# 15DCPW_4 series

15W - Single Output DC-DC Converter - Ultra Wide Input Range - High Isolated & Regulated




## DC-DC Converter 15 Watt

- Input voltage up to 1600VDC (Transient, duration: 10s)
- Ultra wide input voltage range: 200 - 1500VDC
- Industrial grade operating temperature: -40°C to +70 °C
- High I/O isolation voltage up to 4000VAC
- High efficiency, low ripple & noise
- Input under-voltage protection, input reverse polarity protection, output short circuit, over-current, over-voltage protection
- OVC II
- Reinforced insulation

The 15DCPW_4 series is regulated DC-DC converters with an ultra-wide DC input of 200-1500VDC. The products feature high efficiency, high reliability, high insulation and high level of safety. This type of power supply is widely used in renewable energy industries such as photovoltaic, power generation, energy storage, inverters and high-voltage DC conversions.

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.

SHORT CIRCUIT PROTECTED | 100% RoHS compliant | c UL us UL-1741 (Pending)

### Common specifications

| | |
|---|---|
| Short circuit protection: | Continuous, automatic recovery |
| Operation temperature: | -40°C~+70°C |
| Storage temperature: | -40°C ~+85°C |
| Storage humidity: | < 95% (%RH) |
| Case temperature: | 90°C MAX |
| Welding temperature: | Wave-soldering: 260± 5°C; time:5~10s<br>Manual-welding: 360± 10°C; time:3~5s |
| Power Derating: | • 05/12/15VDC output<br>-40°C ~+70°C; 200-300VDC 0.75%/°C<br>• Others output -50°C ~+70°C; 1.50%/°C<br>• 2000m - 5000m 6.7%/Km |
| Altitude: | 5000m Max |
| Safety Standard: | UL1741 safety approved & EN62109-1,<br>BS EN62109-1 (Report); |
| MTBF | >300,000 hours (MIL-HDBK-217F@25°C) |
| Case Material: | Black flame-retardant and heat-resistant plastic (UL94V-0) |
| Cooling: | Free air convection |
| Weight: | 200g Typ. (Horizontal package)<br>280g Typ. (Chassis mounting)<br>350g Typ. (DIN-Rail mounting) |
| Dimensions: | 89.00 x 63.50 x 25.00 mm (Horizontal package)<br>135.00 x 70.00 x 33.50 mm (Chassis mounting)<br>135.00 x 70.00 x 39.00 mm (DIN-Rail mounting) |

### Input specifications

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Input voltage range | | 200 | 800 | 1500 | VDC |
| | Transient (10s) | | | 1000 | VDC |
| Input current | • 200VDC | | | 120 | mA |
| | • 800VDC | | | 30 | mA |
| | • 1500VDC | | | 16 | mA |
| Inrush Current | • 200VDC input | | 30 | | A |
| | • 1500VDC input | | 90 | | A |
| Under-voltage Protection | Lockout activation range: 130 - 175V<br>Lockout deactivation range: 155 - 200V | | | | |
| Input Reverse Polarity Protection | Available | | | | |
| External Input Fuse Required | 4A/1500VDC, required | | | | |
| Hot Plug | Unavailable | | | | |

### Output specifications

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Output voltage accuracy | | | ±2 | | % |
| Line regulation | | | ±1 | | % |
| Load regulation | | | ±1 | | % |
| Ripple & Noise* | 20MHz bandwidth (peak-to-peak value) | | | 150 | mVp-p |
| Temperature Coefficient | | | ±0.02 | ±0.15 | %/°C |
| Over-current Protection | | | • (Feedback-clamp) Voltage limited < 7.5V | | |
| Over-voltage Protection | 05VDC | | | ≤8VDC | |
| | 12VDC | | | ≤20VDC | |
| | 15VDC | | | ≤20VDC | |
| | 24VDC | | | ≤30VDC | |
| Minimum Load | | 0 | | | % |
| Start-up Delay Time** | 200 - 1500VDC | | | 2 | s |
| Hold-up Time | Room temperature, full load, 800VDC input | | 20 | | ms |

*The „parallel cable“ method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.
** Full input voltage / output load range (The cooling-time between input power-off and power-on again is greater than 15s).

**Example:**
**15DCPW_05S4**
**15 = 15Watt; DC = DIP Case; P = Photovoltaic; W = Wide input range;**
**05 = 5Vout; S = Single output; 4 = 4kVAC isolation;**

### Isolation specifications

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Isolation voltage | Input - output;<br>Electric Strength Test for 1min., leakage current <3mA | 4000 | | | VAC |

Note:
1. Unless otherwise specified, all specifications above are measured at rated input voltage and rated output load, TA = 25°C, humidity < 75%;
2. All specifications stated in this datasheet are subject to the above listed models only. For specifications of non-standard models, please contact our technical support team.



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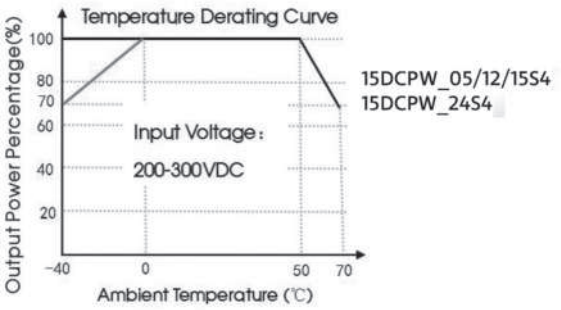
| EMC specifications | | | |
|---|---|---|---|
| Emissions | CE | CISPR32/EN55032 | CLASS A (Recommended Circuit Refer to EMC recommended circuit) |
| Emissions | RE | CISPR32/EN55032 | CLASS A (Recommended Circuit Refer to EMC recommended circuit) |
| Immunity | ESD | IEC/EN61000-4-2 | Contact 6KV/Air 8KV perf. Criteria B |
| Immunity | RS | IEC/EN61000-4-3 | 10V/m perf. Criteria B |
| Immunity | EFT | IEC/EN61000-4-4 | ±2KV<br>±4KV (See Fig. 2 for recommended circuit) Perf. Criteria B |
| Immunity | Surge | IEC/EN61000-4-5 | Line to line ±1KV<br>line to line ±2KV (See Fig. 2 for recommended circuit) Perf. Criteria B |
| Immunity | CS | IEC/EN61000-4-6 | 10 Vr.m.s perf. Criteria A |

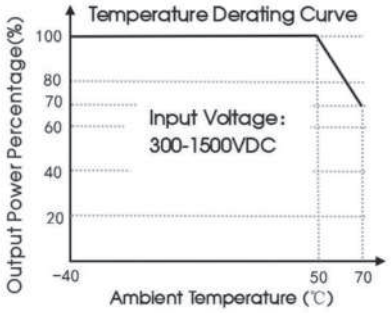
## Product Selection Guide

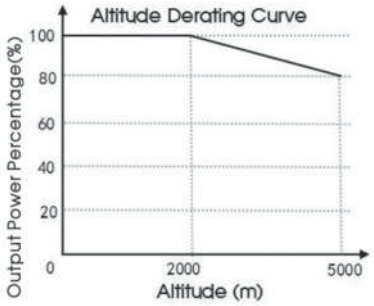
| Certification | Part Number | Power [W] | Nominal Output [V; Vo] | Current Output [mA; Io] | Capacitive Load (Normal temperature full load)[µF, Max.] | Efficiency at 800VDC [%, Typ] |
|---|---|---|---|---|---|---|
| UL pending | 15DCPW_05S4 | 10 | 5 | 2000 | 6000 | 64 |
| UL pending | 15DCPW_12S4 | 15 | 12 | 1250 | 2000 | 71 |
| UL pending | 15DCPW_15S4 | 15 | 15 | 1000 | 1200 | 80 |
| UL pending | 15DCPW_24S4 | 15 | 24 | 625 | 470 | 83 |

Note: * Use suffix "/CM" for chassis and suffix "/DR" for DIN-Rail mounting.

## Product Characteristic Curve

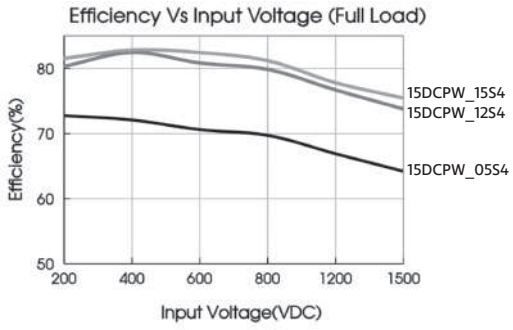


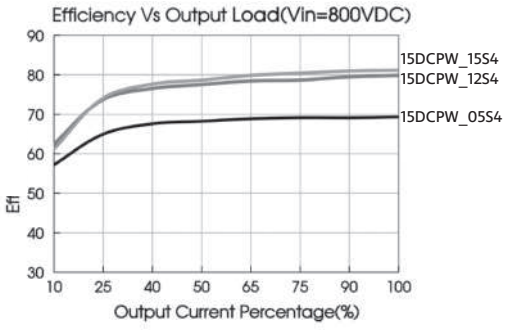




Note:
① For operation of this converter series in an altitude between 2000 - 5000m above sea level, the output power must be derated as per the altitude derating curve;
② This product is suitable for applications using natural air cooling; for applications in closed environment

## Efficiency



# Typical application

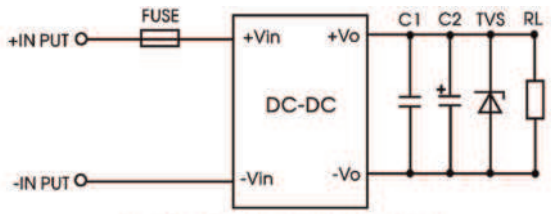



Fig. 1: Typical application circuit

| Model | FUSE | C1(μF) | C2(μF) | TVS |
|---|---|---|---|---|
| 15DCPW_05S4 | 4A/1500VDC, required | 1μF/35V | 120μF/35V | SMBJ7.0A |
| 15DCPW_12S4 | | | 120μF/35V | SMBJ20A |
| 15DCPW_15S4 | | | 120μF/35V | SMBJ20A |
| 15DCPW_24S4 | | | 68μF/35V | SMBJ30A |

**Note on filter components:**
We recommend using an electrolytic capacitor with high frequency and low ESR rating for C2. 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.

# EMC compliance recommended circuit

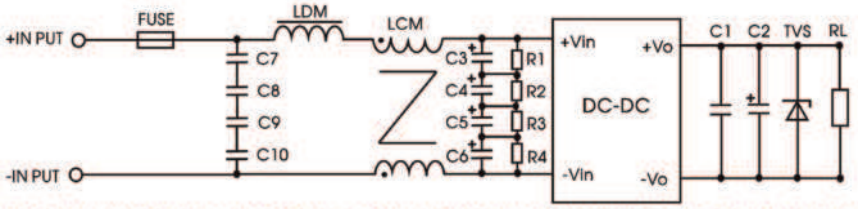
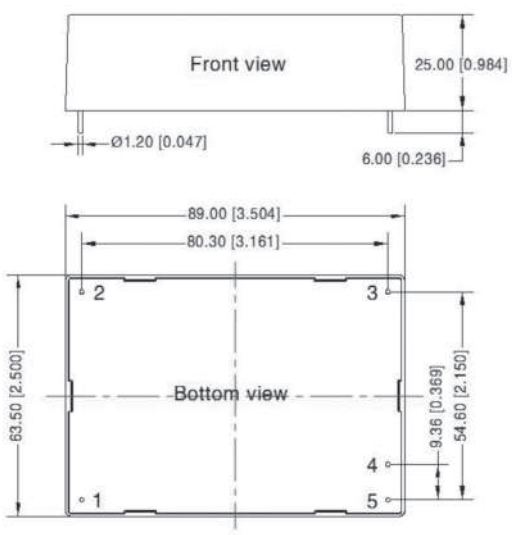


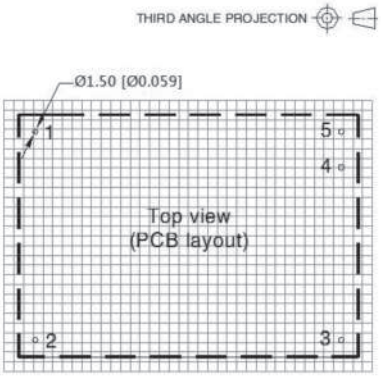

Fig 2: EMC application for higher compliance requirements (output parameters are show in Figure 1)

| Components | Recommended Component value |
|---|---|
| C7, C8, C9, C10 | Safety capacitor 104K/275VAC |
| C3, C4, C5, C6 | 10uF/450VDC |
| R1, R2, R3, R4 | 1MΩ/2W |
| LDM | 330uH/1A |
| LCM | 7mH/1A (three insulated wire) |
| FUSE | 4A/1500VDC, required |

# Dimensions and recommended layout




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

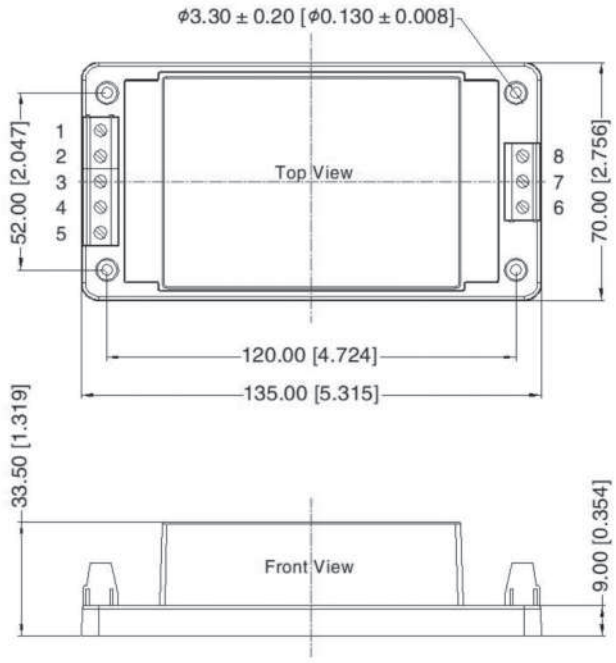



Note: Grid 2.54*2.54mm

| Pin-Out | |
|---|---|
| Pin | Mark |
| 1 | -Vin |
| 2 | +Vin |
| 3 | NC |
| 4 | -Vo |
| 5 | +Vo |

## Dimensions and recommended layout - Chassis mounting

THIRD ANGLE PROJECTION

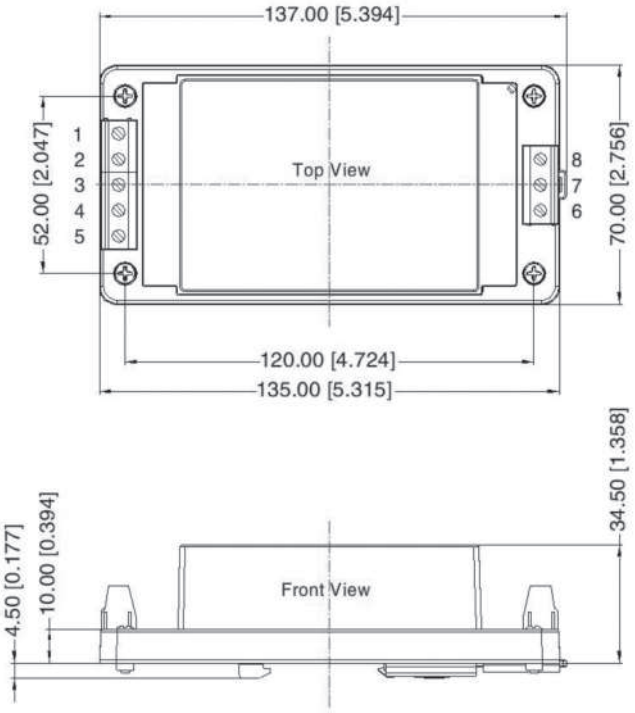



| Pin–Out | |
|---|---|
| Pin | Mark |
| 1 | –Vin |
| 2 | NC |
| 3 | NC |
| 4 | NC |
| 5 | +Vin |
| 6 | NC |
| 7 | –Vo |
| 8 | +Vo |

Note:
Unit: mm[inch]
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N · m
General tolerances: ± 1.00[ ± 0.040]

## Dimensions and recommended layout - Din-Rail mounting

THIRD ANGLE PROJECTION




| Pin–Out | |
|---|---|
| Pin | Mark |
| 1 | –Vin |
| 2 | NC |
| 3 | NC |
| 4 | NC |
| 5 | +Vin |
| 6 | NC |
| 7 | –Vo |
| 8 | +Vo |

Note:
Unit: mm[inch]
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N · m
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: ± 1.00[ ± 0.040]