

Typical Characteristics

- Fixed voltage input, isolated unregulated output, 2W power
- Isolation voltage: 3000VDC
- Low no-load power consumption: 0.025W(Typ.)
- Efficiency: up to 90%
- Working ambient temperature: -40℃~+85℃
- MTBF≥3.5 million hours (3500000Hrs)
- Output short-circuit protection: continuous short-circuit protection, automatic recovery
- Compact SIP package
- Industry standard pin-out
- Ripple/noise (20MHz bandwidth): 30mV_{p-p}(T_{vp}.)

2W, fixed-voltage input, isolated unregulated, single-output DC/DC power module



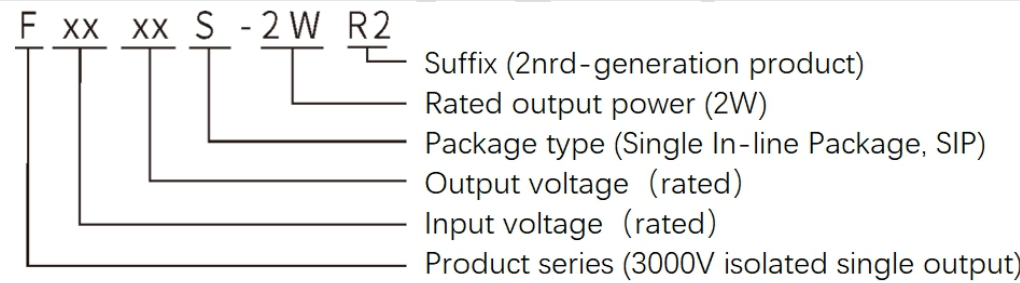
RoHS
Over-temperature protection and continuous output short-circuit protection

F_S-2WR2 Series—is a compact, high-efficiency, low-power, fixed-input-voltage, 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 board-level power supply systems that require the generation of a voltage isolated from the input power supply. This product is suitable for:

- Applications where the input power supply voltage is relatively stable (voltage variation range: ±10% Vin);
- Applications requiring isolation between input and output (isolation voltage ≤ 3000 VDC);
- Applications with low requirements for output voltage stability;
- Typical applications: pure digital circuits, general low-frequency analog circuits, relay driver circuits, data exchange circuits, etc.

Model Number Description



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
	F0503S-2WR2	5 (4.5-5.5)	3.3	400/40	75/180	74/78	2400
	F0505S-2WR2		5	400/40	75/180	80/84	2400
	F0509S-2WR2		9	222/23	75/180	81/85	1000
	F0512S-2WR2		12	166/17	75/180	81/85	560

	F0515S-2WR2	9 (8.1~9.9)	15	133/13	75/180	82/86	560
	F0524S-2WR2		24	83/8	75/180	82/86	220
	F0903S-2WR2		3.3	606/60	75/180	80/83	2400
	F0905S-2WR2		5	400/40	75/180	85/88	2400
	F0909S-2WR2		9	222/23	75/180	86/88	1000
	F0912S-2WR2		12	166/17	75/180	87/89	560
	F0915S-2WR2		15	133/13	75/180	87/89	560
	F0924S-2WR2		24	83/8	75/180	87/89	220
	F1203S-2WR2	12 (10.8~13.2)	3.3	606/60	75/180	81/84	2400
	F1205S-2WR2		5	400/40	75/180	78/82	2400
	F1209S-2WR2		9	222/23	75/180	78/82	1000
	F1212S-2WR2		12	166/17	75/180	80/84	560
	F1215S-2WR2		15	133/13	75/180	81/85	560
	F1220S-2WR2		20	100/10	75/180	81/85	220
	F1224S-2WR2		24	83/8	75/180	82/86	220
	F1503S-2WR2	15 (13.5~16.5)	3.3	606/60	75/180	81/84	2400
	F1505S-2WR2		5	400/40	75/180	76/80	2400
	F1509S-2WR2		9	222/23	75/180	76/80	1000
	F1512S-2WR2		12	166/17	75/180	77/81	560
	F1515S-2WR2		15	133/13	75/180	77/81	560
	F1524S-2WR2		24	83/8	75/180	77/81	220
	F2403S-2WR2	24 (21.6~26.4)	3.3	606/60	75/180	70/76	2400
	F2405S-2WR2		5	400/40	75/180	74/80	2400
	F2409S-2WR2		9	222/23	75/180	75/81	1000
	F2412S-2WR2		12	166/17	75/180	78/84	560
	F2415S-2WR2		15	133/13	75/180	80/86	560
	F2424S-2WR2		24	83/8	75/180	80/86	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 rated 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	3.3VDC output	--	534/8	564/--	mA
		5VDC/7.2VDC output	--	477/8	500/--	
		9VDC/12VDC output	--	471/8	494/--	
		15VDC/24VDC output	--	466/8	488/--	
	9VDC input series		--	249/3	--/5	
	12VDC input series	3.3VDC output	--	222/8	235/--	

		5VDC output	--	208/8	219/--	
		9VDC output	--	203/8	214/--	
		12VDC/15VDC/24VDC output	--	201/8	211/--	
	15VDC input series	5VDC/9VDC output	--	167/8	176/--	
		12VDC/15VDC/24VDC output	--	165/8	173/--	
	24VDC input series	3.3VDC output	--	110/8	119/--	
		5VDC/7.2VDC output	--	104/8	112/--	
		9VDC output	--	103/8	111/--	
		12VDC output	--	99/8	107/--	
Reflected ripple current			--	15	--	VDC
Impulse voltage (I sec. max)	5VDC input series		-0.7	--	9	
	9VDC input series		-0.7	--	15	
	12VDC input series		-0.7	--	18	
	15VDC input series		-0.7	--	21	
	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	5VDC input	--	75	200	mVp-p
		Other input	--	75	180	

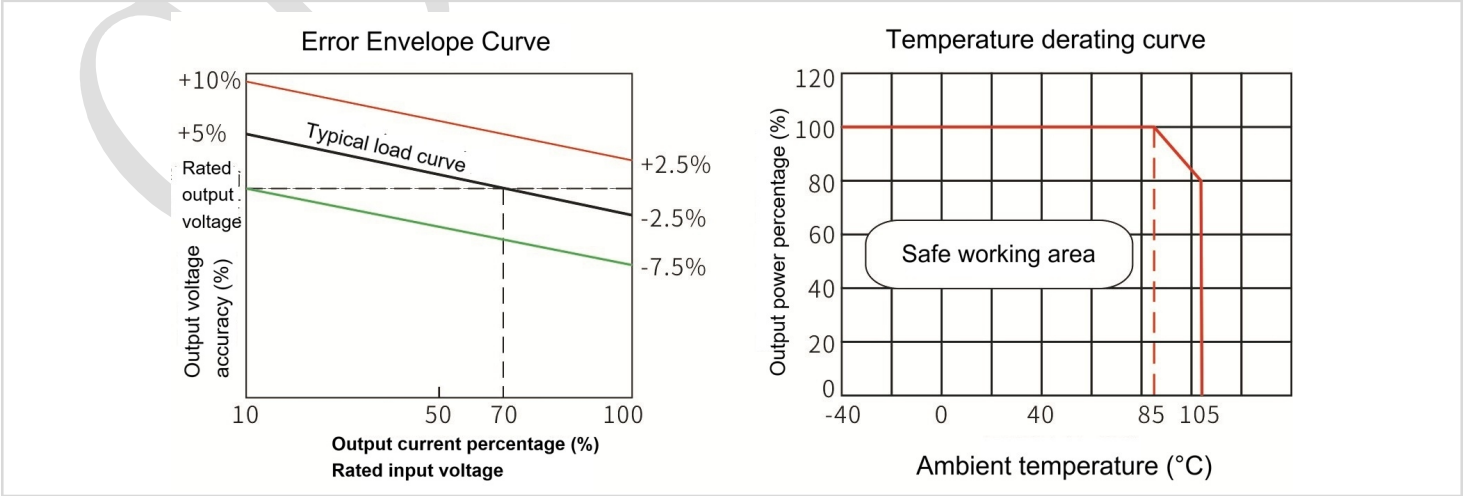
Temperature drift coefficient	Full load	--	±0.02	--	%/° C
Output short-circuit protection	Sustainable short-circuit protection, automatic recovery				

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.	3000	--	--	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	°C
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	°C
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°C	3.5X10 ⁶	--	--	Hrs

Product Performance Curve

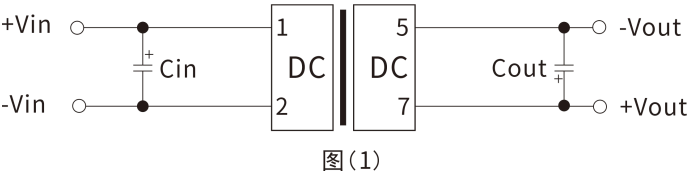


Typical Application Reference Circuit (Recommended Parameters)

1. General applications:

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

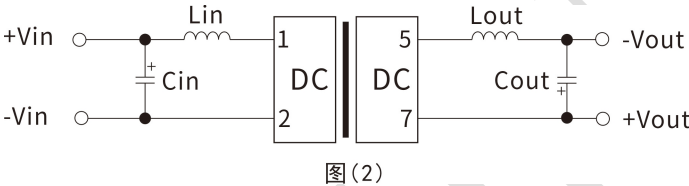
However, care must be taken to select an appropriate filter capacitor. If the capacitor is too large, it is likely to cause startup issues. For each output channel, the recommended capacitive load values—ensuring safe and reliable operation—are detailed in Table 1.



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. 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 drawn; otherwise, the resistor may become excessively hot.

Appearance Dimensions and Pin Assignment, Recommended PCB Layout

1) Appearance Dimensions

Units : mm
Tol.: xx ±0.25

2) Pin Descriptions

1	2	3	4	5	6	7
+Vin	-Vin	No Pin	No Pin	-Vout	No Pin	+Vout
+ input	- input	No Pin	No Pin	- output	No Pin	+ output

3) Recommended layout

Remarks: grid distance : 2.54*2.54mm

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

Test Application Reference

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

Test Method:

1. 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.

2. Schematic diagram for output ripple and noise testing:

Connect the power supply input to the 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.

输入端 Input

Jig board 治具板

电源模块 Power Module

负载功率走线 Load power routing

负载 Load

取样双绞线 30±2cm Sampling twisted-pair cable

DPO (Remove the probe cap and ground wire from the probe) DPO (探头去除探头帽及地线)

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 exceed the DC/DC module's output power;
2. Recommended Circuit 1: For applications with general ripple and noise requirements, connect one filter capacitor in parallel at both the input and output terminals. The external circuit is shown in Figure (1) below; refer to Table (1) for the recommended values of the filter capacitors. Output Load Requirements: Avoid no-load operation 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 = $U_{out} / (I_W \times R_3 \times 10\%)$;
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 $T_a=25^\circ\text{C}$, 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

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