

Typical Characteristics

- fixed-voltage input, isolated, unregulated output, 1W power
- Isolation voltage: 1500VDC
- Low no-load power consumption: 0.025W(Typ.)
- Efficiency: up to 86% (Typ.)
- Working ambient temperature: -40℃~+85℃
- MTBF≥3.5 million hours (3500000Hrs)
- Output short-circuit protection: Continuous short-circuit protection, automatic recovery
- Compact SIP package, plastic housing
- Industry standard pin-out
- Ripple/noise (20MHz bandwidth): 100mVp-p(Typ.)

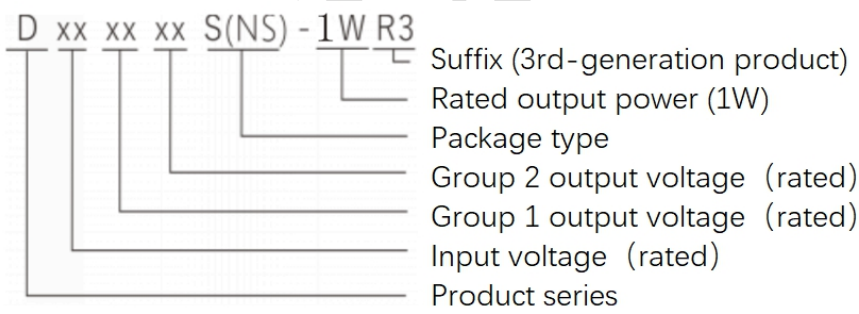
1W, fixed-voltage input, isolated, unregulated, dual-isolated, dual-output



D_S(NS)-1WR3 series is a DC-DC module power supply designed by Huizhi Electronics specifically for IGBT drivers. It features an asymmetric voltage output configuration to minimize IGBT drive losses as much as possible. It also includes output short-circuit protection and self-recovery capabilities. This product is suitable for:

- General-purpose variable-frequency drives
- AC servo drive systems
- Welding machines
- Uninterruptible power supplies (UPS)

Model Number Description



Product selection table

Ce rt if ic at io 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
	D030303S (NS)-1WR3	3.3	3.3	151/15	100/150	72/76	100

D030505S (NS)-1WR3	(2. 97-3. 63)	5	100/10	100/150	76/80	100
D030909S (NS)-1WR3		9	56/6	100/150	82/86	100
D031212S (NS)-1WR3		12	42/4	100/150	82/86	100
D050303S (NS)-1WR3	5 (4. 5-5. 5)	3. 3	151/15	100/150	72/76	100
D050505S (NS)-1WR3		5	100/10	100/150	76/80	100
D050909S (NS)-1WR3		9	56/6	100/150	82/86	100
D051212S (NS)-1WR3		12	42/4	100/150	82/86	100
D051515S (NS)-1WR3		15	34/4	100/150	82/86	100
D052424S (NS)-1WR3	9 (8. 1-9. 9)	24	21/2	100/150	82/86	100
D090303S (NS)-2WR3		3. 3	151/15	100/150	72/76	100
D090505S (NS)-1WR3		5	100/10	100/150	76/80	100
D090909S (NS)-1WR3		9	56/6	100/150	82/86	100
D091212S (NS)-1WR3		12	42/4	100/150	82/86	100
D091515S (NS)-1WR3		15	34/4	100/150	82/86	100
D092424S (NS)-1WR3	12 (10. 8-13. 2)	24	21/2	100/150	82/86	100
D120303S (NS)-1WR3		3. 3	151/15	100/150	72/76	100
D120505S (NS)-1WR3		5	100/10	100/150	76/80	100
D120909S (NS)-1WR3		9	56/6	100/150	82/86	100
D121212S (NS)-1WR3		12	42/4	100/150	82/86	100
D121515S (NS)-1WR3		15	34/4	100/150	82/86	100
D122424S (NS)-1WR3	15 (13. 5-16. 5)	24	21/2	100/150	82/86	100
D150303S (NS)-1WR3		3. 3	151/15	100/150	72/76	100
D150505S (NS)-1WR3		5	100/10	100/150	76/80	100
D150909S (NS)-1WR3		9	56/6	100/150	82/86	100
D151212S (NS)-1WR3		12	42/4	100/150	82/86	100
D151515S (NS)-1WR3		15	34/4	100/150	82/86	100
D152424S (NS)-1WR3	24 (21. 6-26. 4)	24	21/2	100/150	82/86	100
D240303S (NS)-1WR3		3. 3	151/15	100/150	72/76	100
D240505S (NS)-1WR3		5	100/10	100/150	76/80	100
D240909S (NS)-1WR3		9	56/6	100/150	82/86	100
D241212S (NS)-1WR3		12	42/4	100/150	82/86	100
D241515S (NS)-1WR3		15	34/4	100/150	82/86	100
D242424S (NS)-1WR3		24	21/2	100/150	82/86	100

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 voltage range	3.3V input module	-0.7	3.3	5	Vdc

	5V input module	-0.7	5	9	
	9V input module	-0.7	9	15	
	12V input module	-0.7	12	18	
	15V input module	-0.7	15	21	
	24V input module	-0.7	24	30	
Input filter type		Capacitor filtering			
Hot swap		Not supported			

Output characteristics

Items	Working conditions		Min.	Typ.	Max.	Unit
Output voltage accuracy			See Error Envelope Curve			
Line Regulation	Input voltage variation: $\pm 1\%$	3.3V output module	---	---	± 1.5	---
		Other input module	---	---	± 1.2	
Load Regulation	10%~100% load	3.3V input module	---	15	18	%
		5V input module	---	12.8	15	
		9V input module	---	8.3	15	
		12V input module	---	6.8	15	
		15V input module	---	6.3	15	
		24V input module	---	6	15	
Temperature drift coefficient	100% load		---	---	± 0.03	%/°C
Ripple & Noise*	20MHz bandwidth		---	100	150	mVp-p
Output short-circuit protection			Sustainable, automatic recovery ---			

Note: *The test method for ripple and noise uses the twisted-pair test method; see the Test Application Reference.

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	Derate for use when temperature $\geq 85^{\circ}\text{C}$ (see Figure 2)	-40	--	85	$^{\circ}\text{C}$
Storage temperature		-55	--	+125	
Operating cover temperature rise	Ta=25 $^{\circ}\text{C}$	--	25	--	
Storage humidity	No condensation	5	--	95	%RH
Pin soldering temperature resistance	The solder point is 1.5 mm from the housing; 10 seconds	--	--	+300	$^{\circ}\text{C}$
Switching frequency	Full load, rated voltage input	--	100	300	KHz
Vibration		10-150Hz, 5G, 0.75mm. 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 $^{\circ}\text{C}$	3.5X10 ⁶	--	--	Hrs

Product Performance Curve

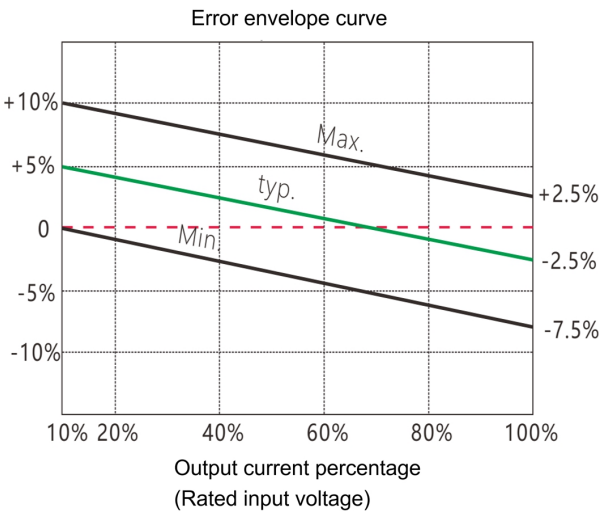


Figure 3

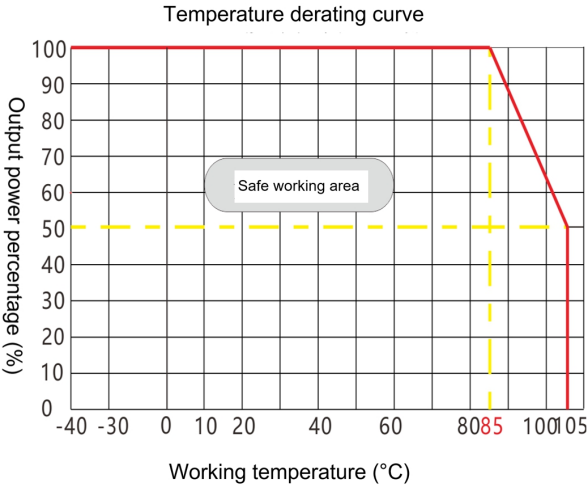
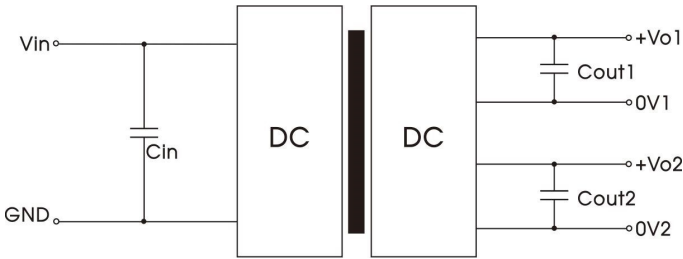


Figure 4

Atypical 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.

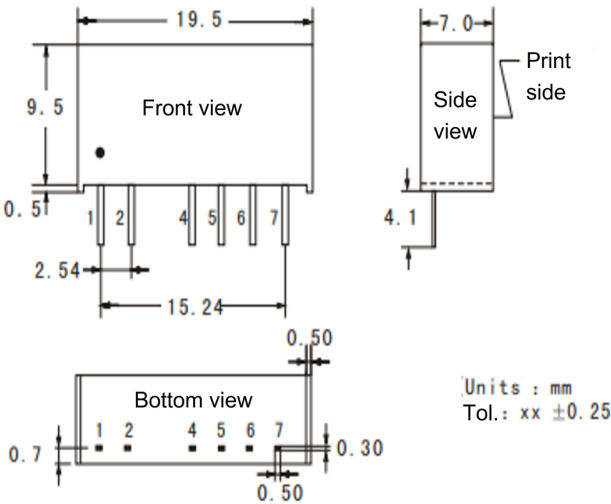


Recommended capacitive load values (Table 1)

Vin	Cin	Vo	Cout
3.3/5	4.7μF/16V	3.3/5	4.7μF/16V
9/12	2.2μF/25V	9/12	1μF/25V
15/24	2.2μF/50V	15/24	1μF/50V

Appearance Dimensions and Pin Descriptions, Recommended PCB Layout

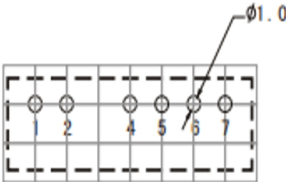
1) Appearance Dimensions



2) Pin Assignment

1	2	4	5	6	7
+Vin	-Vin	+Vo1	0V1	+Vo2	0V2
+ input	- input	+ output 1	output ground 1	+ output 2	Output ground 2

3) Recommended layout



Remarks: grid distance : 2.54*2.54mm

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

Package Description

Package code	L x W x H	
S	19.50 x 6.00x 9.50 mm	0.768 × 0.276 × 0.374inch

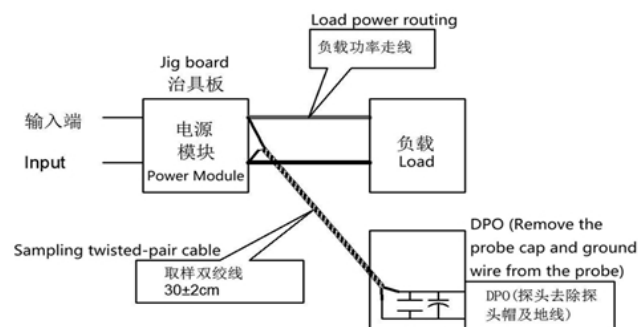
Test Application Reference

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 $0.1\mu\text{F}$ polypropylene capacitor and a $4.7\mu\text{F}$ 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 $30\text{ cm} \pm 2\text{ cm}$ 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.



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; 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 $T_a=25^\circ\text{C}$, 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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