

50W isolated DC-DC converter with ultra-wide, ultra-high 80-1000VDC input for Renewable Energy



FEATURES

- Ultra-wide input voltage range of 80 1000VDC (Transient 1100VDC last for 10s)
- Industrial grade operating temperature -40°C to +85°C
- High I/O isolation voltage up to 4000VAC
- High efficiency, low ripple & noise
- High reliability, long lifespan, low power consumption
- Input under-voltage protection, input reverse polarity protection, output short circuit, over-current, over-voltage protection
- Operating up to 5000m altitude
- Design refer to UL1741, IEC62109

PV50-2YBxxR3 series is a regulated DC-DC converter with an ultra-wide and ultra-high DC input of 80- 1000VDC, which design based on standard of UL1741, IEC62109. The products feature high efficiency, high reliability, high insulation and a high level of safety protection. It is widely used in renewable energy industries, such as photovoltaic inverter, household energy storage. The converters provide multiple protection features and guarantee stable and safe operating environments even under abnormal working conditions. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

| Selection Guide | | | | | | | | |
|-----------------|--------------|--------|-------------------------|----------------------------|----------------|------------------------------|--|--|
| Cortification | Dart No.* | Out | put Power (W) | Nominal Output Voltage and | Efficiency at | Capacitive Load (µF) Max. | | |
| Cernicalion | Full NO. | Steady | Transient (duration 3s) | Current (Vo/Io) | 400VDC(%) Typ. | | | |
| | PV50-2YB12R3 | 40 | 80 | 12V/3.33A | 84 | 2000 | | |
| EIN | PV50-2YB24R3 | 50 | 00 | 24V/2.08A | 86 | 1000 | | |

Note: *Use suffix "WR3" for lead type version.

| Input Specifications | | | | | | |
|-----------------------------------|----------------------------|----------------------|----------------------|------|------|------|
| Item | Operating Conditions | Operating Conditions | | Тур. | Max. | Unit |
| Input Voltago Dango | | | 80 | | 1000 | |
| | Full load | | 150 | | 1000 | VDC |
| Input Current | 80VDC | | | | 1.0 | |
| input Current | 1000VDC | | | | 0.1 | • |
| law who Current | 80VDC | Outlatent | | 30 | | ~ |
| | 1000VDC | Cold start | | 180 | | |
| Input Under voltage Drotection | Lockout activation range | | 20 | | 70 | VDC |
| Input Under-voltage Protection | Lockout deactivation range | | 30 | | 80 | |
| Input Reverse Polarity Protection | | | Available | | | |
| Start-up Delay Time | | | | 2 | 3 | S |
| Required External Input Fuse | | | 4A/1000VDC, required | | | |
| Hot Plug | | | Unavailable | | | |

| Output Specifications | | | | | |
|----------------------------|--------------------------------------|------|-------|------|-------------|
| Item | Operating Conditions | Min. | Тур. | Max. | Unit |
| Output Voltage Accuracy | All load range | | ±2 | | |
| Line Regulation | Rated load | | ±l | | % |
| Load Regulation | 400VDC | | ±l | | |
| Ripple & Noise* | 20MHz bandwidth (peak-to-peak value) | | 100 | 300 | mV |
| | 80VDC | | 0.3 | 0.4 | |
| Stand-by Power Consumption | 400VDC | | 0.4 | 0.5 | W |
| | 1000VDC | | 1 | 1.5 | |
| Temperature Coefficient | | | ±0.02 | | %/ ℃ |

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| Short Circuit Protection | | Hiccup, continuous, self-recovery | | | | |
|--------------------------|--|------------------------------------|--------|--------------------------------|--|----|
| Over-current Protection | | 160%-400%lo, hiccup, self-recovery | | | | |
| | 12V | | ≤16VDC | Output voltage clamp or hiccup | | |
| Over-voltage Protection | 24V | | ≤32VDC | | | |
| Minimum Load | | | 0 | | | % |
| Halahana Tira a | Room temperature, full load 400VDC 1000VDC | 400VDC | | 5 | | ms |
| Hold-up lime | | 1000VDC | | 10 | | |
| | | · | | - | | |

Note: * The "parallel cable" method is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 1uF ceramic capacitor, please refer to PV Converter Application Notes for specific information.

| General Spe | ecifications | | | | | | |
|-----------------------|----------------|-----------------------------------|-----------------------|--|------------|------|----------------------|
| Item | | Operating Conditions | | Min. | Тур. | Max. | Unit |
| Isolation | Input - output | | 4000 | | | VAC | |
| | Input - PE | Electric Strength Test for 1min., | | 4000 | | | |
| | Output - PE | | 2000 | | | | |
| la sud add a s | Input - output | _ | | | | | MΩ |
| Resistance | Input - PE | Test voltage: 500VDC | | 50 | | | |
| | Output - PE | | | | | | |
| Operating Temperature | | | | -40 | | +85 | °C |
| Storage Temperature | | | | -40 | | +85 | |
| Storage Humidity | | Non-condensing | | | | 95 | %RH |
| Switching Frequency | | | _ | | 60 | | kHz |
| | | Operating temperature derating | -40°C to -25°C | 2.67 | | | %/ ℃ |
| | | | +50°C to +70°C | 2.0 | | | |
| Output Power Derating | | | +70°C to +85°C | 2.67 | | | |
| | | Input voltage devoting | 80VDC - 100VDC | 1.5 | | | |
| | | input volidge derailing | 100VDC - 150VDC | 0.4 | | | <i>M</i> V DC |
| Safety Standard | | | | EN/BS EN62109-1; Design refer to UL1741, IEC62109-1 | | | 1 |
| MTBF | | MIL-HDBK-217F@25°C | | ≥300,000 | ≥300,000 h | | |

| Mechanical Specifications | | | | |
|---------------------------|--------------------------|--|--|--|
| Case Material | Metal | | | |
| Dimensions | 134.00 x 58.80 x 37.00mm | | | |
| Weight | 330g (Typ.) | | | |
| Cooling Method | Free air convection | | | |

| Electromagnetic Compatibility (EMC) | | | | | | |
|-------------------------------------|-------|-----------------|--|------------------|--|--|
| Emissions | CE | CISPR32/EN55032 | CLASS B | | | |
| | RE | CISPR32/EN55032 | CLASS B | | | |
| Immunity | ESD | IEC/EN61000-4-2 | Contact ±6KV/Air ±8KV | Perf. Criteria A | | |
| | RS | IEC/EN61000-4-3 | 10V/m | Perf. Criteria A | | |
| | EFT | IEC/EN61000-4-4 | ±4KV | Perf. Criteria A | | |
| | Surge | IEC/EN61000-4-5 | Line to line \pm 1KV/ line to line \pm 2KV | Perf. Criteria A | | |
| | CS | IEC/EN61000-4-6 | 10Vr.m.s | Perf. Criteria A | | |



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DC/DC Converter

PV50-2YBxxR3 Series

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Product Characteristic Curve





Note: 1.With an DC input between 80-150VDC, the output power must be derated as per temperature derating curves; 2.This product is suitable for applications using natural free air convection; for applications in closed environment please consult Mornsun FAE.



Design Reference

1. Typical application circuit



Note on filter components:

We recommend using an electrolytic capacitor with high frequency and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor, used to filter high-frequency noise. TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. IMPORTANT SAFETY INSTRUCTIONS

Additional protective devices, such as lightning protector need to be added if there is an transient pulse voltage greater than 6KV at the Input of PV products in system applications.

3. For additional information please refer to application notes on <u>www.mornsun-power.com.</u>



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Dimensions and Recommended Layout

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WARNING:

- CAUTION: "To reduce the risk of fire, connect only to a circuit provided with 4 amperes maximum
- branch-circuit over-current protection in accordance with the National Electrical Code, ANSI/NFPA70."
- 2. WARNING: REPLACE ONLY WITH THE SAME RATINGS AND TYPE OF FUSE.
- 3. DANGER HIGH VOLTAGE.

AVERTISSEMENT:

- 1. Avertissement: Pour réduire le risque d'incendie, veuillez connecter uniquement à des circuits de dérivation avec protection contre les surintensités conformes au code électrique national ANSI/ NFPA 70.
- 2. AVERTISSEMENT : N'UTILISER QUE DES FUSIBLES DE MÊMECALIBRE ET DE MÊME TYPE QUE LE FUSIBLE DORIGINE.
- 3. DANGER : HAUTE TENSION.

Note:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220648; 1.
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta= 25° , humidity<75% with nominal 2. input voltage and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards; 3.
- We can provide product customization service, please contact our technicians directly for specific information; 4.
- 5. Products are related to laws and regulations: see "Features" and "EMC";
- 6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
- 7. If the final product application is connected to a photovoltaic array, the array needs to be grounded and the voltage between the positive and negative poles of the product shall not be greater than 1000VDC.

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