

# 3W, DC/DC Power Converter

## SDV03F

**SUMMIT**  
ELECTRONICS



### Introduction

The SDV03F series are 1.5KV isolated 3W DC/DC converters with ultra-compact DIP/SMD package. Designed with high efficiency, they operate in a wide temperature range from -40°C to +85°C. Other features include wide input voltage range, and continuous short circuit protections. These converters are ideally suitable for battery operated equipment, measurement equipment, telecom, wireless network, industrial control system, where is space critical, and where isolated, tightly regulated voltages are desired.

### Features

- Rated power: 3W Max
- Input voltage range 2:1
- Regulated output
- High efficiency up to 81%
- Isolation voltage 1.5KVDC
- Low ripple and noise
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact SMD/DIP package
- Under voltage, over voltage, over current, and short circuit protections
- Meet IEC/EN/UL 62368-1
- Meet CISPR32, EN55032
- 3 year warranty

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## SDV03F



### Part numbers

| Model Number | Input Voltage [VDC] |       |       | V <sub>OUT</sub><br>[VDC] | Output Current<br>[mA] |      | Efficiency<br>[%] Typ. | Capacitive<br>Load [uF]<br>Max. |
|--------------|---------------------|-------|-------|---------------------------|------------------------|------|------------------------|---------------------------------|
|              | Nom.                | Range | *Max. |                           | Max.                   | Min. |                        |                                 |
| SDV03F1203   | 12                  | 9~18  | 20    | 3.3                       | 800                    | 0    | 76                     | 1800                            |
| SDV03F1205   | 12                  | 9~18  | 20    | 5                         | 600                    | 0    | 77                     | 1000                            |
| SDV03F1212   | 12                  | 9~18  | 20    | 12                        | 250                    | 0    | 79                     | 470                             |
| SDV03F1215   | 12                  | 9~18  | 20    | 15                        | 200                    | 0    | 80                     | 220                             |
| SDV03F1224   | 12                  | 9~18  | 20    | 24                        | 125                    | 0    | 81                     | 100                             |
| SDV03F2403   | 24                  | 18~36 | 40    | 3.3                       | 800                    | 0    | 76                     | 1800                            |
| SDV03F2405   | 24                  | 18~36 | 40    | 5                         | 600                    | 0    | 77                     | 1000                            |
| SDV03F2412   | 24                  | 18~36 | 40    | 12                        | 250                    | 0    | 79                     | 470                             |
| SDV03F2415   | 24                  | 18~36 | 40    | 15                        | 200                    | 0    | 80                     | 220                             |
| SDV03F2424   | 24                  | 18~36 | 40    | 24                        | 125                    | 0    | 81                     | 100                             |
| SDV03F4803   | 48                  | 36~75 | 80    | 3.3                       | 800                    | 0    | 76                     | 1800                            |
| SDV03F4805   | 48                  | 36~75 | 80    | 5                         | 600                    | 0    | 77                     | 1000                            |
| SDV03F4812   | 48                  | 36~75 | 80    | 12                        | 250                    | 0    | 79                     | 470                             |
| SDV03F4815   | 48                  | 36~75 | 80    | 15                        | 200                    | 0    | 80                     | 220                             |
| SDV03F4824   | 48                  | 36~75 | 80    | 24                        | 125                    | 0    | 81                     | 100                             |

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

\* Part numbers in the above list are for default DIP package. Add suffix "T" for optional SMD package, E.g. SDV03F1205T.

\* Input voltage exceed the Max. value may cause permanent damage. For dual output models, max capacitive load stipulated in the above list is for each output.

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## SDV03F



### Electrical characteristics

Unless otherwise indicated, specifications are measured at  $T_A=25^{\circ}\text{C}$ , nominal input voltage, full load after warm up.

| Parameter                                                                    | Condition           | Min. | Type      | Max.      | Unit  | Note |
|------------------------------------------------------------------------------|---------------------|------|-----------|-----------|-------|------|
| <b>Input current</b><br>Full load                                            | $V_{IN, Nom} = 12V$ |      | 334       |           | mA    |      |
|                                                                              | $V_{IN, Nom} = 24V$ | -    | 167       | -         |       |      |
|                                                                              | $V_{IN, Nom} = 48V$ |      | 84        |           |       |      |
| <b>Input current</b><br>No load                                              | $V_{IN, Nom} = 12V$ | -    | 20        | -         | mA    |      |
|                                                                              | Others              |      | 5         |           |       |      |
| <b>Reflected ripple current</b>                                              |                     | -    | 20        | -         | mA    |      |
| <b>Input voltage surge</b><br>1 second max                                   | $V_{IN, Nom} = 12V$ | -0.7 | -         | 20        | VDC   |      |
|                                                                              | $V_{IN, Nom} = 24V$ | -0.7 |           | 40        |       |      |
|                                                                              | $V_{IN, Nom} = 48V$ | -0.7 |           | 80        |       |      |
| <b>Startup input voltage</b>                                                 | $V_{IN, Nom} = 12V$ |      | -         | 9         | VDC   |      |
|                                                                              | $V_{IN, Nom} = 24V$ | -    |           | 18        |       |      |
|                                                                              | $V_{IN, Nom} = 48V$ |      |           | 36        |       |      |
| <b>Startup time</b>                                                          | Nominal input       | -    | 19        | 30        | mS    |      |
| <b>Input under voltage shutdown</b>                                          | $V_{IN, Nom} = 12V$ | 5    | 8         | -         | VDC   |      |
|                                                                              | $V_{IN, Nom} = 24V$ | 15   | 17        |           |       |      |
|                                                                              | $V_{IN, Nom} = 48V$ | 31   | 35        |           |       |      |
| <b>Output voltage accuracy</b>                                               | $I_{out}=0$ to 100% | -    | $\pm 1$   | $\pm 3$   | %     |      |
| <b>Line regulation</b><br>Full load, $V_{IN} = V_{IN, Min}$ to $V_{IN, Max}$ |                     | -    | $\pm 0.2$ | $\pm 0.5$ | %     |      |
| <b>Load regulation</b>                                                       |                     | -    | $\pm 0.5$ | $\pm 1.0$ | %     |      |
| <b>Output ripple and noise</b>                                               | 20MHz bandwidth     | -    | 50        | 100       | mVp-p |      |

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## SDV03F



|                                                                                        |                                                     |                                |                           |                           |                                  |                     |
|----------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------|---------------------------|---------------------------|----------------------------------|---------------------|
| $I_{OUT}=5\%$ to 100% of $I_{OUT, rated}$                                              |                                                     |                                |                           |                           |                                  |                     |
| <b>Temperature coefficient</b>                                                         | Full load                                           | -                              | -                         | $\pm 0.03$                | %/°C                             |                     |
| <b>Dynamic load response</b><br>$I_{OUT}=25\% \sim 50\% \sim 75\%$ of $I_{OUT, rated}$ | Peak deviation**<br>Peak deviation<br>Recovery time | -                              | $\pm 5$<br>$\pm 3$<br>300 | $\pm 8$<br>$\pm 5$<br>500 | % $V_{OUT}$<br>% $V_{OUT}$<br>uS | ** $V_{OUT}=3.3, 5$ |
| <b>Output over voltage protection</b>                                                  |                                                     | 110                            | -                         | 160                       | % $V_{OUT}$                      |                     |
| <b>Output over current protection</b>                                                  |                                                     | 110                            | 150                       | 200                       | % $I_{OUT}$                      |                     |
| <b>Output short circuit protection</b>                                                 |                                                     | Continuous, automatic recovery |                           |                           |                                  |                     |
| <b>Input filter</b>                                                                    |                                                     | PI filter                      |                           |                           |                                  |                     |
| <b>Hot plug</b>                                                                        |                                                     | None                           |                           |                           |                                  |                     |

# 3W, DC/DC Power Converter

## SDV03F



### General Specifications

| Parameters                                                     | Condition            | Min.                                                           | Typ. | Max. | Unit  | Notes    |
|----------------------------------------------------------------|----------------------|----------------------------------------------------------------|------|------|-------|----------|
| <b>Isolation voltage</b><br>1 minute, leakage current 1mA max. | I/P to O/P           | 1500                                                           | -    | -    | VDC   |          |
| <b>Isolation resistance</b><br>Tested at 500VDC                | I/P to O/P           | 1000                                                           | -    | -    | M ohm |          |
| <b>Isolation capacitance</b><br>100KHz, 0.1V                   | I/P to O/P           | -                                                              | 100  | -    | pF    |          |
| <b>Switching frequency*</b>                                    | Full load            | -                                                              | 350  | -    | KHz   | PFM mode |
| <b>Operating temperature</b>                                   | See "Derating Curve" | -40                                                            | -    | +85  | °C    |          |
| <b>Storage temperature</b>                                     |                      | -55                                                            | -    | +125 | °C    |          |
| <b>Storage humidity</b>                                        | None condensing      | 5                                                              | -    | 95   | %RH   |          |
| <b>Pin soldering temperature</b>                               | 10 seconds           | -                                                              | -    | 300  | °C    |          |
| <b>Case material</b>                                           |                      | Black plastic, UL94-V0                                         |      |      |       |          |
| <b>Cooling method</b>                                          |                      | Free air convection                                            |      |      |       |          |
| <b>Vibration</b>                                               |                      | 10-150Hz, 5G, 0.75mm along X, Y and Z                          |      |      |       |          |
| <b>MTBF</b>                                                    | MIL-HDBK-217F        | >1,000,000 Hours, T <sub>A</sub> =25°C                         |      |      |       |          |
| <b>Design based on standards</b>                               |                      | IEC/EN/UL 62368-1                                              |      |      |       |          |
| <b>EMC</b>                                                     | CE<br>ESD            | CISPR32, EN55032 Class B (2)<br>IEC/EN61000-4-2, Contact ±4kV, |      |      |       |          |

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## SDV03F



|                                                  |             |                                                          |
|--------------------------------------------------|-------------|----------------------------------------------------------|
| (1) With External Circuit as shown in "Figure 1" | RS          | Criteria B                                               |
|                                                  | EFT         | IEC/EN61000-4-3, 10V/m, Criteria A                       |
| (2) With External Circuit as shown in "Figure 2" | Surge       | IEC/EN61000-4-4, $\pm 2$ kV, Criteria B (1)              |
|                                                  | CS          | IEC/EN61000-4-5, Line to Line $\pm 2$ kV, Criteria B (1) |
| <b>Size &amp; Weight</b>                         | DIP Package | 14x14x9mm, 2.2g Typ.                                     |
|                                                  | SMD Package | 15x14x9.1mm, 2.2g Typ.                                   |

# 3W, DC/DC Power Converter

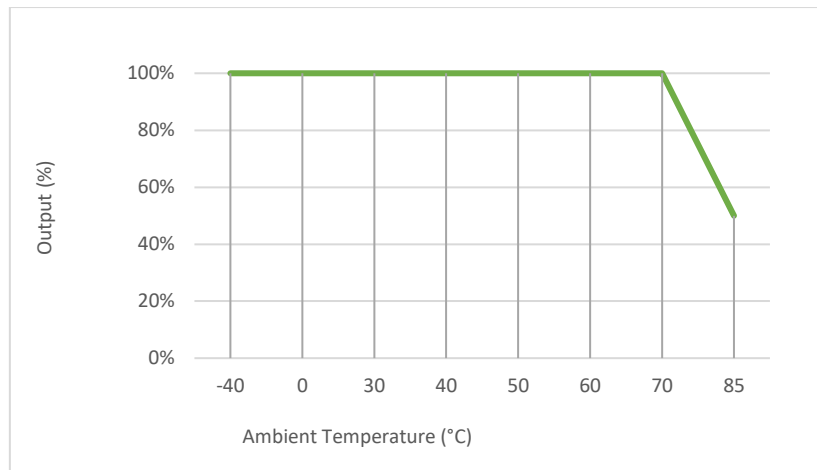
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### Characteristics Curves

#### Derating Curve

#### Output vs Ambient Temperature



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## SDV03F

### 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.

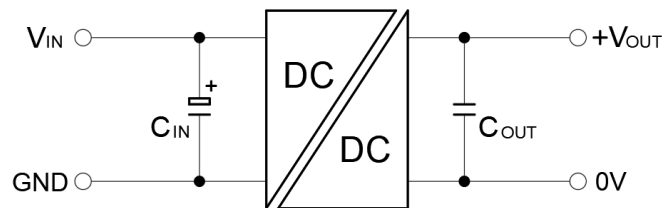


Figure 1: Typical External circuit

#### Recommended component spec

| Item | C <sub>IN</sub> | C <sub>OUT</sub> |
|------|-----------------|------------------|
| Spec | 100 ... 220uF   | 10uF             |

#### EMC Enhancement for EN55032 Class B

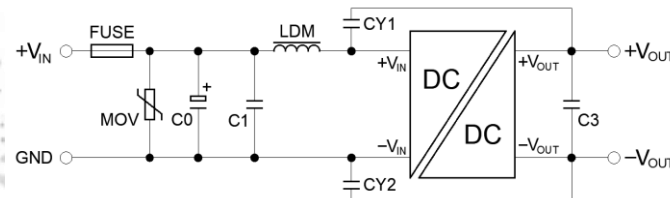


Figure 2: Circuit for EMC Enhancement

#### Recommended component spec

| Items | C <sub>0</sub> | C <sub>1</sub> | LDM   | CY1, CY2 | C <sub>3</sub> |
|-------|----------------|----------------|-------|----------|----------------|
| Spec  | 330uF          | 1 ... 10uF     | 4.7uH | 1nF, 2KV | 10uF           |

\* Fuse to be selected according to application needs. MOV for 12Vin = 14D270K, 24Vin = 14D560K, 48Vin = 14D101K.

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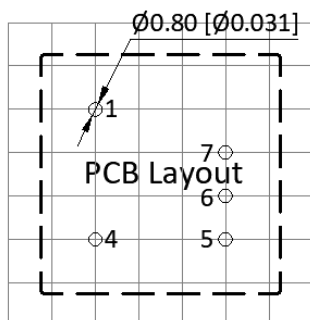
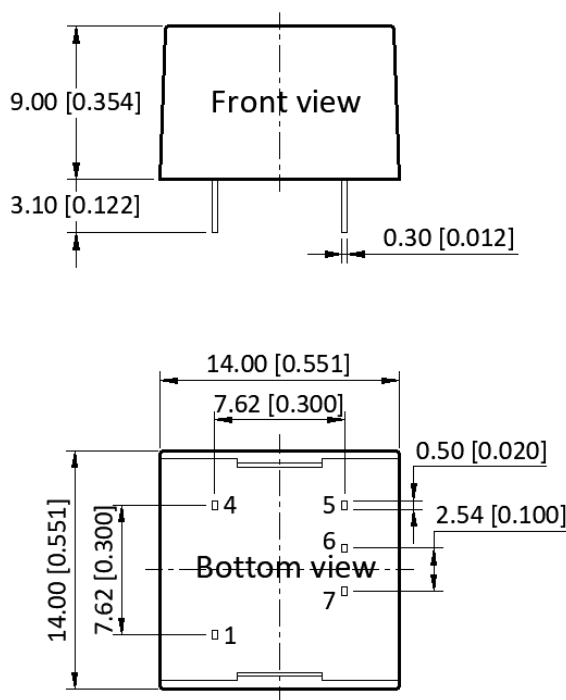
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### Mechanical Specifications

#### Default DIP package

\*Model numbers with no suffix



#### Pin Definition

| Pin # | Single Out        |  |
|-------|-------------------|--|
| 1     | GND               |  |
| 4     | V <sub>IN</sub>   |  |
| 5     | +V <sub>OUT</sub> |  |
| 6     | No connection     |  |
| 7     | 0V                |  |

\* 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

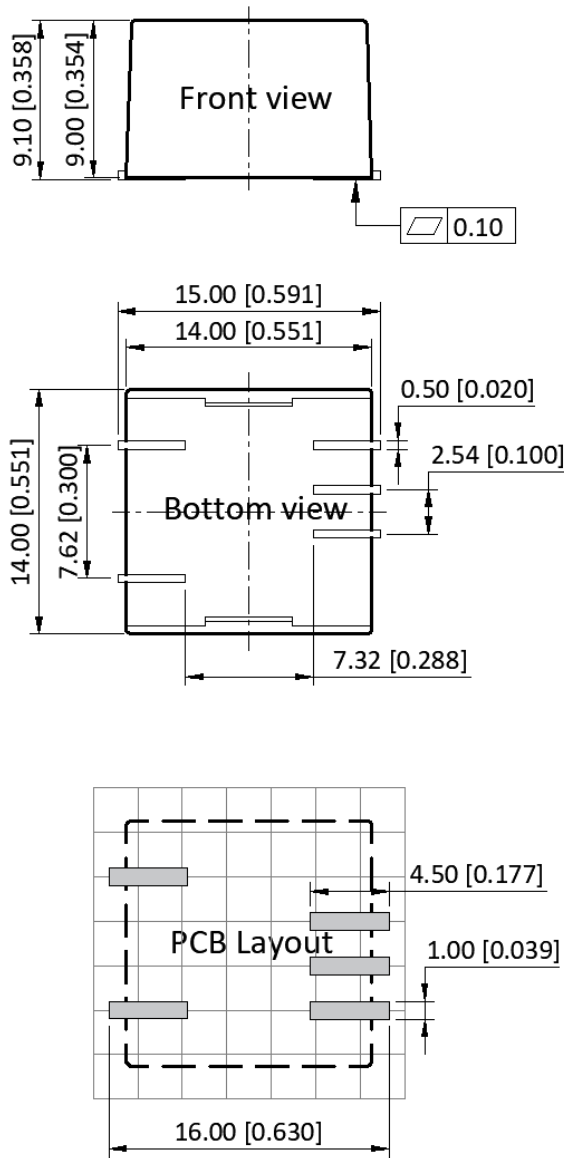
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## SDV03F



### Optional SMD package

\*Model numbers with “T” suffix



### Pin Definition

| Pin # | Single Out        |  |
|-------|-------------------|--|
| 1     | GND               |  |
| 4     | V <sub>IN</sub>   |  |
| 5     | +V <sub>OUT</sub> |  |
| 6     | No connection     |  |
| 7     | 0V                |  |

\* 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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## SDV03F



### 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 |