



Shenzhen Hi-Link Electronic Co.,Ltd

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## 40W Ultra small series power module

40M05/40M09/40M12/40M15/40M24



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## 1. Subminiature series module power supply

The 40W ultra-small series module power supply is a small size and high efficiency module power supply designed by Hi-link Electronics for customers. It has the advantages of global input voltage range, low temperature rise, low power consumption, high efficiency, high reliability, and high safety isolation. Has been widely used in smart home, automation control, communication equipment, instrumentation and other industries.

## 2. Product Model

MODEL	Size (mm)	Output watt (W)	Output voltage (V)	Output current (mA)	Notes
HLK-40M05	57.5*33.5*23.8	40	5	8000	Not confirmed
HLK-40M09		40	9	4400	
HLK-40M12		40	12	3300	
HLK-40M15		40	15	2600	
HLK-40M24		40	24	1600	

## 3. Product features

- 1.Ultra-thin, small, industry's smallest volume
2. Universal universal input voltage (85 ~ 265Vac)
- 3.Low power consumption, environmental protection, no-load loss <0.1W
- 4.Low ripple and low noise
- 5.Good output short circuit and over current protection and self-recovery
- 6.High efficiency and high power density
- 7.Input and output isolation withstand voltage 3000Vac
- 8.100% full load aging and testing
9. High reliability and long life design, continuous working time is more than 100,000 hours
10. Meet UL and CE requirements; product design meets EMC and safety test requirements
11. Adopting high-quality environmental protection waterproof and thermally conductive adhesive potting, moisture-proof, vibration-proof, meet the waterproof and dustproof IP65 standard
12. Economical solution and high cost performance
13. No external circuit required to work
- 14.1 year quality warranty

## 4. Environmental conditions

Items	Technical Parameters	Units	Notes
Working temperature	-25—+60	°C	
Storage temperature	-40—+80	°C	
Relative humidity	5—95	%	
Thermal methods	Natural cooling		
Atmospheric pressure	80—106	Kpa	
Altitude	≤2000	m	
Vibration	Vibration coefficient 10~500Hz,2G10min./1cycle, 60min.each along X,Y,Z axes		Meets requirements for secondary road transportation

## 5. Electrical characteristics

### 5.1. Input features

Items	Technical Parameters	Units	Notes
Rated input voltage	100-240	Vac	
Input voltage range	85-265	Vac	Or 120-350Vdc
The maximum input current	≤0.9	A	
Input inrush current	≤50	A	
Input low start	≤50	mS	
Long-term reliability	MTBF≥100, 000	h	
External fuse recommended	3.15A/250Vac		Slow blow

Note: Tested at room temperature

## 5.2. Output features (5V/8000mA)

Items	Technical Parameters	Units	Notes
No-load rated output voltage	5±0.1	Vdc	
Full-load rated output voltage	5±0.25	Vdc	
Short time maximum output current	≥8100	mA	
Long time maximum output current	8000	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, Output full load≥89	%	
Input high voltage efficiency	Vin=230Vac, Output full load≥90	%	
Output ripple and noise (mVp-p)	≤100 Rated input voltage, output full load. With a 20MHz bandwidth oscilloscope, The load is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤5	%V <sub>O</sub>	
Output over-current protection	Output maximum load 150-200%	A	
Output short circuit protection	Direct short circuit during normal output, and automatically resume normal operation after short circuit is removed		Does not damage the entire machine

### 5.3. Output features (9V/4400mA)

Items	Technical Parameters	Units	Notes
No-load rated output voltage	9±0.1	Vdc	
Full-load rated output voltage	9±0.3	Vdc	
Short time maximum output current	≥4500	mA	
Long time maximum output current	4400	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, Output full load≥91	%	
Input high voltage efficiency	Vin=230Vac, Output full load≥91	%	
Output ripple and noise (mVp-p)	≤100 Rated input voltage, output full load. With a 20MHz bandwidth oscilloscope, The load is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤5	%V <sub>O</sub>	
Output over-current protection	Output maximum load 150-200%	A	
Output short circuit protection	Direct short circuit during normal output, and automatically resume normal operation after short circuit is removed		Does not damage the entire machine

## 5.4. Output features (12V/3300mA)

Items	Technical Parameters	Units	Notes
No-load rated output voltage	12±0.1	Vdc	
Full-load rated output voltage	12±0.4	Vdc	
Short time maximum output current	≥3400	mA	
Long time maximum output current	3300	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	V <sub>in</sub> =115Vac, Output full load≥90	%	
Input high voltage efficiency	V <sub>in</sub> =230Vac, Output full load≥90	%	
Output ripple and noise (mVp-p)	≤120 Rated input voltage, output full load. With a 20MHz bandwidth oscilloscope, The load is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load)≤5	%V <sub>O</sub>	
Output over-current protection	Output maximum load 110-150%	A	
Output short circuit protection	Direct short circuit during normal output, and automatically resume normal operation after short circuit is removed		Does not damage the entire machine

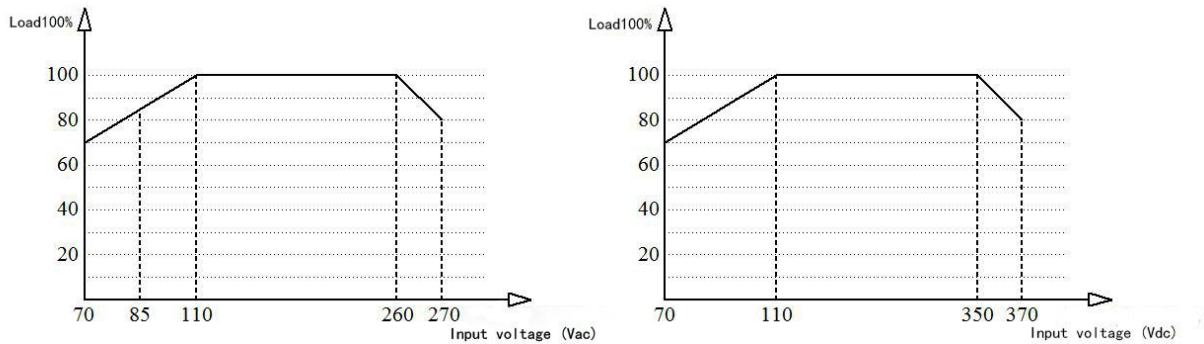
## 5.5. Output features (15V/2600mA)

Items	Technical Parameters	Units	Notes
No-load rated output voltage	15±0.1	Vdc	
Full-load rated output voltage	15±0.4	Vdc	
Short time maximum output current	≥2700	mA	
Long time maximum output current	2600	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, Output full load≥91	%	
Input high voltage efficiency	Vin=230Vac, Output full load≥91	%	
Output ripple and noise (mVp-p)	≤120 Rated input voltage, output full load. With a 20MHz bandwidth oscilloscope, The load is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤5	%V <sub>O</sub>	
Output over-current protection	Output maximum load 110-150%	A	
Output short circuit protection	Direct short circuit during normal output, and automatically resume normal operation after short circuit is removed		Does not damage the entire machine

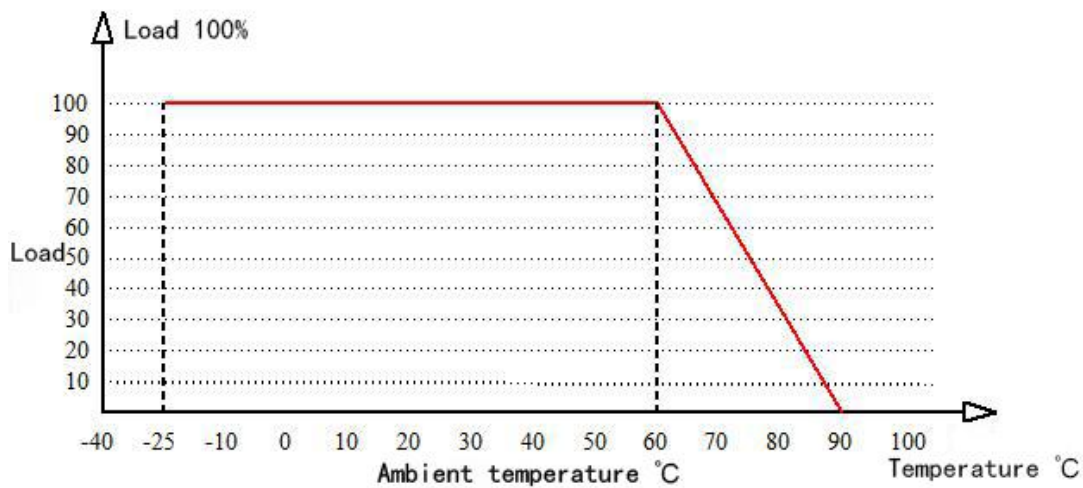
## 5.6. Output features (24V/1600mA)

Items	Technical Parameters	Units	Notes
No-load rated output voltage	24±0.1	Vdc	
Full-load rated output voltage	24±0.4	Vdc	
Short time maximum output current	≥1700	mA	
Long time maximum output current	1600	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, Output full load≥91	%	
Input high voltage efficiency	Vin=230Vac, Output full load≥91	%	
Output ripple and noise (mVp-p)	≤120 Rated input voltage, output full load. With a 20MHz bandwidth oscilloscope, The load is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤5	%V <sub>O</sub>	
Output over-current protection	Output maximum load 110-150%	A	
Output short circuit protection	Direct short circuit during normal output, and automatically resume normal operation after short circuit is removed		Does not damage the entire machine

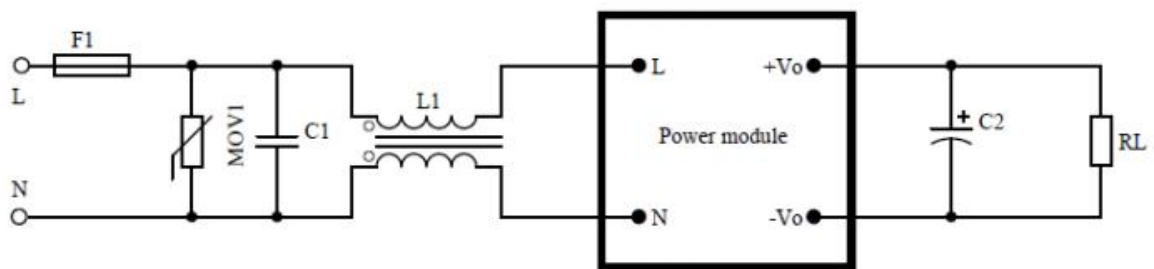
## 6. Input voltage and load characteristics



## 7. Derating curve



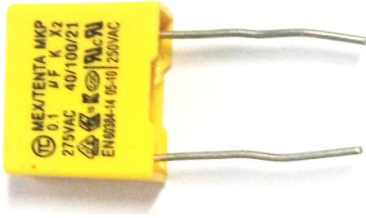

## 8. Typical application circuit



### Input section

Component number / recommended device	Functions	Recommended value
F1/Fuse	Protect the circuit from damage when the module is working wrong	3.15A/250Vac, Slow fuse
MOV1/Varistor	The cumulative surge is to protect the module from damage	10D561K
C1/Safety capacitance	Filtering, safety protection (EMC certification)	0.1uF/275Vac
L1/Common-mode inductance	EMI filtering	Sensible value 10-20mH, current 1-2A

 <p>Safety capacitance</p>	 <p>Common-mode inductance</p>
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Notes:

- Fuse and varistor are basic protection circuits (required).
- If certification is required, safety capacitors and common mode inductors cannot be omitted.

### Output section

Component number / recommended device	Functions	Recommended value
C2/Filter capacitor	Filtering, after adding this capacitor, the user can adjust the output ripple voltage	Aluminum electrolytic capacitor, capacitance value is 100-220uF, withstand voltage derating greater than 75%
RL/load	Load	

## 9. Safety Features

### 9.1. Certification

Product design meets UL and CE safety certification requirements. (UL and CE certifications are made by customers themselves and need to be designed in accordance with reference circuits.)

### 9.2. Safety and electromagnetic compatibility:

- The input terminal design adopts UL certification 3.15A insurance;
- The PCB board is made of double-sided copper-clad board, and the material fire rating is 94-V0;
- Safety standards in accordance with UL1012, EN60950, UL60950
- Insulation voltage I / P-O / P: 2500Vac
- Insulation resistance I/P-O/P>100M Ohms/500Vdc 25°C 70% RH
- Conduction and radiation EN55011, EN55022 (CISPR22)
- Electrostatic discharge IEC/EN 61000-4-2 level 4 8kV/15kV
- RF radiation immunity IEC/EN 61000-4-3 See application note for details

## 10. Marking, packaging, transportation, storage

### 10.1. Sign

#### 10.1.1. Product logo

The unique barcode mark of the product is affixed at the appropriate position of the product to ensure the traceability of the production date and product batch of each product. Its content complies with the provisions of national standards and industry standards.

#### 10.1.2 Packing mark

The product box is marked with the manufacturer's name, address, zip code, product model, year, month, and date of shipment;

It is marked with transport signs such as "up", "moisture proof" and "handle with care", all signs comply with the provisions of GB 191.

### 10.2. Package

The product is packed in a special blister box, which has anti-vibration function and meets the requirements of GB 3873.

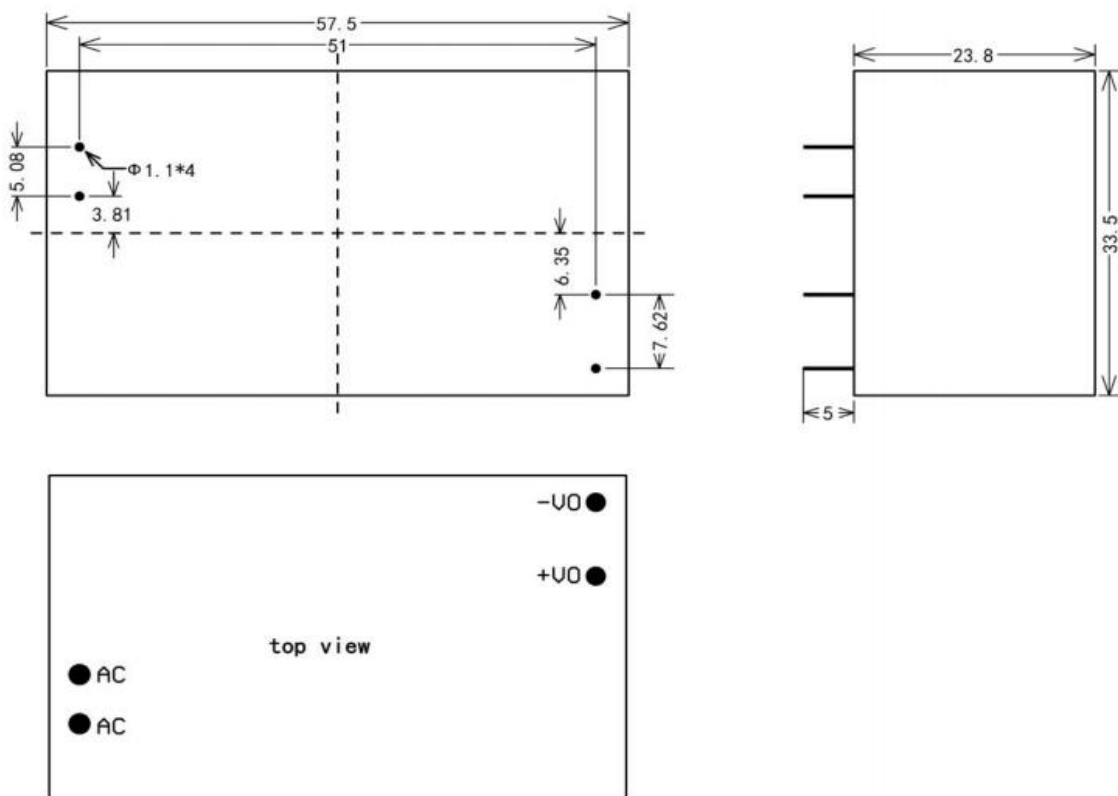
### 10.3. Transport

The packaged product can be transported by any means of transportation, and there should be a canopy during transportation, and there should be no severe vibration, impact, etc.

### 10.4. Storage

Product storage should meet the requirements of GB 3873.

## 11. Dimensions and weight



Dimension error:

1. Length, width, height and lead pitch error  $\pm 1\text{mm}$
2. Lead length error  $\pm 1\text{mm}$
3. Lead diameter error  $-0.2\text{mm}$

Unit: mm

#### Pin Functions:

1	ACL
2	ACN
3	-V0
4	+V0

Weight:  $80\pm 2\text{g}$