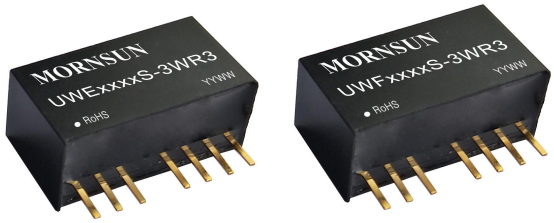
3W isolated DC-DC converter in SIP package
Ultra-wide input and regulated single/dual output




Patent Protection

3 years Warranty

CE Report EN62368-1

UKCA Report BS EN62368-1

RoHS

## FEATURES

- Ultra-wide 8:1 input voltage range
- High efficiency up to 79%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 3k VDC
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40℃ to +105℃
- Industry standard pin-out

*UWE/F_S-3WR3 series of isolated 3W DC-DC converter products with an ultra-wide 8:1 input voltage range. They feature efficiencies of up to 79%, 3000VDC input to output isolation, operating ambient temperature range of -40℃ to +105℃, input under-voltage protection, output short-circuit, over-current protection and they are widely used in applications such as medical care, industrial control, electric power, instruments and communication fields.*

## Selection Guide

| Certification | Part No. | Input Voltage (VDC) | | Output | | Full Load Efficiency② (%) Min./Typ. | Capacitive Load③ (μF)Max. |
|---|---|---|---|---|---|---|---|
| | | Nominal (Range) | Max.① | Voltage(VDC) | Current (mA) Max./Min. | | |
| EN/BS EN | UWE1205S-3WR3 | 12 (4.5-36) | 40 | ±5 | ±300 | 75/77 | 470 |
| | UWE1212S-3WR3 | | | ±12 | ±125 | 77/79 | 220 |
| | UWE1215S-3WR3 | | | ±15 | ±100 | 77/79 | 100 |
| | UWF1205S-3WR3 | | | 5 | 600 | 75/77 | 1000 |
| | UWF1212S-3WR3 | | | 12 | 250 | 77/79 | 330 |
| | UWF1215S-3WR3 | | | 15 | 200 | 77/79 | 220 |

Notes: ① Exceeding the maximum input voltage may cause permanent damage;
② Efficiency is measured at nominal input voltage and rated output load;
③ 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) | 5V/±5V output | -- | 325/8 | 334/16 | mA |
| | Others | -- | 317/8 | 325/16 | |
| Reflected Ripple Current | | -- | 50 | -- | |
| Surge Voltage (1sec. max.) | | -0.7 | -- | 50 | VDC |
| Start-up Voltage | | -- | -- | 4.5 | |
| Input Under-voltage Protection | | 2.5 | 3.5 | -- | |
| Input Filter | | Capacitance Filter | | | |
| Hot Plug | | Unavailable | | | |

## Output Specifications

| Item | Operating Conditions | | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Voltage Accuracy | 0% -100% load | | | -- | ±1 | ±3 | % |
| Linear Regulation | Input voltage variation from low to high at full load | Vo1 | UWE_S-3WR3 Series | -- | -- | ±1 | |
| | | | UWF_S-3WR3 Series | -- | -- | ±0.5 | |
| | | Vo2 | | -- | -- | ±1 | |
| Load Regulation | 5% -100% load | Vo1 | | -- | -- | ±1 | |
| | | Vo2 | | -- | -- | ±1.5 | |
| Cross Regulation | Dual output, Vo1 load at 50%, Vo2 load at range of 25%-100% | | | -- | -- | ±5 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Transient Recovery Time | 25% load step change, nominal input voltag | | -- | 300 | 500 | μs |
| Transient Response Deviation | 25% load step change, nominal input voltage | 5V/±5V output | -- | ±5 | ±8 | % |
| | | Others | -- | ±3 | ±5 | |
| Temperature Coefficient | Full load | | -- | -- | ±0.03 | %/℃ |
| Ripple & Noise① | 20MHz bandwidth, 5% -100% load | | -- | 60 | 100 | mV p-p |
| Over-current Protection | Input voltage range | | 110 | -- | 300 | %Io |
| Short-circuit Protection | Input voltage range | | Continuous, self-recovery | | | |

Note:
①Under 0% -5% load conditions, ripple & noise does not exceed 5%Vo. The "parallel cable" method is used for ripple and noise test, please refer to *DC-DC Converter Application Notes* for specific information.

## General Specification

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Isolation | Input-output Electric Strength test for 1 minute with a leakage current of 1mA max. | 3000 | -- | -- | VDC |
| Insulation Resistance | Input-output insulation at 500VDC | 1000 | -- | -- | MΩ |
| Isolation Capacitance | Input-output capacitance at 100kHz/0.1V | -- | 40 | -- | pF |
| Operating Temperature | See Fig. 1 | -40 | -- | +105 | ℃ |
| Storage Humidity | Without condensation | 5 | -- | 95 | %RH |
| Storage Temperature | | -55 | -- | +125 | ℃ |
| Pin Soldering Resistance Temperature | Soldering spot is 1.5mm away from case for 10 seconds | -- | -- | +300 | |
| Vibration | | 10-150Hz, 5G, 0.75mm. along X, Y and Z | | | |
| Switching Frequency * | PWM mode | -- | 300 | -- | kHz |
| MTBF | MIL-HDBK-217F@25℃ | 1000 | -- | -- | k hours |

Note: *Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

## Mechanical Specifications

| | |
|---|---|
| Case Material | Black plastic; flame-retardant and heat-resistant (UL94-V0) |
| Dimensions | 22.00 x 9.50 x 12.00 mm |
| Weight | 4.5g (Typ.) |
| Cooling method | Free air convection |

## Electromagnetic Compatibility (EMC)

| | | | | |
|---|---|---|---|---|
| Emissions | CE | CISPR32/EN55032 | CLASS B (see Fig.3-② for recommended circuit)/CLASS A (see Fig.4 for recommended circuit) | |
| | RE | CISPR32/EN55032 | CLASS B (see Fig.3-② for recommended circuit)/CLASS A (see Fig.4 for recommended circuit) | |
| Immunity | ESD | IEC/EN61000-4-2 | Contact ±4kV | perf. Criteria B |
| | RS | IEC/EN61000-4-3 | 10V/m | perf. Criteria A |
| | EFT | IEC/EN61000-4-4 | ±2kV (see Fig.3-① for recommended circuit) | perf. Criteria B |
| | Surge | IEC/EN61000-4-5 | line to line ±2kV (see Fig.3-① for recommended circuit) | perf. Criteria B |
| | CS | IEC/EN61000-4-6 | 3 Vr.m.s | perf. Criteria A |

## Typical Characteristic Curves

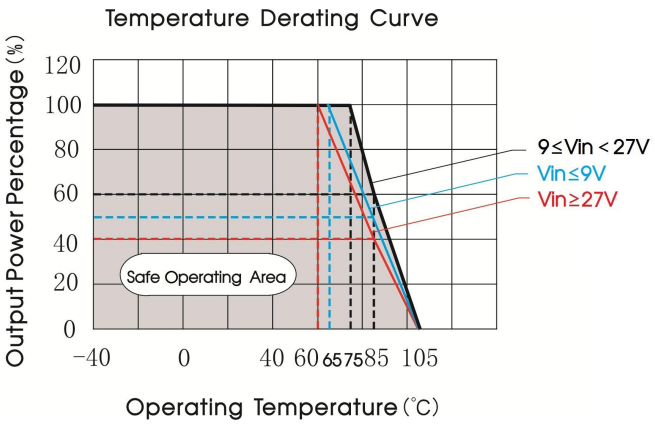



Fig. 1

## Design Reference

### 1. Typical application

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.
Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

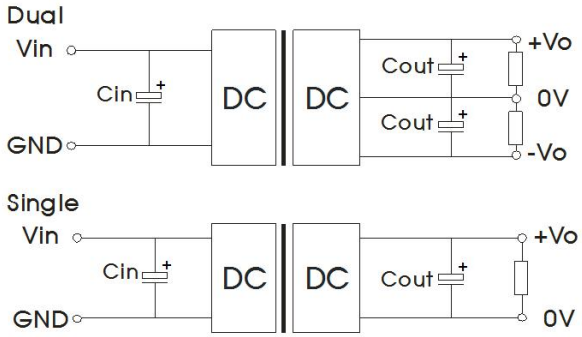



Fig. 2

Parameter description:

| Single Vout (VDC) | Cout (μF) | Cin (μF) | Dual Vout (VDC) | Cout (μF) | Cin (μF) |
|---|---|---|---|---|---|
| 5/12/15 | 22 (25V) | 100 (50V) | ±5/±12/±15 | 22 (25V) | 100 (50V) |

### 2. EMC compliance circuit

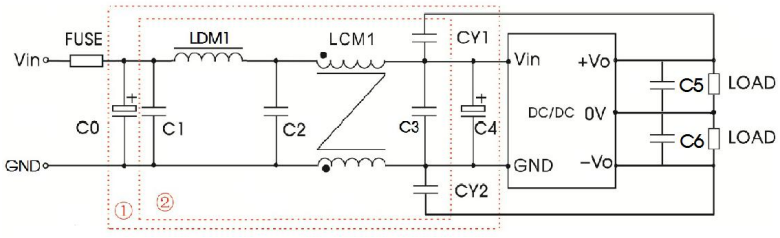



Fig. 3

Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs

Parameter description:

| Components | Vin: 12V |
|---|---|
| FUSE | Choose according to actual input current |
| C0 | 1000μF/50V |
| C4 | 330μF/50V |
| C1/C2/C3 | 10μF/50V |
| LCM1 | 3.3mH, recommended to use MORNSUN's FL2D-10-332 |
| LDM1 | 4.7μH |
| CY1/CY2 | 1nF/3kV |
| C5/C6 | Refer to the Cout in Fig.2 |

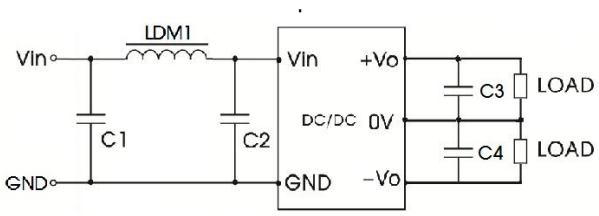


Fig. 4

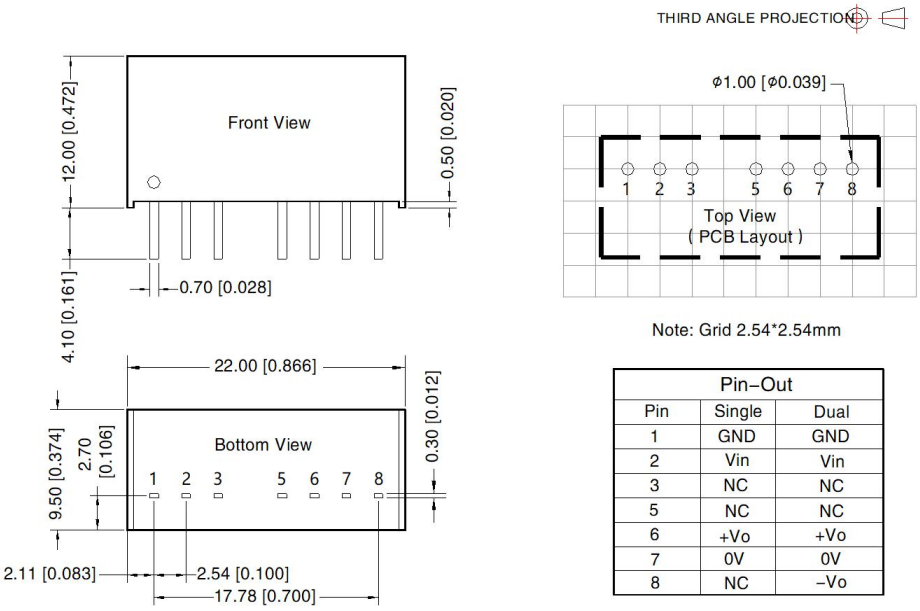
Parameter description:

| Components | Vin: 12V |
|---|---|
| FUSE | Choose according to actual input current |
| C1/C2 | 10μF/50V |
| LDM1 | 22μH |
| C3/C4 | Refer to the Cout in Fig.2 |

3. The products do not support parallel connection of their output

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

## Dimensions and Recommended Layout




Note: Grid 2.54*2.54mm

| Pin-Out | | |
|---|---|---|
| Pin | Single | Dual |
| 1 | GND | GND |
| 2 | Vin | Vin |
| 3 | NC | NC |
| 5 | NC | NC |
| 6 | +Vo | +Vo |
| 7 | 0V | 0V |
| 8 | NC | -Vo |

NC: Not available for electrical connection

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. packaging number: 58210004;
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 Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on 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";
7. 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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