

Features

- Ultraminiature 25.4 x 25.4 x 9.9mm 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, overcurrent 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 Current mA ⁽¹⁾	Efficiency % ⁽²⁾	Capacitive Load max. ⁽³⁾
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

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

POWERLINE

DC/DC-Converter

with 3 year Warranty

RECOM

20 Watt

1" x 1"

Single & Dual Output

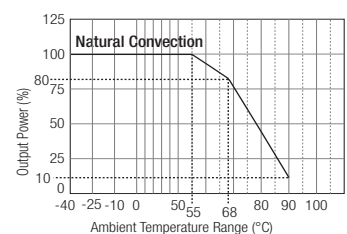


UL-60950-1 Certification Pending

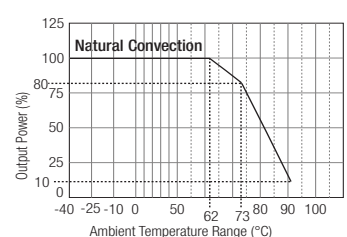
RP20-A

Derating Graph (Ambient Temperature)

RP20-4805SA



RP20-4805SA With Heat Sink



Please Read Application Notes

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	Pi Type	Class A
Input Surge Voltage (1000 ms max.)	12V Input	25VDC
	24V Input	50VDC
	48V Input	100VDC
Input Reflected Ripple (nominal Vin and full load) ⁽⁴⁾		30mA _{p-p}
Start Up Time (nominal Vin and constant resistor load)		30ms max.
Optional Remote ON/OFF ⁽⁵⁾ (Negative logic)	DC-DC ON	Short or 0V < Vr < 1.2V
	DC-DC OFF	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 ⁽⁵⁾		±10%
Minimum Load		0%
Line Regulation (low line, high line at full load)	Single	±0.2%
	Dual	±0.5%
Load Regulation (0% to full load)	Single	±0.2%
	Dual	±1%
Cross Regulation (Asymmetrical 25% <> 100% load)	Dual Output	±5%
Ripple and Noise (20MHz bandwidth, with 1µF MLCC on output)	3.3, 5V Outputs	75mV _{p-p}
	Others	100mV _{p-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	5.4-7.0V
	12V	13.5-19.6V
	15V	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.
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

continued on next page

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

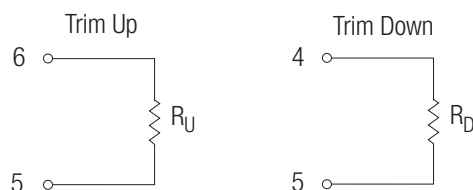
Thermal Impedance ⁽⁶⁾	Natural convection	18.2°C/Watt
	Natural convection with Heat Sink	15.8°C/Watt
Thermal Shock		MIL-STD-810F
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z
Relative Humidity		5% to 95% RH
Case Material		Nickel plated copper
Base Material		FR4 PCB
Potting Material		Epoxy (UL94-V0)
Conducted Emissions ⁽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 ⁽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 ⁽⁹⁾	Belcore TR-NWT-000332	1766 x 10 ³ hours
	MIL-HDBK 217F	553 x 10 ³ hours

Notes :

- Values at nominal input voltage and no load/full load.
- Typical Value at nominal input voltage and full load.
- Test by minimum Vin and constant resistor load.
- Simulated source impedance of 12μH. 12μH inductor in series with +Vin.
- 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.
- 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.
- Meets Class A with external input capacitors shown below. Will meet Class B with external common mode filter (see Application Notes)
- Requires external capacitor to meet EN61000-4-5: 220μF/100V, low ESR (48mOhm)
- 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).

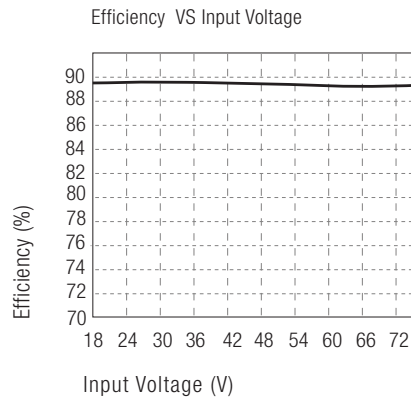
External Output Trimming (optional)

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

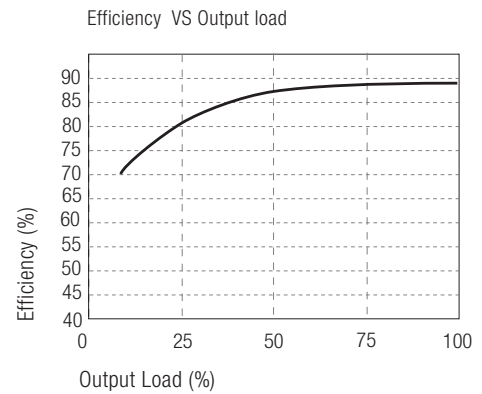


Typical Characteristics

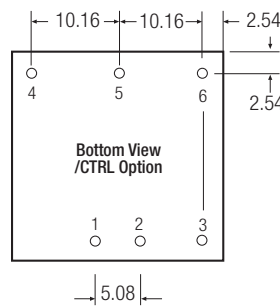
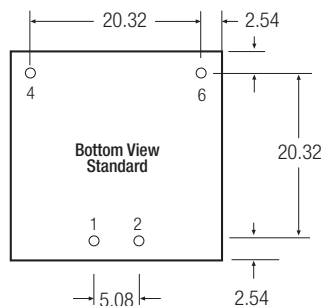
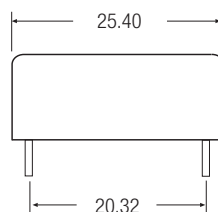
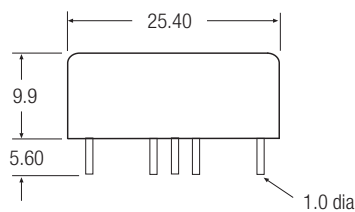
RP20-4805SA (Full Load)



RP20-4805SA (Vin=48V)



Package Style and Pinning (mm)

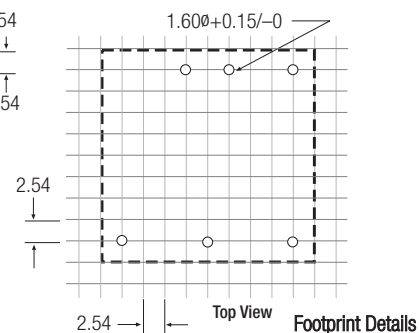


Pin Connections

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 ± 0.5 mm

Pin Pitch Tolerance ± 0.25 mm



EMC Filtering

Class B Filter

Vin=24V: C1=4.7 μ F/25V 1812 MLCC, C2 & C3 omitted, C4 & C5 =470pF/2kV

Vin=24V: C1=4.7 μ F/50V 1812 MLCC, C2 & C3 omitted, C4 & C5 =470pF/2kV

Vin=48V: C1, C2 & C3 = 2.2 μ F/100V 1812 MLCC, C4 & C5 =1nF/2kV

