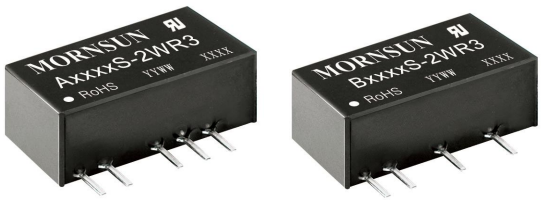
DC/DC Converter

A_S-2WR3 & B_S-2WR3 series

2W isolated DC-DC converter

Fixed input voltage, unregulated dual/ single output



Continuous Short Circuit Protection

c UL us Report CE Report UK CA Report CB RoHS Patent Protection

UL 62368-1 EN 62368-1 BS EN 62368-1 IEC 62368-1

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 86%
- High power density
- I/O isolation test voltage 1.5k VDC
- Industry standard pin-out

A_S-2WR3 & B_S-2WR3 series are specially designed for applications where an (two) isolated voltage is required in a distributed power supply system. They are suitable for:

1. The voltage of the input power supply is relatively stable with a variation of ±10%Vin or less;

2. An input to output isolation voltage of up to 1500VDC is necessary;

3. The requirement for a tight output regulation is not as strict.

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load*(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
--	A0503S-2WR3	5 (4.5-5.5)	±3.3	±303/±30	71/75	1200
	A0505S-2WR3		±5	±200/±20	80/84	1200
	A0509S-2WR3		±9	±111/±11	81/85	470
	A0512S-2WR3		±12	±83/±8	81/85	220
	A0515S-2WR3		±15	±67/±7	82/86	220
	A0524S-2WR3		±24	±42/±4	82/86	100
	B0503S-2WR3		3.3	400/40	74/78	2400
	B0505S-2WR3		5	400/40	80/84	2400
	B0507S-2WR3		7.2	278/28	80/84	1000
	B0509S-2WR3		9	222/22	81/85	1000
	B0512S-2WR3		12	167/17	81/85	560
	B0515S-2WR3		15	133/13	82/86	560
	B0524S-2WR3		24	83/8	82/86	220
UL/EN/BS EN/IEC	A1203S-2WR3	12 (10.8-13.2)	±3.3	±303/±30	71/75	1200
	A1205S-2WR3		±5	±200/±20	76/80	1200
--	A1207S-2WR3		±7.2	±139/±13	76/80	470
	A1209S-2WR3		±9	±111/±11	78/82	470
UL/EN/BS EN/IEC	A1212S-2WR3		±12	±83/±8	79/83	220
	A1215S-2WR3		±15	±67/±7	79/83	220
--	A1224S-2WR3		±24	±42/±4	79/83	100
--	B1203S-2WR3		3.3	400/40	75/79	2400
UL/EN/BS EN/IEC	B1205S-2WR3		5	400/40	78/82	2400
--	B1209S-2WR3		9	222/22	78/82	1000
UL/EN/BS EN/IEC	B1212S-2WR3		12	167/17	80/84	560
	B1215S-2WR3		15	133/13	81/85	560
	B1224S-2WR3		24	83/8	82/86	220

--	A1505S-2WR3	15 (13.5-16.5)	±5	±200/±20	76/80	1200
	A1515S-2WR3		±15	±67/±7	78/82	220
	B1505S-2WR3		5	400/40	76/80	2400
	B1515S-2WR3		15	133/13	77/81	560
	B1524S-2WR3		24	83/8	77/81	220
UL/EN/BS EN/IEC	A2403S-2WR3	24 (21.6-26.4)	±3.3	±303/±30	70/76	1200
	A2405S-2WR3		±5	±200/±20	74/80	1200
--	A2407S-2WR3		±7.2	±139/±13	74/80	470
	A2409S-2WR3		±9	±111/±11	75/81	470
UL/EN/BS EN/IEC	A2412S-2WR3		±12	±83/±8	77/83	220
	A2415S-2WR3		±15	±67/±7	77/83	220
--	A2424S-2WR3		±24	±42/±4	77/83	100
	B2403S-2WR3	24 (21.6-26.4)	3.3	400/40	70/76	2400
UL/EN/BS EN/IEC	B2405S-2WR3		5	400/40	74/80	2400
--	B2409S-2WR3		9	222/22	75/81	1000
UL/EN/BS EN/IEC	B2412S-2WR3		12	167/17	78/84	560
	B2415S-2WR3		15	133/13	80/86	560
	B2424S-2WR3		24	83/8	80/86	220

Note: * The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	3.3VDC output	--	534/8	564/--	mA
		5VDC/7.2VDC output	--	477/8	500/--	
		9VDC/12VDC output	--	471/8	494/--	
		15VDC/24VDC output	--	466/8	488/--	
	12VDC input	3.3VDC output	--	223/8	235/--	
		5VDC/7.2VDC output	--	208/8	219/--	
		9VDC output	--	203/8	214/--	
		12VDC/15VDC/24VDC output	--	201/8	211/--	
	15VDC input	5VDC output	--	167/8	176/--	
		15VDC output	--	163/8	171/--	
		24VDC output	--	165/8	174/--	
	24VDC input	3.3VDC output	--	110/8	120/--	
		5VDC/7.2VDC output	--	104/8	112/--	
		9VDC output	--	103/8	111/--	
		12VDC/15VDC/24VDC output	--	101/8	108/--	
Reflected Ripple Current*			--	15	--	
Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
	12VDC input		-0.7	--	18	
	15VDC input		-0.7	--	21	
	24VDC input		-0.7	--	30	
Input Filter			Capacitance filter			
Hot Plug			Unavailable			

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Output Specifications

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Voltage Accuracy				See output regulation curve(Fig. 1)			
Linear Regulation	Input voltage change: ±1%		3.3VDC output	--	--	±1.5	--
			Others	--	--	±1.2	
Load Regulation	10%-100% load	5VDC input	3.3VDC output	--	10	20	%
			5VDC/7.2VDC output	--	8	15	
			9VDC/12VDC/15VDC output	--	7	10	
			24VDC output	--	5	10	
		12/15/24 VDC input	3.3VDC output	--	15	20	
			5VDC output	--	7	15	
			7.2VDC output	--	6	15	
			9VDC output	--	5	15	
			12VDC output	--	5	10	
			15VDC output	--	4	10	
			24VDC output	--	3	10	
Ripple & Noise*	20MHz bandwidth		5VDC input	--	75	200	mVp-p
			12/15/24VDC input	--	75	180	
Temperature Coefficient	Full load			--	±0.02	--	%/℃
Short-circuit Protection				Continuous, self-recovery			

Note: * The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.		1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	20	--	pF
Operating Temperature	Derating when operating temperature≥85℃, (see Fig. 2)		-40	--	105	℃
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25℃	5VDC input	--	25	--	
		12/15/24VDC input	--	15	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
Storage Humidity	Non-condensing		5	--	95	%RH
Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	5VDC input	--	220	--	kHz
		12/15/24VDC input	--	260	--	
MTBF	MIL-HDBK-217F @ 25℃		3500	--	--	k hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.65 x 7.05 x 10.16mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

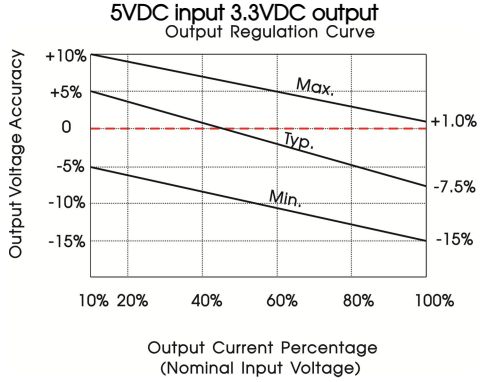
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B
	RE	CISPR32/EN55032	CLASS B
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±6kV perf. Criteria B

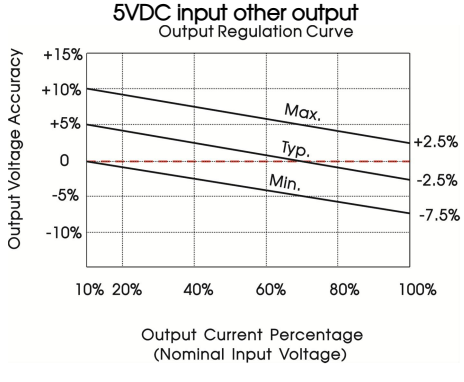
Note: Refer to Fig. 4 for recommended circuit test

Typical Characteristic Curves

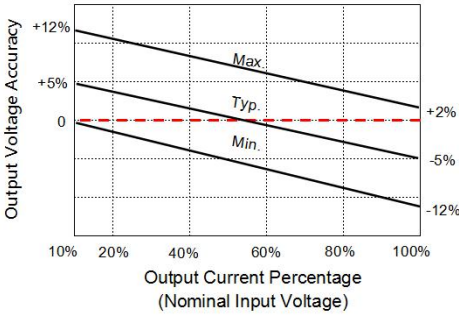
5VDC input 3.3VDC output



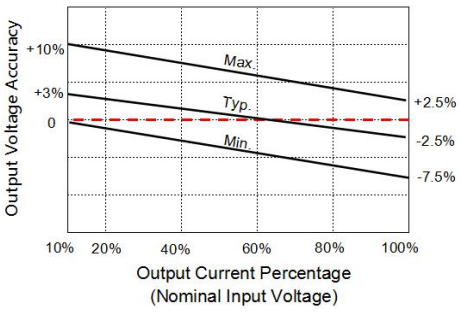
5VDC input other output



12/15/24VDC input 3.3VDC output



12/15/24VDC input 5/7.2VDC output



12/15/24VDC input other output

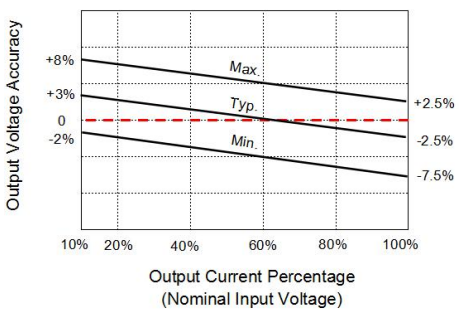


Fig. 1

Temperature Derating Curve

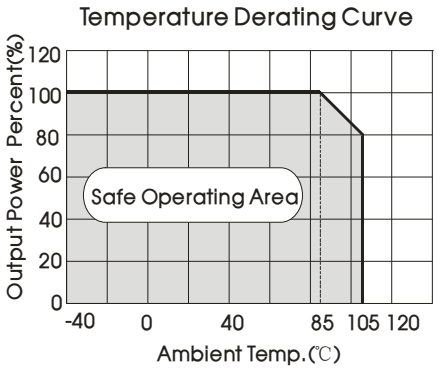
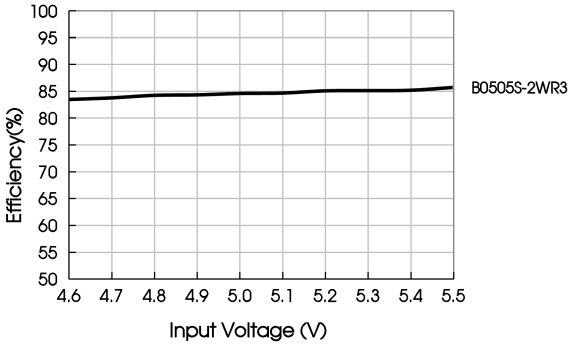
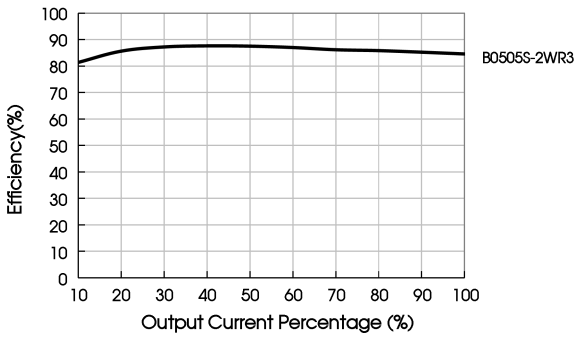


Fig. 2

Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load(Vin=5V)



Design Reference

1. Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problem caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

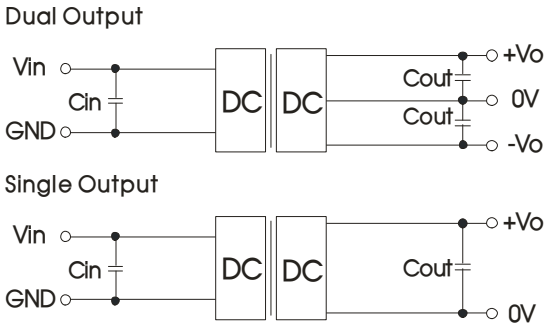


Fig. 3

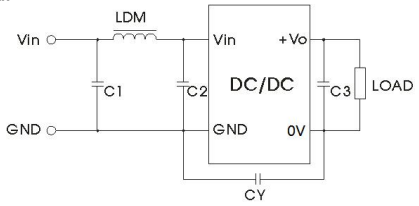
Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout	Dual Vout	Cout*
5VDC	10μF/16V	3.3VDC	10μF/16V	±3.3VDC	4.7μF/16V
12VDC	2.2μF/25V	5VDC	10μF/16V	±5VDC	4.7μF/16V
15VDC	2.2μF/25V	7.2VDC	10μF/16V	±7.2VDC	2.2μF/25V
24VDC	1μF/50V	9VDC	2.2μF/25V	±9VDC	2.2μF/25V
--	--	12VDC	2.2μF/25V	±12VDC	1μF/25V
--	--	15VDC	1μF/25V	±15VDC	1μF/25V
--	--	24VDC	1μF/50V	±24VDC	0.47μF/50V

Note: *The capacitor value of the positive and the negative output is identical.

2. EMC compliance circuit

Single Output



Dual Output

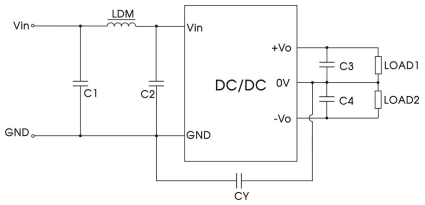


Fig. 4

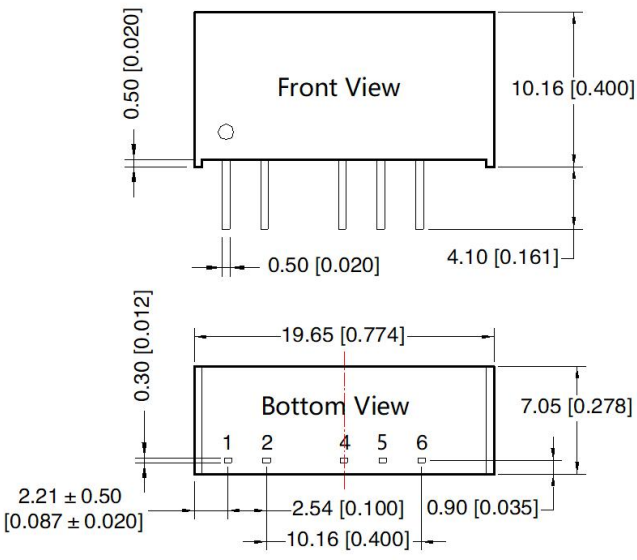
Input voltage		5 VDC	12/15/24 VDC
Emissions	C1/C2	4.7μF /16V	4.7μF /50V
	CY	270pF/2kV	
	C3	Refer to Cout in Fig. 3	
	LDM	6.8μH	

Input voltage		5 VDC	12/15/24 VDC
Emissions	C1/C2	4.7μF /16V	4.7μF /50V
	CY	270pF/2kV	
	C3/C4	Refer to Cout in Fig. 3	
	LDM	6.8μH	

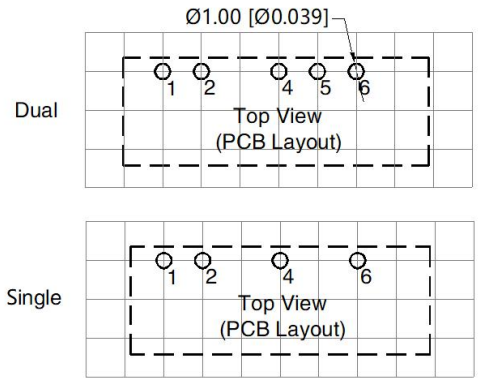
3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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



Note: Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
4	0V	–Vo
5	No Pin	0V
6	+Vo	+Vo

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200001;
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℃, humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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