

Features

- Ultraminiature 25.4 x 25.4 x 9.9mm Package
- 20 Watts Output Power
- Single or Dual Outputs
- Wide 4:1 Input Voltage Range
- 1.6kVDC Isolation
- Fixed Operating Frequency
- Built-in Class A EMC Filter
- Six-Sided Continuous Shield
- Industry Standard Pinout
- Remote On/Off and Trim pins
- Efficiency to 90%

Description

The RP20-SAW series are ultraminiature wide input voltage range power DC/DC converters in a case half the size of industry standard 20W converters. Despite their small size, the RP20-SAW converters are fully specified devices with output currents up to 4.5 Amps, up to 90% 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-SAW 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 24V and 48V Input Types

Part Number	Input Range VDC	Output Voltage VDC	Output Current mA	Input ⁽¹⁾ Current mA	Efficiency ⁽²⁾ %	Capacitive ⁽³⁾ Load max.
RP20-243.3SAW**	9-36	3.3	4500	6/754	86	7000µF
RP20-2405SAW**	9-36	5	4000	6/980	89	5000µF
RP20-2412SAW**	9-36	12	1670	6/980	89	850µF
RP20-2415SAW**	9-36	15	1330	6/980	89	700µF
RP20-483.3SAW**	18-75	3.3	4500	4/737	87	7000µF
RP20-4805SAW**	18-75	5	4000	4/490	89	5000µF
RP20-4812SAW**	18-75	12	1670	4/490	89	850µF
RP20-4815SAW**	18-75	15	1330	4/484	90	700µF
RP20-2412DAW**	9-36	±12	±833	6/980	89	±500µF
RP20-2415DAW**	9-36	±15	±667	6/969	90	±350µF
RP20-4812DAW**	18-75	±12	±833	4/490	89	±500µF
RP20-4815DAW**	18-75	±15	±667	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

RP20-2405SAW/P = 24V 4:1 Input, 5V Output, Positive Logic CTRL pin and Trim pin fitted.

RP20-483.3SAW-HC = 48V 4:1 Input, 3.3V Output, Premounted Heatsink, No Trim or CTRL pins.

RP20-4812DAW/N = 48V 4:1 Input, ±12V Output, Negative Logic CTRL pin

(no trim pin available with dual output)

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 Single & Dual Output

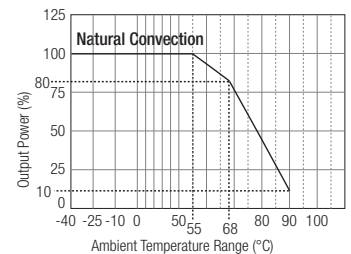


**UL-60950-1 Certification
Pending**

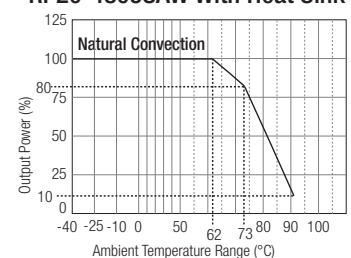
RP20-AW

Derating Graph (Ambient Temperature)

RP20-4805SAW



RP20-4805SAW With Heat Sink



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	EN55022 Class A
Input Surge Voltage (1000 ms max.)	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 ⁽⁶⁾ (Negative logic)	DC-DC ON	Short or $0V < V_r < 1.2V$
	DC-DC OFF	Open or $3.0V < V_r < 15V$
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)	Input - Output	1600VDC
Isolation Resistance		1 GΩ min.
Isolation Capacitance		1500pF 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
Thermal Impedance ⁽⁶⁾	Natural convection	18.2°C/Watt
	Natural convection with Heat Sink	15.8°C/Watt

continued on next page

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

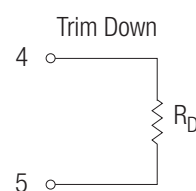
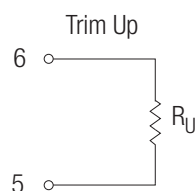
Thermal Shock			MIL-STD-810F
Vibration			10-55Hz, 10G, 30 Min. along X, Y and Z
Relative Humidity			5% to 95% RH
Case Material			Nickel plated copper
Base Material			FR4 PCB
Potting Material			Epoxy (UL94-V0)
Conducted Emissions ⁽⁷⁾		EN55022	Class A
Radiated Emissions		EN55022	Class B
ESD	±8kV Air, ±6kV Contact	EN61000-4-2	Perf. Criteria A
Radiated Immunity	10V/m	EN61000-4-3	Perf. Criteria A
Fast Transient	±2kV	EN61000-4-4	Perf. Criteria A
Surge ⁽⁸⁾	±2kV	EN61000-4-5	Perf. Criteria A
Conducted Immunity	10Vrms	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⁾		Bellcore TR-NWT-000332	1766 x 10 ³ hours
		MIL-HDBK 217F	553 x 10 ³ 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. RP20-2405SAW/P)
Negative logic ON/OFF is marked with suffix-N (eg. RP20-2405SAW/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. Will meet Class B with external common mode filter (see Application Notes). Meets Class A with no external components.
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).

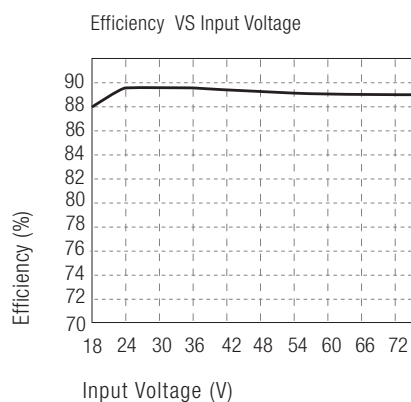
External Output Trimming (optional)

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

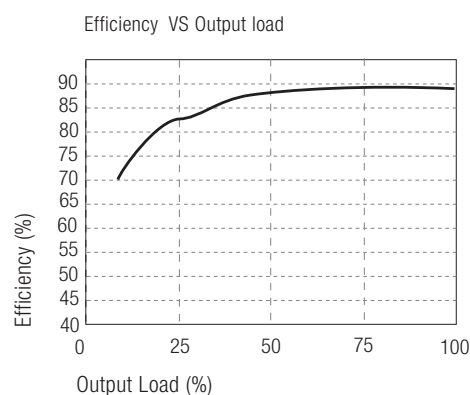


Typical Characteristics

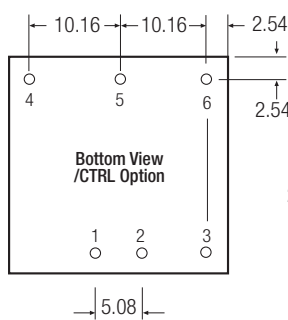
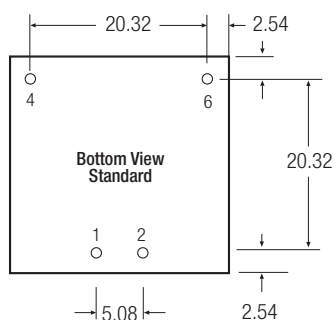
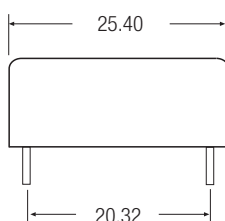
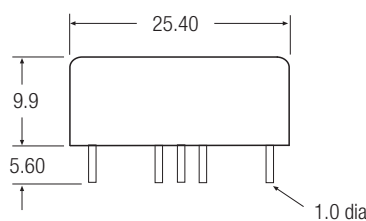
RP20-4805SAW (Full Load)



RP20-4805SAW (Vin=48V)



Package Style and Pinning (mm)

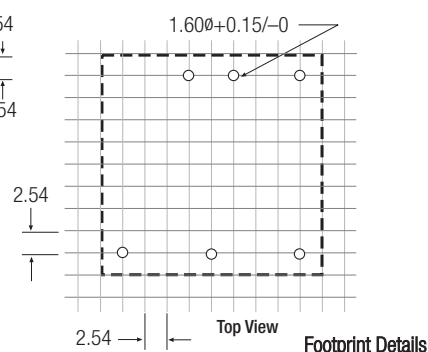


Pin Connections

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/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

