1W, Fixed input voltage, isolated & unregulated dual/single output

Continuous Short Circuit Protection

Patent Protection RoHS

FEATURES

- Subminiature SIP package
- Operating temperature range: -40℃ to +105℃
- Efficiency up to 80%
- Isolation voltage: 1.5K VDC
- High power density
- No external component required
- International standard pin-out

A_S-1W(E)R2 & B_LS-1W(E)R2 series is specially designed for applications where an isolated voltage is required in a distributed power supply system. It is suitable for:

1.Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);

2.Where isolation is necessary between input and output (isolation voltage ≤1500VDC);

3.Where do not has high requirement of line regulation and load regulation;

4. Such as: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

Selection Guide

Part No.*	Input Voltage (VDC)	Output		Efficiency (%,Min./Typ.) @ Full Load	Max. Capacitive Load** (μF)
		Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
A0305S-1WR2	2.97-3.63 (3.3VDC nominal)	±5	±100/±10	74/78	100
A0312S-1WR2		±12	±42/±5	74/78	
A0315S-1WR2		±15	±34/±4	74/78	
B0303LS-1WR2		3.3	303/31	68/72	220
B0305LS-1WR2		5	200/20	74/78	
B0309LS-1WR2		9	111/11	74/78	
B0312LS-1WR2		12	84/9	74/78	
B0315LS-1WR2		15	67/7	74/78	
A0503S-1WR2	4.5-5.5 (5VDC nominal)	±3.3	±152/±15	70/74	100
A0505S-1WR2		±5	±100/±10	76/80	
A0509S-1WR2		±9	±56/±6	76/80	
A0512S-1WR2		±12	±42/±5	76/80	
A0515S-1WR2		±15	±34/±4	76/80	
A0524S-1WR2		±24	±21/±3	76/80	
B0503LS-1WR2		3.3	303/31	70/74	220
B0505LS-1WR2		5	200/20	76/80	
B0509LS-1WR2		9	111/11	76/80	
B0512LS-1WR2		12	84/9	76/80	
B0515LS-1WR2		15	67/7	76/80	
B0524LS-1WR2		24	42/5	76/80	
A0909S-1WR2	8.1-9.9 (9VDC nominal)	±9	±56/±6	76/80	100
A0915S-1WR2		±15	±34/±4	76/80	
A1203S-1WR2	10.8-13.2 (12VDC nominal)	±3.3	±152/±15	72/76	100
A1205S-1WR2		±5	±100/±10	76/80	
A1209S-1WR2		±9	±56/±6	76/80	
A1212S-1WR2		±12	±42/±5	76/80	
A1215S-1WR2		±15	±34/±4	76/80	
A1224S-1WR2		±24	±21/±3	76/80	

Selection Guide

Part No.*	Input Voltage (VDC)	Output		Efficiency (%,Min./Typ.) @ Full Load	Max. Capacitive Load** (μF)
		Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
B1203LS-1WR2	10.8-13.2 (12VDC nominal)	3.3	303/31	72/76	220
B1205LS-1WR2		5	200/20	76/80	
B1209LS-1WR2		9	111/11	76/80	
B1212LS-1WR2		12	84/9	76/80	
B1215LS-1WR2		15	67/7	76/80	
B1224LS-1WR2		24	42/5	76/80	
A1505S-1WR2	13.5-16.5 (15VDC nominal)	±5	±100/±10	76/80	100
A1509S-1WR2		±9	±56/±6	76/80	
A1512S-1WR2		±12	±42/±5	76/80	
A1515S-1WR2		±15	±34/±4	76/80	
A1524S-1WR2		±24	±21/±3	76/80	
B1505LS-1WR2		5	200/20	76/80	220
B1509LS-1WR2		9	111/11	76/80	
B1512LS-1WR2		12	84/9	76/80	
B1515LS-1WR2		15	67/7	76/80	
B1524LS-1WR2		24	42/5	76/80	
A2405S-1WR2	21.6-26.4 (24VDC nominal)	±5	±100/±10	76/80	100
A2409S-1WR2		±9	±56/±6	76/80	
A2412S-1WR2		±12	±42/±5	76/80	
A2415S-1WR2		±15	±34/±4	76/80	
A2424S-1WR2		±24	±21/±3	76/80	
B2403LS-1WR2		3.3	303/31	70/74	220
B2405LS-1WR2		5	200/20	76/80	
B2409LS-1WR2		9	111/11	76/80	
B2412LS-1WR2		12	84/9	76/80	
B2415LS-1WR2		15	67/7	76/80	
B2424LS-1WR2		24	42/5	76/80	

Note: *Series with suffix "-1WER2" are EMI performance optimization model. As A0512S-1WER2,the EMI performance of such products is better than conventional models (eg A0512S-1WR2), but the short circuit performance is worse than conventional models.
**The capacitive loads of positive and negative outputs are the same.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3V input	--	404/30	--	mA
	5V input	--	256/20	--	
	9V input	--	142/20	--	
	12V input	--	106/15	--	
	15V input	--	84/10	--	
	24V input	--	54/7	--	
Surge Voltage (1sec. max.)	3.3V input	-0.7	--	5	VDC
	5V input	-0.7	--	9	
	9V input	-0.7	--	12	
	12V input	-0.7	--	18	
	15V input	-0.7	--	21	
	24V input	-0.7	--	30	
Reflected Ripple Current		--	15	--	mA
Input Filter		Capacitor filter			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See tolerance envelope graph (Fig. 1)			
Line Regulation	Input voltage change: ±1%	3.3VDC output	--	--	±1.5	%
		Other output	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC output	--	18	--	
		5VDC output	--	12	--	
		9VDC output	--	9	--	
		12VDC output	--	8	--	
		15VDC output	--	7	--	
		24VDC output	--	6	--	
Ripple & Noise*	20MHz bandwidth		--	60	--	mVp-p
Temperature Drift Coefficient	100% load		--	--	±0.03	%/℃
Output Short Circuit Protection**	A_S-1WER2 & B_LS-1WER2 series		--	--	1	s
	A_S-1WR2 & B_LS-1WR2 series		Continuous, self-recovery			

Note: * Ripple and noise tested with "parallel cable" method, please see DC-DC Converter Application Notes for specific operation methods.
**Supply voltage must be discontinued at the end of short circuit duration for A_S-1WER2 & B_LS-1WER2 series.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	1500	--	--	VDC
Insulation Resistance	Input-output, insulation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	20	--	pF
Operating Temperature	Derating if the temperature ≥85 C, (see Fig. 2)	-40	--	105	℃
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25℃	--	25	--	
Hand Soldering	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Pin Welding Resistance Temperature	Non-condensing	--	--	95	%
Switching Frequency	100% load, nominal input voltage	--	100	300	KHz
MTBF	MIL-HDFK-217F@25℃	3500	--	--	K hours

Physical Specifications

Casing Material	Black flame-retardant heat-proof epoxy resin (UL94-V0)
Package Dimensions	19.50*9.30*6.00 mm
Weight	2.4g(Typ.)
Cooling methods	Free air convection

EMC Specifications

EMI	Conducted disturbance		CISPR22/EN55022	CLASS B (see Fig. 4 for recommended circuit)	
	Radiated emission		CISPR22/EN55022	CLASS B (see Fig. 4 for recommended circuit)	
EMS	Electrostatic discharge	A_S-1W(E)R2	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
		B_LS-1W(E)R2	IEC/EN61000-4-2	Contact ±8KV	perf. Criteria B

Product Characteristic Curve

Tolerance Envelope Graph

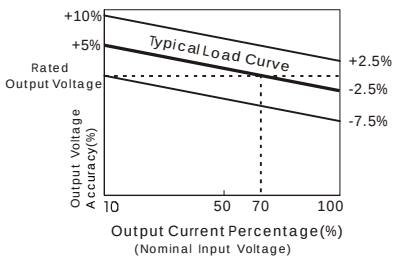


Fig. 1

Temperature Derating Graph

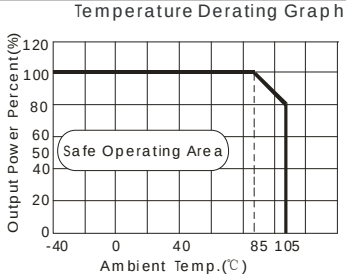
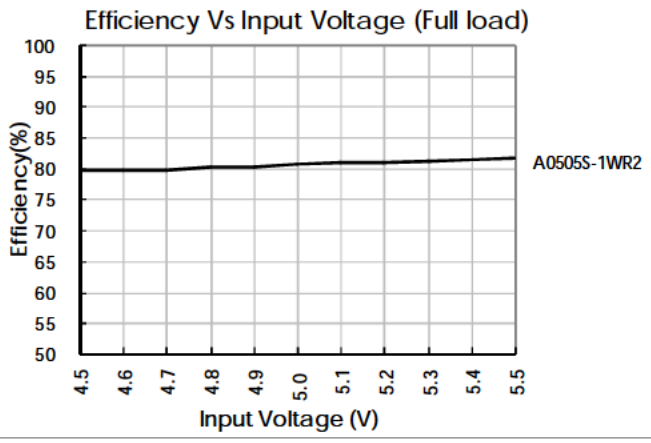
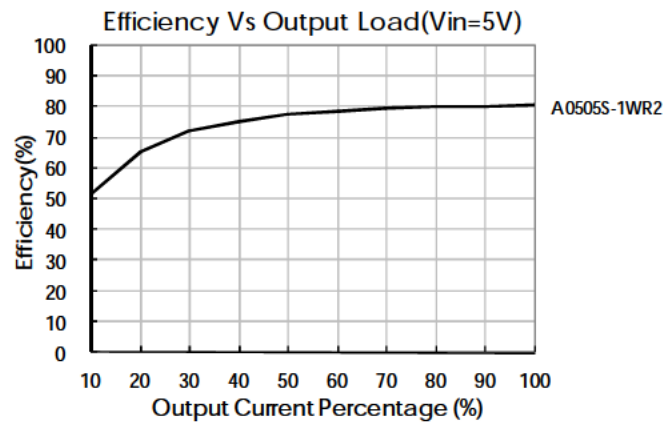
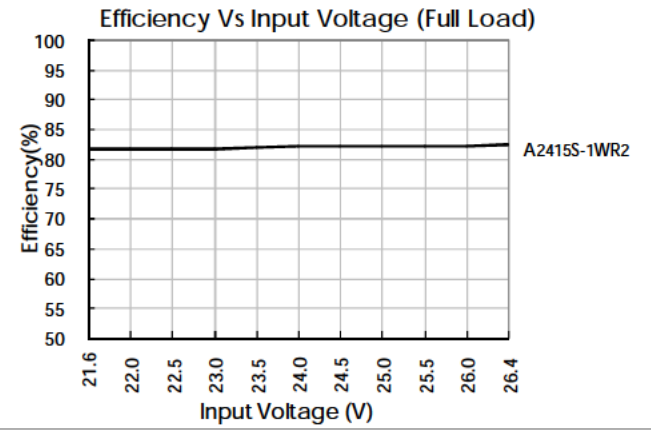
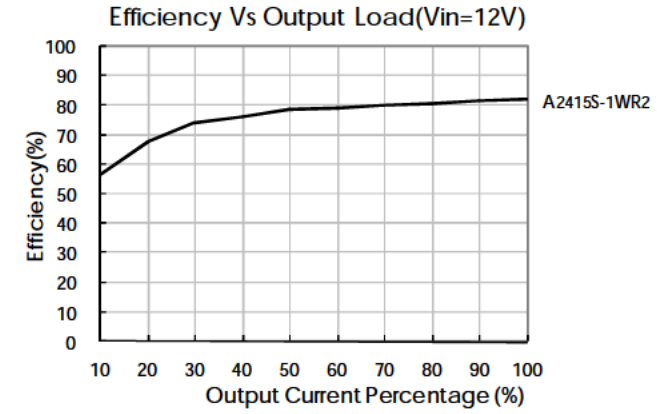


Fig. 2









Design Reference

1. Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.

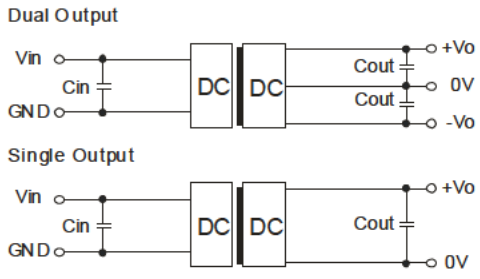


Fig.3

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
3.3/5	4.7	3.3/5	10	±3.3/±5	4.7
9/12	2.2	9/12	2.2	±9/±12	1
15	2.2	15/24	1	±15/±24	0.47
24	1	--	--	--	--

It is not recommended to connect any external capacitor when output power is less than 0.5W.

2. EMC typical recommended circuit (CLASS B)

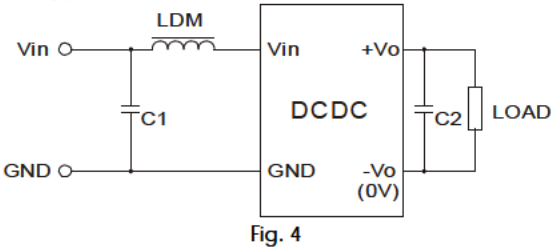


Fig. 4

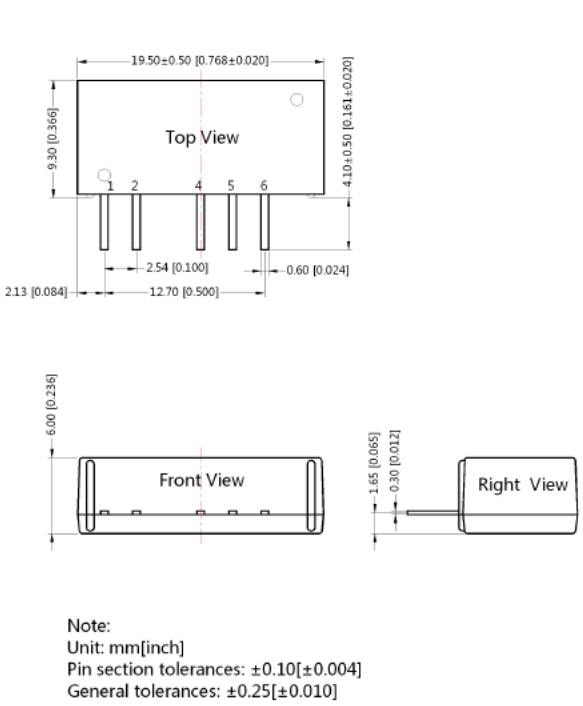
Input voltage (V)		3.3/5/9/12/15/24
EMI	C1	4.7μF /50V
	C2	Refer to the Cout in Fig.3
	LDM	6.8μH

3. Output load requirements

To ensure the module work efficiently and reliably, during the operation, the min. output load should be no less than 10% of the full load. If the actual output power is low, please connect a resister to the output terminal in parallel, with a recommenced resistance which is 10% of the rated power, and derating is required during operation.

4. For more information please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Note: Grid 2.54*2.54mm

Pin-Out		
Pin	B_LS	A_S
1	Vin	Vin
2	GND	GND
4	0V	-Vo
5	No Pin	0V
6	+Vo	+Vo

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Note:

1. Packing Information please refer to 'Product Packing Information'. Packing bag number: 58200029;
2. If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in this datasheet;
3. The max. capacitive load should be tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, data in this data sheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
5. All index testing methods in this datasheet are based on our Company´s corporate standards;
6. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technicians for specific information;
7. We can provide product customization service;
8. Specifications of this product are subject to changes without prior notice.

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