

Typical Characteristics

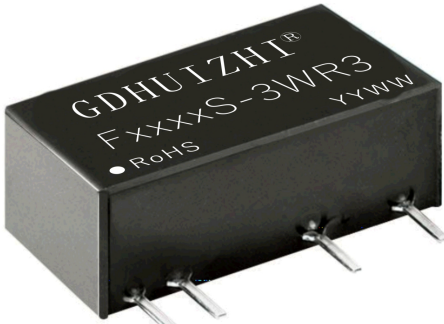
- Fixed voltage input, isolated unregulated output, 3W power
- Isolation voltage: 3000VDC
- Low no-load power consumption: 0.025W(Typ.)
- Efficiency: up to 90%
- Working ambient temperature: -40℃~+85℃
- MTBF≥3.5 million hours (3500000Hrs)
- Output short-circuit protection: continuous short-circuit protection, automatic recovery
- Compact SIP package
- Industry standard pin-out
- Ripple/noise (20MHz bandwidth): 50mVp-p(Typ.)

The F_S-3WR3 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:

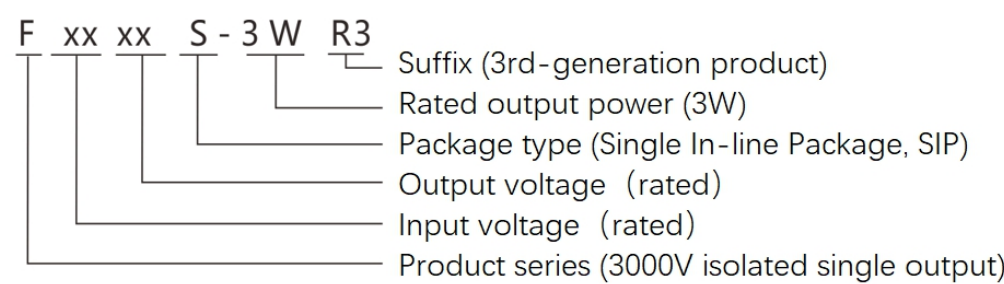
- The input voltage is relatively stable (voltage variation range: ±10% of V_{in});
- Isolation between input and output is required (isolation voltage ≤ 3000 VDC);
- Output voltage stability requirements are not stringent;
- Typical applications: purely digital circuits, general low-frequency analog circuits, relay driver circuits, data exchange circuits, etc.

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



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

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. capacitive load
		Rated value ^② (Range)	Output V (Vdc)	Output I (mA) (Max. Min.)	Full Load (mVp-p) Typ. /Max.	% (Min. / Typ.)	uF
	F0503S-3WR3	5 (4.5-5.5)	3.3	909/90	50/80	77/81	2400
	F0505S-3WR3		5	600/60	50/80	83/86	2400
	F0509S-3WR3		9	333/33	50/80	83/86	1000

	F0512S-3WR3		12	250/25	80/120	83/86	560
	F0515S-3WR3		15	200/20	80/150	83/86	560
	F0524S-3WR3		24	125/12	100/200	83/86	220
	F0903S-3WR3	9 (8.1-9.9)	3.3	909/90	50/80	77/81	2400
	F0905S-3WR3		5	600/60	50/80	83/86	2400
	F0909S-3WR3		9	333/33	50/80	83/86	1000
	F0912S-3WR3		12	250/25	50/80	83/86	560
	F0915S-3WR3		15	200/20	50/80	83/86	560
	F0924S-3WR3		24	125/12	50/80	83/86	220
	F1203S-3WR3	12 (10.8-13.2)	3.3	909/90	50/80	77/81	2400
	F1205S-3WR3		5	600/60	50/80	83/86	2400
	F1209S-3WR3		9	333/33	50/80	83/86	1000
	F1212S-3WR3		12	250/25	50/80	83/86	560
	F1215S-3WR3		15	200/20	50/80	83/86	560
	F1224S-3WR3		24	125/12	50/80	83/86	220
	F1503S-3WR3	15 (13.5-16.5)	3.3	909/90	50/80	77/81	2400
	F1505S-3WR3		5	600/60	50/80	83/86	2400
	F1509S-3WR3		9	333/33	50/80	83/86	1000
	F1512S-3WR3		12	250/25	50/80	83/86	560
	F1515S-3WR3		15	200/20	50/80	83/86	560
	F1524S-3WR3		24	125/12	50/80	83/86	220
	F2403S-3WR3	24 (21.6-26.4)	3.3	909/90	50/80	77/81	2400
	F2405S-3WR3		5	600/60	50/80	83/86	2400
	F2409S-3WR3		9	333/33	50/80	83/86	1000
	F2412S-3WR3		12	250/25	50/80	83/86	560
	F2415S-3WR3		15	200/20	50/80	83/86	560
	F2424S-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	5VDC input series	-0.7	--	9	VDC

	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	Operating 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		--	50	-	mVp-p
Temperature drift coefficient	Full load		--	--	±0.03	%/° C
Output short-circuit protection	Sustainable short-circuit protection, automatic recovery					

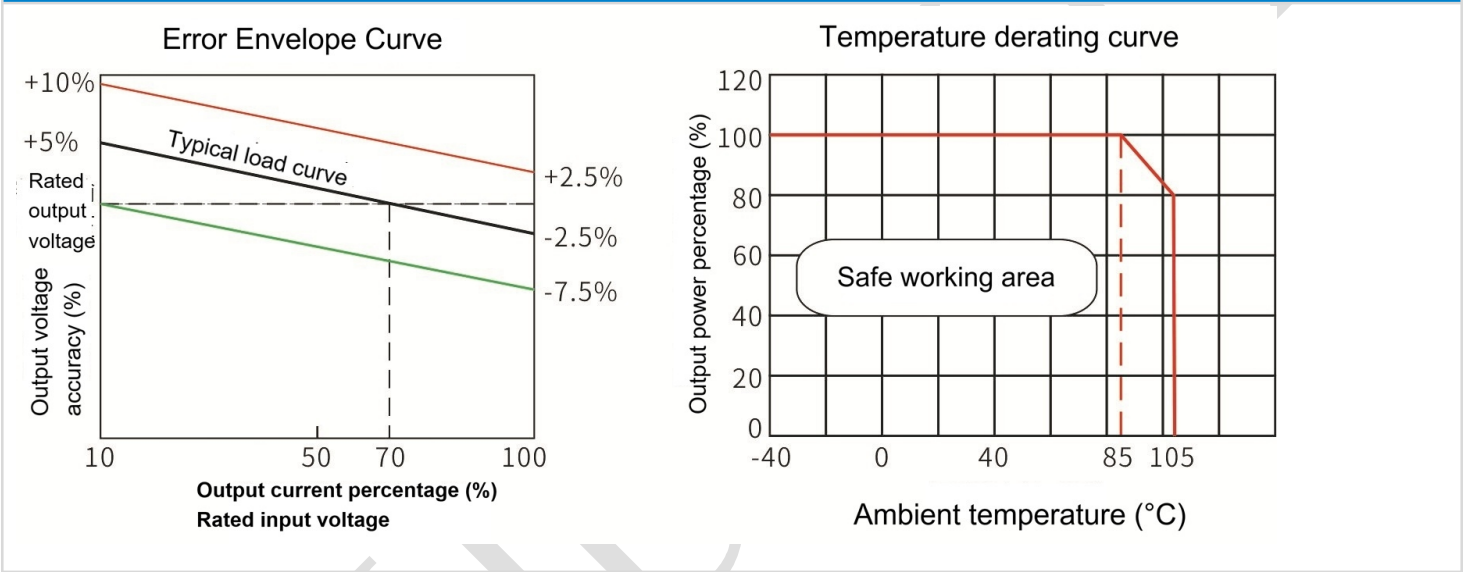
Note: ① Test method for ripple and noise: twisted-pair test method.

General characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test duration: 1 minute, leakage current less than 1 mA.	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	℃
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

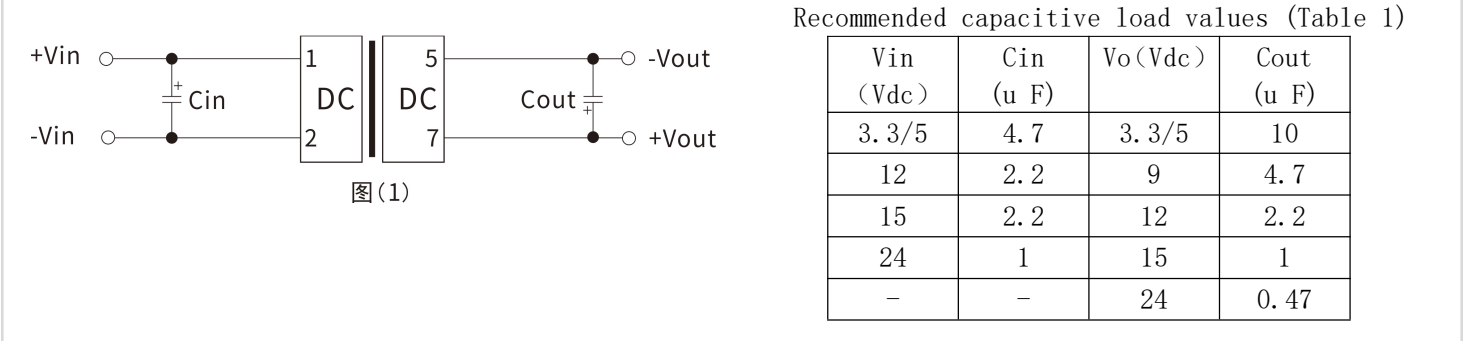


Typical Application Reference Circuit (Recommended Parameters)

1. General applications:

If further reduction of input and output ripple is required, a capacitive 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—which ensure safe and reliable operation—are listed in Table 1.



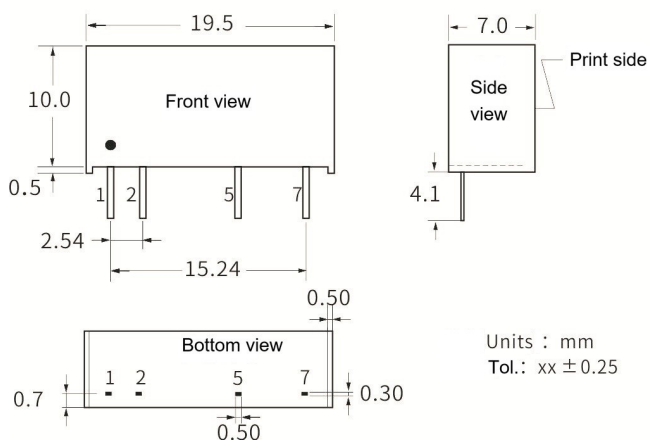
Recommended EMI reference circuit values (Table 2)



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

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 the actual power consumption; otherwise, the resistor will become excessively hot).

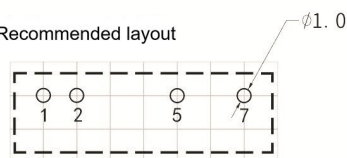
1) Appearance Dimensions



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 descriptions of the power module differ from those in the selection guide, refer to the labels on the actual unit.

L x W x H

S	19.5 x 7.0x 10.0 mm	0.768 × 0.276 ×0.394inch
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Test Application Reference

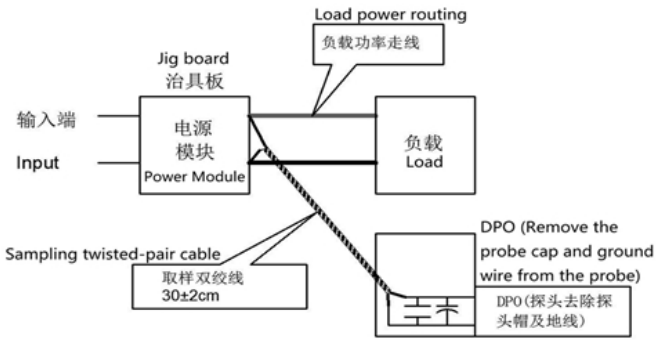
Ripple & Noise Testing: (Twisted-pair method, 20 MHz bandwidth)

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 10 μF high-frequency, low-impedance electrolytic capacitor in parallel at the probe tip. Set the oscilloscope to “Sample” mode.

2. Output Ripple Noise Test Diagram:

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.



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 power supply must exceed the DC/DC module's output power;
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) for the recommended values of the filter capacitors. 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, otherwise it may cause overcurrent or poor startup of the module;
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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