



Shenzhen Hi-Link Electronic Co., Ltd

10W DC/DC power module 24V series

HLK-10D2405/ HLK-10D2412/ HLK-10D2415/ HLK-10D2424



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1. DC/DC power module

10W DC / DC power module A series output power is 10W, 4: 1 wide voltage input range, efficiency up to 91%, 1500VDC conventional isolation voltage, allow working temperature -40 °C to + 85 °C, with input undervoltage protection, Output over-voltage, over-current, short-circuit protection, bare metal meets CISPR32 / EN55032 CLASS A, widely used in medical, industrial control, power, instrumentation, communications, railway and other fields.

2. Product model

(MODEL)	Size (mm)	Output power (W)	Output voltage (V)	Output current (mA)	Notes
HLK-10D2405	25.4*25.4*11	10	5	2000	
HLK-10D2412		10	12	830	
HLK-10D2415		10	15	660	
HLK-10D2424		10	24	420	

3. Product Features

1. Ultra wide range input (4: 1), output 10W
2. Conversion efficiency 91% (Typ)
3. Isolation voltage 1500Vdc
4. Ultra-low standby power consumption: 0.036W (typical)
5. Ultra fast startup: 1mS (typical value)
6. Operating temperature range: -40 °C ~ + 85 °C
7. Input under voltage, output short circuit, over current, over voltage
8. Metal casing, low output ripple
9. International standard pins, PCB board in-line installation
10. Adopting high-quality environmental protection waterproof and thermally conductive adhesive potting, moisture-proof, vibration-proof, meet the waterproof and dustproof IP65 standard
11. High reliability, long life design, long continuous working time

4. Environment conditions

Project name	Technical index	Unit	Notes
Working temperature	-40—+85	°C	
Storage temperature	-40—+80	°C	
Relative humidity	5—95	%	
Heat dissipation method	Natural cooling		
Atmospheric pressure	80—106	Kpa	
Vibration	Vibration coefficient: 10~500Hz,2G10min./1cycle, 60min.each along X,Y,Z axes		Meet secondary road transport requirements

5. Electrical characteristics

5. 1. Input Features

Items	Working conditions	Unit	Notes
Rated input voltage	24	Vdc	
Input voltage range	9-36	Vdc	
Input current	≤1.3	A	
Reflected Ripple Current	40	mA	DC24V Rated input voltage series
Impulse voltage	≤50	Vdc	
Starting voltage	9	Vdc	
Input undervoltage protection	5.5	Vdc	
Startup delay time	1	ms	Rated input voltage and constant resistance load
Input filtering type		PI	
Hot plug		not support	
Remote (Ctrl) *	Module is on		-
	Module Gate		-
	Input current at shutdown	mA	- - -

Note: Tested at room temperature

5. 2. Output characteristics (5V/2000mA)

Project name	Skills requirement	Unit	Notes
No-load rated output voltage	5V±2%	Vdc	
Short time maximum output current	≥2200	mA	
Rated output current	2000	mA	
Voltage regulation	±0.5	%	
Load Regulation	±1	%	
Conversion efficiency	Vin=24Vdc , Output full load 91	%	
Output ripple and noise (mVp-p)	≤100 Pure resistive load, 20MHz bandwidth, peak-to-peak	mV	
Output voltage regulation	----	-	No regulating end
Output overcurrent protection	Output maximum load 110-200%	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
Output overvoltage protection	Output maximum voltage 110-160%	Vdc	
Insulation voltage	Input-output, test time is 1 minute, leakage current is less than 1mA/1500V	-	
Insulation resistance	Input-output, insulation voltage 500VDC	MΩ	
Isolation capacitor	input Output, 100KHz/0.1V 1000pF	-	

Note: ① For product models with output voltages of ± 5VDC and ± 9VDC, the maximum output voltage accuracy is ± 5% under 0%-5% load conditions;
 ② When tested under the working condition of 0% -00% load, the index of load adjustment rate is ± 5%;
 ③ 0% -5% load ripple & noise is less than or equal to 5% Vo. Ripple and noise test method Twisted pair test method, can add a capacitive load to the output end to reduce light load ripple.

5.3. Output characteristics (12V/830mA)

Project name	Skills requirement	Unit	Notes
No-load rated output voltage	12V±2%	Vdc	
Short time maximum output current	≥930	mA	
Rated output current	830	mA	
Voltage regulation	±0.5	%	
Load Regulation	±1	%	
Conversion efficiency	Vin=24Vdc , Output full load 91	%	
Output ripple and noise (mVp-p)	≤100 Pure resistive load, 20MHz bandwidth, peak-to-peak	mV	
Output voltage regulation	----	-	No regulating end
Output overcurrent protection	Output maximum load 110-200%	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
Output overvoltage protection	Output maximum voltage 110-160%	Vdc	
Insulation voltage	Input-output, test time is 1 minute, leakage current is less than 1mA/1500V	-	
Insulation resistance	Input-output, insulation voltage 500VDC	MΩ	
Isolation capacitor	Input Output, 100KHz/0.1V 1000pF	-	

Note: ① For product models with output voltages of ± 5VDC and ± 9VDC, the maximum output voltage accuracy is ± 5% under 0%-5% load conditions;
 ② When tested under the working condition of 0% -00% load, the index of load adjustment rate is ± 5%;
 ③ 0% -5% load ripple & noise is less than or equal to 5% Vo. Ripple and noise test method Twisted pair test method, can add a capacitive load to the output end to reduce light load ripple.

5.4 Output characteristics (15V/660mA)

Project name	Skills requirement	Unit	Notes
No-load rated output voltage	15V±2%	Vdc	
Short time maximum output current	≥760	mA	
Rated output current	660	mA	
Voltage regulation	±0.5	%	
Load Regulation	±1	%	
Conversion efficiency	Vin=24Vdc , Output full load 91	%	
Output ripple and noise (mVp-p)	≤100 Pure resistive load, 20MHz bandwidth, peak-to-peak	mV	
Output voltage regulation	---	-	No regulating end
Output overcurrent protection	Output maximum load 110-200%	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
Output overvoltage protection	Output maximum voltage 110-160%	Vdc	
Insulation voltage	Input-output, test time is 1 minute, leakage current is less than 1mA/1500V	-	
Insulation resistance	Input-output, insulation voltage 500VDC	MΩ	
Isolation capacitor	Input Output, 100KHz/0.1V 1000pF	-	

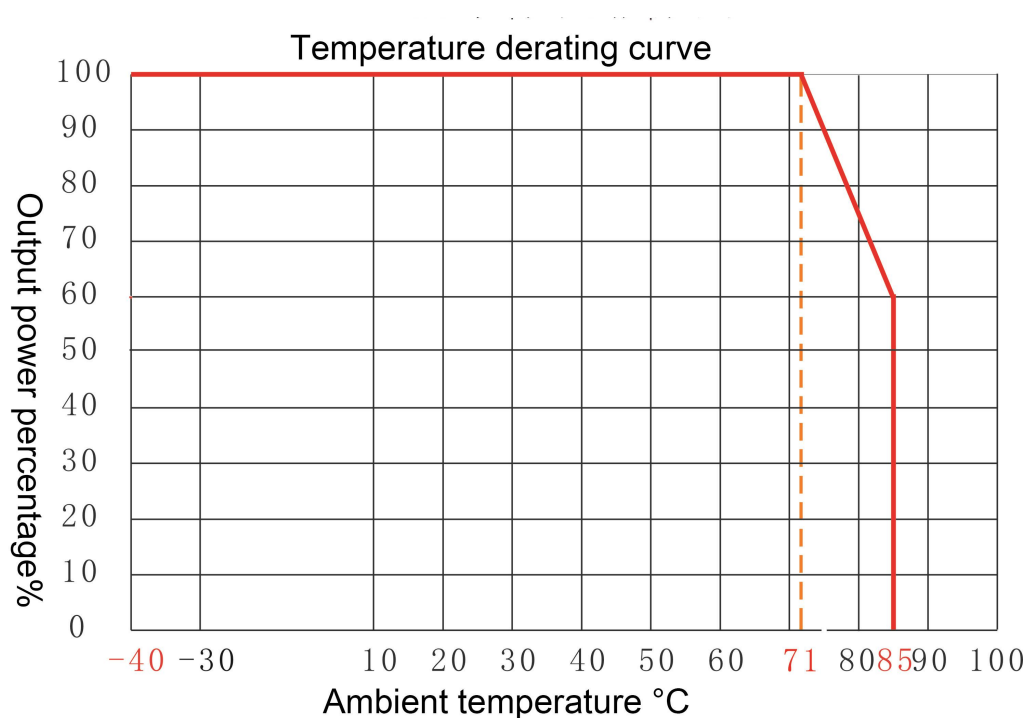
Note: ① For product models with output voltages of ± 5VDC and ± 9VDC, the maximum output voltage accuracy is ± 5% under 0%-5% load conditions;
 ② When tested under the working condition of 0% -100% load, the index of load adjustment rate is ± 5%;
 ③ 0% -5% load ripple & noise is less than or equal to 5% Vo. Ripple and noise test method Twisted pair test method, can add a capacitive load to the output end to reduce light load ripple.

5.5 Output characteristics (24V/420mA)

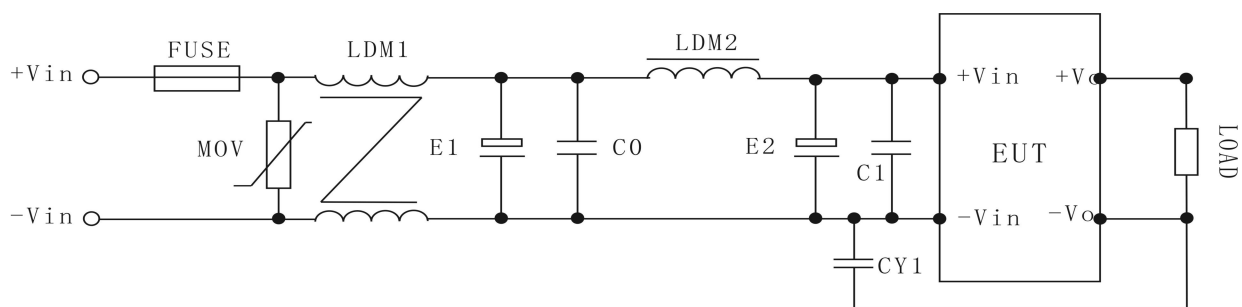
Project name	Skills requirement	Unit	Notes
No-load rated output voltage	24V±2%	Vdc	
Short time maximum output current	≥520	mA	
Rated output current	420	mA	
Voltage regulation	±0.5	%	
Load Regulation	±1	%	
Conversion efficiency	Vin=24Vdc , Output full load 91	%	
Output ripple and noise (mVp-p)	≤100 Pure resistive load, 20MHz bandwidth, peak-to-peak	mV	
Output voltage regulation	---	-	No regulating end
Output overcurrent protection	Output maximum load 110-200%	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
Output overvoltage protection	Output maximum voltage 110-160%	Vdc	
Insulation voltage	Input-output, test time is 1 minute, leakage current is less than 1mA/1500V	-	
Insulation resistance	Input-output, insulation voltage 500VDC	MΩ	
Isolation capacitor	Input Output, 100KHz/0.1V 1000pF	-	

Note: ① For product models with output voltages of ± 5VDC and ± 9VDC, the maximum output voltage accuracy is ± 5% under 0%-5% load conditions;
 ② When tested under the working condition of 0% -100% load, the index of load adjustment rate is ± 5%;
 ③ 0% -5% load ripple & noise is less than or equal to 5% Vo. Ripple and noise test method Twisted pair test method, can add a capacitive load to the output end to reduce light load ripple.

6. Derating curve



7. Typical application circuit



7.1 EMC Parameter recommendation

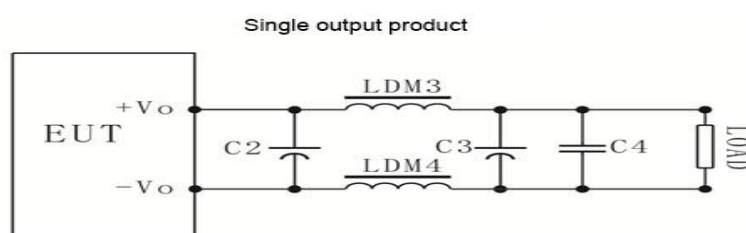
Component Tag / Recommended Device	Effect	Recommended value
FUSE/fuse	Protect the circuit from damage when the module is abnormal	Access the corresponding fuse according to customer needs
MOV1/Varistor	The cumulative surge is protecting the module from damage	14D561K
LDM1/Common mode inductance	EMIFilter	Inductance : 10-30mH

C0,C1 Ceramic capacitors	Filter capacitor	1uF/50V
E1、E2 Electrolytic capacitor	Filter capacitor	100uF/50V
LDM2/Differential mode inductance	EMI Filter	10-68uH
CY1/Y2 capacitance		1nF/250Vac

Note:

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

7.2 Output filtering part



When the requirements on ripple & noise are normal, it is recommended to use only C2 in the periphery;
when the requirements on ripple & noise are strict; the circuit above is recommended.

Note: 1、C2 and C3 use high-frequency and low-resistance electrolytic capacitors, and the total capacity cannot exceed the maximum capacitive load indicated in the manual, otherwise the module will not start normally.

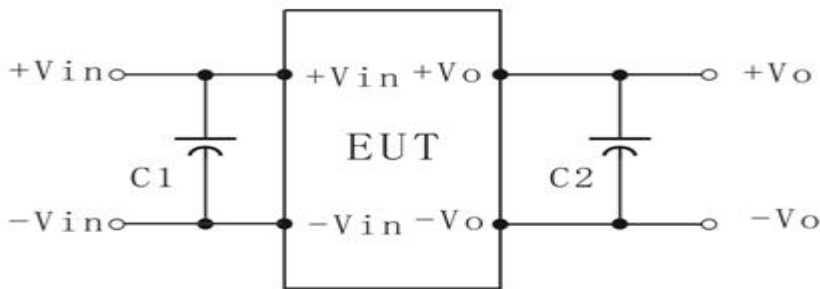
2、For capacitive load, a minimum load of 3% must be guaranteed, otherwise the output of the module will be abnormal.

Component Tag / Recommended Device	Effect	Recommended value
LDM3/Common mode inductance	Adjust the output ripple voltage	Inductance : 0.47-4.7uH According to the debugging results
LDM4/Common mode inductance	Adjust the output ripple voltage	Inductance : 0.47-4.7uH According to the debugging results
C2、C3 Electrolytic capacitor	Ripple voltage filtering	68-220uF/50V
C4 Ceramic capacitors	Ripple voltage filtering	1uF/50V

8. Test application

8.1. DC/DC Test circuit

Generally recommended capacitance: 47 μ F–100 μ F/50V



8.2. Ripple and noise test

(Twisted pair method 20MHZ bandwidth)

Test Methods:

1) The ripple noise is connected by 12 # twisted pair, the oscilloscope bandwidth is set to 20MHz, 100M bandwidth probe, and 0.1 μ F polypropylene capacitor and 47 μ F high-frequency low resistance electrolytic capacitor are connected in parallel on the probe end. .

2) Schematic diagram of output ripple noise test:

Connect the power input end to the input power, and the power output to the electronic load through the fixture board. For the test, use a 30cm $\pm$ 2 cm sampling cable to directly sample from the power output port. The power line selects the corresponding insulated wire with a corresponding diameter according to the output current.

9. Marking, packaging, transportation, storage

9.1. Marking

9.1.1. Product mark

The product's unique bar code mark is attached to the appropriate position of the product to ensure traceability of the date of manufacture, product batch, etc. of each product. Its content meets the requirements of national standards and industry standards.

9.1.2 Packaging mark

The product packaging box is marked with the name of the manufacturer, the factory address, the zip code, the product model, the factory year, month and day; It is marked with "upward", "moisture-proof" and "careful and careless" transport signs, all of which comply with the provisions of GB 191.

9.2. product

The product is packaged in a special blister box, which has anti-vibration function and complies with GB 3873.

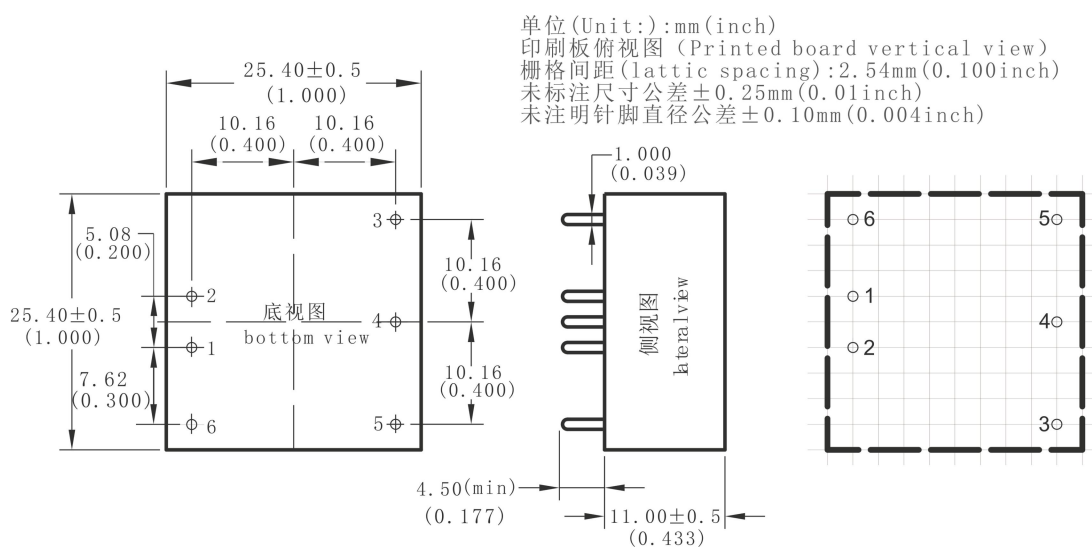
9.3. package

The packaged product can be transported by any means of transport. There should be awnings during transportation, and there should be no severe vibration or impact.

9.4. product

Product storage should comply with the provisions of GB 3873.

10 Dimensions and weight



1	2	3	4	5	6
VIN-	VIN+	VO+	NC	GND	NC
Input negative	Input positive	Output positive	---	Output negative	---