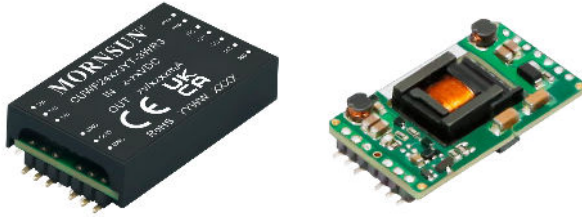


3W isolated DC-DC converter in SMD Package
Ultra-wide input and regulated single output



FEATURES

- Ultra-wide 7:1 input voltage range
- High efficiency up to 80%
- I/O isolation test voltage 3k VAC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Creepage distance is 4.5mm, clearance is 4.2mm
- Operating ambient temperature range: -40°C to +105°C
- EMI meets automotive standards EN55025/CISPR 25 standard Class 4
- AEC-Q100 standards approved
- Production process meets IATF16949 system

CUWF24_J(Y)T-3WR3 series are isolated 3W DC-DC converter products with an ultra-wide 7:1 input voltage range. They feature efficiencies up to 80%, input to output isolation is tested with 3000 VAC and the converter safely operate ambient temperature of -40°C to +105°C, input under-voltage protection, output short-circuit, over-current, over-voltage protection. They are widely used in applications such as automobile electronic, industrial control, electric power, instruments and communication fields.

Selection Guide

| Certification | Part No. ① | Input Voltage (VDC) | | Output | | | Full Load Efficiency (%) Min./Typ. | Capacitive Load (μF)Max. |
|---------------|--------------------|---------------------|--------|--------------|-----------------------|----------|------------------------------------|--------------------------|
| | | Nominal (Range) | Max. ② | Voltage(VDC) | Current(mA) Max./Min. | | | |
| | | | | | 6≤Vin<9 | 9≤Vin≤42 | | |
| EN/BS EN | CUWF2405J(Y)T-3WR3 | 24 (6-42) | 45 | 5 | 480/0 | 600/0 | 74/76 | 1000 |
| | CUWF2412J(Y)T-3WR3 | | | 12 | 200/0 | 250/0 | 76/78 | 470 |
| | CUWF2415J(Y)T-3WR3 | | | 15 | 160/0 | 200/0 | 76/78 | 220 |
| | CUWF2424J(Y)T-3WR3 | | | 24 | 100/0 | 125/0 | 78/80 | 100 |

Notes:
① CUWF24_J(Y)T-3WR3 contains 2 types of products, include CUWF24_JT-3WR3 (SMD package without shell) and CUWF24_JYT-3WR3 (SMD package with shell);
② Exceeding the maximum input voltage may cause permanent damage.

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|-------------|-------|--------|------|
| Input Current (full load / no-load) | Nominal input voltage | -- | 165/8 | 169/15 | mA |
| Reflected Ripple Current | | -- | 30 | -- | |
| Surge Voltage (1sec. max.) | | -0.7 | -- | 50 | VDC |
| Start-up Voltage | | -- | -- | 6 | |
| Input Under-voltage Protection | | 3.5 | 4.5 | -- | |
| Start-up Time | Nominal input voltage & constant resistance load | -- | 10 | 150 | ms |
| Input Filter | | Pi filter | | | |
| Hot Plug | | Unavailable | | | |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|---|-----------|------|-------|------|
| Voltage Accuracy ① | 5%-100% load | -- | ±1 | ±2 | % |
| Linear Regulation | Input voltage variation from low to high at full load | -- | ±0.2 | ±0.5 | |
| Load Regulation | 5%-100% load | -- | ±0.5 | ±1 | |
| Transient Recovery Time | 25% load step change, nominal input voltage | -- | 300 | 500 | μs |
| Transient Response Deviation | 25% load step change, input voltage range | 5V output | ±4 | ±8 | % |
| | | Others | ±3 | ±5 | |
| Temperature Coefficient | Full load | -- | -- | ±0.03 | %/°C |

| | | | | | |
|-----------------------------|--|---------------------------|----|-----|-------|
| Ripple & Noise ^② | 20MHz bandwidth, nominal input voltage, 5%-100% load | -- | 60 | 100 | mVp-p |
| Over-voltage Protection | Input voltage range | 110 | -- | 160 | %Vo |
| Over-current Protection | | 110 | -- | 300 | %Io |
| Short-circuit Protection | | Continuous, self-recovery | | | |

Note:
 ① Output voltage accuracy for 0%-5% load is $\pm 3\%$ max.
 ② Under 0% -5% load conditions, ripple & noise does not exceed 250mV. 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 5mA max. | 3000 | -- | -- | VAC |
| Insulation Resistance | Input-output resistance at 500VDC | 1000 | -- | -- | M Ω |
| Isolation Capacitance | Input-output capacitance at 100kHz/0.1V | -- | 500 | -- | pF |
| Reinforced Isolation | Clearance | 4.2 | -- | -- | mm |
| | Creepage | 4.5 | -- | -- | |
| Operating Temperature | See Fig. 1 | -40 | -- | +105 | °C |
| Storage Temperature | | -55 | -- | +125 | |
| Storage Humidity | Non-condensing | 5 | -- | 95 | %RH |
| Pin Soldering Resistance Temperature | Soldering spot is 1.5mm away from case for 10 seconds | -- | -- | +300 | °C |
| Vibration | | GBT 28046.3-2011 4.1.2.4 Random vibration, passenger car, sprung masses (vehicle body) 1. The r.m.s. acceleration value shall be 27.8 m/s ² . 2. Use a test duration of 8 hours for each plane of the DUT. | | | |
| Switching Frequency * | PWM mode | -- | 270 | -- | kHz |
| MTBF | MIL-HDBK-217F@25°C | 1000 | -- | -- | k hours |
| Moisture Sensitivity Level (MSL) | IPC/JEDEC J-STD-020D.1 | Level 1 | | | |

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 epoxy resin; flame-retardant and heat-resistant (UL94V-0) |
| Dimensions | CUWF24_JT-3WR3 | 43.68 x 23.0 x 10.00 mm |
| | CUWF24_JYT-3WR3 | 43.68 x 25.0 x 10.64 mm |
| Weight | CUWF24_JT-3WR3 | 7.5g (Typ.) |
| | CUWF24_JYT-3WR3 | 10.4g (Typ.) |
| Cooling Method | | Free air convection |

Electromagnetic Compatibility (EMC)

| | | | | |
|-----------|---|--|---|------------------|
| Emissions | CE | CISPR25/EN55025 CLASS 4 (see Fig.3 for recommended circuit) | | |
| | | CISPR32/EN55032 CLASS A (without external components) | | |
| | RE | CISPR25/EN55025 CLASS 4 (see Fig.3 for recommended circuit) | | |
| | | CISPR32/EN55032 CLASS A (without external components) | | |
| Immunity | ESD | ISO10605 Contact ± 6 kV | perf. Criteria B | |
| | RS | ISO11452-2 150V/m (see Fig.3 for recommended circuit) | perf. Criteria A | |
| | BCI | ISO11452-4 1MHz-400MHz,150mA (see Fig.3 for recommended circuit) | perf. Criteria A | |
| | Electrical transient conduction along supply lines only | | ISO7637-2 LEVEL III | |
| | | | Pulse1 (see Fig.3 for recommended circuit) | perf. Criteria B |
| | | | Pulse2a (see Fig.3 for recommended circuit) | perf. Criteria A |
| | | | Pulse2b (see Fig.3 for recommended circuit) | perf. Criteria B |
| | Pulse3a (see Fig.3 for recommended circuit) | perf. Criteria A | | |
| | Pulse3b (see Fig.3 for recommended circuit) | perf. Criteria A | | |

Typical Characteristic Curve

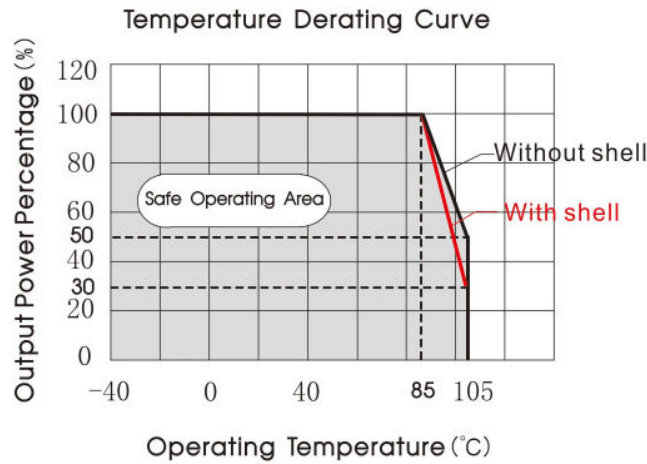


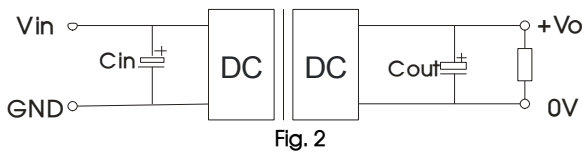
Fig. 1

Design Reference

1. Typical application

All 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 C_{in} and C_{out} 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.



| Vout (VDC) | Cin | Cout |
|------------|-----------|-----------|
| 5 | 100μF/63V | 100μF/16V |
| 12/15 | | 100μF/35V |
| 24 | | 47μF/35V |

2. EMC compliance circuit

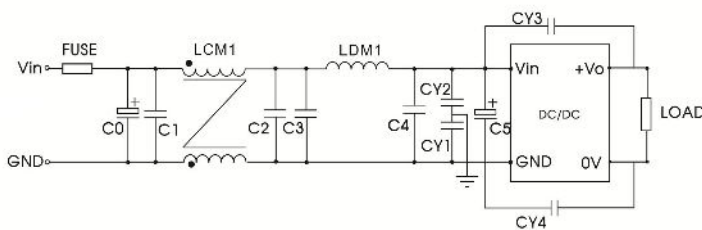


Fig. 3

Parameter description:

| Model | Vin: 24VDC |
|--------------|--|
| FUSE | Choose according to actual input current |
| C0 | 680μF/63V |
| C1/C2/C3/ C4 | 10μF/100V |
| LCM1 | 1mH(FL2D-10-102) |
| LDM1 | 4.7μH/3.1A |
| C5 | 82μF/100V |
| CY1/CY2 | 100pF/400VAC |
| CY3/CY4 | 2200pF/400VAC |

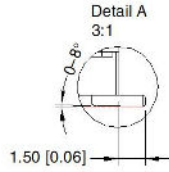
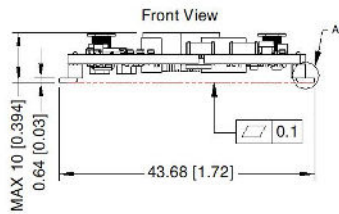
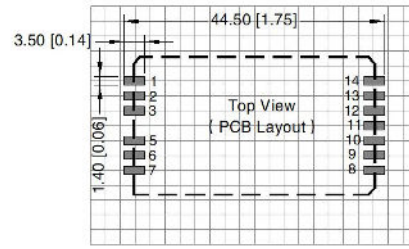
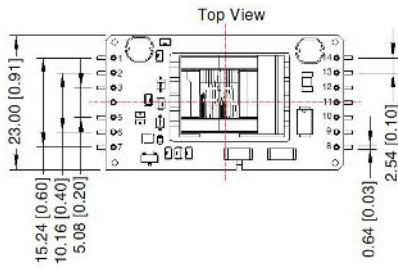
3. The products do not support parallel connection of their output

4. For additional information please refer to DC-DC converter application notes on

www.mornsun-power.com

CUWF24_JT-3WR3 Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

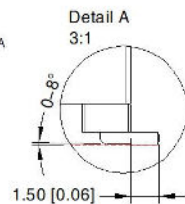
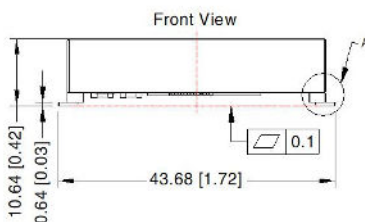
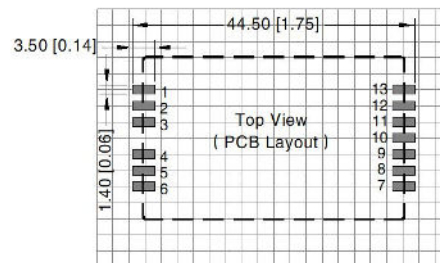
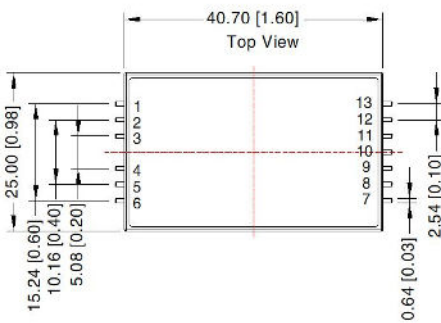
| Pin-Out | | | |
|---------|------|-----|------|
| Pin | Mark | Pin | Mark |
| 1 | Vin | 9 | NC |
| 2 | Vin | 10 | -Vo |
| 3 | Vin | 11 | -Vo |
| 5 | GND | 12 | NC |
| 6 | GND | 13 | +Vo |
| 7 | GND | 14 | +Vo |
| 8 | NC | | |

NC: Pin to be isolated circuitry

Note:
Unit: mm[inch]
Pin diameter tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$

CUW24_JYT-3WR3 Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

| Pin-Out | | | |
|---------|------|-----|------|
| Pin | Mark | Pin | Mark |
| 1 | Vin | 8 | NC |
| 2 | Vin | 9 | -Vo |
| 3 | Vin | 10 | -Vo |
| 4 | GND | 11 | NC |
| 5 | GND | 12 | +Vo |
| 6 | GND | 13 | +Vo |
| 7 | NC | | |

NC: Pin to be isolated circuitry

Note:
Unit: mm[inch]
Pin diameter tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220085(without shell);58210109(with shell);
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 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.

Mornsun Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com