

# Features

## Unregulated Converters

- Low Cost 1W Converter
- Power Sharing on Dual Output Version
- Industry Standard Pinout
- 1kVDC & 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 1KV or 2kVDC isolation , a -40°C to +85°C operating temperature range and optional continuous short circuit protection.

### Selection Guide

| Part Number |       | Input Voltage      | Output Voltage | Output Current | Efficiency |
|-------------|-------|--------------------|----------------|----------------|------------|
| SIP 7       | (2kV) | (VDC)              | (VDC)          | (mA)           | (%)        |
| RB-xx3.3S   | (H)   | 3.3, 5, 12, 15, 24 | 3.3            | 303            | 75         |
| RB-xx05S    | (H)   | 3.3, 5, 12, 15, 24 | 5              | 200            | 70-78      |
| RB-xx09S    | (H)   | 3.3, 5, 12, 15, 24 | 9              | 111            | 70-78      |
| RB-xx12S    | (H)   | 3.3, 5, 12, 15, 24 | 12             | 84             | 78-80      |
| RB-xx15S    | (H)   | 3.3, 5, 12, 15, 24 | 15             | 66             | 80-84      |
| RB-xx24S    | (H)   | 3.3, 5, 12, 15, 24 | 24             | 42             | 74-85      |
| RB-xx3.3D   | (H)   | 3.3, 5, 12, 15, 24 | ±3.3           | ±152           | 70         |
| RB-xx05D    | (H)   | 3.3, 5, 12, 15, 24 | ±5             | ±100           | 70-78      |
| RB-xx09D    | (H)   | 3.3, 5, 12, 15, 24 | ±9             | ±56            | 76-79      |
| RB-xx12D    | (H)   | 3.3, 5, 12, 15, 24 | ±12            | ±42            | 78-82      |
| RB-xx15D    | (H)   | 3.3, 5, 12, 15, 24 | ±15            | ±33            | 80-84      |
| RB-xx24D    | (H)   | 3.3, 5, 12, 15, 24 | ±24            | ±21            | 80-84      |

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

|                                                   |                                        |                                      |
|---------------------------------------------------|----------------------------------------|--------------------------------------|
| Input Voltage Range                               | ±10%                                   |                                      |
| Output Voltage Accuracy                           | ±5%                                    |                                      |
| Line Voltage Regulation                           | 1.2%/1% of $V_{in}$ typ.               |                                      |
| Load Voltage Regulation (10% to 100% full load)   | 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.                    |                                      |
| No Load Power Consumption                         | Single                                 | 101mW min. / 126mW typ. / 238mW max. |
|                                                   | Dual                                   | 87mW min. / 130mW typ. / 228mW max.  |
| Maximum Capacitive Load                           | 33µF / ±10µF                           |                                      |
| Isolation Voltage                                 | (tested for 1 second)                  | 1000VDC min.                         |
| Rated Working Voltage                             | (long term isolation)                  | see Application Notes                |
| Isolation Voltage                                 | H-Suffix (tested for 1 second)         | 2000VDC min.                         |
| Rated Working Voltage                             | H-Suffix (long term isolation)         | see Application Notes                |
| Isolation Capacitance                             | 20pF min. / 75pF max.                  |                                      |
| Isolation Resistance                              | 10 GΩ min.                             |                                      |
| Short Circuit Protection                          | 1 Second                               |                                      |
| P-Suffix                                          | Continuous                             |                                      |
| Operating Temperature Range (free air convection) | -40°C to +85°C (see Graph)             |                                      |

**ECONOLINE**

DC/DC-Converter

**RECOM**

**1 Watt**

**SIP7**

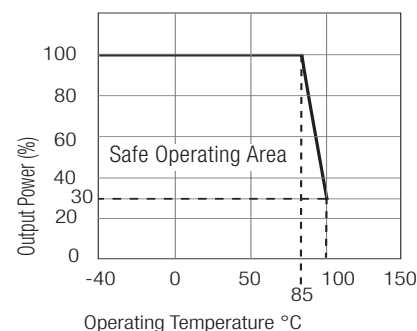
**Single & Dual Output**



**EN-60950-1 Certified**

**RB**

## Derating-Graph (Ambient Temperature)



**Refer to Application Notes**

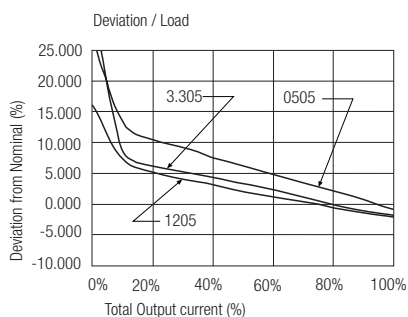
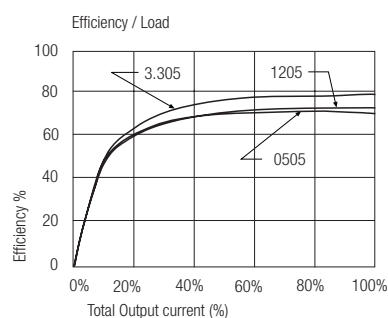
[www.recom-electronic.com](http://www.recom-electronic.com)

## Specifications - continued

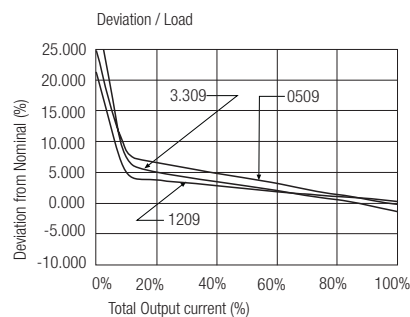
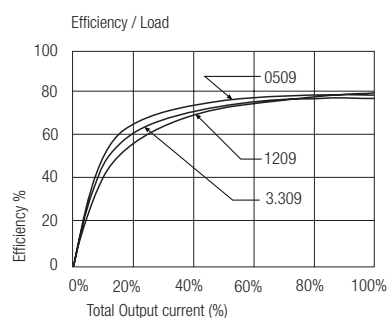
|                           |                                                              |                     |                              |
|---------------------------|--------------------------------------------------------------|---------------------|------------------------------|
| Storage Temperature Range | -55°C to +125°C                                              |                     |                              |
| Relative Humidity         | 95% RH                                                       |                     |                              |
| Package Weight            | 2.2g                                                         |                     |                              |
| MTBF (+25°C)              | Detailed Information see<br>Application Notes chapter "MTBF" | using MIL-HDBK 217F | 1012 x 10 <sup>3</sup> hours |
| (+85°C)                   |                                                              | using MIL-HDBK 217F | 151 x 10 <sup>3</sup> hours  |

## Typical Characteristics - Single Output

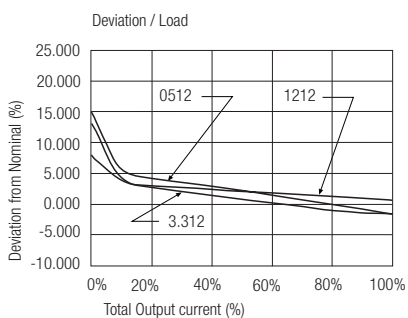
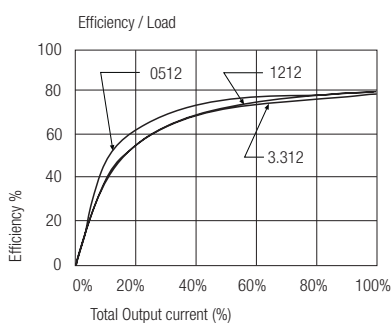
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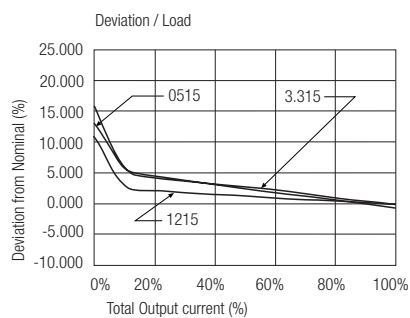
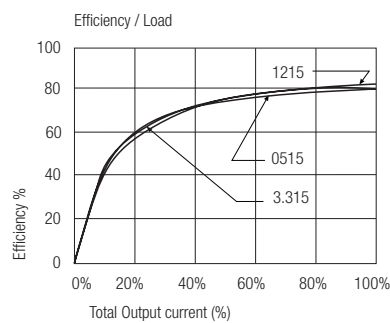
### RB-xx09S



### RB-xx12S

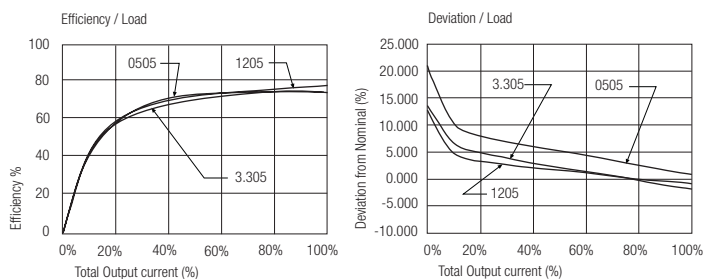


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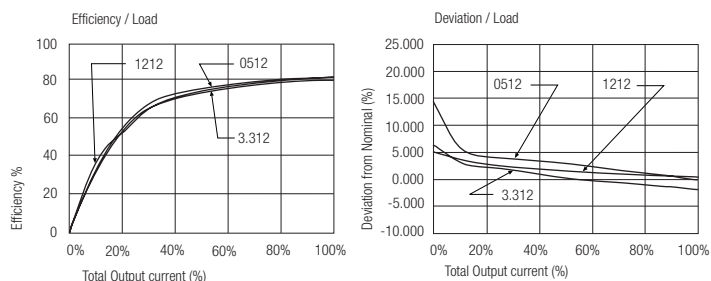


Typical Characteristics - Dual Outputs

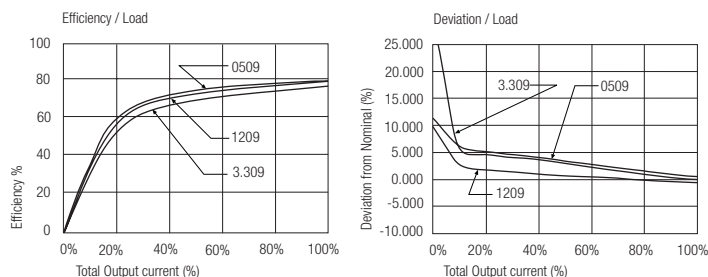
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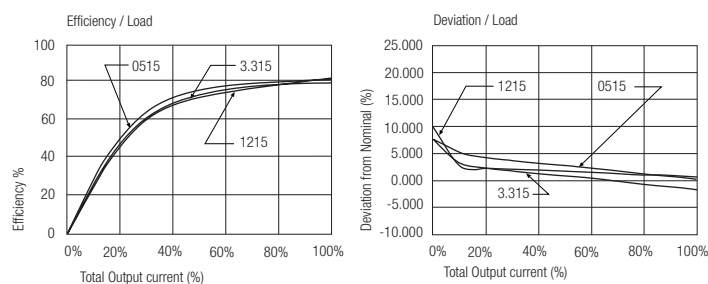
**RB-xx12D**



**RB-xx09D**

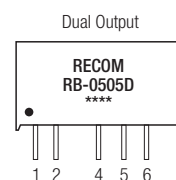
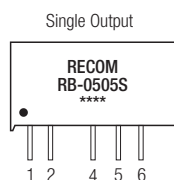
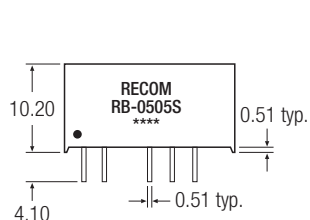


**RB-xx15D**

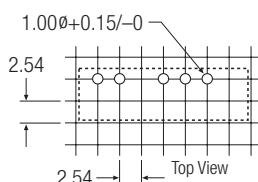
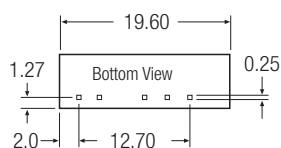


7 PIN SIP Package

3rd angle projection



Recommended Footprint Details



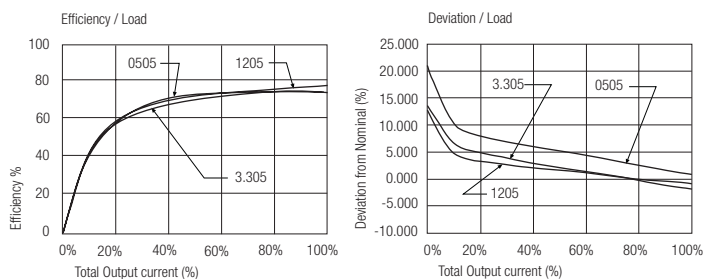
Pin Connections

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | +Vin   | +Vin  |
| 2     | -Vin   | -Vin  |
| 4     | NC     | -Vout |
| 5     | -Vout  | Com   |
| 6     | +Vout  | +Vout |

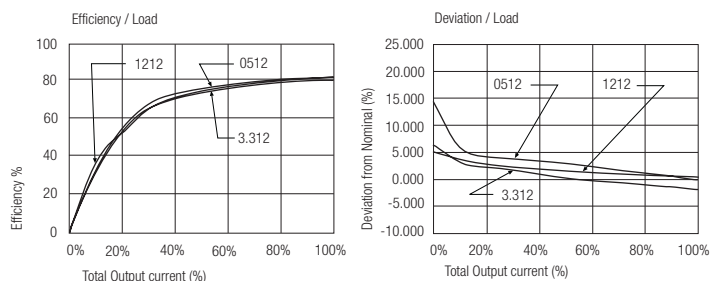
NC = No Connection  
XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

Typical Characteristics - Dual Outputs

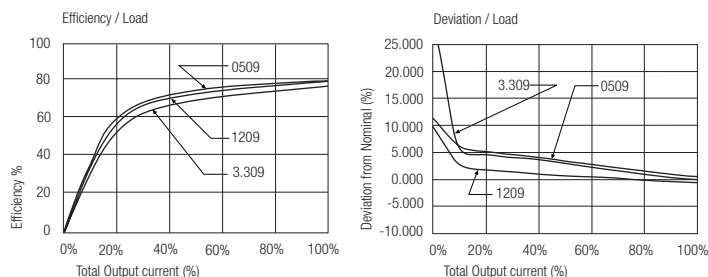
**RB-xx05D**



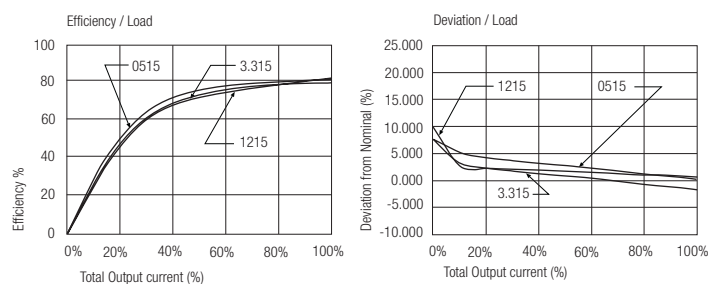
**RB-xx12D**



**RB-xx09D**

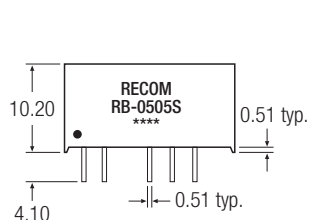


**RB-xx15D**

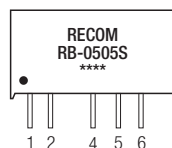


7 PIN SIP Package

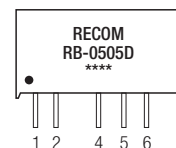
3rd angle projection



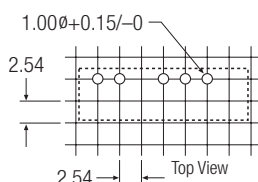
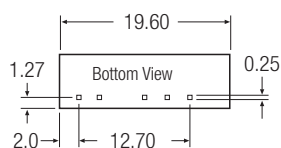
Single Output



Dual Output



Recommended Footprint Details



Pin Connections

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | +Vin   | +Vin  |
| 2     | -Vin   | -Vin  |
| 4     | NC     | -Vout |
| 5     | -Vout  | Com   |
| 6     | +Vout  | +Vout |

NC = No Connection

XX.X ± 0.5 mm

XX.XX ± 0.25 mm