

40W, 200-1200VDC ultra wide input voltage
DC/DC converter for Renewable Energy



RoHS

FEATURES

- 6:1 ultra-wide input voltage range: 200 ~ 1200VDC
- Industrial operating temperature: -25°C ~ 70°C
- 4000VDC high isolation voltage
- high efficiency, Low ripple& noise
- Under input voltage protection (self-recovery)
- Over output voltage protection(self-recovery)
- Short circuit protection(self-recovery)
- Input against reverse protection
- MTBF>300,000 H
- High reliability, long life, three years warranty

PV series are regulated output DC-DC converters with features of 200-1200VDC ultra-high voltage input, high efficiency and high reliability. They can be widely used in photovoltaic power generation, high-voltage inverter and so on, which provide stable operating voltage to the equipment and improve the power and the load's safety performance with multiple protection when working under abnormal conditions.

Selection Guide

| Model | Output Power | Nominal Output Voltage and Current (Vo/Io) | Efficiency (200VDC, %/Typ.) | Max. Capacitive Load(uF) |
|------------|--------------|--|-----------------------------|--------------------------|
| PV40-27B12 | 40W | 12V/3.33A | 83 | 1200 |
| PV40-27B15 | | 15V/2.67A | 84 | 1000 |
| PV40-27B24 | | 24V/1.67A | 84 | 680 |

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|--------------------------------|----------------------|--|------|------|------|
| Input Voltage Range | | 200 | -- | 1200 | VDC |
| Input current | 200VDC | -- | -- | 320 | mA |
| | 600VDC | -- | -- | 100 | |
| | 1200VDC | -- | -- | 55 | |
| Inrush current | 600VDC | -- | 60 | -- | A |
| Input under-voltage protection | | Under voltage protection range: 175~185V Under voltage release range:185~195V | | | |
| External input fuse | | 3.15A Slow blow | | | |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|-----------------------------------|----------------------------------|-------|------|------|
| Output Voltage Accuracy | | -- | ±1 | ±2 | % |
| Linear Regulation | | -- | ±0.5 | ±1 | |
| Load Regulation | | -- | ±0.5 | ±1 | |
| Output Ripple & Noise* | 20MHz bandwidth (peak-peak value) | -- | 100 | 200 | mV |
| Temperature Drift Coefficient | | -- | ±0.02 | -- | %/°C |
| Short Circuit Protection | | Continuous, self-recovery | | | |
| Over-current Protection | | ≥110%Io self-recovery | | | |
| Over-voltage Protection | | (Feedback-clamp) Voltage limited | | | |
| Min. Load | | 1 | -- | -- | % |
| Power-off Holding Time | 600VDC input | -- | 5 | -- | ms |

Note: *Parallel line test method is adopted to test the ripple and noise, please see AC-DC Converter Application Notes for specific operation methods.

General Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|------------------------------|---------------------|------|------|------|
| Isolation Voltage | Input-output | 4000 | -- | -- | VDC |
| Operating Temperature | | -25 | -- | +70 | °C |
| Storage Temperature | | -40 | -- | +85 | |
| Storage Humidity | | -- | -- | 95 | |
| Welding Temperature | Wave-soldering | 260±5°C; time:5~10s | | | |
| | Manual-welding | 360±10°C; time:3~5s | | | |
| Switching Frequency | | -- | 65 | -- | kHz |
| Power Derating | +50°C to +70°C | 1 | -- | -- | %/°C |
| Hot Plug | Unavailable | | | | |
| MTBF | MIL-HDBK-217F@25°C > 300000H | | | | |

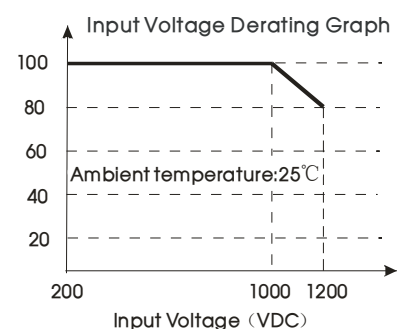
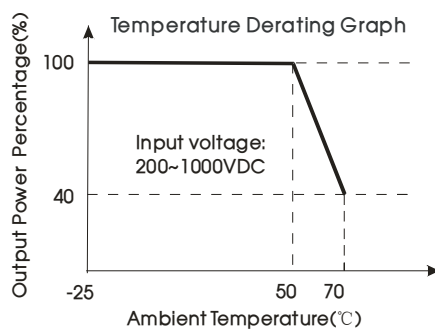
Physical Specifications

| | |
|--------------------|--|
| Casing Material | Black flame-retardant and heat-resistant plastic (UL94-V0) |
| Package Dimensions | 89.0*63.5*25.0mm |
| Weight | 225 g(Typ) |
| Cooling method | Free air convection |

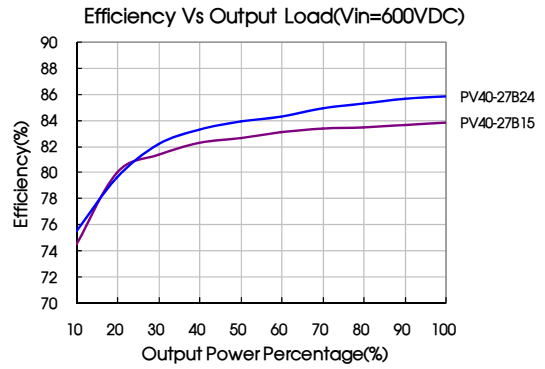
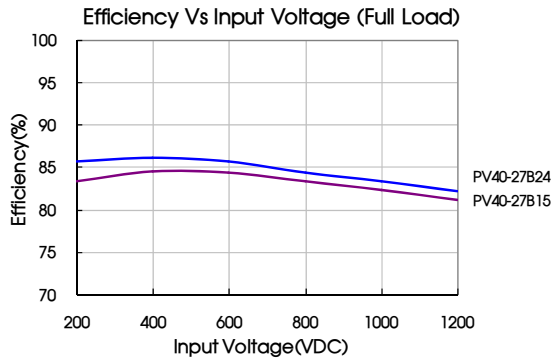
EMC Specifications

| | | | | |
|-----|--|---|--|------------------|
| EMI | Conducted Disturbance | CISPR22/EN55022, CLASS A(Recommended Circuit Refer to Figure2) | | |
| | Radiated Emission | CISPR22/EN55022, CLASS A (Recommended Circuit Refer to Figure2) | | |
| EMS | Electrostatic Discharge | IEC/EN61000-4-2 | ±6KV/±8KV | Perf. Criteria B |
| | Radiation Immunity | IEC/EN61000-4-3 | 10V/m | perf. Criteria A |
| | EFT | IEC/EN61000-4-4 | ±4KV(Recommended Circuit Refer to Figure2) | perf. Criteria B |
| | Surge Immunity | IEC/EN61000-4-5 | ±2KV(Recommended Circuit Refer to Figure2) | perf. Criteria B |
| | Conducted Disturbance immunity | IEC/EN61000-4-6 | 10 Vr.m.s | perf. Criteria A |
| | Immunity for Power frequency magnetic field | IEC/EN61000-4-8 | 10A/m | perf. Criteria A |
| | Immunities of voltage dip, drop and short interruption | IEC/EN61000-4-11 | 0%-70% | perf. Criteria B |

Product Characteristic Curve



Note: Input voltage should be derated based on temperature derating when it is 1000-1200VDC.



Design Reference

1. Typical application circuit

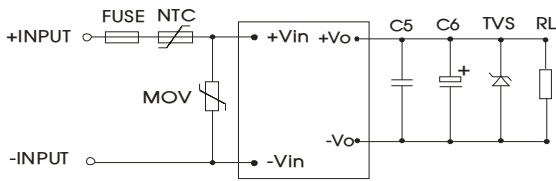


Fig. 1: Typical application circuit

| Model | C5(μF) | C6(μF) | TVS tube |
|------------|--------|--------|----------|
| PV40-27B12 | 1 | 220 | SMBJ20A |
| PV40-27B15 | | | |
| PV40-27B24 | | 120 | SMBJ30A |

Note:

Output filtering capacitor C5 is ceramic capacitor, recommend parameter is 1uF; Output filtering capacitor C6 is electrolytic capacitors, It is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80%. TVS is a recommended component to protect post-circuits (if converter fails).MOV: Varistor, it is used to protect the device under surge. Access as needed.

2. EMC solution-recommended circuit

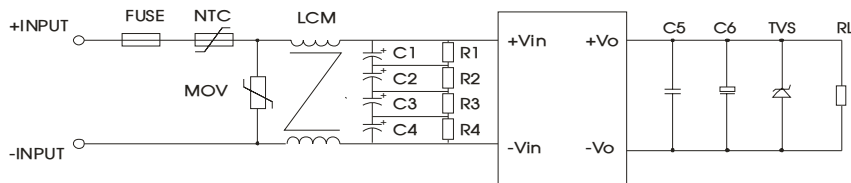


Fig 2: EMC application circuit with higher requirements

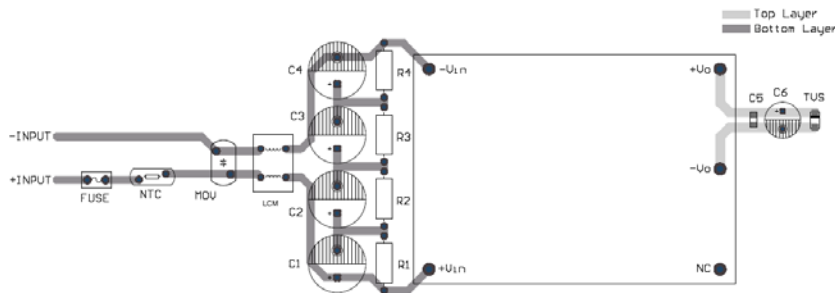


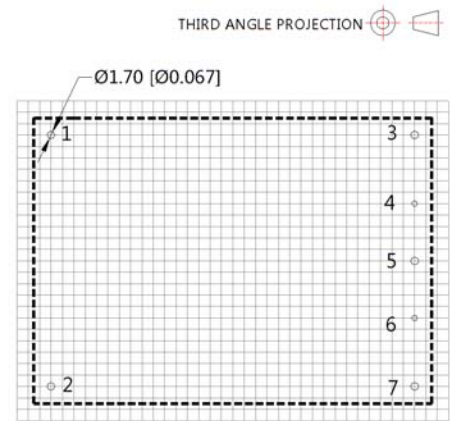
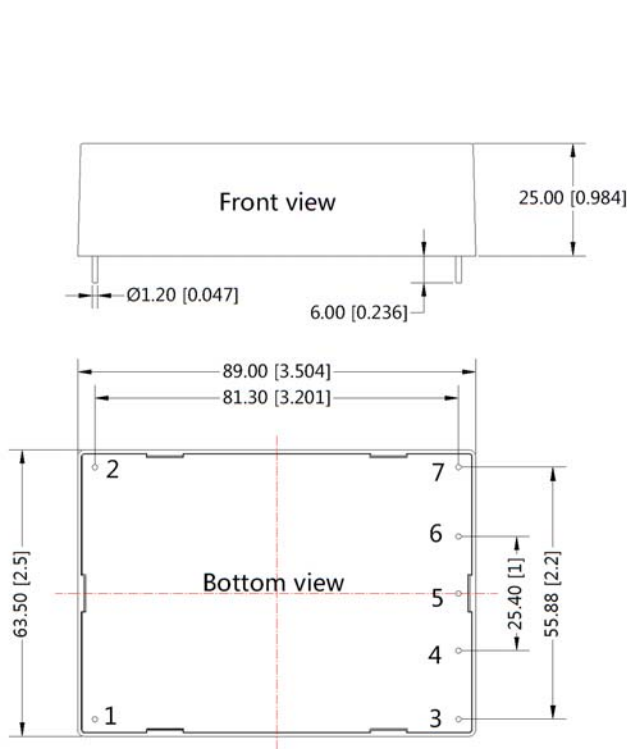
Fig 3: Recommended EMC circuit-PCB layout

Suggestions for safety regulation and wiring width: wire width $\geq 3\text{mm}$, distance between wires $\geq 6\text{mm}$, and distance between wire and ground $\geq 6\text{mm}$

| Element model | Recommended value |
|----------------|--|
| MOV | S20K1000 |
| C1, C2, C3, C4 | 47μF/450V |
| R1, R2, R3, R4 | 1MΩ/2W |
| NTC | 10D-20 |
| LCM | 10mH, recommended to use MORNSUN's FC-CX1D |
| FUSE | 3.15A/250V, slow fusing, necessary |

3. For more information Please find application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Note : Grid 2.54*2.54mm

| Pin-Out | |
|---------|----------|
| Pin | PV40-27B |
| 1 | -Vin |
| 2 | +Vin |
| 3 | +Vo |
| 4 | No Pin |
| 5 | -Vo |
| 6 | No Pin |
| 7 | NC |

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

- Note:
1. Packing Information please refer to 'Product Packing Information'. Packing bag number: 58220021;
 2. Unless otherwise specified, data in this data sheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
 3. All index testing methods in this data sheet are based on our Company's corporate standards;
 4. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
 5. We can provide product customization service;
 6. Specifications of this product are subject to changes without prior notice.

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