3W Ultra-small Power Module

PM03/PM01/PM09/PM12

Version: V2.21 Date: Oct. 2018 Made by Shenzhen Hi-Link Electronic Co., Ltd

Catalogue

1. Ultra-small Power Module

3W ultra-small series of power module is a small volume, high efficiency module power supply designed by Hi-Link Electronics. With the global input voltage range, low temperature rise, low power consumption, high efficiency, high reliability, high security isolation and so on. Has been widely used in smart home, automation, communications equipment, instrumentation and other industries.

2. Product Model

MODEL	**Dimension** (mm)	**Output power** (W)	**Output voltage** (V)	**Output current** (mA)	Notes
HLK-PM03	34*20*15	3	3.3	1000	
HLK-PM01		3	5	600	
HLK-PM09		3	9	330	Need customize
HLK-PM12		3	12	250	

3. Product Features

1. Ultra-thin, ultra-small, the industry's smallest volume;
2. Global universal input voltage (90 ~ 245Vac);
3. Low-power, green, no-load loss <0.1W;
4. Low ripple, low noise;
5. Good output short circuit and overcurrent protection and self recovery;
6. High efficiency, high power density;
7. Input and output isolation voltage 3000Vac;
8. 100% full load aging and testing;
9. High reliability, long life design, continuous working time is greater than 100,000 hours;
10. Meet UL, CE requirements; product design to meet EMC and safety testing requirement;
11. Using high-quality environmentally friendly waterproof plastic potting, moisture, vibration, water and dust to meet IP65 standards;
12. Economic solutions, cost-effective

13. No external circuit to work

14. 1 year quality guarantee period.

4. Environmental Conditions

Project name	Technical indicators	Unit	Notes
Working temperature	-25—+60	℃	
Storage temperature	-40—+80	℃	
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 second-class road transport requirement

5. Electrical Characteristics

5.1. Input characteristics

Project Name	Technical Requirements	Unit	Notes
Rated input voltage	90-245	Vac	
Input voltage range	85-264	Vac	Or 70-350Vdc
The maximum input current	≤0.2	A	
Input inrush current	≤10	A	
The maximum input voltage	≤270	Vac	

Input soft start	≤50	mS	
Input low voltage efficiency	Vin=110Vac，output full load≥69	%	
Input high voltage efficiency	Vin=220Vac，output full load≥70	%	
Long-term reliability	MTBF≥100，000	h	
External fuse recommended	0.5A/250Vac		slow blow

Note：Test at room temperature

5.2. Output characteristics (3.3V/1000mA)

Project Name	Technical Requirements	Unit	Notes
No-load rated output voltage	3.3±0.1	Vdc	
Full load rated output voltage	3.3±0.2	Vdc	
Short time maximum output current	≥1200	mA	
Long time maximum output current	≥1000	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Output ripple and noise (mVp-p)	≤50 Rated input voltage, output full load. With 20MHz bandwidth oscilloscope, Load side 10uF and 0.1uF capacitance test.	mV	
Switch overshoot amplitude	(Rated input voltage, output plus 10% load) ≤5	$\%V_O$	
Output over-current protection	Output the maximum load of 150-200%	A	
Output short circuit protection	Direct output when the normal short-circuit, short circuit removed automatically resume normal work		Undamaged machine

5.3. Output characteristics(5V/600mA)

Project Name	Technical Requirements	Unit	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	≥800	mA	
Long time maximum output current	≥600	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Output ripple and noise (mVp-p)	≤50 Rated input voltage, output full load. With 20MHz bandwidth oscilloscope, Load side 10uF and 0.1uF capacitance test.	mV	
Switch overshoot amplitude	(Rated input voltage, output plus 10% load) ≤5	%V_O	
Output over-current protection	Output the maximum load of 150-200%	A	
Output short circuit protection	Direct output when the normal short-circuit, short circuit removed automatically resume normal work		Undamaged machine

5.4. Output characteristics(9V/330mA)

Project Name	Technical Requirements	Unit	Notes
No-load rated output voltage	9.0±0.1	Vdc	
Full load rated output	9.0±0.2	Vdc	

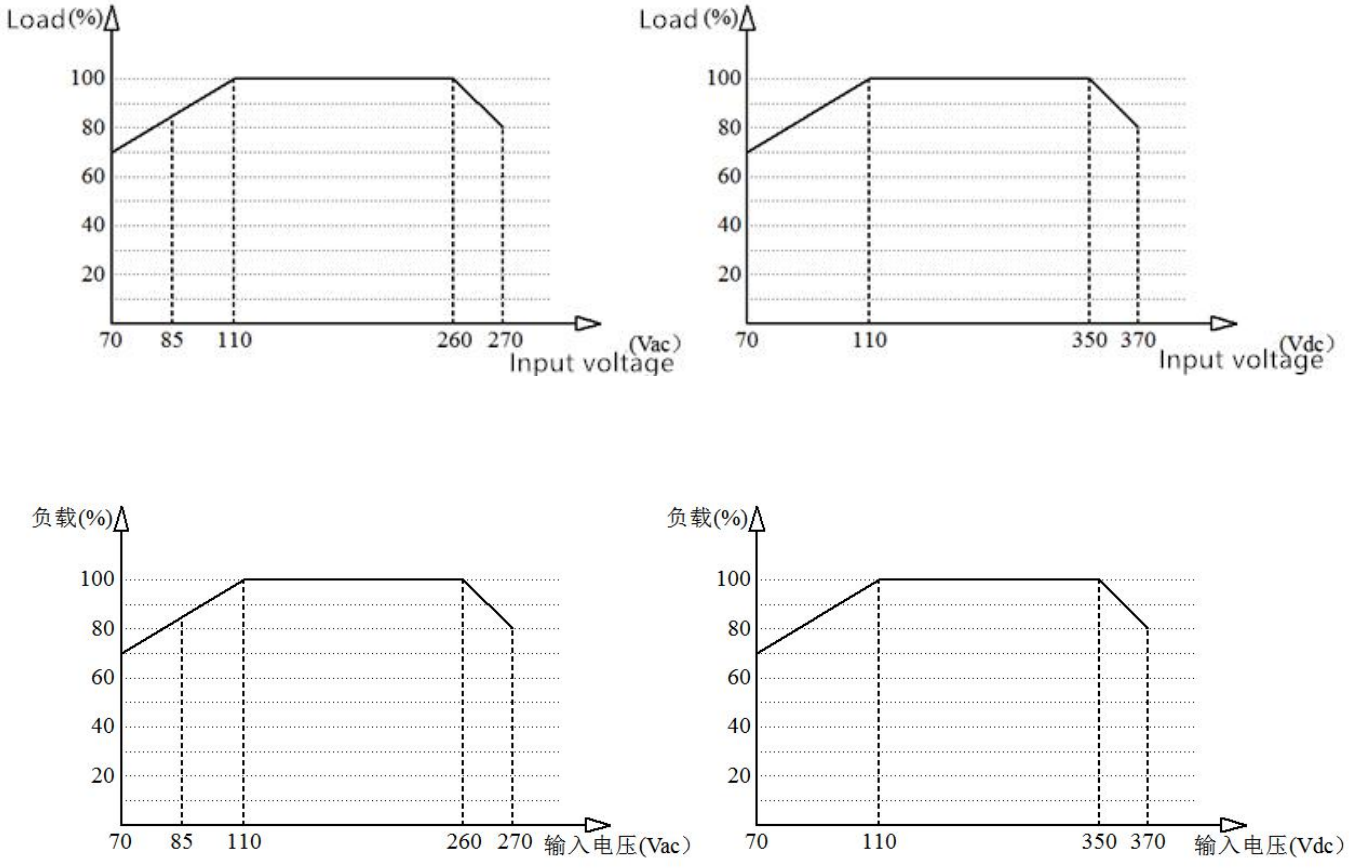
voltage			
Short time maximum output current	≥450	mA	
Long time maximum output current	≥330	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Output ripple and noise (mVp-p)	≤70 Rated input voltage, output full load. With 20MHz bandwidth oscilloscope, Load side 10uF and 0.1uF capacitance test.	mV	
Switch overshoot amplitude	(Rated input voltage, output plus 10% load) ≤5	%V_O	
Output over-current protection	Output the maximum load of 110-150%	A	
Output short circuit protection	Direct output when the normal short-circuit, short circuit removed automatically resume normal work		Undamaged machine

5.5. Output characteristics(12V/250mA)

Project Name	Technical Requirements	Unit	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	≥350	mA	
Long time maximum output current	≥250	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	

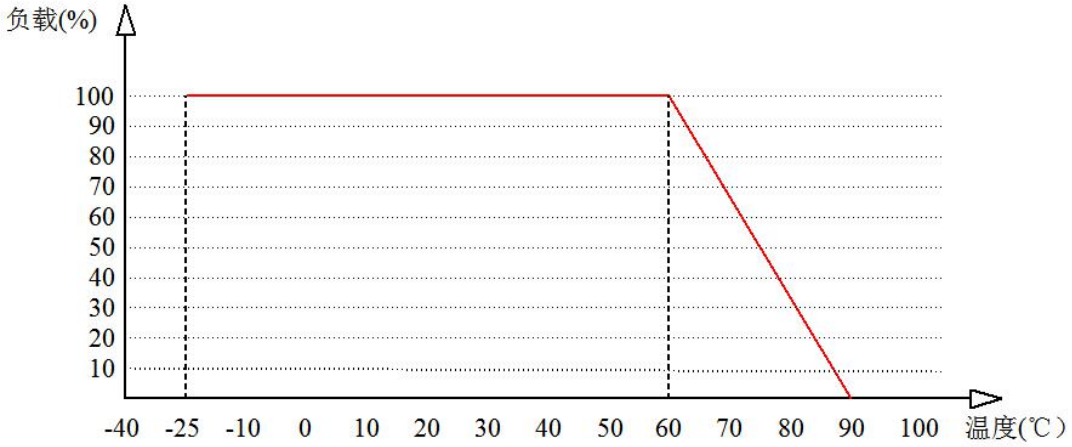
Output ripple and noise (mVp-p)	≤70 Rated input voltage, output full load. With 20MHz bandwidth oscilloscope, Load side 10uF and 0.1uF capacitance test.	mV	
Switch overshoot amplitude	(Rated input voltage, output plus 10% load) ≤5	%V_O	
Output over-current protection	Output the maximum load of 110-150%	A	
Output short circuit protection	Direct output when the normal short-circuit, short circuit removed automatically resume normal work		Undamaged machine

6. Input voltage and load characteristics

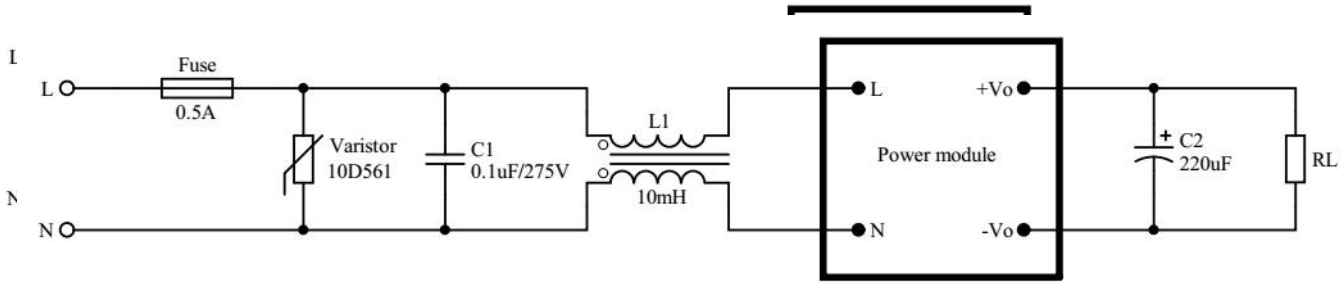


Input voltage and load characteristics curve

7. Working Environment Temperature And Load Characteristics

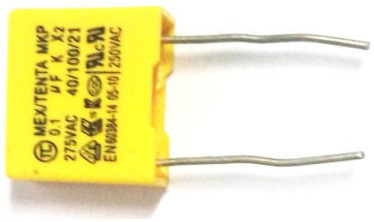


8. Typical Application Circuit



Input section

Component number/ Recommended device	Function	Value
Fuse	protect the circuit from damage when the module is abnormal.	0.5A/250Vac，slow blow
Varistor	Protect the module do not damaged in the accumulative surge	10D561K
C1/Safety capacitor	Filtering safety protection（EMC certification）	0.1uF/275Vac
L1/Common mode choke	EMI filtering	Sense value 10-15mH，current 70-500mA

	
Safety capacitor	Common mode choke

Note：

- Fuses and varistor for the basic protection circuit (Received).
- To pass certification, safety capacitor and common mode inductance can not be omitted.

Output section

Component number/ Recommended device	Function	Value
C2/ Filtering capacitor	Filtering，the output AC signal can be maintain within 30mV	Aluminum electrolytic capacitors，capacitance range 100-220uF，Pressure drop>75%
RL/ Load	Load	

Note：C2 filtering capacitor can bring down the output signal from the original 50mV to less than 30mV.

9. Safety Features

9.1. Certification

The product design meet UL, CE safety certification requirements. (Though the UL and CE certificates need to be done by client)

9.2. Safety and electromagnetic compatibility:

- Design of Input end fulfills the 0.5A security of UL certification；
- PCB board designed as double-sided copper clad plate, the material fireproof rating 94-V0 level；
- Safety standard in line with UL1012, EN60950, UL60950

- Insulation Voltage I/P-O/P:2500Vac
- Insulation Resistor I/P-O/P>100M Ohms/500Vdc 25℃ 70% RH
- Conductivity and Radiation meet EN55011, EN55022 (CISPR22)
- Electrostatic discharge IEC/EN 61000-4-2 level 4 8kV/15kV
- RF Radiation Immunity meet the standard IEC/EN 61000-4-3 (Check details in Application Notes)

9.3. Temperature safety design:

The maximum temperature rise of the power supply capacitor, main converter and other inner surfaces at room temperature does not exceed 90 ℃; the maximum temperature rise of the shell surface does not exceed 60 ℃.

10. Marking, Packaging, Transportation, Storage

10.1. Marking

10.1.1. Product marking

Place the product's unique bar code logo in the proper location on the product to ensure trace ability of each product's production date, product batch, and more. Its content in line with national standards, industry standards.

10.1.2. Package marking

Product box marked with the name of the manufacturer, site, zip code, product model, factory year, month, day;

Marked with "up", "moisture-proof" and "carefree" and other transport signs, all signs are in line with the provisions of GB 191.

10.2. Products

Products using special plastic boxes separated packaging, with anti-vibration function, and in line with the provisions of GB 3873.

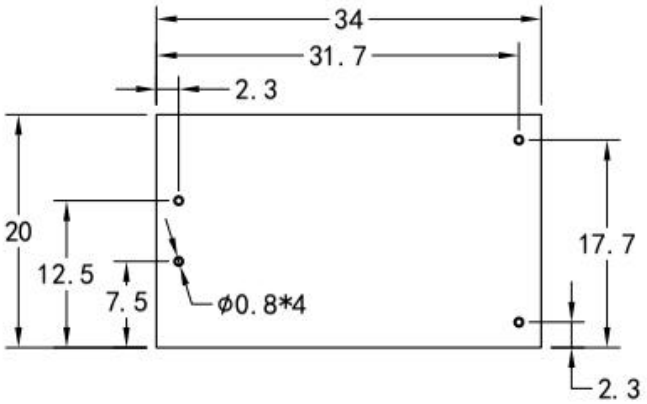
10.3. Packaging

Packaged products can be transported by any means of transportation, should be awning in transit, there should be no violent vibration, impact, etc.

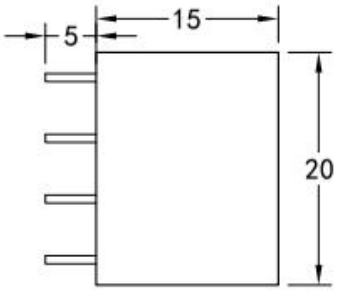
10.4. Storage

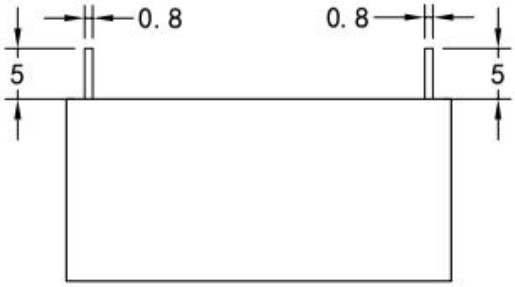
Product storage should be consistent with the provisions of GB 3873.

11. Overall Dimensions And Weight



Pin function	
1	AC
2	AC
3	-V0
4	+V0
Weight：20±1g	





Dimensions Variation:

1. Pin Spacing Variation
2. Pin Length Variation ±0.5mm
3. Pin Diameter Variation-0.2mm

单位：毫米（mm）