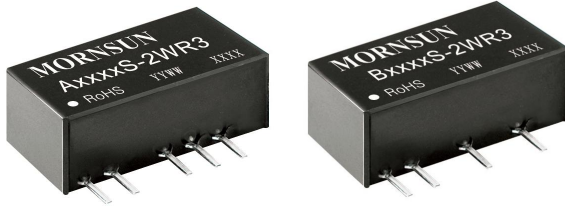


# DC/DC Converter

## A05\_S-2WR3 & B05\_S-2WR3 series

# MORNSUN®

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



Patent Protection RoHS



### FEATURES

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

A05\_S-2WR3 & B05\_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: 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 (%)<br>Min./Typ. | Capacitive Load*( $\mu$ F)<br>Max. |
|---------------|-------------|---------------------|---------------|---------------------------|---------------------------------------|------------------------------------|
|               |             | Nominal (Range)     | Voltage (VDC) | Current (mA)<br>Max./Min. |                                       |                                    |
| --            | A0503S-2WR3 | 5<br>(4.5-5.5)      | $\pm 3.3$     | $\pm 303/\pm 30$          | 71/75                                 | 1200                               |
|               | A0505S-2WR3 |                     | $\pm 5$       | $\pm 200/\pm 20$          | 80/84                                 | 1200                               |
|               | A0509S-2WR3 |                     | $\pm 9$       | $\pm 111/\pm 11$          | 81/85                                 | 470                                |
|               | A0512S-2WR3 |                     | $\pm 12$      | $\pm 83/\pm 8$            | 81/85                                 | 220                                |
|               | A0515S-2WR3 |                     | $\pm 15$      | $\pm 67/\pm 7$            | 82/86                                 | 220                                |
|               | A0524S-2WR3 |                     | $\pm 24$      | $\pm 42/\pm 4$            | 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                                |

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

### Input Specifications

| Item                                   | Operating Conditions |                    | Min.               | Typ.  | Max.   | Unit |
|----------------------------------------|----------------------|--------------------|--------------------|-------|--------|------|
| Input Current<br>(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/-- |      |
| Reflected Ripple Current*              |                      |                    | --                 | 15    | --     |      |
| Surge Voltage (1sec. max.)             |                      |                    | -0.7               | --    | 9      | VDC  |
| Input Filter                           |                      |                    | Capacitance 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 |
|-------------------|---------------------------------|-------------------------------------------|-------------------------------------|------|-----------|------|
| Voltage Accuracy  |                                 |                                           | See output regulation curve(Fig. 1) |      |           |      |
| Linear Regulation | Input voltage change: $\pm 1\%$ | 3.3VDC output                             | --                                  | --   | $\pm 1.5$ | --   |
|                   |                                 | 5VDC/7.2VDC/9VDC/12VDC/15VDC/24VDC output | --                                  | --   | $\pm 1.2$ |      |

# MORNSUN®

MORNSUN Guangzhou Science & Technology Co., Ltd.

2021.10.29-A/0

Page 1 of 4

MORNSUN Guangzhou Science & Technology Co., Ltd. reserves the copyright and right of final interpretation

|                          |                           |                         |    |       |     |       |
|--------------------------|---------------------------|-------------------------|----|-------|-----|-------|
| Load Regulation          | 10%-100% load             | 3.3VDC output           | -- | 10    | 20  | %     |
|                          |                           | 5VDC/7.2VDC output      | -- | 8     | 15  |       |
|                          |                           | 9VDC/12VDC/15VDC output | -- | 7     | 10  |       |
|                          |                           | 24VDC output            | -- | 5     | 10  |       |
| Ripple & Noise*          | 20MHz bandwidth           |                         | -- | 75    | 200 | mVp-p |
| Temperature Coefficient  | Full load                 |                         | -- | ±0.02 | --  | %/°C  |
| Short-circuit Protection | 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.

### 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°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                                                                      | 5                                      | --   | 95   | %RH     |
| Vibration                            |                                                                                     | 10-150Hz, 5G, 0.75mm. along X, Y and Z |      |      |         |
| Switching Frequency                  | Full load, nominal input voltage                                                    | --                                     | 220  | --   | kHz     |
| MTBF                                 | MIL-HDBK-217F @ 25°C                                                                | 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 (see Fig. 4 for recommended circuit) |
|           | RE  | CISPR32/EN55032 | CLASS B (see Fig. 4 for recommended circuit) |
| Immunity  | ESD | IEC/EN61000-4-2 | Air ±8kV, Contact ±6kV perf. Criteria B      |

### Typical Performance Curves

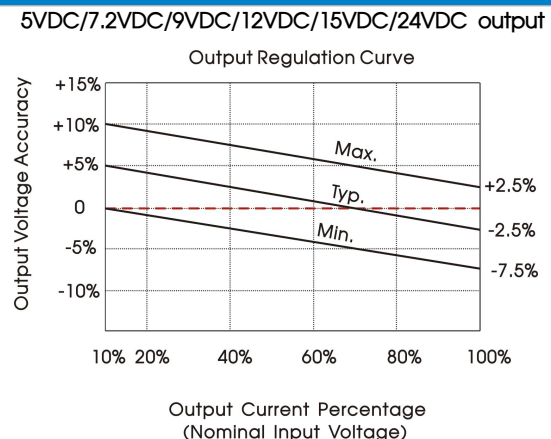
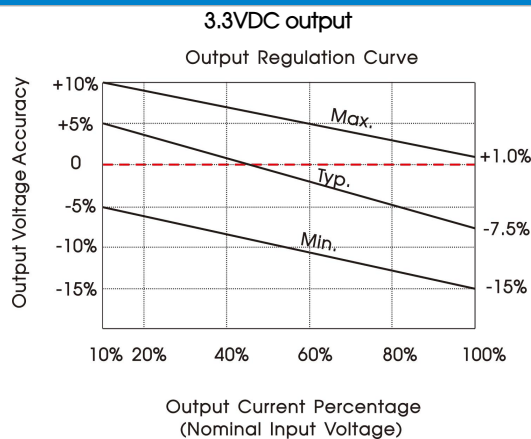


Fig. 1

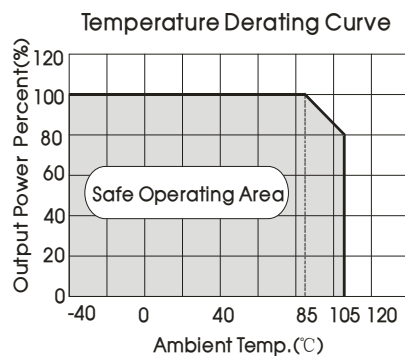
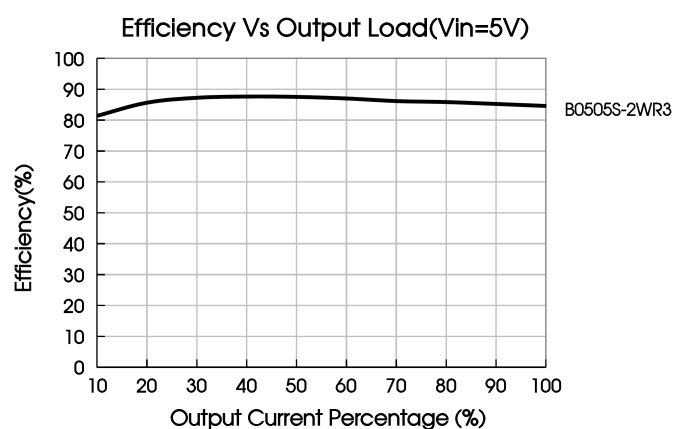
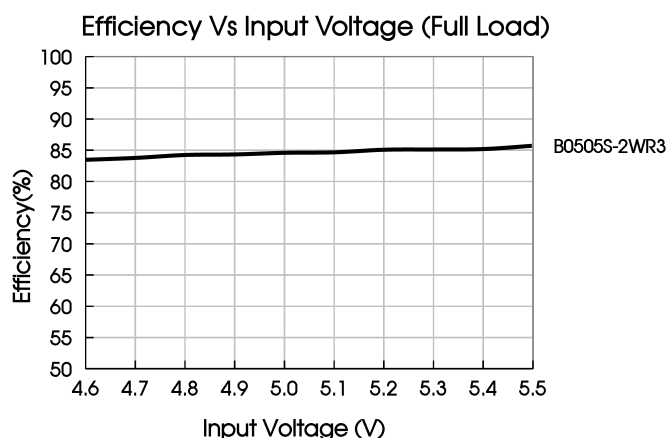


Fig. 2



## 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 problem caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

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  |
| --   | --       | 5VDC        | 10μF/16V  | ±5VDC     | 4.7μF/16V  |
| --   | --       | 7.2VDC      | 10μF/16V  | ±9VDC     | 1μF/25V    |
| --   | --       | 9VDC        | 2.2μF/25V | ±12VDC    | 1μF/25V    |
| --   | --       | 12VDC       | 2.2μF/25V | ±15VDC    | 0.47μF/25V |
| --   | --       | 15VDC       | 1μF/25V   | ±24VDC    | 0.47μF/50V |
| --   | --       | 24VDC       | 1μF/50V   | --        | --         |

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

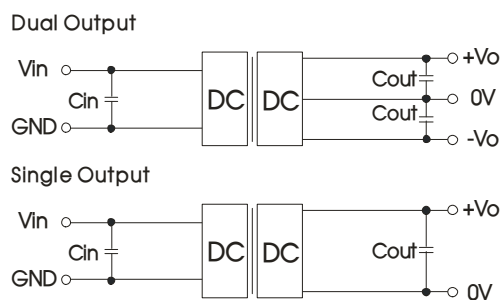
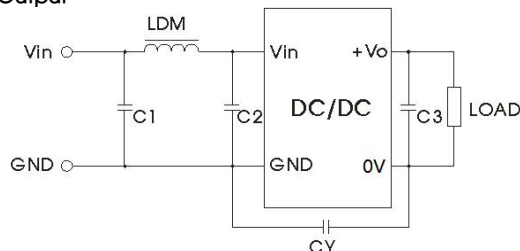


Fig. 3

### 2. EMC compliance circuit

#### Single Output



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

### Dual Output

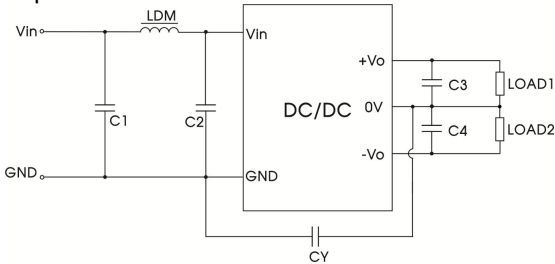
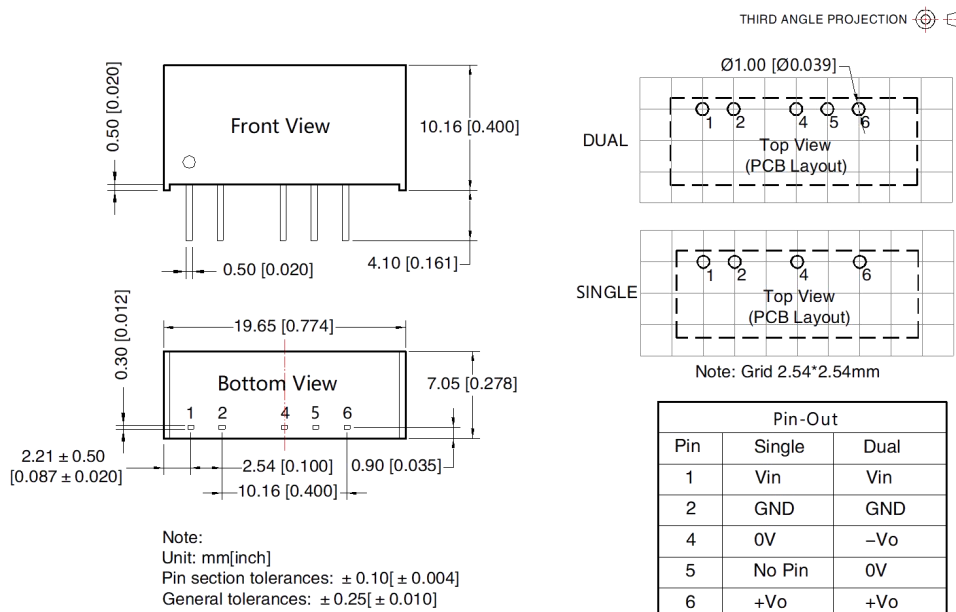


Fig. 4

| Input voltage |       | 5VDC                   |
|---------------|-------|------------------------|
| Emission      | C1/C2 | 4.7μF /16V             |
|               | 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](http://www.mornsun-power.com)

## Dimensions and Recommended Layout



### Notes:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58200001;
- 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;
- The maximum capacitive load offered were tested at input voltage range and full load;
- 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;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Huangpu district, Guangzhou, P.R.China  
 Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: [info@mornsun.cn](mailto:info@mornsun.cn) [www.mornsun-power.com](http://www.mornsun-power.com)