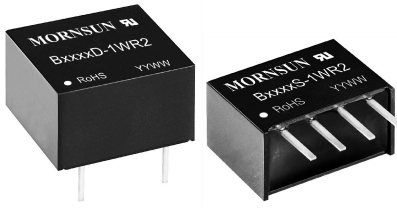


1W, Fixed input voltage, isolated & unregulated single output



Continuous Short Circuit Protection



Patent Protection RoHS



FEATURES

- Continuous short-circuit protection
- Operating temperature range: -40°C to +105°C
- Conversion efficiency high up to 80%
- Miniature SIP/DIP package, International standard pin-out
- Isolation voltage: 1.5K VDC
- EN60950,UL60950 Approval

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

1. Where the voltage of the input power supply is stable (voltage variation: $\pm 10\%V_{in}$);
2. Where isolation between input and output is necessary (isolation voltage $\leq 1500VDC$);
3. Where the output voltage regulation and the ripple & noise of the output voltage is not strictly required;
4. Typical application: digit circuit condition; normal low-frequency artificial circuit condition; relay drive circuit and data switching circuit condition, etc.

Selection Guide

| Certification | Part No. | Input Voltage (VDC) | Output | | Efficiency (%Min./Typ.) @ Full Load | Max. Capacitive Load(μ F) |
|---------------|-------------|---------------------|----------------------|--------------------------------|-------------------------------------|--------------------------------|
| | | Nominal (Range) | Output Voltage (VDC) | Output Current (mA)(Max./Min.) | | |
| UL/CE | B0303S-1WR2 | 3.3 (2.97-3.63) | 3.3 | 303/30 | 68/72 | 220 |
| | 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 | | 3.3 | 303/30 | 68/72 | |
| UL/CE | B0505S-1WR2 | 5 (4.5-5.5) | 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 | |
| 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 | |
| UL/CE | B1203S-1WR2 | | 12 (10.8-13.2) | 3.3 | 303/30 | |
| | 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 | |
| | B1205D-1WR2 | 5 | | 200/20 | 76/80 | |
| | B1209D-1WR2 | 9 | | 111/12 | 76/80 | |
| UL/CE | 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 |
| | B1512S-1WR2 | | 12 | 84/9 | 76/80 |
| | B1515S-1WR2 | | 15 | 67/7 | 76/80 |
| | B1505D-1WR2 | | 5 | 200/20 | 76/80 |
| | B1509D-1WR2 | | 9 | 111/12 | 76/80 |
| | B1515D-1WR2 | | 15 | 67/7 | 76/80 |
| | B2403S-1WR2 | | 3.3 | 303/30 | 68/72 |
| UL/CE | 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 | |
| UL/CE | 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 | -- | mA |
| 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 | | Filter capacitor | | | |
| Hot Plug | | Unavailable | | | |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|----------------------------|---|---------------------------------------|------|------------|-------|
| Output Voltage Accuracy | | See tolerance envelope graph (Fig. 1) | | | |
| Line Regulation | Input voltage change: $\pm 1\%$ | 3.3VDC output | -- | ± 1.5 | -- |
| | | Other 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** | B24xxS-1WR2/ B24xxD-1WR2/B0524S-1WR2/ B0524D-1WR2 | -- | -- | 1 | s |
| | Others | Continuous, self-recovery | | | |

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

**Supply voltage must be discontinued at the end of short circuit duration for B24xxS-1WR2/ B24xxD-1WR2 series, and B0524S-1WR2/B0524D-1WR2 models.

General Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|------------------------------------|--|------|------|------|---------|
| Isolation Voltage | Input-output, with the test time of 1 minute and the leak current lower than 1mA | 1500 | -- | -- | VDC |
| Isolation 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, nominal input, full load output | -- | 25 | -- | |
| Pin Welding Resistance Temperature | Welding spot is 1.5mm away from the casing, 10 seconds | -- | -- | 300 | |
| Storage Humidity | Non-condensing | -- | -- | 95 | %RH |
| Switching Frequency | Full load, nominal input voltage | -- | 100 | -- | KHz |
| MTBF | MIL-HDFK-217F@25°C | 3500 | -- | -- | K hours |

Physical Specifications

| | | |
|-----------------|--|---------------------|
| Casing Material | Black flame-retardant heat-proof epoxy resin (UL94-V0) | |
| Dimensions | B_S-1WR2 series | 11.60*6.00*10.16 mm |
| | B_D-1WR2 series | 12.70*10.16*8.20 mm |
| Weight | B_S-1WR2 series | 1.3g(Typ.) |
| | B_D-1WR2 series | 1.8g(Typ.) |
| Cooling Method | Free air convection | |

EMC Specifications

| | | | |
|-----|-----|-----------------|--|
| EMI | CE | CISPR22/EN55022 | CLASS B (see Fig. 4 for recommended circuit) |
| | RE | CISPR22/EN55022 | CLASS B (see Fig. 4 for recommended circuit) |
| EMS | ESD | IEC/EN61000-4-2 | Contact ±8KV perf. Criteria B |

Product Characteristic Curve

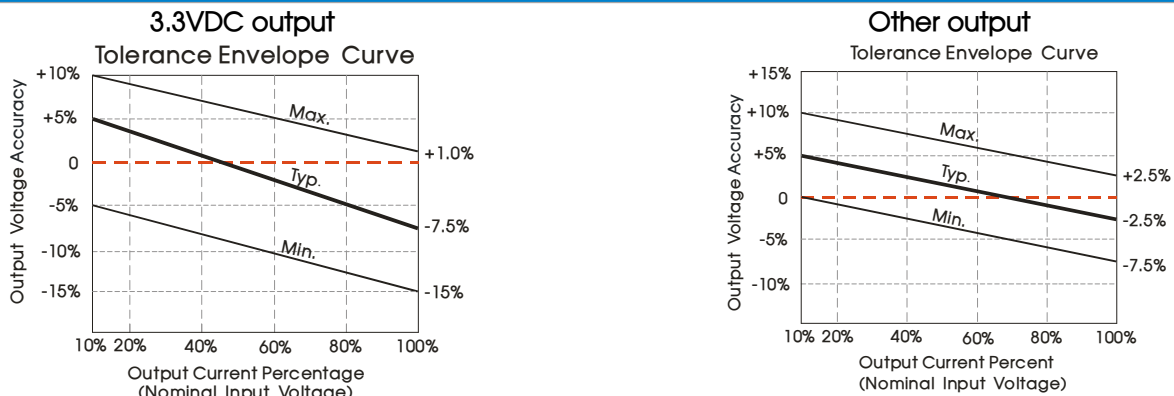


Fig. 1

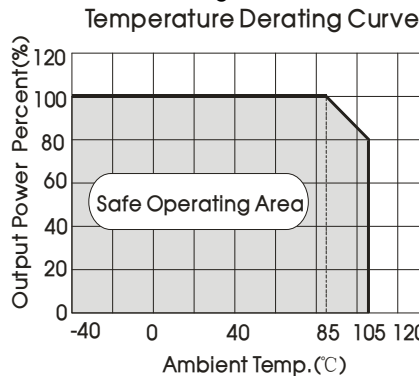
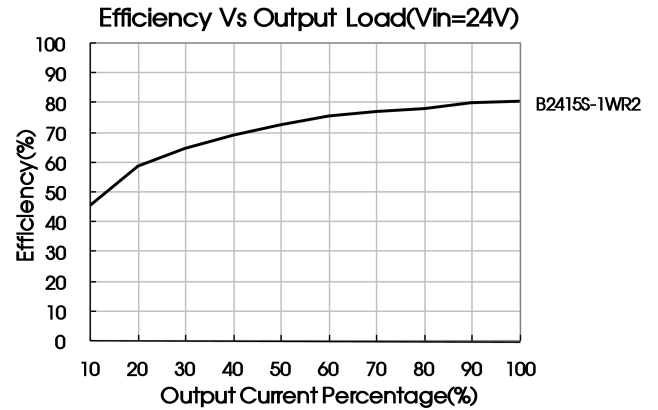
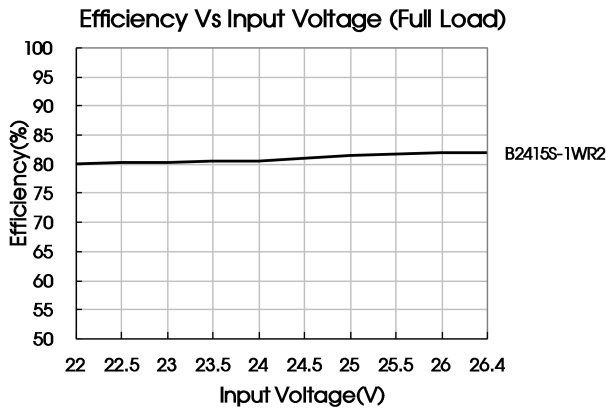
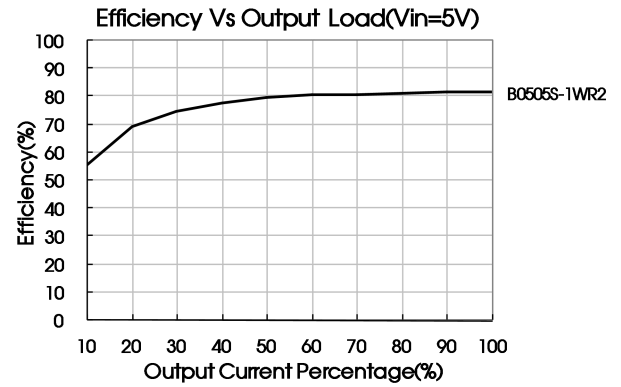
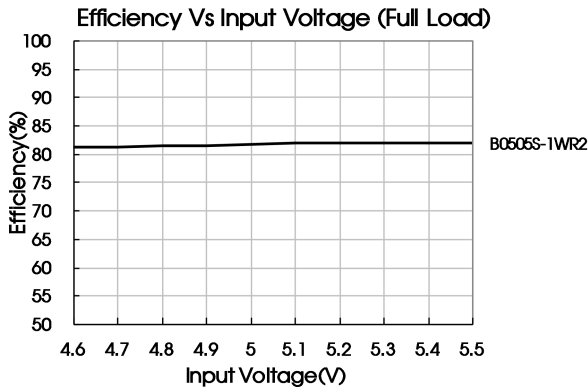


Fig. 2



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(μ F) | Vo (VDC) | Cout(μ F) |
|----------|---------------|----------|----------------|
| 3.3/5 | 4.7 | 3.3/5 | 10 |
| 12 | 2.2 | 9 | 4.7 |
| 15 | 2.2 | 12 | 2.2 |
| 24 | 1 | 15 | 1 |
| -- | -- | 24 | 0.47 |

2. EMC solution-recommended circuit

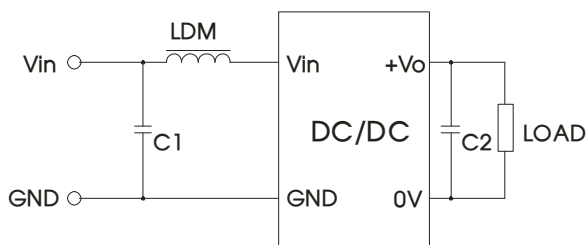


Fig.4

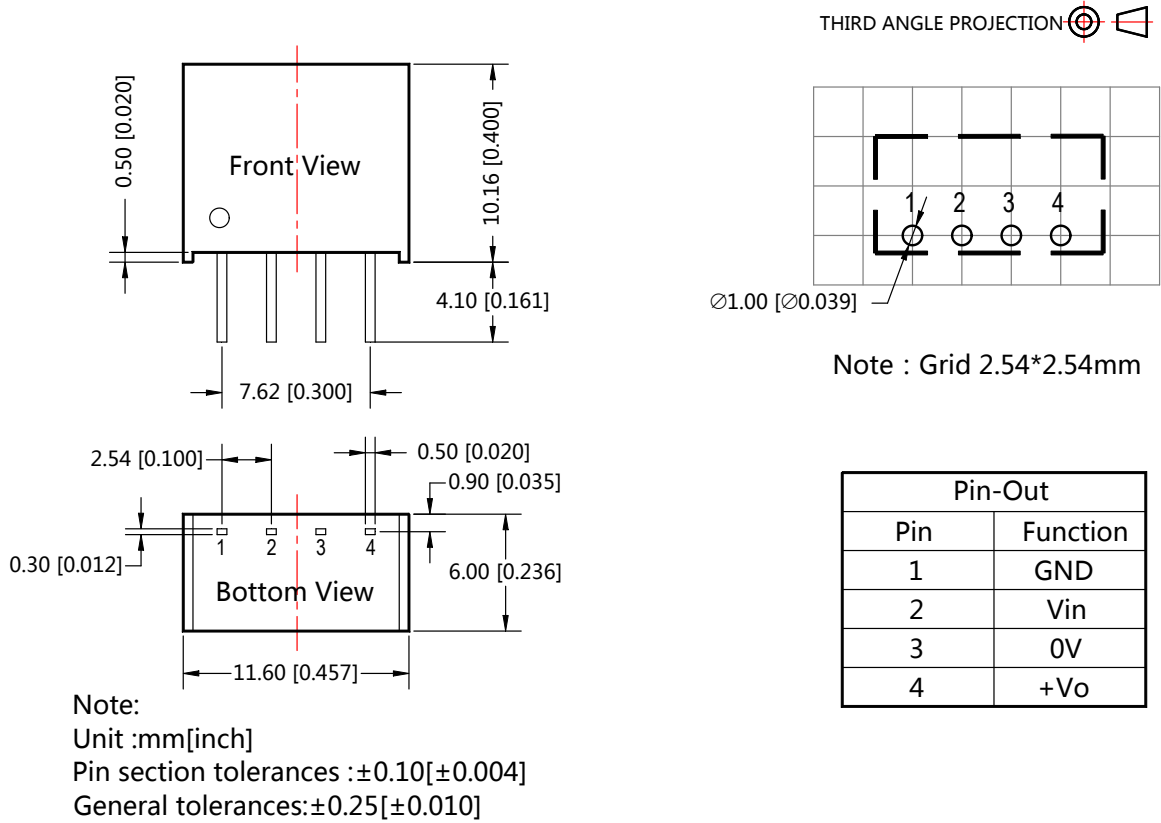
| Input voltage (VDC) | | 3.3/5/12/15/24 |
|---------------------|-----|----------------------------|
| EMI | C1 | 4.7 μ F /50V |
| | C2 | Refer to the Cout in Fig.3 |
| | LDM | 6.8 μ H |

3. Output load requirements

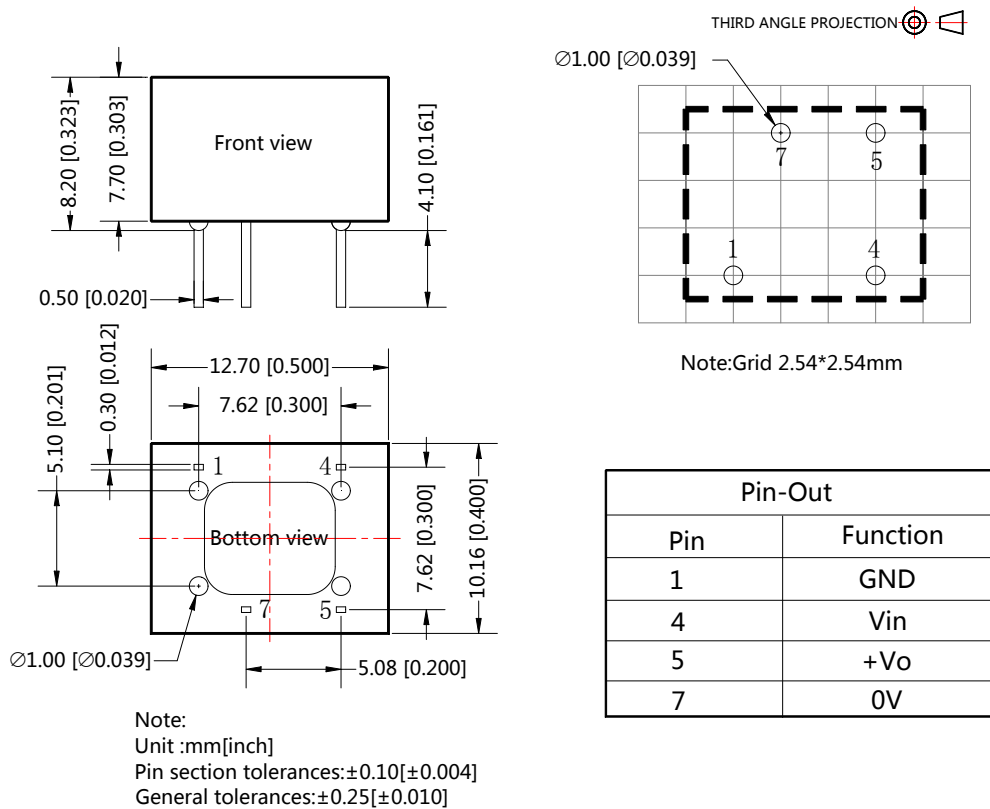
In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

4. For more information please find DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout B_S-1WR2



Dimensions and Recommended Layout B_D-1WR2



Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing 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 nominal input voltage and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25\text{ }^\circ\text{C}$, humidity<75% 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. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
7. We can provide product customization service;
8. Specifications are subject to change without prior notice.

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