

## Features

## Unregulated Converters

- Dual Output from a Single Input Rail
- Power Sharing on Output
- Industry Standard Pinout
- 1kVDC & 2kVDC Isolation
- Custom Solutions Available
- UL94V-0 Package Material
- Efficiency to 85%

**ECONOLINE**

DC/DC-Converter

# RB & RA Series

### Selection Guide

| Part Number |           |       | Input Voltage              | Output Voltage | Output Current | Efficiency |
|-------------|-----------|-------|----------------------------|----------------|----------------|------------|
| SIP 7       | DIP 14    | (2kV) | (VDC)                      | (VDC)          | (mA)           | (%)        |
| RB-xx1.8S   | RA-xx1.8S | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 1.8            | 555            | 70         |
| RB-xx3.3S   | RA-xx3.3S | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 3.3            | 303            | 75         |
| RB-xx05S    | RA-xx05S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 5              | 200            | 70-78      |
| RB-xx09S    | RA-xx09S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 9              | 111            | 76-78      |
| RB-xx12S    | RA-xx12S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 12             | 84             | 78-80      |
| RB-xx15S    | RA-xx15S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 15             | 66             | 80-84      |
| RB-xx24S    | RA-xx24S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 24             | 42             | 74-85      |
| RB-xx1.8D   | RA-xx1.8D | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | ±1.8           | ±278           | 70         |
| RB-xx3.3D   | RA-xx3.3D | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | ±3.3           | ±152           | 70         |
| RB-xx05D    | RA-xx05D  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | ±5             | ±100           | 74-78      |
| RB-xx09D    | RA-xx09D  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | ±9             | ±56            | 76-79      |
| RB-xx12D    | RA-xx12D  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | ±12            | ±42            | 80-82      |
| RB-xx15D    | RA-xx15D  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | ±15            | ±33            | 80-84      |
| RB-xx24D    | RA-xx24D  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | ±24            | ±21            | 80-84      |

xx = Input Voltage

### Specifications (Core Operating Area)

|   |                                |                                      |  |
|---|--------------------------------|--------------------------------------|--|
| Input Voltage Range                               |                                |                                      | ±10%                                   |
| Output Voltage Accuracy                           |                                |                                      | ±5%                                    |
| Line Voltage Regulation                           |                                |                                      | 1.2%/1% of Vin max.                    |
| Load Voltage Regulation (10% to 100% full load)   | 1.8V, 3.3V output types        |                                      | 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. / 171mW max. |  |
|   | Dual                           | 87mW min. / 130mW typ. / 190mW max.  |  |
| Isolation Voltage                                 | (tested for 1 second)          |                                      | 1.000VDC min.                          |
| Rated Working Voltage                             | (long term isolation)          |                                      | see Application Notes                  |
| Isolation Voltage                                 | H-Suffix (tested for 1 second) |                                      | 2.000VDC 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                               |
| Operating Temperature Range (free air convection) |                                |                                      | -40°C to +85°C (see Graph)             |
| Storage Temperature Range                         |                                |                                      | -55°C to +125°C                        |

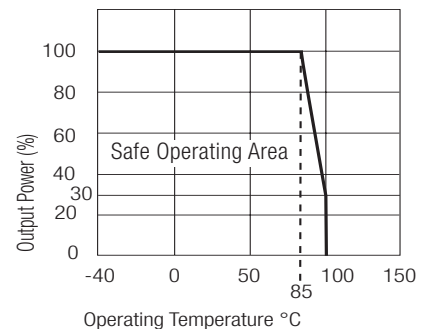
continued on next page

## 1 Watt SIP7 & DIP14 Single & Dual Output



**RECOM**

## Derating-Graph (Ambient Temperature)

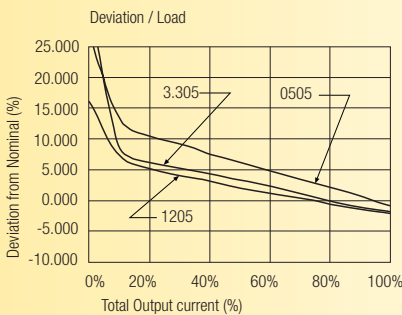
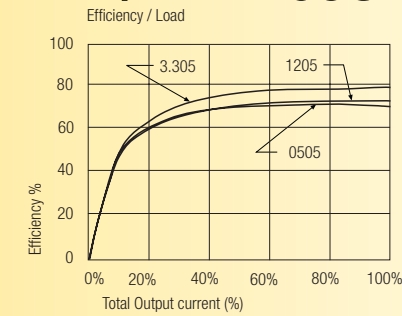


**Specifications (Core Operating Area)**

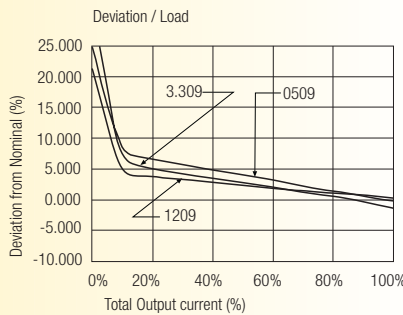
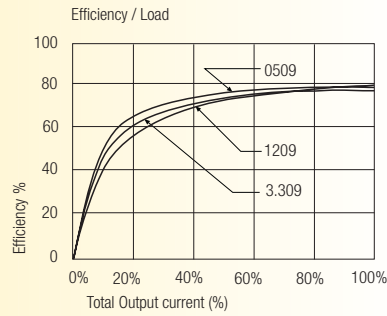
|                         |  |   |
|-------------------------|--|---|
| Relative Humidity       | MSL Level 1  | 95% RH  |
| Package Weight          | RB types   | 2.2g  |
|                         | RA types   | 2.6g  |
| MTBF (+25°C)<br>(+85°C) | Detailed Information see<br>Application Notes chapter "MTBF" | using MIL-HDBK 217F   |
|                         |  | 1012 x 10 <sup>3</sup> hours<br>151 x 10 <sup>3</sup> hours |

**Typical Characteristics**

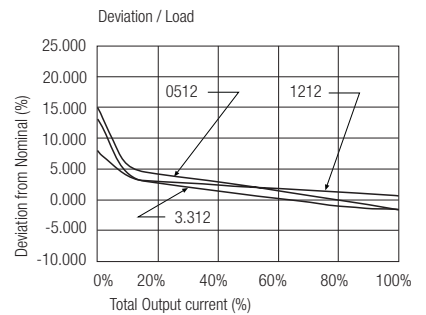
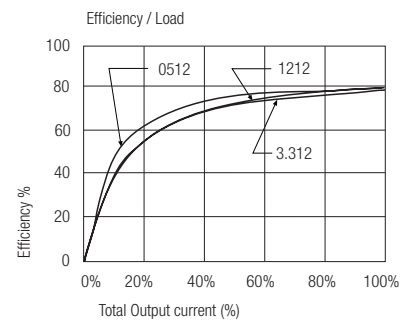
**RB/RA-xx05S**



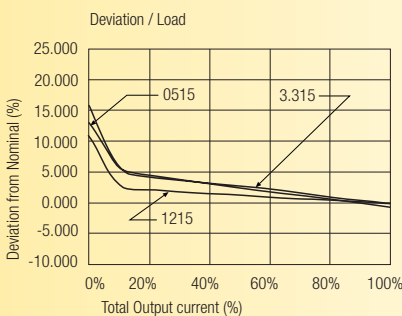
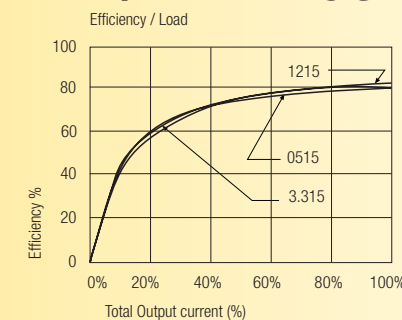
**RB/RA-xx09S**



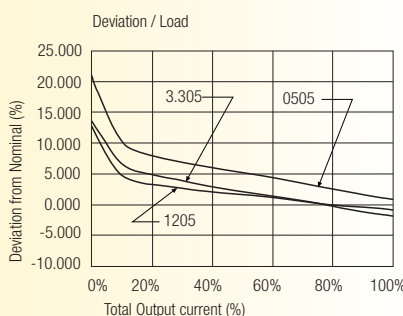
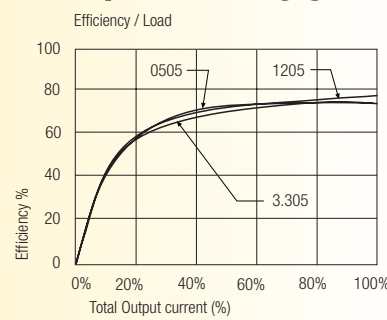
**RB/RA-xx12S**



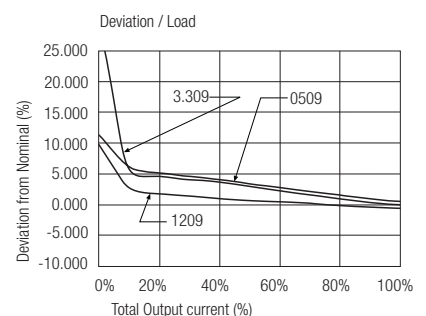
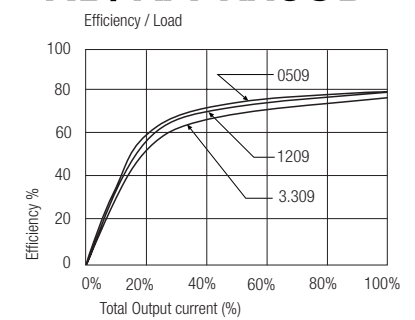
**RB/RA-xx15S**



**RB/RA-xx05D**

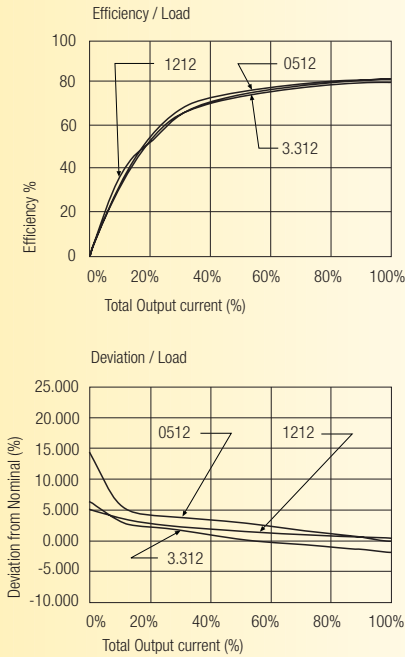


**RB/RA-xx09D**

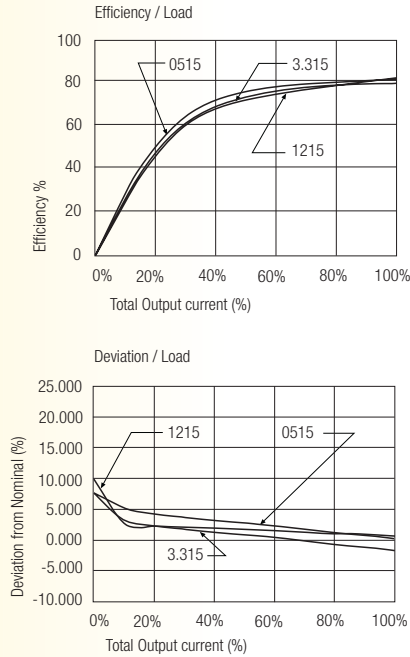


**Typical Characteristics**

**RB/RA-xx12D**

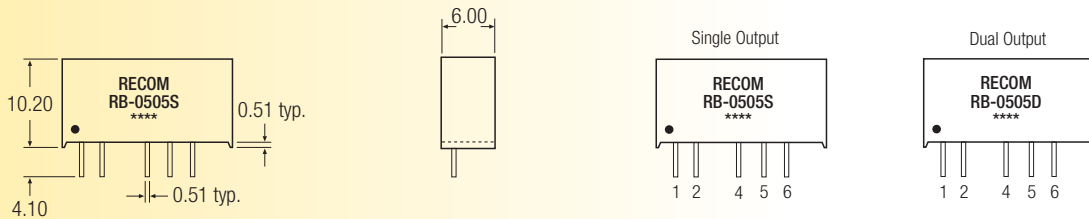


**RB/RA-xx15D**

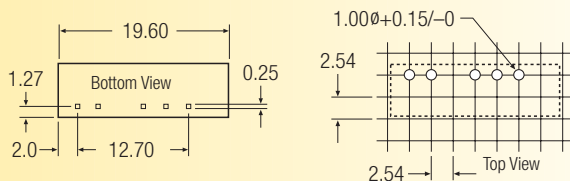


**Package Style and Pinning (mm)**

**7 PIN SIP Package**



**Recommended Footprint Details**



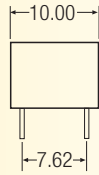
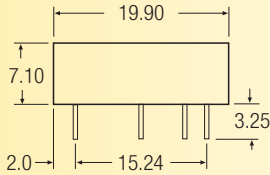
**Pin Connections**

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

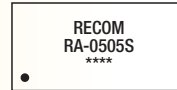
NC = No Connection  
XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

**Package Style and Pinning (mm)**

**14 PIN DIP Package**



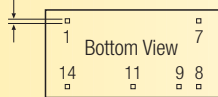
Single Output



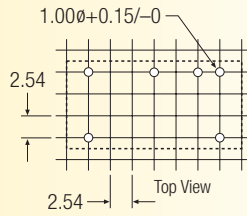
Dual Output



∅ 0.51 typ.



**Recommended Footprint Details**



**Pin Connections**

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | -Vin   | -Vin  |
| 7     | NC     | NC    |
| 8     | -Vout  | Com   |
| 9     | +Vout  | +Vout |
| 11    | NC     | -Vout |
| 14    | +Vin   | +Vin  |

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