

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

### FEATURES

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



UL US CE Patent Protection RoHS



A\_S-1WR2 & B\_LS-1WR2 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:  $\pm 10\%V_{in}$ );
2. Where isolation is necessary between input and output (isolation voltage  $\leq 1500VDC$ );
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

Certification	Part No.	Input Voltage (VDC)	Output		Efficiency (%Min./Typ.) @ Full Load	Max. Capacitive Load*( $\mu F$ )
		Nominal (Range)	Output Voltage (VDC)	Output Current (mA)(Max./Min.)		
--	B0303LS-1WR2	3.3 (2.97-3.63)	3.3	303/31	68/72	220
	B0305LS-1WR2		5	200/20	74/78	
UL/CE	A0503S-1WR2	5 (4.5-5.5)	$\pm 3.3$	$\pm 152/\pm 15$	67/71	100
	A0505S-1WR2		$\pm 5$	$\pm 100/\pm 10$	76/80	
	A0509S-1WR2		$\pm 9$	$\pm 56/\pm 6$	76/80	
	A0512S-1WR2		$\pm 12$	$\pm 42/\pm 5$	76/80	
	A0515S-1WR2		$\pm 15$	$\pm 34/\pm 4$	76/80	
	A0524S-1WR2		$\pm 24$	$\pm 21/\pm 3$	76/80	
--	B0503LS-1WR2	5 (4.5-5.5)	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	9 (8.1-9.9)	$\pm 9$	$\pm 56/\pm 6$	76/80	100
	A0915S-1WR2		$\pm 15$	$\pm 34/\pm 4$	76/80	
	A1203S-1WR2		$\pm 3.3$	$\pm 152/\pm 15$	72/76	
UL/CE	A1205S-1WR2	12 (10.8-13.2)	$\pm 5$	$\pm 100/\pm 10$	76/80	220
	A1209S-1WR2		$\pm 9$	$\pm 56/\pm 6$	76/80	
	A1212S-1WR2		$\pm 12$	$\pm 42/\pm 5$	76/80	
	A1215S-1WR2		$\pm 15$	$\pm 34/\pm 4$	76/80	
	A1224S-1WR2		$\pm 24$	$\pm 21/\pm 3$	76/80	
	B1203LS-1WR2		3.3	303/31	72/76	
UL/CE	B1205LS-1WR2	12 (10.8-13.2)	5	200/20	76/80	220
	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	

Model	Series	Output Voltage (V)	Output Current (mA)	Efficiency (%)	Power (W)
--	A1505S-1WR2	15 (13.5-16.5)	±5	±100/±10	76/80
	A1512S-1WR2		±12	±42/±5	76/80
	A1515S-1WR2		±15	±34/±4	76/80
CE	B1505LS-1WR2	15 (13.5-16.5)	5	200/20	76/80
--	B1512LS-1WR2		12	84/9	76/80
CE	B1515LS-1WR2		15	67/7	76/80
UL/CE	A2405S-1WR2	24 (21.6-26.4)	±5	±100/±10	76/80
	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	24 (21.6-26.4)	3.3	303/31	70/74
UL/CE	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:\*The capacitive loads of positive and negative outputs are identical.

### Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3V input	--	426/30	-/70	mA
	5V input	--	281/25	-/60	
	9V input	--	142/20	-/60	
	12V input	--	106/15	-/50	
	15V input	--	84/10	-/35	
	24V input	--	54/7	-/30	
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			
Hot Plug		Unavailable			

### 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	--	
Load Regulation	10%-100% load	15VDC output	--	7	--	%
		24VDC output	--	6	--	
Ripple & Noise*	20MHz bandwidth	--	60	150	mVp-p	
Temperature Drift Coefficient	100% load	--	--	±0.03	%/°C	

Output Short Circuit Protection**	A24xxS-1WR2 /B24xxLS-1WR2 A0524S-1WR2/B0524LS-1WR2	--	--	1	s
	others	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 A24xxS-1WR2 /B24xxLS-1WR2 series, and A0524S-1WR2/ B0524LS-1WR2 models.

### 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	°C
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25°C	--	25	--	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency	100% load, nominal input voltage	--	100	--	KHz
MTBF	MIL-HDFK-217F@25°C	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-1WR2	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
		B_LS-1WR2	IEC/EN61000-4-2	Contact ±8KV	perf. Criteria B

### Product Characteristic Curve

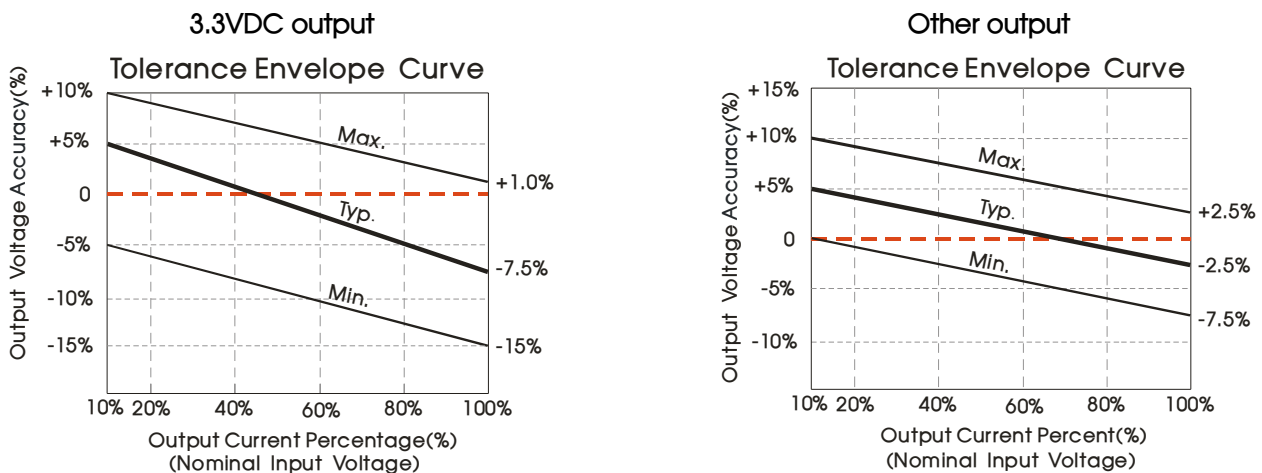


Fig. 1

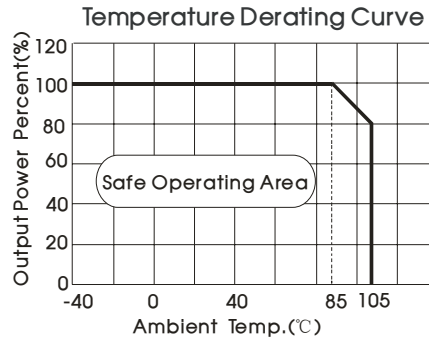
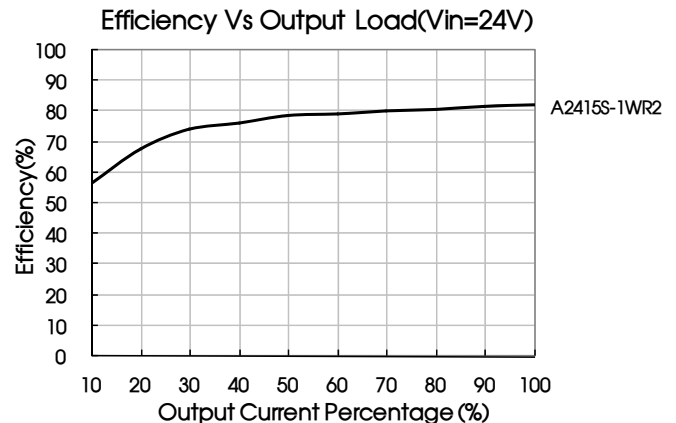
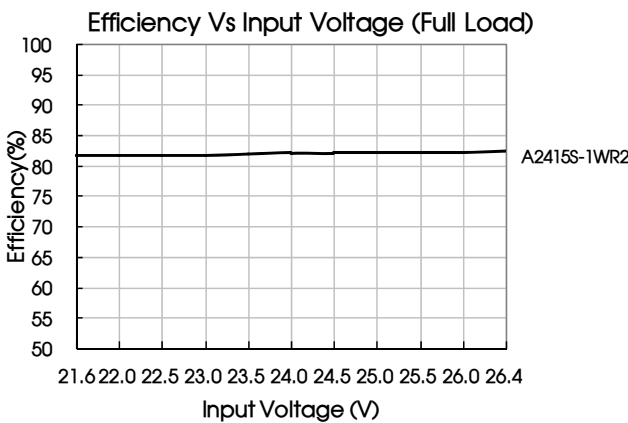
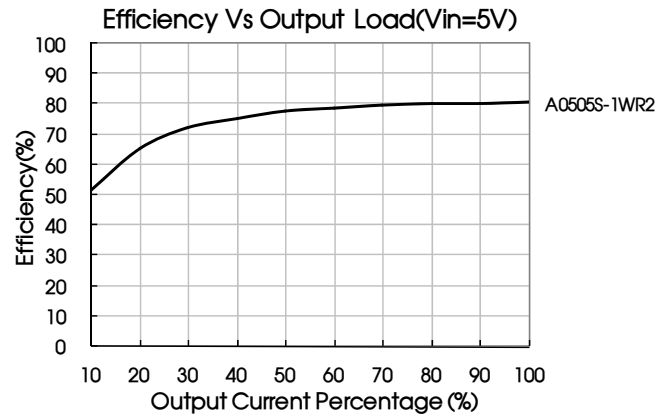
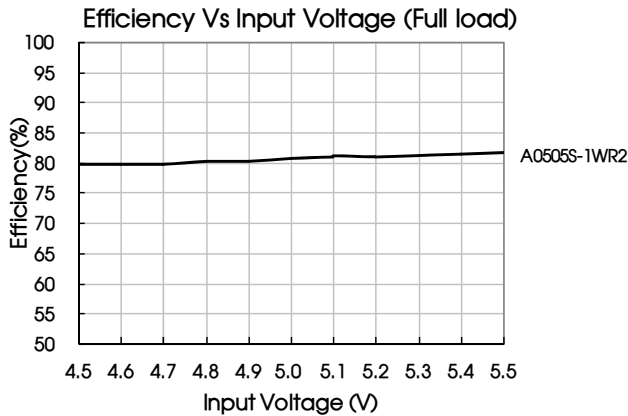


Fig. 2



## 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 ensure the modules running well, the recommended capacitive load values as shown in Table 1.

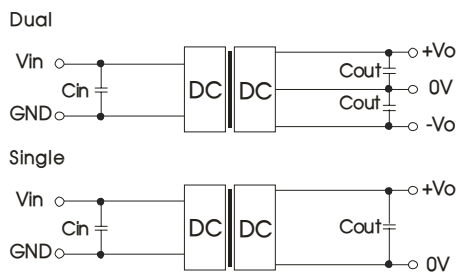


Fig.3

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)

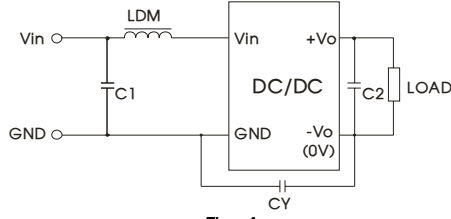


Fig. 4

Input voltage (VDC)		3.3/5/9/12	15/24
EMI	C1	4.7μF /50V	
	C2	Refer to the Cout in Fig.3	
	CY	--	1nF/2KV
	LDM	6.8μH	

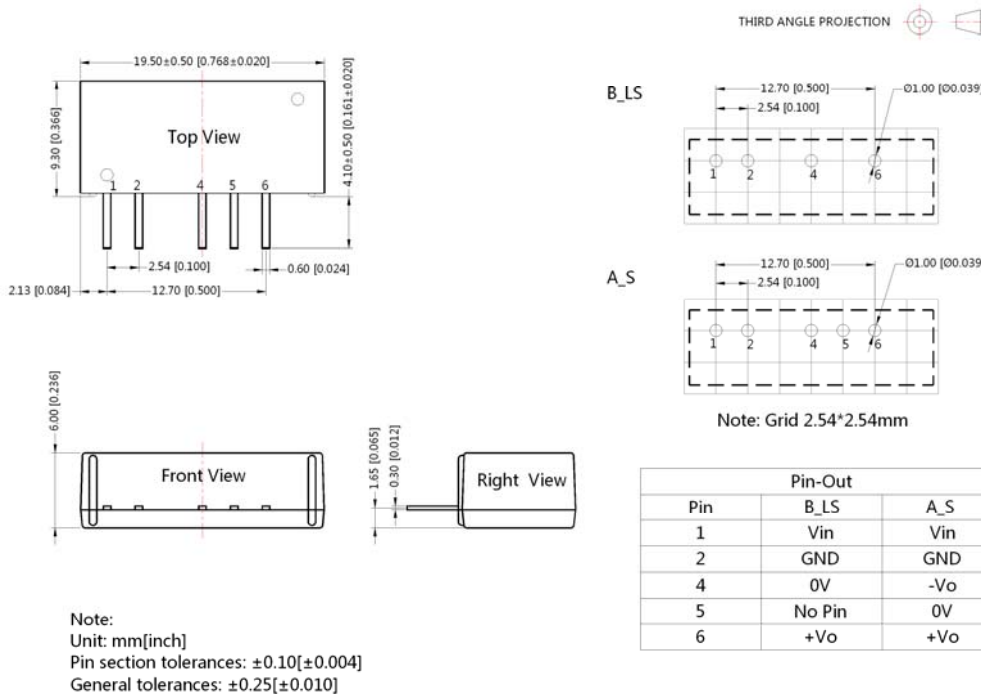
Note: 1. 1.15V/ 24V input series is subject to CY (CY : 1nF/2KV).  
2. It is not needed to add the component in the peripheral circuit when parameter with the symbol of "--".

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 resistor to the output terminal in parallel, with a recommended 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](http://www.mornsun-power.com)

Dimensions and Recommended Layout



- 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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