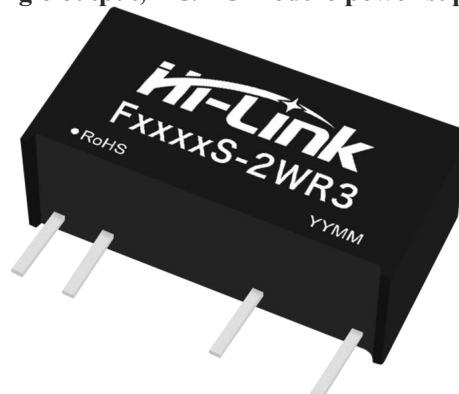


## Typical performance

- Features: constant voltage input, isolated non-regulated output, 2W power
- Isolation voltage: 3000VDC
- Low no-load power consumption: 0.025W(Typ.)
- Efficiency: up to 90%
- Working temperature: -40℃ ~ +85℃
- MTBF ≥ 3.5 million hours (3500000Hrs)
- Output short-circuit protection: Sustainable short-circuit protection, automatic recovery
- Small SIP package
- International standard pin mode
- Ripple/noise(20MHzbandwidth):30mVp-p(Typ.)

2W, Constant voltage input, isolated non-regulated voltage, Single output, DC/DC module power supply



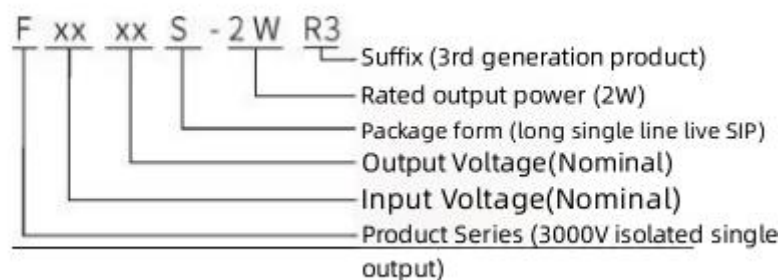
Over temperature protection and output sustainable short circuit protection RoHS

F\_S-2WR3 series ----- is a small volume, high efficiency of micro power, fixed voltage input, isolation of non-regulated voltage, single output, DC/DC module power supply.

This series is specifically designed for applications where on-board power systems require a set of voltages that are isolated from the input power supply. The product is suitable for:

- The input power supply voltage is relatively stable (voltage variation range  $\pm 10\%V_{in}$ );
- The input and output must be isolated (isolation voltage  $\leq 3000VDC$ );
- Does not require high output voltage stability;
- Typical applications: pure digital circuit, general low-frequency analog circuit, relay drive circuit, data exchange circuit, etc.

## Product Coding Rules



## Product Mode List

Certification	Product Mode①	Input Voltage range (Vdc)	Output Voltage/Current		Ripple and Noise	Efficiency @ full	Maximum capacitive
		Nominal value (range value)	Output voltage (Vdc)	Output current (mA) (Max.Min.)	Full load (mVp-p) Typ./Max.	% (Min./ Typ.)	uF

	F0503S-2WR3	5 (4.5~5.5)	3.3	606/60	30/80	80/83	2400
	F0505S-2WR3		5	400/40	30/80	85/88	2400
	F0509S-2WR3		9	222/23	30/80	86/88	1000
	F0512S-2WR3		12	166/17	30/80	87/89	560
	F0515S-2WR3		15	133/13	30/80	87/89	560
	F0524S-2WR3		24	83/8	30/80	87/89	220
	F0903S-2WR3	9 (8.1~9.9)	3.3	606/60	30/80	80/83	2400
	F0905S-2WR3		5	400/40	30/80	85/88	2400
	F0909S-2WR3		9	222/23	30/80	86/88	1000
	F0912S-2WR3		12	166/17	30/80	87/89	560
	F0915S-2WR3		15	133/13	30/80	87/89	560
	F0924S-2WR3		24	83/8	30/80	87/89	220
	F1203S-2WR3	12 (10.8~13.2)	3.3	606/60	30/80	81/84	2400
	F1205S-2WR3		5	400/40	30/80	86/88	2400
	F1209S-2WR3		9	222/23	30/80	87/89	1000
	F1212S-2WR3		12	166/17	30/80	88/90	560
	F1215S-2WR3		15	133/13	30/80	88/90	560
	F1224S-2WR3		24	83/8	30/80	88/90	220
	F1503S-2WR3	15 (13.5~16.5)	3.3	606/60	30/80	81/84	2400
	F1505S-2WR3		5	400/40	30/80	86/88	2400
	F1509S-2WR3		9	222/23	30/80	87/89	1000
	F1512S-2WR3		12	166/17	30/80	88/90	560
	F1515S-2WR3		15	133/13	30/80	88/90	560
	F1524S-2WR3		24	83/8	30/80	88/90	220
	F2403S-2WR3	24 (21.6~26.4)	3.3	606/60	30/80	81/84	2400
	F2405S-2WR3		5	400/40	30/80	86/88	2400
	F2409S-2WR3		9	222/23	30/80	87/89	1000
	F2412S-2WR3		12	166/17	30/80	88/91	560
	F2415S-2WR3		15	133/13	30/80	88/91	560
	F2424S-2WR3		24	83/8	30/80	88/91	220

Note: 1. Due to limited space, the above is only a list of typical products, if you need products other than the list, please contact the company's sales department.

2. The maximum capacitive load means +Vo or -Vo can be connected to the maximum capacitive load, if the value exceeds, 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)	5VDC nominal input series	---	454/5	---/10	mA
	9VDC nominal input series	---	249/3	---/5	
	12VDC nominal input series	---	186/2	---/5	
	15VDC nominal input series	---	148/2	---/4	
	24VDC nominal input series	---	92/1	---/2	

Reflected Ripple		—	15	—	
Impulse voltage (Isec.max)	5VDC nominal input series	−0.7	—	9	VDC
	9VDC nominal input series	−0.7	—	15	
	12VDC nominal input series	−0.7	—	18	
	15VDC nominal input series	−0.7	—	21	
	24VDC nominal input series	−0.7	—	30	
Input filter type		PI version			
Hot plug		Not available			

## Output Characteristics

Item	Working and test conditions		Min.	Typ.	Max.	Unit
output load	Load percentage		10	—	100	%
Output Voltage Accuracy	See error envelope graph		—	—	±15.0	%
Linear adjustment rate	Input voltage variation ±1%	3.3V Output	—	—	±1.5	%
		Other	—	—	±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, 20MHz bandwidth, peak-to-peak		—	30	80	mVp-p
Temperature drift coefficient	Full load		—	—	±0.03	%/°C
Output short circuit protection	Sustainable short circuit protection, automatic recovery					

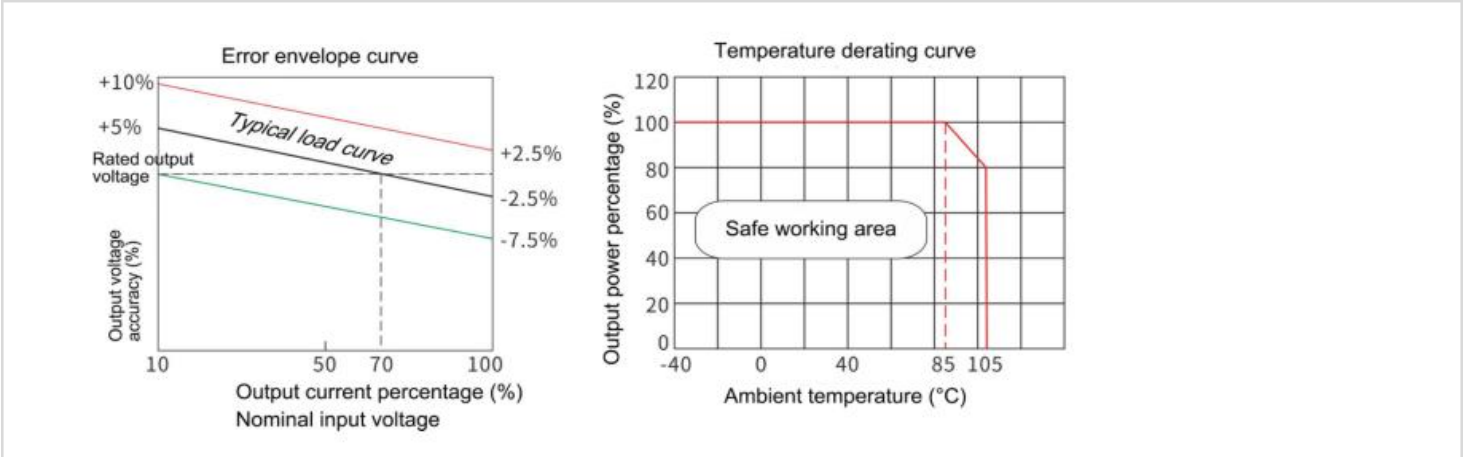
Note: ① Test method of ripple and noise Twisted pair test method.

## General characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test time is 1 minute, leakage current is less than 1mA	3000	—	—	VDC
Insulation resistance	Input-output, insulation voltage 500VDC	1000	—	—	MΩ
Isolation Capacitor	Input-output, 100KHz/0.1V	—	40	—	pF
operating temperature	Using the Reference Temperature Derating Curve	-40	—	+85	°C
storage temperature		-40	—	+125	
The shell heats up when working		--	25	--	

Storage Humidity	no condensation	5	--	95	%RH
Pin resistant to welding temperature	The solder joint is 1.5mm away from the housing,10 seconds	--	--	+300	°C
switching frequency	Full load, nominal voltage input	--	100	--	KHz
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Shell material		Black flame retardant and heat resistant plastic (UL94 V-0)			
Minimum time between failures	MIL-HDBK-217F@25°C	3.5*10 <sup>6</sup>	--	--	Hrs

Temperature characteristic curve



Typical application reference circuit (recommended parameters)

**1. Routine application:**

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

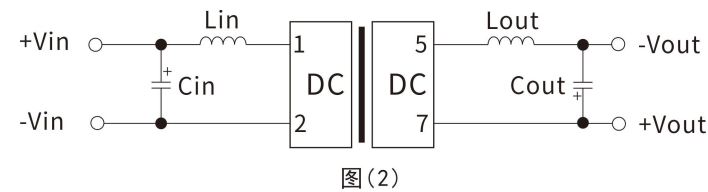
However, attention should be paid to the selection of appropriate filtering capacitors. If the capacitor is too large, it is likely to cause startup problems. For each output, the recommended capacitive load value is shown in Table 1 under the condition of safe and reliable operation.

图(1)

**Recommended capacitive load values (Table 1)**

Vin (Vdc)	Cin (u F)	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	0. 47

2.EMI typical application circuit



Recommended EMI reference circuit values (Table 2)

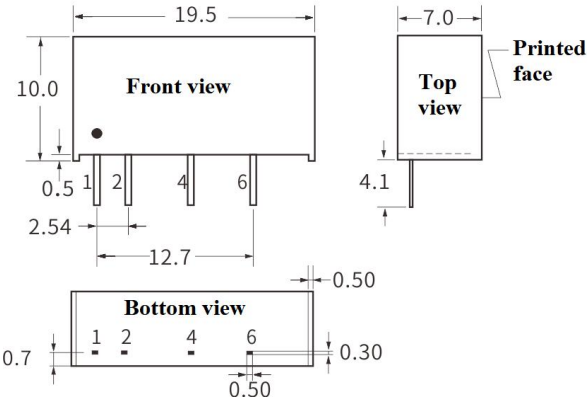
Vin (Vdc)	3. 3/5/12/15/24
Cin	4. 7u F/50V
Cout	Refer to Table 1
Lin	4. 7uH
Lout	4. 7uH

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 used. If the power you need is really small, please parallel a resistor between the negative poles of the output side (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 relatively high)

Product appearance size and pin definition, suggested printing layout

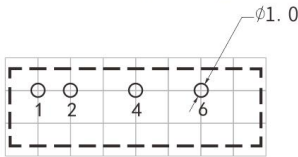
1. Physical dimension (unit:mm,tolerance:xx±0.25)



2. Pin definition

1	2	3	4	5	6
+Vin	-Vin	No Pin	-Vout	No Pin	+Vout

3. Recommended print layout



Note:the grid distance is 2.54\*2.54mm

**\*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 x W x H	
S	19.5 x 7.0x 10.0 mm	0.768 × 0.276 ×0.394inch

Test application reference

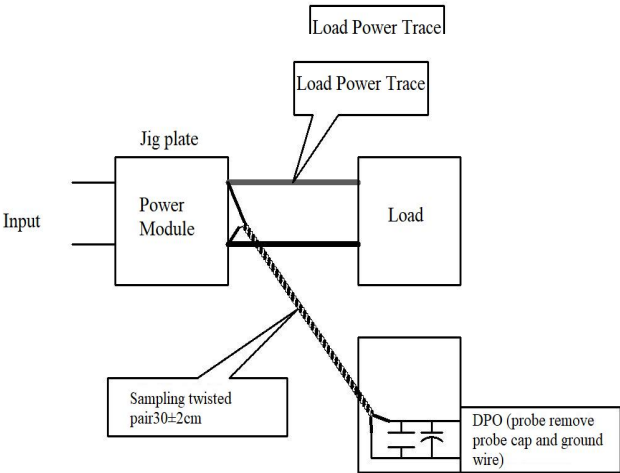
Ripple & noise test: (twisted pair method 20MHZ bandwidth)

Testing method:

1. Ripple noise is connected by 12# twisted pair cable, the bandwidth of the oscilloscope is set to 20MHz, the bandwidth of the probe is 100M, and the 0.1uF polypropylene capacitor and the 4.7uF high-frequency low-resistance electrolytic capacitor are connected in parallel to the probe end, and the oscilloscope sampling uses Sample sampling model.

2. Schematic diagram of output ripple noise test:

Connect the power input to the input power supply and the power output to the electronic load via the fixture board. Sample directly from the power output port with a separate 30cm ± 2cm sampling line for the test. Power wire Select insulated wires with corresponding wire diameters based on the output current.



## 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, and the output power of the input power must be greater than the input power requirements: Ensure that the output voltage fluctuation range of the power supply does not exceed the input requirements of the DC/DC module, and the output power of the input power must be greater than the output power of the DC/DC module.
2. Recommended circuit 1 For the occasion of general ripple noise requirements, a filter capacitor can be connected in parallel with the input and output terminals. The external circuit is shown in Figure (1) below, and the recommended value of the filter capacitor is shown in Table (1). 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, it is recommended to connect the dummy load outside the output terminal. The dummy load (resistance) can be calculated according to the rated power of the module, and the resistance value is  $U_{out}/(1WR3*10\%)$ .
3. Overload protection: under normal working conditions, the output circuit of the product has no protection function for overload, and the overload will be over-temperature protection for a long time, and the output will be turned off;
4. Output sustainable short-circuit protection, automatic recovery.
5. The capacity of the external capacitance of the output end should not be too large, otherwise it will easily cause overcurrent or poor start when the module is started;
6. If the product works below the minimum required load, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
7. The maximum capacitive load is tested in the input voltage range and under full load conditions;
8. Unless otherwise specified, all indicators in this manual are measured at  $T_a=25^{\circ}\text{C}$ , humidity  $<75\%\text{RH}$ , nominal input voltage and rated output load;
9. All index test methods in this manual are based on the company's standards;
10. Our company can provide product customization, specific circumstances can directly contact our technical personnel;
11. Product specifications are subject to change

## Contact information

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