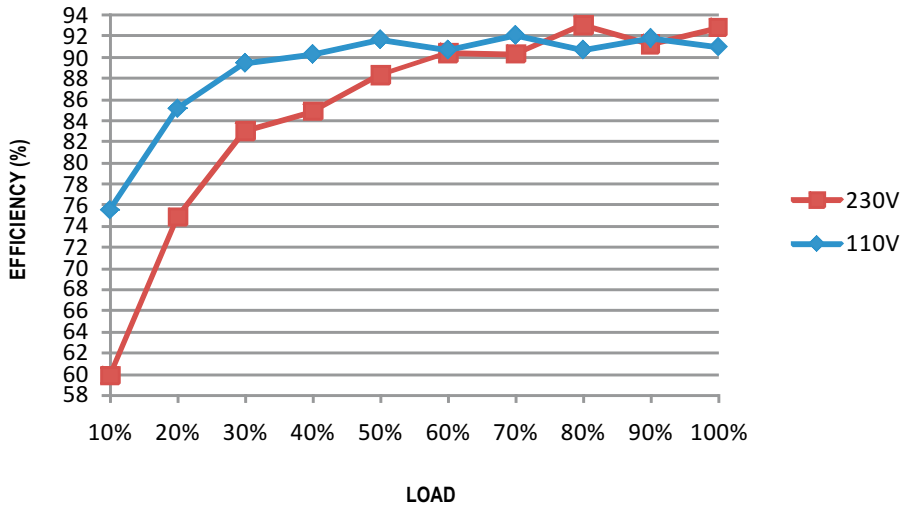
■ Power Factor Characteristic

Power factor will be higher than 0.9 when output loading is 75% or higher.



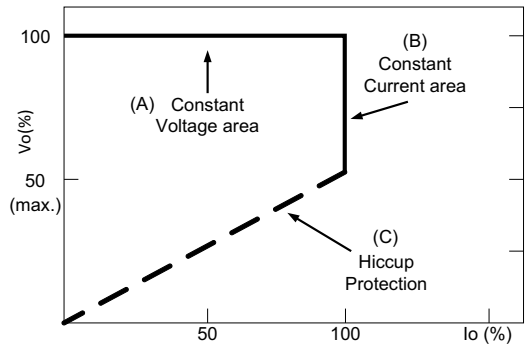
■ EFFICIENCY vs LOAD (48V Model)

PLP-45 series possess superior working efficiency that up to 89% can be reached in field applications.



■ DRIVING METHODS OF LED MODULE

There are two major kinds of LED drive method "direct drive" and "with LED driver".
A typical LED power supply may either work in "constant voltage mode (CV) or constant current mode (CC)" to drive the LEDs.
Mean Well's LED power supply with CV+ CC characteristic can be operated at both CV mode [with LED driver, at area (A)] and CC mode [direct drive, at area (B)].



Typical LED power supply I-V curve

Test Report: PLP-45-12

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	VERDICT
1	RIPPLE & NOISE	V1：4.2 Vp-p (Max)	I/P： 230VAC O/P：FULL LOAD Ta：25℃	V1： 2.4 Vp-p (Max)	P
2	CURRENET ADJUST RANGE	CH1： 2.85 A ~ 3.8 A	I/P： 230 VAC I/P： 115 VAC O/P：CV:10V Ta：25℃	2.1 A ~ 4.37 A/ 230 VAC 2.08 A ~ 4.37 A/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1：10 %~ -10 % (Max)	I/P：100 VAC / 264 VAC O/P：FULL/ MIN LOAD Ta：25℃	V1： 4.5 %~ -4.5 %	P
4	LINE REGULATION	V1： 3 %~ -3 % (Max)	I/P：100 VAC ~ 264 VAC O/P：FULL LOAD Ta：25℃	V1： 2.1 %~ -2.1 %	P
5	LOAD REGULATION	V1： 5 %~ -5 % (Max)	I/P： 230 VAC O/P：FULL ~MIN LOAD Ta：25℃	V1： 0.6 %~ 4.5 %	P
6	SET UP TIME	230VAC： 1000 ms (Max) 115VAC： 2000 ms(Max)	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	230VAC/ 577 ms 115VAC/ 1154 ms	P
7	OVER/UNDERSHOOT TEST	< ±5%	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	TEST： < 5 %	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℃	40 V~264V	P
			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 OSC	I/P：90 VAC ~ 264 VAC O/P：FULL~MIN LOAD Ta：25℃	TEST： OK	P
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℃	230V: PF= 0.98 / 100% Load PF= 0.969 / 75% Load 115V: PF= 1 / 100% Load PF= 1 / 75% Load	P
4	EFFICIENCY	86% (TYP)	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	87.9 %	P
5	INPUT CURRENT	230V/ 0.3 A (TYP) 115V/ 0.6 A (TYP)	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I = 0.23 A/ 230 VAC I = 0.46 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 42 A (TYP)	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I = 27 A/ 230 VAC	P
7	LEAKAGE CURRENT	< 0.75 mA / 240 VAC	I/P： 264 VAC O/P：Min LOAD Ta：25℃	L-FG： 0.28 mA N-FG： 0.28 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	100 %~ 110 %	I/P： 230 VAC I/P： 115 VAC O/P：TESTING Ta：25℃	100.5%/ 230 VAC 100.5%/ 115 VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1：15 V~ 18 V	I/P： 230 VAC I/P： 115 VAC O/P：MIN LOAD Ta：25℃	16.93 V/ 230 VAC 16.88 V/ 115 VAC Shut down Re- power ON	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P： 264 VAC O/P：FULL LOAD Ta：25℃	NO DAMAGE Constant Current Limiting	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 1 Rated： TK10B60D 10A/600V	I/P：High-Line +3V = 267 V O/P： (1)Full Load Turn on (2) Output Short (3)Fulll load continue Ta：25℃	(1) 640 V (2) 550 V (3) 580 V	P
2	Diode Peak Voltage	D100 Rated： FMEN-2308 30A/80V	I/P：High-Line +3V = 267 V O/P： (1)Full Load Turn on (2)Output Short (3)Fulll load continue Ta：25℃	(1) 71.6 V (2) 61.6 V (3) 71 V	P
3	Clamp Diode Peak Voltage	D2 Rated： GP20K:2A/800V	I/P：High-Line +3V = 267 V O/P： (1) Dynamic Load 90%Duty/1KHz (2)Fulll load continue Ta：25℃	(1) 640 V (2) 554 V	P
4	Control IC Voltage Test	U 1 Rated： TDA4863G 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℃	(1) 17.28 V (2) 12.23~12.32 V (3) 17.3 V	P

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P： 3.75 KVAC/min I/P-FG： 1.88 KVAC/min O/P-FG： 0.5 KVAC/min	I/P-O/P： 4KVAC/min I/P-FG： 2.256 KVAC/min O/P-FG： 0.6 KVAC/min Ta：25℃	I/P-O/P： 3.57 mA I/P-FG： 3.18 mA O/P-FG： 1.42 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℃/70%RH	I/P-O/P： 30 GΩ I/P-FG： 30 GΩ O/P-FG： 30 GΩ NO DAMAGE	P

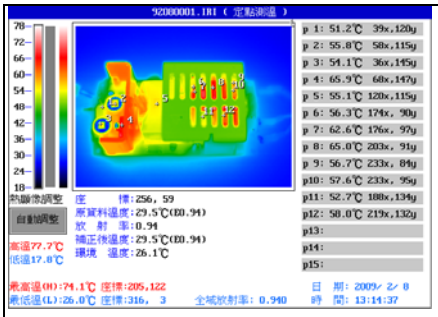
E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASSC	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	PASS	P
2	CONDUCTION	EN55015 CLASS B	I/P： 230 VAC (50HZ) O/P：FULL/50% LOAD Ta：25℃	PASS Test by certified Lab	P
3	RADIATION	EN55015 CLASS B	I/P： 230 VAC (50HZ) O/P：FULL LOAD Ta：25℃	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR：8KV / Contact：4KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT： 1KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N ：1KV L,N-PE：2KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	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:PLP-45-12			P



	Position	P/N	Temp	VERDICT
P1	LF100	TR895-R1	51.2℃	PASS
P2	C105	2200u/16V	55.8℃	PASS
P3	C106	2200u/16V	54.1℃	PASS
P4	D100	FMEN-2308	65.9℃	PASS
P5	T1	TF2013-R1	55.1℃	PASS
P6	Q1	TK10B60D	56.3℃	PASS
P7	D2	GP20K	62.6℃	PASS
P8	L1	TR853	65.0℃	PASS
P9	C8	224/450V	56.7℃	PASS
P10	C7	224/450V	57.6℃	PASS
P11	C51	100u/25V	52.7℃	PASS
P12	LF2	LF159	58.0℃	PASS

2 TEMPERATURE RISE TEST — P

MODEL ： PLP-45-24

1. ROOM AMBIENT BURN-IN ：6 HRS
   I/P ： 230VAC O/P ： FULL LOAD Ta= 26.3 ℃
2. HIGH AMBIENT BURN-IN ： 2 HRS
   I/P ： 230VAC O/P ： FULL LOAD Ta= 62.6 ℃

NO	Position	P/N	ROOM AMBIENT Ta= 26.3 ℃	HIGH AMBIENT Ta= 62.6 ℃
1	LF2	LF159 UT-20V 0.42A	47.5℃	81.5℃
2	C51	100u/25V UL10Kh 6.3*11 YXM	55.0℃	86.6℃
3	T1	TF1883-R1 PQ32	58.5℃	89.7℃
4	C106	1000u/35V UL10Kh 12.5*20 KY	50.8℃	82.2℃
5	Q1	TK10B60D 10A/600V	55.6℃	88.0℃
6	D100	BYV32E-200 20A/200V TO220	58.1℃	89.3℃
7	C101	47u/25V L5Kh 5*11 KY	45.1℃	77.1℃
8	L1	TR853 T60-26 320u	58.0℃	90.9℃
9	BD1	4A/800V SILICON US4KB80R-7000	60.0℃	93.0℃
10	C8	224/450V 10% P=10 MMX	55.2℃	88.4℃
11	D2	HER206 2A/600V T-52mm	73.8℃	105.5℃
12	U1	TDA4863G	61.3℃	91.0℃
13	C1	474/275VAC 20%	37.0℃	73.0℃

3	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P ： 230 VAC O/P ： O/P SHORT Ta ： 25℃	TEST ： OK	P
4	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P ： 264VAC/100VAC O/P ： LED=23V Ta= -35 ℃	TEST ： OK	P
5	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 62.6 ℃ NO DAMAGE	I/P ： 272 VAC O/P ： LED=23V Ta= 62.6 ℃ HUMIDITY= 95 %R.H	TEST ： OK	P

6	TEMPERATURE COEFFICIENT	± 0.03 %(0~50℃)	I/P： 230 VAC O/P：FULL LOAD	± 0.02 %(0~50℃)	P
7	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature： -45℃~ +90℃ 2. Temperature change rate ：25℃ / 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： -35℃~ +65℃ 2. Temperature change rate ：25℃ / 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	P
9	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℃		TEST：OK	P
10	CAPACITOR LIFE CYCLE	PLP-45-24:SUPPOSE C106 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta= 60 ℃ LIFE TIME		(1) 566416.5HRS (2) 70363.8HRS	P
11	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE： 586.5K HRS			P

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