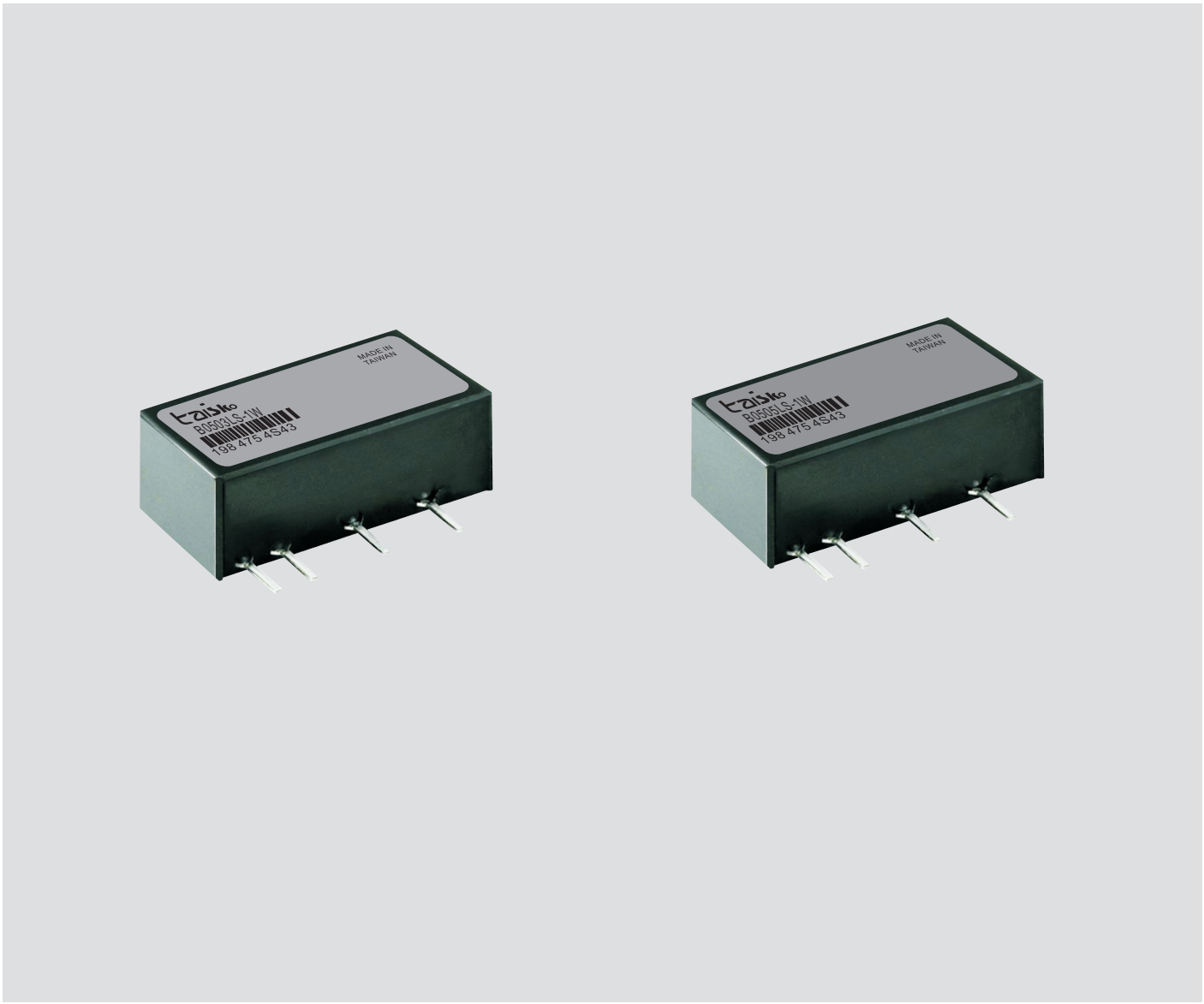
PCB mounting of DC/DC power

B-LS-1W Series

Thin type | Insulation | Safety certification | OCP | OVP | Control | Wide input range



Features

Industry standard
Wide input range
High efficiency through synchronous rectification circuit
6-side shielding
I/O insulation voltage
Built-in overcurrent protection circuit (automatic recovery)
Built-in overvoltage protection circuit
Built-in remote on/off
Output voltage adjustment by external variable resistor
High reliability

- RoHS Mark
- Safety Certification
- 3-year Warranty

1W, constant voltage input, isolated non stabilized single output

1. Product features:

International standard pins, small SIP packaging

Low static current

High conversion efficiency

Isolation voltage 1500VDC

Working temperature range: -40 ÿ~+85 ÿ

No need for external components

2 Product Description:

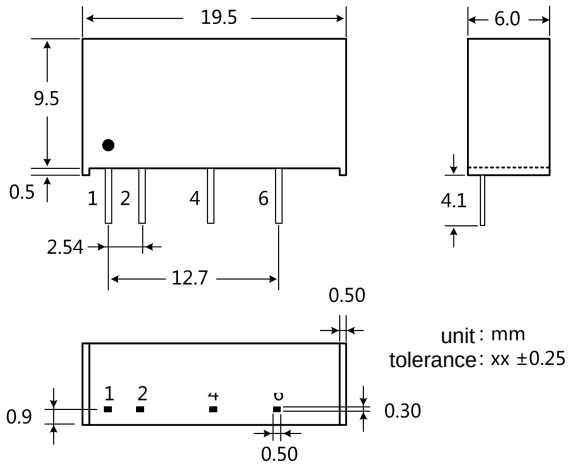
The B-LS-1W series products are specifically designed for applications in on-board power systems that require the generation of a set of voltages isolated from the input power supply.

3 Scope of application:

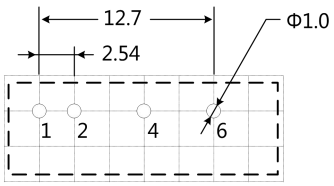
1. The voltage of the input power supply is relatively stable (voltage variation range ± 10% Vin);
2. Isolation is required between input and output (isolation voltage ÿ 1500VDC);
3. Low requirements for output voltage stability and output ripple noise;
4. Typical applications: pure digital circuit scenarios, general low-frequency analog circuit scenarios, relay drive circuits, data exchange circuit scenarios, etc.

4. Appearance dimensions and pin specifications

4.1 Appearance dimension diagram



4.2 Suggested printing images



Note: The spacing between grids is 2.54 * 2.54mm

4.3 Pin Definition

Pin		describe
Number	name	
1	+Vin	power input positive pole
2	GND	power input negative pole
4	0V	power output reference ground
6	+Vo	power output positive pole

5 Product Model Table

Product model	Input voltageVDC	output			Efficiency (%) Under full load		Maximum capacity negative load (μF)
	Nominal value (Range value)	Output voltage (VDC)	Output current (mA)				
			Maximum value	minimum value	Minimum value	Nominal value	
B0503LS-1W	5	3.3	300	30	71	76	68
B0505LS-1W	(4.5~5.5)	5	200	20	73	78	47
BxxxxLS-1W	can design special specification products according to customer needs						

Note:

1. The no-load power consumption of the above models of products is about 10% of the rated output power
2. The nominal output voltage refers to the input voltage tested at the nominal value and output current under full load conditions;
3. The maximum capacitive load is the maximum capacity of the module power supply to output capacitive loads. Generally, the external output capacitance cannot exceed the maximum capacitive load value of the module power supply, otherwise it will cause poor module startup and affect the module

The reliability of long-term operation of the block.

6 6 Specification parameters

6.1 Maximum limit parameters

Using beyond the following limit values may cause permanent damage to the module,

project	condition	Minimum value	Nominal value	Maximum value	unit
Input voltage range	5.0 V input	-0.7	5	9	V dc
Maximum output power	--	--	--	1	W
Working temperature range	Output at full load	-40	--	+85	℃
Storage temperature	--	-55	--	+105	℃
Storage humidity	No condensation	--	--	95	%
Pin resistance to welding temperature	Manual welding @ 3-5 seconds	--	370	--	℃
	Wave soldering for 5-10 seconds	--	265	--	
Output short-circuit protection	--	--	--	1	seconds

6.2 Input characteristics

project	Condition	minimum value	Nominal value	Maximum value	unit
Input current (full load/no load)	5.0 V input	--	281/25	--/60	mA
Input filter		Capacitive filtering			
Hot swappable		Not supported			

Note: The testing method for reflected ripple current can be found in the "Application Guide for DC-DC (Constant Voltage) Module Power Supply"

6.3 Output characteristics

project	condition		Minimum value	Nominal value	Maximum value	unit
Output voltage accuracy	--		See the error envelope curve graph			
Linear voltage regulation rate	Input voltage change ± 1%	3.3 V output	--	±1.5	--	%
		Load regulation rate	--	±1.2	--	
Other voltage outputs	10% to 100% load	3.3 V output	--	15	--	%
		5.0 V output	--	13	--	

project	Condition	Minimum value	Nominal value	Maximum value	unit
Ripples and noise	20MHz bandwidth	--	50	100	mVp-p
Temperature drift coefficient*	Output at full load	--	±0.03	--	%/℃

Note: The testing of ripple and noise is carried out using the proximity test method with the ground wire of the oscilloscope probe removed

6.4 General characteristics

project	Condition	minimum value	Nominal value	Maximum value	unit
Insulation voltage	Test time of 1 minute, leakage current less than 1mA	1500	--	--	VDC
Insulation resistance	Input output, insulation voltage 500VDC	1000	--	--	MΩ
Isolation capacitor	input-output, 100KHz/0.1V	--	30	--	pF
switching frequency	100% load, input nominal voltage	--	150	300	KHz
Product working temperature rise	Nominal input, 100% load @ TA=25 ÿ	--	25	--	℃
Mean time between failures	MIL-HDBK-217F@25℃	2000	--	--	Khours

6.5 Physical characteristics

project	condition
Shell material	Black flame retardant and heat-resistant plastic (UL94-V0)
Package size	19.50*6.00*10.00mm
Weight	2.1g (nominal)
Cooling method	Natural air cooling

6.6 EMC characteristics

Classification	project	parameter
EMI	Conducting harassment	CISPR22/EN55022 class B (recommended circuit as shown in Figure 8)
	Radiation harassment	CISPR22/EN55022 class B (recommended circuit as shown in Figure 8)
EMS	electrostatic discharge	IEC/EN61000-4-2 Contact ±8kV perf.criteria B

7 Product characteristic curve

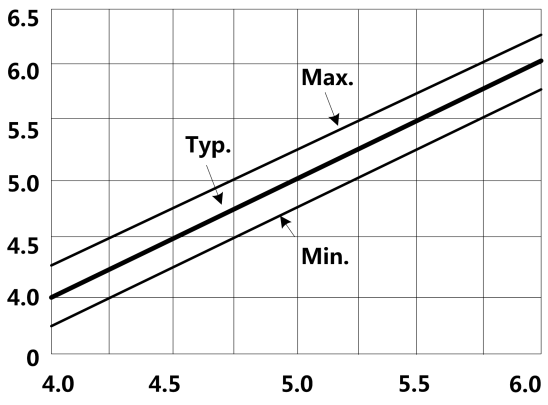


Figure 1 Output 5VDC Input Output Voltage Relationship Curve

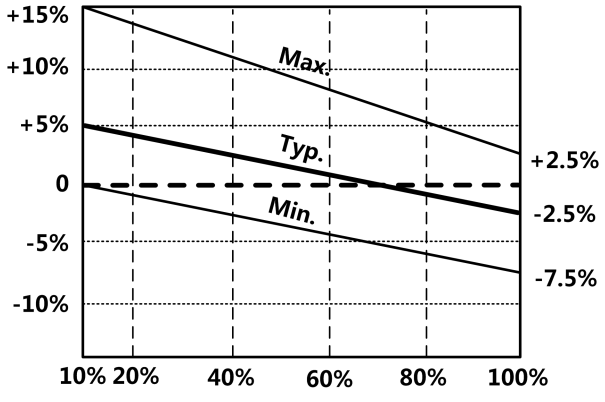


Figure 2 Output 5VDC error envelope curve graph

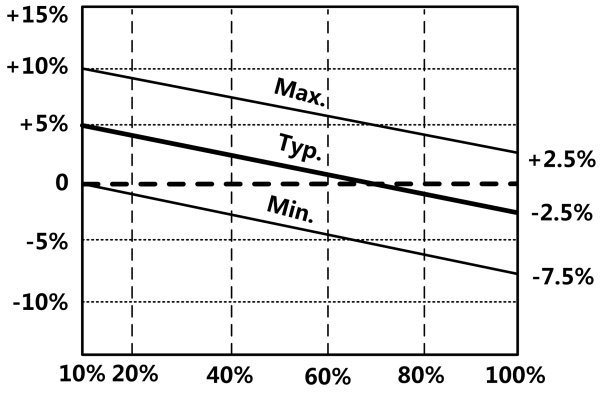


Figure 3 Output voltage error envelope curve

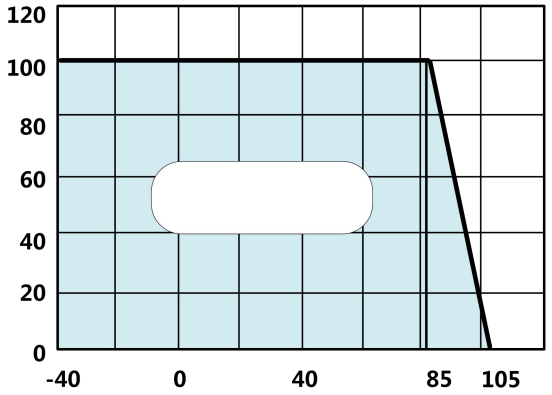


Figure 4 Environmental temperature vs output power

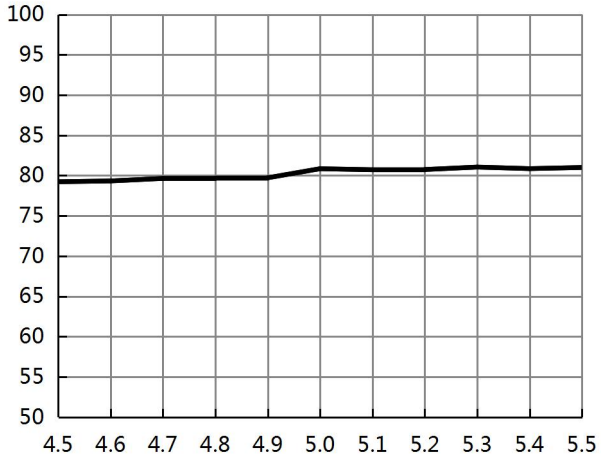


Figure 5 B0505LS-1W efficiency vs input voltage (full load)

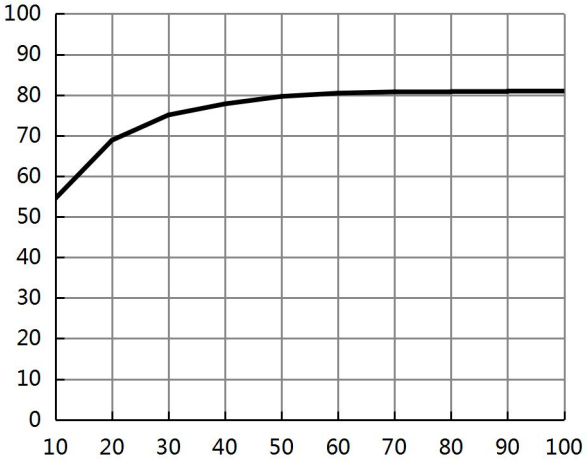


Figure 6 B0505LS-1W efficiency vs output load (nominal input)

8 Design references

8.1 Typical Applications

If further reduction of input and output ripple is required, a capacitor filtering network can be connected at the input and output terminals, and the application circuit is shown in Figure 7.

However, attention should be paid to selecting appropriate filtering capacitors. If the capacitance is too large, it is likely to cause startup problems. For each output, it is recommended to ensure safe and reliable operation

The sexual load values are detailed in Table 1.

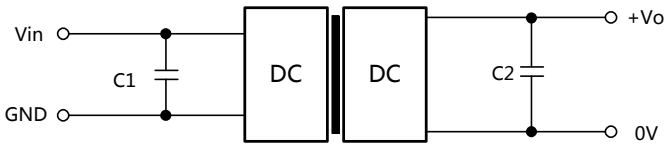


Figure 7. Application Circuit

Table 1. Recommended external capacitor parameters

Vin (V)	C1 (μF)	+Vo (V)	C2 (μF)
3.3/5	4.7	3.3/5	4.7
12/15	2.2	9	2.2
24	1	12/15	1
		24	0.47

8.2 EMC Typical Recommended Circuit

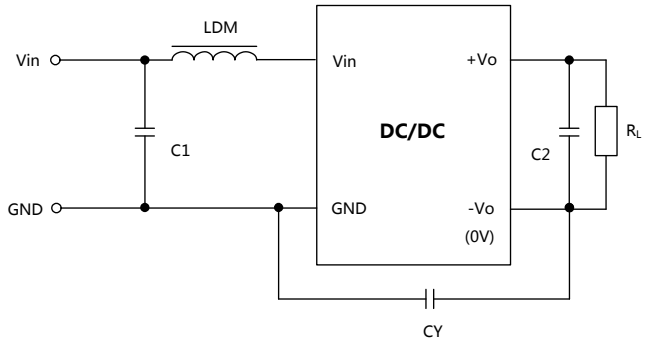


Figure 8 EMC Recommended Circuit

Table 2. EMC Recommended Parameters

Input voltage (V)		3.3/5	12/15/24
EMI	C1	10 μ F/35V	4.7 μ F/50V
	LDM	4.7 μ H	10 μ H
	C2	Refer to C2 parameter in Figure 7	
	CY	102K/4KV	

8.3 Output Load Requirements

To ensure the efficient and reliable operation of the module, its minimum output load should not be less than 10% of the rated load when in use. If your required power is indeed small, please use it at the output end

Parallel connection of a resistor (the sum of the power consumed by the resistor and the actual power used is greater than or equal to 10% of the rated power).

9. Precautions for product use

9.1 Consideration of input voltage stability

When using the product, it is required that the input voltage be relatively stable. Fluctuations in the input voltage can cause instability in the output voltage, such as in the "Input Output Voltage" section of the product characteristic curve

As shown in the relationship curve. From the graph, it can be seen that under a constant load, the output voltage changes with the input voltage. So, to obtain a stable output voltage,

It is necessary to ensure the stability of the input voltage. This product is suitable for situations where the input voltage is stable or the range of change is relatively small.

2 9.2 Consideration of Constant Output Load

During the use of the product, changes in the output load can also cause changes in the output voltage, as shown in the "Output Voltage Error Envelope Curve" section of the product characteristic curve.

From the graph, it can be seen that under stable input voltage, the output voltage changes with the load. In the design and selection stage of the power supply system, it is necessary to comprehensively consider module electricity

Evaluate whether the output voltage meets the design requirements based on the actual range of load changes in the circuit, based on the load variation of the source. This product is suitable for constant or variable load ratio

Smaller occasions.

3 9.3 Suppression of output ripple and noise/Selection of output filtering capacitor

When the product is in use, the output terminal does not require an additional capacitor to function properly. To further reduce the output ripple and noise of the product, filtering can be applied at the output end of the product

Capacitance. However, it must be noted that the output terminal cannot increase the capacity of the electrolytic capacitor. An excessive capacity of the electrolytic capacitor may cause the output voltage of the module to not be established, and may even lead to product damage

Damage; Different models of output terminals have the requirement of "maximum capacitive load". In order to ensure the safe and reliable operation of the product during use, the output ripple and noise meet the requirements

Under the premise of reducing the output capacitance as much as possible. Typical application circuits can be found in the design reference section.

4 9.4 Prevent product hot plug testing or use

The so-called hot swapping usually refers to inserting or removing the product from the circuit without disconnecting the power supply. During use or testing, the product does not support

Perform hot swapping operations. Because during the hot swapping process, high voltage spikes may occur due to sudden changes in current, which may lead to product damage. Another scenario is between the power supply and the product

Insert a mechanical switch between the input terminals to control the on/off of the power supply. In fact, mechanical switches can also generate high voltage spikes during on/off operations, and there are also

Can cause product damage. Any operation that may produce high voltage spikes during testing or use of the product should not be ignored, and measures need to be taken to prevent high voltage spikes from being directly added to production