

20W isolated DC-DC converter in DIP package
Ultra-wide input, regulated dual output



CE Patent Protection RoHS



FEATURES

- Ultra-wide 4:1 input voltage range
- I/O isolation test voltage 3.0k VDC
- Output-output isolation test voltage 1.5k VDC
- Input under-voltage, output short-circuit, over-current protection
- Operating ambient temperature range: -40°C to +105°C
- EN62368 approved
- Meets IEC62368, UL62368 standards

URD_LD-20WR3 series of isolated 20W DC-DC products with a 4:1 input voltage range. 3000VDC input to output isolation, operating ambient temperature range of -40°C to +105°C, Input under-voltage protection, output short circuit, over-current protection and EMI meets CISPR32/EN55032 CLASS B, which make them widely used in regulated dual output areas, such as data transmission device, Tele-communication device, distributed power supply system, hybrid module system, remote control system.

Selection Guide

| Certification | Part No. | Input Voltage (VDC) | | Output (Vo1 /Vo2) | | | Full Load Efficiency ^② (%,) Min./Typ. | Max. Capacitive Load(μF) (Vo1 /Vo2) |
|---------------|-------------------|---------------------|-------------------|-------------------|-------------------|-------------------|--|-------------------------------------|
| | | Nominal (Range) | Max. ^① | Voltage (VDC) | Current (mA) Max. | Current (mA) Min. | | |
| CE | URD480505LD-20WR3 | 48 (18-75) | 80 | 5/5 | 2000/2000 | 0/0 | 82/84 | 2000/2000 |
| | URD480512LD-20WR3 | | | 5/12 | 2000/833 | 0/0 | 82/84 | 2000/680 |
| | URD480524LD-20WR3 | | | 5/24 | 2000/417 | 0/0 | 82/84 | 2000/220 |

Notes:

① Exceeding the maximum input voltage may cause permanent damage;

② Efficiency is measured at nominal input voltage and rated output load.

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|--|-------|--------|------|
| Input Current (full load / no-load) | Nominal input voltage | -- | 496/6 | 509/12 | mA |
| Reflected Ripple Current | Nominal input voltage | -- | 40 | -- | |
| Surge Voltage (1sec. max.) | | -0.7 | -- | 100 | VDC |
| Start-up Voltage | | -- | -- | 18 | |
| Shut-down Voltage | | 12 | 15 | -- | |
| Start-up Time | Nominal input & constant resistance load | -- | 20 | 50 | ms |
| Input Filter | | Pi filter | | | |
| Ctrl * | Module on | Ctrl pin open or pulled high (3.5-12VDC) | | | |
| | Module off | Ctrl pin pulled low to GND (0-1.2VDC) | | | |
| | Input current when off | -- | 2 | 7 | mA |
| Hot Plug | | Unavailable | | | |

Note: *The Ctrl pin voltage is referenced to input GND.

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|---|------|------|------|------|
| Voltage Accuracy ^① | 5%-100% load | Vo1 | ±1 | ±3 | % |
| | | Vo2 | ±3 | ±5 | |
| | 0%-5% load | Vo1 | ±1 | ±3 | |
| | | Vo2 | ±3 | ±5 | |
| Linear Regulation | Input voltage variation from low to high at full load | Vo1 | ±0.5 | ±1 | |
| | | Vo2 | ±2 | ±3 | |
| Load Regulation ^② | 5%-100% load | Vo1 | ±0.5 | ±1 | |
| | | Vo2 | ±1.5 | ±3 | |

| | | | | | | |
|--|---|-----|-----------------------------------|-----|-------|-------|
| | 0%-5% load | Vo1 | -- | ±3 | ±4 | % |
| | | Vo2 | -- | ±3 | ±5 | |
| Cross Regulation | Dual output with Positive output at 50% load and Negative output from 25%-100% load | | -- | -- | ±10 | |
| Transient Recovery Time | 25% load step change, nominal input voltage | | -- | 300 | 500 | µs |
| Transient Response Deviation | | | -- | ±4 | ±8 | % |
| Temperature Coefficient | Full load | | -- | -- | ±0.03 | %/°C |
| Ripple & Noise ^③ | 20MHz bandwidth, 5%-100% load | Vo1 | -- | 50 | 100 | mVp-p |
| | | Vo2 | -- | 50 | 100 | |
| Over-current Protection | | | 120 | -- | 210 | %Io |
| Over-voltage Protection | Input voltage range | | 110 | -- | 160 | %Vo |
| Short-circuit Protection ^④ | | | Hiccup, continuous, self-recovery | | | |
| Note: | | | | | | |
| ① The load of Vo1/Vo2 should be the same; | | | | | | |
| ② Load regulation for 0%-100% load is ±5%; | | | | | | |
| ③ Ripple & Noise at ≤ 5% load is 5%Vo. Max. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information; | | | | | | |
| ④ If Vo2 in short, the load of Vo1 at least >5%. | | | | | | |

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. | 3000 | -- | -- | VDC |
| | Output-output Electric Strength test for 1 minute with a leakage current of 1mA max. | 1500 | -- | -- | |
| | Input/output-case Electric Strength test for 1 minute with a leakage current of 1mA max. | 1500 | -- | -- | |
| Insulation Resistance | Input-output insulation at 500VDC/1min, @25°C, 75%RH | 1000 | -- | -- | MΩ |
| Isolation Capacitance | Input-output capacitance at 100KHz/0.1V | -- | 2200 | -- | pF |
| 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 | | 10-55Hz, 2G,30 Min. along X, Y and Z | | | |
| Switching Frequency * | PWM mode | -- | 300 | -- | KHz |
| MTBF | MIL-HDBK-217F@25°C | 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 | Aluminum alloy |
| Dimensions | 50.80 x 25.40 x 11.80 mm |
| Weight | 28.0g (Typ.) |
| Cooling Method | Free air convection |

Electromagnetic Compatibility (EMC)

| | | | |
|-----------|-------|-----------------|--|
| Emissions | CE | CISPR32/EN55032 | CLASS A (without external components)/ CLASS B (see Fig.3-② for recommended circuit) |
| | RE | CISPR32/EN55032 | CLASS A (without external components)/ CLASS B (see Fig.3-② 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 V.r.m.s perf. Criteria A |

Typical Characteristic Curves

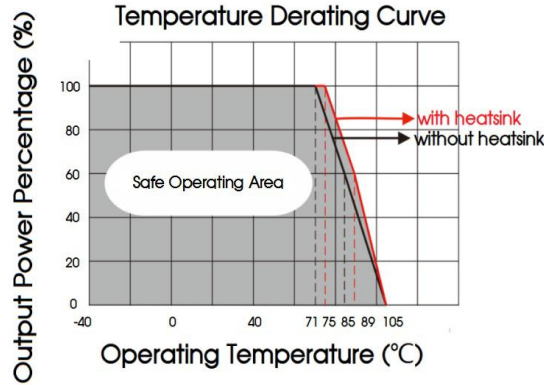
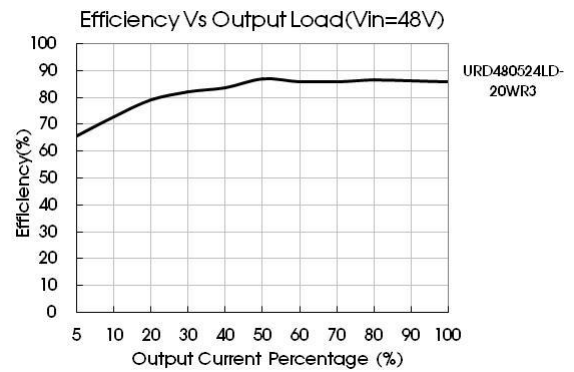
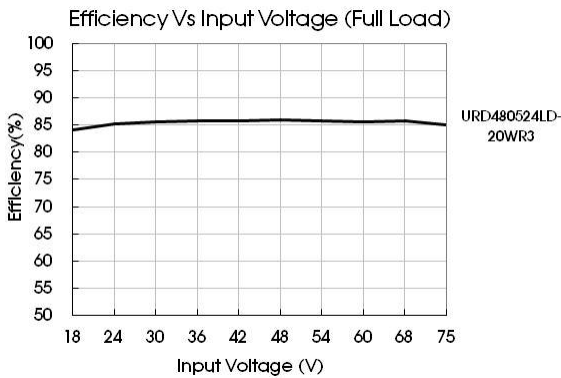


Fig. 1



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 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.



Fig. 2

| Single Vout (VDC) | Cout (μ F) | Cin (μ F) |
|-------------------|-----------------|----------------|
| 5 | 47 | 100 |
| 12 | 22 | |
| 24 | 22 | |

2. EMC compliance circuit

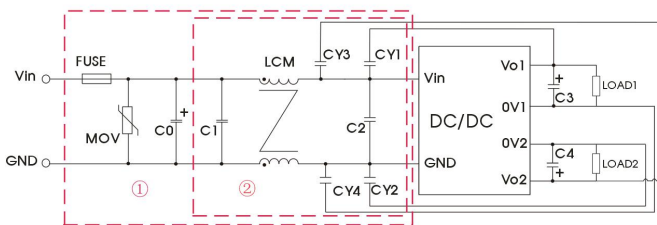


Fig. 3

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

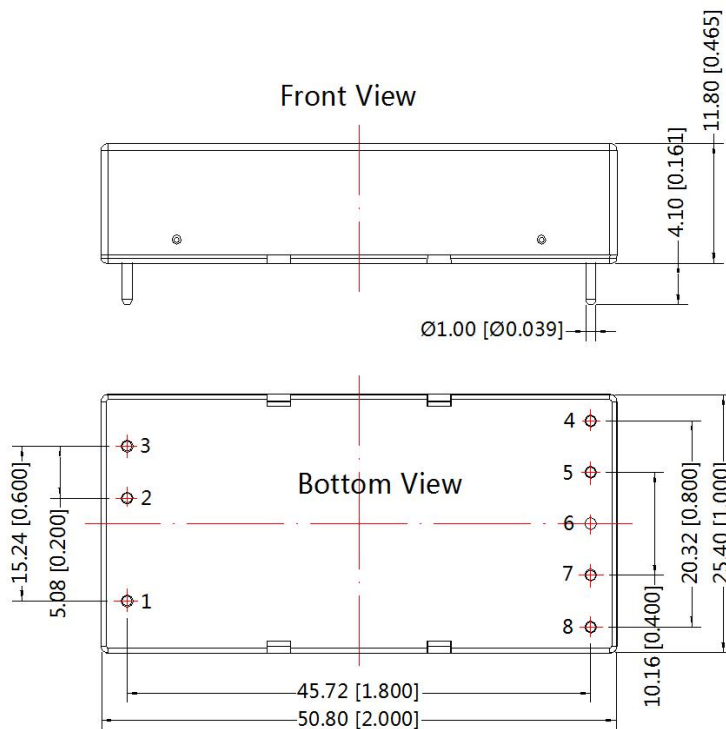
Parameter description

| Model | Vin:48V |
|--------------------|--|
| FUSE | Choose according to actual input current |
| C0 | 680 μ F/100V |
| C1 / C2 | 4.7 μ F/100V |
| MOV | S14K60 |
| C3 / C4 | Refer to the Cout in Fig.2 |
| LCM | 1mH(FL2D-30-102) |
| CY1 /CY2 /CY3 /CY4 | Y1/102M/400VAC |

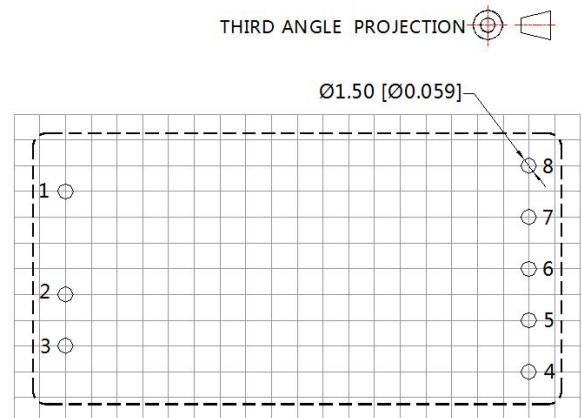
3. The products do not support parallel connection of their output

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

Dimensions and Recommended Layout



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



Note : Grid: 2.54*2.54mm

| Pin-Out | |
|---------|----------|
| Pin | Function |
| 1 | Ctrl |
| 2 | GND |
| 3 | Vin |
| 4 | +Vo2 |
| 5 | 0V2 |
| 6 | No Pin |
| 7 | 0V1 |
| 8 | +Vo1 |

Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com.Packaging bag number 58200035;
- 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 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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