

## Features

### Regulated Converters

- 4:1 Wide Input Voltage Ranges
- High Input Voltage Range (110VDC)
- 8 Watts Regulated Output Power
- 1.6kVDC Isolation
- Protected Outputs
- Five-Sided Shield
- No Derating to 81°C Ambient
- Standard DIP24 and SMD-Pinning
- Efficiency up to 88 %

### Description

The RP08-AW series wide range input DC/DC converters are certified to UL 60950-1 and cUL 60950-1. This makes them ideal for all telecom and industrial applications where approved safety standards are required.

The 24V and 110VDC input versions have been especially designed for railway applications.

The DIP24 package is available in both pinned and SMD case styles and meets military standards for thermal shock and vibration tolerance.

### Selection Guide 24V, 48 and 110V Wide Input Types

| Part Number        | Input Range VDC     | Output Voltage VDC | Output Current mA | Input <sup>(4,5)</sup> Current mA | Efficiency <sup>(6)</sup> % | Capacitive <sup>(7)</sup> Load max. |
|--------------------|---------------------|--------------------|-------------------|-----------------------------------|-----------------------------|-------------------------------------|
| <b>DIP24 (SMD)</b> |                     |                    |                   |                                   |                             |                                     |
| RP08-243.3SAW**    | 9-40 <sup>(9)</sup> | 3.3                | 2400              | 40/407                            | 85                          | 1330µF                              |
| RP08-2405SAW**     | 9-40 <sup>(9)</sup> | 5                  | 1600              | 40/402                            | 87                          | 1330µF                              |
| RP08-2412SAW**     | 9-40 <sup>(9)</sup> | 12                 | 666               | 25/407                            | 86                          | 288µF                               |
| RP08-2415SAW**     | 9-40 <sup>(9)</sup> | 15                 | 533               | 25/407                            | 86                          | 200µF                               |
| RP08-483.3SAW**    | 18-75               | 3.3                | 2400              | 20/204                            | 85                          | 1330µF                              |
| RP08-4805SAW**     | 18-75               | 5                  | 1600              | 20/201                            | 87                          | 1330µF                              |
| RP08-4812SAW**     | 18-75               | 12                 | 666               | 13/201                            | 87                          | 288µF                               |
| RP08-4815SAW**     | 18-75               | 15                 | 533               | 13/198                            | 88                          | 200µF                               |
| RP08-1103.3SAW**   | 43-160              | 3.3                | 2400              | 8/90                              | 85                          | 1330µF                              |
| RP08-11005SAW**    | 43-160              | 5                  | 1600              | 8/90                              | 85                          | 1330µF                              |
| RP08-11012SAW**    | 43-160              | 12                 | 666               | 4/88                              | 86                          | 288µF                               |
| RP08-11015SAW**    | 43-160              | 15                 | 533               | 4/88                              | 86                          | 200µF                               |
| RP08-2405DAW**     | 9-40 <sup>(9)</sup> | ±5                 | ±800              | 20/417                            | 84                          | ±900µF                              |
| RP08-2412DAW**     | 9-40 <sup>(9)</sup> | ±12                | ±333              | 25/407                            | 86                          | ±133µF                              |
| RP08-2415DAW**     | 9-40 <sup>(9)</sup> | ±15                | ±267              | 25/407                            | 86                          | ±90µF                               |
| RP08-4805DAW**     | 18-75               | ±5                 | ±800              | 10/208                            | 84                          | ±900µF                              |
| RP08-4812DAW**     | 18-75               | ±12                | ±333              | 13/201                            | 87                          | ±133µF                              |
| RP08-4815DAW**     | 18-75               | ±15                | ±267              | 13/201                            | 87                          | ±90µF                               |
| RP08-11005DAW**    | 43-160              | ±5                 | ±800              | 5/93                              | 82                          | ±900µF                              |
| RP08-11012DAW**    | 43-160              | ±12                | ±333              | 5/90                              | 85                          | ±133µF                              |
| RP08-11015DAW**    | 43-160              | ±15                | ±267              | 5/90                              | 85                          | ±90µF                               |

\*\* add Suffix SMD for SMD package

## POWERLINE

### DC/DC-Converter

with 3 year Warranty

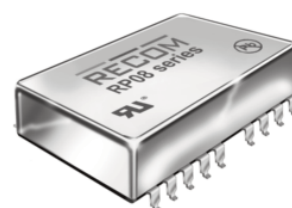
RECOM

### 8 Watt

### DIP24/SMD,

### Single &

### Dual Output



**UL-60950-1 Certified  
E196683**

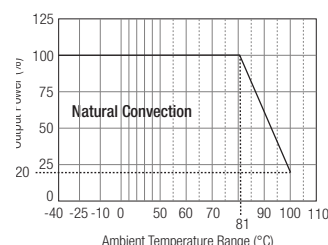
**(Except 110VDC Input  
- UL Pending)**

## RP08-W

## Derating Graph

(Ambient Temperature)

### RP08-4805SAW



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)

**Please Read Application Notes**

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

|                                                               |                                    |                                |
|---------------------------------------------------------------|------------------------------------|--------------------------------|
| Input Voltage Range                                           | 24VDC Input                        | 9-40VDC <sup>(*)</sup>         |
|                                                               | 48VDC Input                        | 18-75VDC                       |
|                                                               | 110VDC Input                       | 43-160VDC                      |
| Input Filter                                                  |                                    | Pi Type                        |
| Input Surge Voltage (100ms max)                               | 24VDC Input                        | 50VDC                          |
|                                                               | 48VDC Input                        | 100VDC                         |
|                                                               | 110VDC Input                       | 170VDC                         |
| Undervoltage Lockout                                          | 24VDC Input                        | Startup: 9V, Shutdown 8V       |
|                                                               | 48VDC Input                        | Startup: 18V, Shutdown 16V     |
|                                                               | 110VDC Input                       | Startup: 43V, Shutdown 42V     |
| Input Reflected Ripple (nominal Vin and full load)            |                                    | 20mA <sub>p-p</sub>            |
| Start Up Time (nominal Vin and constant resistor load)        |                                    | 450ms typ.                     |
| Remote ON/OFF <sup>(*)</sup>                                  | DC-DC ON                           | Open or 3.0V < Vr < 12V        |
|                                                               | DC-DC OFF                          | Short or 0V < Vr < 1.2V        |
| Remote OFF input current                                      | Nominal input                      | 2.5mA                          |
| Output Power                                                  |                                    | 8W max.                        |
| Output Voltage Accuracy (full Load and nominal Vin)           |                                    | ±1%                            |
| Minimum Load                                                  |                                    | 0%                             |
| Line Regulation (low line, high line at full load)            |                                    | ±0.2%                          |
| Load Regulation (0% to 100% Load)                             | Single (0% to 100% Load)           | ±0.5%                          |
|                                                               | Dual (0% to 100% Load)             | ±1.0%                          |
|                                                               | Single (10% to 90% Load)           | ±0.3%                          |
|                                                               | Dual (10% to 90% Load)             | ±0.8%                          |
| Cross Regulation Dual Output (asymmetrical 25% <-> 100% load) |                                    | ±5%                            |
| Ripple and Noise (20MHz bandwidth, with 1µF MLCC on output)   |                                    | 75mV <sub>p-p</sub>            |
| Temperature Coefficient                                       |                                    | ±0.02%/°C max.                 |
| Transient Response (25% load step change)                     |                                    | 250µs                          |
| Input Voltage Variation, dv/dt                                | complies with ETS300 132, part 4.4 | 5V/ms                          |
| Over Load Protection (% of full load at nominal Vin)          |                                    | 150% typ                       |
| Overvoltage Protection                                        | 3.3V                               | 3.9V                           |
| Single output only                                            | 5.1V                               | 6.2V                           |
| Zener Diode Clamp                                             | 12V                                | 15V                            |
|                                                               | 15V                                | 18V                            |
| Undervoltage Lockout                                          |                                    | See Application Notes          |
| Short Circuit Protection                                      |                                    | Continuous, automatic recovery |
| Efficiency                                                    |                                    | see „Selection Guide“ table    |
| Isolation Voltage (rated for one minute)                      | In to Out and I/O to Case          | 1600VDC                        |
|                                                               | I/O to Case (SMD)                  | 1000VDC                        |
| Isolation Resistance                                          |                                    | 1 GΩ min.                      |
| Isolation Capacitance                                         |                                    | 1500pF max.                    |
| Operating Frequency                                           |                                    | 300kHz typ.                    |
| Operating Temperature Range (no derating)                     | 5, 12, 15, ±12, ±15V               | -40°C to +78°C                 |
|                                                               | 3.3, ±5V                           | -40°C to +74°C                 |
|                                                               | (with derating)                    | All types                      |
|                                                               |                                    | -40°C to +100°C                |
| Maximum Case Temperature                                      |                                    | +105°C                         |
| Storage Temperature Range                                     |                                    | -55°C to +125°C                |
| Thermal Impedance                                             | Natural convection                 | 20°C/Watt                      |

continued on next page

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

|                                    |                                                             |                              |
|------------------------------------|-------------------------------------------------------------|------------------------------|
| Case Material                      | Nickel-coated copper with non-conductive black plastic base |                              |
| Potting Material                   | Epoxy (UL94-V0)                                             |                              |
| Weight                             | 18g (DIP), 20g (SMD)                                        |                              |
| Packing Quantity                   | Refer to App Notes for tube dimensions                      | 7pcs per Tube                |
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| Conducted Emissions <sup>(9)</sup> | EN55022                                                     | Class A                      |
| Radiated Emissions                 | EN55022                                                     | Class B                      |
| ESD                                | EN61000-4-2                                                 | Perf. Criteria A             |
| Radiated Immunity                  | EN61000-4-3                                                 | Perf. Criteria A             |
| Fast Transient <sup>(9)</sup>      | EN61000-4-4                                                 | Perf. Criteria A             |
| Surge <sup>(9)</sup>               | EN61000-4-5                                                 | Perf. Criteria A             |
| Conducted Immunity                 | EN61000-4-6                                                 | Perf. Criteria A             |
| Thermal Shock                      | MIL-STD-810F                                                |                              |
| Vibration                          | 10-55Hz, 10G, 30 Min. along X, Y and Z                      |                              |
| Relative Humidity                  | 5% to 95% RH                                                |                              |
| MTBF <sup>(2)</sup>                | Bellcore-TR-NWT-000332                                      | 2350 x 10 <sup>3</sup> hours |
|                                    | MIL-HDBK-217F                                               | 1078 x 10 <sup>3</sup> hours |

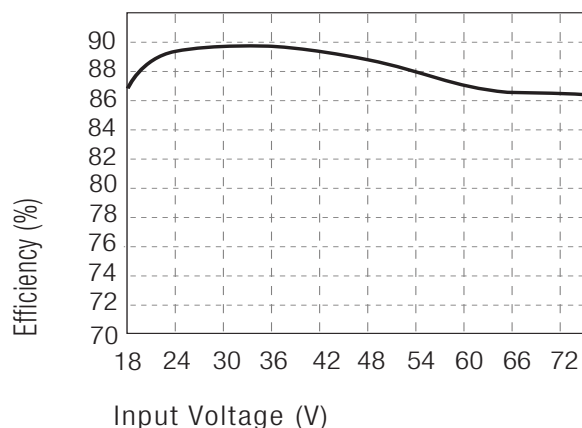
**Notes :**

1. The ON/OFF control pin voltage is referenced to negative input.
2. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground Benign and controlled environment). Mil-HDBK-217F, Notice 2, Full Load, 25°C, Ground Benign.
3. Vin=24V, fit a 1.0μF/50V 1210 MLCC capacitor across the input pins to meet EN55022 Class A.  
Vin=48V, fit a 0.47μF/100V 1810 MLCC capacitor across the input pins to meet EN55022 Class A.  
Vin=110V, fit 2x 0.47μF/250V 1810 MLCC capacitor in parallel across the input pins to meet EN55022 Class A  
See application notes for Class B Filter suggestion.
4. Typical value at nominal input voltage and no load.
5. Maximum value at nominal input voltage and full load
6. Typical value at nominal input voltage and full load.
7. Test by minimum Vin and constant resistor load.
8. Meets EN61000-4-4,-5 with a capacitor across the input. Recom suggests Nippon Chemi-Con KY series, 220μF/100V (24V and 48V) or 150μF/200V (110V)
9. The 24V input voltage range can be used up to 40VDC for 1 second. For a continuous input voltage, 36V is the limit.

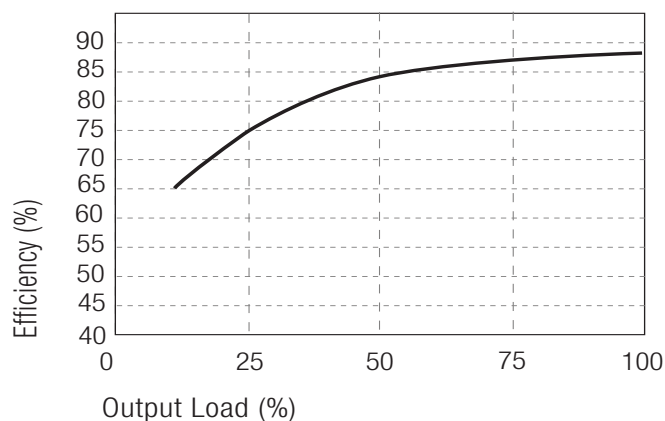
**Typical Performance Graphs**

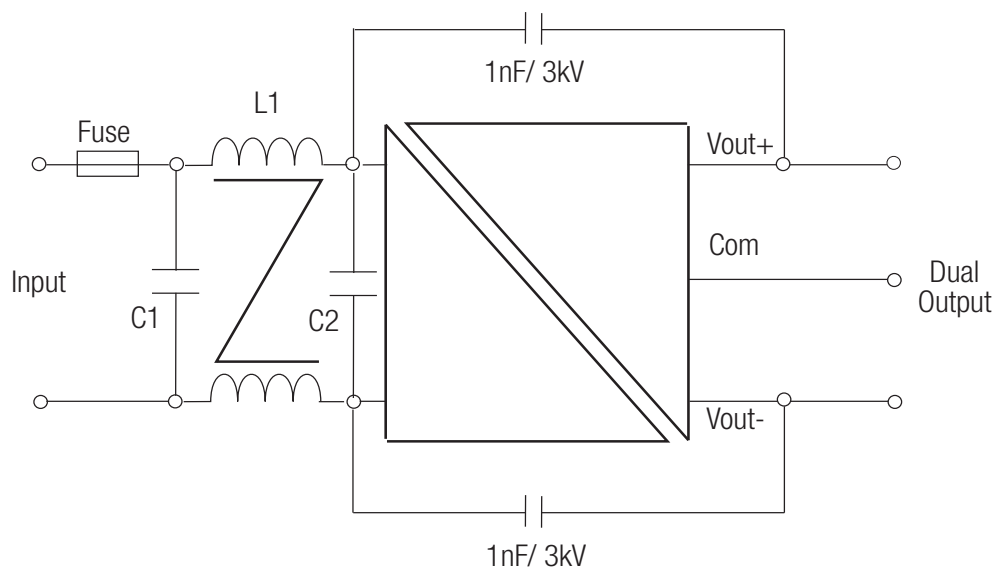
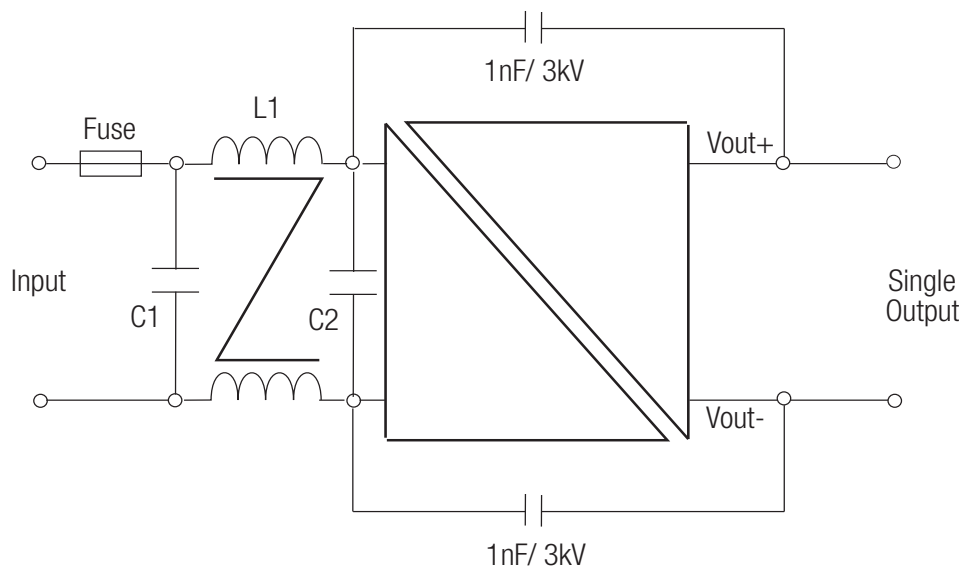
## RP08-4805SAW

Efficiency VS Input Voltage



Efficiency VS Output load



**Class B Filter**

Vin=24V: C1=4.7 $\mu$ F/50V 1812 MLCC, L1 = CMC-06, C2=omit

Vin=48V: C1= 1.5 $\mu$ F/100V 1812 MLCC, L1 = CMC-06, C2=1.5 $\mu$ F/100V 1812 MLCC

Vin=110V: C1= 0.47 $\mu$ F/250V 1812 MLCC, L1 = CMC-06, C2=0.47 $\mu$ F/250V 1812 MLCC

CMC-06 = 2x325 $\mu$ H Common Mode Choke, 3.3A rated, 35mOhm DCR.

# RP08-S\_DAW Series