

# 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 rangew 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 (4,5) mA | Efficiency (6) % | Capacitive (7) 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

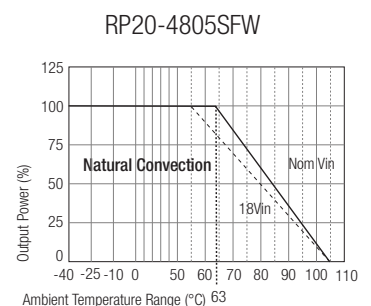


**UL-60950-1 Certified  
E196683**

# RP20-FW

RP20-FW

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

**Please Read 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                 |

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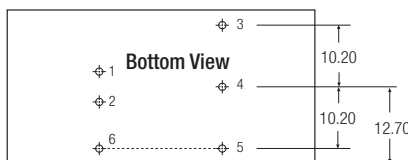
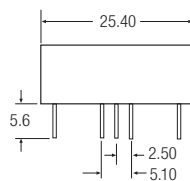
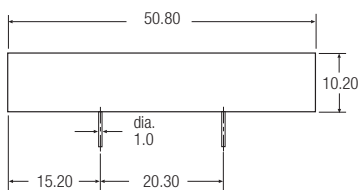
**Specifications** (typical at nominal input and 25°C unless otherwise noted)

|                                    |                        |  |
|------------------------------------|------------------------|--|
| 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>                | Bellcore-TR-NWT-000332 | 2350 x 10 <sup>3</sup> hours           |
|                                    | MIL-HDBK-217F          | 659 x 10 <sup>3</sup> hours            |

**Notes :**

- 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.
- BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment).
- Requires external filter to meet EN55022 Class A and B. Refer to Application Notes.
- Typical value at nominal input voltage and no load.
- Maximum value at nominal input voltage and full load.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistor load.
- 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.
- 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 ±0.35 mm

**External Output Trimming**

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

