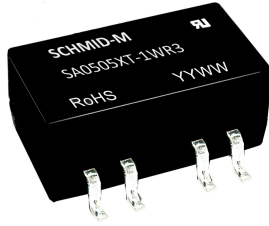


1W isolated DC-DC converter
Fixed input voltage and unregulated dual output



Continuous Short
Circuit Protection



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

SA05_XT-1WR3 series are specially designed for applications where 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(%) Min./Typ. | Capacitive Load(μF)* Max. |
|---------------|---------------|----------------------|------------------|--------------------------|--------------------------------------|------------------------------|
| | | Nominal (Range) | Voltage (VDC) | Current(mA) Max./Min. | | |
| UL/CE/CB | SA0505XT-1WR3 | 5 (4.5-5.5) | ±5 | ±100/±10 | 78/82 | 1200 |
| | SA0509XT-1WR3 | | ±9 | ±56/±6 | 79/83 | 470 |
| | SA0512XT-1WR3 | | ±12 | ±42/±5 | 79/83 | 220 |
| | SA0515XT-1WR3 | | ±15 | ±34/±4 | 79/83 | 220 |
| | SA0524XT-1WR3 | | ±24 | ±21/±3 | 81/85 | 100 |

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

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit | |
|--|----------------------|--------------------|------|--------|--------|----|
| Input Current (full load / no-load) | 5VDC input | 5VDC output | -- | 244/5 | 257/10 | 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% | -- | -- | 1.2 | % | |
| Load Regulation | 10%-100% load | 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 output | -- | 30 | 75 | mVp-p |
| | | 24VDC output | -- | 50 | 100 | |
| Temperature Coefficient | Full load | -- | ±0.02 | -- | %/°C | |

DC/DC Converter

SA05_XT-1WR3 Series

| | |
|--|---------------------------|
| 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 $\geq 100^{\circ}\text{C}$, (see Fig. 2) | -40 | -- | 105 | $^{\circ}\text{C}$ |
| Storage Temperature | | -55 | -- | 125 | |
| Case Temperature Rise | $T_a=25^{\circ}\text{C}$ | -- | 15 | -- | |
| Storage Humidity | Non-condensing | -- | -- | 95 | %RH |
| Reflow Soldering Temperature* | | Peak temp. $\leq 245^{\circ}\text{C}$, maximum duration time $\leq 60\text{s}$ 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 | 15.24 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. 5 for recommended circuit) |
| | RE | CISPR32/EN55032 CLASS B (see Fig. 5 for recommended circuit) |
| Immunity | ESD | IEC/EN61000-4-2 Air $\pm 8\text{kV}$, Contact $\pm 4\text{kV}$ perf. Criteria B |

Typical Characteristic Curves

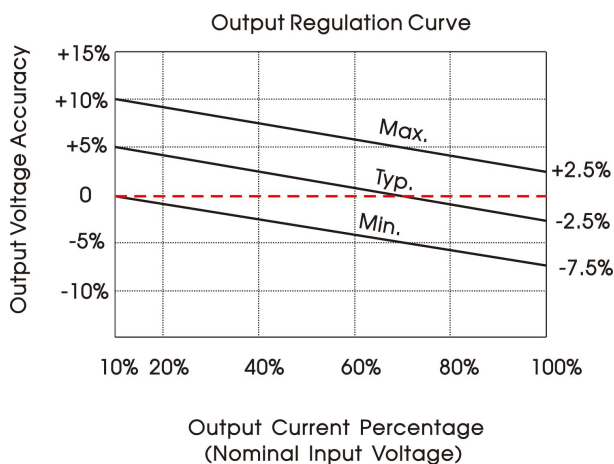


Fig. 1

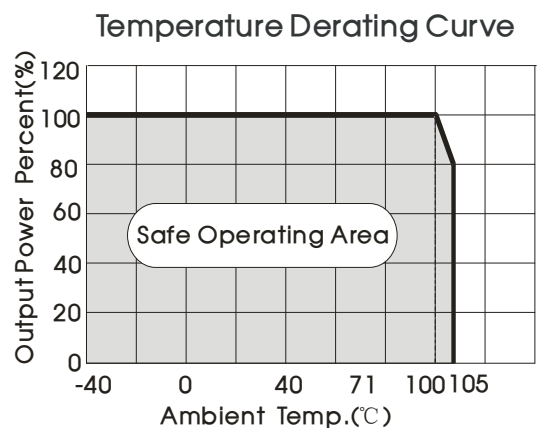
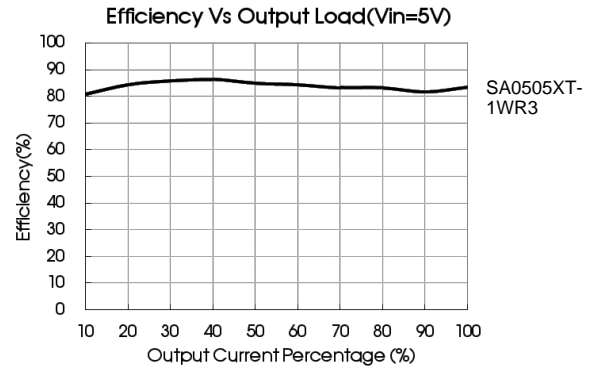
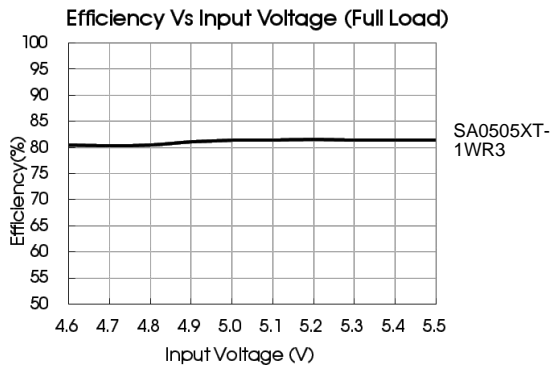


Fig. 2

DC/DC Converter

SA05_XT-1WR3 Series



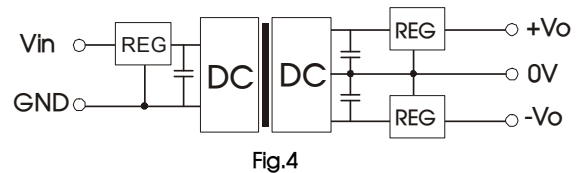
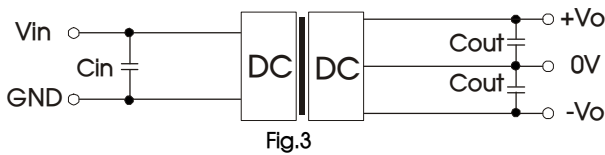
Design Reference

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.

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) |
|----------|---------|----------|----------|
| 5 | 4.7 | ±5 | 4.7 |
| | | ±9 | 2.2 |
| | | ±12 | 1 |
| | | ±15/±24 | 1 |

2. EMC (CLASS B) compliance circuit

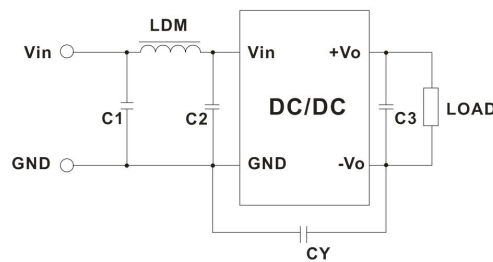


Fig. 5

EMC recommended circuit value table (Table 2)

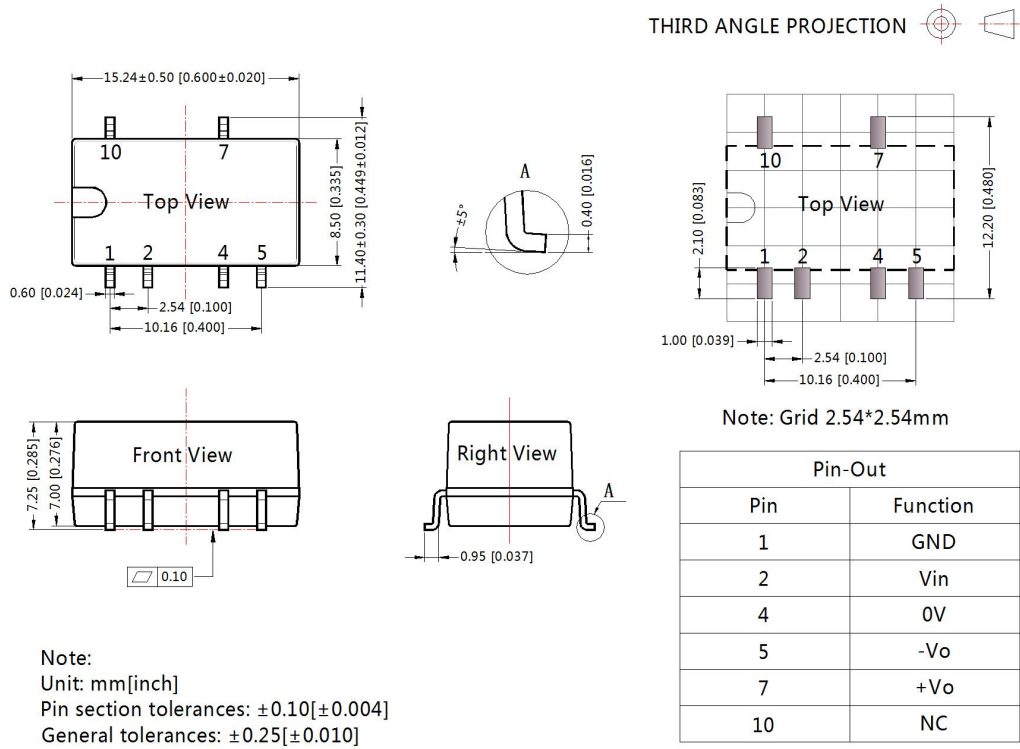
| Input voltage | Output voltage(VDC) | | |
|---------------|---------------------|------------------------------|--|
| | 5VDC | 5/9 | 12/15/24 |
| EMI | C1/C2 | 4.7μF /25V | 4.7μF /25V |
| | CY | -- | 1nF/2KVDC HEC C1206X102K202T JOHANSON 202R18W102KV4E |
| | C3 | Refer to the Cout in table 1 | |
| | LDM | 6.8μH | 6.8μH |

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

DC/DC Converter

SA05_XT-1WR3 Series

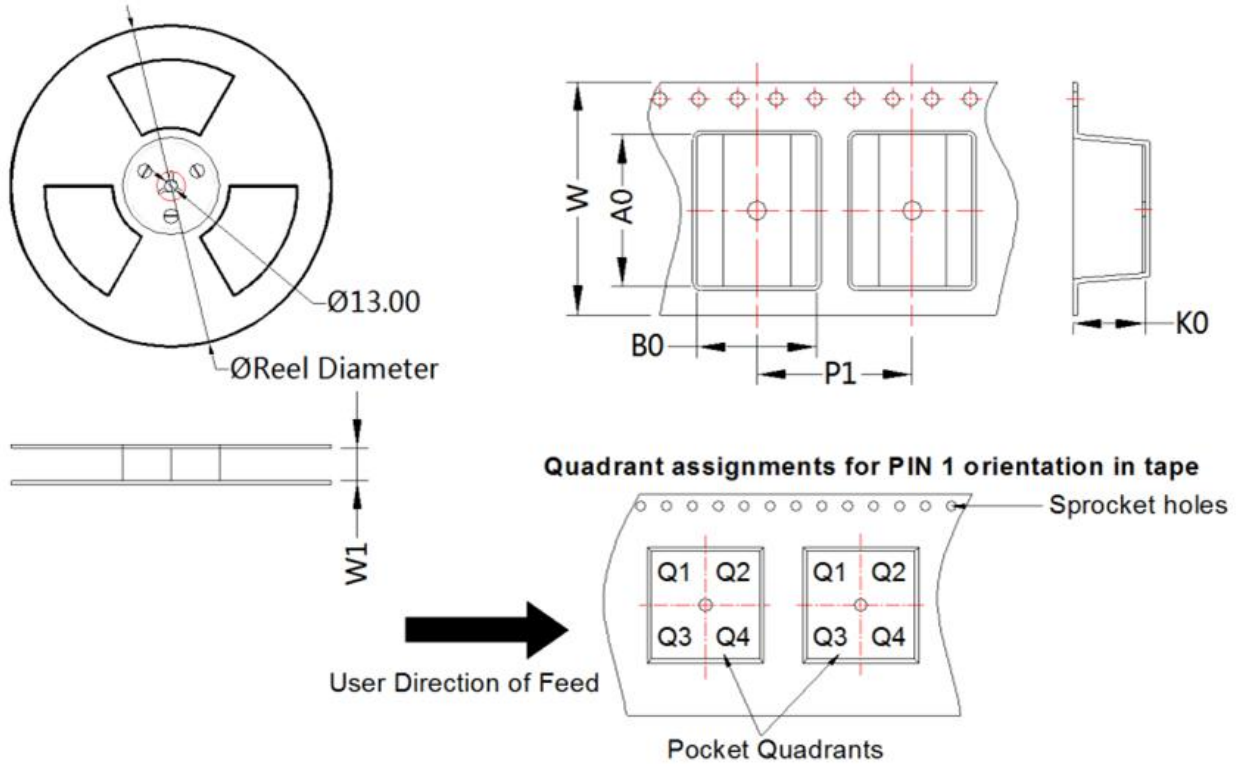
Dimensions and Recommended Layout



NC: Pin to be isolated from circuitry

DC/DC Converter

SA05_XT-1WR3 Series



| Device | Package Type | Pin | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|--------------|--------------|-----|-----|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SA05_XT-1WR3 | SMD | 6 | 500 | 330.0 | 24.5 | 15.64 | 12.4 | 7.45 | 16.0 | 24.0 | Q1 |

Notes:

1. 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;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. 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;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. 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.