

## Features

- Ultraminiature 25.4 x25.4x9.9mm Package
- 20 Watts Output Power
- Single or Dual Outputs
- Wide 2:1 Input Voltage Range
- 1.6kVDC Isolation
- Fixed Operating Frequency
- Six-Sided Continuous Shield
- Industry Standard Pinout
- Remote On/Off and Trim pins
- Undervoltage Lockout
- Efficiency to 90%

## Description

The RP20-SA series are ultraminiature 2:1 input voltage range power DC/DC converters in a case half the size of industry standard 20W converters. Despite their small size, the RP20-SA converters are fully specified devices with output currents up to 4.5 Amps, up to 91% efficiency, no minimum load, 1600VDC isolation, a built-in Class A EMC filter and low ripple/noise figures. The outputs are also fully protected against short circuits, over-current and overvoltage. The no load input current is particularly low (only 4mA/6mA). The RP20-SA series will find many uses in applications where board space and/or board height is at a premium or in battery-powered systems where standby current is important.

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

Part Number	Input Range VDC	Output Voltage VDC	Output Current mA	Input <sup>(1)</sup> Current mA	Efficiency <sup>(2)</sup> %	Capacitive <sup>(3)</sup> Load max.
RP20-123.3SA**	9-18	3.3	4500	10/1510	86	7000µF
RP20-1205SA**	9-18	5	4000	10/1960	89	5000µF
RP20-1212SA**	9-18	12	1670	10/1960	89	850µF
RP20-1215SA**	9-18	15	1330	10/1960	89	700µF
RP20-243.3SA**	18-36	3.3	4500	6/749	87	7000µF
RP20-2405SA**	18-36	5	4000	6/969	90	5000µF
RP20-2412SA**	18-36	12	1670	6/969	90	850µF
RP20-2415SA**	18-36	15	1330	6/958	91	700µF
RP20-483.3SA**	36-75	3.3	4500	4/373	87	7000µF
RP20-4805SA**	36-75	5	4000	4/490	89	5000µF
RP20-4812SA**	36-75	12	1670	4/484	90	850µF
RP20-4815SA**	36-75	15	1330	4/484	90	700µF
RP20-1212DA**	9-18	±12	±833	10/1960	89	±500µF
RP20-1215DA**	9-18	±15	±677	10/1938	90	±350µF
RP20-2412DA**	18-36	±12	±833	6/969	90	±500µF
RP20-2415DA**	18-36	±15	±677	6/969	90	±350µF
RP20-4812DA**	36-75	±12	±833	4/490	89	±500µF
RP20-4815DA**	36-75	±15	±677	4/484	90	±350µF

\*\* Standard part is without suffixes and Trim and CTRL pins are not fitted.

\* add suffix /P for CTRL function with positive logic (1=ON, 0=OFF) including trim pin for single output

\* add suffix /N for CTRL function with negative logic (0=ON, 1=OFF) including trim pin for single output

\* add suffix -HC for premounted heatsink and clips

## Ordering Examples

RP20-2405SA/P = 24V Input, 5V Output, Positive Logic CTRL pin and Trim pin fitted

RP20-4812DA-HC = 48V Input, ±12V Output, Heatsink fitted

## POWERLINE

DC/DC-Converter

with 3 year Warranty

RECOM

20 Watt

1" x 1"

Single &

Dual Output



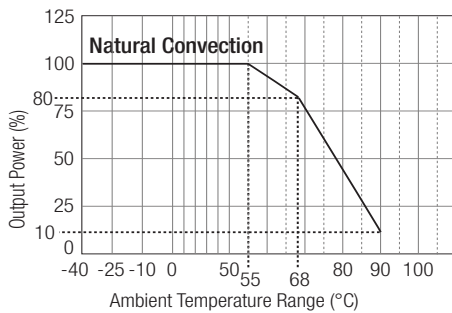
UL-60950-1 Certification  
Pending

RP20-A

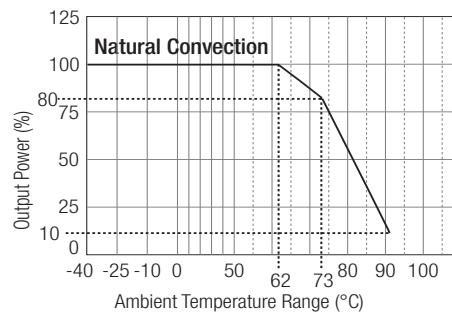
Please Read Application Notes

www.recom-electronic.com

**Derating Graphs** (ambient Temperature)



**RP20-4805SA**



**RP20-4805SA  
With Heat Sink**

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)

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

Input Voltage Range	12V nominal input 24V nominal input 48V nominal input	9-18VDC 18-36VDC 36-75VDC
Input Filter	Pi Type	Class A
Input Surge Voltage (1000 ms max.)	12V Input 24V Input 48V Input	25VDC 50VDC 100VDC
Input Reflected Ripple (nominal Vin and full load) (see Note 4)		30mAp-p
Start Up Time (nominal Vin and constant resistor load)		30ms max.
Optional Remote ON/OFF (See Note 5) (Negative logic)	DC-DC ON DC-DC OFF	Short or 0V < Vr < 1.2V Open or 3.0V < Vr < 15V
Remote Pin drive current	Nominal Vin	-0.5mA~1mA
Remote OFF input current	Nominal Vin	2mA
Output Voltage Accuracy (full Load and nominal Vin)		±1%
Optional Output Trim (see Note 5)		±10%
Minimum Load		0%
Line Regulation (low line, high line at full load)	Single Dual	±0.2% ±0.5%
Load Regulation (0% to full load)	Single Dual	±0.2% ±1%
Cross Regulation (Asymmetrical 25% <-> 100% load)	Dual Output	±5%
Ripple and Noise (20MHz bandwidth)	3.3, 5V Outputs Others	75mVp-p 100mVp-p
Temperature Coefficient		±0.02%/°C max.
Transient Response	25% load step change	250µs
Over Voltage Protection	3.3V	3.7-5.4V
Zener diode clamp (only single)	5V 12V 15V	5.4-7.0V 13.5-19.6V 16.8-20.5V
Over Load Protection (% of full load at nominal Vin)		150% typ
Undervoltage Lockout		See Application Notes
Short Circuit Protection		Hiccup, automatic recovery
Efficiency		see „Selection Guide“ table
Isolation Voltage (rated for one minute)		1600VDC
Isolation Resistance		1 GΩ min.
Isolation Capacitance		1000pF max.

continued on next page

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

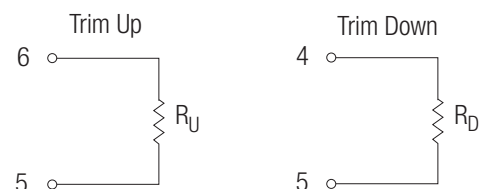
Operating Frequency		330kHz typ.
Operating Temperature Range		-40°C to +90°C(with derating)
Maximum Case Temperature		+105°C
Storage Temperature Range		-55°C to +125°C
Thermal Impedance (see Note 6)	Natural convection Natural convection with Heat Sink	18.2°C/Watt 15.8°C/Watt
Thermal Shock		MIL-STD-810F
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z
Relative Humidity		5% to 95% RH
Case Material		Nickel plated copper
Base Material		FR4 PCB
Potting Material		Epoxy (UL94-V0)
Conducted Emissions (see Note 7)	EN55022	Class A
Radiated Emissions	EN55022	Class A
ESD	EN61000-4-2	Perf. Criteria A
Radiated Immunity	EN61000-4-3	Perf. Criteria A
Fast Transient	EN61000-4-4	Perf. Criteria A
Surge (see note 8)	EN61000-4-5	Perf. Criteria A
Conducted Immunity	EN61000-4-6	Perf. Criteria A
Weight		15g
Packing Quantity	Refer to App Notes for tube dimensions	8 pcs per Tube
Dimensions		25.4 x 25.4 x 9.9mm
MTBF (see Note 9)	Bellcore TR-NWT-000332 MIL-HDBK 217F	1766 x 10 <sup>3</sup> hours 553 x 10 <sup>3</sup> hours

**Notes :**

1. Values at nominal input voltage and no load/full load.
2. Typical Value at nominal input voltage and full load.
3. Test by minimum Vin and constant resistor load.
4. Simulated source impedance of 12µH. 12µH inductor in series with +Vin.
5. The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to negative input.  
Positive logic ON/OFF is marked with suffix-P (eg. RP20-2405SA/P)  
Negative logic ON/OFF is marked with suffix-N (eg. RP20-2405SA/N).  
If no suffix is specified, the control pin will be omitted.
6. Optional Heat-sink P/N is 7G-0047-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.
7. Meets Class A with external input capacitors shown below. Will meet Class B with external common mode filter (see Application Notes)
8. Requires external capacitor to meet EN61000-4-5: 220µF/100V, low ESR (48mOhm)
9. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C.  
MIL-HDBK 217F Notice 2. Ta = 25°C, full load, (Ground, Benign, controlled environment).

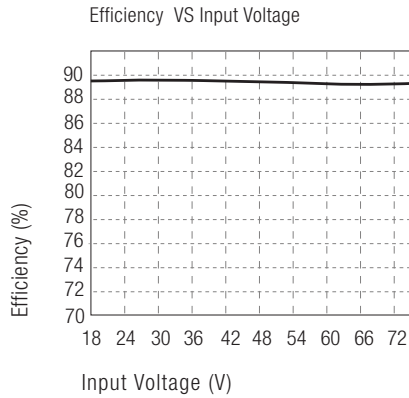
**External Output Trimming (optional)**

With suffix /CTRL, the output can be externally trimmed by using the method shown here.  
See Application Notes for details

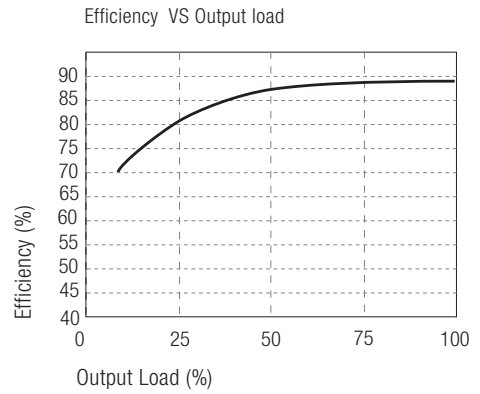


**Typical Characteristics**

**RP20-4805SA (Full Load)**

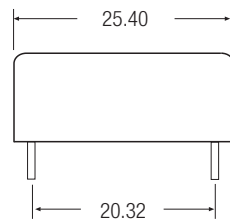
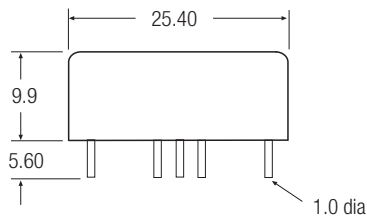


**RP20-4805SA (Vin=48V)**



**Package Style and Pinning (mm)**

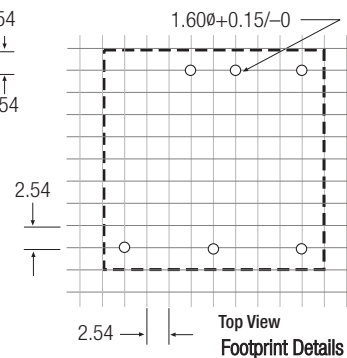
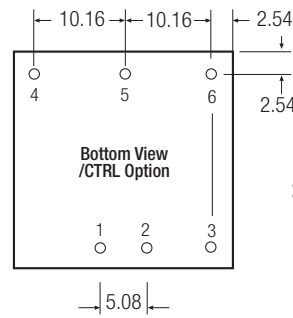
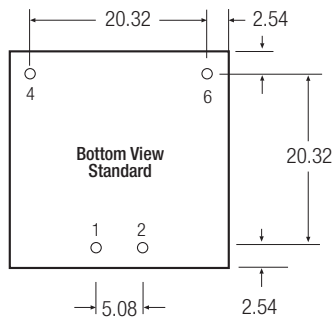
3rd angle projection



**Pin Connections**

Pin #	Single	Single/P or /N	Dual	Dual/P or /N
1	+Vin	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin	-Vin
3	no pin	CTRL	no pin	CTRL
4	+Vout	+Vout	+Vout	+Vout
5	no pin	Trim	Com	Com
6	-Vout	-Vout	-Vout	-Vout

Case Tolerance  $\pm 0.5$  mm  
Pin Pitch Tolerance  $\pm 0.25$  mm



**RP20-A**

**EMC Filtering**

**Class B Filter**

Vin=24V: C1=4.7 $\mu$ F/25V 1812 MLCC, C2 & C3 omitted, C4 & C5 =470pF/2kV  
 Vin=24V: C1=4.7 $\mu$ F/50V 1812 MLCC, C2 & C3 omitted, C4 & C5 =470pF/2kV  
 Vin=48V: C1, C2 & C3 = 2.2 $\mu$ F/100V 1812 MLCC, C4 & C5 =1nF/2kV

