

Typical Characteristics

- Fixed-voltage input, isolated regulated single output, 1W power
- Isolation voltage: 1500VDC
- Low no-load power consumption: 0.025W(Typ.)
- Efficiency: up to 74%
- 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.)

IB_LS-1WR3 Series is a compact, high-efficiency, low-power, fixed-input-voltage, isolated, single-output DC/DC module power supply designed by Huizhi Electronics for its customers;

This product series is specifically designed for applications in on-board power supply systems that require the generation of a voltage isolated from the input power source. This product is suitable for:

- Applications where the input voltage is relatively stable (voltage variation range: $\pm 5\%$ V_{in});
- Applications requiring isolation between input and output (isolation voltage ≤ 1500 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.;

1W, fixed-voltage input, isolated regulated single output, DC/DC power module



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

Model Number Description

IB	xx	xx	LS	-1W	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, regulated single output)

Product selection table

Certification	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.)	μ F

	IB0303LS-1WR3	3.3 (3.14-3.47)	3.3	200/20	30/80	70/74	2400
	IB0305LS-1WR3		5	200/20	30/80	70/74	2400
	IB0309LS-1WR3		9	111/11	30/80	70/74	2400
	IB0312LS-1WR3		12	83/11	30/80	70/74	2400
	IB0503LS-1WR3	5 (4.75-5.25)	3.3	200/20	30/80	70/74	2400
	IB0505LS-1WR3		5	200/20	30/80	70/74	2400
	IB0509LS-1WR3		9	111/12	30/80	70/74	1000
	IB0512LS-1WR3		12	84/9	30/80	70/74	560
	IB0515LS-1WR3		15	67/7	80/150	70/74	220
	IB0524LS-1WR3		24	42/4	100/200	70/74	220
	IB0903LS-1WR3	9 (8.55-9.45)	3.3	200/20	30/80	70/74	2400
	IB0905LS-1WR3		5	200/20	30/80	70/74	2400
	IB0909LS-1WR3		9	111/12	30/80	70/74	1000
	IB0912LS-1WR3		12	84/9	30/80	70/74	560
	IB0915LS-1WR3		15	67/7	30/80	70/74	220
	IB0924LS-1WR3		24	42/7	30/80	70/74	220
	IB1203LS-1WR3	12 (11.4-12.6)	3.3	200/20	30/80	70/74	2400
	IB1205LS-1WR3		5	200/20	30/80	70/74	2400
	IB1209LS-1WR3		9	111/12	30/80	70/74	1000
	IB1212LS-1WR3		12	84/9	30/80	70/74	560
	IB1215LS-1WR3		15	67/7	30/80	70/74	220
	IB1224LS-1WR3		24	42/7	30/80	70/74	220
	IB1503LS-1WR3	15 (14.25-15.75)	3.3	200/20	30/80	70/74	2400
	IB1505LS-1WR3		5	200/20	30/80	70/74	2400
	IB1509LS-1WR3		9	111/12	30/80	70/74	1000
	IB1512LS-1WR3		12	84/9	30/80	70/74	560
	IB1515LS-1WR3		15	67/7	30/80	70/74	220
	IB1524LS-1WR3		24	42/7	30/80	70/74	220
	IB2403LS-1WR3	24 (22.8-25.2)	3.3	200/20	30/80	70/74	2400
	IB2405LS-1WR3		5	200/20	30/80	70/74	2400
	IB2409LS-1WR3		9	111/12	30/80	70/74	1000
	IB2412LS-1WR3		12	84/9	30/80	70/74	560
	IB2415LS-1WR3		15	67/7	30/80	70/74	220
	IB2424LS-1WR3		24	42/7	30/80	70/74	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)	3.3VDC input series	--	410/15	--/35	mA
	5VDC input series	--	270/15	--/35	
	9VDC input series	--	150/10	--/25	
	12VDC input series	--	113/10	--/25	
	15VDC input series	--	90/10	--/25	
	24VDC input series	--	66/8	--/15	
Reflected ripple current		--	15	--	
Impulse voltage (I sec. max)	3.3V/5VDC input series	-0.7	--	9	VDC
	9V/12VDC/15 input series	-0.7	--	18	
	24VDC input series	-0.7	--	30	
Input filter type	Capacitor filtering				
Hot swap	Not supported				

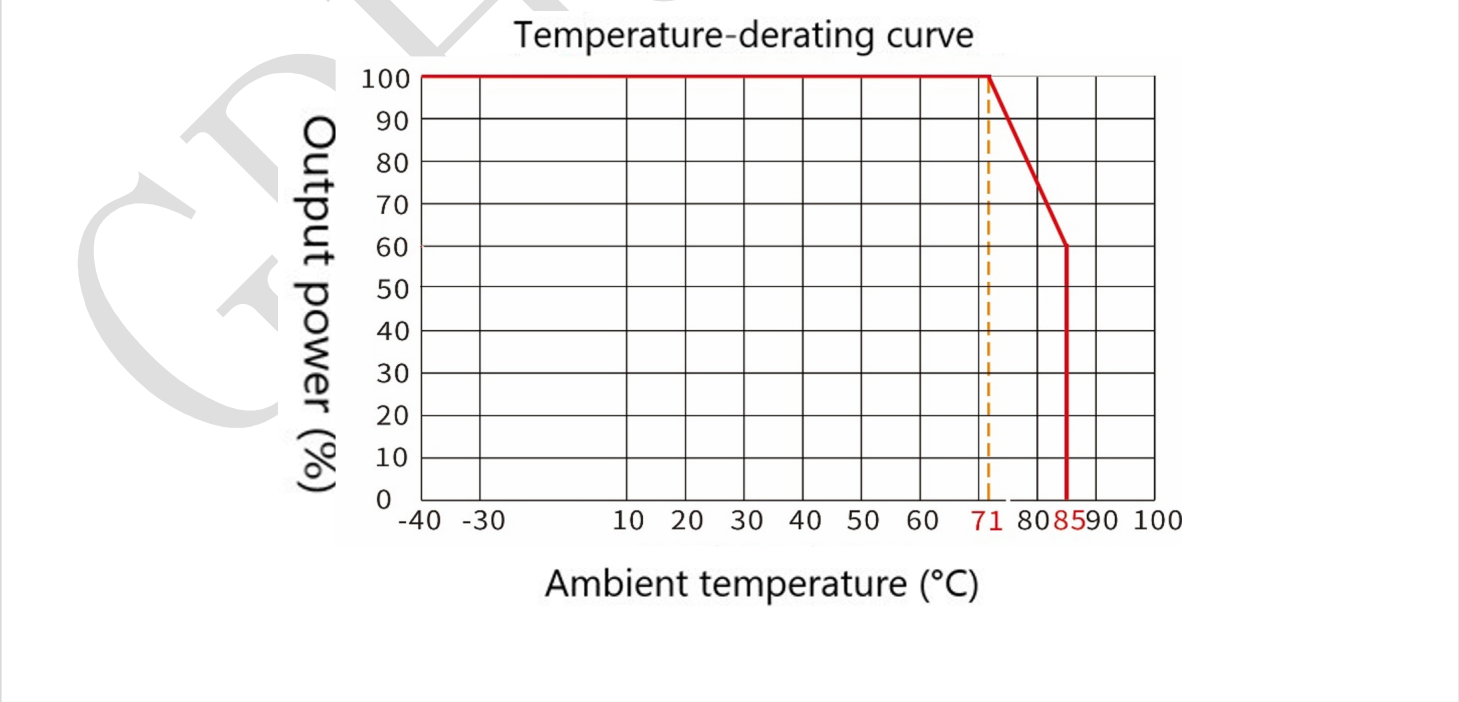
Output characteristics					
Items	Operating and test conditions	Min.	Typ.	Max.	Unit
Output load	Load percentage	10	--	100	%
Output voltage accuracy		--	--	±3.0	%
Line Regulation	Input voltage variation: ±1%	--	--	±0.25	%
Load Regulation	10%~100% load	--	±1	±2	%
Ripple & Noise	Pure resistive load, 20 MHz bandwidth, peak-to-peak value	--	30	80	mVp-p
Temperature drift coefficient	Full load	--	--	±0.03	%/° C
Output short-circuit protection	Long-term 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.	1500	--	--	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



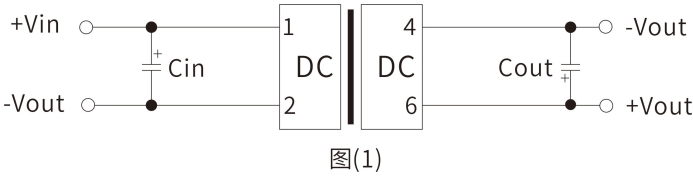
Typical Application Reference Circuit (Recommended Parameters)

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.

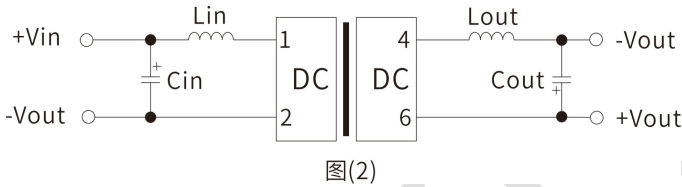
However, care must be taken to select an appropriate filter capacitor. If the capacitor is too large, it is likely to cause startup issues. For each output channel, the recommended capacitive load values—which ensure safe and reliable operation—are listed in Table 1.

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
9/12/15	2.2	9	4.7
24	1	12	2.2
—	—	15	1
—	—	24	1

2. Typical EMI application circuits



Recommended EMI reference circuit values (Table 2)

Vin (Vdc)	3.3/5/9/12/15/24
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 five times greater than the actual power consumption; otherwise, the resistor will become excessively hot).

Appearance Dimensions and Pin Assignment, Recommended PCB Layout

1) Appearance Dimensions (Unit: mm, Tol.: xx ±0.25)

Unit: mm, Tol.: xx ±0.25

2) Pin Assignment

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

3) Recommended layout

Remarks: grid distance : 2.54*2.54mm

*Note: If the pin assignment of the power module is different from those in the selection guide, refer to the labels on the actual product.

Package Description

Package code	L x W x H	
LS	19.50 x 6.0 x 10.0 mm	0.768 ×0.236 ×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.

Input端 Input

Jig board 治具板

电源模块 Power Module

负载功率走线 负载功率走线

负载 Load

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

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 = $U_{out} / (1W \times R3 \times 10\%)$;
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 or sales staff directly for details;
11. Product specifications are subject to change without notice.

Contact

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