Shenzhen Hi-Link Electronic Co., Ltd.

3W Ultra small series power module

3M03BL/3M05BL/3M09BL
3M12BL/3M15BL/3M24BL

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1. Ultra-small Series Power Module

3W ultra-small series power supply module is a small size, high efficiency modular 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, high safety isolation and so on. It has been widely used in smart home, automation control, communication equipment, instrumentation and other industries.

2. Product Model

Model	Size(mm)	Output power(W)	Output voltage(V)	Output current(mA)
HLK-3M03BL	18*32*1	3	3.3	1000
HLK-3M05BL		3	5	600
HLK-3M09BL		3	9	330
HLK-3M12BL		3	12	250
HLK-3M15BL		3	15	200
HLK-3M24BL		3	24	125

3. Product Features

- Ultra-thin, ultra-compact, smallest size in the industry
- Global input voltage (85~265Vac)
- Low power consumption, green environmental protection, no-load loss <0.1W
- Low ripple, low noise
- Good output short-circuit and over-current protection and self-recovery
- High efficiency, high power density
- Input and output isolation voltage 3000Vac
- 100% full load aging and testing
- High reliability, long life design, continuous operation time is more than 100000 hours.
- Meet UL, CE requirements; product design to meet EMC and safety testing requirements.
- High-quality environmentally friendly waterproof thermally conductive adhesive potting, moisture-proof, vibration-proof, meet the waterproof and dust-proof IP65 standard.
- Economic solution, high cost performance
- No need for external circuitry to work
- 1 year quality warranty

4. Environmental Conditions

Items	Technical Parameters	Unit	Note
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		Meets requirements for secondary road transportation

5. Electrical Features

5.1 Input Features

Items	Technical Parameters	Units	Notes
Rated input voltage	100-240	Vac	
Input voltage range	85-265	Vac	Or 120-350Vdc
Maximum input current	≤0.2	A	
Input frequency	47-63	Hz	
Input low start	≤200	mS	
Long-term reliability	MTBF≥100, 000	h	
External fuse recommended	1A / 250Vac or 10Ω wire wound resistance		Slow blow

Note: Tested at 45°C

5.2 Output Features (3.3V/1000mA)

Items	Technical Parameters	Units	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	
Rated output current	1000	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=110Vac, output full load≥70	%	
Input high voltage efficiency	Vin=220Vac, output full load≥70	%	
Output ripple and noise (mVp-p)	≤50 Rated input voltage, output fully loaded. Tested with a 20MHz bandwidth oscilloscope with 10uF and 0.1uF capacitors in parallel at the load side.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load)≤ 5	%V_O	
110V output overcurrent protection	2.08	A	No-damage to the whole device
220V output overcurrent protection	2.63	A	No-damage to the whole device
110V output short circuit protection	286	mW	No-damage to the whole device
220V output short circuit protection	732	mW	No-damage to the whole device
Output voltage rise time	≤300	mS	

5.3 Output Features (5V/600mA)

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	≥700	mA	
Rated output current	600	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=115Vac, output full load≥70	%	
Input high voltage efficiency	Vin=230Vac, output full load≥70	%	
Output ripple and noise (mVp-p)	≤50 Rated input voltage, output fully loaded. Tested with a 20MHz bandwidth oscilloscope with 10uF and 0.1uF capacitors in parallel at the load side.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load)≤ 5	%V_O	
110V output overcurrent protection	1.55	A	No-damage to the whole device
220V output overcurrent protection	2.02	A	No-damage to the whole device
110V output short circuit protection	256	mA	No-damage to the whole device
220V output short circuit protection	570	mA	No-damage to the whole device
Output voltage rise time	≤300	mS	

5.4 Output Features (9V/330mA)

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	≥430	mA	
Rated output current	330	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=110Vac, output full load≥75	%	
Input high voltage efficiency	Vin=220Vac, output full load≥75	%	
Output ripple and noise (mVp-p)	≤50 Rated input voltage, output fully loaded. Tested with a 20MHz bandwidth oscilloscope with 10uF and 0.1uF capacitors in parallel at the load side.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load)≤ 5	%V_O	
110V output overcurrent protection	0.85	A	No-damage to the whole device
220V output overcurrent protection	1.12	A	No-damage to the whole device
110V output short circuit protection	250	mW	No-damage to the whole device
220V output short circuit protection	514	mW	No-damage to the whole device
Output voltage rise time	≤300	mS	

5.5 Output Features (12V/250mA)

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	≥350	mA	
Rated output current	250	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=110Vac, output full load≥75	%	
Input high voltage efficiency	Vin=220Vac, output full load≥75	%	
Output ripple and noise (mVp-p)	≤50 Rated input voltage, output fully loaded. Tested with a 20MHz bandwidth oscilloscope with 10uF and 0.1uF capacitors in parallel at the load side.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load)≤ 5	%V_O	
110V output overcurrent protection	0.71	A	No-damage to the whole device
220V output overcurrent protection	0.92	A	No-damage to the whole device
110V output short circuit protection	216	mW	No-damage to the whole device
220V output short circuit protection	521	mW	No-damage to the whole device
Output voltage rise time	≤300	mS	

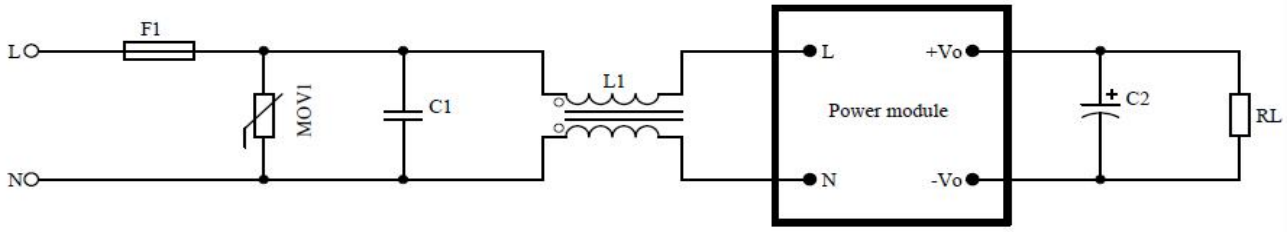
5.6 Output Features (15V/200mA)

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	≥300	mA	
Rated output current	200	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=110Vac, output full load≥75	%	
Input high voltage efficiency	Vin=220Vac, output full load≥75	%	
Output ripple and noise (mVp-p)	≤50 Rated input voltage, output fully loaded. Tested with a 20MHz bandwidth oscilloscope with 10uF and 0.1uF capacitors in parallel at the load side.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load)≤ 5	%V_O	
110V output overcurrent protection	0.53	A	No-damage to the whole device
220V output overcurrent protection	0.69	A	No-damage to the whole device
110V output short circuit protection	231	mW	No-damage to the whole device
220V output short circuit protection	505	mW	No-damage to the whole device
Output voltage rise time	≤300	mS	

5.7 Output Features (24V/125mA)

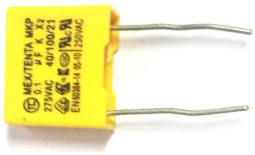
Items	Technical Parameters	Units	Notes
No-load rated output voltage	24.0±0.1	Vdc	
Full-load rated output voltage	24.0±0.2	Vdc	
Short time maximum output current	≥220	mA	
Rated output current	125	mA	
Voltage regulation	±0.2	%	
Load regulation	±0.5	%	
Input low voltage efficiency	Vin=110Vac, output full load≥80	%	
Input high voltage efficiency	Vin=220Vac, output full load≥75	%	
Output ripple and noise (mVp-p)	≤50 Rated input voltage, output fully loaded. Tested with a 20MHz bandwidth oscilloscope with 10uF and 0.1uF capacitors in parallel at the load side.	mV	
Switching on/off overshoot amplitude	(Rated input voltage, output plus 10% load)≤ 5	%V_O	
110V output overcurrent protection	0.24	A	No-damage to the whole device
220V output overcurrent protection	0.33	A	No-damage to the whole device
110V output short circuit protection	191	mA	No-damage to the whole device
220V output short circuit protection	505	mA	No-damage to the whole device
Output voltage rise time	≤300	mS	

6. Typical Application Circuit



Input parts

Component number / recommended device	Functions	Recommended value
F1/ Fuse	Protect the circuit from damage when the module is working wrong	1A/250Vac, Slow fuse
MOV1/Varistor	The cumulative surge is to protect the module from damage	10D561K
C1/ X Safety capacitance	Filtering, safety protection (EMC certification)	0.1uF/275Vac
L1/Common-mode inductance	EMI filtering	Sensible value: 10-30mH Test requirements: 1KHZ / 0.3V Current: 100-500mA



Safety capacitance

Common-mode inductance

Notes:

- Fuses and varistors are basic protection circuits (must be connected).
- Safety capacitors and common mode inductance cannot be omitted if certification is required.

Output parts

Component number / recommended device	Functions	Recommended value
C2/filter capacitor	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	

7. Safety Features

7.1 Certification

The product design meets UL, CE safety certification requirements. (UL, CE certification is done by the customer and is required to follow the reference circuit design.)

7.2 Safety and EMC.

- The input side is designed with UL recognized 1A/250Vac slow blow fuse or 10Ω wire-wound resistor;
- PCB boards are made of double-sided copper-clad boards, and the material fire rating 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℃ 70% RH
- Conductivity and radiation Conformity to EN55011, EN55022 (CISPR22)
- Electrostatic discharge IEC/EN 61000-4-2 level 4 8kV/15kV
- Radio Frequency Radiation Immunity IEC/EN 61000-4-3 See application note for detail

8. Marking, Packaging, Transportation, Storage

8.1 Marking

8.1.1 Product Marking

A unique bar-code mark of the product is affixed at an appropriate position of the product to ensure the traceability of the date of production, product batch and other information of each piece of product. Its content is in line with the provisions of national standards and industry standards.

8.1.2 Packing Marking

The product box is labeled with the name of the manufacturer, factory address, zip code, product model, factory year, month and day;

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

8.2 Packaging

The products are packaged in special blister boxes for separation, with anti-vibration function and in accordance with GB 3873.

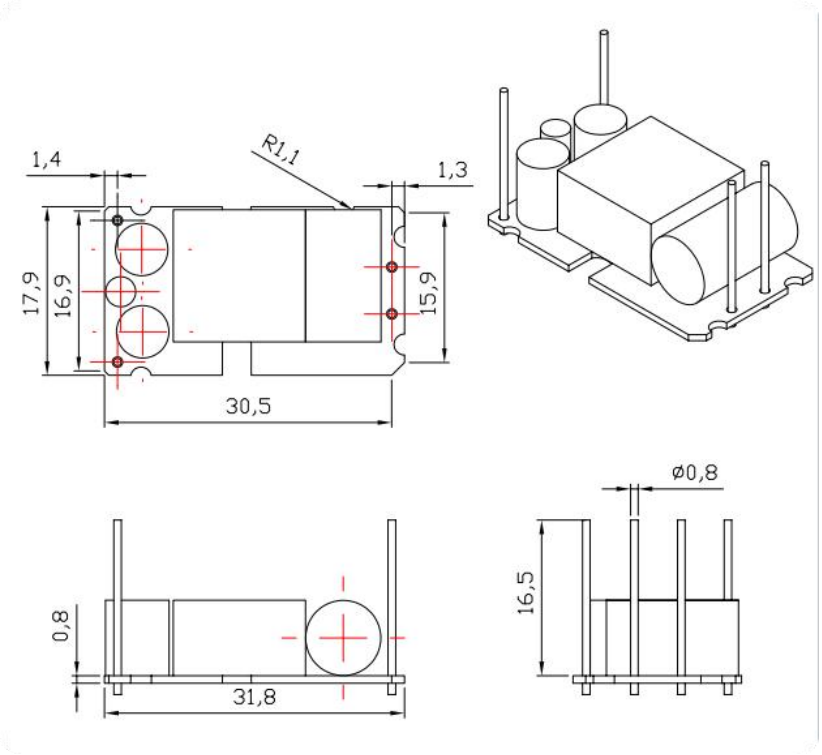
8.3 Transportation

The packaged products can be transported by any means of transportation, and should be covered during transportation without severe vibration, impact, and so on.

8.4 Storage

Product storage should comply with the provisions of GB 3873.

9. Dimensions and Weight



Pin Function	
1	AC
2	AC
3	-V0
4	+V0
Weight: 32±2g	

Dimension error:

1. Length, width, height and pin spacing error ±1mm
2. Pin length error ±1mm
3. Tolerance of pin diameter -0.2mm

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