

Typical Characteristics

- Fixed-voltage input, isolated unregulated, output, power: 3W
- Isolation voltage: 1500VDC/1min, 3000VDC/1s
- Low no-load power consumption: 0.025W(Typ.)
- Working ambient temperature: -40℃~+85℃
- Efficiency: up to 91%
- Output short-circuit protection: continuous short-circuit protection, automatic recovery
- Industry standard pin-out
- Compact SIP package
- Ripple/noise (20MHz bandwidth): 30mVp-p(Typ.)
- MTBF≥3.5 million hours (3500000Hrs)

3W, fixed-voltage input, isolated unregulated, single-output DC/DC power module



Over-temperature protection and continuous output short-circuit protection
RoHS

*B_M-3WR3 Series—is a compact, high-efficiency, low-power, fixed-voltage, input-isolated, non-regulated single-output DC/DC module power supply designed by Huizhi Electronics for its customers;
This product series is specifically designed for applications in on-board power supply systems that require the generation of a voltage isolated from the input power source.
This product is suitable for:*

- Applications where the input voltage is relatively stable (voltage variation range: $\pm 10\%$ V_{in});
- Applications requiring isolation between the input and output (isolation voltage ≤ 1500 VDC);
- Applications with high requirements for output voltage stability and low output ripple and noise;
- Typical applications: pure digital circuits, general low-frequency analog circuits, relay driver circuits, data switching circuits, etc.

Model Number Description

B	xx	xx	M	-	3W	R3	
							Suffix (3rd-generation product)
							Rated output power (3W)
							Package type (Single In-line Package, SIP)
							Output voltage (rated)
							Input voltage (rated)
							Product series (1500V isolated single output)

Product Selection Table

Cer tif ica tio n	Model number	Input voltage range (Vdc)	Output Voltage/Current		Ripple and Noise	Efficiency@ Full load	Max. capaci tive load
		Rated value ^② (Range)	Output V (Vdc)	Output I (mA) (Max. Min.)	Full Load (mVp-p) Typ. /Max.	% (Min. / Typ.)	μ F

	B0503M-3WR3	5 (4.5~5.5)	3.3	909/90	50/80	77/81	2400
	B0505M-3WR3		5	600/60	50/80	83/86	2400
	B0509M-3WR3		9	333/33	50/80	83/86	1000
	B0512M-3WR3		12	250/25	80/120	83/86	560
	B0515M-3WR3		15	200/20	80/150	83/86	560
	B0524M-3WR3		24	125/12	100/200	83/86	220
	B0903M-3WR3	9 (8.1~9.9)	3.3	909/90	50/80	77/81	2400
	B0905M-3WR3		5	600/60	50/80	83/86	2400
	B0909M-3WR3		9	333/33	50/80	83/86	1000
	B0912M-3WR3		12	250/25	50/80	83/86	560
	B0915M-3WR3		15	200/20	50/80	83/86	560
	B0924M-3WR3		24	125/12	50/80	83/86	220
	B1203M-3WR3	12 (10.8~13.2)	3.3	909/90	50/80	77/81	2400
	B1205M-3WR3		5	600/60	50/80	83/86	2400
	B1209M-3WR3		9	400/40	50/80	83/86	1000
	B1212M-3WR3		12	333/33	50/80	83/86	560
	B1215M-3WR3		15	200/20	50/80	83/86	560
	B1224M-3WR3		24	125/12	50/80	83/86	220
	B1503M-3WR3	15 (13.5~16.5)	3.3	909/90	50/80	77/81	2400
	B1505M-3WR3		5	600/60	50/80	83/86	2400
	B1509M-3WR3		9	400/40	50/80	83/86	1000
	B1512M-3WR3		12	333/33	50/80	83/86	560
	B1515M-3WR3		15	200/20	50/80	83/86	560
	B1524M-3WR3		24	125/12	50/80	83/86	220
	B2403M-3WR3	24 (21.6~26.4)	3.3	909/90	50/80	77/81	2400
	B2405M-3WR3		5	600/60	50/80	83/86	2400
	B2409M-3WR3		9	333/33	50/80	83/86	1000
	B2412M-3WR3		12	250/25	50/80	83/86	560
	B2415M-3WR3		15	200/20	50/80	83/86	560
	B2424M-3WR3		24	125/12	50/80	83/86	220

Note: 1. Due to space limitations, the above is only a list of representative products. For products not included in this list, please contact our sales department.

2. The maximum capacitive load indicates the maximum capacitive load that can be connected to +Vo or -Vo. If this value is exceeded, the product will not start properly.

Test Conditions: Unless otherwise specified, all parameter measurements were taken at the nominal input voltage, with a purely resistive rated load, and at an ambient temperature of 25° C.

Input characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Input Current (Full Load/No Load)	5VDC input series	--	740/15	--/20	mA
	9VDC input series	--	416/10	--/15	
	12VDC input series	--	308/5	--/15	

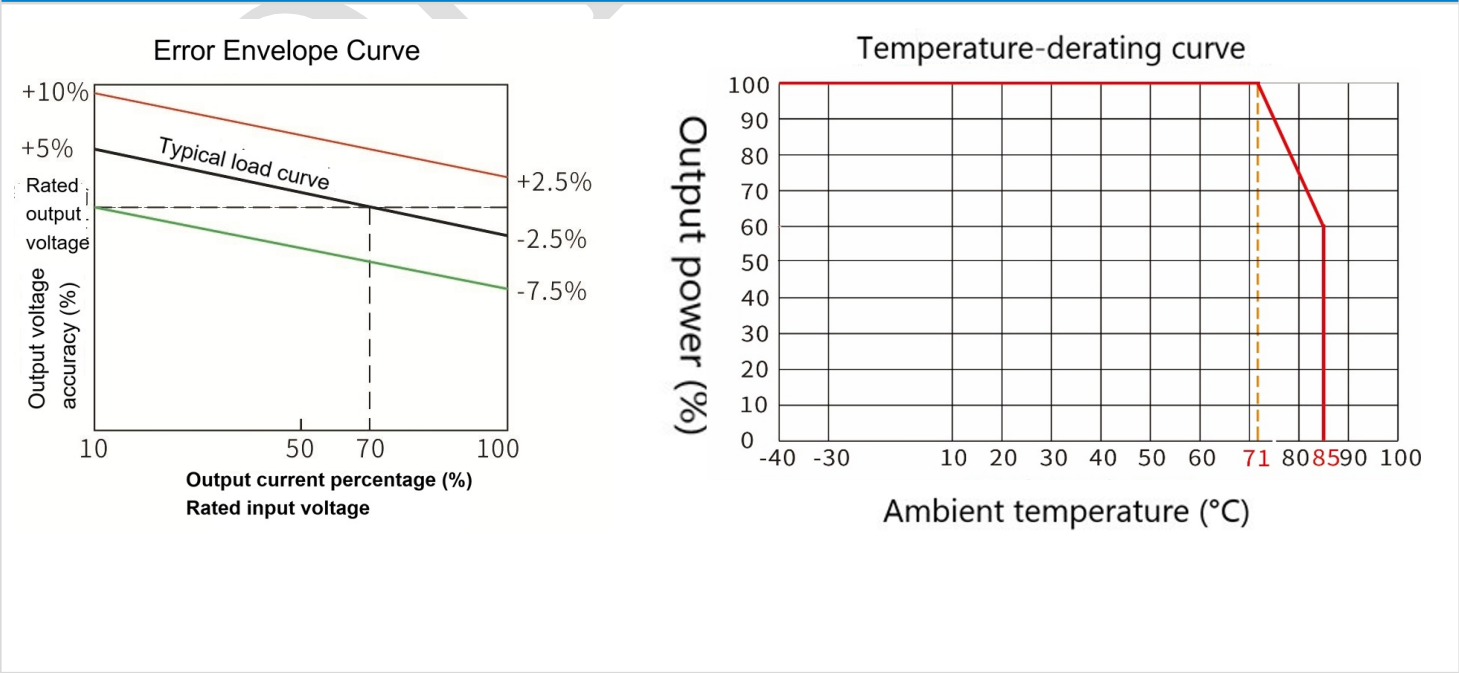
	15VDC input series	--	247/4	--/12	
	24VDC input series	--	154/2	--/8	
Reflected Ripple Current		--	15	--	
Impulse voltage (1 sec. max)	3.3VDC input series	-0.7	--	5	VDC
	5VDC input series	-0.7	--	5	
	9VDC input series	-0.7	--	9	
	12VDC input series	-0.7	--	18	
	15VDC input series	-0.7	--	20	
	24VDC input series	-0.7	--	30	
Input filter type		Capacitor filtering			
Hot swap		Not supported			

Output characteristics						
Items	Working and test conditions		Min.	Typ.	Max.	Unit
Output load	Load percentage		10	--	100	%
Output voltage accuracy	See the error envelope curve		--	--	±15.0	%
Line Regulation	Input voltage variation: ±1%	3.3V output	--	--	±1.5	%
		Others	--	--	±1.2	%
Load Regulation	10%~100% load	3.3VDC output	--	18	--	%
		5VDC output	--	12	--	%
		9VDC output	--	8	--	%
		12VDC output	--	7	--	%
		15VDC output	--	6	--	%
		24VDC output	--	5	--	%
Ripple & Noise	Pure resistive load, 20 MHz bandwidth, peak-to-peak value		--	30	80	mVp-p
Temperature drift coefficient	Full load		--	--	±0.03	%/° C
Output short-circuit protection	Sustainable short-circuit protection, automatic recovery					
Note: ① Test method for ripple and noise: Twisted-pair test method.						

General characteristics

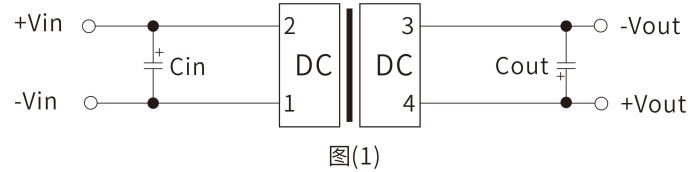
Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test duration: 1 minute, leakage current less than 1 mA.	1500	---	---	VDC
Insulation resistance	Input-output, insulation voltage 500 VDC.	1000	---	---	MΩ
Isolation capacitor	Input-Output, 100 kHz/0.1 V	---	40	---	pF
Operating temperature	Use the reference temperature derating curve	-40	---	+85	℃
Storage temperature		-40	---	+125	
Maximum operating case temperature		---	25	---	
Storage humidity	No condensation	5	---	95	%RH
Pin soldering temperature resistance	The solder joint is 1.5 mm from the housing; 10 seconds	---	---	+300	℃
Switching frequency	Full load, rated voltage input	---	100	---	KHz
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Housing material		Black flame-retardant, heat-resistant plastic (UL94 V-0)			
Minimum mean time between failures	MIL-HDBK-217F@25℃	3.5X10 ⁶	---	---	Hrs

Product Performance Curve



Typical Application Reference Circuit (Recommended Parameters)

1. General applications:



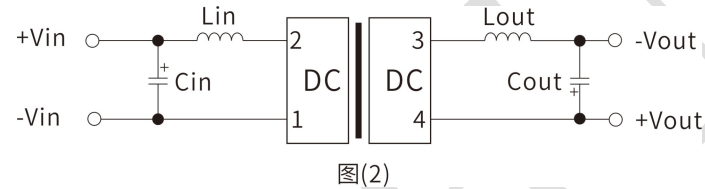
If further reduction of input and output ripple is required, a capacitor filter network can be connected across the input and output terminals; the circuit is shown in Figure 1.

However, care must be taken to select an appropriate filter capacitor. If the capacitor is too large, it is likely to cause startup issues. For each output channel, the recommended capacitive load values—which ensure safe and reliable operation—are listed in Table 1.

Recommended capacitive load values (Table 1)

Vin (Vdc)	Cin(u)	Vo (Vdc)	Cout(u F)
3.3/5	4.7	3.3/5	10
12	2.2	9	4.7
15	2.2	12	2.2
24	1	15	1
—	—	24	1

2. Typical EMI application circuits



Recommended EMI reference circuit values (Table 2)

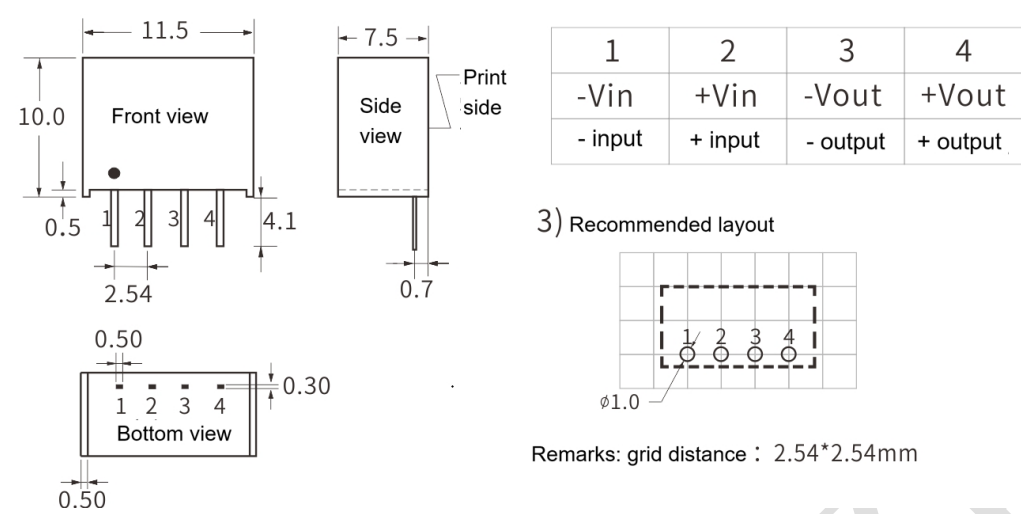
Vin (Vdc)	3.3/5/12/15/24
Cin	4.7u F/50V
Cout	See table 1
Lin	4.7uH
Lout	4.7uH

3. Output load requirements

To ensure that this module operates efficiently and reliably, the minimum output load must not be less than 10% of the rated load during use. If your power requirement is indeed very low, please connect a resistor in parallel between the positive and negative terminals of the output (the total power rating of the resistor must be greater than or equal to 10% of the rated power, and the selected resistor's power rating must be at least 5 times greater than the actual power consumption; otherwise, the resistor will become excessively hot).

Appearance Dimensions and Pin Assignment, Recommended PCB Layout

1) Appearance Dimensions (Unit: mm, Tol.: xx ±0.25) 2) Pin Assignment



*Note: If the pin definitions of the power module differ from those in the selection guide, refer to the labels on the actual product.

Package Description

Package code	L x W x H	
M	11.50 x 7.5 x 10.0mm	0.453 × 0.295 × 0.394inch

Test Application Reference

Ripple & Noise Testing: (Twisted-pair method, 20 MHz bandwidth)

Test Method:

- For ripple and noise testing, use a Category 12 twisted-pair cable. Set the oscilloscope bandwidth to 20 MHz and use a 100 MHz bandwidth probe. Connect a 0.1 μF polypropylene capacitor and a 4.7 μF high-frequency, low-impedance electrolytic capacitor in parallel at the probe tip. Set the oscilloscope to “Sample” mode.
- Schematic diagram for output ripple and noise testing:

Connect the power supply input to the input power source. Connect the power supply output to the electronic load via the fixture board. For testing, use a 30 cm ± 2 cm sampling lead to take a direct sample from the power supply output port. Select insulated wires with appropriate gauge based on the magnitude of the output current.

Schematic diagram for output ripple and noise testing:

- Input端 (Input):** Connects to the **电源模块 (Power Module)**.
- 电源模块 (Power Module):** Connects to the **负载 (Load)** via the **夹具板 (Jig board)**.
- 负载 (Load):** Connects to the **负载功率走线 (Load power routing)**.
- 夹具板 (Jig board):** Connects to the **负载功率走线 (Load power routing)**.
- 负载功率走线 (Load power routing):** Connects to the **负载 (Load)**.
- 采样双绞线 (Sampling twisted-pair cable):** Connects to the **负载功率走线 (Load power routing)**.
- DPO (Remove the probe cap and ground wire from the probe):** Connects to the **负载功率走线 (Load power routing)**.

Application Precautions

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; the output power of the input power supply must be greater than the output power of the DC/DC module.
2. Recommended Circuit 1: For applications with general ripple and noise requirements, a filter capacitor can be connected in parallel at both the input and output terminals. The external circuit is shown in Figure (1) below; refer to Table (1). Output Load Requirements: Avoid operating under no-load conditions whenever possible. When the actual power consumption of the load is less than 10% of the module's rated output power or no-load conditions occur, it is recommended to connect a dummy load to the output. The dummy load (resistor) can be calculated based on 5-10% of the module's rated power, where the resistance value = $U_{out} / (1W \times R3 \times 10\%)$;
3. Overload Protection: Under normal operating conditions, the product's output circuit does not provide overload protection. Prolonged overload will trigger over-temperature protection, causing the output to shut down;
4. The output features continuous short-circuit protection with automatic recovery.
5. The capacitance of the external capacitor connected to the output should not be too large, as this may cause overcurrent or poor startup during module startup;
6. If the product operates below the minimum required load, performance compliance with all specifications in this manual cannot be guaranteed;
7. Maximum capacitive loads are tested within the input voltage range and under full-load conditions;
8. Unless otherwise specified, all specifications in this manual are measured at $T_a=25^{\circ}C$, humidity $<75\%RH$, nominal input voltage, and rated output load;
9. All test methods for the specifications in this manual are based on our company's standards;
10. We offer product customization; please contact our technical staff directly for details;
11. Product specifications are subject to change without notice.

Contact

GDHUIZHI®

广东汇智电子科技有限公司

Guangdong Huizhi Electronic Technology Co., Ltd.

地址: 广东省肇庆市端州区 11 区肇庆大道北侧厂房、办公楼(二期)3 楼

Add.: 3rd floor, factory and office building (phase II) on the north side of Zhaoqing Avenue,

District 11, Duanzhou District, Zhaoqing City, Guangdong Province, China

Homepage: www.huizhi-elec.com/www.chinaebizal.com

Tel: +86 - 758 - 2566 585

E-mail: sales@huizhi-elec.com