

2W isolated DC-DC converter
Fixed input voltage, unregulated single or dual output



FEATURES

- High power density
- High efficiency up to 84%
- Operating ambient temperature range: -40°C ~ +85°C
- Compact DIP package
- Industry standard pin-out
- I/O isolation test voltage 1.5k VDC
- IEC60950/UL60950/EN60950 approved

UL **us** **CE** **CB** Patent Protection **RoHS**



A_D-2WR2 & B_D- series is designed for use in distributed power supply systems and especially suitable in applications such as pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits, where:

1. The voltage of the input power supply is relatively stable with a variation of $\pm 10\%V_{in}$ 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*(μ F) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
--	B0303D-2WR2	3.3 (2.97-3.63)	3.3	400/40	66/70	220
	B0305D-2WR2		5	400/40	74/78	
UL/CE/CB	A0505D-2WR2	5 (4.5-5.5)	± 5	$\pm 200/\pm 20$	76/80	100
	A0509D-2WR2		± 9	$\pm 111/\pm 11$	80/84	
	A0512D-2WR2		± 12	$\pm 83/\pm 8$	80/84	
	A0515D-2WR2		± 15	$\pm 67/\pm 7$	80/84	
	A0524D-2WR2		± 24	$\pm 42/\pm 4$	80/84	
--	B0503D-2WR2	5 (4.5-5.5)	3.3	400/40	70/74	220
	B0505D-2WR2		5	400/40	76/80	
	B0509D-2WR2		9	222/22	80/84	
	B0512D-2WR2		12	167/17	80/84	
	B0515D-2WR2		15	133/13	80/84	
	B0524D-2WR2		24	83/8	80/84	
--	B0915D-2WR2	9 (8.1-9.9)	15	133/13	79/83	
UL/CE/CB	A1205D-2WR2	12 (10.8-13.2)	± 5	$\pm 200/\pm 20$	76/80	100
	A1209D-2WR2		± 9	$\pm 111/\pm 11$	80/84	
	A1212D-2WR2		± 12	$\pm 83/\pm 8$	79/83	
	A1215D-2WR2		± 15	$\pm 67/\pm 7$	80/84	
	A1224D-2WR2		± 24	$\pm 42/\pm 4$	80/84	
	B1205D-2WR2		5	400/40	76/80	220
	B1209D-2WR2		9	222/22	79/83	
	B1212D-2WR2		12	167/17	78/82	
	B1215D-2WR2		15	133/13	80/84	
	B1224D-2WR2		24	83/8	80/84	
--	A1515D-2WR2	15 (13.5-16.5)	± 15	$\pm 67/\pm 7$	77/81	100
UL/CE/CB	A2405D-2WR2	24 (21.6-26.4)	± 5	$\pm 200/\pm 20$	75/79	

UL/CE/CB	A2409D-2WR2	24 (21.6-26.4)	±9	±111/±11	80/84	100
	A2412D-2WR2		±12	±83/±8	79/83	
	A2415D-2WR2		±15	±67/±7	80/84	
	A2424D-2WR2		±24	±42/±4	80/84	220
	B2405D-2WR2		5	400/40	75/79	
	B2409D-2WR2		9	222/22	81/85	
	B2412D-2WR2		12	167/17	79/83	
	B2415D-2WR2		15	133/13	80/84	
	B2424D-2WR2		24	83/8	80/84	

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)	3.3V input	--	777/40	-/70	mA
	5V input	--	500/35	-/60	
	9V input	--	278/25	-/60	
	12V input	--	208/20	-/50	
	15V input	--	159/15	-/35	
	24V input	--	105/10	-/30	
Reflected Ripple Current		--	15	--	mA
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	
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy		See output regulation curve (Fig. 1)				
Linear Regulation	Input voltage change: ±1%	3.3V output	--	--	±1.5	--
		Others output	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC output	--	15	--	%
		5VDC output	--	12	--	
		9VDC output	--	9	--	
		12VDC output	--	8	--	
		15VDC output	--	7	--	
		24VDC output	--	6	--	
Ripple & Noise*	20MHz bandwidth	--	75	200	mVp-p	
Temperature Coefficient	100% load	--	--	±0.03	%/°C	
Short-circuit Protection**	B03xxD-2WR2 A12xxD-2WR2/B12xxD-2WR2 A15xxD-2WR2/B15xxD-2WR2 A24xxD-2WR2/B24xxD-2WR2 A0512D-2WR2/A0515D-2WR2 A0524D-2WR2/B0524D-2WR2	--	--	1	s	
	Others	Continuous, self-recovery				

Notes: * 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: B03xxD-2WR2 series, A12xxD-2WR2/B12xxD-2WR2/A15xxD-2WR2/B15xxD-2WR2/ A24xxD-2WR2/B24xxD-2WR2 series and A0512D-2WR2/A0515D-2WR2/A0524D-2WR2/B0524D-2WR2.

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	24V input	--	50	--	pF
		Other input	--	20	--	
Operating Temperature	Derating when operating temperature up to 85°C (see Fig. 2)	-40	--	85	°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	20.32 x 10.16 x 8.20mm
Weight	2.8g(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	A_D-2WR2	IEC/EN61000-4-2 Contact ±6KV perf. Criteria B
		B_D-2WR2	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

Typical Characteristic Curves

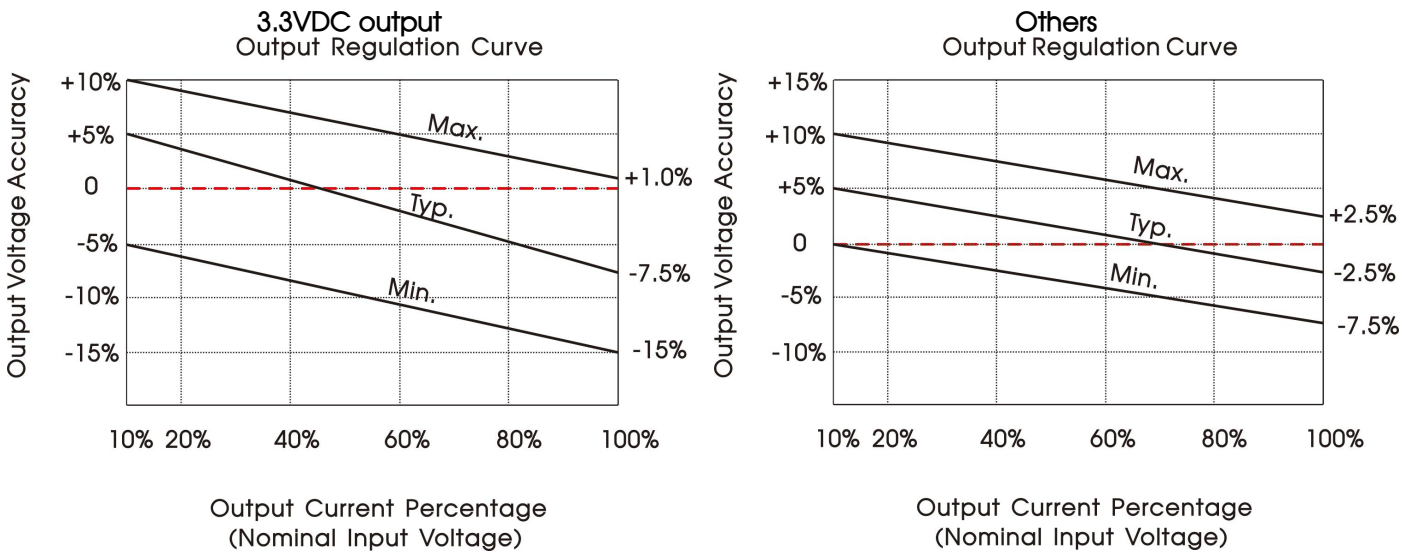


Fig. 1

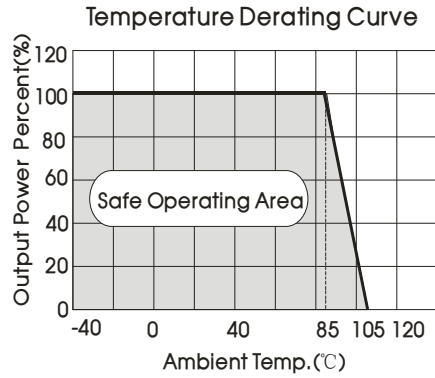
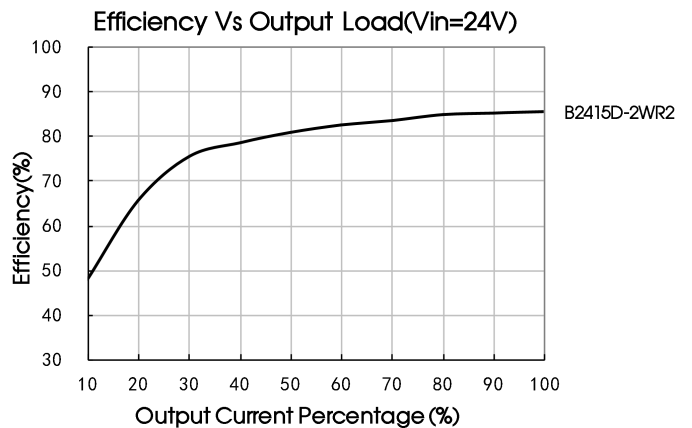
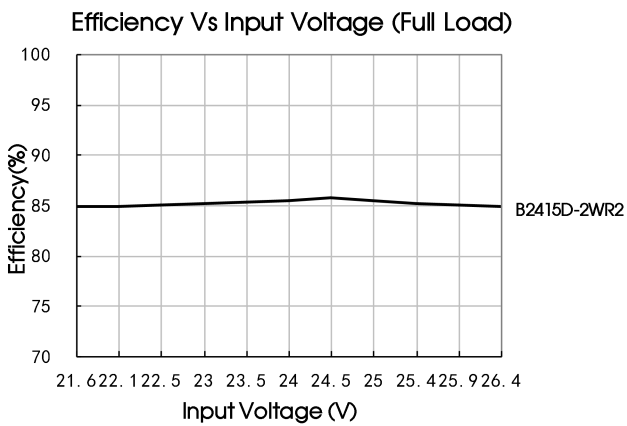
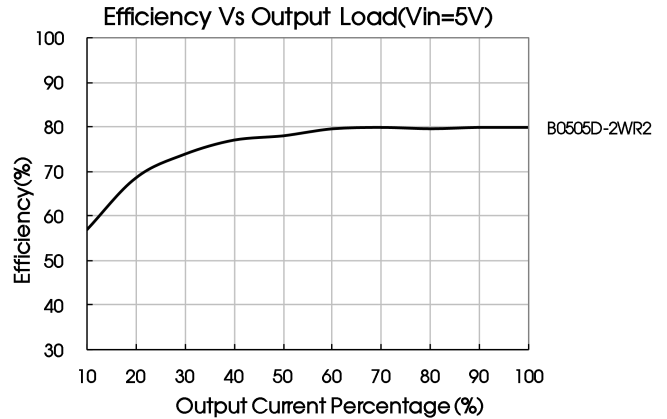
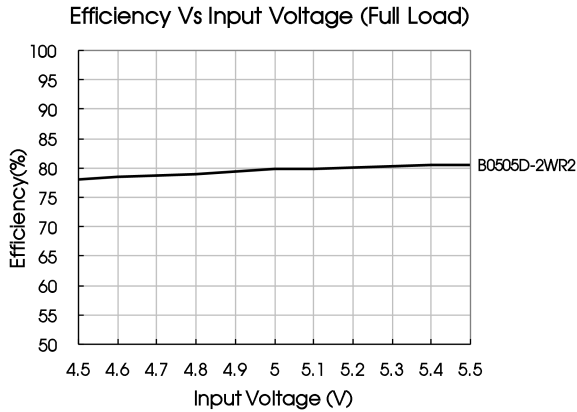


Fig. 2



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.

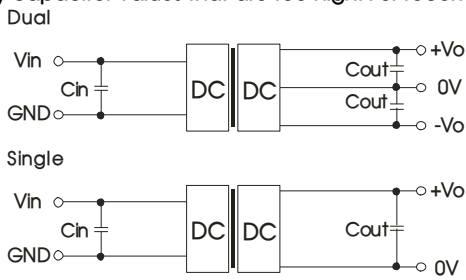


Fig.3

Table 1: Recommended input and output capacitor values

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

2. EMC (CLASS B) compliance circuit

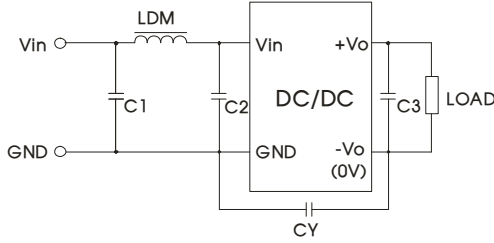


Fig. 4

Input voltage (VDC)		3.3/5/9/12/15	24
EMI	C1/C2	4.7μF /50V	
	C3	Refer to the Cout in Fig.3	
	CY	--	1nF/2KV
	LDM	6.8μH	

Note: For 24V input models use a Y-capacitor CY of 1nF/2kV.

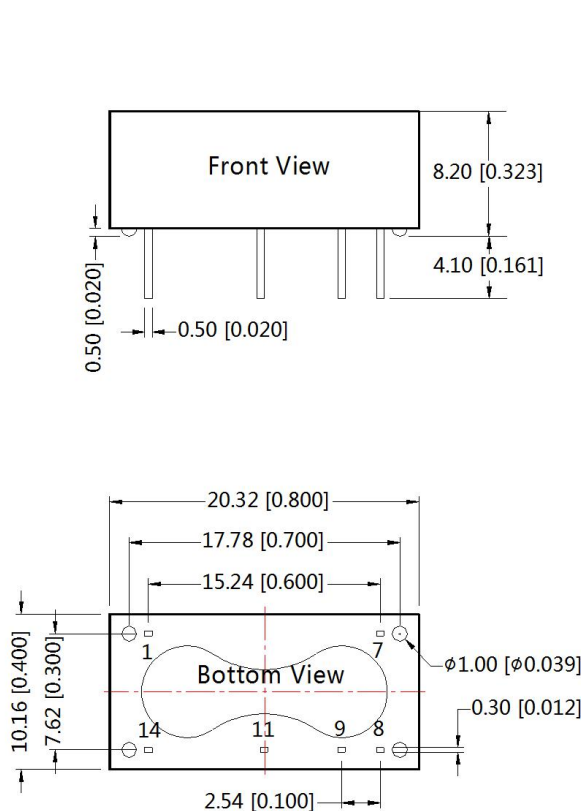
3. Minimum Output Load Requirement

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

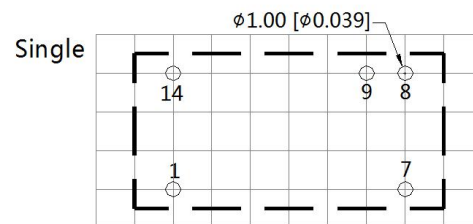
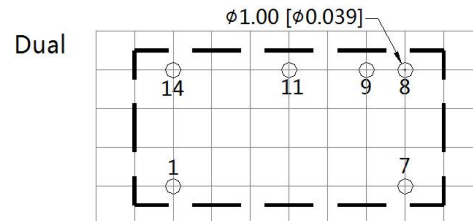
www.mornsun-power.com

Dimensions and Recommended Layout



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

THIRD ANGLE PROJECTION



Note : Grid 2.54*2.54mm

Pin	Pin-Out	
	Single	Dual
1	GND	GND
7	NC	NC
8	0V	0V
9	+Vo	+Vo
11	No Pin	-Vo
14	Vin	Vin

NC: Pin to be isolated circuitry

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200009;
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.

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