Features

Unregulated Converters

- Low Cost 1W Converter
- Power Sharing on Dual Output Version
- Industry Standard Pinout
- 1kVDC or 2kVDC Isolation Options
- Optional Continuous Short Circuit Protected
- UL94V-0 Package Material
- Efficiency to 85%

Description

The RB series DC/DC converter has been designed for isolating or converting DC power rails in general purpose applications. Although low cost, it does not compromise on features and offers 1kVDC or 2kVDC isolation, a -40°C to +85°C operating temperature range and optional continuous short circuit protection.

Selection Guide

<table>
<thead>
<tr>
<th>Part Number SIP 7</th>
<th>Input Voltage (VDC)</th>
<th>Output Voltage (VDC)</th>
<th>Output Current (mA)</th>
<th>Efficiency (%)</th>
<th>Max Capacitive Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB-xx3.3S (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>3.3</td>
<td>303</td>
<td>75</td>
<td>2200µF</td>
</tr>
<tr>
<td>RB-xx5S (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>5</td>
<td>200</td>
<td>70-78</td>
<td>1000µF</td>
</tr>
<tr>
<td>RB-xx9S (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>9</td>
<td>111</td>
<td>70-78</td>
<td>1000µF</td>
</tr>
<tr>
<td>RB-xx12S (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>12</td>
<td>84</td>
<td>78-80</td>
<td>470µF</td>
</tr>
<tr>
<td>RB-xx15S (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>15</td>
<td>66</td>
<td>80-84</td>
<td>470µF</td>
</tr>
<tr>
<td>RB-xx24S (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>24</td>
<td>42</td>
<td>74-85</td>
<td>220µF</td>
</tr>
<tr>
<td>RB-xx3.3D (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>±3.3</td>
<td>±152</td>
<td>±70</td>
<td>±1000µF</td>
</tr>
<tr>
<td>RB-xx5D (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>±5</td>
<td>±100</td>
<td>±70-78</td>
<td>±470µF</td>
</tr>
<tr>
<td>RB-xx9D (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>±9</td>
<td>±56</td>
<td>76-79</td>
<td>±470µF</td>
</tr>
<tr>
<td>RB-xx12D (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>±12</td>
<td>±42</td>
<td>78-82</td>
<td>±220µF</td>
</tr>
<tr>
<td>RB-xx15D (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>±15</td>
<td>±33</td>
<td>80-84</td>
<td>±220µF</td>
</tr>
<tr>
<td>RB-xx24D (H)</td>
<td>3.3, 5, 12, 15, 24</td>
<td>±24</td>
<td>±21</td>
<td>80-84</td>
<td>±100µF</td>
</tr>
</tbody>
</table>

XX = Input Voltage. Other input and output voltage combinations available on request.

* add Suffix “P” for Continuous Short Circuit Protection, e.g. RB-0505S/P, RB-0505S/HP

Specifications (measured at TA = 25°C, nominal input voltage, full load and after warm-up)

- Input Voltage Range ±10%
- Output Voltage Accuracy ±5%
- Line Voltage Regulation 1.2%/1% of Vin typ.
- Load Voltage Regulation
  - 3.3V output type: 20% max.
  - 5V output type: 15% max.
  - 9V, 12V, 15V, 24V output types: 10% max.
- Output Ripple and Noise (20MHz limited)
  - Single output types: 100mVp-p max.
  - Dual output types: ±75mVp-p max.
- Operating Frequency 50kHz min. / 100kHz typ. / 105kHz max.
- Efficiency at Full Load 70% min. / 80% typ.
- Minimum Load = 0%

Efficiency at Full Load 70% min. / 80% typ.

Min. Load = 0%

Specifications valid for 10% minimum load only.

- Isolation Voltage
  - Tested for 1 second: 1000VDC / 500VAC / 60Hz
  - Rated for 1 minute**: 2000VDC / 1000VAC / 60Hz

- Isolation Capacitance 20pF min. / 75pF max.
- Isolation Resistance 10 GΩ min.
- Short Circuit Protection
  - 1 Second
  - Continuous

- Operating Temperature Range (free air convection) -40°C to +85°C (see Graph)
- Storage Temperature Range -55°C to +125°C
- Relative Humidity 95% RH

Additional information:

- EN-60950-1 Certified
- UL-60950-1 Certified
- EN-60601-1 Certified* ([*/H suffix]

*EN-60950-1 Certified
**EN-60601-1 Certified

Derating-Graph (Ambient Temperature)

- Safe Operating Area

**Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.
ECONOLINE
DC/DC-Converter

Specifications (measured at $T_A = 25^\circ\text{C}$, nominal input voltage, full load and after warm-up)

- **Package Weight**: 2.2g
- **Packing Quantity**: 25 pcs per Tube
- **MTBF (+25^\circ\text{C})**: 1012 x $10^3$ hours
- **MTBF (+85^\circ\text{C})**: 151 x $10^3$ hours

**Certifications**
- CB Test Report: Report E22406
- UL General Safety Report: E358085
- EN General Safety Report: SPCLVD1109103
- EN Medical Safety Report: MDD1112018 + RM1112018
- Edition Medical Report + ISO14971 Risk Assessment
- IEC 60950-1:2005 2nd Ed.
- UL 60950-1 2nd Ed.
- EN60950-1:2006 + A12:2011

**Typical Characteristics - Single Output**

**RB-xx05S**

- **Efficiency / Load**
- **Deviation / Load**

**RB-xx09S**

- **Efficiency / Load**
- **Deviation / Load**

**RB-xx12S**

- **Efficiency / Load**
- **Deviation / Load**

**RB-xx15S**

- **Efficiency / Load**
- **Deviation / Load**
**Typical Characteristics - Dual Outputs**

**RB-xx05D**

- Efficiency / Load
- Deviation / Load

**RB-xx09D**

- Efficiency / Load
- Deviation / Load

**RB-xx12D**

- Efficiency / Load
- Deviation / Load

**RB-xx15D**

- Efficiency / Load
- Deviation / Load

**Notes**

**Note 1**

Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

**Package Style and Pinning (mm)**

**SIP7 Package**

- RECOM RB-050SS
- RECOM RB-090SS
- RECOM RB-120SS
- RECOM RB-150SS

**Pin Connections**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+Vin</td>
<td>+Vin</td>
</tr>
<tr>
<td>2</td>
<td>-Vin</td>
<td>-Vin</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
<td>-Vout</td>
</tr>
<tr>
<td>5</td>
<td>-Vout</td>
<td>Com</td>
</tr>
<tr>
<td>6</td>
<td>+Vout</td>
<td>+Vout</td>
</tr>
</tbody>
</table>

NC = No Connection
XOX ± 0.5 mm
XXX ± 0.25 mm

The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, (fatal) bodily harm or damage property. The buyer shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.