



**Shenzhen Hi-Link Electronic Co., Ltd.**

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## **40W Ultra small series power module**

**40M05A/40M09A /40M12A**

**40M15A /40M24A**



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## 1. Ultra-small Series Power Module

The 40W ultra-small series module power supply is a small size and high efficiency module power supply designed by Hilink 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. It 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-40M05A	62*45*22.5	40	5	8000	
HLK-40M09A		40	9	4444	
HLK-40M12A		40	12	3333	
HLK-40M15A		40	15	2666	
HLK-40M24A		40	24	1666	

## 3. Product features

1. Ultra-thin, ultra-small, smallest size in the industry
2. Universal input voltage (85~305Vac)
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, high power density
7. Input and output isolation withstand voltage 3000Vac
8. 100% full load burn-in and test
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 testing requirements
11. Using high-quality environmentally friendly waterproof thermal conductive glue potting, moisture-proof, vibration-proof, meet the waterproof and dustproof IP65 standard
12. Economical solution, high cost performance
13. Can work without external circuit
14. 1 year quality guarantee period

## 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		Meet the requirements of secondary road transportation

## 5. Electrical characteristics

### 5.1 Input features

Items	Technical Parameters	Units	Notes
Rated input voltage	100-277	Vac	
Input voltage range	85-305	Vac	Or 70-350Vdc
The maximum input current	≤1.0	A	
Input inrush current	≤30	A	
Input low start	≤100	mS	
Long-term reliability	MTBF≥100, 000	h	
External fuse recommended	3.15A/300V		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±0.1	Vdc	
Full-load rated output voltage	5.0±0.2	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	V <sub>in</sub> =115Vac, Full output≥85	%	
Input high voltage efficiency	V <sub>in</sub> =230Vac, Full output≥85	%	
Output ripple and noise (mVp-p)	≤100 Rated input voltage, full output load. Using a 20MHz bandwidth oscilloscope, The load end is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤%V <sub>O</sub>	%	
Output over-current protection	Output maximum load 130-150%	A	
Output short circuit protection	Direct short-circuit during normal output, and automatically resume normal operation after the short-circuit is removed		Does not damage the whole machine

### 5.3. Output features (9V/4444mA)

Items	Technical Parameters	Units	Notes
No-load rated output voltage	9.0±0.1	Vdc	
Full-load rated output voltage	9.0±0.2	Vdc	
Short time maximum output current	≥4544	mA	
Long time maximum output current	4444	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	V <sub>in</sub> =115Vac, Full output≥88	%	
Input high voltage efficiency	V <sub>in</sub> =230Vac, Full output≥88	%	
Output ripple and noise (mVp-p)	≤100 Rated input voltage, full output load. Using a 20MHz bandwidth oscilloscope, The load end is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤%V <sub>O</sub>	%	
Output over-current protection	Output maximum load 130-150%	A	
Output short circuit protection	Direct short-circuit during normal output, and automatically resume normal operation after the short-circuit is removed		Does not damage the whole machine

## 5. 4. Output features (12V/3333mA)

Items	Technical Parameters	Units	Notes
No-load rated output voltage	12.0±0.1	Vdc	
Full-load rated output voltage	12.0±0.2	Vdc	
Short time maximum output current	≥3433	mA	
Long time maximum output current	3333	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, Full output≥89	%	
Input high voltage efficiency	Vin=230Vac, Full output≥89	%	
Output ripple and noise (mVp-p)	≤100 Rated input voltage, full output load. Using a 20MHz bandwidth oscilloscope, The load end is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤%Vo	%	
Output over-current protection	Output maximum load 130-150%	A	
Output short circuit protection	Direct short-circuit during normal output, and automatically resume normal operation after the short-circuit is removed		Does not damage the whole machine

## 5.5. Output features (15V/2666mA)

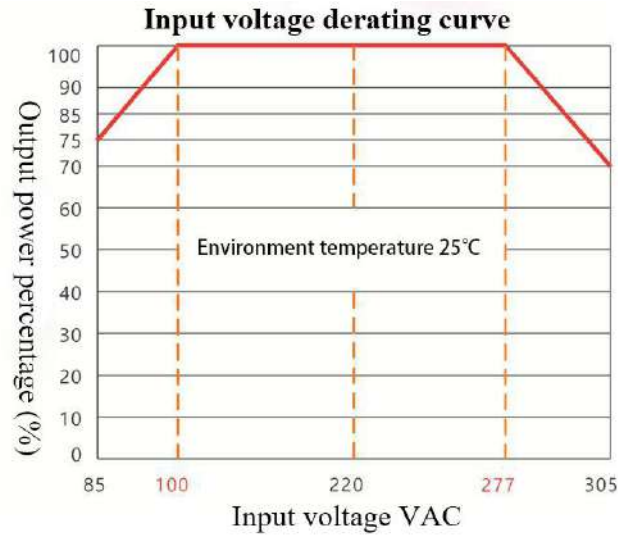
Items	Technical Parameters	Units	Notes
No-load rated output voltage	15.0±0.1	Vdc	
Full-load rated output voltage	15.0±0.2	Vdc	
Short time maximum output current	≥2766	mA	
Long time maximum output current	2666	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	V <sub>in</sub> =115Vac, Full output≥89	%	
Input high voltage efficiency	V <sub>in</sub> =230Vac, Full output≥89	%	
Output ripple and noise (mVp-p)	≤100 Rated input voltage, full output load. Using a 20MHz bandwidth oscilloscope, The load end is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤%V <sub>O</sub>	%	
Output over-current protection	Output maximum load 130-150%	A	
Output short circuit protection	Direct short-circuit during normal output, and automatically resume normal operation after the short-circuit is removed		Does not damage the whole machine



## 5. 6. Output features (24V/1666mA)

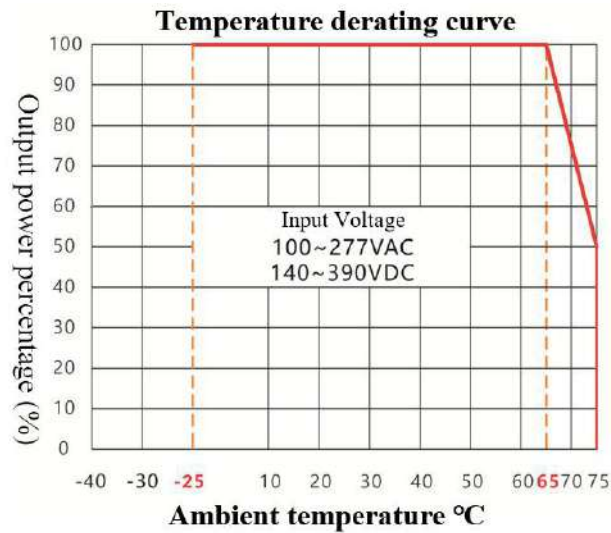
Items	Technical Parameters	Units	Notes
No-load rated output voltage	24±0.1	Vdc	
Full-load rated output voltage	24±0.2	Vdc	
Short time maximum output current	≥1766	mA	
Long time maximum output current	1666	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, Full output≥90	%	
Input high voltage efficiency	Vin=230Vac, Full output≥90	%	
Output ripple and noise (mVp-p)	≤100 Rated input voltage, full output load. Using a 20MHz bandwidth oscilloscope, The load end is tested with 10uF and 0.1uF capacitors.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load) ≤%V <sub>O</sub>	%	
Output over-current protection	Output maximum load 130-150%	A	
Output short circuit protection	Direct short-circuit during normal output, and automatically resume normal operation after the short-circuit is removed		Does not damage the whole machine

## 6. Input voltage and load characteristics

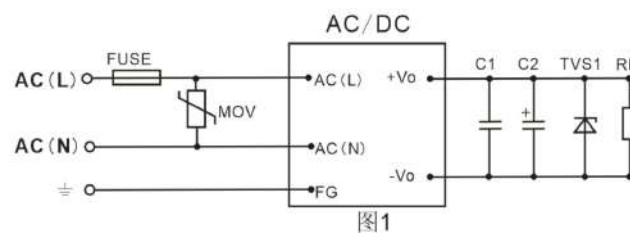


**Input voltage and load characteristic curve**

## 7. Derating curve



## 8. Typical application circuit



## Input parts

Component number / recommended device	Functions	Recommended value
Fuse	When the module is abnormal, protect the circuit from damage	3.15A/300Vac, Slow blow
MOV/Varistor	The cumulative surge protects the module from damage	10D561K

Remark:

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

## Output parts

Component number / recommended device	Functions	Recommended value
C1/Filter capacitor	Remove high frequency noise	Recommended to use 0.1UF ceramic capacitors, the withstand voltage derating is greater than 75%
C2/Filter capacitor	Filter, after adding this capacitor, the user can adjust the output ripple voltage	Use high-frequency low-resistance electrolytic capacitors with a capacity of 100uF/1A output current, and withstand voltage derating greater than 75%
TVS1	TVS tube is the protection circuit	
RL/load	load	

## 9. Safety characteristics

### 9. 1. Certification

Product design meets UL and CE safety certification requirements. (UL and CE certification are made by the customer, and need to be designed in accordance with the reference circuit.)

### 9. 2. Safety and electromagnetic compatibility:

The input terminal design adopts UL certification 2A insurance;

The PCB board is made of double-sided copper clad laminate, and the fire rating of the material is 94-V0;

Safety standards comply 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 comply with EN55011, EN55022 (CISPR22)

Electrostatic discharge IEC/EN 61000-4-2 level 4 8kV/15kV

RF radiation immunity IEC/EN 61000-4-3 Please refer to the application note for details

## 10. Marking, packaging, transportation, storage

### 10. 1. Sign

#### 10. 1. 1. Product logo

A unique barcode mark of the product is affixed to 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 packaging box is marked with the manufacturer's name, factory address, zip code, product model, year, month, and day of manufacture;

It is marked with "upward", "moisture-proof", "handle with care" and other transportation signs. All signs comply with the regulations of GB 191.

### 10. 2. Package

The product is packaged in a special blister box with 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

