ShenZhen Hi-Link Electronic Co., Ltd

20W Series of Ultra-compact Power Module

20M05/20M09/20M12/20M15/20M24

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1. Mini-ultra Power Supply Module

The 20W ultra-small series power supply module is a small volume, high efficiency power module for customers designed by Hi-Link. It has the advantage of global input voltage range, low temperature rise, low power consumption, high efficiency, high reliability, high security isolation etc. and has been widely used in smart home, automation control, communication equipment, instruments and other industries.

2. Product Model

Model	Dimension (mm)	Output power (W)	Output Voltage (V)	Output Current (mA)	Notes
HLK-20M05	57.5*33.5*23.5	20	5	4000	
HLK-20M09			9	2200	
HLK-20M12			12	1600	
HLK-20M15			15	1300	
HLK-20M24			24	830	

3. Product Characteristic

1. Ultra thin, ultra small, minimum volume in the industry
2. Universal input voltage (90~265Vac)
3. Low power consumption, environmental protection, no-load loss<0.1W
4. Low ripple and low noise
5. Good output short circuit, over-current protection and self-recovery
6. High efficiency and high power density
7. Input-output isolated voltage-proof 3000Vac
8. 100% full load aging and testing
9. High reliability, long life design, continuous working time more than 100000 hours
10. Meet UL, CE requirements; product design meets EMC and safety test requirements
11. Adopt high quality environmental protection waterproof heat conduction glue to fill seal, moisture-proof, anti-vibration, meet the IP65 standard of waterproof and dust proof
12. Economic solution, cost-effective
13. Working without an external circuit
14. 1 year warranty

4. Environment Condition

Project Name	Technical Critical	Unit	Notes
Working temperature	-25—+60	℃	
Storage temperature	-40—+80	℃	
Relative humidity	5—95	%	
Heat dissipation mode	natural cooling		
Atmospheric pressure	80—106	Kpa	
Sea level elevation	≤2000	m	
Vibrate	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 characteristic

Project Name	Technical Critical	Unit	Note
Rated input voltage	100-240	Vac	
Input voltage range	85-265	Vac	Or 70-350Vdc
Maximum input current	≤0.4	A	
Input surge current	≤34	A	
Input low start	≤50	mS	
Long-term reliability	MTBF≥100, 000	h	
External fuse recommendation	2A/250Vac		Slow fuse

Note: test at room temperature

5.2. Output Characteristic (5V/4000mA)

Project Name	Technical Critical	Unit	Note
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	≥4200	mA	
Rated output current	4000	mA	
Voltage regulation	±0.2	V	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, output full-load≥80	%	
Input high voltage efficiency	Vin=230Vac, output full-load≥82	%	
Output ripple and noise (mVp-p)	≤100 Rated input voltage, full output load. Using 20MHz bandwidth oscilloscope, Load side and 10uF and 0.1uF capacitors are tested.	mV	
Turn on or turn off overshoot amplitude	(rated input voltage, output plus 10% load) ≤ 5	%V_O	
Output over-current protection	150-200% of output maximum load	A	
Output short circuit protection	Direct short circuit in normal output and automatic return to normal operation after removal of short circuit		No damage to the whole machine

5.3. Output Characteristic (9V/2200mA)

Project Name	Technical Critical	Unit	Note
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	≥2300	mA	
Long time maximum output current	2200	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, output full-load≥80	%	
Input high voltage efficiency	Vin=230Vac, output full-load≥82	%	
Output ripple and noise (mVp-p)	≤150 Rated input voltage, full output load. Using 20MHz bandwidth oscilloscope, Load side and 10uF and 0.1uF capacitors are tested.	mV	
Turn on or turn off overshoot amplitude	(rated input voltage, output plus 10% load) ≤5	%V_O	
Output over-current protection	110-150% of output maximum load	A	
Output short circuit protection	Direct short circuit in normal output and automatic return to normal operation after removal of short circuit		No damage to the whole machine

5.4. Output Characteristic (12V/1600mA)

Project Name	Technical Critical	Unit	Note
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	≥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≥82	%	
Input high voltage efficiency	Vin=230Vac, output full-load≥84	%	
Output ripple and noise (mVp-p)	≤150 Rated input voltage, full output load. Using 20MHz bandwidth oscilloscope, Load side and 10uF and 0.1uF capacitors are tested.	mV	
Turn on or turn off overshoot amplitude	(rated input voltage, output plus 10% load) ≤5	%Vo	
Output over-current protection	110-150% of output maximum load	A	
Output short circuit protection	Direct short circuit in normal output and automatic return to normal operation after removal of short circuit		No damage to the whole machine

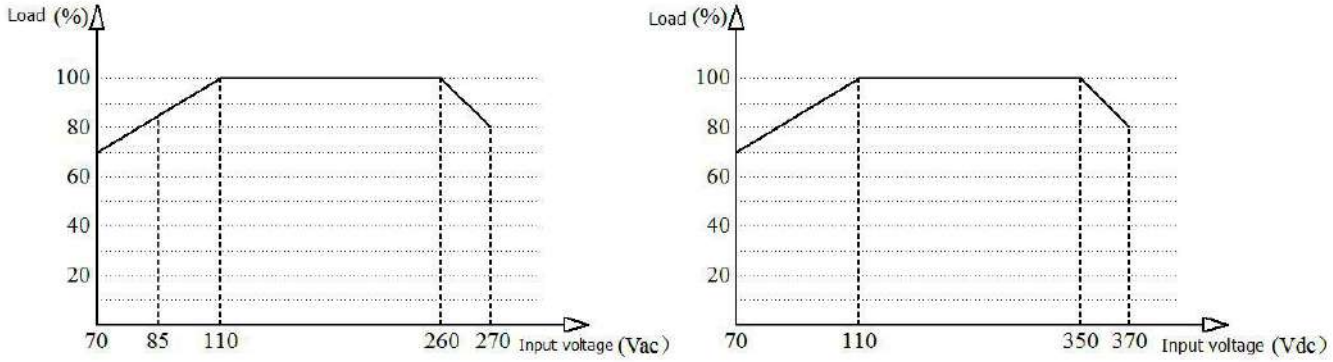
5.5. Output Characteristic (15V/1300mA)

Project Name	Technical Critical	Unit	Note
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	≤1400	mA	
Rated output current	1300	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, output full-load≥82	%	
Input high voltage efficiency	Vin=230Vac, output full-load≥84	%	
Output ripple and noise (mVp-p)	≤150 Rated input voltage, full output load. Using 20MHz bandwidth oscilloscope, Load side and 10uF and 0.1uF capacitors are tested.	mV	
Turn on or turn off overshoot amplitude	(rated input voltage, output plus 10% load) ≤5	%V_O	
Output over-current protection	110-150% of output maximum load	A	
Output short circuit protection	Direct short circuit in normal output and automatic return to normal operation after removal of short circuit		No damage to the whole machine

5.6. Output Characteristic (24V/830mA)

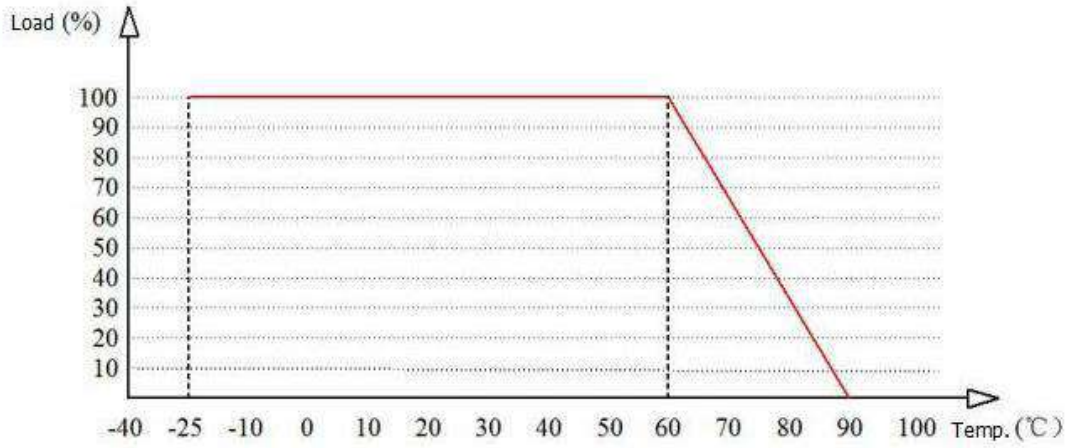
Project Name	Technical Critical	Unit	Note
No-load rated output voltage	24.0±0.1	Vdc	
Full-load rated output voltage	24.0±0.2	Vdc	
Short time maximum output current	≥900	mA	
Rated output current	830	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, output full-load≥84	%	
Input high voltage efficiency	Vin=230Vac, output full-load≥85	%	
Output ripple and noise (mVp-p)	≤220 Rated input voltage, full output load. Using 20MHz bandwidth oscilloscope, Load side and 10uF and 0.1uF capacitors are tested.	mV	
Turn on or turn off overshoot amplitude	(rated input voltage, output plus 10% load) ≤5	%V_O	
Output over-current protection	110-150% of output maximum load	A	
Output short circuit protection	Direct short circuit in normal output and automatic return to normal operation after removal of short circuit		No damage to the whole machine

6. Input Voltage and load characteristic



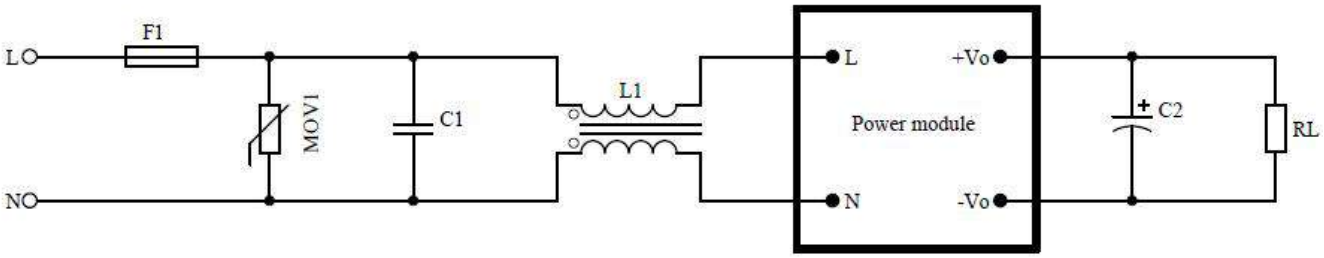
Input voltage and load characteristic curve

7. Working environment temperature and load characteristic



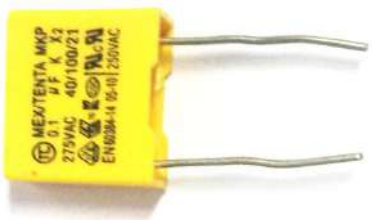
Working environment temperature and load characteristic curve

8. Typical application circuit



Input part

Recommended device	Function	Recommended value
F1/Fuse	Protect the circuit from damage when the module is abnormal	2A/250Vac, slow fuses
MOV1/Varistor	The cumulative surge is to protect the module from damage	10D561K
C1/Safety capacitance	Filtering, Security Protection (EMC certification)	0.22uF/275Vac
L1/Common mode inductance	EMI filter	Inductive value 10-30mH,Test Requirements:1KHZ/0.3V, current 300-700mA



Safety capacitance

Common-mode inductance

Note：

- Fuse and varistor are basic protective circuits.
- If you need to pass the authentication, the Anchorage capacitance and common-mode inductance must not be omitted.

Output Part

Component bit number / recommended device	Function	Recommended value
C2/filter capacitor	Filter, output ripple can be controlled in 30mV after adding this capacitor	Aluminium electrolytic capacitance, capacity 100-220 UF, voltage reduction greater than 75%
RL/load	load	

Note: C2 filter capacitor can reduce the output ripple from the original 50mV to the 30mV.

9. Safety Characteristic

9.1. Certification

Product design complies with UL,CE safety certification requirements. (UL,CE certification is done by customers themselves.)

9.2. Safety and electromagnetic compatibility

- The input design adopts UL certification 2A insurance;
- The PCB board is made of double-sided copper clad foil, and the material fire resistance grade is 94-V0 grade;
- Safety standards comply with UL1012, EN60950, UL60950
- Insulation voltage: I/P-O/P:2500Vac
- Insulation resistance: I/P-O/P>100MOhms/500Vdc25℃ 70%RH
- Conduction and radiation conformance to EN55011, EN55022(CISPR22)
- Electrostatic discharge: IEC/EN61000-4-2level48kV/15kV
- Radio frequency radiation immunity: IEC/EN61000-4-3

9.3. Temperature rise safety design:

The maximum temperature rise of the internal surface of the power supply capacitor and the main converter is not more than 90 ℃ at room temperature, and the maximum temperature rise of theshellsurfaceisnotmorethan60 ℃.

10. Marking, packing, transportation, storage

10.1. Marking

10.1.1. Product mark

A unique bar code label is affixed to ensure the trace ability of information

such as the production date and batch of each piece of product. Its content conforms to the national standard, the industry standard stipulation

10.1.2. Packing mark

The packing boxes are marked with the name of the manufacturer, site, zip code, product model, factory year, month, day;

Marked "up", "moisture-proof", "careful light" and other transport signs, all signs are in accordance with the GB 191 requirements.

10.2. Packing

The product uses the special absorption plastic box to separate the packing, has the vibration proof function, and conforms to the GB3873 stipulation.

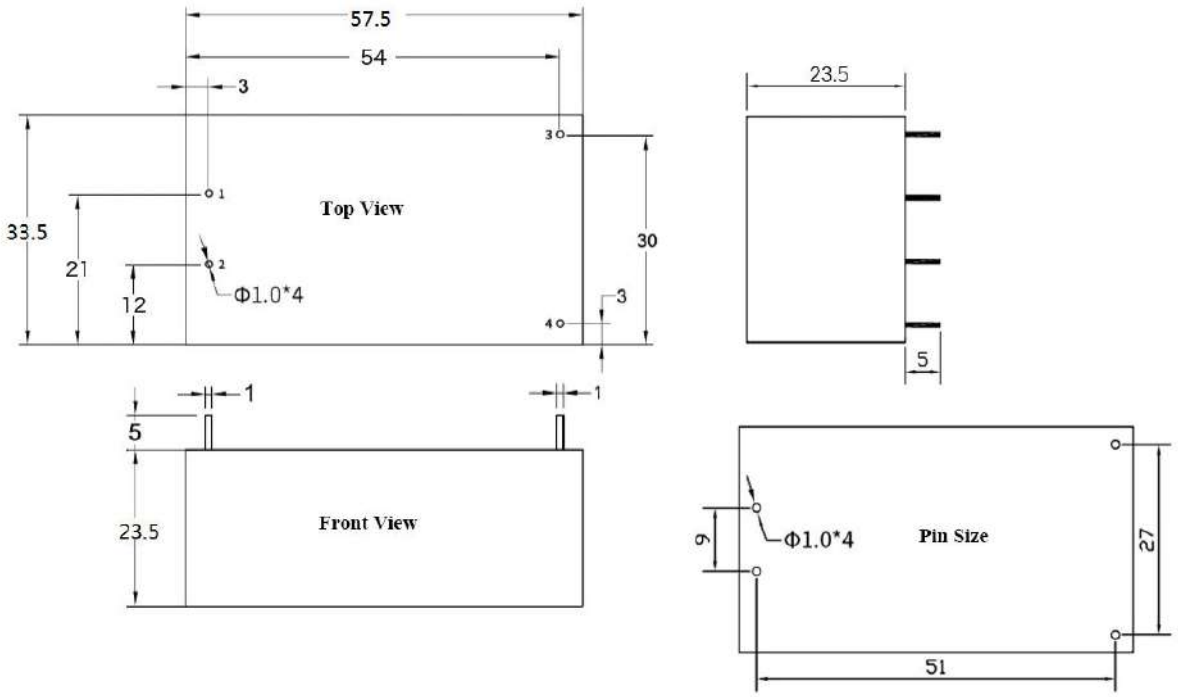
10.3. Transportation

The packaged products can be transported by any means of transportation, should be covered in the transportation, should not be violent vibration, impact, etc.

10.4. Storage

Products shall be stored in accordance with GB3873.

11. Weight and Dimensions



Size Error :

1. Length, width, height and pin spacing error ±8%
2. Pin length error ±1mm
3. Pin diameter error +-0.2mm
4. Weight ≤ 80g

Pin function	
1	AC
2	AC
3	-V0
4	+V0
Weight: 80±2g	