

## Features

- Ultraminiature 25.4 x25.4x9.9mm Package
- 15 Watts Output Power
- Single or Dual Outputs
- Wide 4:1 Input Voltage Range
- 1.6kVDC Isolation
- Fixed Operating Frequency
- Six-Sided Continuous Shield
- Industry Standard Pinout
- Remote On/Off and Trim pins
- Efficiency to 87 %

## Description

The RP15-SAW series are ultraminiature wide input voltage range power DC/DC converters in a case half the size of industry standard 15W converters. Despite their small size, the RP15-SAW converters are fully specified devices with output currents up to 4 Amps, no minimum load, 1600VDC isolation and low ripple/noise figures. The outputs are also fully protected against short circuits, overcurrent and overvoltage. The RP15-SAW series will find many uses in applications where board space and/or board height is at a premium.

## Selection Guide 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. |
|-----------------|-----------------|--------------------|-------------------|---------------------------------|-----------------------------|-------------------------------------|
| RP15-243.3SAW** | 9-36            | 3.3                | 4000              | 50/688                          | 86                          | 1000µF                              |
| RP15-2405SAW**  | 9-36            | 5                  | 3000              | 70/762                          | 86                          | 1000µF                              |
| RP15-2412SAW**  | 9-36            | 12                 | 1300              | 20/783                          | 87                          | 330µF                               |
| RP15-2415SAW**  | 9-36            | 15                 | 1000              | 20/753                          | 87                          | 220µF                               |
| RP15-483.3SAW** | 18-75           | 3.3                | 4000              | 40/336                          | 86                          | 1000µF                              |
| RP15-4805SAW**  | 18-75           | 5                  | 3000              | 40/382                          | 86                          | 1000µF                              |
| RP15-4812SAW**  | 18-75           | 12                 | 1300              | 15/392                          | 87                          | 330µF                               |
| RP15-4815SAW**  | 18-75           | 15                 | 1000              | 15/377                          | 87                          | 220µF                               |
| RP15-2405DAW**  | 9-36            | ±5                 | ±1500             | 20/772                          | 85                          | ±500µF                              |
| RP15-2412DAW**  | 9-36            | ±12                | ±625              | 25/753                          | 87                          | ±150µF                              |
| RP15-2415DAW**  | 9-36            | ±15                | ±500              | 25/744                          | 88                          | ±100µF                              |
| RP15-4805DAW**  | 18-75           | ±5                 | ±1500             | 15/386                          | 85                          | ±500µF                              |
| RP15-4812DAW**  | 18-75           | ±12                | ±625              | 15/382                          | 86                          | ±150µF                              |
| RP15-4815DAW**  | 18-75           | ±15                | ±500              | 15/377                          | 87                          | ±100µF                              |

\*\* 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

RP15-2405SAW/P = 24V 4:1 Input, 5V Output, Positive Logic CTRL pin and Trim pin fitted.

RP15-4805DAW-HC = 48V 4:1 Input, ±5V Output, Premounted Heatsink

RP15-483.3DAW/N = 48V 4:1 Input, ±5V Output, Negative Logic CTRL pin  
(no trim pin with dual output)

## POWERLINE

DC/DC-Converter

with 3 year Warranty



## 15 Watt Single & Dual Output

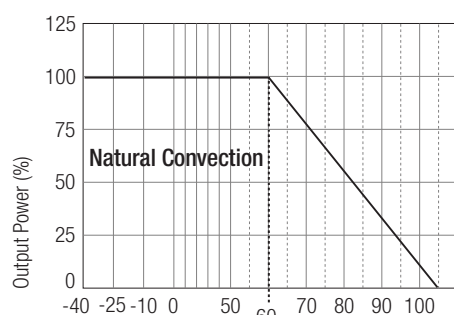


**UL-60950-1 Certified**  
**E196683**

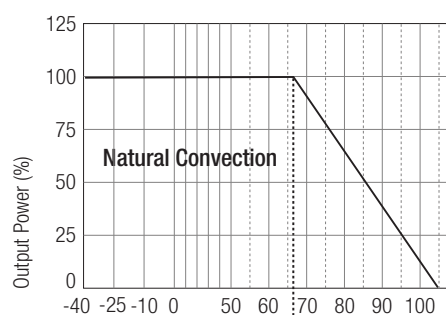
# RP15-AW

Please Read Application Notes

## Typical Characteristics



**RP15-4805SAW**



**RP15-4805SAW  
With Heat Sink**

Ambient Temperature Range (°C)

Ambient Temperature Range (°C)

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                                             | 24V nominal input<br>48V nominal input | 9-36VDC<br>18-75VDC                         |
| Input Filter                                                    |                                        | Pi Type                                     |
| Input Surge Voltage (100 ms max.)                               | 24V Input<br>48V Input                 | 50VDC<br>100VDC                             |
| Input Reflected Ripple (nominal Vin and full load) (see Note 4) |                                        | 30mA <sub>p-p</sub>                         |
| Start Up Time (nominal Vin and constant resistor load)          |                                        | 30ms max.                                   |
| Optional Remote ON/OFF (See Note 5)                             | DC-DC ON                               | Short or 0V < Vr < 1.2V                     |
| (Negative logic)                                                | DC-DC OFF                              | Open or 3.0V < Vr < 12V                     |
| Remote Pin drive current                                        | Nominal Vin                            | -0.5mA~1.0mA                                |
| Remote OFF input current                                        | Nominal Vin                            | 2.5mA                                       |
| 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<br>Dual                         | ±0.2%<br>±0.5%                              |
| Load Regulation (0% to full load)                               | Single<br>Dual                         | ±0.2%<br>±1%                                |
| Cross Regulation (Asymmetrical 25% <> 100% load)                | Dual Output                            | ±5%                                         |
| Ripple and Noise (20MHz bandwidth)                              | 3.3, 5V Outputs<br>Others              | 75mV <sub>p-p</sub><br>100mV <sub>p-p</sub> |
| 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.                                 |

continued on next page

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

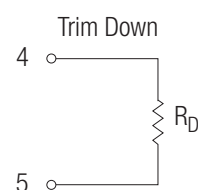
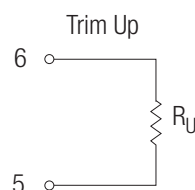
|                                   |                                        |                              |
|-----------------------------------|----------------------------------------|------------------------------|
| Operating Frequency               | 400kHz typ                             |                              |
| Operating Temperature Range       | -40°C to +85°C(with derating)          |                              |
| Maximum Case Temperature          | +105°C                                 |                              |
| Storage Temperature Range         | -55°C to +125°C                        |                              |
| Thermal Impedance<br>(see Note 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 (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)                 | Belcore TR-NWT-000332                  | 1330 x 10 <sup>3</sup> hours |
|                                   | MIL-HDBK 217F                          | 563 x 10 <sup>3</sup> 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. RP15-2405SAW/P)  
Negative logic ON/OFF is marked with suffix-N (eg. RP15-2405SAW/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)

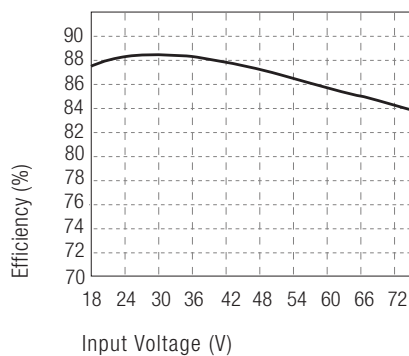
With /CTRL suffix, output can be externally trimmed by using the method shown here.  
See Application Notes for details.



## Typical Characteristics

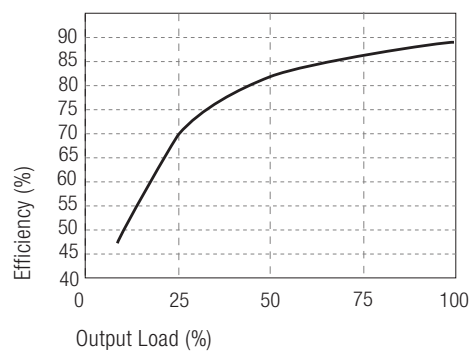
### RP15-4805SAW

Efficiency VS Input Voltage



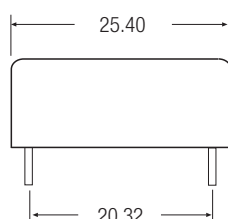
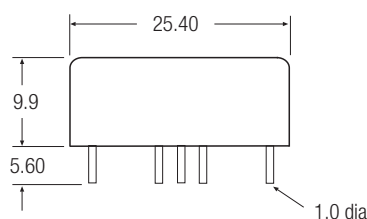
### RP15-4805SAW

Efficiency VS Output load



## Package Style and Pinning (mm)

3rd angle projection

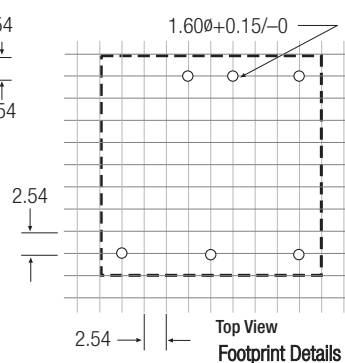
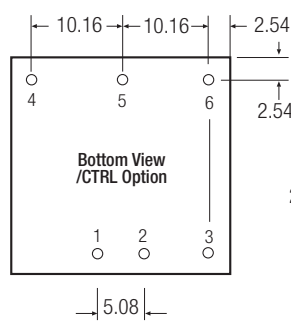
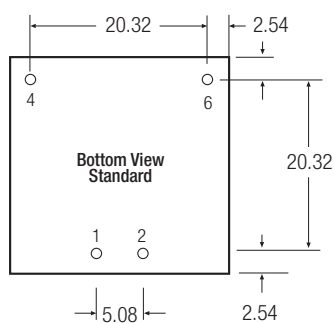


Pin Connections

| Pin # | Single | Single/<br>P or /N | Dual   | Dual/<br>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



RP15-AW

## EMC Filtering - For Class B filter suggestion, see Application Notes

### Class A Filter

Vin=24V: C1=6.8 $\mu$ F/50V 1812 MLCC, C2 omitted.

Vin=48V: C1, C2 = 2.2 $\mu$ F/100V 1812 MLCC

