

Typical performance

- Sustainable short circuit protection
- Isolated voltage 1500VDC/min, 3000VDC/1s
- No-load input current as low as 5mA
- Working environment temperature: -40°C~+85°C
- Efficiency up to 88%
- International standard pin mode
- Small SIP package
- Low ripple/noise (20MH bandwidth): 30mVp-p(typ)
- MTBF≥3.5 million hours (3500000Hrs)

B_S-1WR3 series is a small size, high-efficiency micro power, constant voltage, input isolation and unregulated, single output DC/DC power supply module provided by Hi-link to customers; this series of products are specially designed for the needs of on-board power supply systems. Designed for applications that generate a set of voltages isolated from the input power supply.

This product is suitable for:

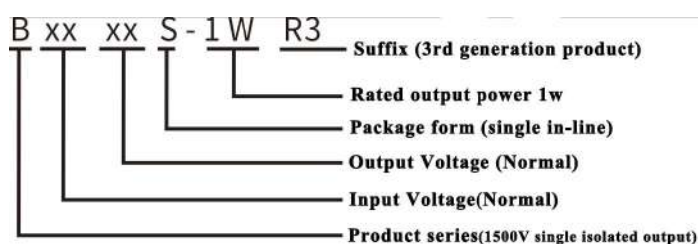
- The voltage of the input power supply is relatively stable (voltage variation range $\pm 10\%V_{in}$);
- Isolation is required between input and output (isolation voltage $\leq 1500VDC$);
- The requirements for output voltage stability are not high;
- Typical applications: pure digital circuits, general low-frequency analog circuits, relay drive circuits, data exchange circuits, etc.

1W, constant voltage input,
isolated unregulated single output
DC-DC power module



Continuous short-circuit protection, RoHS

Product Coding Rules



Product List

| Certificate | Product Module number ^① | Input Voltage range (Vdc) | Output Voltage/Current | | Ripple and Noise | Efficiency @ full load | Maximum capacitive load |
|-------------|------------------------------------|---|------------------------|-----------------------------------|-------------------------------|------------------------|-------------------------|
| | | Nominal value ^② (range value) | Output voltage (Vdc) | Output current (mA) (Max.Min.) | Full load (mVp-p) Typ/Max. | %, (Min/Typ) | uF |
| | B0303S-1WR3 | 3.3 | 3.3 | 303/30 | 30/80 | 78/81 | 2400 |
| | B0305S-1WR3 | (2.97~3.63) | 5 | 200/20 | 30/80 | 79/82 | 2400 |

DC/DC isolated module

Shenzhen Hi-Link Electronic Co.,Ltd.

| | | | | | | | |
|--|-------------|-------------------|-----|--------|--------|-------|------|
| | B0309S-1WR3 | | 9 | 111/12 | 30/80 | 79/82 | 1000 |
| | B0312S-1WR3 | | 12 | 84/9 | 30/80 | 80/83 | 560 |
| | B0315S-1WR3 | | 15 | 67/7 | 30/80 | 80/83 | 560 |
| | B0324S-1WR3 | | 24 | 42/4 | 50/100 | 81/84 | 220 |
| | B0503S-1WR3 | 5 (4.5~5.5) | 3.3 | 303/30 | 30/80 | 80/83 | 2400 |
| | B0505S-1WR3 | | 5 | 200/20 | 30/80 | 85/88 | 2400 |
| | B0509S-1WR3 | | 9 | 111/12 | 30/80 | 80/83 | 1000 |
| | B0512S-1WR3 | | 12 | 84/9 | 30/80 | 80/83 | 560 |
| | B0515S-1WR3 | | 15 | 67/7 | 30/80 | 80/83 | 560 |
| | B0524S-1WR3 | | 24 | 42/4 | 50/100 | 81/85 | 220 |
| | B1203S-1WR3 | 12 (10.8~13.2) | 3.3 | 303/30 | 30/80 | 81/84 | 2400 |
| | B1205S-1WR3 | | 5 | 200/20 | 30/80 | 86/88 | 2400 |
| | B1209S-1WR3 | | 9 | 111/12 | 30/80 | 87/89 | 1000 |
| | B1212S-1WR3 | | 12 | 84/9 | 30/80 | 88/90 | 560 |
| | B1215S-1WR3 | | 15 | 67/7 | 30/80 | 88/90 | 560 |
| | B1224S-1WR3 | | 24 | 42/4 | 50/100 | 88/90 | 220 |
| | B1503S-1WR3 | 15 (13.5~16.5) | 3.3 | 303/30 | 30/80 | 81/84 | 2400 |
| | B1505S-1WR3 | | 5 | 200/20 | 30/80 | 86/88 | 2400 |
| | B1509S-1WR3 | | 9 | 111/12 | 30/80 | 87/89 | 1000 |
| | B1512S-1WR3 | | 12 | 84/9 | 30/80 | 88/90 | 560 |
| | B1515S-1WR3 | | 15 | 67/7 | 30/80 | 88/90 | 560 |
| | B1524S-1WR3 | | 24 | 42/4 | 50/100 | 88/90 | 220 |
| | B2403S-1WR3 | 24 (21.6~26.4) | 3.3 | 303/30 | 30/80 | 81/84 | 2400 |
| | B2405S-1WR3 | | 5 | 200/20 | 30/80 | 86/88 | 2400 |
| | B2409S-1WR3 | | 9 | 111/12 | 30/80 | 87/89 | 1000 |
| | B2412S-1WR3 | | 12 | 84/9 | 30/80 | 88/91 | 560 |
| | B2415S-1WR3 | | 15 | 67/7 | 30/80 | 88/91 | 560 |
| | B2424S-1WR3 | | 24 | 42/4 | 50/100 | 88/91 | 220 |

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.

Test conditions: Without specified needs, all parameter tests are measured at nominal input voltage, purely resistive rated load and 25°C room temperature.

Input Characteristics

| Items | Working conditions | Min. | Typ. | Max. | Unit |
|--|--------------------|----------------------|-------|-------|------|
| Input current (fully loaded/unloaded) | 3.3VDC Input | -- | 378/8 | --/15 | mA |
| | 5VDC Input | -- | 241/5 | --/10 | |
| | 12VDC Input | -- | 100/2 | --/8 | |
| | 15VDC Input | -- | 83/2 | --/6 | |
| Reflected Ripple Current | | -- | 15 | -- | mA |
| Impulse voltage (Isec.max) | 3.3VDC Input | -0.7 | -- | 5 | VDC |
| | 5VDC Input | -0.7 | -- | 9 | |
| Input filter type | | Capacitive filtering | | | |
| Hot plug | | Not available | | | |

Output Characteristics

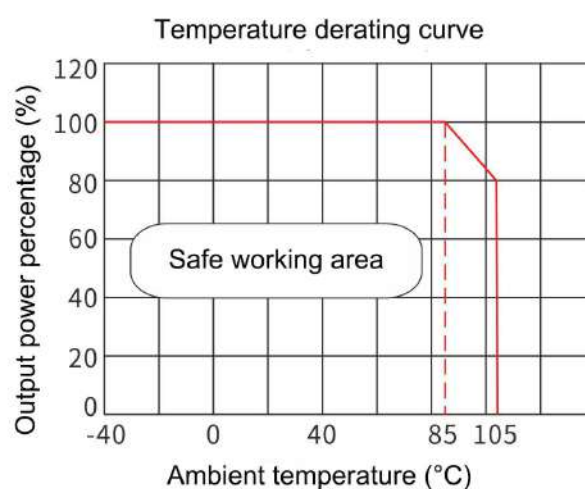
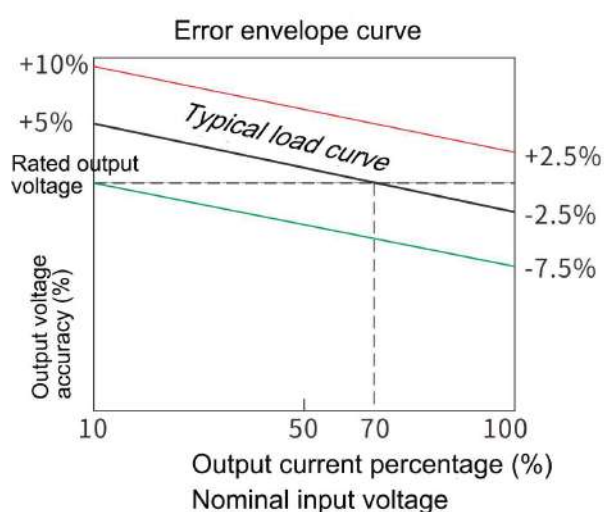
| Items | Working and test conditions | | Min. | Typ. | Max. | Unit |
|---------------------------------|--|---------------|------|------|-------|-------|
| Output load | Load percentage | | 10 | -- | 100 | % |
| Output Voltage Accuracy | Refer to Error Envelope Curve | | -- | -- | ±15.0 | % |
| Linear adjustment rate | Input voltage variation | 3.3V Output | -- | -- | ±1.5 | % |
| | | Others | -- | -- | ±1.2 | % |
| Load Regulation | 10%~100% Load | 3.3VDC Output | -- | 15 | 20 | % |
| | | 5VDC Output | -- | 10 | 15 | % |
| | | 9VDC Output | -- | 8 | 10 | % |
| | | 12VDC Output | -- | 7 | 10 | % |
| | | 15VDC Output | -- | 6 | 10 | % |
| | | 24VDC Output | -- | 5 | 10 | % |
| Ripple & Noise | Pure resistive load, 20MHz bandwidth, peak-to-peak | | -- | 30 | 80 | mVp-p |
| Temperature Drift Coefficient | Full load | | -- | -- | ±0.03 | %/°C |
| Output short circuit protection | | | -- | -- | 1 | S |

Note: ①The test method of ripple and noise is twisted pair test method.

General Characteristics

| Items | Working conditions | Min. | Typ. | Max. | Unit |
|---|---|--|------|------|------|
| Insulation voltage | Input-output, test time is 1 minute, leakage current is less than 1mA | 1500 | -- | -- | VDC |
| Insulation resistance | Input-output, insulation voltage 500VDC | 1000 | -- | -- | MΩ |
| Isolation capacitor | Input-output, 100KHz/0.1V | -- | 20 | -- | pF |
| Operating temperature | Refer to Temperature Derating Curve | -40 | -- | +85 | °C |
| Storage temperature | | -40 | -- | +125 | |
| Shell temperature rise during operation | | -- | 25 | -- | |
| 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 | Full load, nominal voltage input | -- | 100 | -- | KHz |
| Shock | | 10-55Hz, 10G, 30Min.alongX, Y andZ | | | |
| Shell material | | Black flame retardant heat resistant plastic (UL94V-0) | | | |
| Minimum time between failures | MIL-HDBK-217F@25°C | 3.5X10 ⁶ | -- | -- | Hrs |

Product characteristic curve



Typical Application Reference Circuit (Recommended Parameters)

1.General application: Details of recommended capacitive load values (Table 1)

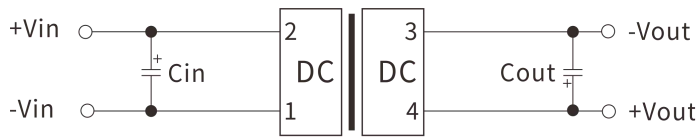


Figure 1

If it is required to further reduce the input and output ripple, a capacitor filter network can be connected to the input and output ends, and the application circuit is shown in Figure 1.

However, attention should be paid to the selection of appropriate filter capacitors. If the capacitor is too large, it is likely to cause startup problems. For each output, under the condition of ensuring safe and reliable operation, the recommended capacitive load value is shown in Table 1.

| Vin(Vdc) | Cin(uF) | Vo(Vdc) | Cout(uF) |
|----------|---------|---------|----------|
| 3.3/5 | 4.7 | 3.3/5 | 10 |
| 12 | 2.2 | 9 | 4.7 |
| 15 | 2.2 | 12 | 2.2 |
| | | 15 | 1 |
| - | - | | |

2. EMI typical application circuit



Figure 2

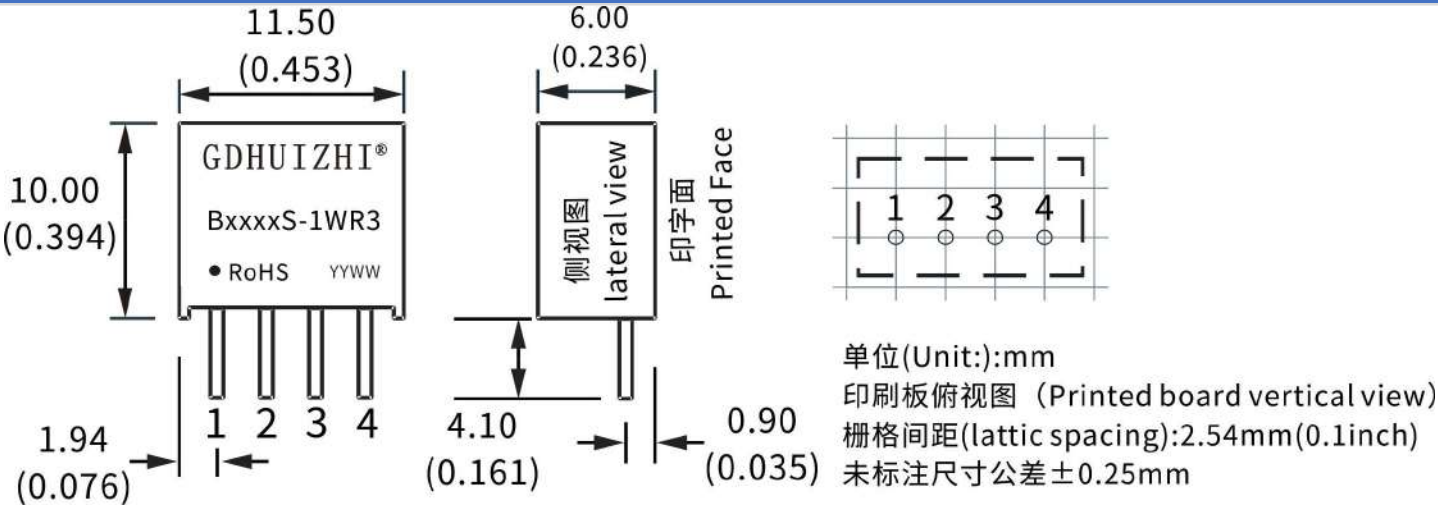
3. Output load requirements

In order to ensure that the module can work efficiently and reliably, the minimum output load cannot be less than 10% of the rated load when in use. If the power you need is really small, please connect a resistor in parallel between the positive and negative poles of the output terminal (the sum of the actual power used by the resistor is greater than or equal to 10% of the rated power and the rated power of the selected resistor must be greater than 5 times the actual power used, otherwise the temperature of the resistor will be higher).

Recommended EMI Reference Circuit Values (Table 2)

| | |
|----------|------------------|
| Vin(Vdc) | 3.3/5/12/15 |
| Cin | 4.7uF/50V |
| Cout | Refer to Table 1 |
| Lin | 4.7uH |
| Lout | 4.7uH |

Package size and pin function diagram



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.

| | | | | |
|----------|-----|------|-----|-----|
| Pin | 1 | 2 | 3 | 4 |
| Function | GND | +Vin | -Vo | +Vo |

Package description

| | | |
|--------------|------------------|-----------------------|
| Package code | LxWxH | |
| S | 11.50x6.0x10.0mm | 0.453×0.236×0.394inch |

Test Application Reference

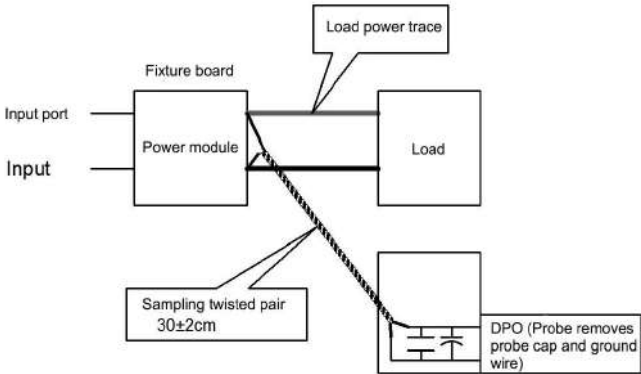
Ripple and noise test (Twisted pair method, 20MHZ bandwidth)

Testing method:

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

(2) Schematic diagram of output ripple&noise test:

Connect the power input terminal to the input power supply terminal. The power output is connected to the electronic load through the fixture board. The test uses a 30cm ± 2 cm sampling line to sample directly from the power output port. The power line selects the insulated wire with the corresponding wire diameter according to the magnitude of the output current.



Product application considerations

1. Input requirements: Ensure that the output voltage fluctuation range of the power supply does not exceed the input requirements of the DC / DC module itself, and the output power of the input power supply must be greater than the output power of the DC / DC module.
2. One recommended circuit: For applications where ripple and noise requirements are normal, a filter capacitor can be connected in parallel at the input and output ends. The external circuit is shown in the following figure1 with the recommended value details of the filter capacitor. Output load requirements: Try to avoid no-load use. When the actual power consumption of the load is less than 10% of the rated output power of the module or there is no-load phenomenon, it is recommended that a dummy load be connected to the output end. The dummy load (resistance) can be calculated by $5\sim 10\%$ of the rated power of the module, resistance value = $U_{out} / (1W * 10\%)$.
3. Over-load protection: Under normal operating conditions, the output circuit of this product has no protection function against overload conditions. The easiest way is to connect a resettable fuse in series at the input end, or add a circuit breaker to the circuit.
4. The external capacitor of the output terminal should not be too large, otherwise it will easily cause over-current or poor start-up when the module starts.
5. If the product works below the minimum required load, the performance of the product cannot be guaranteed to meet all performance indications in this manual.
6. The maximum capacitive load is tested under the input voltage range and full load condition.
7. Unless special instructions, all indexes in this manual are measured at the condition, $T_a = 25\text{ }^{\circ}\text{C}$, humidity $<75\%$ RH, nominal input voltage and output rated load.
8. All index testing methods in this manual are based on the company's standards
9. Our company can provide product customization, and you can directly contact our technical staff for specific conditions
10. Product specifications are subject to change without notice.

Contact

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