

# 2W, DC/DC Power Converter

## SDM02A

**SUMMIT**  
ELECTRONICS



### Introduction

The SDM02A series are unregulated SIP4 package DC/DC converters with single output, and 1.5KVDC isolation. These converters feature high efficiency, low ripple and noise, short circuit protection, and wide operating temperature range. They are widely used in distributed power system in industrial applications where isolation and voltage converting is needed.

### Features

- Rated power: 2W Max
- Input voltage range  $\pm 10\%$
- Unregulated single output
- High efficiency, up to 86%
- Small no load input current
- Isolation voltage 1.5KVDC
- Operating temperature range:  $-40 \sim +105^{\circ}\text{C}$  ambient
- RoHS compliant
- Compact SIP4 package
- Continuous short circuit protection
- Designed to meet
- UL/EN/IEC 62368-1
- 3 year warranty

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### Part numbers

| Model Number | Input Voltage [VDC] $\pm 10\%$ | Output Voltage (VDC) | Output Current (mA) Max | Output Current (mA) Min | Efficiency (%) Typ. | Capacitive Load (uF) Max. |
|--------------|--------------------------------|----------------------|-------------------------|-------------------------|---------------------|---------------------------|
| SDM02A0505   | 5                              | 5                    | 400                     | 40                      | 80                  | 2400                      |
| SDM02A0509   | 5                              | 9                    | 222                     | 22                      | 80                  | 1000                      |
| SDM02A0512   | 5                              | 12                   | 167                     | 17                      | 80                  | 560                       |
| SDM02A0515   | 5                              | 15                   | 133                     | 13                      | 80                  | 560                       |
| SDM02A0524   | 5                              | 24                   | 83                      | 8                       | 80                  | 220                       |
| SDM02A1203   | 12                             | 3.3                  | 400                     | 40                      | 79                  | 2400                      |
| SDM02A1205   | 12                             | 5                    | 400                     | 40                      | 82                  | 2400                      |
| SDM02A1209   | 12                             | 9                    | 222                     | 22                      | 82                  | 1000                      |
| SDM02A1212   | 12                             | 12                   | 167                     | 17                      | 84                  | 560                       |
| SDM02A2405   | 24                             | 5                    | 400                     | 40                      | 80                  | 2400                      |
| SDM02A2415   | 24                             | 15                   | 133                     | 13                      | 84                  | 560                       |
| SDM02A2424   | 24                             | 24                   | 83                      | 8                       | 86                  | 220                       |

\* Only typical models are listed. Other models may be available upon request.

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### Electrical characteristics

Unless otherwise indicated, specifications are measured at TA=25°C, humidity <75%, nominal input voltage and rated output load.

| Parameter                                                                             | Condition              | Min.                                                | Type  | Max. | Unit  | Note |
|---------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------|-------|------|-------|------|
| <b>Input current</b><br>Full load                                                     | V <sub>IN</sub> =5V    |                                                     | 500   |      |       |      |
|                                                                                       | V <sub>IN</sub> =12V   | -                                                   | 200   | -    | mA    |      |
|                                                                                       | V <sub>IN</sub> =24V   |                                                     | 100   |      |       |      |
| <b>Input current</b><br>No load                                                       |                        | -                                                   | 8     | -    | mA    |      |
| <b>Reflected Ripple Current</b>                                                       |                        | -                                                   | 15    | -    | mA    |      |
| <b>Surge voltage</b><br>1 second max                                                  | V <sub>IN</sub> =5V    | -0.7                                                |       | 9    |       |      |
|                                                                                       | V <sub>IN</sub> =12V   | -0.7                                                | -     | 18   | VDC   |      |
|                                                                                       | V <sub>IN</sub> =24V   | -0.7                                                |       | 30   |       |      |
| <b>Output voltage accuracy</b>                                                        | All models             | Refer to graphic in “Characteristic Curves” section |       |      |       |      |
| <b>Line regulation</b><br>For V <sub>IN</sub> change of ±1%                           | V <sub>OUT</sub> =3.3V | -                                                   | -     | ±1.5 | %     |      |
|                                                                                       | All others             |                                                     |       | ±1.2 |       |      |
| <b>Load regulation</b><br>I <sub>OUT</sub> =10% to 100%<br>of I <sub>OUT, rated</sub> | V <sub>OUT</sub> =3.3V |                                                     | 12    | 25   |       |      |
|                                                                                       | V <sub>OUT</sub> =5V   | -                                                   | 10    | 20   | %     |      |
|                                                                                       | Others                 |                                                     | 8     | 15   |       |      |
| <b>Temperature coefficient</b>                                                        | Full load              | -                                                   | ±0.03 | -    | %/°C  |      |
| <b>Output ripple and noise</b>                                                        |                        | -                                                   | 75    | 200  | mVp-p |      |
| <b>Output short circuit protection</b>                                                |                        | Continuous, automatic recovery                      |       |      |       |      |
| <b>Input filter</b>                                                                   |                        | Capacitor                                           |       |      |       |      |
| <b>Hot plug</b>                                                                       |                        | None                                                |       |      |       |      |

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\* Operating with less than 10% of rated load will not cause permanent damage to the converters, but the performances data may not fall into the specifications, and reliable operating is not assured.

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### General Specifications

| Parameters                                                                                              | Condition            | Min.                                  | Typ. | Max. | Unit  |
|---------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------|------|------|-------|
| <b>Isolation voltage</b><br>Tested between input and output for 1 minute, leakage current less than 1mA |                      | 1500                                  | -    | -    | VDC   |
| <b>Isolation resistance</b><br>Tested at 500VDC                                                         |                      | 1000                                  | -    | -    | M ohm |
| <b>Isolation capacitance</b><br>Tested between input and output, test condition 100KHz, 0.1V            |                      | -                                     | 20   | -    | pF    |
| <b>Operating temperature</b>                                                                            | See "Derating Curve" | -40                                   | -    | +105 | °C    |
| <b>Storage temperature</b>                                                                              |                      | -55                                   | -    | +125 | °C    |
| <b>Temperature rise at case</b>                                                                         | Full load            | -                                     | 15   | -    | °C    |
| <b>Storage humidity</b>                                                                                 | Non-condensing       | -                                     | -    | 95   | %RH   |
| <b>Switching frequency</b>                                                                              | Full load            | -                                     | 220  | -    | KHz   |
| <b>Pin soldering resistance</b><br>1.5mm away from case for 10 sec                                      |                      | -                                     | -    | 300  | °C    |
| <b>Vibration</b>                                                                                        |                      | 10-150Hz, 5G, 0.75mm along X, Y and Z |      |      |       |
| <b>Case material</b>                                                                                    |                      | Black plastic UL94-V0                 |      |      |       |
| <b>Cooling method</b>                                                                                   |                      | Free air convection                   |      |      |       |
| <b>Design based on standards</b>                                                                        |                      | UL/EN/IEC 62368-1                     |      |      |       |
| <b>Safety certifications</b>                                                                            |                      | EN/IEC 62368-1                        |      |      |       |

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|               |                       |                                                                                                                                 |
|---------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>EMC</b>    | Emissions<br>Immunity | CISPR32, EN55032 Class B with External Circuit<br>IEC/EN61000-4-2, air $\pm 8\text{kV}$ , contact $\pm 6\text{kV}$ , Criteria B |
| <b>MTBF</b>   | MIL-HDBK-217F         | >3,500,000 Hours, $T_A=25^\circ\text{C}$                                                                                        |
| <b>Size</b>   |                       | 11.6 x 6.00 x 10.20 mm                                                                                                          |
| <b>Weight</b> |                       | 1.6g Typ.                                                                                                                       |

\*External circuit is required in order to meet Class B, refer to Figure 2 in Recommended External Circuit.

# 2W, DC/DC Power Converter

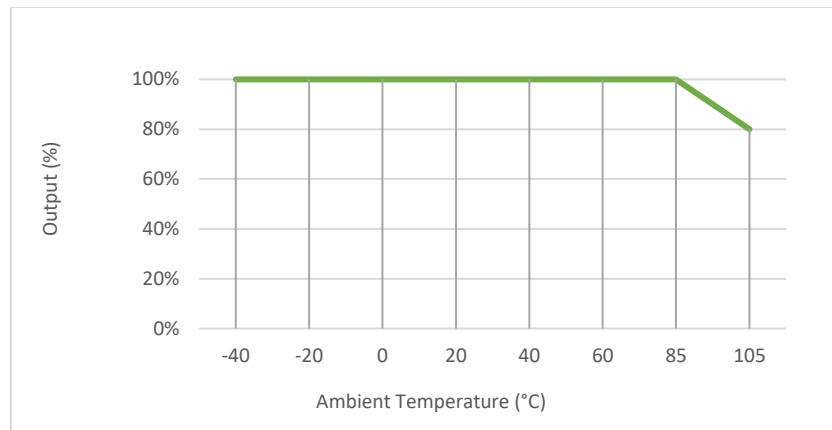
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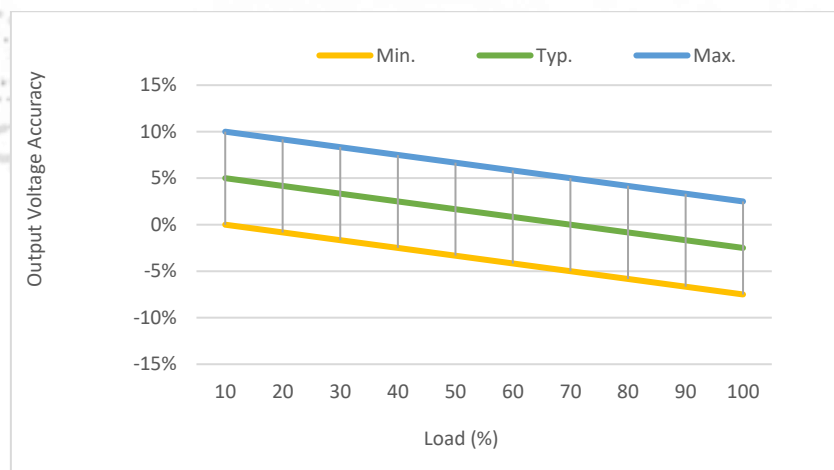
### Characteristics Curves

#### Derating Curve

#### Output vs Ambient Temperature



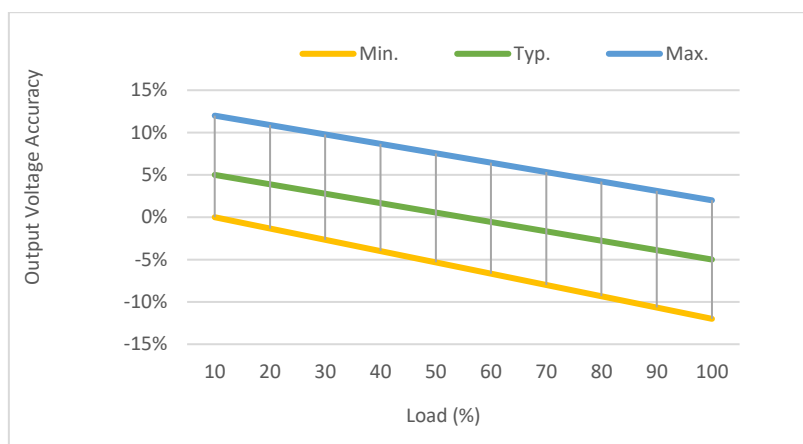
#### Output Voltage Accuracy vs Load



None 3.3V output models

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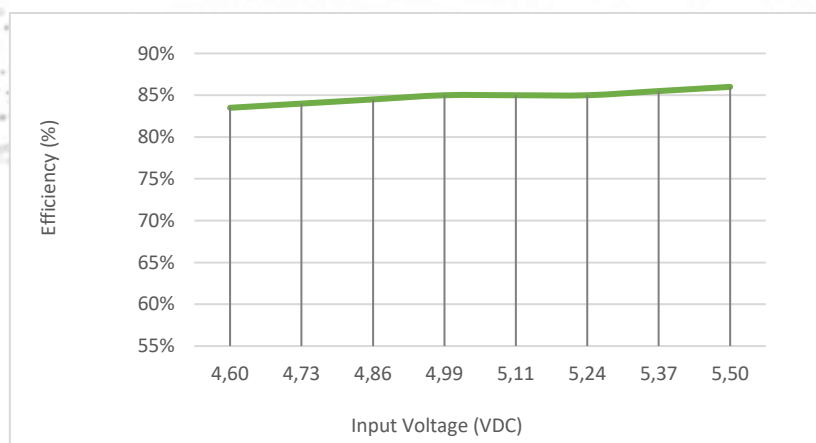
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3.3V output models

### Efficiency Curves

#### Efficiency vs Input Voltage



SDM02A, with full Load

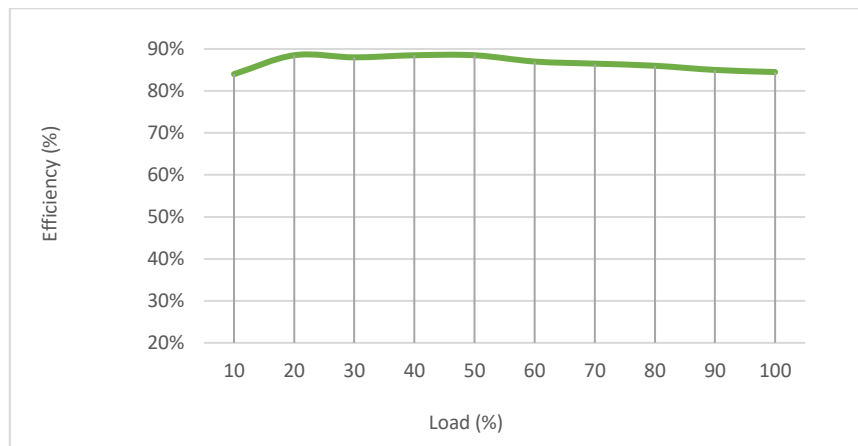


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### Efficiency vs Load



SDM02A, with nominal input voltage

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### Recommended External Circuit

#### Typical Application Circuit

\*Typical application circuit is to further lower the input and output ripple. It is not required for general use.

\*Recommended component specifications are typical values. Excessive external capacitive load may cause startup problem.



Figure 1: Typical External circuit

#### Recommended component spec

| Input voltage   | 5V         | 12V        | 24V        |
|-----------------|------------|------------|------------|
| C <sub>IN</sub> | 4.7uF, 16V | 2.2uF, 25V | 1.0uF, 50V |

#### Recommended component spec

| Output voltage   | 3.3, 5V   | 9V         | 12V        | 15V      | 24V         |
|------------------|-----------|------------|------------|----------|-------------|
| C <sub>OUT</sub> | 10uF, 16V | 4.7uF, 16V | 2.2uF, 25V | 1uF, 25V | 0.47uF, 50V |

#### Circuit for EMC Enhancement

\*Use this application circuit to meet Class B EMC performance.

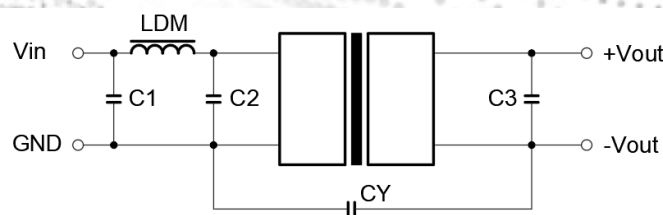


Figure 2: Circuit for EMC Enhancement

#### Recommended component spec

| Component | LDM   | C1, C2     | CY       |
|-----------|-------|------------|----------|
| Spec      | 6.8uH | 4.7uF, 50V | 1nF, 2KV |

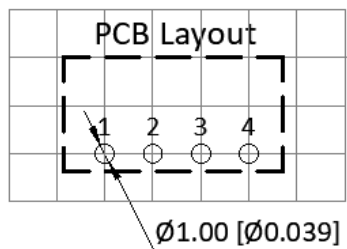
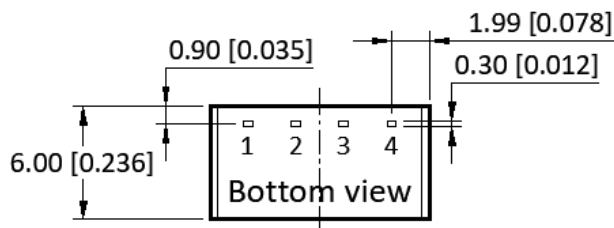
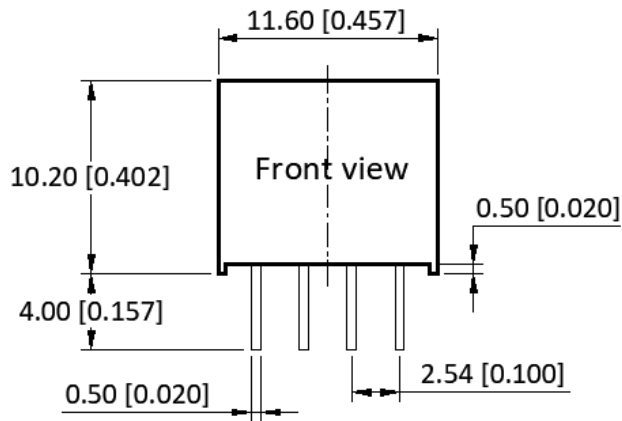
\*C3 refer to C<sub>OUT</sub> in

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### Mechanical Specifications



#### Pin Definition

| Pin # | Single Out        |  |
|-------|-------------------|--|
| 1     | GND               |  |
| 2     | V <sub>IN</sub>   |  |
| 3     | 0V                |  |
| 4     | +V <sub>OUT</sub> |  |

\* Unless otherwise specified unit:  
mm [inch]

\* General tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]

\* Pin thickness:  $\pm 0.10$  [ $\pm 0.004$ ]

\* Footprint grid 2.54 x 2.54 mm

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### Ordering information

Ordering can be done via [www.summit-electronics.com](http://www.summit-electronics.com) or via [info@summit-electronics.com](mailto:info@summit-electronics.com). Please contact us for more information. Customisation of the product is available on request.

### Technical support

For all product questions please contact us via [info@summit-electronics.com](mailto:info@summit-electronics.com)

### Document revision

| Rev      | Date       | Changes                 |
|----------|------------|-------------------------|
| 2025v0.1 | 27-08-2025 | First issue of document |