

# 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%

## Description

The RP20-F series 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 12V, 24V and 48V Input Types

Part Number	Input Range VDC	Output Voltage VDC	Output Current mA	Input <sup>(4)</sup> Current mA	Efficiency <sup>(5)</sup> %	Capacitive <sup>(6)</sup> Load max.
RP20-123.3SF	9-18	3.3	5000	1719	84	13000µF
RP20-1205SF	9-18	5	4000	2008	87	6800µF
RP20-1212SF	9-18	12	1670	2062	85	2200µF
RP20-1215SF	9-18	15	1330	2052	85	755µF
RP20-243.3SF	18-36	3.3	5000	838	86	13000µF
RP20-2405SF	18-36	5	4000	980	89	6800µF
RP20-2412SF	18-36	12	1670	1006	87	2200µF
RP20-2415SF	18-36	15	1330	1002	87	755µF
RP20-483.3SF	36-75	3.3	5000	414	87	13000µF
RP20-4805SF	36-75	5	4000	490	89	6800µF
RP20-4812SF	36-75	12	1670	497	88	2200µF
RP20-4815SF	36-75	15	1330	500	87	755µF
RP20-1212DF	9-18	±12	±833	2032	86	±680µF
RP20-1215DF	9-18	±15	±667	2034	86	±450µF
RP20-2412DF	18-36	±12	±833	1004	87	±680µF
RP20-2415DF	18-36	±15	±667	1005	87	±450µF
RP20-4812DF	36-75	±12	±833	496	88	±680µF
RP20-4815DF	36-75	±15	±667	502	87	±450µF

\* 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

RP20-2405SF = 24V Input, 5V Output, Positive Logic CTRL pin fitted

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

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

# POWERLINE

DC/DC-Converter

with 3 year Warranty

# RECOM

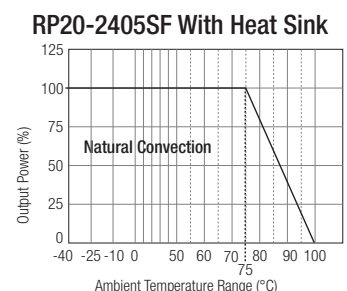
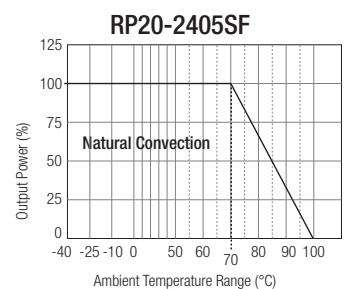
## 20 Watt 2" x 1" Single & Dual Output



**UL-60950-1 Certified  
E196683**

# RP20-F

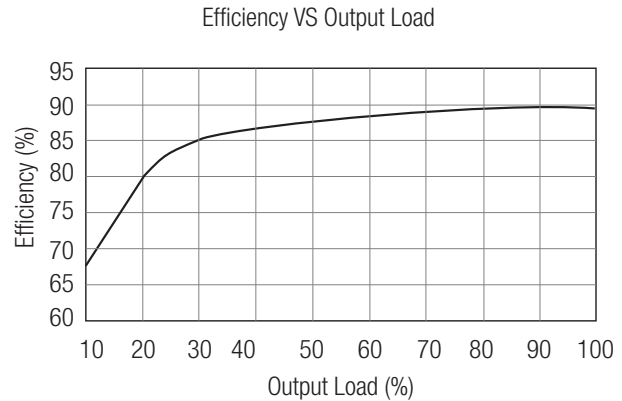
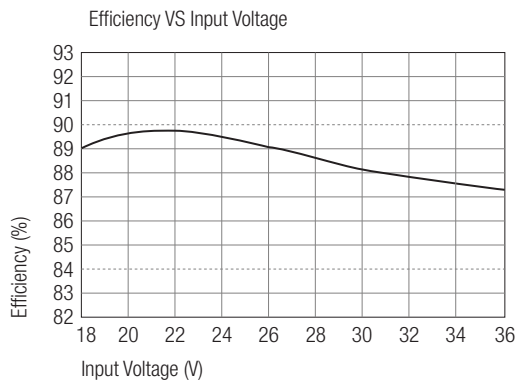
## Derating-Graph (Ambient Temperature)



**Refer to Application Notes**

**Typical Characteristics**

**RP20-2405SF**



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

Input Voltage Range	12V nominal input	9-18VDC
	24V nominal input	18-36VDC
	48V nominal input	36-75VDC
Input Filter <sup>(9)</sup>		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	36VDC
	24V Input	50VDC
	48V Input	100VDC
Input Reflected Ripple (nominal Vin and full load) <sup>(3)</sup>		20mA <sub>p-p</sub>
Start Up Time (nominal Vin and constant resistor load)		10ms typ.
Remote ON/OFF <sup>(7)</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%
Voltage Adjustability		±10%
Minimum Load <sup>(1)</sup>	Single	0%
	Dual	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 25% <-> 100% load)	Dual	±5%
Ripple and Noise (20MHz bandwidth, with 1µF MLCC on output) (Measured with a 1004pF/50V MLCC)	Single 1.5, 1.8, 2.5, 3.3V	60mV <sub>p-p</sub>
	Single 5, 12, 15V	75mV <sub>p-p</sub>
	Dual 5, 12, 15V	100mV <sub>p-p</sub>

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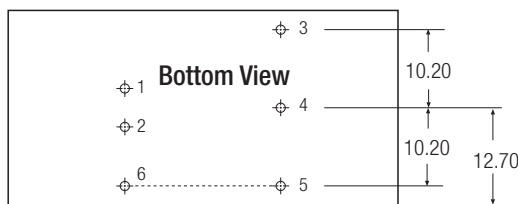
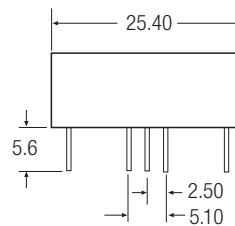
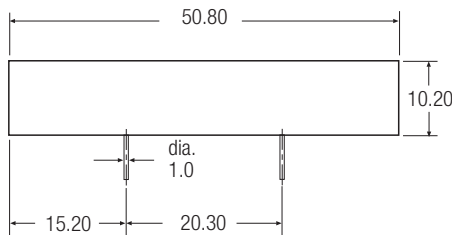
**Specifications** (typical at nominal input and 25°C unless otherwise noted)

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	6.2V
	12V	15V
	15V	18V
Over Load Protection (% of full load at nominal Vin)		150% typ
Undervoltage Lockout		none
Short Circuit Protection		Hiccup, automatic recovery
Efficiency		see „Selection Guide“ table
Isolation Voltage	Input to Output	1600VDC
(rated for one minute)	Input (Output) to case	1600VDC
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 +125°C
Thermal Impedance <sup>(9)</sup>	Natural convection	12°C/Watt
	Natural convection with Heat Sink	10°C/Watt
Thermal Shock		MIL-STD-810D
Vibration		10-55Hz, 10G, 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 <sup>(9, 10)</sup>	EN55022	Class A
Radiated Emissions	EN55022	Class A
ESD	EN61000-4-2	Perf. Criteria B
Radiated Immunity	EN61000-4-3	Perf. Criteria B
Fast Transient	EN61000-4-4	Perf. Criteria B
Surge	EN61000-4-5	Perf. Criteria B
Conducted Immunity	EN61000-4-6	Perf. Criteria B
Weight		27g
Packing Quantity	Refer to App Notes for tube dimensions	9 pcs per Tube
Dimensions		50.8 x 25.4 x 10.2mm
MTBF <sup>(2)</sup>		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-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. 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 KY series, 220μF/100V, ESR 90m Ω.
10. See application notes for Class B common mode filter suggestion.

**Package Style and Pinning (mm)**



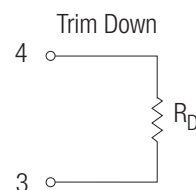
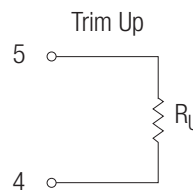
**Pin Connections**

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. See Application Notes for details.



The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.