

## Features

- 2:1 Wide Input Voltage Range
- 20 Watts Output Power
- 1.6kVDC Isolation
- UL Certified
- Fixed Operating Frequency
- Six-Sided Continuous Shield
- Standard 50.8 x25.4x10.2mm Package
- Efficiency to 89%

**POWERLINE**  
DC/DC-Converter

# RP20- S\_DF Series

**20 Watt  
2" x 1" Package  
Single & Dual  
Output**

### Selection Guide 12V, 24V and 48V Input Types

| Part Number  | Input Range | Output Voltage | Output Current | Input <sup>(4)</sup> Current | Efficiency <sup>(5)</sup> | Capacitive <sup>(6)</sup> Load max. |
|--------------|-------------|----------------|----------------|------------------------------|---------------------------|-------------------------------------|
|              | VDC         | VDC            | mA             | mA                           | %                         | μF                                  |
| RP20-121.5SF | 9-18        | 1.5            | 6000           | 1014                         | 78                        | 65000                               |
| RP20-121.8SF | 9-18        | 1.8            | 6000           | 1200                         | 79                        | 65000                               |
| RP20-122.5SF | 9-18        | 2.5            | 6000           | 1603                         | 82                        | 33000                               |
| RP20-123.3SF | 9-18        | 3.3            | 5000           | 1719                         | 84                        | 13000                               |
| RP20-1205SF  | 9-18        | 5              | 4000           | 2008                         | 87                        | 6800                                |
| RP20-1212SF  | 9-18        | 12             | 1670           | 2062                         | 85                        | 2200                                |
| RP20-1215SF  | 9-18        | 15             | 1330           | 2052                         | 85                        | 755                                 |
| RP20-241.5SF | 18-36       | 1.5            | 6000           | 493                          | 80                        | 65000                               |
| RP20-241.8SF | 18-36       | 1.8            | 6000           | 584                          | 81                        | 65000                               |
| RP20-242.5SF | 18-36       | 2.5            | 6000           | 781                          | 84                        | 33000                               |
| RP20-243.3SF | 18-36       | 3.3            | 5000           | 838                          | 86                        | 13000                               |
| RP20-2405SF  | 18-36       | 5              | 4000           | 980                          | 89                        | 6800                                |
| RP20-2412SF  | 18-36       | 12             | 1670           | 1006                         | 87                        | 2200                                |
| RP20-2415SF  | 18-36       | 15             | 1330           | 1002                         | 87                        | 755                                 |
| RP20-481.5SF | 36-75       | 1.5            | 6000           | 247                          | 80                        | 65000                               |
| RP20-481.8SF | 36-75       | 1.8            | 6000           | 288                          | 82                        | 65000                               |
| RP20-482.5SF | 36-75       | 2.5            | 6000           | 391                          | 84                        | 33000                               |
| RP20-483.3SF | 36-75       | 3.3            | 5000           | 414                          | 87                        | 13000                               |
| RP20-4805SF  | 36-75       | 5              | 4000           | 490                          | 89                        | 6800                                |
| RP20-4812SF  | 36-75       | 12             | 1670           | 497                          | 88                        | 2200                                |
| RP20-4815SF  | 36-75       | 15             | 1330           | 500                          | 87                        | 755                                 |
| RP20-1212DF  | 9-18        | ±12            | ±833           | 2032                         | 86                        | ±680                                |
| RP20-1215DF  | 9-18        | ±15            | ±667           | 2034                         | 86                        | ±450                                |
| RP20-2412DF  | 18-36       | ±12            | ±833           | 1004                         | 87                        | ±680                                |
| RP20-2415DF  | 18-36       | ±15            | ±667           | 1005                         | 87                        | ±450                                |
| RP20-4812DF  | 36-75       | ±12            | ±833           | 496                          | 88                        | ±680                                |
| RP20-4815DF  | 36-75       | ±15            | ±667           | 502                          | 87                        | ±450                                |

\* no suffix for CTRL function with Positive Logic (1=ON, 0=OFF), this is standard

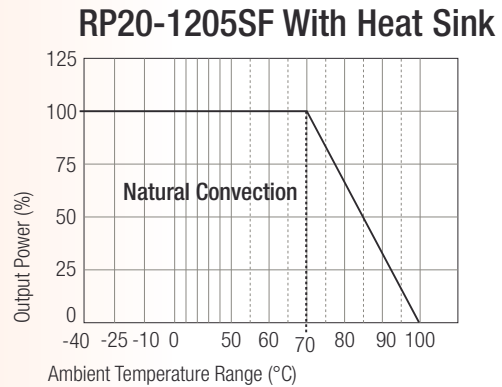
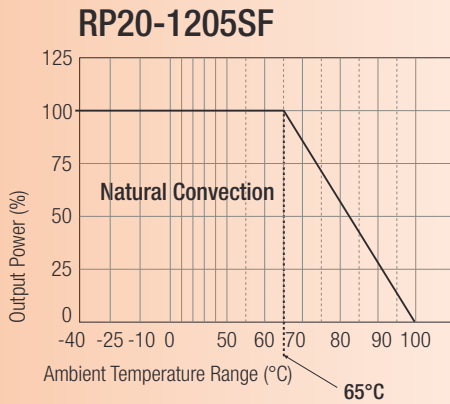
\* add /N for CTRL function with Negative Logic (0=ON, 1=OFF)



**UL-60950-1 Certified**

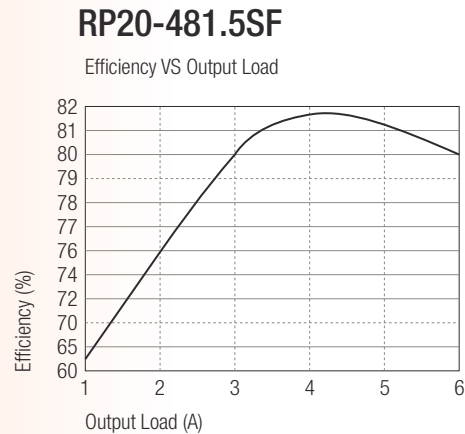
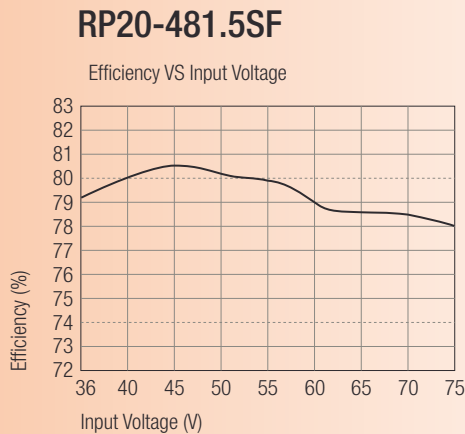
**RECOM**

**Derating-Graph (Ambient Temperature)**



Derating graphs are valid only for the shown part numbers. If you need detailed derating-information about a part-number not shown here please contact our technical customer service at [info@recom-development.at](mailto:info@recom-development.at)

**Typical Characteristics**



**Specifications** (typical at nominal input and 25°C unless otherwise noted)

|   |   |  |
|---|---|--|
| Input Voltage Range   | 12V nominal input<br>24V nominal input<br>48V nominal input | 9-18VDC<br>18-36VDC<br>36-75VDC                    |
| Input Filter (see Note 9)                                       |   | L-C Type   |
| Input Voltage Variation dv/dt                                   | (Complies with ETS300 132 part 4.4)                         | 5V/ms max  |
| Input Surge Voltage (100 ms max.)                               | 12V Input<br>24V Input<br>48V Input                         | 36VDC<br>50VDC<br>100VDC                           |
| Input Reflected Ripple (nominal Vin and full load) (see Note 3) |   | 20mA <sub>p-p</sub>                                |
| Start Up Time (nominal Vin and constant resistor load)          |   | 10ms typ.  |
| Remote ON/OFF (see Note 7)                                      | DC-DC ON<br>DC-DC OFF                                       | Open or 3.0V < Vr < 12V<br>Short or 0V < Vr < 1.2V |
| Remote OFF input current  | Nominal input   | 2.5mA  |
| Output Power  |   | 20W max.   |
| Output Voltage Accuracy (full Load and nominal Vin)             |   | ±1%  |
| Voltage Adjustability   |   | ±10%   |

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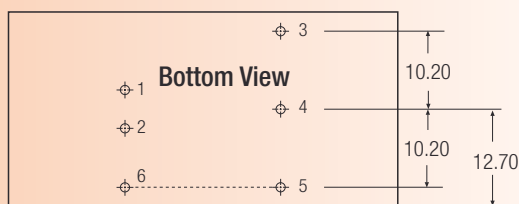
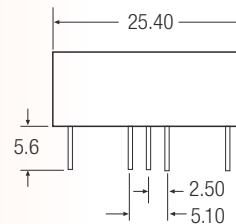
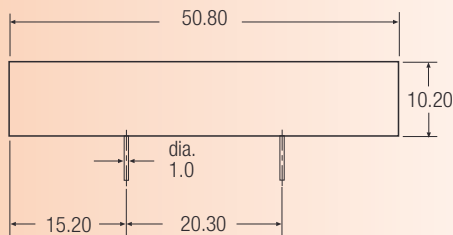
**Specifications** (typical at nominal input and 25°C unless otherwise noted)

|   |  |                                       |
|---|--|---------------------------------------|
| Minimum Load (see Note 1)   | Single<br>Dual   | 0%<br>10% of full load                |
| Line Regulation (low line, high line at full load)                      |  | ±0.2%                                 |
| Load Regulation (25% to 100% full load)                                 |  | ±0.5%                                 |
| Cross Regulation (asymmetrical load 25%/100% full load)                 | Dual   | ±5%                                   |
| Ripple and Noise (20MHz bandwidth)<br>(Measured with a 1004pF/50V MLCC) | Single 1.5, 1.8, 2.5, 3.3V<br>Single 5, 12, 15V<br>Dual 5, 12, 15V | 60mVp-p<br>75mVp-p<br>100mVp-p        |
| Temperature Coefficient   |  | ±0.02%/°C max.                        |
| Transient Response (25% load step change)                               |  | 500µs                                 |
| Over Voltage Protection   | 1.5, 1.8, 2.5, 3.3V  | 3.9V                                  |
| Zener diode clamp (only single)   | 5V<br>12V<br>15V   | 6.2V<br>15V<br>18V                    |
| Over Load Protection (% of full load at nominal Vin)                    |  | 150% typ                              |
| Short Circuit Protection  |  | Hiccup, automatic recovery            |
| Efficiency  |  | see „Selection Guide“ table           |
| Isolation Voltage   | Input to Output<br>Input (Output) to case                          | 1600VDC min.<br>1600VDC min.          |
| Isolation Resistance  |  | 1 GΩ min.                             |
| Isolation Capacitance   |  | 1000pF max.                           |
| Operating Frequency   |  | 500kHz typ.                           |
| Operating Temperature Range   |  | -40°C to +85°C(with derating)         |
| Maximum Case Temperature  |  | +100°C                                |
| Storage Temperature Range   |  | -55°C to +105°C                       |
| Thermal Impedance<br>(see Note 8)                                       | Natural convection<br>Natural convection with Heat Sink            | 12°C/Watt<br>10°C/Watt                |
| Thermal Shock   |  | MIL-STD-810D                          |
| Vibration   |  | 10-55Hz, 2G, 30 Min. along X, Y and Z |
| Relative Humidity   |  | 5% to 95% RH                          |
| Case Material   |  | Nickel plated copper                  |
| Base Material   |  | Non-conductive black plastic          |
| Potting Material  |  | Epoxy (UL94-V0)                       |
| Conducted Emissions (see Note 10)                                       | EN55022  | Class A                               |
| Radiated Emissions  | EN55022  | Class A                               |
| ESD   | EN61000-4-2  | Perf. Criteria 2                      |
| Radiated Immunity   | EN61000-4-3  | Perf. Criteria 2                      |
| Fast Transient  | EN61000-4-4  | Perf. Criteria 2                      |
| Surge   | EN61000-4-5  | Perf. Criteria 2                      |
| Conducted Immunity  | EN61000-4-6  | Perf. Criteria 2                      |
| Weight  |  | 27g                                   |
| Dimensions  |  | 50.8 x 25.4 x 10.2mm                  |
| MTBF (see Note 2)   |  | 1791 x 10 <sup>3</sup> hours          |

**Notes :**

1. The RP20-S\_DF series requires a minimum of 10% loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
2. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment).
3. Simulated source impedance of 12μH. 12μH inductor in series with +Vin.
4. Maximum value at nominal input voltage and full load of standard type.
5. Typical value at nominal input voltage and full load.
6. Test by minimum Vin and constant resistor load.
7. The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to negative input.
  - Positive logic ON/OFF is standard, no suffix (Ex. RP20-2405SF)
  - Negative logic ON/OFF is marked with suffix-N (Ex. RP20-2405SF/N).
8. Heat sink is optional and P/N: 7G-0020A.
9. An external filter capacitor is required for normal operation. The capacitor should be capable of handling 1A ripple current for 48V/24V models. RECOM suggest: Nippon chemi-con KMF series, 220μF/100V, ESR 90m Ω.
10. See application notes for EMI-filtering.

**Package Style and Pinning (mm)**



**Pin Connections**

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | +Vin   | +Vin  |
| 2     | -Vin   | -Vin  |
| 3     | +Vout  | +Vout |
| 4     | Trim   | Com   |
| 5     | -Vout  | -Vout |
| 6     | CTRL   | CTRL  |

Pin Pitch Tolerance ±0.35 mm

**External Output Trimming**

Output can be externally trimmed by using the method shown below.

