



## 5DMSW4\_1.5 series

5W - Single Output DC-DC Converter - Wide Input - Isolated & Regulated

### DC-DC Converter

5 Watt

- ⊕ Input voltage range 4:1
- ⊕ Short circuit protection (SCP)
- ⊕ Over current protection
- ⊕ Operating temperature: -45°C to 85°C
- ⊕ 1500VDC isolation voltage
- ⊕ No additional components required
- ⊕ Six-sided metal shielding packaging

Introducing our new 4:1 input DC-DC converter 5DMSW4\_1.5 series. Designed for high-performance and reliability, this converter series features a wide 4:1 input voltage range and offers integrated short circuit and overcurrent protection, ensuring safe and stable operation in demanding environments. With a 1500VDC isolation voltage, a robust six-sided metal shielding package, and an extended operating temperature range from -45°C to +85°C, these converters are built to perform under harsh conditions. Requiring no additional external components, the series supports simplified integration and excellent EMI performance - ideal for industrial, communication, and embedded applications where efficiency and dependability matter most.



| Common specifications                    |  |
|--|--|
| Short circuit protection                 | Continuous, self-recovery  |
| Over current protection                  | Full voltage input range $\geq 1.5$ times the rated output current |
| Switching frequency                      | 300 kHz (nominal input voltage, 100% load)                         |
| Operation temperature                    | -40°C ~+85°C (with derating)                                       |
| Storage temperature                      | -55°C ~+125°C  |
| Temperature coefficient                  | 0.03%/°C 100% full load  |
| Storage humidity                         | <95% RH (non-condensing)   |
| MTBF: (MIL-HDBK-217F@25°C)               | 1,000,000 hours  |
| Casing temperature rise during operation | 35°C (typ.)  |
| Temperature coefficient                  | 0.03%/°C 100% full load  |
| Pin soldering temperature                | 300°C (soldering time $\leq 3s$ )                                  |
| No-load power consumption                | 500mW (typ.)   |
| Cooling method                           | Natural air cooling  |
| Weight                                   | 15g  |

| Input specifications  |   |         |          |          |       |
|-----------------------|---|---------|----------|----------|-------|
| Item                  | Test condition  | Min     | Typ      | Max      | Units |
| *Input voltage 4:1    | No-load current 15mA<br>No-load current 5mA   | 9<br>18 | 36<br>72 | 40<br>80 | VDC   |
| Maximum input voltage | 24VDC input (9-36VDC)<br>48VDC input (18-72VDC)   |         |          | 40<br>80 | VDC   |
| Control pin (Ctrl)    | When the module is enabled, Ctrl is left floating. When the module is disabled, Ctrl is connected to low level. |         |          | 1.2      | VDC   |
| Hot swap              | Non hot swap  |         |          |          |       |

\*The input voltage must not exceed this value, otherwise it may cause permanent damage to the module.

**Example:**  
**5DMSW4\_2405S1.5**  
 5 = 5Watt; D = DIP; MS = Series; W4 = Wide input (4:1); 24 = 24Vin;  
 05 = 5Vout; S = Single Output; 1.5 = 1500VDC isolation.

| Output specifications              |  |     |           |            |       |
|------------------------------------|--|-----|-----------|------------|-------|
| Item                               | Test condition                               | Min | Typ       | Max        | Units |
| Linear voltage regulation rate     | From the lowest to the highest input voltage |     | <0.2      | <0.5       | %     |
| Load regulation                    | 10% to 100% load                             |     | <0.5      | <1.0       | %     |
| Output voltage accuracy            | Specified input range and load               |     | $\pm 1$   | $\pm 3$    | %     |
| Ripple and noise (20MHz bandwidth) | 3.3V/5V/12V/15V<br>24V                       |     | 50<br>100 | 100<br>150 | mVp-p |

Note: Unless otherwise specified, all parameters are tested under nominal input voltage, resistive load, and at room temperature of 25°C.

| Isolation specifications             |  |      |     |     |       |
|--------------------------------------|--|------|-----|-----|-------|
| Item                                 | Test condition                                     | Min  | Typ | Max | Units |
| Isolation voltage (input and output) | Test time 1 minute, leakage current less than 1mA. | 1500 |     |     | VDC   |
| Isolation resistance                 | Isolation voltage: 500V                            | 1000 |     |     | MΩ    |
| Isolation capacitor                  | Input/Output 100kHz/V                              |      | 100 |     | pF    |

1. Recommended Circuit Design: To further reduce input and output ripple, it is advisable to connect an LC filter network at both ends of the module, using suitable filter capacitors. Ceramic or high-frequency, low-impedance electrolytic capacitors are recommended. Tantalum capacitors should be avoided, as they may cause damage to the module. Using excessive capacitance or capacitors with very low ESR values may result in operational instability, reduced current limiting, or lowered output voltage. As a guideline, the recommended output capacitance is 220  $\mu$ F per ampere of rated output current. The maximum allowable capacitive load per output - ensuring safe and reliable performance - can be found in the Maximum Capacitive Load Value Table.
2. Input Current Considerations: When using a power source with fluctuating output, ensure that its voltage range and ripple remain within the module's specified input limits. The input power source must be capable of supplying sufficient current to handle the module's instantaneous start-up current ( $I_p$ ), which is approximately 1.4 times the maximum average input current, i.e.,  $I_p \leq 1.4 \times I_{in-max}$ .
3. Load Requirements: To maintain stable operation, the minimum load should not fall below 10% of the rated output. Operating below this threshold will not damage the module, but may lead to significantly increased output ripple, and the performance stated in this datasheet can no longer be guaranteed.
4. Usage Restrictions: This product is not designed for parallel operation and does not support hot swapping.

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### Product Selection Guide - Single output

| Approval | Part number     | Input Voltage Nominal (V) | Input Voltage Range (V) | Output Rated Voltage (V) | Output Minimum Current (mA) | Output Maximum Current (mA) | Conversion Efficiency (%) |
|----------|-----------------|---------------------------|-------------------------|--------------------------|-----------------------------|-----------------------------|---------------------------|
|          | 5DMSW4_2403S1.5 | 24                        | 9-36                    | 3.3                      | 150                         | 1500                        | 76                        |
|          | 5DMSW4_2405S1.5 | 24                        | 9-36                    | 5                        | 100                         | 1000                        | 80                        |
|          | 5DMSW4_2409S1.5 | 24                        | 9-36                    | 9                        | 55                          | 555                         | 80                        |
|          | 5DMSW4_2412S1.5 | 24                        | 9-36                    | 12                       | 42                          | 416                         | 82                        |
|          | 5DMSW4_2415S1.5 | 24                        | 9-36                    | 15                       | 33                          | 333                         | 82                        |
|          | 5DMSW4_2424S1.5 | 24                        | 9-36                    | 24                       | 21                          | 208                         | 83                        |
|          | 5DMSW4_4803S1.5 | 48                        | 18-72                   | 3.3                      | 150                         | 1500                        | 76                        |
|          | 5DMSW4_4805S1.5 | 48                        | 18-72                   | 5                        | 100                         | 1000                        | 80                        |
|          | 5DMSW4_4809S1.5 | 48                        | 18-72                   | 9                        | 55                          | 555                         | 82                        |
|          | 5DMSW4_4812S1.5 | 48                        | 18-72                   | 12                       | 42                          | 416                         | 83                        |
|          | 5DMSW4_4815S1.5 | 48                        | 18-72                   | 15                       | 33                          | 333                         | 84                        |
|          | 5DMSW4_4824S1.5 | 48                        | 18-72                   | 24                       | 21                          | 208                         | 84                        |

### Product characteristic curve

Temperature derating graph

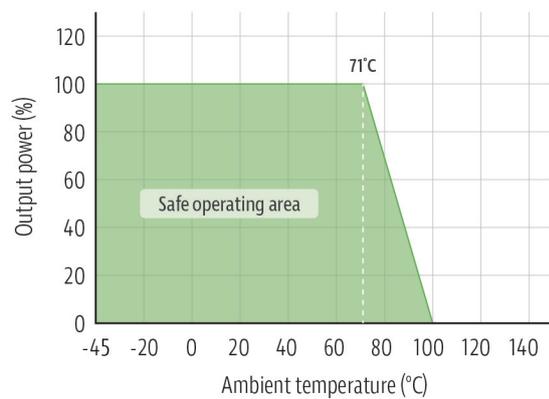
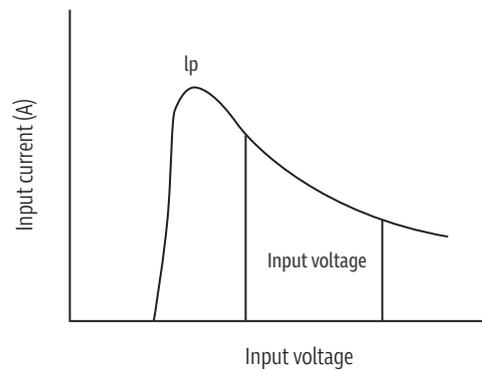


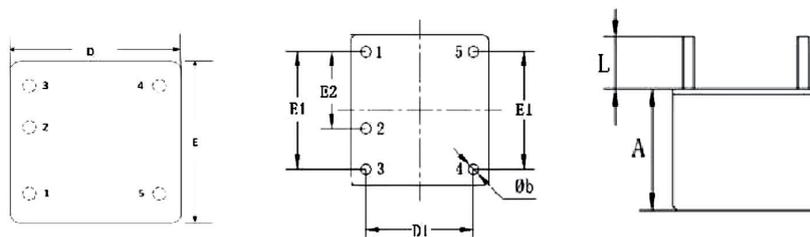
Figure 2



## 5DMSW4\_1.5 series

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### Mechanical dimensions



(Unit: mm)  
(Tolerance:  $\pm 0.25$ )

| 5W (Single output) |                |                |             |        |                 |
|--------------------|----------------|----------------|-------------|--------|-----------------|
| Pin                | 1              | 2              | 3           | 4      | 5               |
| Function           | +Vin           | -Vin           | Ctrl        | 0V     | +Vo             |
| Description        | Positive input | Negative input | Control pin | Ground | Positive output |

Pin Package: Through-hole, five-sided metal shell

Outer Dimensions (mm): 12.7 x 12.7 x 10.8

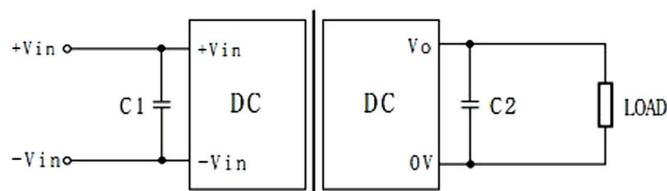
Table A - Dimensions (Top/Bottom View):

| Dimension Symbol | Min (mm) | Typical (mm) | Max (mm) |
|------------------|----------|--------------|----------|
| D                | 12.20    | 12.70        | 13.20    |
| D1               | 9.60     | 9.90         | 10.20    |
| E                | 12.20    | 12.70        | 13.20    |
| E1               | 9.60     | 9.90         | 10.20    |

Table B - Dimensions (Side View):

| Dimension Symbol | Min (mm) | Typical (mm) | Max (mm) |
|------------------|----------|--------------|----------|
| E2               | 6.20     | 6.50         | 6.80     |
| Phi_b1           | 0.6      | 0.8          | 1.0      |
| A                | 10.40    | 10.80        | 11.20    |
| L                | 4.5      | 5.5          | 6.0      |

### Recommended circuit



Maximum Capacitive Load

| Single output (VDC) | External capacitor | Dual output (VDC) | External capacitor |
|---------------------|--------------------|-------------------|--------------------|
| 3.3                 | 2200               | $\pm 5$           | 680                |
| 5                   | 1000               | $\pm 9$           | 470                |
| 12                  | 470                | $\pm 12$          | 330                |
| 15                  | 330                | $\pm 15$          | 220                |
| 24                  | 220                | $\pm 24$          | 100                |