

Typical Characteristics

- Fixed-voltage input, isolated, unregulated dual-output, 1W power
- Isolation voltage: 6000VDC
- 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, plastic housing
- Industry standard pin-out
- Ripple/noise (20MHz bandwidth): 30mVp-p(Typ.)

1W, Fixed-voltage input, isolated, unregulated dual-output (positive and negative), DC/DC power module



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

G_S-1WR3 Series—is a compact, high-efficiency, low-power, fixed-voltage input, isolated, unregulated dual-output (positive and negative) DC/DC module power supply designed by Huizhi Electronics for its customers;

This product series meets the requirements for reinforced insulation and is primarily used in power supply applications that require compact size, high isolation, low isolation capacitance, and low leakage current. It is suitable for applications such as medical equipment, power systems, and IGBT drivers.

This product is suitable for:

- Applications where the input voltage is relatively stable (voltage variation range: ±10% Vin);
- Applications requiring isolation between the input and output (isolation voltage ≤ 6000 VDC);
- Applications with high requirements for output voltage stability and low output ripple and noise;
- Typical applications: pure digital circuits, general low-frequency analog circuits, relay driver circuits, data switching circuits, etc.

Model Number Description

G xx xx S - 1 W R3

- Suffix (3rd-generation product)
- Rated output power (1W)
- Package type (Single In-line Package, SIP)
- Output voltage (rated)
- Input voltage (rated)
- Product series (6000V isolated dual output)

Product selection table

Cer tif ica tion	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

	G0303S-1WR3	3.3 (2.97~3.63)	±3.3	±152/±15	100/150	76/80	1200
	G0305S-1WR3		±5	±100/±10	80/120	86/88	1200
	G0309S-1WR3		±9	±56/±6	80/120	87/89	560
	G0312S-1WR3		±12	±42/±5	80/120	87/89	330
	G0315S-1WR3		±15	±34/±4	80/120	87/89	330
	G0324S-1WR3		±24	±21/±3	80/120	87/89	100
	G0503S-1WR3	5 (4.5~5.5)	±3.3	±152/±15	100/150	71/75	1000
	G0505S-1WR3		±5	±100/±10	80/120	76/80	1000
	G0509S-1WR3		±9	±56/±6	80/120	76/80	470
	G0512S-1WR3		±12	±42/±5	80/120	77/81	220
	G0515S-1WR3		±15	±34/±4	80/120	77/81	220
	G0524S-1WR3		±24	±21/±3	80/120	87/89	100
	G0903S-1WR3	9 (8.1~9.9)	±3.3	±152/±15	100/150	76/80	1200
	G0905S-1WR3		±5	±100/±10	80/120	86/88	1200
	G0909S-1WR3		±9	±56/±6	80/120	87/89	560
	G0912S-1WR3		±12	±42/±5	80/120	87/89	330
	G0915S-1WR3		±15	±34/±4	80/120	87/90	330
	G0924S-1WR3		±24	±21/±3	80/120	87/90	100
	G1203S-1WR3	12 (10.8~13.2)	±3.3	±152/±15	100/150	76/80	1200
	G1205S-1WR3		±5	±100/±10	80/120	75/79	1000
	G1209S-1WR3		±9	±56/±6	80/120	75/79	470
	G1212S-1WR3		±12	±42/±5	80/120	77/81	200
	G1215S-1WR3		±15	±34/±4	80/120	77/81	200
	G1224S-1WR3		±24	±21/±3	80/120	87/89	100
	G1503S-1WR3	15 (13.5~16.5)	±3.3	±152/±15	100/150	76/80	1200
	G1505S-1WR3		±5	±100/±10	80/120	73/77	1200
	G1509S-1WR3		±9	±56/±6	80/120	87/89	560
	G1512S-1WR3		±12	±42/±5	80/120	87/89	330
	G1515S-1WR3		±15	±34/±4	80/120	87/89	330
	G1524S-1WR3		±24	±21/±3	80/120	87/89	100
	G2403S-1WR3	24 (21.6~26.4)	±3.3	±152/±15	100/150	76/80	1200
	G2405S-1WR3		±5	±100/±10	80/120	86/88	1200
	G2409S-1WR3		±9	±56/±6	80/120	87/89	560
	G2412S-1WR3		±12	±42/±5	80/120	87/89	330
	G2415S-1WR3		±15	±34/±4	80/120	87/89	330
	G2424S-1WR3		±24	±21/±3	80/120	87/89	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 Current (Full Load/No Load)	3.3VDC input series	--	378/6	--/12	mA
	5VDC input series	--	224/5	--/10	
	9VDC input series	--	123/3	--/5	
	12VDC input series	--	93/3	--/5	
	15VDC input series	--	74/2	--/4	
	24VDC input series	--	47/1	--/2	
Reflected ripple current		--	15	--	mA
Impulse voltage (I sec. max)	3.3VDC input series	-0.7	--	5	VDC
	5VDC input series	-0.7	--	9	
	9VDC input series	-0.7	--	12	
	12VDC input series	-0.7	--	15	
	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	3.3V output	--	100	150	mVp-p
		Other output	--	80	120	
Temperature drift coefficient	Full load		--	--	±0.03	%/° C

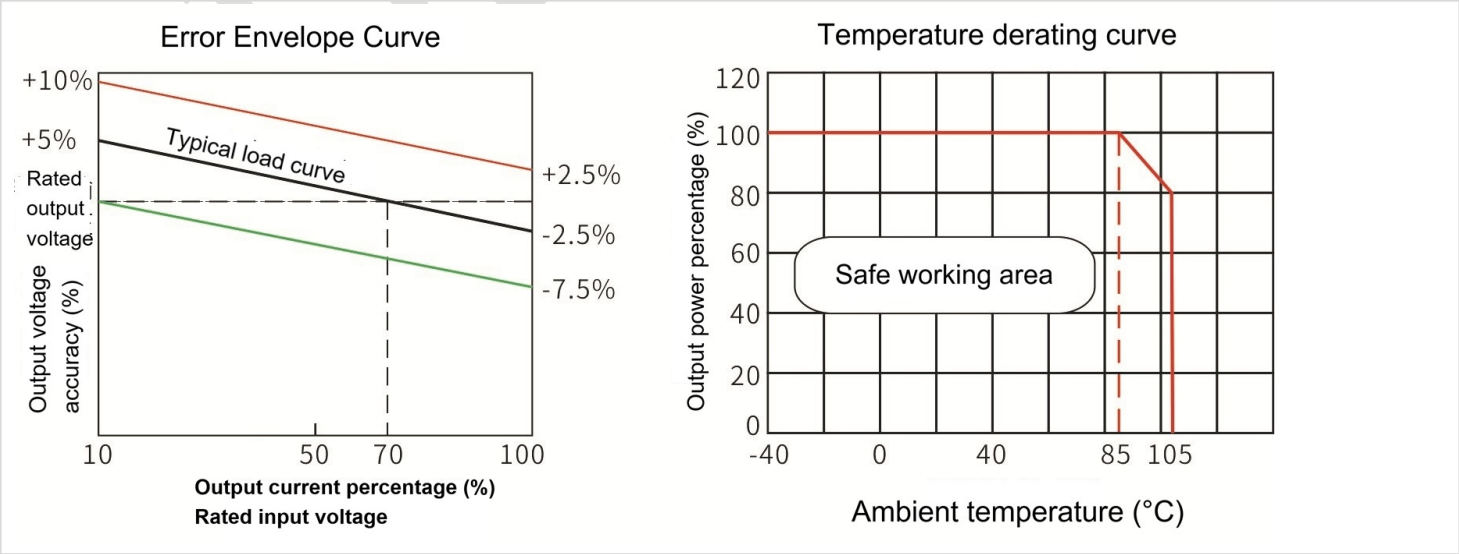
Output short-circuit protection	Sustainable short-circuit protection, automatic recovery
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Note: ① Test method for ripple and noise: Twisted-pair test method.

General characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test duration: 1 minute, leakage current less than 1 mA.	6000	---	---	VDC
Insulation resistance	Input-output, insulation voltage 500 VDC.	1000	---	---	MΩ
Isolation capacitor	Input-Output, 100 kHz/0.1 V	---	20	---	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

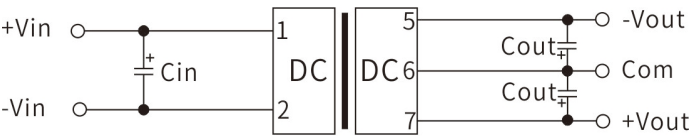


Typical Application Reference Circuit (Recommended Parameters)

1. General applications:

If further reduction of input and output ripple is required, a 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.

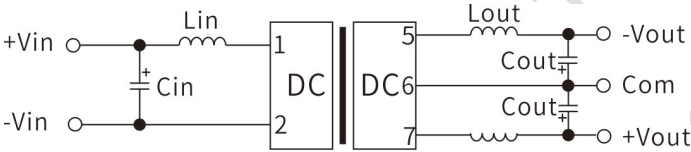


图(1)

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
9/12	2.2	12	2.2
15/24	1	15	1
—	—	24	0.47
—	—	—	—

2. Typical EMI application circuits



图(2)

Recommended EMI reference circuit values (Table 2)

Vin (Vdc)	3.3/5/12/9/15/24
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 will become excessively hot).

Appearance Dimensions and Pin Assignment, Recommended PCB Layout

1) Appearance Dimensions

Units: mm
Tol.: xx ± 0.25

2) Pin Assignment

1	2	3	4	5	6	7
+Vin	-Vin	No Pin	No Pin	-Vout	0V	+Vout
+ input	- input	No pin	No pin	- output	Com. G	+ output

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 product.

Package Description

Package code	L x W x H	
S	19.50 x 9.8 x 12.5 mm	0.768 × 0.386 × 0.492inch

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.

Diagram labels: 输入端 (Input), 电源模块 (Power Module), 负载 (Load), 负载功率走线 (Load power routing), 采样双绞线 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 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 = $U_{out} / (I_W \times R_3 \times 10\%)$;
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 or sales staff directly for details;
11. Product specifications are subject to change without notice.

Contact

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