

0.25W, Fixed input voltage, isolated & unregulated single output



Continuous Short Circuit Protection



### FEATURES

- Continuous short-circuit protection
- Operating temperature range: -40°C to +105°C
- Isolation voltage: 1.5K VDC
- Compact SMD package
- Internal surface mounted design
- International standard pin-out



Patent Protection RoHS

*B\_XT-W2R2 series is specially designed for applications where an isolated voltage is required in a distributed power supply system. It is suitable for:*

1. Where the voltage of the input power supply is stable (voltage variation:  $\pm 10\%V_{in}$ );
2. Where isolation is necessary between input and output (isolation voltage  $\leq 1500VDC$ );
3. Where do not has high requirement of line regulation, load regulation and the ripple & noise of the output voltage;  
Such as: pure digital circuits, low frequency analog circuits, and relay-driven circuits.

### Selection Guide

| Certification | Part No.     | Input Voltage (VDC) | Output               |                                 | Efficiency (%Min./Typ.) @ Full Load | Max. Capacitive Load ( $\mu F$ ) |       |
|---------------|--------------|---------------------|----------------------|---------------------------------|-------------------------------------|----------------------------------|-------|
|               |              | Nominal (Range)     | Output Voltage (VDC) | Output Current (mA) (Max./Min.) |                                     |                                  |       |
| --            | B0303XT-W2R2 | 3.3<br>(2.97-3.63)  | 3.3                  | 76/8                            | 68/73                               | 220                              |       |
|               | B0305XT-W2R2 |                     | 5                    | 50/5                            | 68/73                               |                                  |       |
|               | B0312XT-W2R2 |                     | 12                   | 21/2                            | 68/73                               |                                  |       |
| CE            | B0503XT-W2R2 | 5<br>(4.5-5.5)      | 3.3                  | 76/8                            | 69/74                               |                                  |       |
|               | B0505XT-W2R2 |                     | 5                    | 50/5                            | 72/77                               |                                  |       |
| --            | B0509XT-W2R2 |                     | 9                    | 28/3                            | 69/74                               |                                  |       |
|               | CE           |                     | B0512XT-W2R2         | 12                              | 21/2                                |                                  | 69/74 |
| B0515XT-W2R2  |              |                     | 15                   | 17/2                            | 68/73                               |                                  |       |
| --            | B1203XT-W2R2 |                     | 12<br>(10.8-13.2)    | 3.3                             | 76/8                                |                                  | 68/73 |
|               | CE           | B1205XT-W2R2        |                      | 5                               | 50/5                                |                                  | 72/77 |
|               |              | B1209XT-W2R2        |                      | 9                               | 28/3                                |                                  | 68/73 |
|               |              | B1212XT-W2R2        |                      | 12                              | 21/2                                |                                  | 72/77 |
|               | B2405XT-W2R2 | 24<br>(21.6-26.4)   |                      | 5                               | 50/5                                | 66/71                            |       |

### Input Specifications

| Item                                | Operating Conditions | Min.             | Typ.   | Max. | Unit |
|-------------------------------------|----------------------|------------------|--------|------|------|
| Input Current (full load / no-load) | 3.3V input           | --               | 104/20 | --   | mA   |
|                                     | 5V input             | --               | 68/15  | --   |      |
|                                     | 12V input            | --               | 27/10  | --   |      |
|                                     | 24V input            | --               | 15/8   | --   |      |
| Surge Voltage (1sec. max.)*         | 3.3V input           | -0.7             | --     | 5    | VDC  |
|                                     | 5V input             | -0.7             | --     | 9    |      |
|                                     | 12V input            | -0.7             | --     | 18   |      |
|                                     | 24V input            | -0.7             | --     | 30   |      |
| Reflected Ripple Current            | 3.3V/5V input        | --               | 20     | --   | mA   |
|                                     | 12V/24V input        | --               | 5      | --   |      |
| Input Filter                        |                      | Capacitor 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  |    |
|-----------------------------------|------------------------------|---------------------------------------|-------|-------|-------|----|
| Output Voltage Accuracy           |                              | See tolerance envelope graph (Fig. 1) |       |       |       |    |
| Line Regulation                   | Input voltage change:<br>±1% | 3.3V output                           | --    | --    | ±1.5  | -- |
|                                   |                              | other output                          | --    | --    | ±1.2  |    |
| Load Regulation                   | 10%-100% load                | 3.3V output                           | --    | 15    | 20    | %  |
|                                   |                              | 5V/9V output                          | --    | 12    | 15    |    |
|                                   |                              | 12V /15V output                       | --    | 7     | 10    |    |
| Ripple & Noise*                   | 20MHz bandwidth              | --                                    | 10&20 | 120   | mVp-p |    |
| Temperature Drift Coefficient     | Full load                    | --                                    | --    | ±0.03 | %/°C  |    |
| Output Short Circuit Protection** | B03xxXT-W2R2                 | --                                    | --    | 1     | s     |    |
|                                   | Others                       | Continuous, self-recovery             |       |       |       |    |

Note: \* Ripple and noise tested with "parallel cable" method, please see *DC-DC Converter Application Notes* for specific operation methods.  
\*\* Supply voltage must be discontinued at the end of short circuit duration for B03xxXT-W2R2 series.

### 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 if the temperature ≥100°C (see Fig. 2)                                  | -40  | --   | 105  | °C      |
| Storage Temperature                |  | -55  | --   | 125  |         |
| Casing Temperature Rise            | Ta=25°C  | --   | 20   | --   |         |
| Pin Welding Resistance Temperature | Welding spot is 1.5mm away from the casing, 10 seconds                           | --   | --   | 300  |         |
| Reflow Soldering Temperature       |  | Peak temp. ≤245°C, maximum duration time ≤60s at 217°C.<br>For actual application, please refer to IPC/JEDEC J-STD-020D.1. |      |      |         |
| Storage Humidity                   | Non-condensing   | --   | --   | 95   | %RH     |
| Switching Frequency                | 100% load, nominal input voltage   | --   | 100  | 300  | KHz     |
| MTBF                               | MIL-HDBK-217F@25°C   | 3500   | --   | --   | K hours |

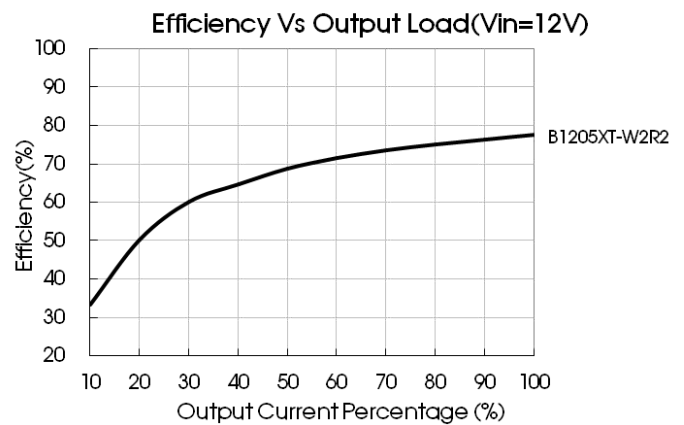
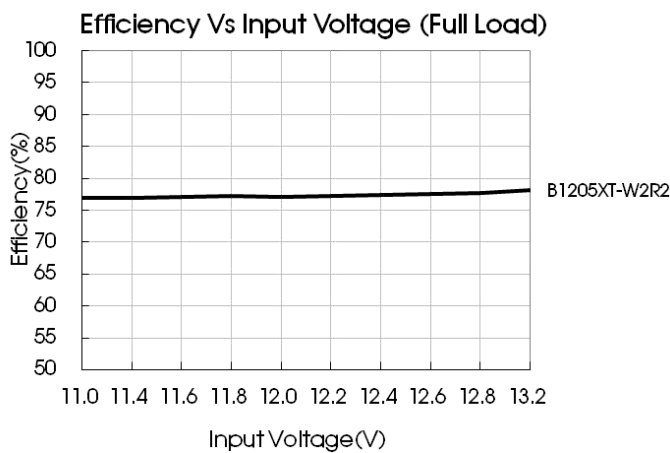
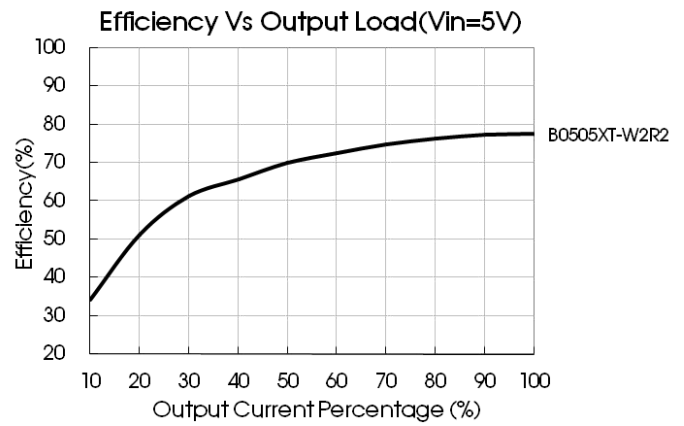
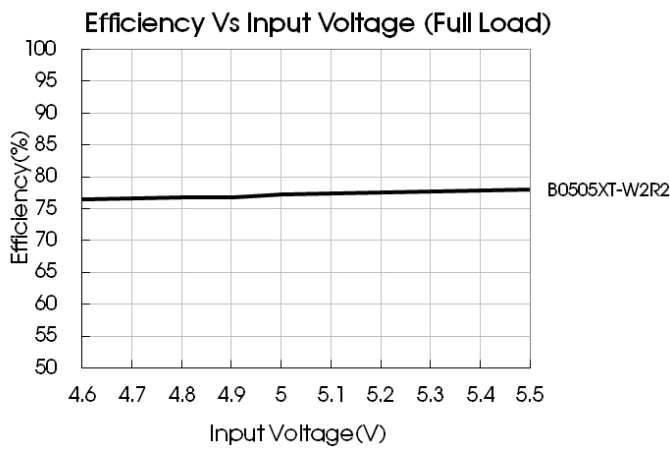
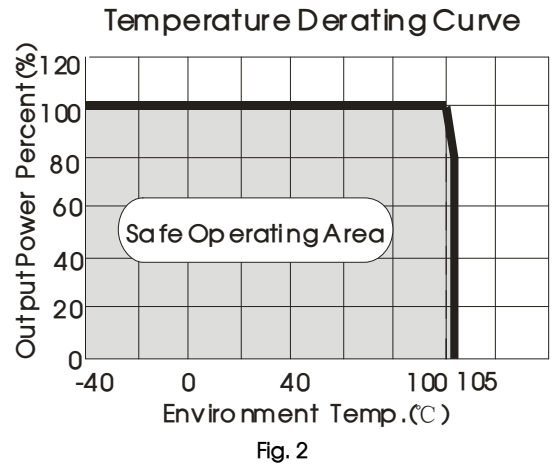
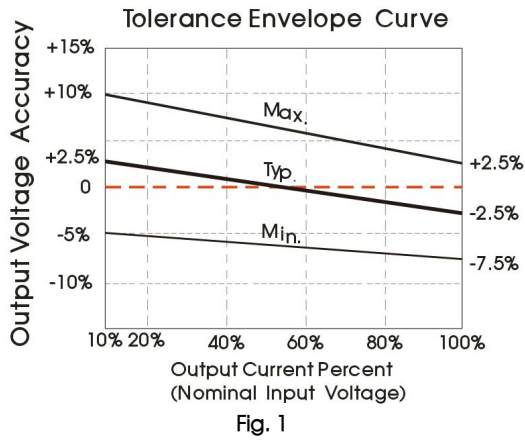
### Physical Specifications

|                    |   |
|--------------------|---|
| Casing Material    | Black flame-retardant and heat-resistant Epoxy resin (UL94 V-0) |
| Package Dimensions | 12.70*11.20*7.25 mm   |
| Weight             | 1.5 g (Typ.)  |
| Cooling Method     | Free air convection   |

### EMC Specifications

|     |                         |                 |  |
|-----|-------------------------|-----------------|--|
| EMI | Conducted disturbance   | CISPR32/EN55032 | CLASS B (see Fig. 5 for recommended circuit) |
|     | Radiated emission       | CISPR32/EN55032 | CLASS B (see Fig. 5 for recommended circuit) |
| EMS | Electrostatic discharge | IEC/EN61000-4-2 | Contact ±8KV perf. Criteria B                |

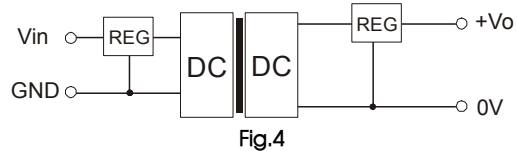
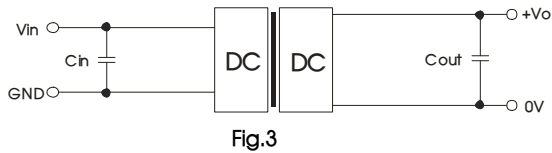
Product Characteristic Curve



Design Reference

1. Typical application

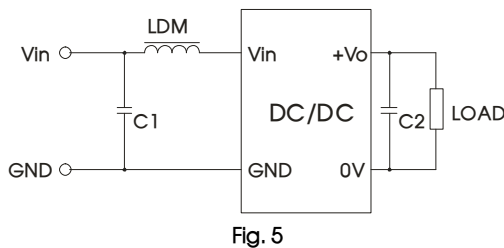
If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensure the modules running well, the recommended capacitive load values as shown in Table 1. The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Fig. 4).



Recommended capacitive load value table (Table 1)

| Vin(VDC) | Cin(μF) | Vo (VDC) | Cout(μF) |
|----------|---------|----------|----------|
| 3.3/5    | 4.7     | 3.3/5    | 10       |
| 12       | 2.2     | 12       | 2.2      |
| 24       | 1       | 15       | 1        |

2. EMC typical recommended circuit



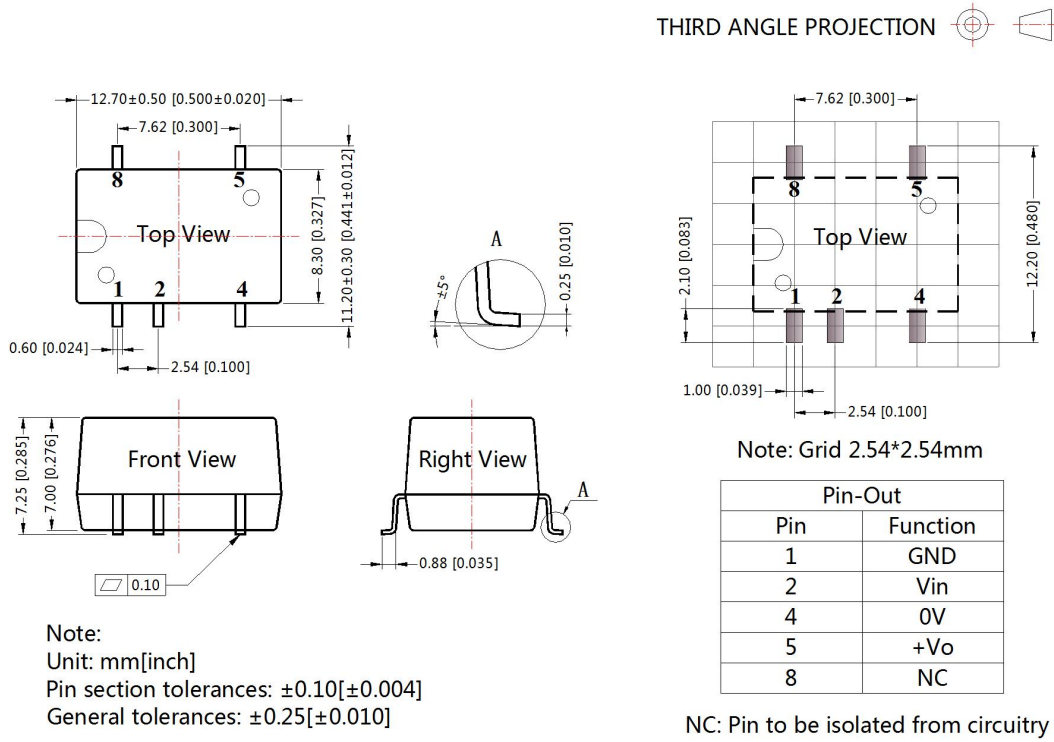
| Input voltage (VDC) |     | 3.3/5/12/24                |
|---------------------|-----|----------------------------|
| EMI                 | C1  | 4.7μF /50V                 |
|                     | C2  | Refer to the Cout in Fig.3 |
|                     | LDM | 6.8μH                      |

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 the 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: 58210023, 58210024;
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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