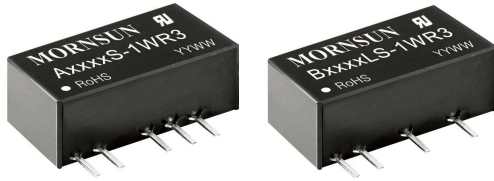


1W, Fixed input voltage, isolated & unregulated dual/single output



Continuous Short  
Circuit Protection



Patent Protection RoHS



### FEATURES

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating temperature range: -40°C to +105°C
- High efficiency up to 85%
- Isolation voltage: 1.5K VDC
- International standard pin-out
- SIP package
- UL62368, EN62368 approval

A05\_S-1WR3 & B05\_LS-1WR3 series are specially designed for applications where an isolated (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              |                                   | Efficiency<br>(%Min./Typ.)<br>@ Full Load | Max. Capacitive<br>Load*<br>(μF) |
|---------------|--------------|---------------------|---------------------|-----------------------------------|-------------------------------------------|----------------------------------|
|               |              | Nominal<br>(Range)  | Output Voltage(VDC) | Output Current<br>(mA)(Max./Min.) |                                           |                                  |
| UL/CE         | A0503S-1WR3  | 5<br>(4.5-5.5)      | ±3.3                | ±152/±15                          | 70/74                                     | 1200                             |
|               | A0505S-1WR3  |                     | ±5                  | ±100/±10                          | 78/82                                     | 1200                             |
|               | A0509S-1WR3  |                     | ±9                  | ±56/±6                            | 79/83                                     | 470                              |
|               | A0512S-1WR3  |                     | ±12                 | ±42/±5                            | 79/83                                     | 220                              |
|               | A0515S-1WR3  |                     | ±15                 | ±34/±4                            | 79/83                                     | 220                              |
|               | A0524S-1WR3  |                     | ±24                 | ±21/±3                            | 81/85                                     | 100                              |
|               | B0503LS-1WR3 |                     | 3.3                 | 303/30                            | 70/74                                     | 2400                             |
|               | B0505LS-1WR3 |                     | 5                   | 200/20                            | 78/82                                     | 2400                             |
|               | B0509LS-1WR3 |                     | 9                   | 111/12                            | 79/83                                     | 1000                             |
|               | B0512LS-1WR3 |                     | 12                  | 84/9                              | 79/83                                     | 560                              |
|               | B0515LS-1WR3 |                     | 15                  | 67/7                              | 79/83                                     | 560                              |
|               | B0524LS-1WR3 |                     | 24                  | 42/4                              | 81/85                                     | 220                              |

Note: \* The capacitive loads of positive and negative outputs are identical.

### Input Specifications

| Item                                   | Operating Conditions | Min.             | Typ.   | Max.   | Unit |
|----------------------------------------|----------------------|------------------|--------|--------|------|
| Input Current<br>(full load / no-load) | 3.3VDC/5VDC output   | --               | 270/5  | 286/10 | mA   |
|                                        | 9VDC/12VDC output    | --               | 241/12 | 254/20 |      |
|                                        | 15VDC/24VDC output   | --               | 241/18 | 254/30 |      |
| Reflected Ripple Current*              |                      | --               | 15     | --     |      |
| Surge Voltage (1sec. max.)             | 5VDC input           | -0.7             | --     | 9      | VDC  |
| Input Filter                           |                      | Filter capacitor |        |        |      |
| 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 curve(Fig. 1) |      |      |      |
| Line Regulation         | Input voltage change: ±1% | 3.3VDC output                        | --   | 1.5  | %/%  |
|                         |                           | Others                               | --   | 1.2  |      |

|                          |                           |               |    |       |     |       |
|--------------------------|---------------------------|---------------|----|-------|-----|-------|
| Load Regulation          | 10%-100% load             | 3.3VDC output | -- | 15    | 20  | %     |
|                          |                           | 5VDC output   | -- | 10    | 15  |       |
|                          |                           | 9VDC output   | -- | 8     | 10  |       |
|                          |                           | 12VDC output  | -- | 7     | 10  |       |
|                          |                           | 15VDC output  | -- | 6     | 10  |       |
|                          |                           | 24VDC output  | -- | 5     | 10  |       |
| Ripple & Noise*          | 20MHz bandwidth           | Others        | -- | 30    | 75  | mVp-p |
|                          |                           | 24VDC output  | -- | 50    | 100 |       |
| Temperature Coefficient  | 100% load                 |               | -- | ±0.02 | --  | %/°C  |
| Short Circuit Protection | Continuous, self-recovery |               |    |       |     |       |

Note: \* Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.

### 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, isolation voltage 500VDC                                           | 1000          | --   | --   | MΩ      |
| Isolation Capacitance              | Input-output, 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  |         |
| Casing Temperature Rise            | Ta=25°C                                                                          | 3.3VDC output | --   | 25   |         |
|                                    |                                                                                  | Others        | --   | 15   |         |
| 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                                                 | --            | 270  | --   | KHz     |
| MTBF                               | MIL-HDBK-217F@25°C                                                               | 3500          | --   | --   | K hours |

### Physical Specifications

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| Casing Material | Black flame-retardant and heat-resistant plastic (UL94 V-0) |
| Dimensions      | 19.65*6.00*10.16mm                                          |
| Weight          | 2.1g(Typ.)                                                  |
| Cooling Method  | Free air convection                                         |

### EMC Specifications

|     |     |                 |                                              |
|-----|-----|-----------------|----------------------------------------------|
| EMI | CE  | CISPR32/EN55032 | CLASS B (see Fig. 4 for recommended circuit) |
|     | RE  | CISPR32/EN55032 | CLASS B (see Fig. 4 for recommended circuit) |
| EMS | ESD | IEC/EN61000-4-2 | Air ±8kV, Contact ±4kV perf. Criteria B      |

### Product Characteristic Curve

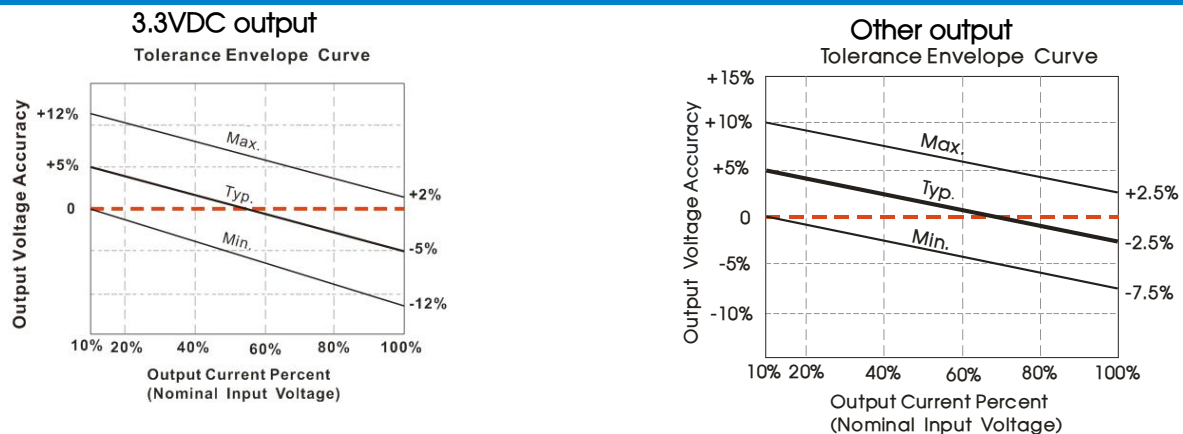


Fig. 1

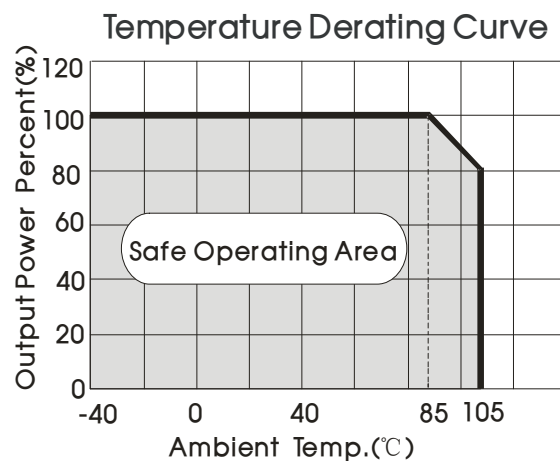
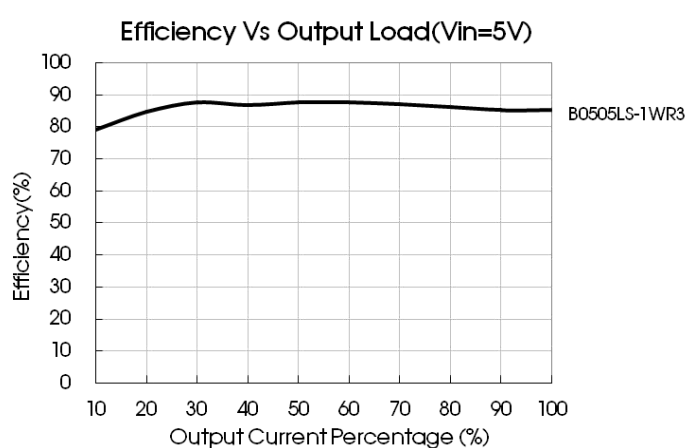
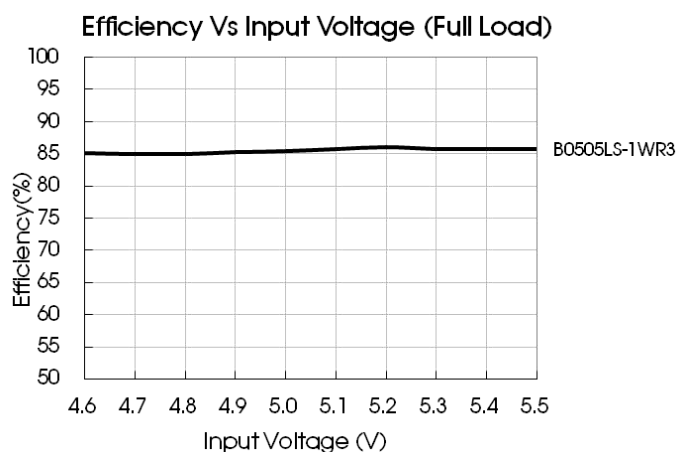
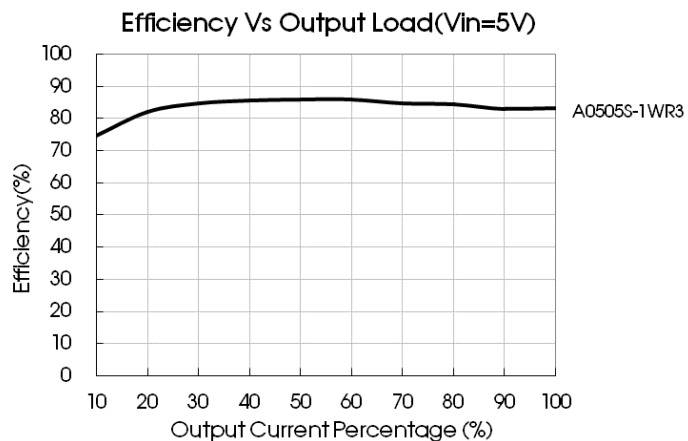
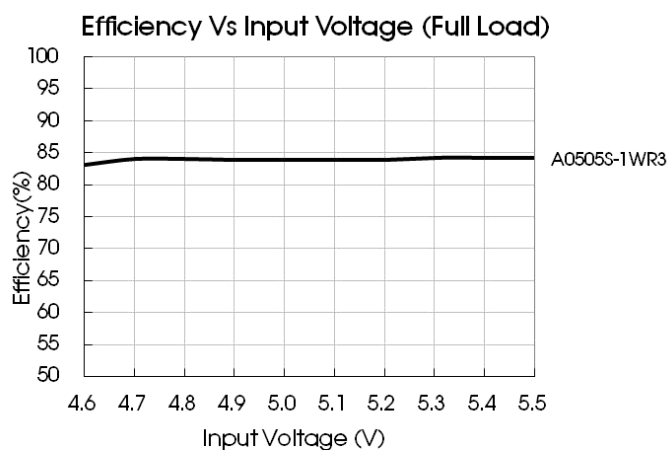


Fig. 2



## Design Reference

### 1. Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.3. Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.

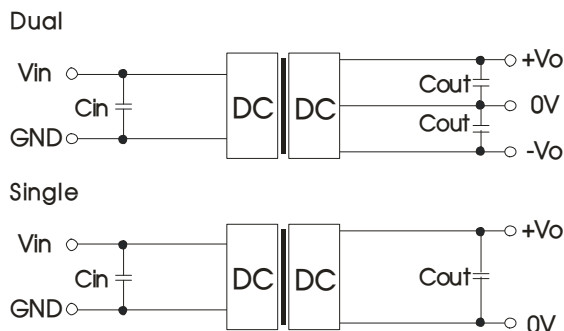


Fig.3

Recommended capacitive load value table (Table 1)

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

### 2. EMC solution-recommended circuit

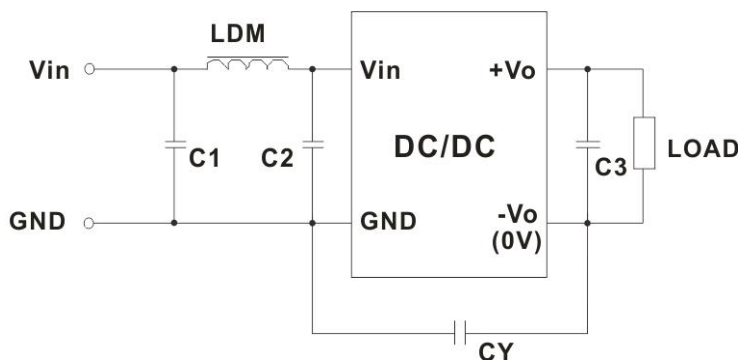


Fig. 4

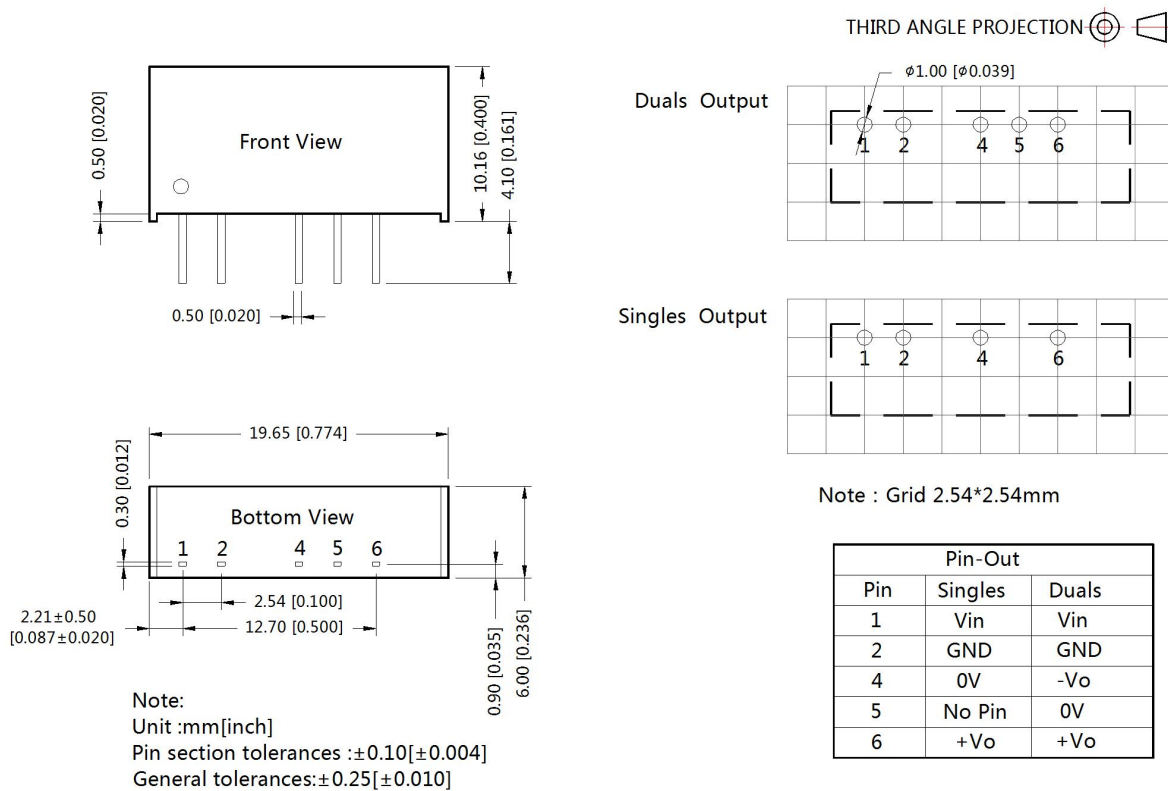
EMC recommended circuit value table (Table 2)

| Input voltage 5VDC | Output voltage (VDC) |       | 3.3/5/9                      | 12/15/24                                               |
|--------------------|----------------------|-------|------------------------------|--------------------------------------------------------|
|                    | EMI                  | C1/C2 | 4.7μF /25V                   | 4.7μF /25V                                             |
|                    |                      | CY    | --                           | 1nF/4KVDC<br>VISHAY HGZ102MBP<br>TDK CD45-E2GA102M-GKA |
|                    |                      | C3    | Refer to the Cout in table 1 |                                                        |
|                    |                      | LDM   | 6.8μH                        | 6.8μH                                                  |

Note: In the case of actual use, the requirements for EMI are high, it is subject to CY .

3. For more information please find DC-DC converter application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout



Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com). Packing 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  $T_a=25^{\circ}\text{C}$ , humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our Company's 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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