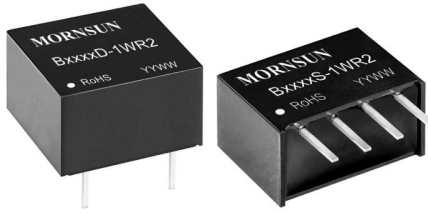


DC/DC Converter

B_S-1WR2 & B_D-1WR2 series

1W isolated DC-DC converter
Fixed input voltage and unregulated single output



CE CB Patent Protection RoHS



FEATURES

- Continuous short-circuit protection
- High efficiency up to 80%
- Operating ambient temperature -40°C to +105°C
- Compact SIP/DIP package
- Industry standard pin-out
- I/O isolation test voltage 1.5k VDC
- Meets IEC60950, UL60950, EN62368 approved

B_S-1WR2 & B_D-1WR2 series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

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.			
--	B0303S-1WR2	3.3 (2.97-3.63)	3.3	303/30	68/72	220	
	CE		B0305S-1WR2	5	200/20		72/76
			B0312S-1WR2	12	84/9		76/80
--	B0303D-1WR2		3.3	303/30	68/72		
	B0305D-1WR2		5	200/20	72/76		
--	B0503S-1WR2		5 (4.5-5.5)	3.3	303/30		68/72
	CE	B0505S-1WR2		5	200/20		76/80
		B0509S-1WR2		9	111/12		76/80
		B0512S-1WR2		12	84/9		76/80
		B0515S-1WR2		15	67/7		76/80
		B0524S-1WR2		24	42/4		76/80
--	B0503D-1WR2	3.3		303/30	68/72		
	CE/CB	B0505D-1WR2		5	200/20	76/80	
		B0509D-1WR2		9	111/12	76/80	
		B0512D-1WR2		12	84/9	76/80	
		B0515D-1WR2		15	67/7	76/80	
		B0524D-1WR2		24	42/4	76/80	
--	B1203S-1WR2	12 (10.8-13.2)	3.3	303/30	68/72		
	CE/CB		B1205S-1WR2	5	200/20	76/80	
			B1209S-1WR2	9	111/12	76/80	
			B1212S-1WR2	12	84/9	76/80	
			B1215S-1WR2	15	67/7	76/80	
			B1224S-1WR2	24	42/4	76/80	
--	B1203D-1WR2		3.3	303/30	68/72		
	CE		B1205D-1WR2	5	200/20	76/80	
			B1209D-1WR2	9	111/12	76/80	
			B1212D-1WR2	12	84/9	76/80	
			B1215D-1WR2	15	67/7	76/80	
--	B1505S-1WR2		15 (13.5-16.5)	5	200/20	76/80	220
	--	B1512S-1WR2		12	84/9	76/80	
		B1515S-1WR2		15	67/7	76/80	
	--	B1505D-1WR2		5	200/20	76/80	220
		B1509D-1WR2		9	111/12	76/80	

	B1515D-1WR2		15	67/7	76/80
	B2403S-1WR2		3.3	303/30	68/72
CE/CB	B2405S-1WR2	24 (21.6-26.4)	5	200/20	76/80
	B2409S-1WR2		9	111/12	76/80
	B2412S-1WR2		12	84/9	76/80
	B2415S-1WR2		15	67/7	76/80
	B2424S-1WR2		24	42/4	76/80
--	B2403D-1WR2		3.3	303/30	68/72
CE/CB	B2405D-1WR2		5	200/20	76/80
	B2409D-1WR2		9	111/12	76/80
	B2412D-1WR2		12	84/9	76/80
	B2415D-1WR2		15	67/7	76/80
	B2424D-1WR2	24	42/4	76/80	

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3V input	--	404/30	--/70	mA
	5V input	--	277/20	--/60	
	12V input	--	115/15	--/50	
	15V input	--	83/10	--/35	
	24V input	--	57/17	--/30	
Reflected Ripple Current		--	15	--	
Surge Voltage (1sec. max.)	3.3 input	-0.7	--	5	VDC
	5V input	-0.7	--	9	
	12V input	-0.7	--	18	
	15V input	-0.7	--	21	
	24V input	-0.7	--	30	
Input Filter		Capacitance Filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy		See Output Regulation Curves (Fig. 1)				
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	±1.5	--
		5/9/12/15/24VDC output	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC output	--	18	--	%
		5VDC output	--	12	--	
		9VDC output	--	8	--	
		12VDC output	--	7	--	
		15VDC output	--	6	--	
24VDC output	--	5	--			
Ripple & Noise*	20MHz bandwidth	--	60	150	mVp-p	
Temperature Coefficient	Full load	--	--	±0.03	%/°C	
Short-circuit Protection**	B03xxS-1WR2/B03xxD-1WR2/B24xxS-1WR2/ B24xxD-1WR2/B0524S-1WR2/ B0524D-1WR2	--	--	1	s	
	Others	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.
** At the end of the short circuit duration, the supply voltage must be disconnected from following models: B03xxS-1WR2 / B03xxD-1WR2 series, B24xxS-1WR2/ B24xxD-1WR2 series, and B0524S-1WR2/B0524D-1WR2.

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	--	--	M Ω
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	20	--	pF
Operating Temperature	Derating when operating temperature up to 85° C, (see Fig. 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25°C	--	25	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 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

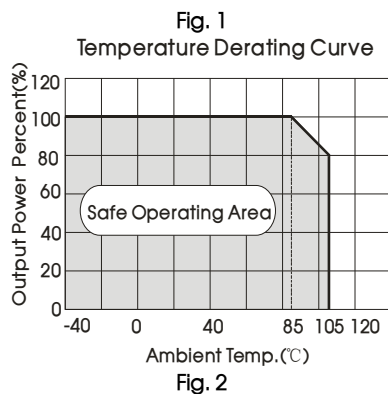
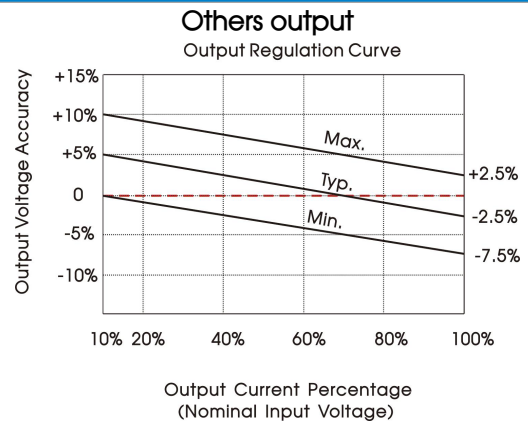
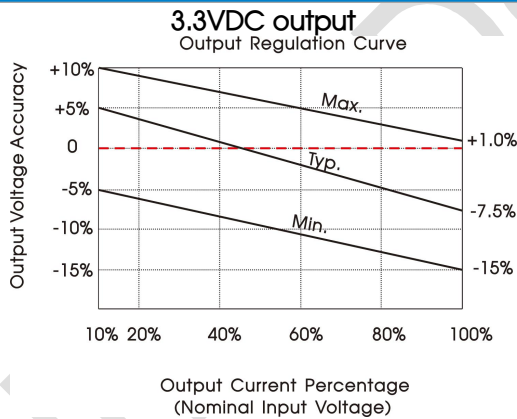
Mechanical Specifications

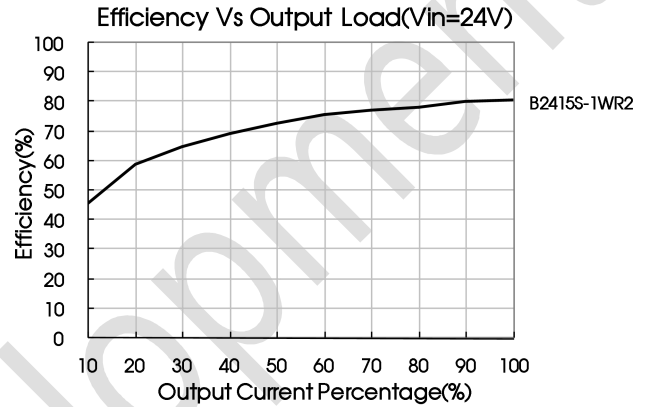
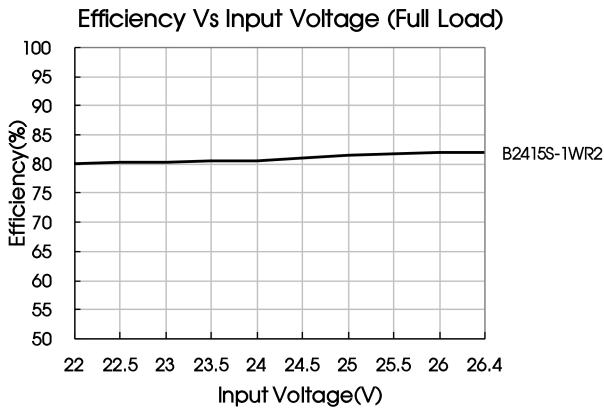
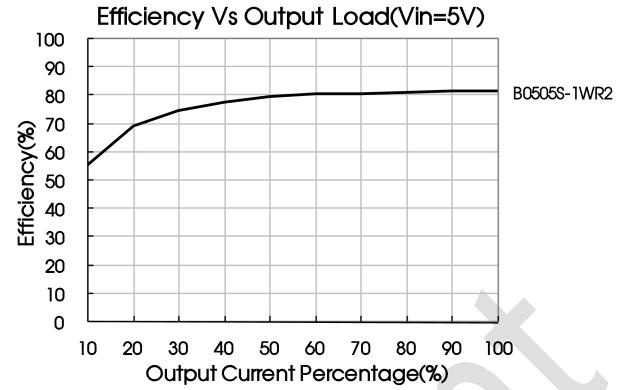
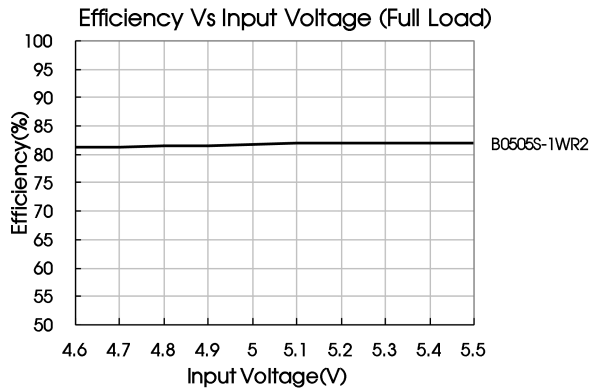
Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)	
Dimensions	B_S-1WR2 series	11.60 x 6.00 x 10.16 mm
	B_D-1WR2 series	12.70 x 10.16 x 8.20 mm
Weight	B_S-1WR2 series	1.3g (Typ.)
	B_D-1WR2 series	1.8g (Typ.)
Cooling Method	Free air convection	

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact \pm 8kV perf. Criteria B

Typical Performance Curves





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 problems 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	Vo	Cout
3.3/5VDC	4.7μF/16V	3.3/5VDC	10μF/16V
12VDC	2.2μF/25V	9VDC	4.7μF/16V
15VDC	2.2μF/25V	12VDC	2.2μF/25V
24VDC	1μF/50V	15VDC	1μF/25V
--	--	24VDC	0.47μF/50V

2. EMC (CLASS B) compliance circuit

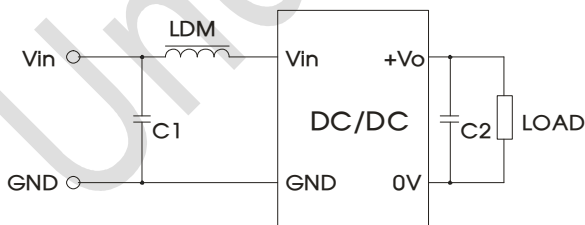


Fig. 4

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

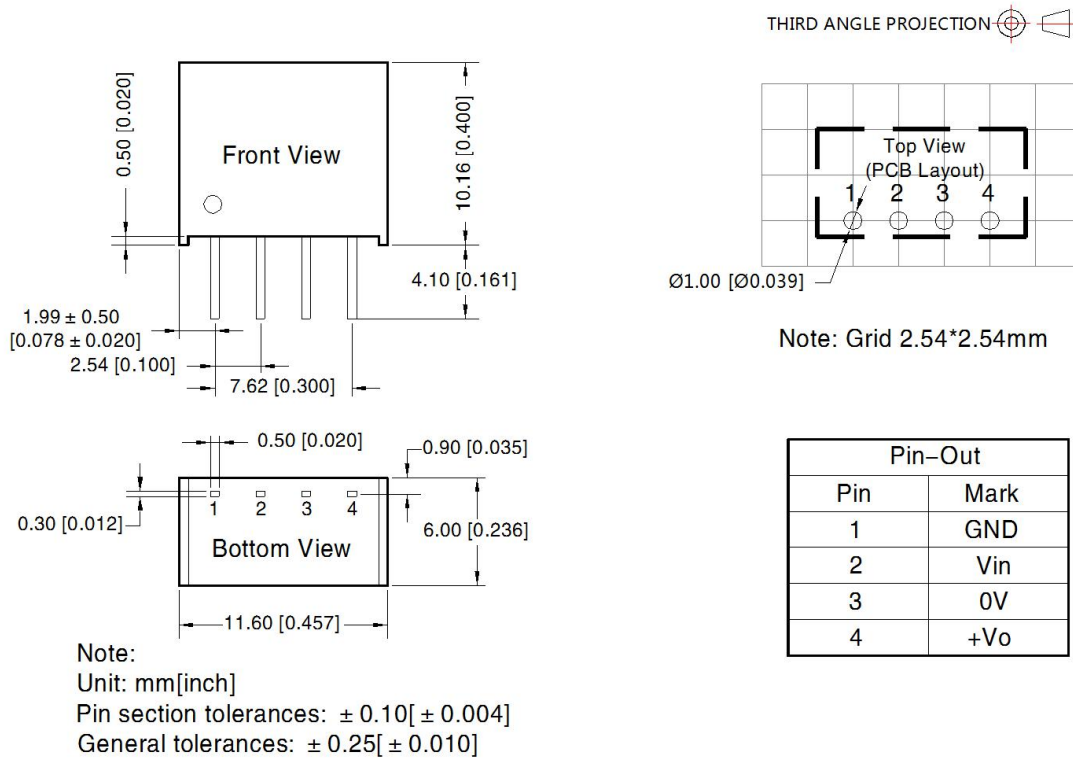
3. Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

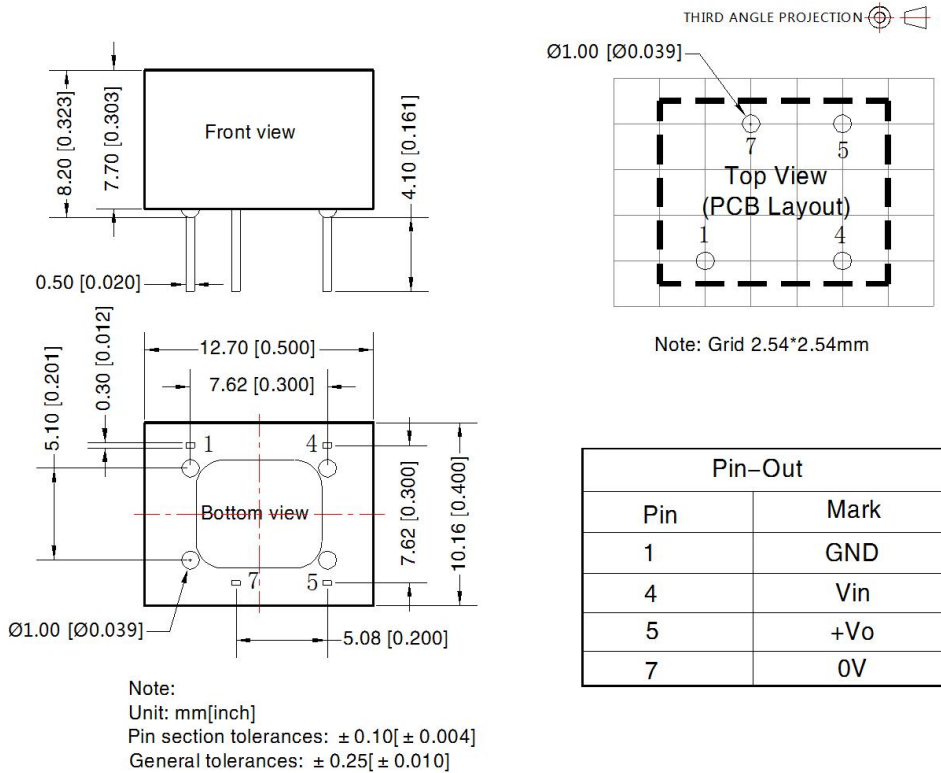
4. For additional information, please refer to DC-DC converter application notes on

www.mornsun-power.com

Dimensions and Recommended Layout (B_S-1WR2)



Dimensions and Recommended Layout (B_D-1WR2)



Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200003(B_S-1WR2), 58200011(B_D-1WR2);
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 $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our company 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.

Mornsun Guangzhou Science & Technology Co., Ltd.

Address: No. 8 Nanyun 4th Road, Huangpu District, Guangzhou, China
Tel: 86-20-38601850

Fax: 86-20-38601272

E-mail: info@mornsun.cn

www.mornsun-power.com