

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



UL US CE Patent Protection RoHS

FEATURES

- Ultra Compact SIP package
- Operating temperature range: -40°C to +105°C
- High efficiency up to 80%
- Isolation voltage: 1.5K VDC
- High power density
- No external component required
- International standard pin-out
- UL60950,EN60950 approval

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;
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*(μF)
		Nominal (Range)	Output Voltage (VDC)	Output Current (mA)(Max./Min.)		
--	A0315S-1WR2	3.3 (2.97-3.63)	± 15	$\pm 34/\pm 4$	72/76	100
	B0303LS-1WR2		3.3	303/31	68/72	220
	B0305LS-1WR2		5	200/20	74/78	
UL/CE	A0503S-1WR2	5 (4.5-5.5)	± 3.3	$\pm 152/\pm 15$	67/71	100
	A0505S-1WR2		± 5	$\pm 100/\pm 10$	76/80	
	A0509S-1WR2		± 9	$\pm 56/\pm 6$	76/80	
	A0512S-1WR2		± 12	$\pm 42/\pm 5$	76/80	
	A0515S-1WR2		± 15	$\pm 34/\pm 4$	76/80	
	A0524S-1WR2		± 24	$\pm 21/\pm 3$	76/80	
UL/CE	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)	± 9	$\pm 56/\pm 6$	76/80	100
	A0915S-1WR2		± 15	$\pm 34/\pm 4$	76/80	
	A1203S-1WR2		± 3.3	$\pm 152/\pm 15$	72/76	
UL/CE	A1205S-1WR2	12 (10.8-13.2)	± 5	$\pm 100/\pm 10$	76/80	100
	A1209S-1WR2		± 9	$\pm 56/\pm 6$	76/80	
	A1212S-1WR2		± 12	$\pm 42/\pm 5$	76/80	
	A1215S-1WR2		± 15	$\pm 34/\pm 4$	76/80	
	A1224S-1WR2		± 24	$\pm 21/\pm 3$	76/80	
	B1203LS-1WR2		3.3	303/31	72/76	
UL/CE	B1205LS-1WR2	5	200/20	76/80		
	B1209LS-1WR2	9	111/11	76/80		
	B1212LS-1WR2	12	84/9	76/80		

UL/CE	Model	12 (10.8-13.2)	15	67/7	76/80	220
	B1215LS-1WR2		15	67/7	76/80	220
	B1224LS-1WR2		24	42/5	76/80	220
--	A1505S-1WR2	15 (13.5-16.5)	±5	±100/±10	76/80	100
	A1512S-1WR2		±12	±42/±5	76/80	
UL	A1515S-1WR2		±15	±34/±4	76/80	
CE	B1505LS-1WR2		5	200/20	76/80	220
--	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	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
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			

Note: * Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.

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	150	mVp-p
Temperature Drift Coefficient	100% load	--	--	±0.03	%/°C
Output Short Circuit Protection**	B03xxLS-1WR2/A24xxS-1WR2 /B24xxLS-1WR2 A0524S-1WR2/B0524LS-1WR2/A0315S-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 B03xxLS-1WR2 series, A24xxS-1WR2 /B24xxLS-1WR2 series, and A0524S-1WR2/B0524LS-1WR2/A0315S-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-HDBK-217F@25°C	3500	--	--	K hours

Physical Specifications

Casing Material	Black flame-retardant heat-proof epoxy resin (UL94 V-0)
Package Dimensions	19.50*6.00*9.30 mm
Weight	2.4g(Typ.)
Cooling methods	Free air convection

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS B (see Fig. 4 for recommended circuit)		
	RE	CISPR22/EN55022	CLASS B (see Fig. 4 for recommended circuit)		
EMS	ESD	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

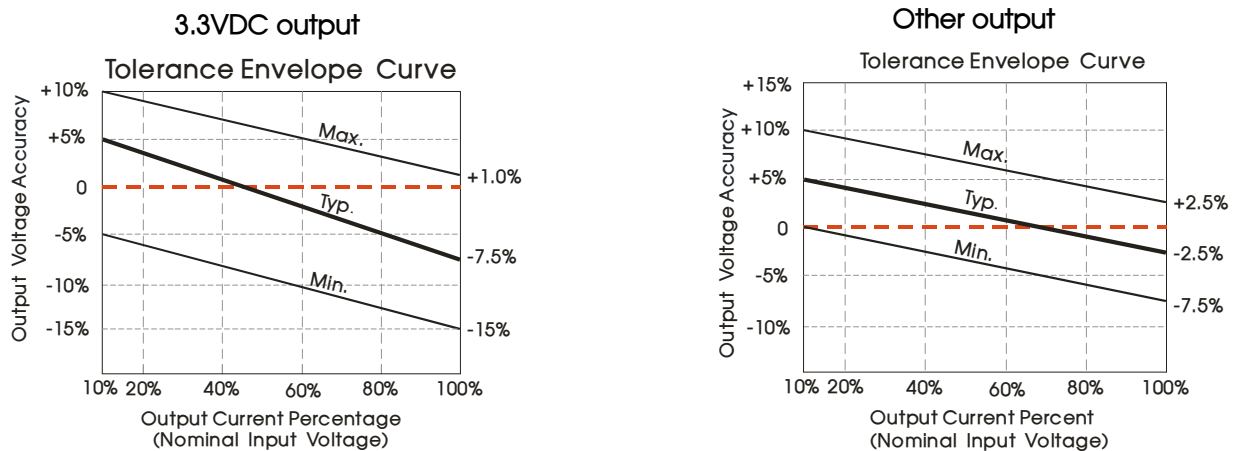


Fig. 1

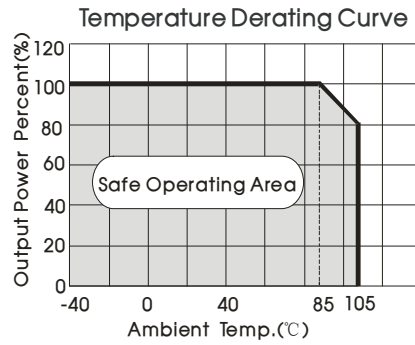
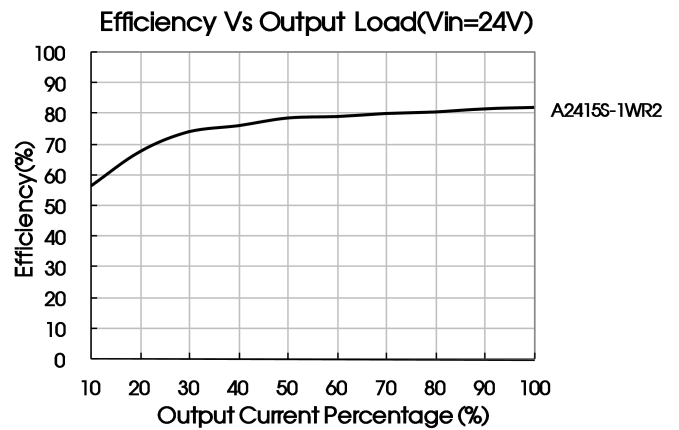
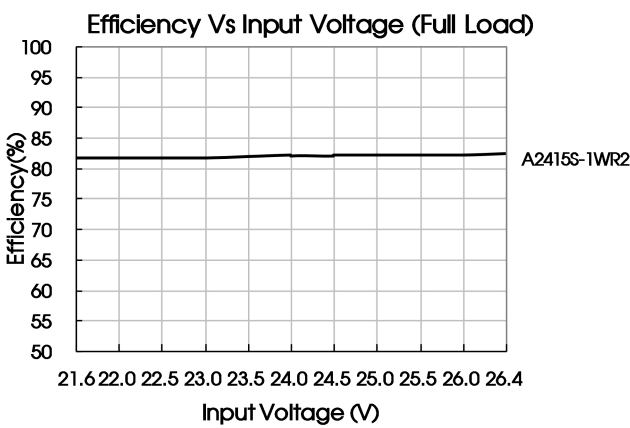
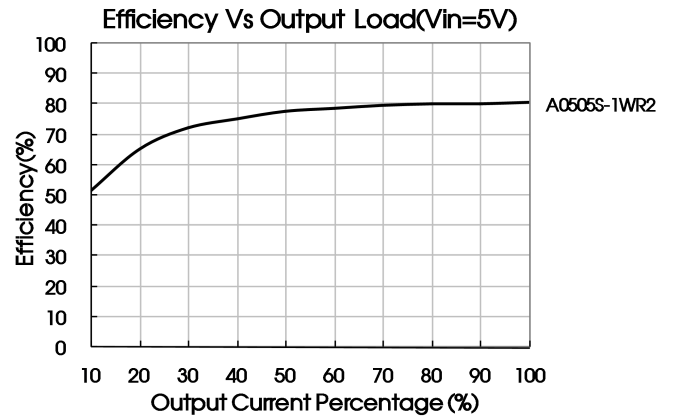
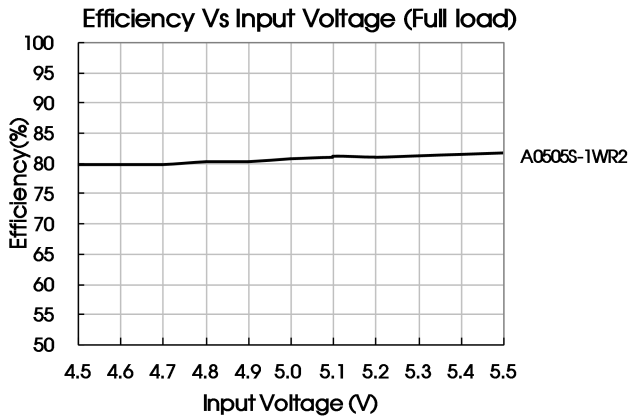


Fig. 2



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.

Dual



Single



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	--	--	--	--

2. EMC typical recommended circuit (CLASS B)

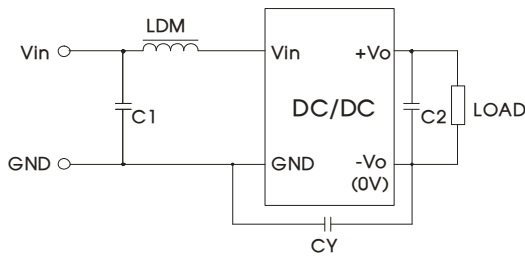


Fig. 4

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	

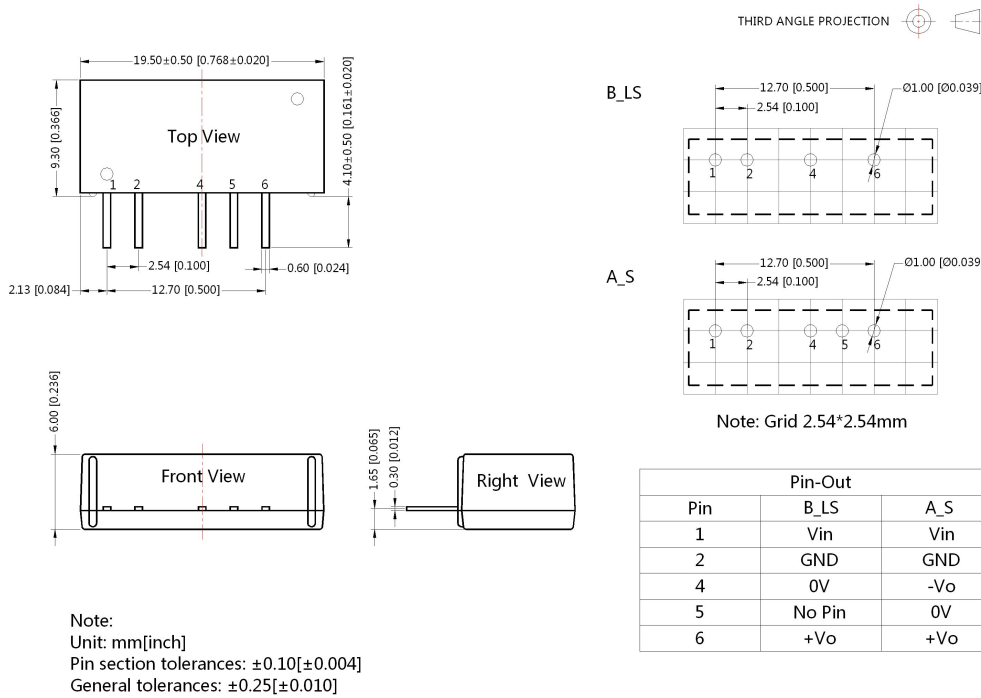
Note: 1. 15V/ 24V input series is subject to CY (CY : 1nF/2KV).
2. It is not needed to add the component in the peripheral circuit when parameter with the symbol of "--".

3. Output load requirements

In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

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

Dimensions and Recommended Layout



Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58200029;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C , humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our Company's corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Specifications are subject to change without prior notice.

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