

POWERLINE - DC/DC-Converter

F-Series, 20W, 1.6 kV Isolation, 2:1 Wide Input Range (Single Output)



RECOM

Features

- 20 Watts max. Output Power
- 2:1 Wide Input Voltage Range
- International Safety Standard Design
- Six-Sided Continuous Shield
- High Efficiency up to 88%
- Standard Package, 50.8 mm x 25.4 mm x 10.2 mm
- Fixed Switching Frequency



Selection Guide 24V and 48V Input Types

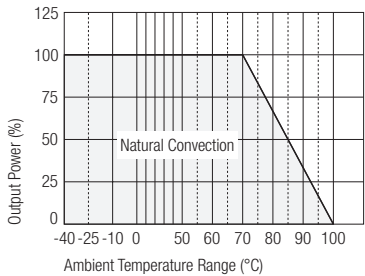
| Part Number | Input Voltage | Output Voltage | Output Current | Input Current (see note 5) | Efficiency % (see note 6) |
|--------------|---------------|----------------|----------------|----------------------------|---------------------------|
| RP20-241.5SF | 18-36VDC | 1.5VDC | 6000mA | 0.500A | 79 |
| RP20-241.8SF | 18-36VDC | 1.8VDC | 6000mA | 0.577A | 82 |
| RP20-242.5SF | 18-36VDC | 2.5VDC | 6000mA | 0.781A | 84 |
| RP20-243.3SF | 18-36VDC | 3.3VDC | 5000mA | 0.838A | 86 |
| RP20-2405SF | 18-36VDC | 5VDC | 4000mA | 0.992A | 88 |
| RP20-481.5SF | 36-75VDC | 1.5VDC | 6000mA | 0.247A | 80 |
| RP20-481.8SF | 36-75VDC | 1.8VDC | 6000mA | 0.285A | 83 |
| RP20-482.5SF | 36-75VDC | 2.5VDC | 6000mA | 0.386A | 85 |
| RP20-483.3SF | 36-75VDC | 3.3VDC | 5000mA | 0.414A | 87 |
| RP20-4805SF | 36-75VDC | 5VDC | 4000mA | 0.490A | 89 |

Maximum Capacitive Load

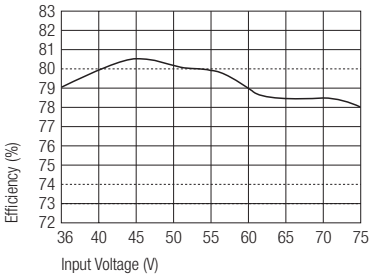
| | |
|--------------|---------|
| RP20-xx1.5SF | 65000µF |
| RP20-xx1.8SF | 65000µF |
| RP20-xx2.5SF | 33000µF |
| RP20-xx3.3SF | 13000µF |
| RP20-xx05SF | 6800µF |

RP20-481.5SF: Derating and Efficiency Curves, External Output Trimming

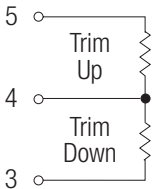
Derating Curve without Heat-Sink



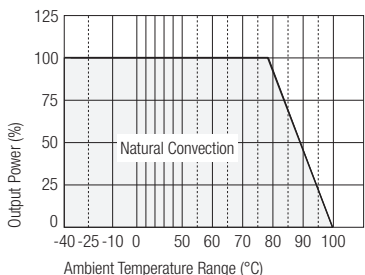
Efficiency vs Input Voltage



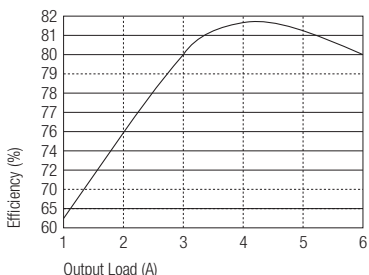
External Output Trimming



Derating Curve with Heat-Sink



Efficiency vs Output Load



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

| | | |
|---|--|-------------------------|
| Output Power | 20W max. | |
| Voltage Accuracy (full Load and nominal Vin) | ±1% | |
| Voltage Adjustability | ±10% | |
| Minimum Load (see note 1) | 10% of FL | |
| Line Regulation (LL-HL at FL) | ±0.2% max. | |
| Load Regulation (10% to 100% FL) | ±0.5% | |
| Ripple and Noise, 20MHz BW (measured with a 104pF/50V MLCC) | 75mVp-p | |
| Temperature Coefficient | ±0.02%/°C max. | |
| Transient Response Recovery Time, 25% Load Step Change | 300µsec | |
| Over Voltage Protection (zener diode clamp): | 1.5V Output | TBD |
| | 1.8V Output | TBD |
| | 2.5V Output | 3.6V |
| | 3.3V Output | 3.9V |
| | 5V Output | 6.2V |
| Over Load Protection (% of full load at nominal Vin) | 150% typ. | |
| Short Circuit Protection | Hiccup, Automatic Recovery | |
| Input Voltage Range | 24V types nominal input | 18-36VDC |
| | 48V types nominal input | 36-75VDC |
| Input Filter | L-C Type | |
| Input Surge Voltage (100 ms max.) | 24V Input | 50VDC |
| | 48V Input | 100VDC |
| Input Reflected Ripple (see note 2) | Nominal Vin and full load | 100mAp-p |
| Start Up Time (nominal Vin and constant resistor load) | 20ms typ. | |
| Remote ON/OFF (see note 3) | DC-DC ON | Open or 3.5V < Vr < 12V |
| | DC-DC OFF | Short or 0V < Vr < 1.2V |
| Remote off Input Current | Nominal Vin | 2.5 mA |
| Isolation Voltage | 1600VDC | |
| Isolation Resistance | 10 ⁹ Ω | |
| Isolation Capacitance | 1000pF | |
| Switching Frequency | 300kHz, typ. | |
| Approved to Safety Standards | UL 1950, EN60950 | |
| Case Material | Nickel-Coated Copper | |
| Base Material | Non-conducted Black Plastic | |
| Potting Material | Epoxy (JL94-V0) | |
| Weight | 27g (0.95 oz) | |
| Dimensions | 50.8 x 25.4 x 10.2 mm | |
| MTBF (MIL-HDBK-217F, TA = 25°C full load) | 3.369 x 10 ⁵ Hours | |
| 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 (see note 4) | Natural convection | 12°C/Watt |
| Thermal Shock | MIL-STD-810D | |
| Vibration | 10-55Hz, 2G, 3 Min. Period, 30 Min. along X, Y and Z | |

continued on next page

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

| | | |
|---------------------|-------------|------------------|
| Relative Humidity | | 5% to 95% RH |
| Conducted Emissions | EN55022 | Level A |
| Radiated Emissions | EN55022 | Level A |
| Conducted Immunity | EN61000-4-6 | Perf. Criteria 2 |
| Radiated Immunity | EN61000-4-3 | Perf. Criteria 2 |
| Surge | EN61000-4-5 | Perf. Criteria 2 |
| Fast Transient | EN61000-4-4 | Perf. Criteria 2 |
| ESD | EN61000-4-2 | Perf. Criteria 2 |

- Notes:
1. The RP20 F-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. Simulated source impedance of 12uH, 12uH inductor in series with +Vin.
 3. The ON/OFF control function. There is positiv logic (standard) and negative logic (option). The pin voltage is referenced to negative input. To order negative logic ON-OFF control add the suffix 'N' (Ex: RP20-2405SFN)
 4. Heat sink is optional and P/N: 7G-0020A. Thermal impedance is 10°C/Watt for natural convection
 5. Maximum value at nominal input voltage and full load.
 6. Typical value at nominal input voltage and full load.

Package Style and Pinning (mm)

