

New energy 150-1500VDC over wide and over high input voltage isolation switching power supply



RoHS

PV45-29D1505-10 — 150-1500VDC ultra wide input voltage regulated DC-DC Switching Power Supply, which has advantages such as high efficiency, high reliability and high safety isolation. The product is widely used in industries such as SVG, photovoltaic power generation and high voltage frequency conversion, providing a stable operating voltage for the system. The multiple protection features enhance the safety performance of the power supply and the System under Harsh working conditions. For harsh EMC environment, this product must use the refered application circuit.

FEATURES

- Ultra wide input voltage range (10:1): 150 - 1500VDC
- 4KVAC high isolation voltage
- Industrial grade operating temperature: -40°C to +85°C
- High efficiency, Low ripple & noise
- Reverse input voltage protection, Output short circuit, over-current, over-voltage protection
- High reliability, Long lifespan
- Meet 5000m altitude requirements

Selection Guide

| Part No. | Output Power | nominal Output Voltage and Current(Vo/Io) | | Efficiency (%/Typ.) | Max. Capacitive Load (μF) | |
|-----------------|--------------|---|---------|---------------------|---------------------------|-----|
| | | Vo1/Io1 | Vo2/Io2 | | Vo1 | Vo2 |
| PV45-29D1505-10 | 45W | 15V/2.66A | 5V/1A | 78 | 1500 | 330 |

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|----------------------------------|----------------------|--|------|------|------|
| Input Voltage Range | | 150 | -- | 1500 | VDC |
| Input current | 200VDC | -- | 350 | -- | mA |
| | 300VDC | -- | 230 | -- | |
| | 850VDC | -- | 90 | -- | |
| | 1500VDC | -- | 50 | -- | |
| Inrush current | 200VDC | -- | 30 | -- | A |
| | 300VDC | -- | 40 | -- | |
| | 850VDC | -- | 100 | -- | |
| | 1500VDC | -- | 180 | -- | |
| Maximum transients input voltage | 1600VDC | Duration time: 1s, normal output (Maximum transient input voltage interval 15S) | | | |
| Hot Plug | | Unavailable | | | |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit | |
|-------------------------------|--------------------------------------|--------------------------------------|-------|------|------|----|
| Output Voltage Accuracy | All load range | Main circuit (vo1) | -- | -- | ±1 | % |
| | | Auxiliary circuit (vo2) | -- | -- | ±1 | |
| Line Regulation | Full load | Main circuit (vo1) | -- | -- | ±1 | |
| | | Auxiliary circuit (vo2) | -- | -- | ±1 | |
| Load Regulation | 10% - 100% load | Main circuit (vo1) | -- | -- | ±2 | |
| | | Auxiliary circuit (vo2) | -- | -- | ±2 | |
| Ripple & Noise* | 20MHz bandwidth (peak-peak value) | Main circuit (vo1) | -- | -- | 150 | mV |
| | | Auxiliary circuit (vo2) | -- | -- | 150 | |
| Temperature Drift Coefficient | | -- | ±0.02 | -- | %/°C | |
| Short Circuit Protection | | Hiccup, continuous, self-recovery | | | | |
| Over-current Protection | | 110% - 300%Io, Hiccup, self-recovery | | | | |
| Over-voltage Protection | Main circuit (Vo1) | ≤25VDC | | | | |
| | Auxiliary circuit (vo2) | ≤13VDC | | | | |

| | | | | | | |
|---------------|-----------------------------|--------------|----|----|----|----|
| Min. Load | Main circuit (vo1) | 10 | -- | -- | % | |
| | Auxiliary circuit (vo2) | 10 | -- | -- | | |
| Hold-up Time | Room temperature, Full load | 300VDC input | 5 | -- | -- | ms |
| | | 850VDC input | 15 | -- | -- | |
| Delay Time ** | 150 - 1500VDC | -- | 2 | -- | s | |

Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Switching Power Supply Application Notes for specific operation.
 ** Delay Time test condition: Full input voltage range, full output load range (The cooling time between Input power-off and the next input Power-on is bigger than 15s).

General Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit | |
|--|------------------------|--|------|------|------|---------|
| Isolation Voltage | Input-output | 4000 | -- | -- | VAC | |
| | Input- \perp | 2500 | -- | -- | | |
| | Output-output | 2500 | -- | -- | | |
| | Output- \perp | 2500 | -- | -- | | |
| Operating Temperature | | -40 | -- | +85 | °C | |
| Storage Temperature | | -40 | -- | +85 | | |
| Storage Humidity | | -- | -- | 95 | %RH | |
| Power Derating | Temperature derating | -40°C to 0°C (Input Voltage: 150VDC - 200VDC) | 1.5 | -- | -- | % / °C |
| | | -40°C to 0°C (Input Voltage: 200VDC - 1500VDC) | 1.0 | -- | -- | |
| | | +60°C to +70°C | 4.0 | -- | -- | |
| | | +70°C to +85°C | 2.0 | -- | -- | |
| | Input Voltage derating | 150 - 200VDC (Ambient temperature: 25°C) | 0.4 | -- | -- | % / VDC |
| 1400 - 1500VDC (Ambient temperature: 25°C) | 0.2 | -- | -- | | | |
| Switching Frequency | | -- | 65 | -- | kHz | |
| Altitude* | | -- | -- | 5000 | m | |
| MTBF | | MIL-HDBK-217F@25°C ≥ 300,000 h | | | | |

Note: * Products are used at altitudes above 2000m, refer to "Altitude derating curve" to use the output power derating.

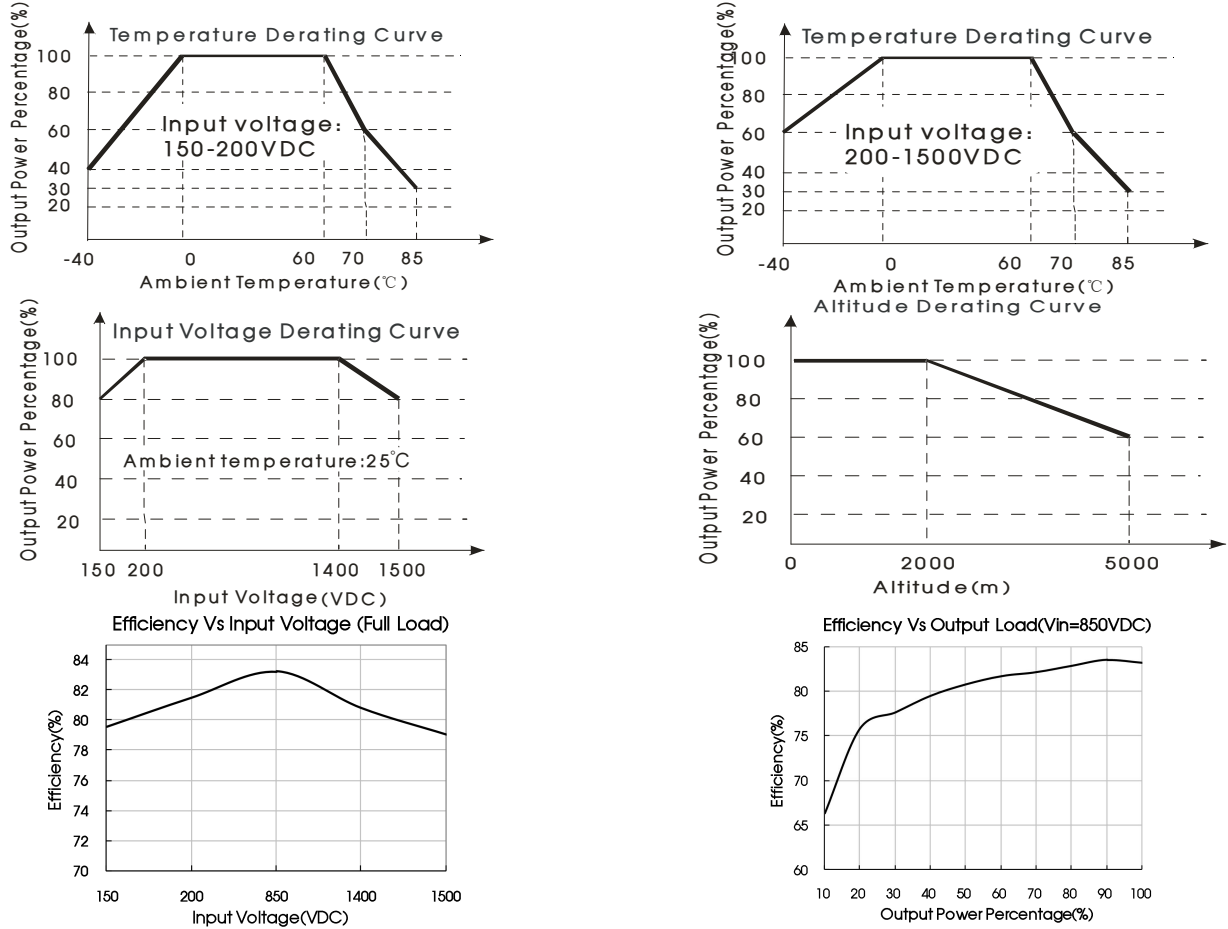
Physical Specifications

| | |
|-----------------|------------------------|
| Casing Material | metal |
| Dimensions | 144.50*105.00*43.00 mm |
| Weight | 510g (Typ.) |
| Cooling method | Free air convection |

EMC Specifications

| | | | | |
|-----|--|------------------|---|------------------|
| EMI | CE | CISPR32/EN55032 | CLASS A (See Fig. 2 for recommended circuit) | |
| | RE | CISPR32/EN55032 | CLASS A (See Fig. 2 for recommended circuit) | |
| EMS | ESD | IEC/EN61000-4-2 | Contact ±6KV/Air ±8KV | Perf. Criteria B |
| | RS | IEC/EN61000-4-3 | 10V/m | perf. Criteria A |
| | EFT | IEC/EN61000-4-4 | ±4KV | perf. Criteria B |
| | Surge | IEC/EN61000-4-5 | line to line ±2KV/ line to ground ±4KV | perf. Criteria B |
| | CS | IEC/EN61000-4-6 | 10Vr.m.s (See Fig. 2 for recommended circuit) | perf. Criteria A |
| | Voltage dips, short and interruptions immunity | IEC/EN61000-4-29 | 0%, 40%, 70% | perf. Criteria B |

Product Characteristic Curve



Note: ① For the PV45-29D1505-10, input voltage should be derated based on temperature de-rating profile when it is 150 - 200VDC, 1400VDC - 1500VDC;
 ② For the PV45-29D1505-10, altitude should be derated based on temperature de-rating profile when it is 2000 - 5000m;
 ③ Electrolytic capacitor having a constant period of use, its life depends on the actual ambient temperature, in the harsh operating environment will affect the life of the product and shorten the life of the product, the product is not recommended for long-term work in high temperature environment of more than 70 °C
 ④ This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.

Design Reference

1. Typical application circuit

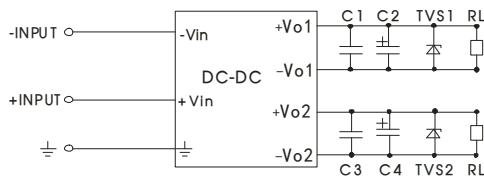


Fig. 1: Typical application circuit

| Model | C1, C3 | C2, C4 | TVS1 | TVS2 |
|-----------------|--------|--------|---------|----------|
| PV45-29D1505-10 | 1μF | 100μF | SMBJ20A | SMBJ7.0A |

Note: Output filtering capacitors C2, C4 are electrolytic capacitors, they are recommended to apply electrolytic capacitors with high frequency and low resistance. For capacitance and current of capacitors please refer to manufacture's datasheets. Capacitor voltage reduced to at least 80%. C1, C3 are ceramic capacitors, which are used to filter high-frequency noise. TVS1, TVS2 are recommended component to protect post-circuits if Switching Power Supply fails.

2. EMC solution-recommended circuit

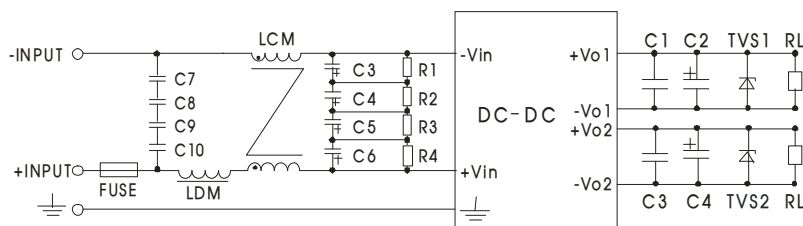



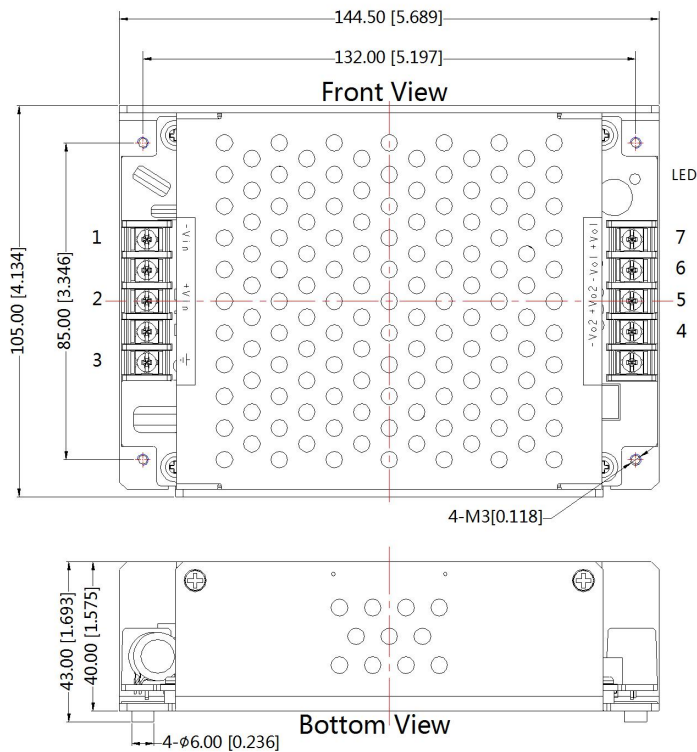
Fig 2: EMC application circuit (The output circuit parameters show in Figure 1)

| Element model | Recommended value |
|-----------------|------------------------|
| C7, C8, C9, C10 | 104K/275VAC |
| C3, C4, C5, C6 | 47uF/450VDC |
| R1, R2, R3, R4 | 1MΩ /2W |
| LDM | 330uH/0.38A |
| LCM | 7mH/1A |
| FUSE | 15A/1500VDC, necessary |

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



| Pin-Out | |
|---------|----------|
| Pin | Function |
| 1 | -Vin |
| 2 | +Vin |
| 3 | ⊥ |
| 4 | -Vo2 |
| 5 | +Vo2 |
| 6 | -Vo1 |
| 7 | +Vo1 |

Note:
Unit: mm[inch]
Wire range: 22-12 AWG, 4.0mm²
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58220039;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. In order to improve the conversion efficiency, when the product is working high voltage, the module may have certain audio noise, but does not affect the reliability of the product;
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.

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