

## Typical performance

- Features: constant voltage input, isolated unregulated output 1W
- Isolated voltage: 3000VDC
- Efficiency: up to 89%
- Working environment temperature: -40°C~+85°C
- Failure-free time MTBF $\geq$ 3.5 million hours (3500000Hrs)
- Output short circuit protection: continuous short circuit protection, automatic recovery
- Small SIP package, black flame retardant and heat resistant plastic housing
- International standard pin method
- Ripple/Noise (20MHz bandwidth): 45mVp-p (Typ.)

1W, constant voltage input, isolated and unregulated dual output DC/DC module power supply



Over temperature protection and output continuous short circuit protection RoHS

E\_S-1WR3 series—is specially designed for applications in distributed power systems that need to generate two power sources 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  $\leq 3000VDC$ );
- Occasions that do not require high output voltage stability and output ripple noise;

## Product selection table

Certification	Product model <sup>①</sup>	Input voltage range(Vdc)	Output voltage/current		Ripple and noise	Efficiency @ full load	Maximum capacitive load
		Nominal value <sup>②</sup> (range value)	Output voltage (Vdc)	Output current (mA) (Max.Min.)	Full load (mVp-p) Typ./Max.	% (Min./Typ.)	uF
	E0303S-1WR3	3.3 (2.97~3.63)	$\pm 3.3$	$\pm 152/\pm 15$	45/100	78/81	1200
	E0305S-1WR3		$\pm 5$	$\pm 100/\pm 10$	45/100	79/82	1200
	E0309S-1WR3		$\pm 9$	$\pm 56/\pm 6$	45/100	81/84	470
	E0312S-1WR3		$\pm 12$	$\pm 42/\pm 5$	45/100	82/85	230
	E0315S-1WR3		$\pm 15$	$\pm 34/\pm 4$	45/100	82/85	230
	E0324S-1WR3		$\pm 24$	$\pm 21/\pm 3$	45/100	84/88	100
	E0503S-1WR3	5 (4.5~5.5)	$\pm 3.3$	$\pm 152/\pm 15$	45/100	81/84	1200
	E0505S-1WR3		$\pm 5$	$\pm 100/\pm 10$	45/100	84/86	1200
	E0509S-1WR3		$\pm 9$	$\pm 56/\pm 6$	45/100	85/88	470
	E0512S-1WR3		$\pm 12$	$\pm 42/\pm 5$	45/100	85/88	230
	E0515S-1WR3		$\pm 15$	$\pm 34/\pm 4$	45/100	85/88	230
	E0524S-1WR3		$\pm 24$	$\pm 21/\pm 3$	45/100	86/89	100
	E1203S-1WR3	12	$\pm 3.3$	$\pm 152/\pm 15$	45/100	81/84	2400

	E1205S-1WR3		±5	±100/±10	45/100	82/86	2400
	E1209S-1WR3		±9	±56/±6	45/100	84/87	1000
	E1212S-1WR3		±12	±42/±5	45/100	84/87	560
	E1215S-1WR3		±15	±34/±4	45/100	86/88	560
	E1224S-1WR3		±24	±21/±3	45/100	88/90	220
	E1503S-1WR3	15 (13.5~16.5)	±3.3	±152/±15	45/100	81/84	2400
	E1505S-1WR3		±5	±100/±10	45/100	82/86	2400
	E1509S-1WR3		±9	±56/±6	45/100	84/87	1000
	E1512S-1WR3		±12	±42/±5	45/100	88/90	560
	E1515S-1WR3		±15	±34/±4	45/100	88/90	560
	E1524S-1WR3		±24	±21/±3	45/100	88/90	220
	E2403S-1WR3	24 (21.6~26.4)	±3.3	±152/±15	45/100	81/84	2400
	E2405S-1WR3		±5	±100/±10	45/100	82/87	2400
	E2409S-1WR3		±9	±56/±6	45/100	84/88	1000
	E2412S-1WR3		±12	±42/±5	45/100	88/91	560
	E2415S-1WR3		±15	±34/±4	45/100	88/91	560
	E2424S-1WR3		±24	±21/±3	45/100	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 (full load/no load)	3.3VDC input series	--	370/3	--/15	mA
	5VDC input series	--	235/3	--/15	
	12VDC input series	--	99/3	--/15	
	15VDC input series	--	99/3	--/15	
	24VDC input series	--	51/3	--/15	
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

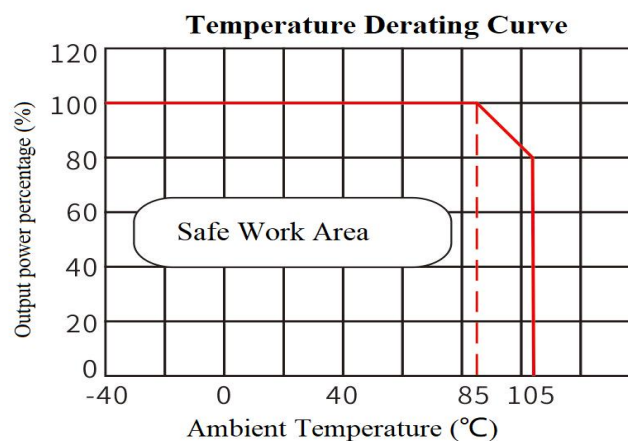
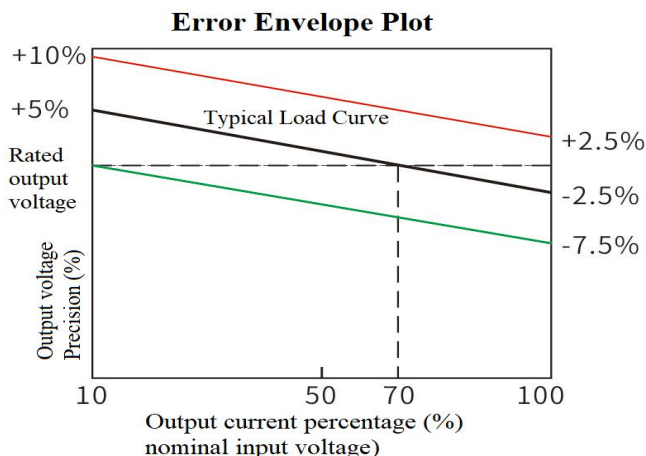
Project	Working and testing conditions		Min.	Typ.	Max.	Unit
Output load	Load percentage		10	--	100	%
Output voltage accuracy	See error envelope curve		--	--	±15.0	%
Linear adjustment rate	Input voltage variation ±1%	3.3V output	--	--	±1.5	%
		Others	--	--	±1.2	%
Load regulation	10%~100% load	3.3VDC output	--	10	--	%
		5VDC output	--	8	--	%
		9VDC output	--	8	--	%
		12VDC output	--	7	--	%
		15VDC output	--	6	--	%
		24VDC output	--	6	--	%
Ripple and noise	Pure resistive load, 20MHz bandwidth, peak-to-peak		--	45	100	mVp-p
Temperature drift coefficient	Full load		--	--	±0.03	%/°C
Output short circuit protection	Continuous short circuit protection, automatic recovery					

Note: ①The test method of ripple and noise is twisted pair test method.

## General characteristics

Project	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-Output, test time a minute, leakage current is less than 1mA	3000	--	--	VDC
Insulation resistance	Input-Output, insulation voltage 500VDC	1000	--	--	MΩ
Isolated 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, 10s	--	--	+300	°C
On-off level	Full load, nominal voltage input	--	100	--	KHz
Shock		10-55Hz, 10G, 30Min.alongX, YandZ			
Shell material		Black flame-retardant heat-resistant plastic (UL94V-0)			
Minimum time between failures	MIL-HDFK-217F@25°C	3.5X10 <sup>6</sup>	--	--	Hrs

## Product characteristic curve



## Typical Application Reference Circuit (Recommended Parameters)

### 1. Regular application:

If it is required to further reduce the input and output ripple, a capacitor filter 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.

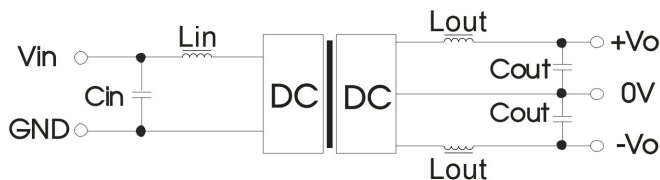
Details of recommended capacitive load values (Table 1)



Vin (Vdc)	Cin	Vo (Vdc)	Cout
3.3/5	4.7uF/16V	±3.3/±5	4.7uF/16V
9/12	2.2uF/25V	±9/±12	1uF/25V
15/24	2.2uF/50V	±15/±24	0.47uF/50V

### 2. Typical Application Circuit

For occasions with strict requirements on ripple and noise, the external circuit can refer to Figure 2 below:

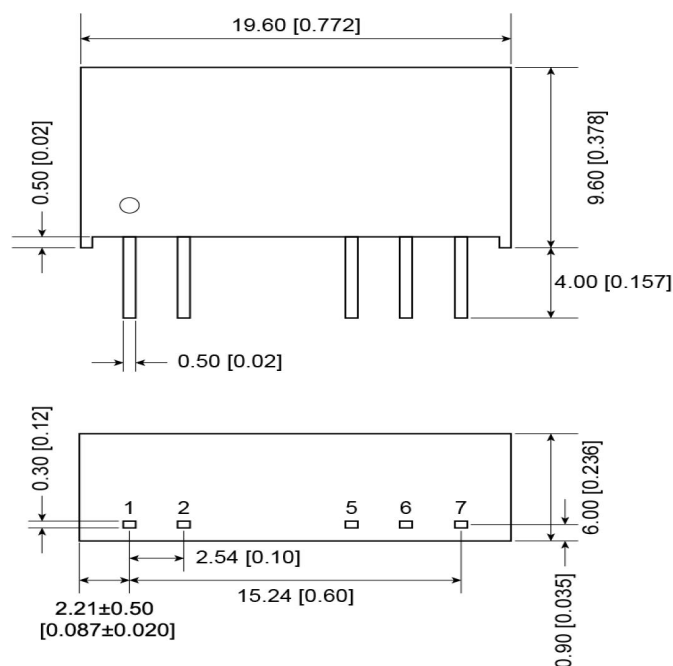


Vin (Vdc)	3.3/5/9/12/15/24
Cin	Reference table 1
Cout	Reference table 1
Lin	4.7uH
Lout	4.7uH

### 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



**Note:**

Size unit: mm[inch]

Terminal diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]

Unmarked tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]

Pin	Function (single channel)	Function (dual)
1	Vin	Vin
2	GND	GND
5	-Vo	-Vo
6	NO PIN	COM
7	+Vo	+Vo

CN: cannot be connected to any external circuit

**\*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 code	LxWxH	
S	19.60x6.00x9.60mm	0.772×0.236×0.378inch

## Test Application Reference

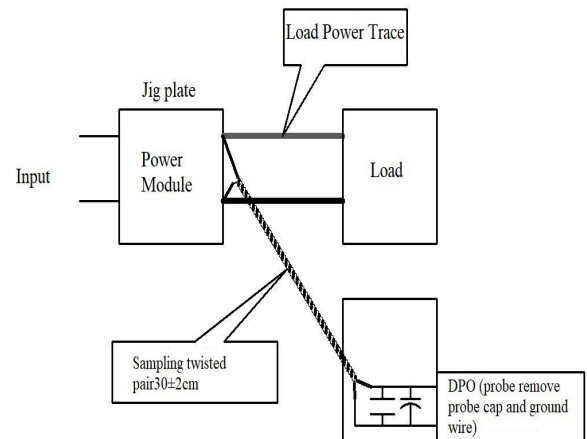
Ripple and noise test: (Twisted pair method 20MHZ bandwidth)

Testing method:

1. Ripple noise is connected by 12# twisted pair, the bandwidth of the oscilloscope is set to 20MHz, the bandwidth of the probe is 100M, and a 0.1uF polypropylene capacitor and a 4.7uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probe end, and the oscilloscope sampling uses the sample sampling mode.

2. Schematic diagram of output ripple noise test:

3. Connect the power input terminal to the input power supply, and connect the power output to the electronic load through the fixture board. The test uses 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 output rated power of the module 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 rated power of the module. 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 details

### Shenzhen Hi-Link Electronic Co.,Ltd

**Address:** 3rd Floor, Building 1, 1970 Science and Technology Park, No. 112, Minkang Road, Minzhi, Longhua, Shenzhen, Guangdong, China

**Website:** [www.hlktech.net](http://www.hlktech.net)

**Email:** [sales@hlktech.com](mailto:sales@hlktech.com)

**Phone:** 0755-23152658