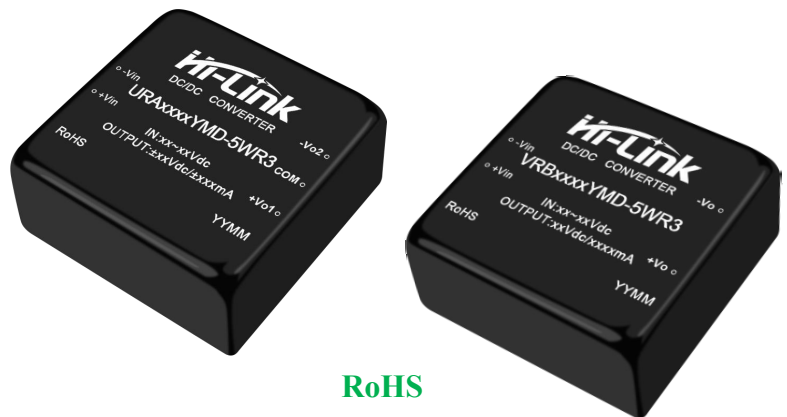


Typical Performance

- Wide voltage range input (2:1), output: 5W
- Conversion efficiency : 84% (Typ)
- Isolation voltage :1500Vdc
- Standby power consumption: 0.3W (typ.)
- Quick start: 100mS (typ.)
- Operating temperature range: -40~+85°C
- Output short circuit, over current, over voltage protection
- Metal shell, low output ripple
- International standard pins, PCB board in-line installation

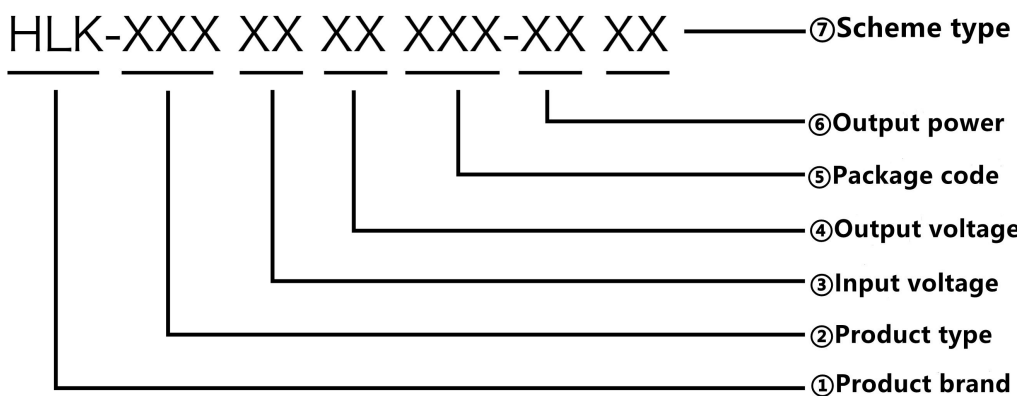
5W, wide voltage input, isolated regulated single/
dual output, DIP package,
DC-DC power supply module



RoHS

VR(A)B_YMD-5WR3 series product output power is 5W, 2:1 wide voltage input range, efficiency up to 84%, 1500VDC conventional isolation voltage, allowable operating temperature -40°Cto+85°C, with output overvoltage, overcurrent and short circuit protection. Can be widely used in medical, industrial control, electric power, instrumentation, communication, railway and other fields.

Product Coding Rules



Product Selection Table

| | Model ^① | Input voltage range (Vdc) | | Output voltage/current | | Ripple and Noise | Maximum capacitive | Efficiency @ full load |
|--|--------------------|---|---------------|------------------------|-----------------------------------|----------------------------------|--------------------|------------------------|
| | | Nominal value ^② (range value) | Maximum value | Output voltage (Vdc) | Output current (mA) (Max.Min.) | Fully loaded (mVp-p) TPY/Max. | μF | (%) Min/TPY |
| | VRB1203YMD-5WR3 | 12 (9~18) | 30 | 3.3 | 1200/0 | 30/50 | 2500 | 75/77 |
| | VRB1205YMD-5WR3 | | | 5 | 1000/0 | 30/50 | 2200 | 76/78 |
| | VRB1212YMD-5WR3 | | | 12 | 416/0 | 50/80 | 680 | 78/80 |
| | VRB1215YMD-5WR3 | | | 15 | 333/0 | 50/80 | 470 | 79/81 |
| | VRB1224YMD-5WR3 | | | 24 | 208/0 | 50/80 | 220 | 81/83 |
| | VRA1205YMD-5WR3 | | | ±5 | ±500/0 | 30/50 | 1100 | 76/78 |
| | VRA1212YMD-5WR3 | | | ±12 | ±208/0 | 50/80 | 330 | 78/80 |
| | VRA1215YMD-5WR3 | | | ±15 | ±167/0 | 50/80 | 220 | 79/81 |
| | VRA1224YMD-5WR3 | | | ±24 | ±104/0 | 50/80 | 100 | 81/83 |
| | VRB2403YMD-5WR3 | | | 24 (18~36) | 40 | 3.3 | 1200/0 | 30/50 |
| | VRB2405YMD-5WR3 | 5 | 1000/0 | | | 30/50 | 2200 | 76/78 |
| | VRB2412YMD-5WR3 | 12 | 416/0 | | | 50/80 | 680 | 80/82 |
| | VRB2415YMD-5WR3 | 15 | 333/0 | | | 50/80 | 470 | 80/82 |
| | VRB2424YMD-5WR3 | 24 | 208/0 | | | 50/80 | 220 | 82/84 |
| | VRA2405YMD-5WR3 | ±5 | ±500/0 | | | 30/50 | 1100 | 76/78 |
| | VRA2412YMD-5WR3 | ±12 | ±208/0 | | | 50/80 | 330 | 80/82 |
| | VRA2415YMD-5WR3 | ±15 | ±167/0 | | | 50/80 | 220 | 80/82 |
| | VRA2424YMD-5WR3 | ±24 | ±104/0 | | | 50/80 | 100 | 82/84 |
| | VRB4803YMD-5WR3 | 48 (36~72) | 80 | | | 3.3 | 1200/0 | 30/50 |
| | VRB4805YMD-5WR3 | | | 5 | 1000/0 | 30/50 | 2200 | 76/78 |
| | VRB4812YMD-5WR3 | | | 12 | 416/0 | 50/80 | 680 | 80/82 |
| | VRB4815YMD-5WR3 | | | 15 | 333/0 | 50/80 | 470 | 80/82 |
| | VRB4824YMD-5WR3 | | | 24 | 208/0 | 50/80 | 220 | 82/84 |
| | VRA4805YMD-5WR3 | | | ±5 | ±500/0 | 30/50 | 1100 | 76/78 |
| | VRA4812YMD-5WR3 | | | ±12 | ±208/0 | 50/80 | 330 | 80/82 |

| | | | | | | | |
|------------------|--------------|-----|-----|--------|-------|------|-------|
| VRA4815YMD-5WR3 | 110 (72-144) | 180 | ±15 | ±167/0 | 50/80 | 220 | 80/82 |
| VRA4824YMD-5WR3 | | | ±24 | ±104/0 | 50/80 | 100 | 82/84 |
| VRB11003YMD-5WR3 | | | 3.3 | 1200/0 | 30/50 | 2500 | 75/77 |
| VRB11005YMD-5WR3 | | | 5 | 1000/0 | 30/50 | 2200 | 76/78 |
| VRB11012YMD-5WR3 | | | 12 | 416/0 | 50/80 | 680 | 80/82 |
| VRB11015YMD-5WR3 | | | 15 | 333/0 | 50/80 | 470 | 80/82 |
| VRB11024YMD-5WR3 | | | 24 | 208/0 | 50/80 | 220 | 82/84 |
| VRA11005YMD-5WR3 | | | ±5 | ±500/0 | 30/50 | 1100 | 76/78 |
| VRA11012YMD-5WR3 | | | ±12 | ±208/0 | 50/80 | 330 | 80/82 |
| VRA11015YMD-5WR3 | | | ±15 | ±167/0 | 50/80 | 220 | 80/82 |
| VRA11024YMD-5WR3 | | | ±24 | ±104/0 | 50/80 | 100 | 82/84 |

Note: 1. Due to limited space, the above is just a list of typical products. If you need products other than the list, please contact the sales department of our company.

2. The maximum capacitive load indicates the maximum capacitive load that can be connected to +Vo or -Vo. If it exceeds this value, the product will not be able to start normally.

3. If the input voltage exceeds the maximum value, it may cause permanent damage to the product.

Test conditions: Unless otherwise specified, all parameter tests are measured under nominal input voltage, purely resistive rated load and 25° C room temperature.

Input Features

| Project | Working conditions | | Min. | Typ. | Max. | Unit |
|---|--|-------|------|--------|--------|------|
| Input current (full load/no load) | 12VDC Nominal Input Series, Nominal Input Voltage | 3.3V | - | 428/25 | 440/30 | mA |
| | | Other | - | 534/25 | 548/30 | |
| | 24VDC Nominal Input Series, Nominal Input Voltage | 3.3V | - | 214/13 | 220/15 | |
| | | Other | - | 267/13 | 274/15 | |
| | 48VDC Nominal Input Series, Nominal Input Voltage | 3.3V | - | 107/7 | 110/8 | |
| | | Other | - | 134/7 | 137/8 | |
| 110VDC Nominal Input Series, Nominal Input Voltage | 3.3V | - | 47/3 | 48/4 | | |
| | Other | - | 58/3 | 60/4 | | |
| Reflected Ripple Current | 12VDC Nominal Input Series, Nominal Input Voltage | | - | - | - | mA |
| | 24VDC Nominal Input Series, Nominal Input Voltage | | - | - | - | |
| | 48VDC Nominal Input Series, Nominal Input Voltage | | - | - | - | |
| | 110VDC Nominal Input Series, Nominal Input Voltage | | - | 20 | - | |

| | | | | | |
|----------------------------------|--|-------------|-----|-----|-----|
| Impulse voltage (Isec.max) | 12VDC Nominal Input Series, Nominal Input Voltage | -0.7 | - | 30 | VDC |
| | 24VDC Nominal Input Series, Nominal Input Voltage | -0.7 | - | 50 | |
| | 48VDC Nominal Input Series, Nominal Input Voltage | -0.7 | - | 100 | |
| | 110VDC Nominal Input Series, Nominal Input Voltage | -0.7 | - | 200 | |
| Starting voltage | 12VDC Nominal Input Series, Nominal Input Voltage | - | - | 9 | |
| | 24VDC Nominal Input Series, Nominal Input Voltage | - | - | 18 | |
| | 48VDC Nominal Input Series, Nominal Input Voltage | - | - | 36 | |
| | 110VDC Nominal Input Series, Nominal Input Voltage | - | - | 72 | |
| Input undervoltage protection | 12VDC Nominal Input Series, Nominal Input Voltage | - | - | - | |
| | 24VDC Nominal Input Series, Nominal Input Voltage | - | - | - | |
| | 48VDC Nominal Input Series, Nominal Input Voltage | - | - | - | |
| | 110VDC Nominal Input Series, Nominal Input Voltage | - | - | - | |
| Startup time | Nominal input voltage and constant resistance load | - | 100 | - | mS |
| Input filter type | | PI type | | | |
| Hot plug | | Not support | | | |

Output Features

| Project | Working and test conditions | +Vo1 | | | -Vo2 | | |
|---------------------------|--|------|-------------------|---------|------|-------------------|---------|
| | | Min. | Typ. | Max. | Min | Typ. | Max. |
| Output load | Load percentage | 0% | - | 100% | 0% | - | 100% |
| Output voltage accuracy | | - | ±1.0% | ±2.0% | - | ±2.0% | ±3.0% |
| Linear adjustment rate | Input voltage range | - | ±0.2% | ±0.5% | - | ±1.5% | ±2% |
| Load regulation | 20%~100% rated load, balanced load | - | ±0.5% | ±1% | - | ±4.0% | ±5.0% |
| Ripple & Noise | Pure resistive load, 20MHz bandwidth, peak-to-peak | - | 50mVp-p | 80mVp-p | - | 50mVp-p | 80mVp-p |
| Startup delay time | | - | 100ms | - | - | 100ms | - |
| Output voltage regulation | Input voltage range | - | No adjustment end | - | - | No adjustment end | - |

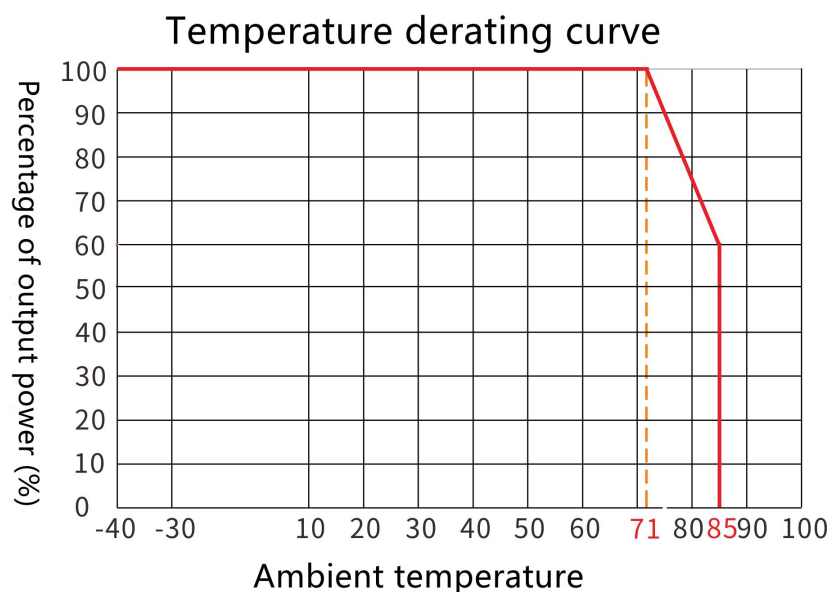
| | | | | | | | |
|---------------------------------|--------------------------|----------------------------|--------|--------|---|-------|-------|
| Dynamic response step deviation | 25% nominal load step | - | ±3.0% | ±5.0% | - | ±3.0% | ±5.0% |
| Dynamic response recovery time | | - | 300μs | 500μs | - | 300μs | 500μs |
| Output overvoltage protection | Full voltage range input | 110%Vo | - | 160%Vo | | | |
| Output overcurrent protection | Full voltage range input | 110%Io | 150%Io | 200%Io | | | |
| Output short circuit protection | Full voltage range input | Sustainable, self-recovery | | | | | |

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

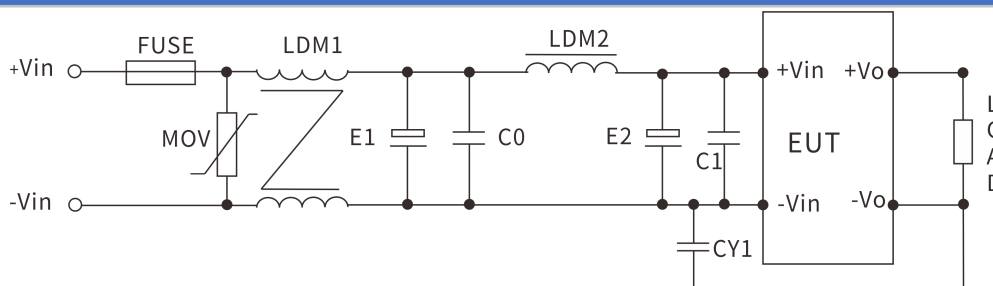
General Features

| Project | Working conditions | Min. | Typ. | Max. | Unit |
|----------------------------------|--|--------------------------------|-------------------|------|------|
| Insulation voltage | Input-output, test time : 1 minute, leakage current is less than 1mA | 1500 | - | - | VDC |
| Insulation resistance | Input-output, insulation voltage | 1000 | - | - | MΩ |
| Isolation capacitor | Input-Output, 100KHz/0.1V | - | 1000 | - | pF |
| Working temperature | Reference temperature derating curve | -40 | - | +85 | °C |
| Storage temperature | | -40 | - | +125 | |
| Working maximum case temperature | | - | - | +100 | |
| Storage humidity | No condensation | 5 | - | 95 | %RH |
| Pin soldering temperature | The solder joint is 1.5mm away from the shell, 10 seconds | - | - | +300 | °C |
| On-off level | PWM mode | - | 250 | - | KHz |
| Vibration | | 10-55Hz,10G,30Min.alongX,YandZ | | | |
| Shell material | | Aluminum shell | | | |
| Minimum time between failures | MIL-HDBK-217F@25°C | - | 2X10 ⁵ | - | Hrs |

Temperature Characteristic Curve



EMC Peripheral Recommended Circuit

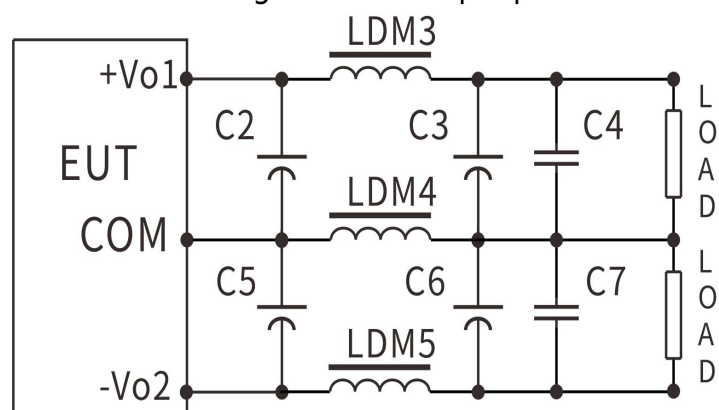


Parameter recommendation: The following are typical parameters, please adjust accordingly according to the actual use environment

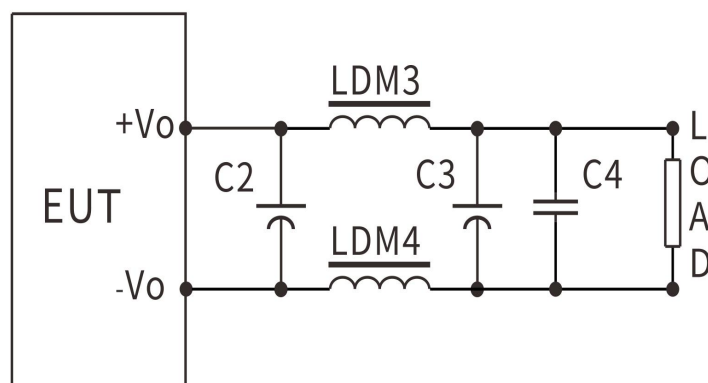
| Device code | 12V input product | 24V input product | 48V input product | 110V input product |
|-----------------------------------|---|-------------------|-------------------|--------------------|
| FMSE fuse | Access the corresponding fuse according to customer needs | | | |
| MOV varistor | 14D330K | 14D560K | 14D101K | 14D201K |
| LDM1 common mode inductance | 10mH | 10mH | 15mH | 30mH |
| E1、E2 electrolytic capacitor | 100μF/50V | 100μF/50V | 100μF/100V | 63μF/200V |
| C0、C1 ceramic capacitors | 1μF/50V | 1μF/50V | 1μF/100V | 0.47μF/250V |
| LDM2 differential mode inductance | 10μH | 10μH | 15μH | 68μH |
| CY1 safety Y2 capacitor | 1nF/250Vac | | | |

Output Filter Peripheral Recommended Circuit

Positive and negative dual output products



Single output product



When the requirements for ripple & noise are general, it is recommended to use only C2 and C5 for the periphery; when the requirements for ripple & noise are strict, the circuit shown above is recommended.

Note: 1. C2, C3, C5, C6 use high-frequency low-resistance electrolytic capacitors, and the total capacity cannot exceed the maximum capacitive load marked in the manual, otherwise the module will not be able to start normally.

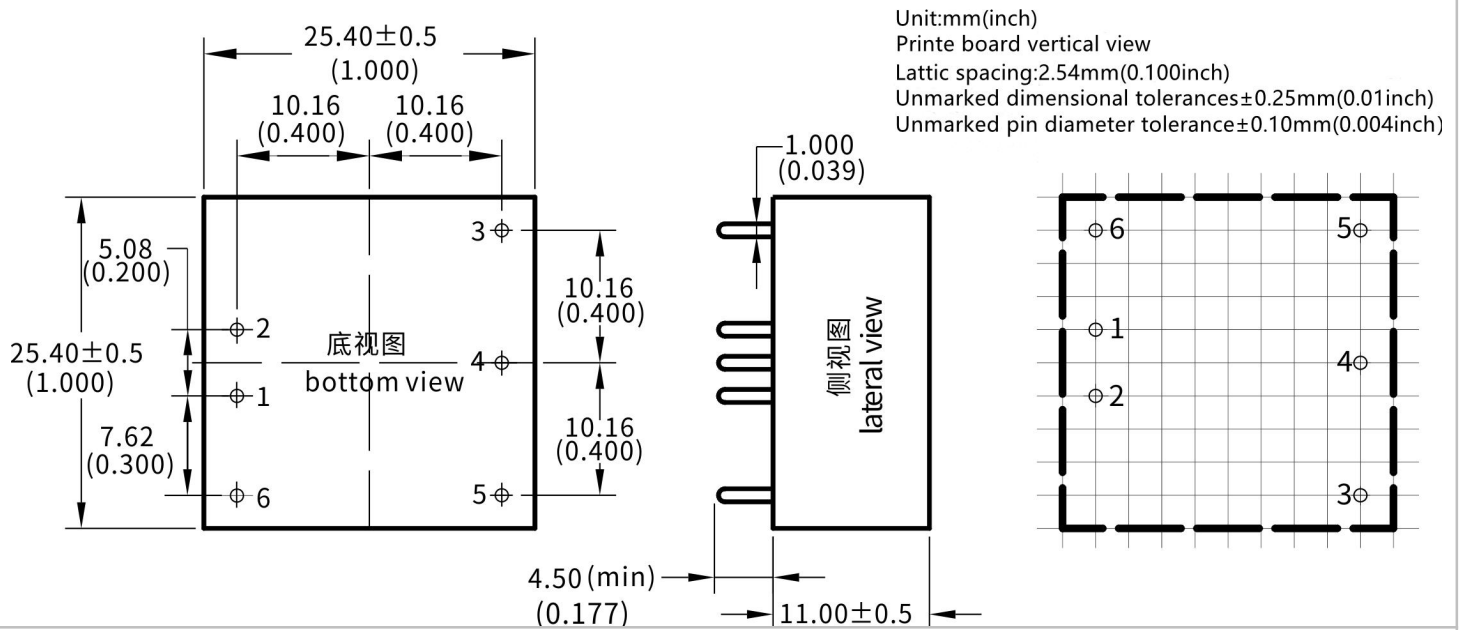
2. When the capacitive load is used, the minimum load of 3% must be guaranteed, otherwise the module output will be abnormal.

3. LDM5 is only used for dual output products.

Parameter recommendation:

| Device code | 3.3V Output | ±5V or 5V output | ±9V/12V or 9V/12V output | ±15V or 15V output | ±24V or 24V output |
|------------------------------|-------------|------------------|--------------------------|--------------------|--------------------|
| LDM3 inductance | 0.47μH | 1μH | 2.2μH | 2.2μH | 4.7μH |
| LDM4 inductance | 0.47μH | 1μH | 2.2μH | 2.2μH | 4.7μH |
| LDM5 inductance | - | 1μH | 2.2μH | 2.2μH | 4.7μH |
| C2、C3 electrolytic capacitor | 220μF | 220μF | 100μF | 100μF | 68μF |
| C5、C6 electrolytic capacitor | 220μF | 220μF | 100μF | 100μF | 68μF |
| C4、C7 electrolytic capacitor | 1μF/50V | | | | |

Package Size and Pin Function Diagram



| | | | | | | |
|------------|----------------|----------------|-------------------|------------|-------------------|------------|
| Single (S) | 1 | 2 | 3 | 4 | 5 | 6 |
| | -Vin | +Vin | +Vo | NP | GND | NC |
| | Input negative | Input positive | Output positive | No contact | Output ground | No contact |
| Double (D) | -Vin | +Vin | +Vo1 | COM | -Vo2 | NC |
| | Input negative | input positive | Output positive 1 | Commons | Output negative 2 | No contact |

***Note:** If the definition of each pin of the power module is inconsistent with the selection manual, the label on the physical label shall prevail.

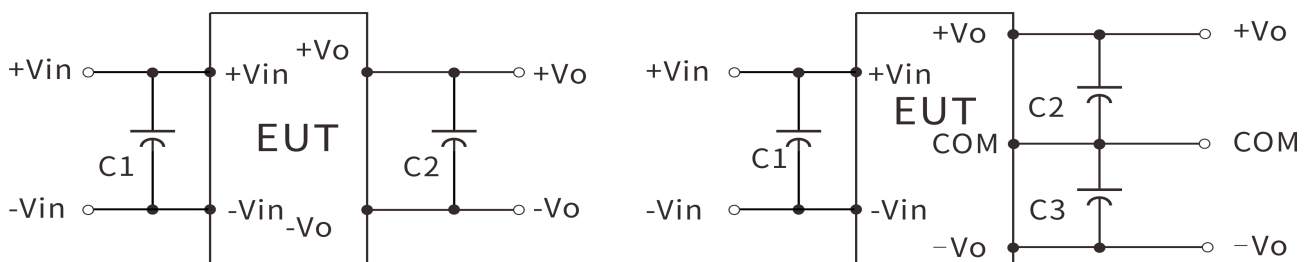
Package Description

| Package code | L×W×H | |
|--------------|------------------|-----------------------|
| A3 | 25.4×25.4×11.0mm | 1.000×1.000×0.433inch |

Test Application Reference

Recommended test circuit 1. DC/DC test circuit:

Generally recommended capacitors: C1: 47-100μF; C2、C3: 10-22μF



2、Ripple & noise test: (twisted pair method 20MHz bandwidth)

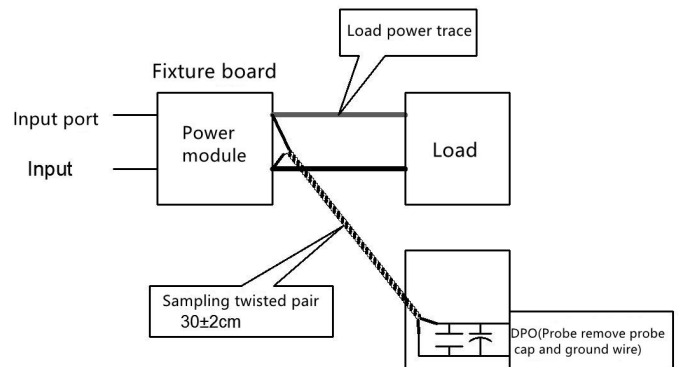
Testing method:

a) Ripple noise is connected by 12# twisted pair, the bandwidth of the oscilloscope is set to 20MHz, the bandwidth of the probe is 100M, and the 0.1uF polypropylene capacitor and the 47uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probe end, and the oscilloscope sampling uses the Sample sampling mode .

b) Schematic diagram of output ripple noise test

Connect the power input terminal to the input power supply, and connect the power output to the electronic load through the

fixture board, and use a 30cm±2cm sampling line to directly sample from the power output port for testing. According to the size of the output current, the power line selects the wire with the insulation sheath of the corresponding wire diameter.



Contact

[Shenzhen Hi-Link Electronic Co., Ltd](http://www.hlktech.net)

Add: 3rd Floor, Building 1, 1970 Science and Technology Park, Minzhi, Longhua District, Shenzhen, Guangdong, China
518131

Website: www.hlktech.net

E-mail: sales@hlktech.com

Tel: 0755-23152658