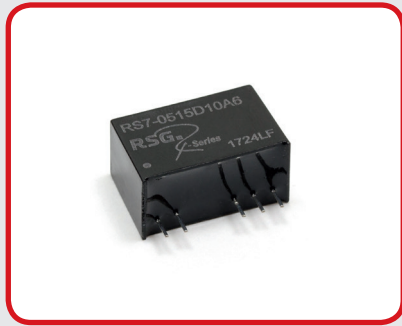


RSM-S/D10v2

1.0W Unregulated Single & Dual Output DC/DC Converter



Picture similar

- 7 Pin SIL Package
- $\pm 10\%$ Input Range
- Reinforced 4200VAC/6000VDC Isolation
- EN60601-1, ANSI/AAMI ES60601-1 medical safety (1xMOPP/2xMOOP)
- Efficiency up to 81%
- Operating Temperature Range $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- Patient leakage current max. $2\mu\text{A}$
- Low Ripple and Noise
- Non Conductive Black Plastic Case

RoHS

| Output Specifications | |
|-----------------------------------|---|
| Voltage Accuracy | See tolerance envelope graph |
| Maximum Output Current | See table |
| Line Regulation | $\pm 1.2 \sim 1.5\%$ max.(per $\pm 1\%$ Vin Change) |
| Load Regulation | from 10% to 100% Load: 15% to 20% max. – |
| Cross Regulation (Dual Output) | – |
| Short Circuit Protection | 3s |
| Ripple & Noise (20 MHz bandwidth) | 80mV typ., 150mV pk-pk max. |
| Temperature Coefficient | $\pm 0.02\%/^{\circ}\text{C}$ |
| Capacitor Load | See table |

| Input Specifications | |
|---------------------------------|---|
| Voltage Range | See table |
| Start-up Time | – |
| No-Load/Full-Load Input Current | See table |
| Input Filter | C/L (see filter details on following pages) |
| Input Reflected Ripple Current | 200mA typ. |

| General Specifications | |
|---|---------------------------------------|
| Efficiency | See table typ. |
| I/O Isolation Voltage (60 sec) | 4200VAC; 6000VDC |
| Out1/Out2 Isolation Voltage (Dual Separate) | – |
| I/O Isolation Capacitance | 5pF typ. |
| I/O Isolation Resistance | 1000M Ohm, min |
| Switching Frequency | 100kHz typ. |
| Humidity | 95% rel H |
| Reliability Calculated MTBF | >3.5Mhrs (MIL-HDBK-217 f) |
| Safety Standard(s) | EN60601-1, ANSI/AAMI ES60601-1 (meet) |

| Environmental Specifications | |
|------------------------------|---|
| Operating Temperature range | $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ (see Derating Curve) |
| Maximum Case Temperature | – |
| Storage Temperature | $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$ |
| Cooling | Natural Convection |

| Physical Specifications | |
|-------------------------|--|
| Case Material | Black flame-retardant, heat-resistant plastic (UL94 V-0) |
| Pin Material SIP Case | – |
| Pin Material DIP Case | – |
| Potting Material | – |
| Weight SIP Case | 4.2g typ. |
| Weight DIP Case | – |
| Dimensions SIP Case | 0.77" x 0.39" x 0.49" |
| Dimensions DIP Case | – |

| Absolute Maximum Ratings (1) | |
|------------------------------|--|
| Input Surge Voltage (100 ms) | |
| 3.3V Models | 7VDC max. |
| 5V Models | 9VDC max. |
| 12V Models | 18VDC max. |
| 15V Models | 21VDC max. |
| 24V Models | 30VDC max. |
| Soldering Temperature (2) | Pin Welding Resistance 300°C max. (Welding spot is 1.5mm away from the casing, 10 seconds) |

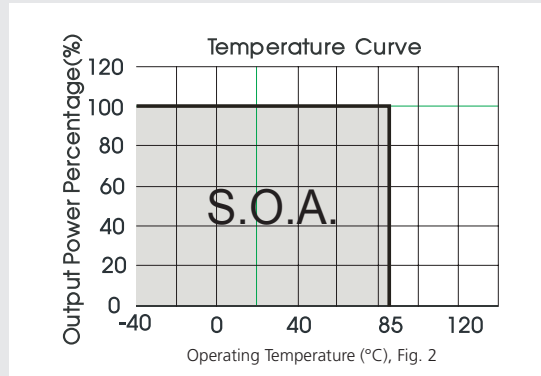
| EMC Specifications | |
|---------------------------------------|--|
| Radiated / Conducted Emissions | CISPR22/EN55022 Class B see EMI Filter |
| ESD | IEC 61000-4-2 Perf.Criteria A |
| RS | – |
| EFT | – |
| SURGE | – |
| CS | – |
| PFMF or Voltage Dip/Drop/Interruption | – |

(1) These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. (2) 1.5 mm from case 10 sec max. All specifications typical at $T_A = 25^{\circ}\text{C}$, nominal input voltage and full load unless otherwise specified.

The information and specification contained in this data sheet are believed to be correct at time of publication. However RSG accepts no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice.

Number structure RSM series

| RSM | – | 12 | 15 | S | 10 | D | 6 | (v2) |
|-----------------------|---|---|------------------------|---------------------------------|-------------------|-------------|---|------|
| Name/package | V-input nom. | V-output | Output type | Power | Int. Code | Isolation | | |
| RSM = SIL7 Medical | 03 = 3.3V 05 = 5V ... 24 = 24V | 03 = 3.3V 05 = 5V ... 24 = 24V | S = Single D = Dual | 10 = 1.00W ... 20 = 2.00W | Logistics Code | 6 = 6.0kVDC | | |

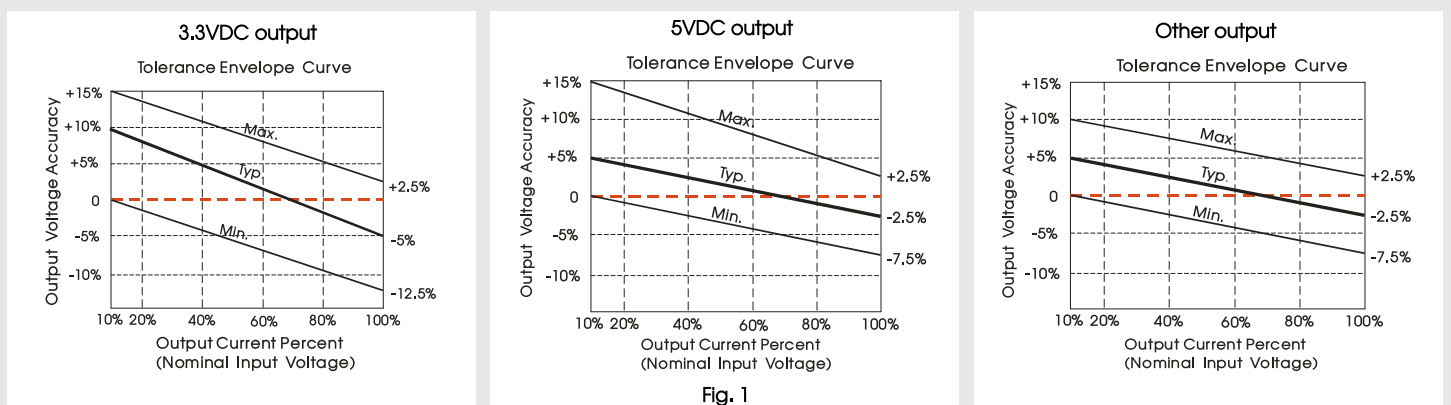


Model Selection Guide

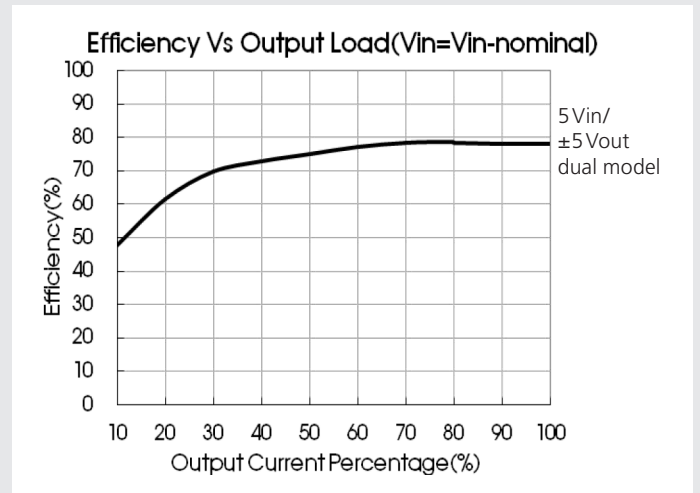
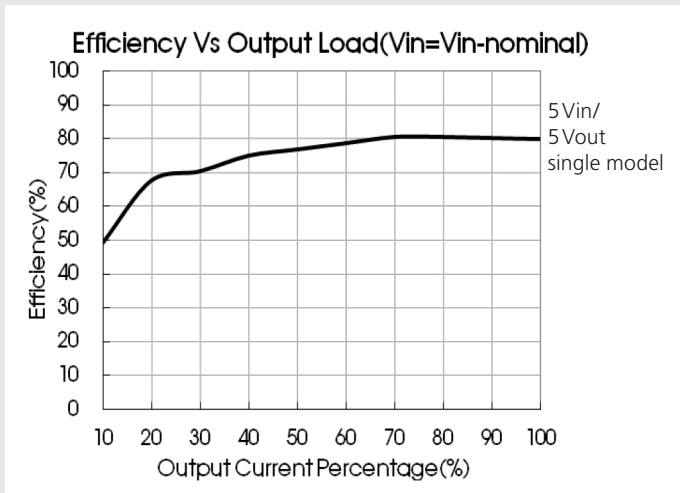
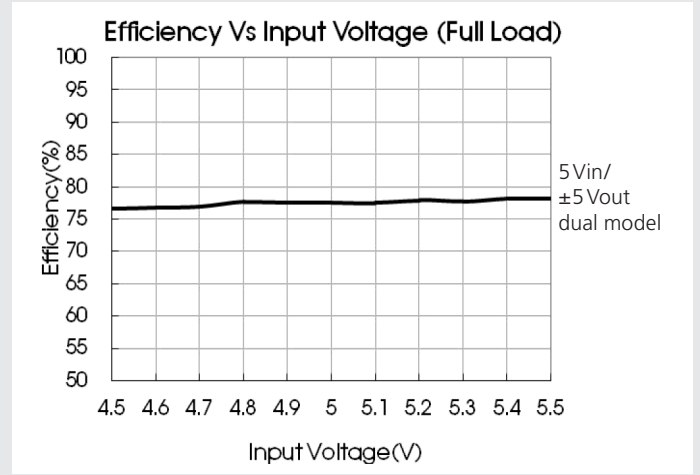
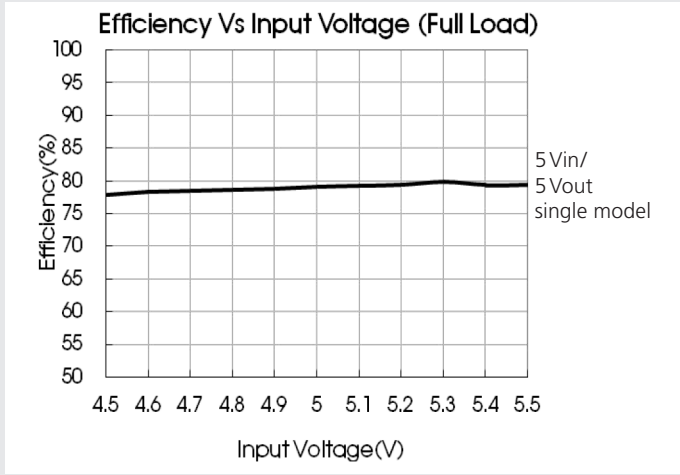
| Model Number | Input | | Output | | Efficiency | Capacitor Load (µF) |
|-----------------|-------------------------------|-----------------------------------|----------------|---------------------------|-------------------------------|---------------------|
| | Voltage (VDC) Nom. (Range) | max. Current (mA) full/no load | Voltage (V DC) | Current (mA) max./min. | @ Full Load (%, Min./Typ.) | max. |
| RSM-0305S10D6v2 | 3.3 (2.97~3.63) | 426/45 | 5 | 200/20 | 67/71 | 1000 |
| RSM-0503S10D6v2 | 5 (4.5~5.5) | 274/35 | 3.3 | 303/31 | 69/73 | 1000 |
| RSM-0505S10D6v2 | 5 (4.5~5.5) | 274/35 | 5 | 200/20 | 74/78 | 1000 |
| RSM-0512S10D6v2 | 5 (4.5~5.5) | 274/35 | 12 | 84/9 | 72/76 | 470 |
| RSM-0515S10D6v2 | 5 (4.5~5.5) | 274/35 | 15 | 67/7 | 72/76 | 470 |
| RSM-1205S10D6v2 | 12 (10.8~13.2) | 114/15 | 5 | 200/20 | 73/77 | 1000 |
| RSM-1212S10D6v2 | 12 (10.8~13.2) | 114/15 | 12 | 84/9 | 77/81 | 470 |
| RSM-1215S10D6v2 | 12 (10.8~13.2) | 114/15 | 15 | 67/7 | 77/81 | 470 |
| RSM-2405S10D6v2 | 24 (21.6~26.4) | 56/10 | 5 | 200/20 | 72/76 | 1000 |
| RSM-2412S10D6v2 | 24 (21.6~26.4) | 56/10 | 12 | 84/9 | 74/78 | 470 |
| RSM-2415S10D6v2 | 24 (21.6~26.4) | 56/10 | 15 | 67/7 | 74/78 | 470 |
| RSM-0505D10D6v2 | 5 (4.5~5.5) | 274/35 | ±5 | ±100/±10 | 74/78 | 470 |
| RSM-0509D10D6v2 | 5 (4.5~5.5) | 274/35 | ±9 | ±56/±6 | 76/80 | 470 |
| RSM-0512D10D6v2 | 5 (4.5~5.5) | 274/35 | ±12 | ±42/±5 | 70/74 | 220 |
| RSM-0515D10D6v2 | 5 (4.5~5.5) | 274/35 | ±15 | ±34/±4 | 72/76 | 220 |
| RSM-1205D10D6v2 | 12 (10.8~13.2) | 114/15 | ±5 | ±100/±10 | 73/77 | 470 |
| RSM-1209D10D6v2 | 12 (10.8~13.2) | 114/15 | ±9 | ±56/±6 | 76/80 | 470 |
| RSM-1212D10D6v2 | 12 (10.8~13.2) | 114/15 | ±12 | ±42/±5 | 69/73 | 220 |
| RSM-1215D10D6v2 | 12 (10.8~13.2) | 114/15 | ±15 | ±34/±4 | 71/75 | 220 |
| RSM-1515D10D6v2 | 15 (13.5~16.5) | 93/18 | ±15 | ±34/±4 | 68/72 | 220 |
| RSM-2405D10D6v2 | 24 (21.6~26.4) | 56/10 | ±5 | ±100/±10 | 71/75 | 470 |
| RSM-2409D10D6v2 | 24 (21.6~26.4) | 56/10 | ±9 | ±56/±6 | 75/79 | 470 |
| RSM-2412D10D6v2 | 24 (21.6~26.4) | 56/10 | ±12 | ±42/±5 | 72/76 | 220 |
| RSM-2415D10D6v2 | 24 (21.6~26.4) | 56/10 | ±15 | ±34/±4 | 72/76 | 220 |

The models listed above are standard types. If you need special specifications or have questions regarding packing or need application support, please contact our specialists: sales@rsg-electronic.de or +49 69-984047-0

Product Characteristic Curve



Electrical Characteristic Curves



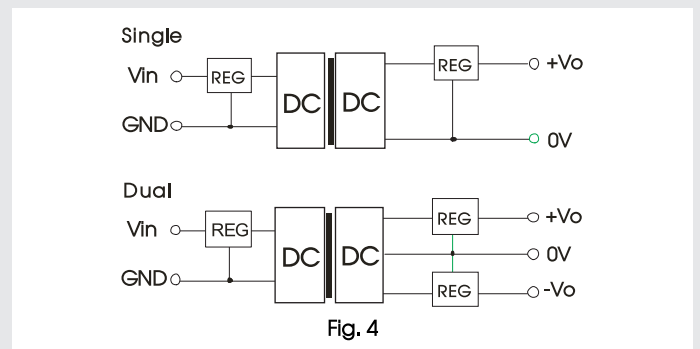
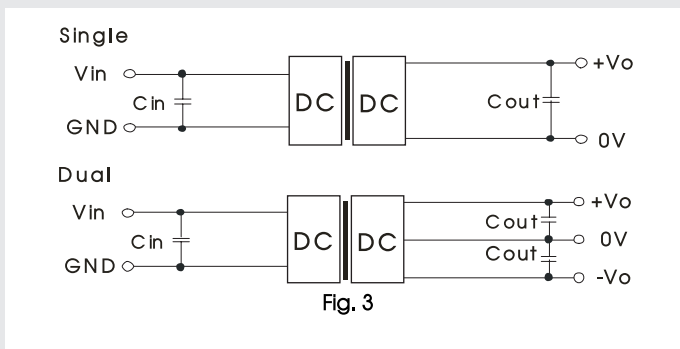
Design Reference

1. Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3.

Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensure the modules running well, the recommended capacitive load values as shown in Table 1.

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Fig. 4).



| Recommended capacitive load value table (Table 1) | | | | | |
|---|---------------------|------------------------|----------------------|----------------------|----------------------|
| V_{IN} (VDC) | C_{IN} (μ F) | Single V_{OUT} (VDC) | C_{OUT} (μ F) | Dual V_{OUT} (VDC) | C_{OUT} (μ F) |
| 3.3/5 | 10 | 3.3/5 | 10 | ±5 | 4.7 |
| 12/15 | 4.7 | 12 | 2.2 | ±9 | 2.2 |
| 24 | 2.2 | 15 | 1 | ±12/±15 | 1 |

2. EMC typical recommended circuit (CLASS B)

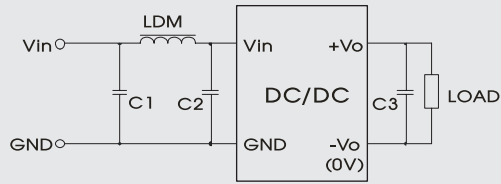


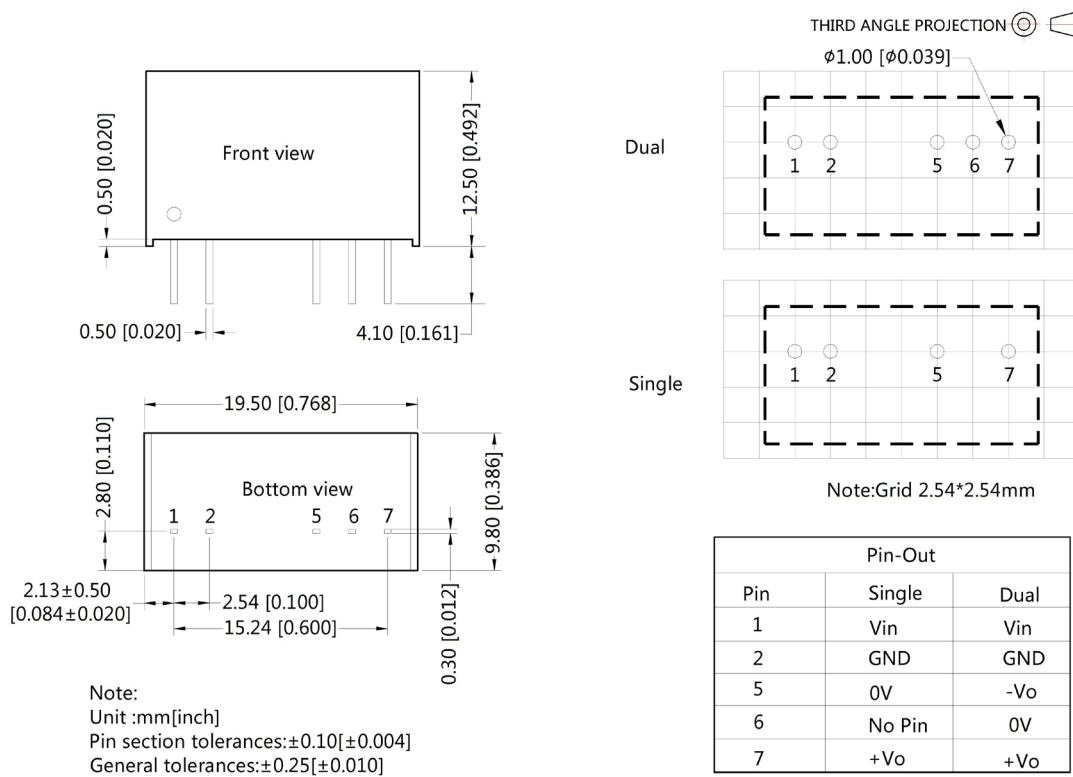
Fig. 5

| Recommended typical circuit parameters: | | |
|---|--------|-----------------------------|
| Vin (VDC) | | 3.3 / 5 / 12 / 15 / 24 |
| EMI | C1, C2 | 4.7 μF/50V |
| | C3 | Refer to the Cout in Fig. 3 |
| | LDM | 6.8 μH |

3. Output load requirements

For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

Mechanical Specifications



Notes

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet.
2. The maximum capacitive loads offered were tested at input voltage range and full load.
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25, humidity<75%RH with nominal input voltage and rated output load.