1W, Fixed input voltage, 5000VAC or 6000VDC isolated & unregulated dual/single output


Patent Protection RoHS

3 years Warranty

Continuous Short Circuit Protection

## FEATURES

- High efficiency up to 83%
- The leakage current < 2μA
- Isolation Capacitance as low as 4pF
- Creepage & Clearance Distance > 5mm
- Reinforced insulation, Isolation voltage: 5000VAC or 6000VDC
- Operating ambient temperature range: -40℃ to +105℃
- Continuous short-circuit protection
- Meet EN60601-1, ANSI/AAMI ES60601-1 standard (1xMOPP & 2xMOOP)
- Meet IEC62368 standard

*G_S-1WR3 & H_S-1WR3 series meet reinforced insulation requirements. They are specially designed for applications where require compact size, high isolation, low isolation capacitor and low leakage current power. They are widely used in medical, electricity, IGBT driver and so on. They are suitable for:*
*1.Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);*
*2.Where isolation is necessary between input and output (isolation voltage ≤5000VAC or 6000VDC);*
*3.Where do not has high requirement of line regulation and the ripple & noise of the output voltage;*
*Such as, medical collection isolation, high voltage collection circuit and IGBT drive circuit.*

## 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. | | |
| -- | G1205S-1WR3 | 12 (10.8-13.2) | ±5 | ±100/±10 | 75/79 | 1000 |
| | G1209S-1WR3 | | ±9 | ±56/±6 | 75/79 | 470 |
| | G1212S-1WR3 | | ±12 | ±42/±5 | 77/81 | 200 |
| | G1215S-1WR3 | | ±15 | ±34/±4 | 77/81 | 200 |
| | H1203S-1WR3 | | 3.3 | 303/31 | 72/76 | 2200 |
| | H1205S-1WR3 | | 5 | 200/20 | 75/79 | 2200 |
| | H1209S-1WR3 | | 9 | 111/12 | 77/81 | 680 |
| | H1212S-1WR3 | | 12 | 84/9 | 79/83 | 470 |
| | H1215S-1WR3 | | 15 | 67/7 | 79/83 | 470 |
| | H1224S-1WR3 | | 24 | 42/4 | 78/82 | 220 |
| | G1505S-1WR3 | 15 (13.5-16.5) | ±5 | ±100/±10 | 73/77 | 1000 |
| | G1512S-1WR3 | | ±12 | ±42/±5 | 75/79 | 220 |
| | G1515S-1WR3 | | ±15 | ±33/±4 | 75/79 | 220 |
| | G2405S-1WR3 | 24 (21.6-26.4) | ±5 | ±100/±10 | 71/75 | 1000 |
| | G2409S-1WR3 | | ±9 | ±56/±6 | 71/75 | 470 |
| | G2412S-1WR3 | | ±12 | ±42/±5 | 72/76 | 220 |
| | G2415S-1WR3 | | ±15 | ±34/±4 | 72/76 | 220 |
| | H2405S-1WR3 | | 5 | 200/20 | 72/76 | 2200 |
| | H2409S-1WR3 | | 9 | 111/12 | 72/76 | 680 |
| | H2412S-1WR3 | | 12 | 84/9 | 72/76 | 470 |
| | H2415S-1WR3 | | 15 | 67/7 | 72/76 | 470 |
| | H2424S-1WR3 | | 24 | 42/4 | 72/76 | 220 |

Note:* The capacitive loads of positive and negative outputs are identical.

## Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Input Current (full load/no-load) | 12V input | -- | 106/10 | 116/-- | mA |
| | 15V input | -- | 90/10 | 100/-- | |
| | 24V input | -- | 56/12 | 59/-- | |
| Surge Voltage (1sec. max.) | 12V input | -0.7 | -- | 18 | VDC |
| | 15V input | -0.7 | -- | 21 | |
| | 24V input | -0.7 | -- | 30 | |
| Reflected Ripple Current* | | -- | 200 | -- | mA |
| 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 |
|---|---|---|---|---|---|---|
| Output Voltage Accuracy | | | See output regulation curve(Fig. 1) | | | |
| Linear Regulation | Input voltage change: ±1% | 3.3V output | -- | -- | 1.5 | -- |
| | | Other output | -- | -- | 1.2 | |
| Load Regulation | 10%-100% load | 3.3V/5V output | -- | -- | 20 | % |
| | | Other output | -- | -- | 15 | |
| Ripple & Noise* | 20MHz bandwidth | 3.3V output | -- | 100 | 150 | mVp-p |
| | | Other output | -- | 80 | 120 | |
| Temperature Coefficient | 100% full load | | -- | ±0.02 | -- | %/℃ |
| Output 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, with the test time of 1 minute, the leakage current < 1mA | 5000 | -- | -- | VAC |
| | | 6000 | -- | -- | VDC |
| Patient Leakage Current* | 250VAC, 50/60Hz | -- | -- | 2 | μA |
| Insulation Resistance | Input-output, isolation voltage 500VDC | 1000 | -- | -- | MΩ |
| Isolation Capacitance | Input-output, 100kHz/0.1V | -- | 4 | -- | pF |
| Operating Temperature | Derating when operating temperature≥85℃ (see Fig. 2) | -40 | -- | 105 | ℃ |
| Storage Temperature | | -55 | -- | 125 | |
| Case Temperature Rise | Ta=25℃ | -- | 25 | -- | |
| Pin Soldering Resistance Temperature | Welding spot is 1.5mm away from the casing, 10 seconds | -- | -- | 300 | |
| Storage Humidity | Non-condensing | 5 | -- | 95 | %RH |
| Switching Frequency | 100% load, nominal input voltage | -- | 200 | -- | kHz |
| MTBF | MIL-HDBK-217F@25℃ | 19360 | -- | -- | k hours |
| Creepage & Clearance Distance | | 5 | -- | -- | mm |
| Note: * Leakage current and reinforced insulation is based on 250 VAC, 50/60 Hz system input voltage. | | | | | |

## Mechanical Specifications

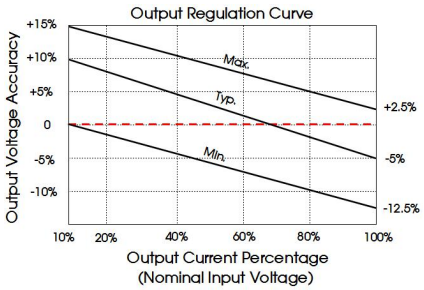
| | |
|---|---|
| Case Material | Black plastic; flame-retardant and heat-resistant (UL94V-0) |
| Dimensions | 19.50 x 9.80 x 12.50 mm |
| Weight | 4.0g(Typ.) |
| Cooling Method | Free air convection |

## Electromagnetic Compatibility (EMC)

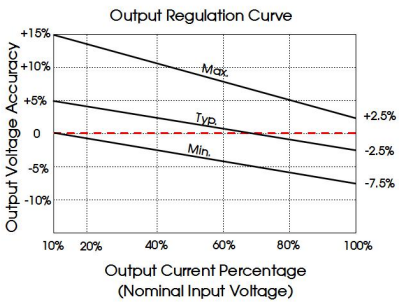
| | | |
|---|---|---|
| Emissions | CE | CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)<br>EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit) |
| | RE | CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)<br>EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit) |
| Immunity | ESD | EN60601-1-2 (IEC/EN61000-4-2) Air ±15kV, Contact ±8kV perf. Criteria B |

## Typical Characteristic Curves

3.3VDC output




5VDC output




Other output

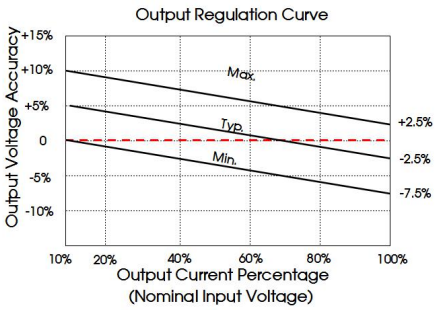



Fig. 1

Temperature Derating Curve

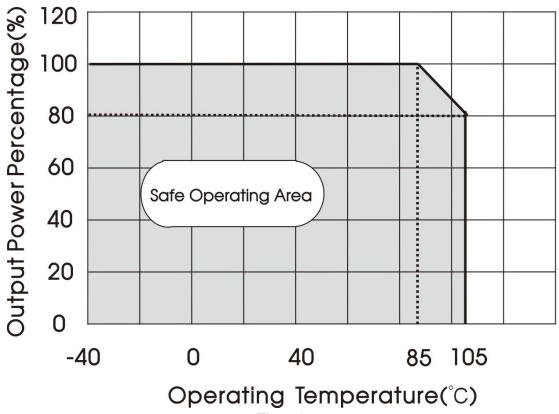



Fig. 2

## Design Reference

### 1. Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.

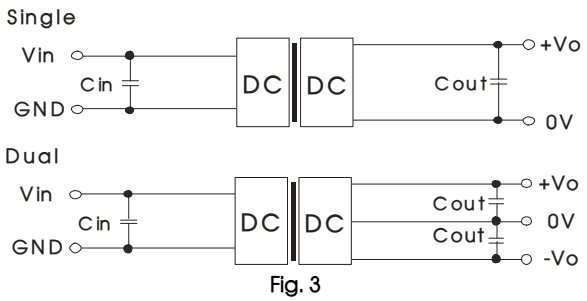


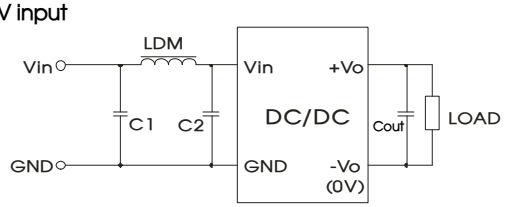

Fig. 3

Table 1: Recommended input and output capacitor values

| Vin | Cin | Single Vout | Cout | Dual Vout | Cout |
|---|---|---|---|---|---|
| 12VDC | 10μF/25V | 3.3/5VDC | 10μF/16V | -- | -- |
| 15VDC | 1μF/25V | 9VDC | 10μF/16V | ±5/±9VDC | 4.7μF/16V |
| 24VDC | 2.2μF/50V | 12VDC | 2.2μF/25V | ±12/±15VDC | 1μF/25V |
| -- | -- | 15VDC | 1μF/25V | -- | -- |
| -- | -- | 24VDC | 0.47μF/50V | -- | -- |

## 2. EMC (CLASS B) compliance circuit

12V/15V input




24V input

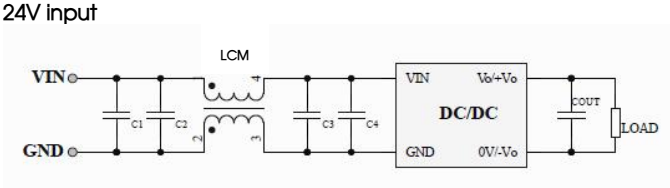



Fig. 4

EMC recommended circuit value table (Table 2)

| Input voltage | | 12/15 VDC |
|---|---|---|
| Emissions | C1/C2 | 4.7μF /25V |
| | Cout | Refer to the Cout in table 1 |
| | LDM | 22μH |

| Input voltage | | | 24 VDC |
|---|---|---|---|
| Emissions | C1/C2 | | 4.7μF /50V |
| | C3 | G24_S-1WR3 | 100μF /50V |
| | | Other output | 4.7μF /50V |
| | C4 | G24_S-1WR3 | -- |
| | | Other output | 4.7μF /50V |
| | COUT | | Refer to the Cout in table 1 |
| | LCM | | 22μH（Nickel zinc inductance） |

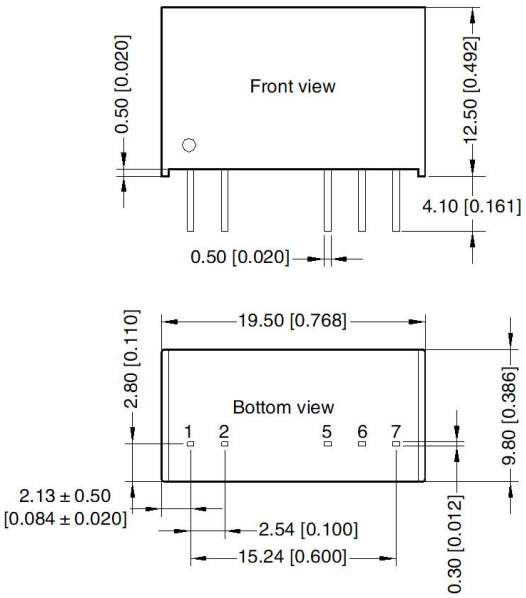
## 3. Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

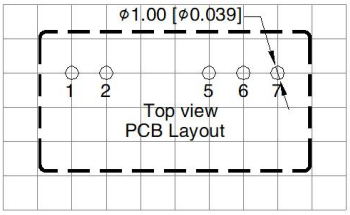
## 4. For additional information, please refer to DC-DC converter application notes on www.mornsun-power.com

## Dimensions and Recommended Layout

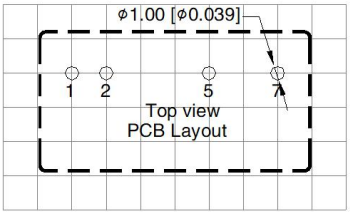
THIRD ANGLE PROJECTION




Dual




Single




Note: Grid 2.54*2.54mm

| Pin-Out | | |
|---|---|---|
| Pin | Single | Dual |
| 1 | Vin | Vin |
| 2 | GND | GND |
| 5 | 0V | -Vo |
| 6 | No Pin | 0V |
| 7 | +Vo | +Vo |

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

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200013;
2. 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;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. 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;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. 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.

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