

Typical performance

- Features: constant voltage input, isolated unregulated output 1W
- Isolation Voltage: 3000VDC
- Low no-load power consumption: 0.025W (Typ.)
- Efficiency: up to 90%
- Working temperature: -40°C~+85°C
- Failure-free time MTBF≥3.5 million hours (3500000Hrs)
- Output short circuit protection: continuous short circuit protection, automatic recovery
- Small SIP Package, Plastic Housing
- International standard pin method
- Ripple / Noise (20MHz bandwidth) : 30mVp-p (Typ.)

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



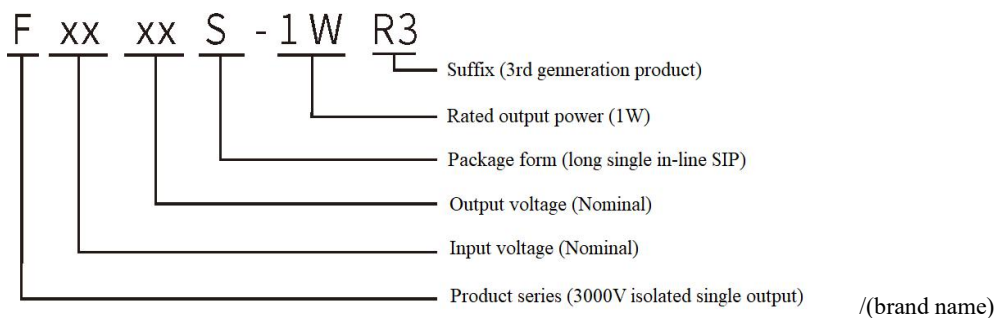
Over temperature protection and output continuous short circuit protection RoHS

F_S-1WR3 series - is our company to provide customers with small size, high efficiency DC/DC micro power module power supply, constant voltage input, isolated and unregulated, single output. This series of products is specially designed for applications in on-board power systems that need to generate a set of voltages that are 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 $\leq 3000VDC$);
- 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.

Product coding rules



Product selection table

Certification	Product Model ^①	Input voltage range	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.)	Fully loaded (mVp-p) Typ./Max.	% (Min./Typ.)	uF
	F030S-1WR3	3.3	3.3	303/30	30/80	78/81	2400
	F030S-1WR3	(2.97~3.63)	5	200/20	30/80	79/82	2400

F0312S-1WR3		12	84/9	30/80	80/83	560
F0503S-1WR3	5 (4.5~5.5)	3.3	303/30	30/80	80/83	2400
F0505S-1WR3		5	200/20	30/80	85/88	2400
F0509S-1WR3		9	111/12	30/80	85/88	2400
F0512S-1WR3		12	84/9	30/80	86/88	1000
F0515S-1WR3		15	67/7	30/80	87/89	560
F0524S-1WR3		24	42/4	30/80	87/89	560
F1203S-1WR3		12 (10.8~13.2)	3.3	303/30	30/80	81/84
F1205S-1WR3	5		200/20	30/80	86/88	2400
F1209S-1WR3	9		111/12	30/80	87/89	1000
F1212S-1WR3	12		84/9	30/80	88/90	560
F1215S-1WR3	15		67/7	30/80	88/90	560
F1224S-1WR3	24		42/4	30/80	88/90	220
F1503S-1WR3	15 (13.5~16.5)		3.3	303/30	30/80	81/84
F1505S-1WR3		5	200/20	30/80	86/88	2400
F1509S-1WR3		9	111/12	30/80	87/89	1000
F1512S-1WR3		12	84/9	30/80	88/90	560
F1515S-1WR3		15	67/7	30/80	88/90	560
F1524S-1WR3		24	42/4	30/80	88/90	220
F2403S-1WR3		24 (21.6~26.4)	3.3	303/30	30/80	81/84
F2405S-1WR3	5		200/20	30/80	86/88	2400
F2409S-1WR3	9		111/12	30/80	87/89	1000
F2412S-1WR3	12		84/9	30/80	88/91	560
F2415S-1WR3	15		67/7	30/80	88/91	560
F2424S-1WR3	24		42/4	30/80	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: Unless otherwise specified, all parameter tests are measured at nominal input voltage, purely resistive rated load and 25°C room temperature.

Input characteristics

Project	Working conditions	Min.	Typ.	Max.	Unit
Input current (Fully loaded/no load)	3.3VDC input series	--	378/8	--/15	mA
	5VDC input series	--	227/5	--/10	
	12VDC input series	--	93/2	--/5	
	15VDC input series	--	74/2	--/4	
	24VDC input series	--	46/1	--/2	
Reflected Ripple Current		--	15	--	mA

Impulse voltage (Isec.max)	3.3VDC input series	-0.7	--	5	VDC
	5VDC input series	-0.7	--	9	
	12VDC input series	-0.7	--	18	
	15VDC input series	-0.7	--	21	
	24VDC input series	-0.7	--	30	
Input filter type	Capacitive filtering				
Hot plug	No support				

Output characteristics

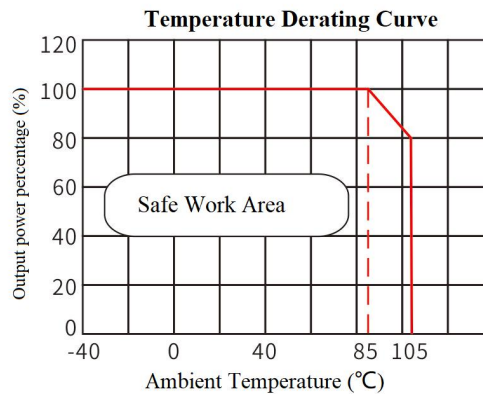
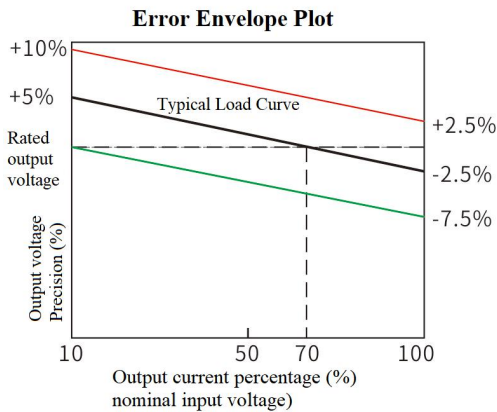
Project	Working and testing conditions	Min.	Typ.	Max.	Unit	
Output load	Load percentage	10	--	100	%	
Output voltage accuracy	See error envelope curve	--	--	±15.0	%	
Linear adjustment rate	Input voltage variation ±1%	3.3V output	--	--	±1.5	%
		Others	--	--	±1.2	%
Load Regulation	10%~100% load	3.3VDC output	--	18	--	%
		5VDC output	--	12	--	%
		9VDC output	--	8	--	%
		12VDC output	--	7	--	%
		15VDC output	--	6	--	%
		24VDC output	--	5	--	%
Ripple & Noise	Pure resistive load, 20MHz bandwidth, peak-to-peak	--	30	80	mVp-p	
Temperature Drift	Fully loaded	--	--	±0.03	%/°C	
Output short circuit	Continuous short circuit protection, automatic recovery					

Note: Ripple and noise test method twisted pair test method.

General characteristics

Project	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-Output, test time is 1 minute, the leakage current is less than 1mA	3000	--	--	VDC
Insulation resistance	Input-Output, insulation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitor	Input-Output, 100KHz/0.1V	--	20	--	pF
Working temperature	Using the reference 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,	--	--	+300	°C
On-off level	Full load, nominal voltage input	--	100	--	KHz
Shock		10-55Hz, 10G, 30Min. along X, Y and Z			
Shell material		Black flame retardant heat resistant plastic (UL94V-0)			
Minimum time between failures	MIL-HDFK-217F@25°C	3.5X 10 ⁶	--	--	Hrs

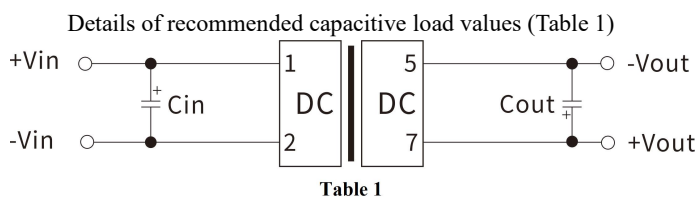
Product characteristic curve



Typical Application Reference Circuit (Recommended Parameters)

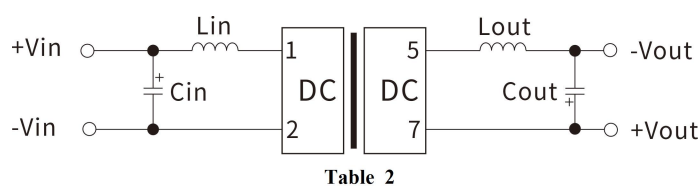
1. General application:

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
24	1	15	1
-	-	24	0.47

2. EMI typical application circuit



Recommended EMI reference circuit values are detailed (Table 2)

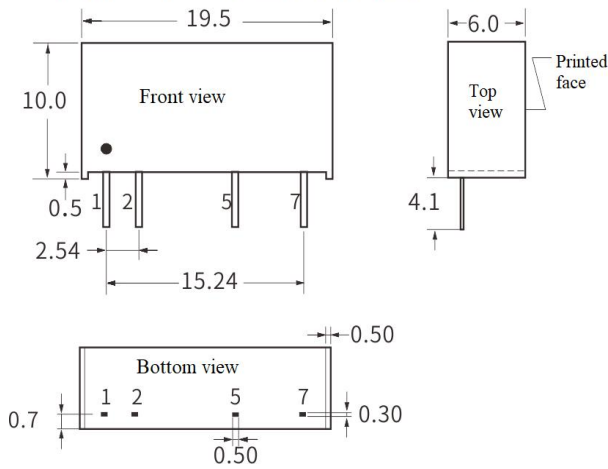
Vin(Vdc)	3.3/5/12/15/24
Cin	4.7uF/50V
Cout	Refer to Table 1
Lin	4.7uH
Lout	4.7uH

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 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 (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).

Product appearance size and pin definition, recommended printing layout

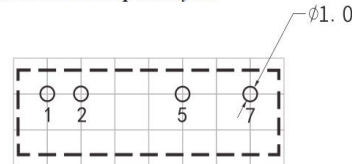
1. physical dimension (Unit: mm, Tolerance: xx ±0.25)



2. Pin definition

1	2	3	4	5	6	7
+Vin	-Vin	No Pin	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 number	LxWxH	
S	19.50x6.0x10.0mm	0.768×0.236×0.394inch

Test Application Reference

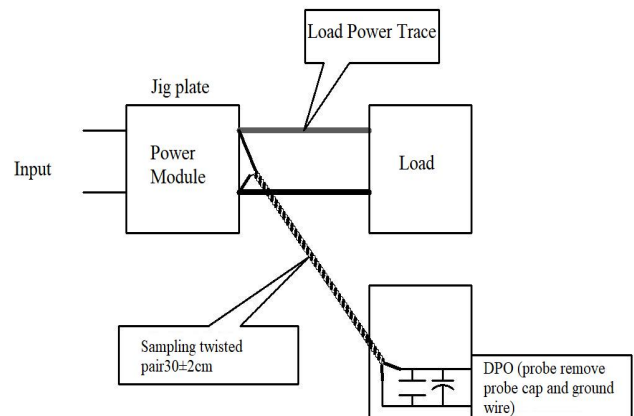
Ripple & noise test: (twisted pair method 20MHz bandwidth)

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:

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



Application Notes

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. Recommended circuit 1 For occasions with general requirements for ripple and noise, a filter capacitor can be connected in parallel at the input end and the output end. 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 module's output rated power or there is no-load phenomenon, it is recommended to connect a dummy load at the output end. The dummy load (resistance) can be based on the module's rated power. 5~10% calculation, resistance value= $U_{out}/(1WR3*10\%)$;
3. Overload protection: Under normal working conditions, the output circuit of this product has no protection function for overload conditions, and over-temperature protection will be provided for long-term overload, and the output will be turned off;
4. Output continuous short-circuit protection, automatic recovery.
5. The capacitance value of the external capacitor at the output terminal should not be too large, otherwise it will easily cause overcurrent or poor startup 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 the performance indicators in this manual;
7. The maximum capacitive load is tested under the input voltage range and 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 output rated load;
9. All index testing methods in this manual are based on the company's standards;
10. Our company can provide product customization, and you can directly contact our technical staff for specific conditions;
11. Product specifications are subject to change without notice.

Contact information

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