

## Features

- 2:1 Wide Input Voltage Range
- 12 Watts Output Power
- 1.6kVDC Isolation
- UL Certified
- Over Current Protection
- Five-Sided Shield
- Standard DIP24 and SMD-Pinning
- Efficiency to 88 %

## Description

The RP12-A series DC/DC converter 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 DIP24 package is available in both pinned and SMD case styles and meets military standards for thermal shock and vibration tolerance.

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

| Part Number    | Input Range VDC | Output Voltage VDC | Output Current mA | Input <sup>(4)</sup> Current mA | Efficiency <sup>(5)</sup> % | Capacitive <sup>(6)</sup> Load max. |
|----------------|-----------------|--------------------|-------------------|---------------------------------|-----------------------------|-------------------------------------|
| DIP24 (SMD)    |                 |                    |                   |                                 |                             |                                     |
| RP12-123.3SA** | 9-18            | 3.3                | 3500              | 1646                            | 84                          | 2000µF                              |
| RP12-1205SA**  | 9-18            | 5                  | 2400              | 1606                            | 86                          | 2000µF                              |
| RP12-1212SA**  | 9-18            | 12                 | 1000              | 1606                            | 86                          | 430µF                               |
| RP12-1215SA**  | 9-18            | 15                 | 800               | 1606                            | 86                          | 300µF                               |
| RP12-243.3SA** | 18-36           | 3.3                | 3500              | 823                             | 85                          | 2000µF                              |
| RP12-2405SA**  | 18-36           | 5                  | 2400              | 803                             | 87                          | 2000µF                              |
| RP12-2412SA**  | 18-36           | 12                 | 1000              | 803                             | 87                          | 430µF                               |
| RP12-2415SA**  | 18-36           | 15                 | 800               | 803                             | 87                          | 300µF                               |
| RP12-483.3SA** | 36-75           | 3.3                | 3500              | 411                             | 85                          | 2000µF                              |
| RP12-4805SA**  | 36-75           | 5                  | 2400              | 401                             | 87                          | 2000µF                              |
| RP12-4812SA**  | 36-75           | 12                 | 1000              | 401                             | 87                          | 430µF                               |
| RP12-4815SA**  | 36-75           | 15                 | 800               | 401                             | 87                          | 300µF                               |
| RP12-1205DA**  | 9-18            | ±5                 | ±1200             | 1687                            | 82                          | ±1250µF                             |
| RP12-1212DA**  | 9-18            | ±12                | ±500              | 1626                            | 87                          | ±200µF                              |
| RP12-1215DA**  | 9-18            | ±15                | ±400              | 1626                            | 87                          | ±120µF                              |
| RP12-2405DA**  | 18-36           | ±5                 | ±1200             | 843                             | 83                          | ±1250µF                             |
| RP12-2412DA**  | 18-36           | ±12                | ±500              | 813                             | 88                          | ±200µF                              |
| RP12-2415DA**  | 18-36           | ±15                | ±400              | 813                             | 88                          | ±120µF                              |
| RP12-4805DA**  | 36-75           | ±5                 | ±1200             | 422                             | 83                          | ±1250µF                             |
| RP12-4812DA**  | 36-75           | ±12                | ±500              | 406                             | 88                          | ±200µF                              |
| RP12-4815DA**  | 36-75           | ±15                | ±400              | 406                             | 88                          | ±120µF                              |

\*\* add Suffix SMD for SMD package

## POWERLINE

DC/DC-Converter

with 3 year Warranty

RECOM

## 12 Watt DIP24/SMD Single & Dual Output

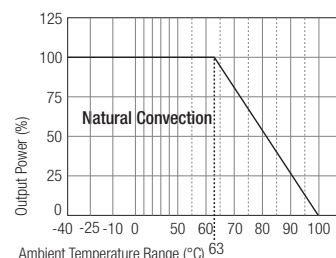


**UL-60950-1 Certified**  
**E196683**

## RP12-A

## Derating Graph (Ambient Temperature)

### RP12-4805SA



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                                               | 12V nominal input                   | 9-18VDC                        |
|                                                                   | 24V nominal input                   | 18-36VDC                       |
|                                                                   | 48V nominal input                   | 36-75VDC                       |
| Under Voltage Lockout                                             | 12V Input DC-DC ON                  | 9VDC                           |
|                                                                   | DC-DC OFF                           | 8VDC                           |
|                                                                   | 24V Input DC-DC ON                  | 18VDC                          |
|                                                                   | DC-DC OFF                           | 16VDC                          |
|                                                                   | 48V Input DC-DC ON                  | 36VDC                          |
|                                                                   | DC-DC OFF                           | 33VDC                          |
| Input Filter                                                      |                                     | Pi Type                        |
| Input Voltage Variation dv/dt                                     | (Complies with ETS300 132 part 4.4) | 5V/ms max.                     |
| Input Surge Voltage (100 ms max.)                                 | 12V Input                           | 36VDC                          |
|                                                                   | 24V Input                           | 50VDC                          |
|                                                                   | 48V Input                           | 100VDC                         |
| Input Reflected Ripple (nominal Vin and full load) <sup>(3)</sup> |                                     | 20mA <sub>p-p</sub>            |
| Start Up Time (nominal Vin and constant resistor load)            |                                     | 600ms typ.                     |
| Remote ON/OFF <sup>(7)</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                                                      |                                     | 12W max.                       |
| Output Voltage Accuracy (full Load and nominal Vin)               |                                     | ±1.2%                          |
| Minimum Load <sup>(1)</sup>                                       |                                     | 10% of full load               |
| Line Regulation (low line, high line at full load)                | Single                              | ±0.2%                          |
|                                                                   | Dual                                | ±0.5%                          |
| Load Regulation (25% to 100% full load)                           | Single                              | ±0.5%                          |
|                                                                   | Dual                                | ±1%                            |
| Cross Regulation (asymmetrical 25% <> 100% load)                  |                                     | ±5%                            |
| Ripple and Noise (20MHz bandwidth, with 1µF MLCC on output)       |                                     | 85mV <sub>p-p</sub>            |
| Temperature Coefficient                                           |                                     | ±0.02%/°C max.                 |
| Transient Response (25% load step change)                         |                                     | 300µs                          |
| Over Voltage Protection                                           | 3.3V                                | 3.9V                           |
| Zener diode clamp (only single)                                   | 5V                                  | 6.2V                           |
|                                                                   | 12V                                 | 15V                            |
|                                                                   | 15V                                 | 18V                            |
| Over Load Protection (% of full load at nominal Vin)              |                                     | 150% typ                       |
| Undervoltage Lockout                                              |                                     | See Application Notes          |
| Short Circuit Protection                                          |                                     | Continuous, automatic recovery |
| Efficiency                                                        |                                     | see „Selection Guide“ table    |
| Isolation Voltage<br>(rated for one minute)                       | In to out                           | 1600VDC min.                   |
|                                                                   | I/O to case                         | 1600VDC min.                   |
| Isolation Resistance                                              |                                     | 1 GΩ min.                      |
| Isolation Capacitance                                             |                                     | 1200pF max.                    |

continued on next page

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

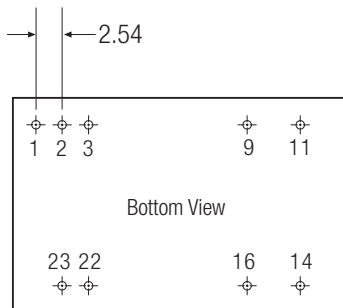
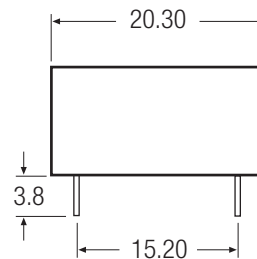
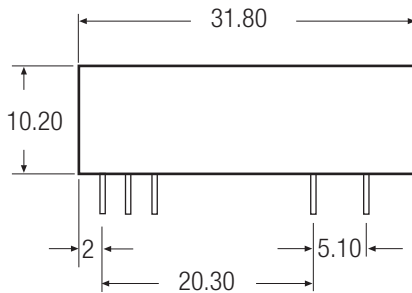
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|------------------------------------|----------------------------------------|----------------------------------------|
| Operating Frequency                |                                        | 400kHz typ.                            |
| Operating Temperature Range        |                                        | -40°C to +85°C (with derating)         |
| Maximum Case Temperature           |                                        | +100°C                                 |
| Storage Temperature Range          |                                        | -55°C to +125°C                        |
| Thermal Impedance                  | Natural convection                     | 20°C/Watt                              |
| Thermal Shock                      |                                        | MIL-STD-810D                           |
| Vibration                          |                                        | 10-55Hz, 10G, 30 Min. along X, Y and Z |
| Relative Humidity                  |                                        | 5% to 95% RH                           |
| Case Material                      |                                        | Nickel plated copper                   |
| Base Material                      |                                        | Non-conductive black plastic           |
| Potting Material                   |                                        | Epoxy (UL94-V0)                        |
| Conducted Emissions <sup>(8)</sup> | EN55022                                | Class A                                |
| Radiated Emissions                 | EN55022                                | Class A                                |
| ESD                                | EN61000-4-2                            | Perf. Criteria B                       |
| Radiated Immunity                  | EN61000-4-3                            | Perf. Criteria B                       |
| Fast Transient                     | EN61000-4-4                            | Perf. Criteria B                       |
| Surge                              | EN61000-4-5                            | Perf. Criteria B                       |
| Conducted Immunity                 | EN61000-4-6                            | Perf. Criteria B                       |
| Weight                             | DIP                                    | 18g                                    |
|                                    | SMD                                    | 20g                                    |
| Packing Quantity                   | Refer to App Notes for tube dimensions | 7pcs per Tube                          |
| Dimensions                         |                                        | 31.8 x 20.3 x 10.2mm                   |
| MTBF <sup>(2)</sup>                |                                        | 2750 x 10 <sup>3</sup> hours           |

**Notes :**

1. The RP12 series requires a minimum of 10% loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
2. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment).
3. Simulated source impedance of 12μH. 12μH inductor in series with +Vin.
4. Maximum value at nominal input voltage and full load of standard type.
5. Typical value at nominal input voltage and full load.
6. Test by minimum Vin and constant resistor load.
7. The ON/OFF control pin voltage is referenced to negative input.
8. See application notes for EMI-filtering.

## Package Style and Pinning (mm)

DIP24 Package Style



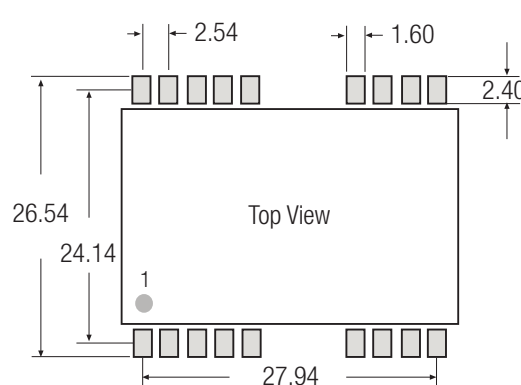
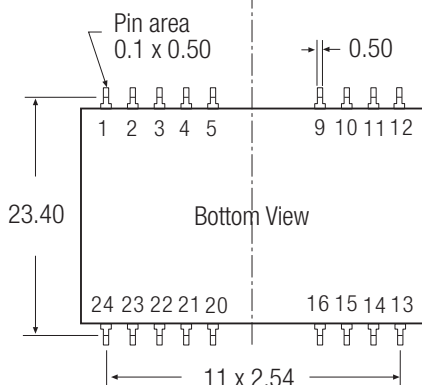
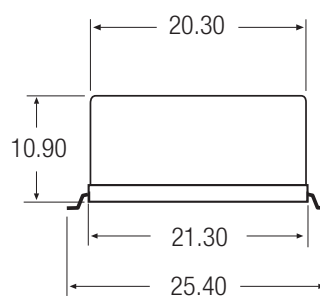
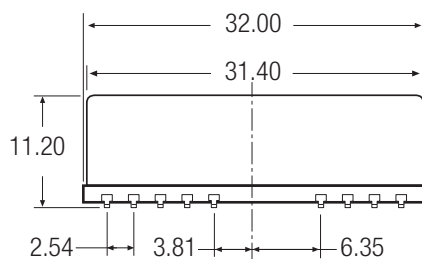
Pin Connections

| Pin # | Single | Dual   |
|-------|--------|--------|
| 1     | ON/OFF | ON/OFF |
| 2     | -Vin   | -Vin   |
| 3     | -Vin   | -Vin   |
| 9     | NC     | Com    |
| 11    | NC     | -Vout  |
| 14    | +Vout  | +Vout  |
| 16    | -Vout  | Com    |
| 22    | +Vin   | +Vin   |
| 23    | +Vin   | +Vin   |

NC = No Connection

Pin Pitch Tolerance  $\pm 0.35$  mm

## SMD Package Style and Pinning (mm) (Same sepc. as the original DIP sepc. and pin definition, excl. of the SMD Typ pin.)



Pin Connections

| Pin #  | Single | Dual   |
|--------|--------|--------|
| 1      | ON/OFF | ON/OFF |
| 2      | -Vin   | -Vin   |
| 3      | -Vin   | -Vin   |
| 9      | NC     | Com    |
| 11     | NC     | -Vout  |
| 14     | +Vout  | +Vout  |
| 16     | -Vout  | Com    |
| 22     | +Vin   | +Vin   |
| 23     | +Vin   | +Vin   |
| Others | NC     | NC     |

NC = No Connection

Pin Pitch Tolerance  $\pm 0.35$  mm