

## Features

### Regulated Converters

- 4:1 Wide Input Voltage Range
- 20 Watts Regulated Output Power
- 1.6kVDC Isolation
- Over Current and Over Voltage Protection
- Six-Sided Shield
- No Derating to 63°C
- Standard 2" x 1" Package and Pinning
- Efficiency to 86 %

### Description

The RP20-FW series wide range input DC/DC converters are certified to UL 60950-1 and to cUL 60950-1. This makes them ideal for all telecom and industrial applications where approved safety standards are required. The industry standard 2" x 1" package meets military standards for thermal shock and vibration tolerance.

### Selection Guide 24V and 48V Wide Input Types

| Part Number   | Input Range VDC | Output Voltage VDC | Output Current mA | Input Current <sup>(4,5)</sup> mA | Efficiency <sup>(6)</sup> % | Capacitive <sup>(7)</sup> Load max. |
|---------------|-----------------|--------------------|-------------------|-----------------------------------|-----------------------------|-------------------------------------|
| RP20-243.3SFW | 9-36            | 3.3                | 5500              | 60/922                            | 84                          | 18000µF                             |
| RP20-2405SFW  | 9-36            | 5                  | 4000              | 60/1016                           | 86                          | 9600µF                              |
| RP20-2412SFW  | 9-36            | 12                 | 1670              | 75/1031                           | 85                          | 1650µF                              |
| RP20-2415SFW  | 9-36            | 15                 | 1330              | 75/1014                           | 86                          | 1050µF                              |
| RP20-483.3SFW | 18-75           | 3.3                | 5500              | 30/461                            | 84                          | 18000µF                             |
| RP20-4805SFW  | 18-75           | 5                  | 4000              | 30/508                            | 86                          | 9600µF                              |
| RP20-4812SFW  | 18-75           | 12                 | 1670              | 40/515                            | 85                          | 1650µF                              |
| RP20-4815SFW  | 18-75           | 15                 | 1330              | 40/507                            | 86                          | 1050µF                              |
| RP20-2405DFW  | 9-36            | ±5                 | ±2000             | 85/1068                           | 82                          | ±4800µF                             |
| RP20-2412DFW  | 9-36            | ±12                | ±833              | 100/1028                          | 85                          | ±625µF                              |
| RP20-2415DFW  | 9-36            | ±15                | ±667              | 100/1017                          | 86                          | ±525µF                              |
| RP20-4805DFW  | 18-75           | ±5                 | ±2000             | 45/534                            | 82                          | ±4800µF                             |
| RP20-4812DFW  | 18-75           | ±12                | ±833              | 50/514                            | 85                          | ±825µF                              |
| RP20-4815DFW  | 18-75           | ±15                | ±667              | 50/508                            | 86                          | ±525µF                              |

\* 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)

\* add suffix -HC for premounted heatsink and clips

### Ordering Examples

RP20-2405SFW = 24V 4:1 Input, 5V Output, Positive Logic CTRL pin fitted

RP20-4812DFW/N-HC = 48V 4:1 Input, ±12V Output, Negative Logic CTRL pin fitted, Heatsink fitted

## POWERLINE

### DC/DC-Converter

with 3 year Warranty

RECOM

## 20 Watt

## 2" x 1"

## Single &

## Dual Output

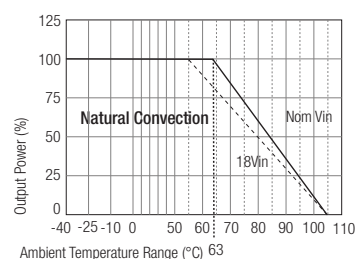


**UL-60950-1 Certified**  
**E196683**

## RP20-FW

## Derating-Graph (Ambient Temperature)

RP20-4805SFW



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 support at [info@recom-development.at](mailto:info@recom-development.at)

**Refer to Application Notes**

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

|                                                                   |                                        |                                |
|-------------------------------------------------------------------|----------------------------------------|--------------------------------|
| Input Voltage Range                                               | 24V nominal input                      | 9-36VDC                        |
|                                                                   | 48V nominal input                      | 18-75VDC                       |
| Input Filter                                                      |                                        | Pi Type                        |
| Input Surge Voltage (100 ms max.)                                 | 24V Input                              | 50VDC                          |
|                                                                   | 48V Input                              | 100VDC                         |
| Input Reflected Ripple (nominal Vin and full load)                |                                        | 20mA <sub>p-p</sub>            |
| Start Up Time (nominal Vin and constant resistor load)            |                                        | 20ms typ.                      |
| Remote ON/OFF <sup>(1)</sup>                                      | DC-DC ON                               | Open or 3.0V < Vr < 12V        |
|                                                                   | DC-DC OFF                              | 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%                            |
| Minimum Load                                                      |                                        | 0%                             |
| Line Regulation (low line, high line at full load)                |                                        | ±0.2%                          |
| Load Regulation (0% to 100% full load)                            | Single                                 | ±0.5%                          |
|                                                                   | Dual                                   | ±1%                            |
| Cross Regulation Dual Output (asymmetrical load 25% <> 100% load) |                                        | ±5%                            |
| Ripple and Noise (20MHz bandwidth, with 1µF MLCC on output)       | 3.3V                                   | 60mV <sub>p-p</sub>            |
|                                                                   | 5.0, 12, 15V                           | 75mV <sub>p-p</sub>            |
|                                                                   | ±5, ±12, ±15V                          | 100mV <sub>p-p</sub>           |
| Temperature Coefficient                                           |                                        | ±0.02%/°C max.                 |
| Transient Response (25% load step change)                         |                                        | 250µs                          |
| Input Voltage Variation, dv/dt                                    | complies with ETS300 132, part 4.4     | 5V/ms                          |
| Over Load Protection (% of full load at nominal Vin)              |                                        | 150% typ                       |
| Overvoltage Protection (Single)                                   |                                        | Zener Diode Clamp              |
| Undervoltage Protection                                           |                                        | See Application Notes          |
| Short Circuit Protection                                          |                                        | Continuous, automatic recovery |
| Efficiency                                                        |                                        | see „Selection Guide“ table    |
| Isolation Voltage (rated for one minute)                          | In to Out and I/O to case              | 1600VDC                        |
| Isolation Resistance                                              |                                        | 10 GΩ min.                     |
| Isolation Capacitance                                             |                                        | 1500pF max.                    |
| Operating Frequency                                               |                                        | 400kHz typ.                    |
| Operating Temperature Range                                       | no derating                            | -40°C to +63°C                 |
|                                                                   | with derating                          | -40°C to +105°C                |
| Maximum Case Temperature                                          |                                        | +105°C                         |
| Storage Temperature Range                                         |                                        | -55°C to +125°C                |
| Thermal Impedance <sup>(8)</sup>                                  | Natural convection                     | 12°C/Watt                      |
|                                                                   | with Heatsink                          | 10°C/Watt                      |
| Case Material                                                     |                                        | Nickel plated copper           |
| Base Material                                                     |                                        | Non-conductive black plastic   |
| Potting Material                                                  |                                        | Epoxy (UL94-V0)                |
| Weight                                                            |                                        | 27g                            |
| Packing Quantity                                                  | Refer to App Notes for tube dimensions | 9 pcs per Tube                 |

continued on next page

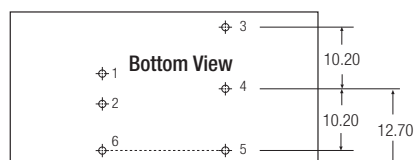
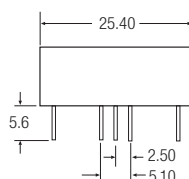
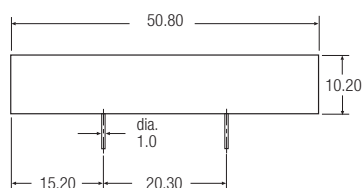
## Specifications (typical at nominal input and 25°C unless otherwise noted)

|                                    |                       |                                        |
|------------------------------------|-----------------------|----------------------------------------|
| Conducted Emissions <sup>(3)</sup> | EN55022               | Class A                                |
| Radiated Emissions <sup>(3)</sup>  | EN55022               | Class A                                |
| ESD                                | EN61000-4-2           | Perf. Criteria B                       |
| Radiated Immunity                  | EN61000-4-3           | Perf. Criteria A                       |
| Fast Transient                     | EN61000-4-4           | Perf. Criteria B                       |
| Surge                              | EN61000-4-5           | Perf. Criteria B                       |
| Conducted Immunity                 | EN61000-4-6           | Perf. Criteria A                       |
| Thermal Shock                      |                       | MIL-STD-810D                           |
| Vibration                          |                       | 10-55Hz, 10G, 30 Min. along X, Y and Z |
| Relative Humidity                  |                       | 5% to 95% RH                           |
| MTBF <sup>(2)</sup>                | Belcore-TR-NWT-000332 | 2350 x 10 <sup>3</sup> hours           |
|                                    | MIL-HDBK-217F         | 659 x 10 <sup>3</sup> hours            |

## Notes :

1. The RP20-S\_DFW 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. Requires external filter to meet EN55022 Class A and B. Refer to Application Notes.
4. Typical value at nominal input voltage and no load.
5. Maximum value at nominal input voltage and full load.
6. Typical value at nominal input voltage and full load.
7. Test by minimum Vin and constant resistor load.
8. Optional Heatsink Part Number 7G-0020-C . Powerline DC/DC Converters can be ordered with pre-mounted heatsinks including antivibration fixing clips (add suffix -HC). See Application Notes for heatsink details.
9. 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).

## 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  $\pm 0.35$  mm

### External Output Trimming

Single Output can be trimmed  $\pm 10\%$  by using external resistors  
See Application Notes for details

