

1W isolated DC-DC converter
Fixed input voltage and unregulated single output



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

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating ambient temperature range: -40°C ~ +105°C
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage 1.5k VDC
- Industry standard pin-out
- IEC62368, UL62368, EN62368 approved

B05_XT-1WR3 series are specially designed for applications where an 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(%) Min./Typ. | Capacitive Load(μF) Max. |
|---------------|--------------|----------------------|------------------|--------------------------|--------------------------------------|-----------------------------|
| | | Nominal (Range) | Voltage (VDC) | Current(mA) Max./Min. | | |
| UL/CE/CB | B0503XT-1WR3 | 5 (4.5-5.5) | 3.3 | 303/30 | 70/74 | 2400 |
| | B0505XT-1WR3 | | 5 | 200/20 | 78/82 | 2400 |
| | B0509XT-1WR3 | | 9 | 111/12 | 79/83 | 1000 |
| | B0512XT-1WR3 | | 12 | 84/9 | 79/83 | 560 |
| | B0515XT-1WR3 | | 15 | 67/7 | 79/83 | 560 |
| | B0524XT-1WR3 | | 24 | 42/4 | 81/85 | 220 |

Input Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|--|----------------------|--------------------|--------------------|--------|--------|------|
| Input Current (full load / no-load) | 5VDC input | 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 | -- | mA |
| Surge Voltage (1sec. max.) | 5VDC input | | -0.7 | -- | 9 | VDC |
| Input Filter | | | Capacitance filter | | | |
| Hot Plug | | | Unavailable | | | |

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|-------------------|---------------------------|---------------|--------------------------------------|------|------|------|
| Voltage Accuracy | | | See output regulation curve (Fig. 1) | | | |
| Linear Regulation | Input voltage change: ±1% | 3.3VDC output | -- | -- | 1.5 | % |
| | | Other outputs | -- | -- | 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 | Other outputs | -- | 30 | 75 | mVp-p |
| | | 24VDC output | -- | 50 | 100 | |
| Temperature Coefficient | Full load | | -- | ±0.02 | -- | %/°C |
| Short-circuit Protection | | | Continuous, self-recovery | | | |

Note: * 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 ≥ 100°C, (see Fig. 2) | | -40 | -- | 105 | °C |
| Storage Temperature | | | -55 | -- | 125 | |
| Case Temperature Rise | Ta=25°C | 3.3VDC output | -- | 25 | -- | |
| | | Other outputs | -- | 15 | -- | |
| Storage Humidity | Non-condensing | | -- | -- | 95 | %RH |
| Reflow Soldering Temperature | | | Peak temp. ≤ 245°C, maximum duration time ≤ 60s over 217°C. | | | |
| Switching Frequency | Full load, nominal input voltage | | -- | 270 | -- | KHz |
| MTBF | MIL-HDBK-217F@25°C | | 3500 | -- | -- | K hours |
| Moisture Sensitivity Level (MSL) | IPC/JEDEC J-STD-020D.1 | | Level 1 | | | |

Note: * For actual application, please refer to IPC/JEDEC J-STD-020D.1.

Mechanical Specifications

| | |
|-----------------|--|
| Case Material | Black plastic; flame-retardant and heat-resistant (UL94 V-0) |
| Dimensions | 13.20 x 11.40 x 7.25 mm |
| Weight | 1.4g(Typ.) |
| Cooling methods | 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 ±4kV perf. Criteria B |

Typical Characteristic Curves

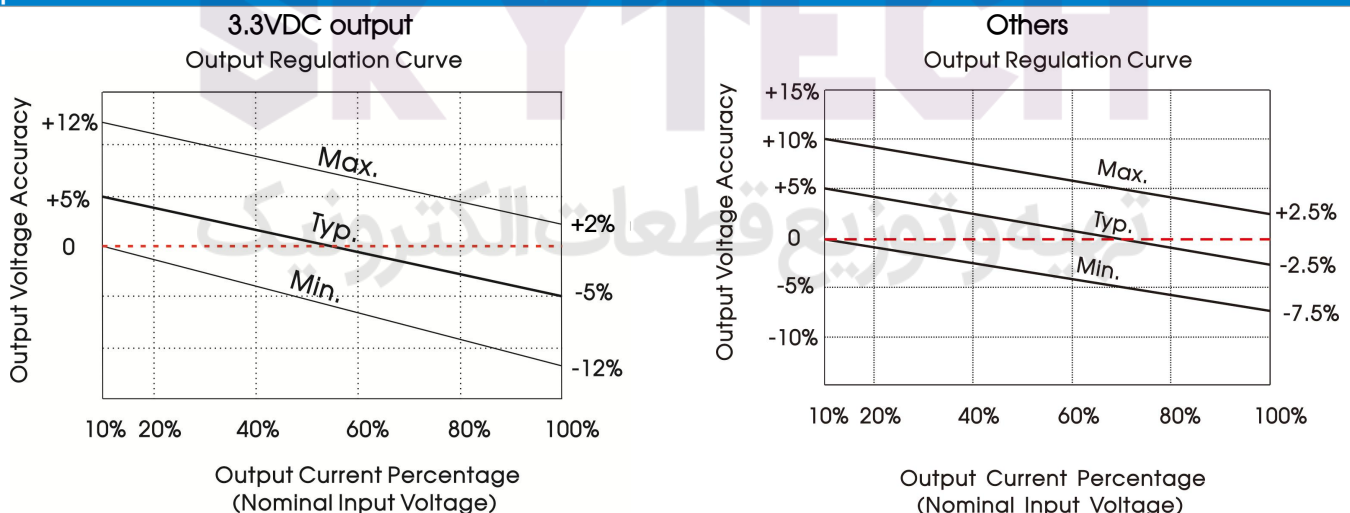
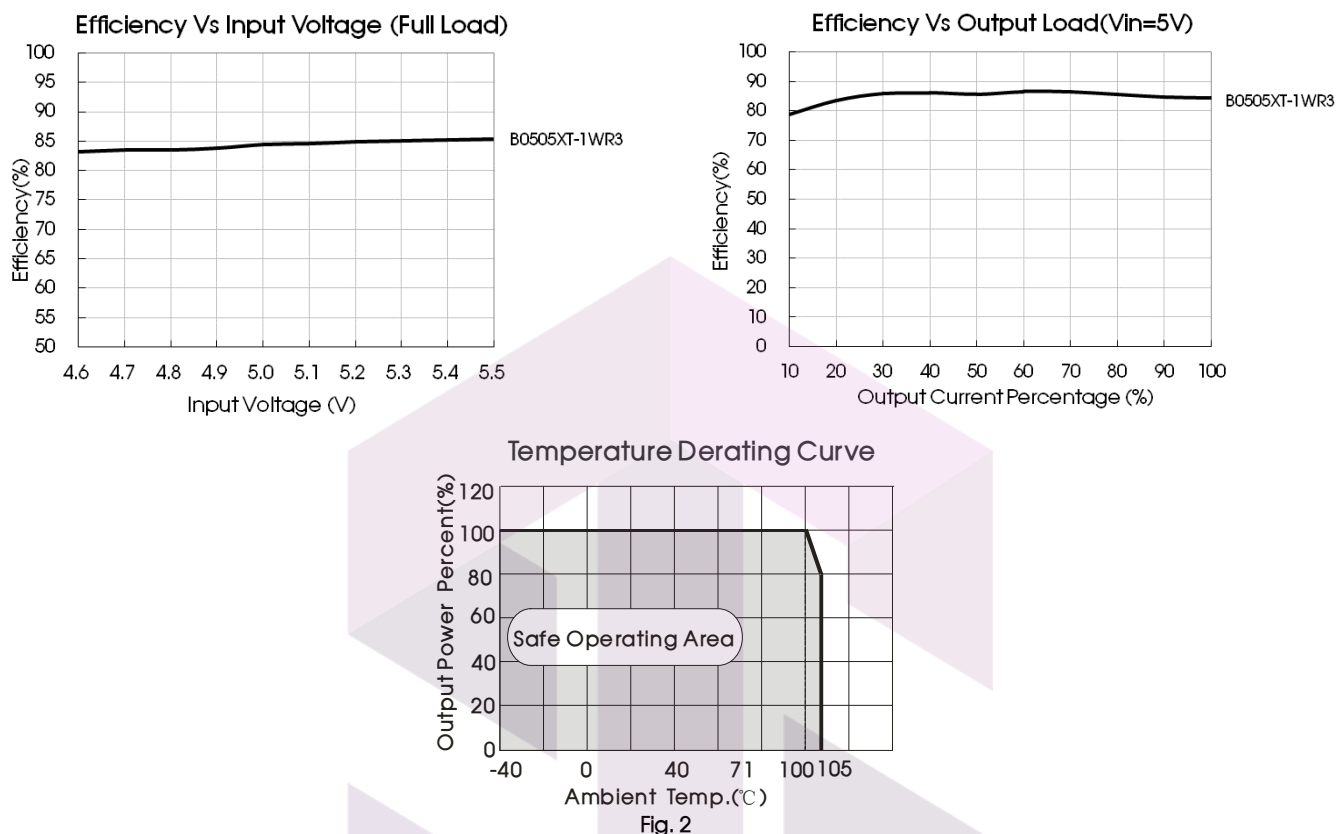


Fig. 1



Design Reference

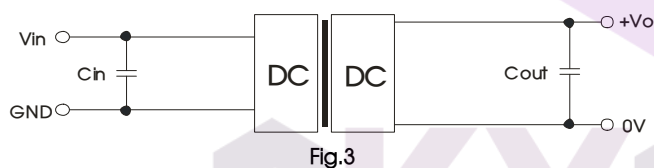
1. Typical application circuit

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.

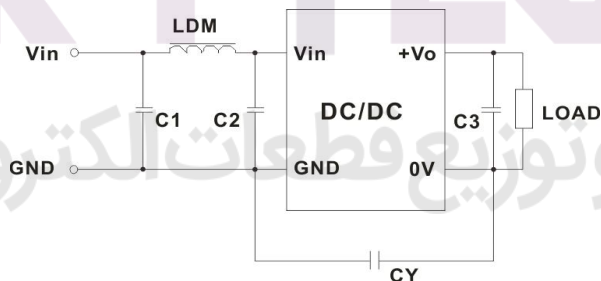
Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

Recommended capacitive load value table (Table 1)

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



2. EMC (CLASS B) compliance circuit



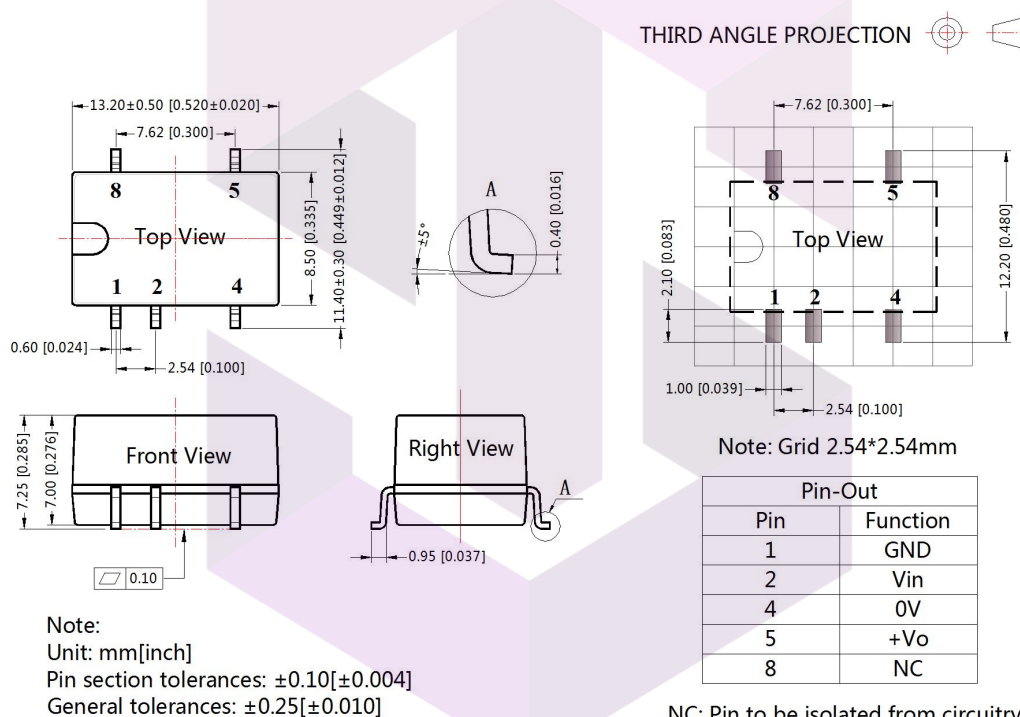
EMC recommended circuit value table (Table 2)

| Input voltage 5VDC | Output voltage(VDC) | | 3.3/5/9 | 12/15/24 |
|--------------------------|---------------------|-------|------------------------------|--|
| | EMI | C1/C2 | 4.7μF /25V | 4.7μF /25V |
| | | CY | -- | 1nF/2KVDC HEC C1206X102K202T JOHANSON 202R18W102KV4E |
| | | 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.

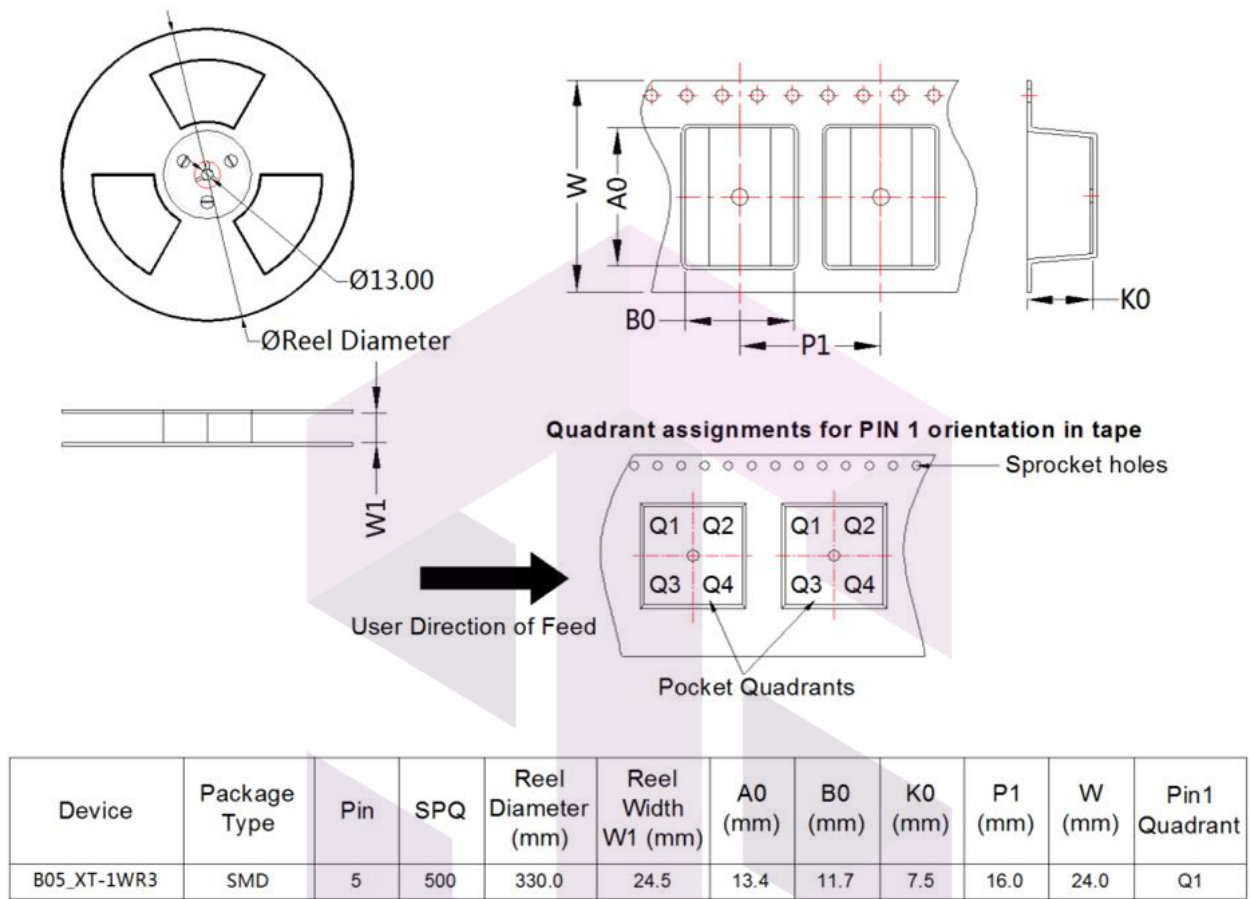
3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com.

Dimensions and Recommended Layout



SKYTECH

تهیه و توزیع قطعات الکترونیک



Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Tube Packaging bag number: 58210024, Roll Packaging bag number: 58200054;
- 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 $T_a=25^{\circ}\text{C}$, 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.

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