



■ Features :

- Universal AC input / Full range(up to 277VAC)
- Built-in constant current limiting circuit with adjustable OCP level
- Fully isolated plastic case
- Protections:Short circuit/Over load/Over voltage/Over temperature
- Built-in active PFC function
- IP64 design for indoor or outdoor installations
- Small and compact size
- Cooling by free air convection
- 100% full load burn-in test
- High reliability,low cost
- Suitable for Damp / wet locations
- Suitable for LED lighting and moving sign applications
- 2 years warranty

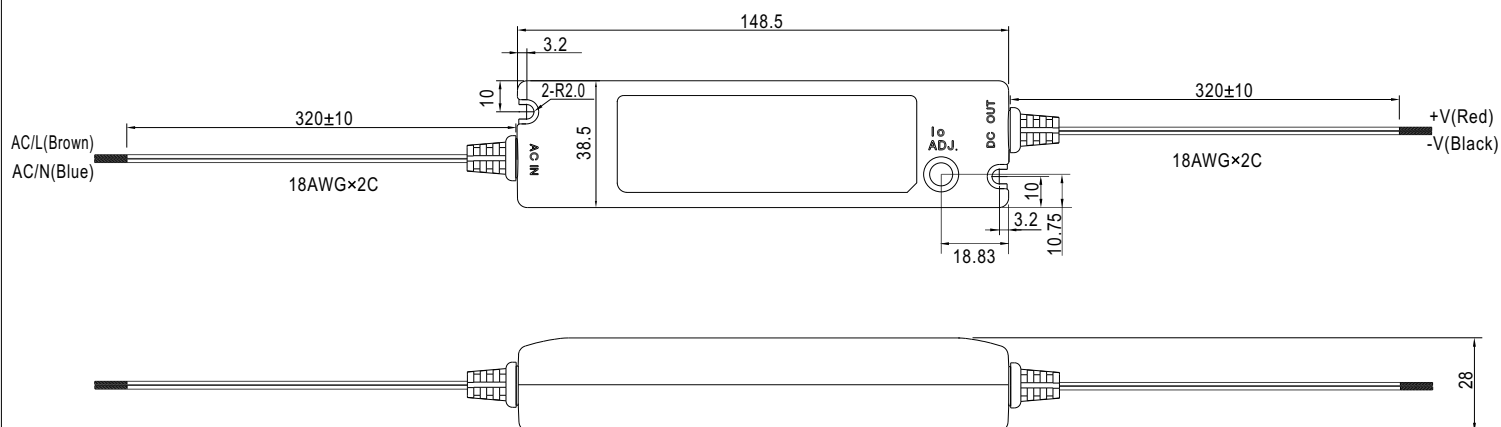


SPECIFICATION

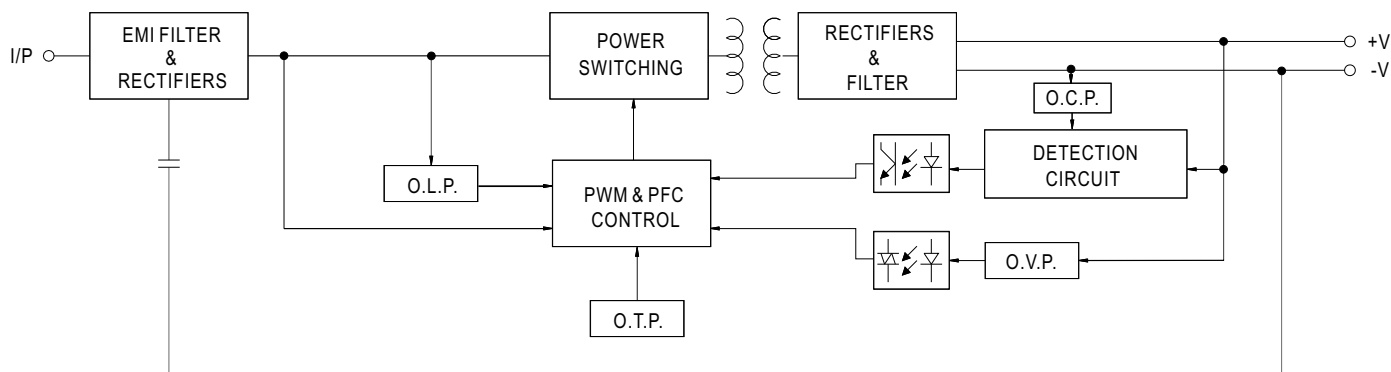
MODEL		PLN-20-12	PLN-20-18	PLN-20-24	PLN-20-36	PLN-20-48
OUTPUT	DC VOLTAGE	12V	18V	24V	36V	48V
	LED OPERATION VOLTAGE Note.5	9 ~ 12V	13.5 ~ 18V	18 ~ 24V	27 ~ 36V	36 ~ 48V
	RATED CURRENT	1.6A	1.1A	0.8A	0.55A	0.42A
	CURRENT RANGE	0 ~ 1.6A	0 ~ 1.1A	0 ~ 0.8A	0 ~ 0.55A	0 ~ 0.42A
	CURRENT ADJ. RANGE	75% ~ 100%				
	RATED POWER	19.2W	19.8W	19.2W	19.8W	20.2W
	RIPPLE & NOISE (max.) Note.2	2.5Vp-p	3.0Vp-p	3.0Vp-p	3.0Vp-p	3.8Vp-p
	VOLTAGE TOLERANCE Note.3	±10%				
	LINE REGULATION	±3.0%				
	LOAD REGULATION	±10%				
	SETUP TIME	2300ms / 230VAC 3000ms / 115VAC at full load				
INPUT	VOLTAGE RANGE Note.4	90 ~ 277VAC 127~392VDC				
	FREQUENCY RANGE	47 ~ 63Hz				
	POWER FACTOR	PF ≧ 0.9 at 75~100% load, 115VAC/230VAC				
	EFFICIENCY(Typ.)	80%	81%	82%	83%	83.5%
	AC CURRENT	0.4A/115VAC 0.2A/230VAC				
	INRUSH CURRENT(max.)	40A/230VAC				
	LEAKAGE CURRENT	0.5mA / 240VAC				
PROTECTION	OVER CURRENT Note.5	95 ~ 110% Protection type : Constant current limiting, recovers automatically after fault condition is removed				
	SHORT CIRCUIT	Hiccup mode, recovers automatically after fault condition is removed.				
	OVER VOLTAGE	14 ~ 16V	19 ~ 22V	27 ~ 34V	41 ~ 46V	54 ~ 60V
		Protection type : Shut off o/p voltage, clamping by zener diode				
	OVER TEMPERATURE	110°C±10°C (TSW1) Protection type : Shut down o/p voltage, recovers automatically after temperature goes down				
ENVIRONMENT	WORKING TEMP.	-30 ~ +60°C (Refer to output load derating curve)				
	WORKING HUMIDITY	20 ~ 90% RH non-condensing				
	STORAGE TEMP., HUMIDITY	-40 ~ +80°C, 10 ~ 95% RH				
	TEMP. COEFFICIENT	±0.06%/°C (0 ~ 50°C)				
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes				
SAFETY & EMC	SAFETY STANDARDS	IEC61347-1, IEC61347-2-13, TUV EN61347-1, EN61347-2-13, UL8750, IP64 approved				
	WITHSTAND VOLTAGE	I/P-O/P:3.75KVAC				
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms/500VDC / 25°C/ 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;EN61547, light industry level, criteria A				
OTHERS	MTBF	643.6Khrs min. MIL-HDBK-217F (25°C)				
	DIMENSION	148.5*38.5*28mm (L*W*H)				
	PACKING	0.18Kg; 60pcs/12.8Kg/0.9CUFT				
NOTE		1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C 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. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. Derating may be needed under low input voltage, please check the static characteristic 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. 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

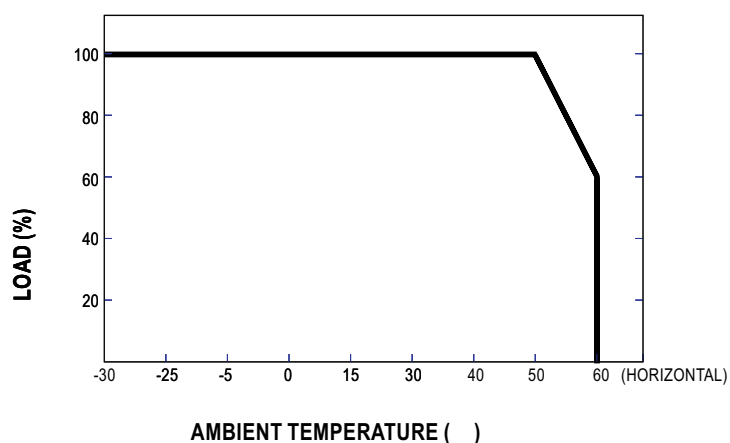
Case No.989B Unit:mm



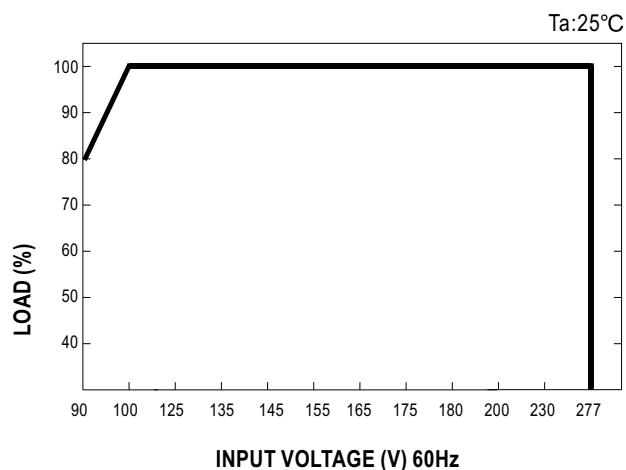
Block Diagram



Derating Curve



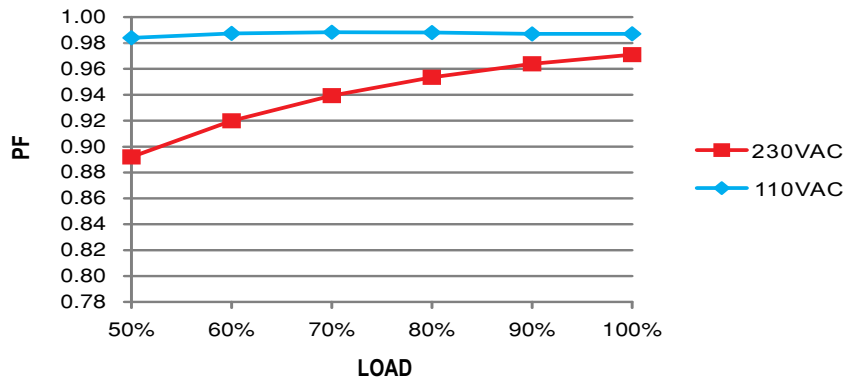
Static Characteristics



Power Factor Characteristic

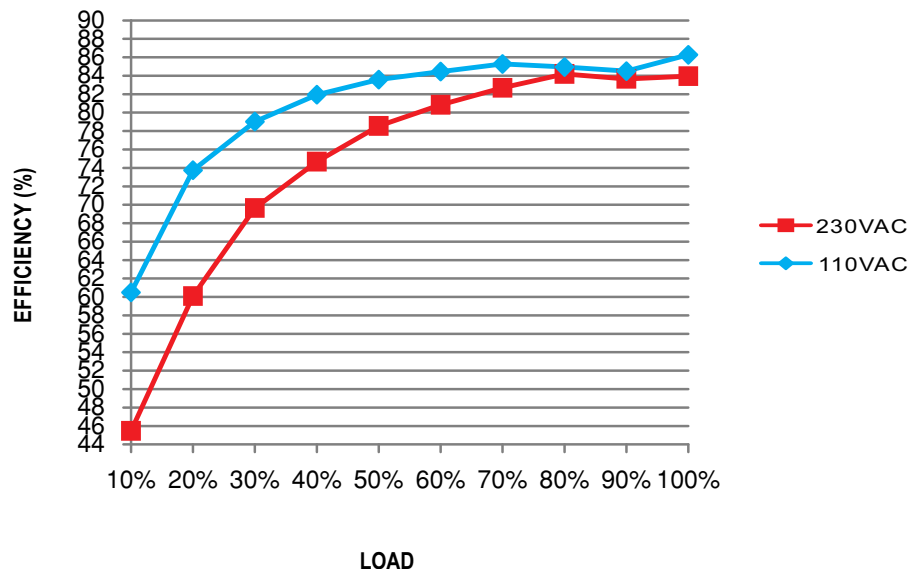
Power factor will be higher than 0.9 when output loading is 75% or higher.

Constant Current Mode



EFFICIENCY vs LOAD (48V Model)

PLN-20 series possess superior working efficiency that up to 83.5% can be reached in field applications.

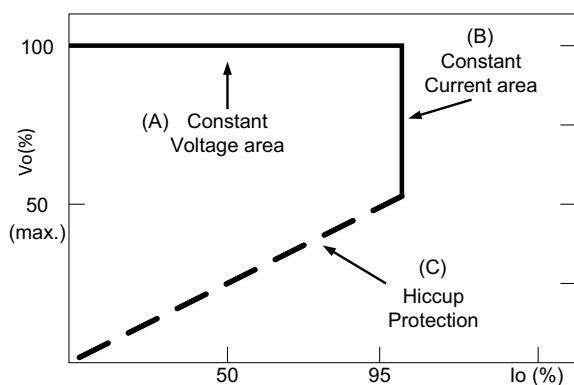


DRIVING METHODS OF LED MODULE

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

MODEL : PLN-20-24

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 3.0 Vp-p (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	V1: 0.85 Vp-p (Max)	PASS
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 0.6A ~ 0.8A	I/P: 230 VAC I/P:115VAC O/P:MIN LOAD Ta:25°C	0.572A~0.842A/230VAC 0.581A~0.847A/115VAC	PASS
3	OUTPUT VOLTAGE TOLERANCE	V1: -10 %~+10 % (Max)	I/P: 100VAC / 277 VAC O/P:FULL/ 0% LOAD Ta:25°C	V1: -5.68%~ +3.46 %	PASS
4	LINE REGULATION	V1: -3 %~ +3 % (Max)	I/P: 100 VAC ~ 277VAC O/P:FULL LOAD Ta:25°C	V1: -0.625 %~ +0.075 %	PASS
5	LOAD REGULATION	V1: -10 %~ +10 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.154 %~ +0.105 %	PASS
6	SET UP TIME	230VAC/ 2300 ms (Max) 115VAC/ 3000 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 667.8 ms 115 VAC/ 1451.1 ms	PASS
7	OVER/UNDERSHOOT TEST	< ±10 %	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: +7.69 % -1.67 %	PASS
8	DYNAMIC LOAD	V1: 3000 mVp-p	I/P: 230 VAC O/P: (1)FULL /Min LOAD 90%DUTY/1KHZ (2)FULL /Min LOAD 50%DUTY/120HZ Ta:25°C	(1) 900 mVp-p (2) 1450 mVp-p	PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90 VAC~ 277 VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	90 V~ 277 V	PASS
			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 ~277 VAC O/P: FULL-MIN LOAD Ta: 25°C	TEST: OK	PASS
3	POWER FACTOR	PF ≥ 0.9 at 75%~100% load 115VAC/230VAC	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	PF= 0.927 / 230VAC 100% PF= 0.984 / 230VAC 100% PF= 0.901 / 230VAC 75% PF= 0.986 / 230VAC 75%	PASS
4	EFFICIENCY	82 % (Typ)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	84.8 %	PASS
5	INPUT CURRENT	230 V/ 0.2 A (Typ) 115 V/ 0.4 A (Typ)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	I = 0.103 A/ 230VAC I = 0.200 A/ 115VAC	PASS
6	INRUSH CURRENT	230 V/ 40 A (Typ) COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 15.5 A/ 230VAC	PASS

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	95%~ 110 % RATED OUTPUT POWER	I/P: 277 VAC I/P: 230 VAC I/P: 100 VAC O/P: TESTING Ta: 25°C	107.5 %/277VAC 107.4 %/ 230VAC 106.7 %/ 100 VAC Hiccup Mode	PASS
2	OVER VOLTAGE PROTECTION	CH1: 27 V~ 34 V	I/P: 230 VAC O/P: MIN LOAD Ta: 25°C	30.4 V/ 230VAC Shut off o/p voltage, clamping by zener diode	PASS
3	OVER TEMPERATURE PROTECTION	SPEC: TSW1= 110 °C ± 10 °C 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: 277 VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup Mode	PASS

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																
1	TEMPERATURE RISE TEST	MODEL : PLN-20-36 1. ROOM AMBIENT BURN-IN : 2 HRS I/P: 230 VAC O/P: 100% LOAD Ta= 28.5 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P: 230 VAC O/P: 100% LOAD Ta= 49.4 °C <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 28.5 °C</th><th>HIGH AMBIENT Ta= 49.4 °C</th></tr><tr><td>1</td><td>BD1</td><td>KBP208G</td><td>57.6°C</td><td>77.3°C</td></tr><tr><td>2</td><td>C8</td><td>224/450V</td><td>63.3°C</td><td>82.4°C</td></tr><tr><td>3</td><td>Q1</td><td>2SK3532</td><td>67.0°C</td><td>85.6°C</td></tr><tr><td>4</td><td>D1</td><td>BYV26EGP</td><td>71.3°C</td><td>89.8°C</td></tr><tr><td>5</td><td>ZD1</td><td>P6KE150A</td><td>78.1°C</td><td>96.1°C</td></tr><tr><td>6</td><td>T1</td><td>TF-6194</td><td>76.5°C</td><td>94.8°C</td></tr><tr><td>7</td><td>D100</td><td>FCF10A40</td><td>66.7°C</td><td>84.6°C</td></tr><tr><td>8</td><td>C16</td><td>100u/35V YXF</td><td>65.6°C</td><td>85.4°C</td></tr><tr><td>9</td><td>C125</td><td>22u/50V YXM</td><td>60.4°C</td><td>79.4°C</td></tr><tr><td>10</td><td>C105</td><td>1000u/50V KY</td><td>55.6°C</td><td>75.0°C</td></tr><tr><td>11</td><td>U1</td><td>L6561D</td><td>64.3°C</td><td>84.4°C</td></tr><tr><td>12</td><td>TSW1</td><td>NTC 220K Ω</td><td>69.1°C</td><td>89.9°C</td></tr><tr><td>13</td><td>CASE</td><td>UP CASE</td><td>49.6°C</td><td>73.0°C</td></tr><tr><td>14</td><td>LF1</td><td>TR-6080</td><td>48.0°C</td><td>68.3°C</td></tr><tr><td>15</td><td>L1</td><td>TR-6065</td><td>59.1°C</td><td>78.9°C</td></tr></table>			NO	Position	P/N	ROOM AMBIENT Ta= 28.5 °C	HIGH AMBIENT Ta= 49.4 °C	1	BD1	KBP208G	57.6°C	77.3°C	2	C8	224/450V	63.3°C	82.4°C	3	Q1	2SK3532	67.0°C	85.6°C	4	D1	BYV26EGP	71.3°C	89.8°C	5	ZD1	P6KE150A	78.1°C	96.1°C	6	T1	TF-6194	76.5°C	94.8°C	7	D100	FCF10A40	66.7°C	84.6°C	8	C16	100u/35V YXF	65.6°C	85.4°C	9	C125	22u/50V YXM	60.4°C	79.4°C	10	C105	1000u/50V KY	55.6°C	75.0°C	11	U1	L6561D	64.3°C	84.4°C	12	TSW1	NTC 220K Ω	69.1°C	89.9°C	13	CASE	UP CASE	49.6°C	73.0°C	14	LF1	TR-6080	48.0°C	68.3°C	15	L1	TR-6065	59.1°C	78.9°C	PASS
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7	D100	FCF10A40	66.7°C	84.6°C																																																																																	
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P: 230 VAC O/P: 108 % LOAD Ta:25°C	TEST : OK	PASS																																																																																
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 VAC O/P: 100 % LOAD Ta= -30 °C	TEST : OK	PASS																																																																																
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P: 277 VAC O/P:FULL LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST : OK	PASS																																																																																
5	TEMPERATURE COEFFICIENT	±0.06 %(0~50°C)	I/P: 230 VAC O/P:FULL LOAD	± 0.022 %(0~50°C)	PASS																																																																																
6	VIBRATION TEST	1 Carton & 1 Set Operating at I/P: VAC NO LOAD (1) Waveform: Sine Wave (2) Frequency:10~500Hz (3) Sweep Time:10min/sweep cycle (4) Acceleration:2G (5) Test Time:1 hour in each axis (X.Y.Z) (6) Ta:25°C		TEST : OK	PASS																																																																																

M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	PLN-20-36: SUPPOSE C 105 IS THE MOST CRITICAL COMPONENT I/P: 230 VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 481176 HRS I/P: 230 VAC O/P:FULL LOAD Ta= 50 °C LIFE TIME= 94341 HRS			PASS
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 643.6K HRS			PASS

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75 KVAC/min EN 60950	I/P-O/P: 4.2 KVAC/min Ta:25°C	I/P-O/P: 1.002 mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25°C	I/P-O/P: >9999 MΩ NO DAMAGE	PASS
3	LEAKAGE CURRENT	< 0.5 mA / 240VAC EN 60950	I/P: 277 VAC O/P:NO LOAD Ta:25°C	L-FG: 0.007 mA N-FG: 0.014 mA	PASS

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230/240/220 VAC/50HZ O/P:100%/75%/50%/25% LOAD Ta:25°C	PASS	PASS
2	CONDUCTION	EN55022 CLASS B	I/P:230 VAC (50HZ) /115V(60HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab	PASS
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC (50HZ)/115V(60HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	PASS
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	PASS
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
7	Test by certified Lab & Test Report Prepare				

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 2SK3532 : 900 V 6 A	I/P:High-Line +3V = 280 V O/P: (1)Full Load Turn on (2)Output Short (3)Dynamic Load 50% Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz Ta:25℃	(1) 602 V (2) 655 V (3) 580 V (4) 594 V	PASS
2	Diode Peak Voltage	D 100 Rated FMX-12SL : 200 V 10 A	I/P:High-Line +3V = 280 V O/P: (1)Full Load Turn on (2)Output Short (3)Dynamic Load 50% Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz Ta:25℃	(1) 147 V (2) 120 V (3) 144 V (4) 147 V	PASS
3	Clamp Diode Peak Voltage	D 1 Rated BYV26EGP : 1000 V 2 A	I/P:High-Line +3V = 280 V O/P: (1)Dynamic Load 50% Load/ Min. Load 90%Duty/1KHz (2)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz Ta:25℃	(1) 520 V (2) 500 V	PASS
4	Control IC Voltage Test	U 1 Rated L6561D : 18 V U 100 Rated AP4310 : 40 V	I/P:High-Line +3V =280 V O/P: (1) Output Short (2)O.L.P (3)O.V.P (4)NO LOAD VR 下限 LOW LINE Ta:25℃	U1 U100 (1) 12.1 V (1) 5.0 V (2) 12.1 V (2) 4.3 V (3) 12.2 V (3) 7.7 V (4) 15.0 V (4) 12.1 V	PASS

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/7/14	RD SAMPLE	PASS	SKY	LIUWY
2010/2/4	PRODUCT SAMPLE (W0911C082)	PASS	SKY	LIUWY

2007/11/26 A50-G058