



■ Features :

- Universal AC input / Full range (up to 305VAC)
- Built-in active PFC function
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- OCP point adjustable through output cable or internal potential meter
- Suitable for LED lighting and moving sign applications
- IP67 / IP65 design for indoor or outdoor installations
- Compliance to worldwide safety regulations for lighting
- Suitable for dry / damp / wet locations
- 5 years warranty (Note.10)



SEL'

IP65

IP67



RL

HLG-240H-12 A Blank : IP67 rated. Cable for I/O connection.

A : IP65 rated. Output voltage and constant current level can be adjusted through internal potential meter.

B : IP67 rated. Constant current level adjustable through output cable.

C : Terminal block for I/O connection. Output voltage and constant current level can be adjusted through internal potential meter.

SPECIFICATION

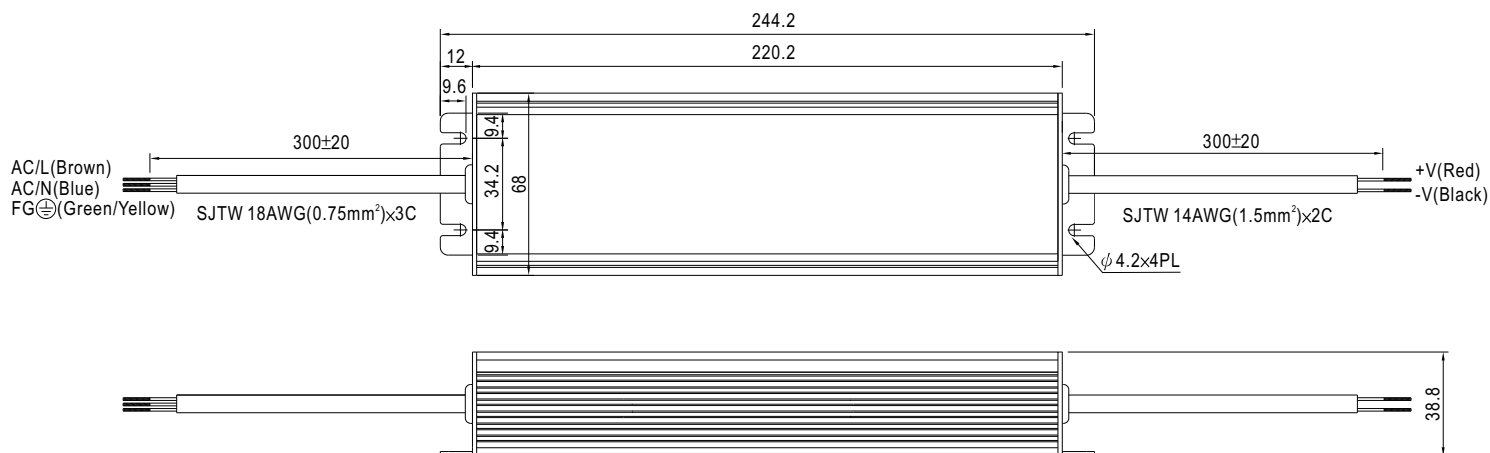
MODEL		HLG-240H-12	HLG-240H-15	HLG-240H-20	HLG-240H-24	HLG-240H-30	HLG-240H-36	HLG-240H-42	HLG-240H-48	HLG-240H-54
OUTPUT	DC VOLTAGE	12V	15V	20V	24V	30V	36V	42V	48V	54V
	CONSTANT CURRENT REGION Note.4	6 ~ 12V	7.5 ~ 15V	10 ~ 20V	12 ~ 24V	15 ~ 30V	18 ~ 36V	21 ~ 42V	24 ~ 48V	27 ~ 54V
	RATED CURRENT	16A	15A	12A	10A	8A	6.7A	5.72A	5A	4.45A
	RATED POWER	192W	225W	240W	240W	240W	241.2W	240.2W	240W	240.3W
	RIPPLE & NOISE (max.) Note.2	150mVp-p	150mVp-p	150mVp-p	150mVp-p	200mVp-p	250mVp-p	250mVp-p	250mVp-p	350mVp-p
	VOLTAGE ADJ. RANGE Note.6	11.2 ~ 12.8V	14 ~ 16V	18.6 ~ 21.4V	22.4 ~ 25.6V	28 ~ 32V	33.5 ~ 38.5V	39 ~ 45V	44.8 ~ 51.2V	50 ~ 57V
	CURRENT ADJ. RANGE	Can be adjusted by internal potential meter or through output cable								
		8 ~ 16A	7.5 ~ 15A	6 ~ 12A	5 ~ 10A	4 ~ 8A	3.3 ~ 6.7A	2.86 ~ 5.72A	2.5 ~ 5A	2.23 ~ 4.45A
	VOLTAGE TOLERANCE Note.3	±2.5%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
LOAD REGULATION Note.8	±2.0%	±1.5%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	
SETUP, RISE TIME Note.9	2500ms, 80ms at full load 230VAC /115VAC									
HOLD UP TIME (Typ.)	15ms at full load 230VAC /115VAC									
INPUT	VOLTAGE RANGE Note.5	90 ~ 305VAC		127 ~ 431VDC						
	FREQUENCY RANGE	47 ~ 63Hz								
	POWER FACTOR	PF0.95/230VAC		PF ≥ 0.98/115VAC at full load and rated output voltage				PF ≥ 0.9 at 65 ~ 100% load		
	EFFICIENCY (Typ.)	90%	90%	92%	93%	93%	93%	93%	93.5%	94%
	AC CURRENT	4A / 115VAC		2A / 230VAC						
	INRUSH CURRENT(Typ.)	COLD START 75A/230VAC								
LEAKAGE CURRENT	<0.75mA / 277VAC									
PROTECTION	OVER CURRENT Note.4	95 ~ 108% 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	15.5 ~ 18V 16.5 ~ 19.5V 22 ~ 26V 26 ~ 33V 32.5 ~ 36.5V 40 ~ 48V 46 ~ 50V 53 ~ 62V 59 ~ 65V Protection type : Shut down and latch off o/p voltage, re-power on to recover								
	OVER TEMPERATURE	105℃ ±5℃ (TSW1)		95℃ ±5℃ (TSW1)						
		Protection type : Shut down o/p voltage, recovers automatically after temperature goes down								
ENVIRONMENT	WORKING TEMP.	-40 ~ +60℃ @ full load ; +70℃ @ 60% load (Refer to 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, 5G 12min./1cycle, period for 72min. each along X, Y, Z axes								
SAFETY & EMC	SAFETY STANDARDS Note.7	UL1012, TUV EN61347-1, EN61347-2-13 independent (except for HLG-240H C type), UL60950-1, UL8750, TUV EN60950-1, IP65 or IP67 approved								
	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, EN55022 (CISPR22) Class B								
	HARMONIC CURRENT	Compliance to EN61000-3-2 Class C (≥ 50% load) ; EN61000-3-3								
	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN61547, EN55024, heavy industry level (surge 4KV), criteria A								
OTHERS	MTBF	207.9Khrs min. MIL-HDBK-217F (25℃)								
	DIMENSION	244.2*68*38.8mm (L*W*H)(HLG-240H-Blank/A/B) 251*68*38.8mm (L*W*H)(HLG-240H-C)								
	PACKING	1.3Kg; 12pcs/16.6Kg/0.74CUFT (HLG-240-Blank/A/B) 1.23Kg; 12pcs/15.8Kg/1.16CUFT (HLG-240-C)								
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. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. Constant current operation region is within 50% ~ 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. 5. Derating may be needed under low input voltages. Please check the static characteristics for more details. 6. Type A and type C only. 7. Safety and EMC design refer to EN60598-1, subject 8750(UL), CNS15233, GB7000.1, FCC part18. 8. Length of set up time is measured at cold first start. Turning ON/OFF the power supply may lead to increase of the set up time. 9. 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. 10. Refer to warranty statement.									

Mechanical Specification

Case No.994C

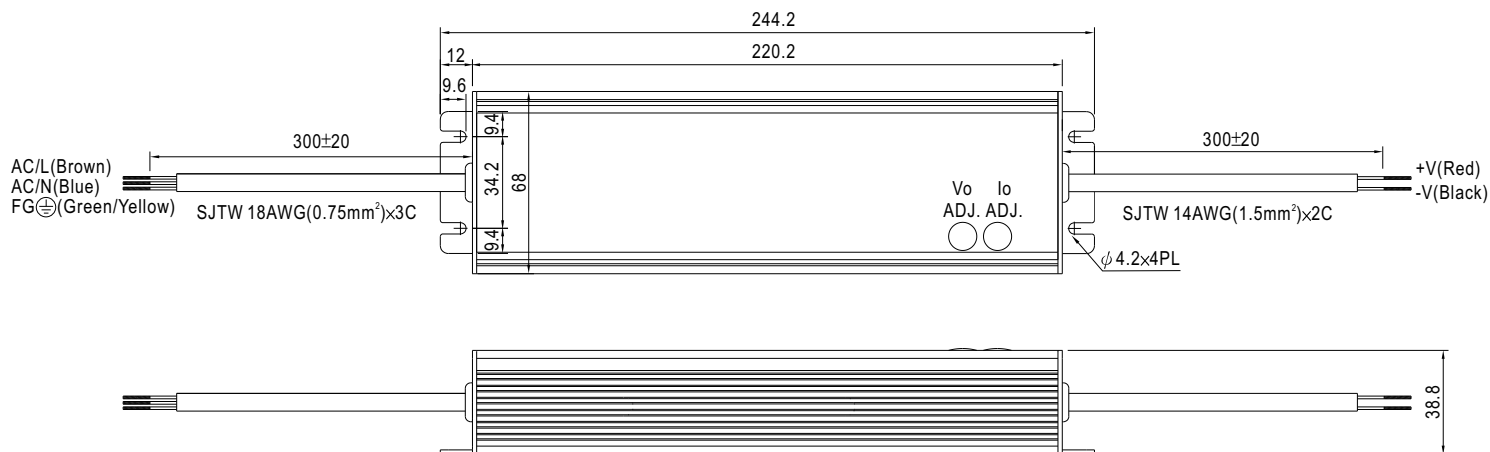
Unit:mm

Blank:(HLG-240H)



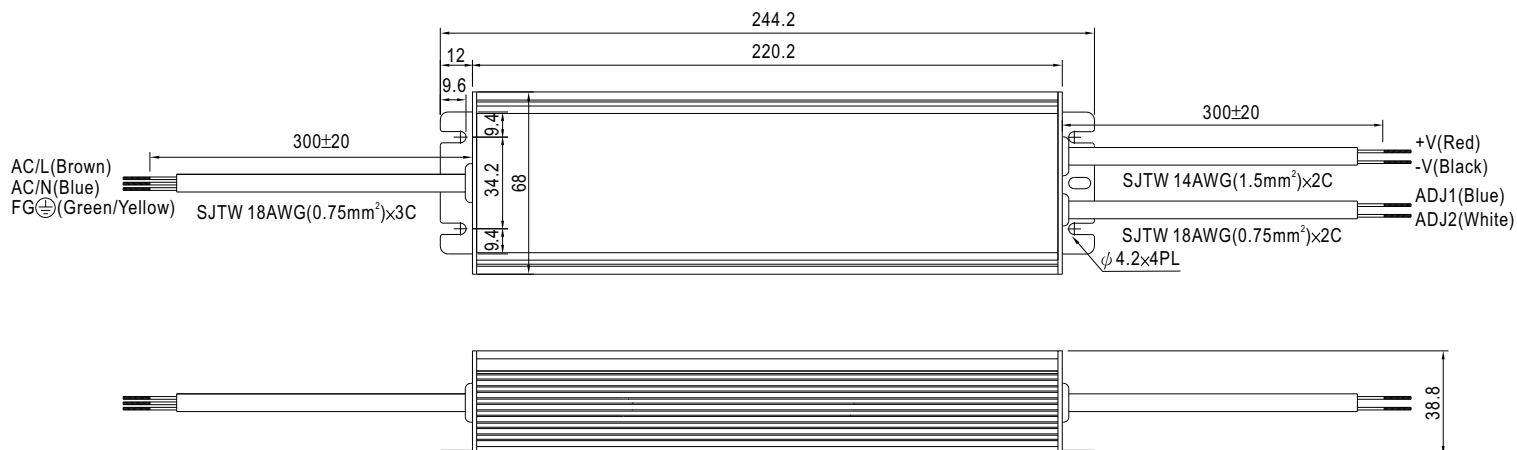
※IP67 rated. Cable for I/O connection.

A Type:(HLG-240H-_A)



※ IP65 rated. Output voltage and constant current level can be adjusted through internal potential meter.
(Can access by removing the rubber stopper on the case.)

B Type:(HLG-240H-_B)

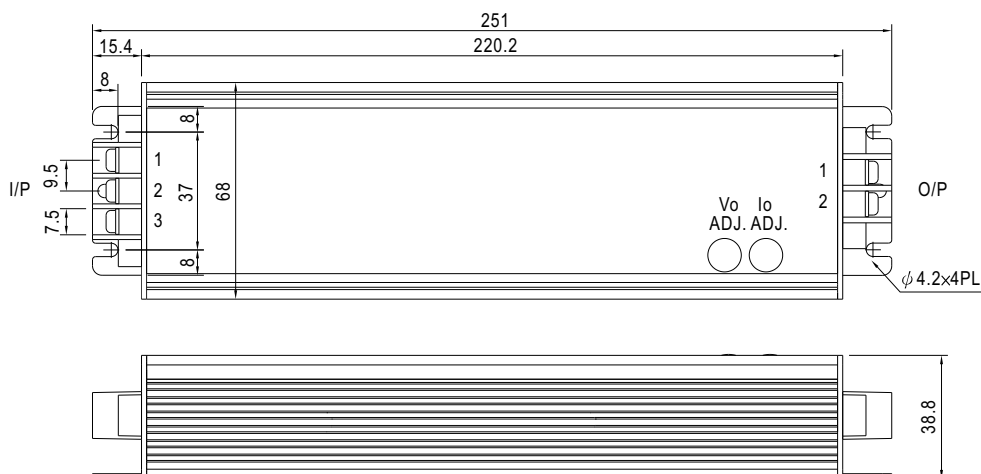


※ IP67 rated. Output constant current level can be adjusted through output cable by connecting a resistor between ADJ1 and ADJ2.

※ Reference resistance value for output current adjustment (Typical)

Percentage of rated current \ Model	12V	15V	20V	24V	30V	36V	42V	48V	54V
Slightly > 100%	Open	Open	Open	Open	Open	Open	Open	Open	Open
75%	680 Ω	560 Ω	680 Ω	510 Ω	820 Ω	1.8K Ω	680 Ω	620 Ω	820 Ω
50%	120 Ω	47 Ω	91 Ω	51 Ω	120 Ω	500 Ω	82 Ω	68 Ω	150 Ω
Slightly < 50%	Short	Short	Short	Short	Short	Short	Short	Short	Short

C Type:(HLG-240H-_C)



AC Input Terminal Pin No. Assignment

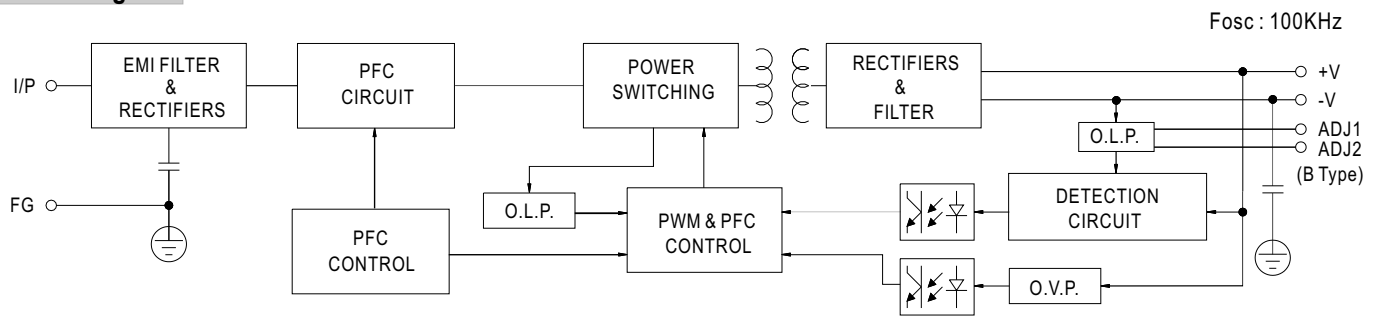
Pin No.	Assignment
1	FG $\perp$
2	AC/L
3	AC/N

DC Output Terminal Pin No. Assignment

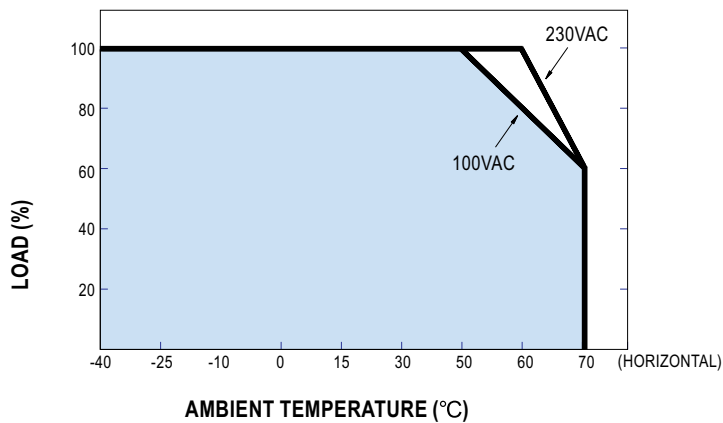
Pin No.	Assignment
1	-V
2	+V

※ Output voltage and constant current level can be adjusted through internal potential meter.
(Can access by removing the rubber stopper on the case.)

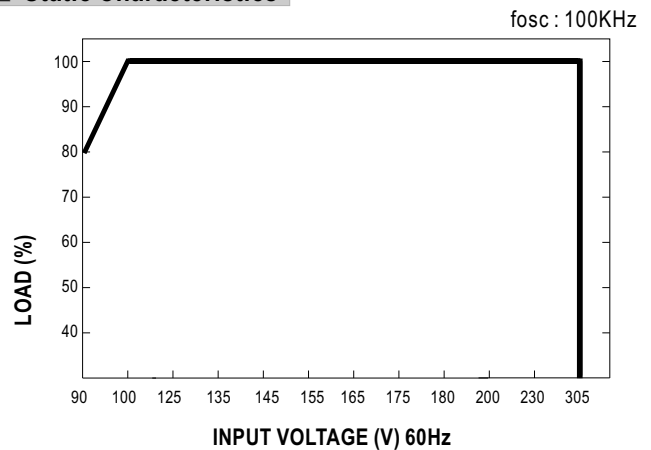
Block Diagram



Derating Curve



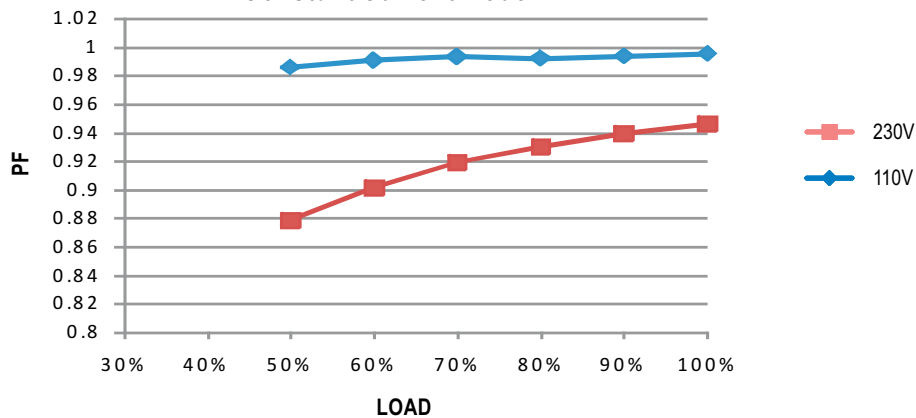
Static Characteristics



Power Factor Characteristic

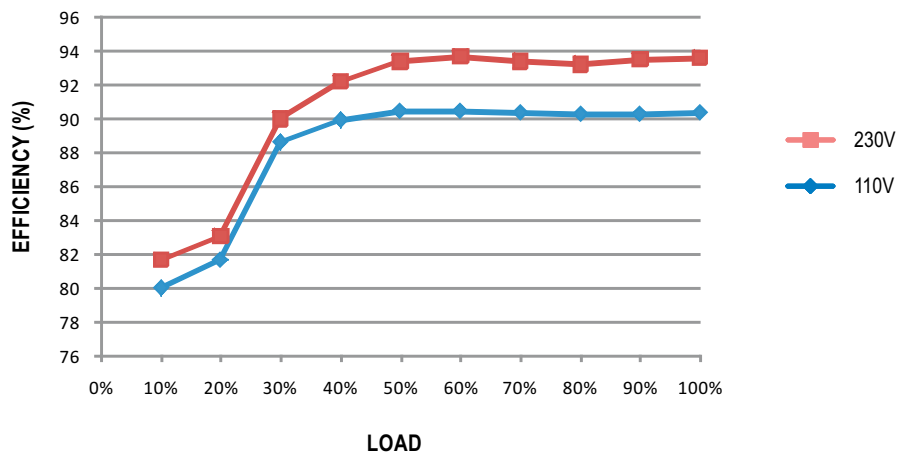
Power factor will be higher than 0.9 when output loading is 65% or higher.

Constant Current Mode



EFFICIENCY vs LOAD (48V Model)

HLG-240H series possess superior working efficiency that up to 93.5% can be reached in field applications.

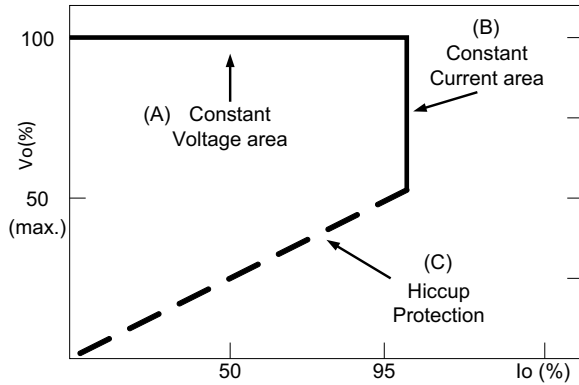


DRIVING METHODS OF LED MODULE

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)).

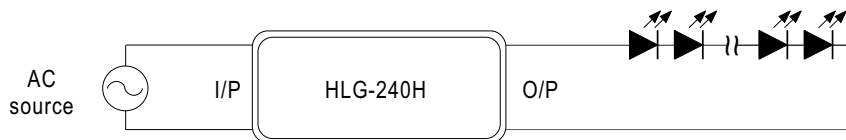


Typical LED power supply I-V curve

Direct driving :

Under direct driving, the power supply will work in "constant current mode (CC)" and output voltage of the power supply will be clamped by sum of forward voltage (V_F) of the LED strip.

The total forward voltage of series connecting LEDs is suggested for 75%~95% of power supply rated output voltage due to concern of the best PF value and efficiency.

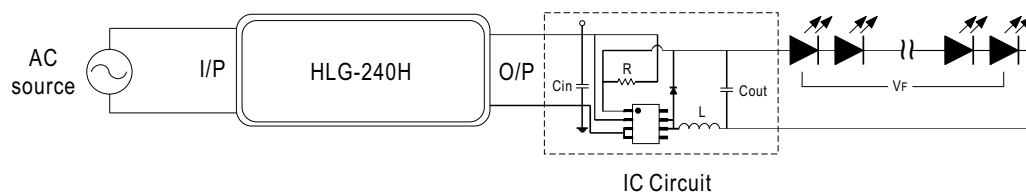


With LED driver :

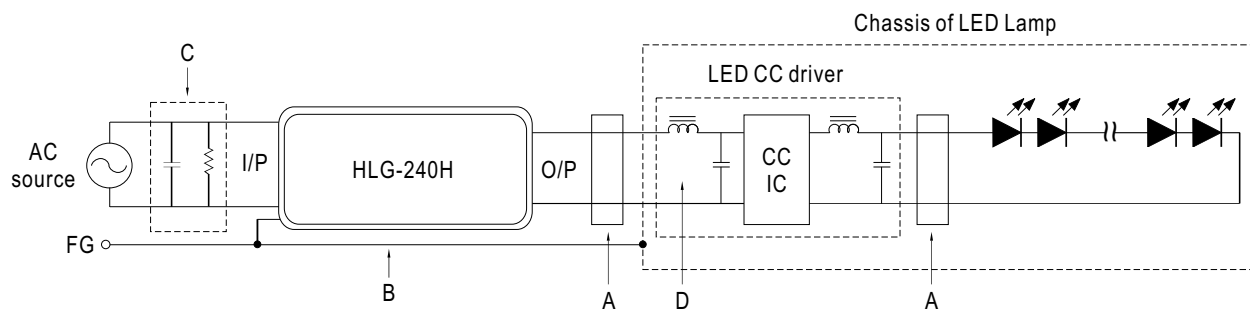
Using additional driver, the power supply will work in "constant voltage mode (CV)" and output voltage of the power supply will be kept in rated value. In this drive mode, several design issues need to be considered:

1. Output voltage of PSU must be higher than total forward voltage of series connecting LEDs by 3V minimum.
2. Input capacitor (C_{in}) of LED driver circuit should use 2.2uF ~ 22uF (typ.) of rating depends on the operating frequency of the LED driver.

The higher the operating frequency is used, the smaller value of C_{in} should be chosen, and vice versa.



EMI DEBUG SUGGESTION

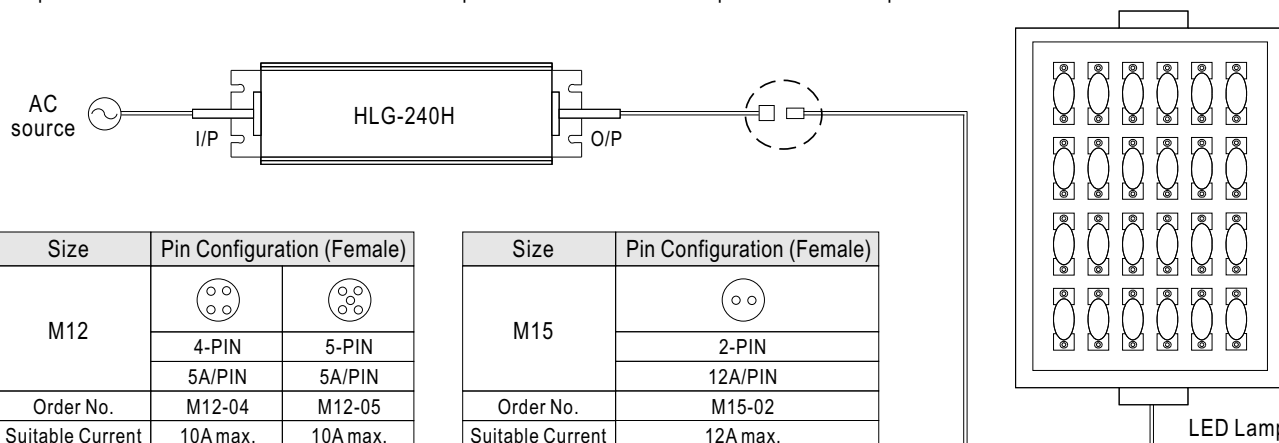


- A. Add a common mode ferrite choke on output wires to reduce the common emission between 10M ~ 300MHz per lighting EMI regulation.
- B. Chassis of LED lamp and chassis of HLG-240H or the FG wire should be connected to the safety ground to reduce the EMI noise, including the conduction and radiation emission.
- C. The additional X-Cap and discharge resistor can reduce the low frequency conduction noise between 9K ~ 1MHz per lighting EMI regulation.
- D. L-C filter should be added at the DC input of LED constant current driver to avoid the differential emission and high frequency noise generated by the CC driver.

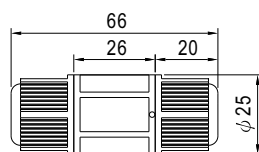
WATERPROOF CONNECTION

Waterproof connector

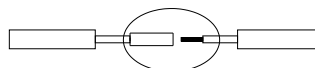
Waterproof connector can be assembled on the output cable of HLG-240H to operate in wet/damp or outdoor environment.



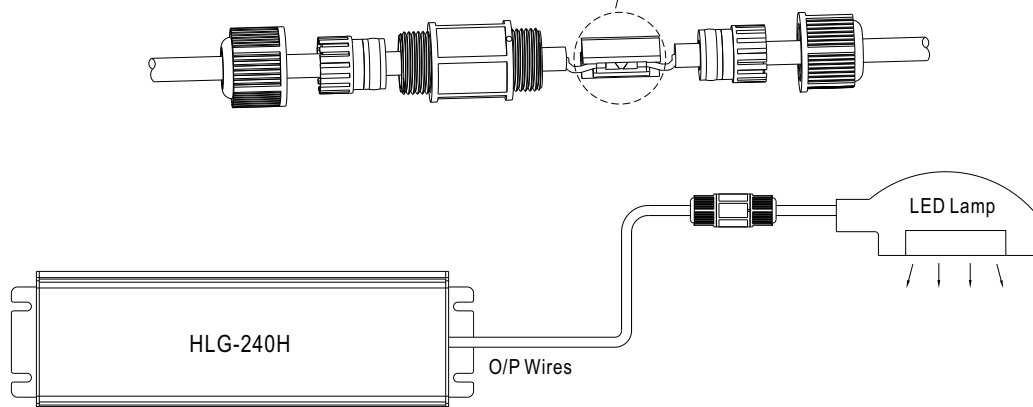
Cable Joiner



Suitable for 14AWG~22AWG



Up to four wires can be connected through this cable joiner by soldering or clamping by tools.





Test Report: HLG-240H-36

240W Single Output Switching Power Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Other Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 250 mVp-p (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	V1: 40 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 33.5V~ 38.5 V	I/P: 230 VAC I/P:115VAC O/P:MIN LOAD Ta:25°C	31.36V~39.3 V /230VAC 31.37V~39.31 V/115VAC	P
3	CURRENT ADJ RANGE	3.3 A~ 6.7A	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	0.51A~6.92 A	P
4	CONSTANT CURRENT REGION	18V~36V	I/P: 230 VAC O/P:CV MODE Ta:25°C	O/P=18V: 6.88 A O/P=35V: 6.79 A	P
5	OUTPUT VOLTAGE TOLERANCE	V1: -1 % ~ 1 % (Max)	I/P: 100 VAC /264VAC O/P:FULL/ 0 % LOAD Ta:25°C	V1: 0.16 %~-0.16 %	P
6	LINE REGULATION	V1: - 0.5% ~ 0.5 % (Max)	I/P:100 VAC ~264 VAC O/P:FULL LOAD Ta:25°C	V1: 0 %~ 0 %	P
7	LOAD REGULATION	V1: - 0.5% ~ 0.5 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.16 %~-0.16 %	P
8	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/ 1636 ms 115 VAC/ 1636 ms	P
9	RISE TIME	230VAC/ 80 ms (Max) 115VAC/ 80 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 29 ms 115 VAC/ 30 ms	P
10	HOLD UP TIME	230VAC/ 12 ms (Typ) 115VAC/ 12 ms (Typ)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 23 ms 115 VAC/ 23 ms	P
11	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST:< 5 %	P
12	DYNAMIC LOAD	V1: 3600 mVp-p	I/P: 230 VAC O/P:(1)FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C	424mVp-p	P

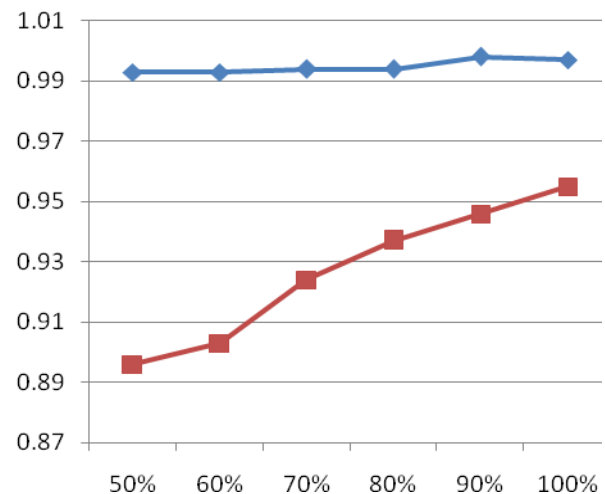
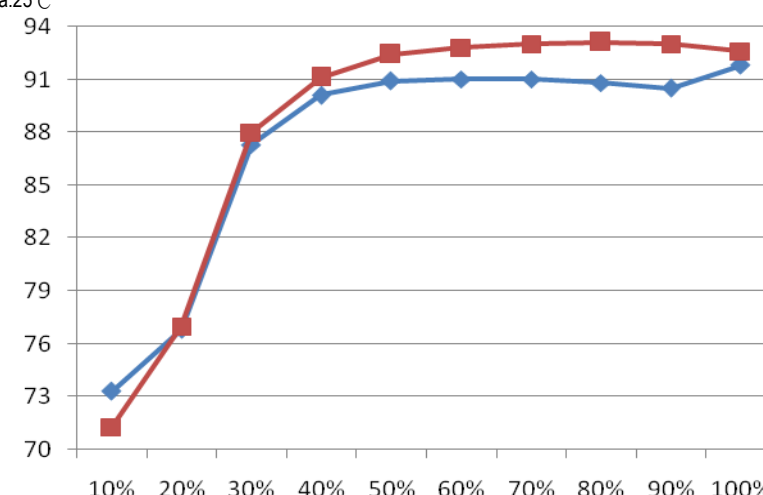
INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	67V~264V	P
			I/P: (1) LOW-LINE=3V=87 V (2) HIGH-LINE=264 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: 100 VAC ~264VAC O/P: FULL~MIN LOAD Ta: 25°C	OK	P
3	POWER FACTOR	0.95/ 230 VAC FULL LOAD (TYP) 0.98/ 115 VAC FULL LOAD (TYP) 0.9/ 230 VAC 65% LOAD (TYP) 0.9/ 115 VAC 65%LOAD (TYP)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD / 65% LOAD Ta: 25°C	PF=0.957 /230V/100%LOAD PF= 1 /115V/100%LOAD PF=0.912 /230V/65%LOAD PF=0.994 /115V/65%LOAD	P
4	EFFICIENCY	93% (TYP)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	94.1 %	P
5	INPUT CURRENT	230 V/ 2 A (Typ) 115 V/ 4 A (Typ)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	I =1.16 A/ 230VAC I =2.28 A/ 115VAC	P
6	INRUSH CURRENT	230 V/ 75A (Typ) COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 56 A/ 230VAC	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	95 %~108 %	I/P: 264 VAC I/P: 230 VAC I/P: 100 VAC O/P: TESTING Ta: 25°C	102%/264VAC 102%/ 230VAC 102%/100VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	V1: 40 V~ 48V	I/P: 264 VAC I/P: 230 VAC I/P: 90 VAC O/P: MIN LOAD Ta: 25°C	43.02V/264VAC 43.1V/ 230VAC 43.11V/ 90VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: TSW1: 105±5°C O.T.P. NO DAMAGE	I/P: 230 VAC O/P: FULL LOAD	O.T.P. Active Shut down o/p volotage , recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup Mode	P

OTHER TEST

NO	TEST ITEM	RESULT
1	POWER FACTOR CHARACTERISTIC CONSTANT CURRENT MODE	CONSTANT CURRENT MODE I/P:230V/110V O/P:100/90/80/70/60/50% LOAD Ta:25°C  BLUE WIRE=110V ; RED WIRE=230V
2	EFFICIENCY VS LOAD	I/P:230V/110V O/P:100/90/80/70/60/50/40/30/20/10% LOAD Ta:25°C  BLUE WIRE=110V ; RED WIRE=230V

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q4 Rated STF21NM60N 17A/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) 458 V (2) 452 V (3) 454 V	P
2	Diode Peak Voltage	Q101 Rated IRF3415 43A/150V	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) 119 V (2) 83 V (3) 38.8 V	P
		Q102 Rated IRF3415 43A/150V	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) 150 V (2) 88 V (3) 48.4 V	
3	Input Capacitor Voltage	C5 Rated: NCC: 150μ/450 V/105°C/PAG Series	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) 428.6 V (2) 430.6 V (3) 431 V	P
4	Control IC Voltage Test	U 70 Rated L6599AD : 8.85V~16 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) 13.07 V (2) 12.69 V (3) 12.66 V	P
5	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated SPW20N60C3 20.7A/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) 520 V (2) 474 V (3) 518 V	P

SAFETY & EMC TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	IEC60950-1 I/P-O/P: 3.75KVAC/min<10mA I/P-FG:1.88 KVAC/min<10mA O/P-FG:1.5KVAC/min<10mA	I/P-O/P: 4 KVAC/min I/P-FG: 2.256KVAC/min O/P-FG: 1.8 KVAC/min Ta:25°C	I/P-O/P: 4.69 mA I/P-FG: 4.2 mA O/P-FG: 5.21 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	I/P-O/P: 28.8 GΩ I/P-FG: 20.8 GΩ O/P-FG: 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	IEC60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	13 mΩ	P
4	LEAKAGE CURRENT	IEC60950-1 < 0.75 mA / 277VAC	I/P: 280 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.3 mA N-FG: 0.3 mA	P
5	APPROVAL	TUV: Certificate NO : R50171244 UL: File NO : E127738			P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS C CLASS D	I/P: 240VAC/50HZ LOAD:LED/ELECTRONIC LOAD O/P:100%/50% LOAD Ta:25°C	PASS	P
2	CONDUCTION	EN55022 EN55015 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 EN55015 CLASS B	I/P: 230 VAC (50HZ) 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

Reliability Test

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																	
1.	THERMO TRACER TEST Before potted (ROOM AMBIENT)	MODEL:HLG-240H-24 94020001.101 (定點測溫) 58 55 51 47 44 40 37 33 30 26 23 20.94 26.94 28.94 30.94 32.94 34.94 36.94 38.94 40.94 42.94 44.94 46.94 48.94 50.94 52.94 54.94 56.94 58.94 熱像儀調整 座 標: 216, 9 自動調整 廠資料溫度: 40.4℃(E0.94) 放射率: 0.94 修正後溫度: 40.4℃(E0.94) 高溫50.1℃ 低溫22.5℃ 最高溫(H): 53.9℃ 座標: 95.152 最低溫(L): 26.7℃ 座標: 9.239 全域放射率: 0.940 日 期: 2009/ 4/ 2 時 間: 17: 3:53 p 1: 47.8℃ 8x,118u p 2: 50.4℃ 56x, 93u p 3: 53.1℃ 111x,144u p 4: 45.9℃ 269x,124u p 5: 51.2℃ 301x,149u p 6: 50.7℃ 283x, 72u p 7: 51.9℃ 275x,152u p 8: p 9: p10: p11: p12: p13: p14: p15: <table><tr><th></th><th>Position</th><th>P/N</th><th>Temp</th><th>VERDICT</th></tr><tr><td>P1</td><td>I/P</td><td>CASE AC I/P</td><td>47.8℃</td><td>PASS</td></tr><tr><td>P2</td><td>CASE</td><td>UP CASE</td><td>50.4℃</td><td>PASS</td></tr><tr><td>P3</td><td>CASE</td><td>SIDE CASE</td><td>53.1℃</td><td>PASS</td></tr><tr><td>P4</td><td>O/P</td><td>CASE DC O/P</td><td>45.9℃</td><td>PASS</td></tr><tr><td>P5</td><td>O/P</td><td>CASE DCO/P</td><td>51.2℃</td><td>PASS</td></tr><tr><td>P6</td><td>O/P</td><td>CASE DCO/P</td><td>50.7℃</td><td>PASS</td></tr><tr><td>P7</td><td>O/P</td><td>CASE DCO/P</td><td>51.9℃</td><td>PASS</td></tr><tr><td>P8</td><td></td><td></td><td></td><td></td></tr><tr><td>P9</td><td></td><td></td><td></td><td></td></tr><tr><td>P10</td><td></td><td></td><td></td><td></td></tr><tr><td>P11</td><td></td><td></td><td></td><td></td></tr><tr><td>P12</td><td></td><td></td><td></td><td></td></tr><tr><td>P13</td><td></td><td></td><td></td><td></td></tr><tr><td>P14</td><td></td><td></td><td></td><td></td></tr><tr><td>P15</td><td></td><td></td><td></td><td></td></tr></table>					Position	P/N	Temp	VERDICT	P1	I/P	CASE AC I/P	47.8℃	PASS	P2	CASE	UP CASE	50.4℃	PASS	P3	CASE	SIDE CASE	53.1℃	PASS	P4	O/P	CASE DC O/P	45.9℃	PASS	P5	O/P	CASE DCO/P	51.2℃	PASS	P6	O/P	CASE DCO/P	50.7℃	PASS	P7	O/P	CASE DCO/P	51.9℃	PASS	P8					P9					P10					P11					P12					P13					P14					P15					P
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2	TEMPERATURE RISE TEST	MODEL : HLG-240H-24 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 26.5 °C 2. HIGH AMBIENT BURN-IN : 12 HRS I/P : 230VAC O/P : FULL LOAD Ta= 61.7 °C <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 26.5 °C</th><th>HIGH AMBIENT Ta= 61.7 °C</th></tr><tr><td>1</td><td>LF1</td><td>TR688-R4</td><td>64.0℃</td><td>91.1℃</td></tr><tr><td>2</td><td>C1</td><td>684/275VAC 20% P=15 R.46</td><td>61.3℃</td><td>89.3℃</td></tr><tr><td>3</td><td>LF2</td><td>TR827-R1 R-16x12x8C</td><td>63.4℃</td><td>91.2℃</td></tr><tr><td>4</td><td>BD1</td><td>10A/800V SILICON US10KB80R</td><td>64.0℃</td><td>92.7℃</td></tr><tr><td>5</td><td>L2</td><td>TR892 CS-17212 142u GS220</td><td>62.7℃</td><td>90.9℃</td></tr><tr><td>6</td><td>L1</td><td>DT TF1940 QP-3325 CLG-240</td><td>61.5℃</td><td>89.9℃</td></tr><tr><td>7</td><td>Q1</td><td>SPW20N60C3 20.7A/600V TO247</td><td>64.7℃</td><td>93.2℃</td></tr><tr><td>8</td><td>U1</td><td>NCP1605DR2G SOIC-16</td><td>61.5℃</td><td>90.2℃</td></tr><tr><td>9</td><td>TSW1</td><td>ST-22W-R0 105℃ 60mm</td><td>64.1℃</td><td>92.7℃</td></tr><tr><td>10</td><td>Q3</td><td>STF21NM60N 17A/600V TO220 FP</td><td>65.1℃</td><td>93.3℃</td></tr><tr><td>11</td><td>T1</td><td>TF1944 LP-3925 CLG-240-24 B</td><td>79.0℃</td><td>106.6℃</td></tr><tr><td>12</td><td>Q101</td><td>IRFB3607PBF 80A/75V</td><td>69.6℃</td><td>98.3℃</td></tr><tr><td>13</td><td>C102</td><td>1000u/35V UL10Kh 12.5*20 ZLH</td><td>66.5℃</td><td>94.9℃</td></tr><tr><td>14</td><td>LF101</td><td>TR847-R2 T14x8x7(A07)</td><td>71.8℃</td><td>100.1℃</td></tr><tr><td>15</td><td>CASE</td><td>UP CASE</td><td>54.7℃</td><td>85.7℃</td></tr></table>				NO	Position	P/N	ROOM AMBIENT Ta= 26.5 °C	HIGH AMBIENT Ta= 61.7 °C	1	LF1	TR688-R4	64.0℃	91.1℃	2	C1	684/275VAC 20% P=15 R.46	61.3℃	89.3℃	3	LF2	TR827-R1 R-16x12x8C	63.4℃	91.2℃	4	BD1	10A/800V SILICON US10KB80R	64.0℃	92.7℃	5	L2	TR892 CS-17212 142u GS220	62.7℃	90.9℃	6	L1	DT TF1940 QP-3325 CLG-240	61.5℃	89.9℃	7	Q1	SPW20N60C3 20.7A/600V TO247	64.7℃	93.2℃	8	U1	NCP1605DR2G SOIC-16	61.5℃	90.2℃	9	TSW1	ST-22W-R0 105℃ 60mm	64.1℃	92.7℃	10	Q3	STF21NM60N 17A/600V TO220 FP	65.1℃	93.3℃	11	T1	TF1944 LP-3925 CLG-240-24 B	79.0℃	106.6℃	12	Q101	IRFB3607PBF 80A/75V	69.6℃	98.3℃	13	C102	1000u/35V UL10Kh 12.5*20 ZLH	66.5℃	94.9℃	14	LF101	TR847-R2 T14x8x7(A07)	71.8℃	100.1℃	15	CASE	UP CASE	54.7℃	85.7℃	P
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3	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : O/P SHORT TEST Ta : 25℃	TEST : OK	P																																																																																	
4	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 230 VAC/100VAC O/P : CV=23V Ta= -35 °C	TEST : OK	P																																																																																	
5	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C NO DAMAGE	I/P : 264 VAC O/P : CV=23V Ta= 61.7 °C HUMIDITY= 95 %R.H	TEST : OK	P																																																																																	

6	TEMPERATURE COEFFICIENT	$\pm 0.03\%$ (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	$\pm 0.003\%$ (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 : -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	P
9	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	P
10	CAPACITOR LIFE CYCLE	HLG-240H-24:SUPPOSE C102 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) 196640 HRS (2) 27898.3 HRS	P
11	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 207.9K HRS			P
12	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure : Above 50,000 hours @ Tcase 70°C			P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2009/7/31	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/9/29	PRODUCT SAMPLE W0907E29	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023