

## Features

## Unregulated Converters

- Dual Output from a Single Input Rail
- Power Sharing on Output
- Industry Standard Pinout
- 1kVDC & 2kVDC Isolation
- Optional Continuous Short Circuit Protected
- UL94V-0 Package Material
- Efficiency to 85%

**ECONOLINE**

DC/DC-Converter

## RB & RA Series

### Selection Guide

| Part Number |           |       | Input Voltage (VDC)        | Output Voltage (VDC) | Output Current (mA) | Efficiency (%) |
|-------------|-----------|-------|----------------------------|----------------------|---------------------|----------------|
| SIP 7       | DIP 14    | (2kV) |                            |                      |                     |                |
| 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                 | 70-78          |
| 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                | 70-78          |
| 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                 | 78-82          |
| 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

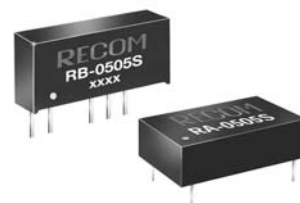
\* add Suffix "P" for Continuous Short Circuit Protection, e.g. RB-0505S/P, RB-0505S/HP

### Specifications (Core Operating Area)

|                                                   |                                        |                                      |
|---------------------------------------------------|----------------------------------------|--------------------------------------|
| Input Voltage Range                               | ±10%                                   |                                      |
| Output Voltage Accuracy                           | ±5%                                    |                                      |
| Line Voltage Regulation                           | 1.2%/1% of Vin typ.                    |                                      |
| 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. / 238mW max. |
|                                                   | Dual                                   | 87mW min. / 130mW typ. / 228mW max.  |
| Isolation Voltage (tested for 1 second)           | 1000VDC min.                           |                                      |
| Rated Working Voltage (long term isolation)       | see Application Notes                  |                                      |
| Isolation Voltage (tested for 1 second)           | H-Suffix                               | 2000VDC min.                         |
| Rated Working Voltage (long term isolation)       | H-Suffix                               | 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)             |                                      |

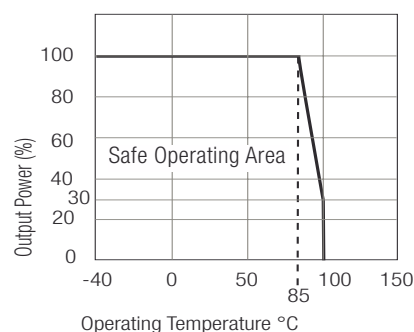
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## 1 Watt SIP7 & DIP14 Single & Dual Output



**RECOM**

## Derating-Graph (Ambient Temperature)

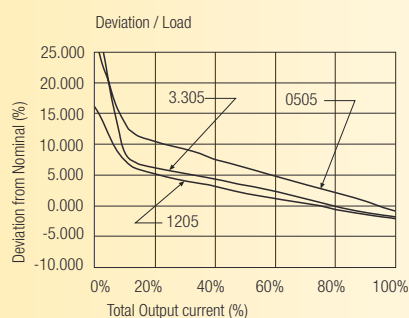
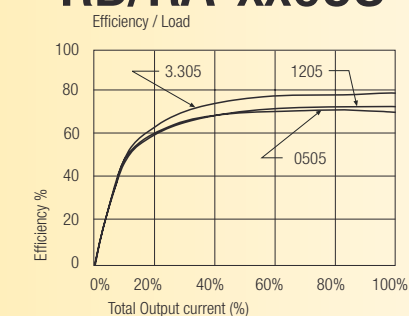


**Specifications (Core Operating Area)**

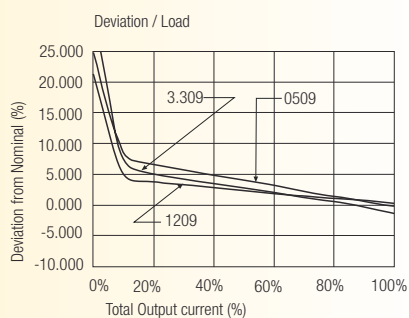
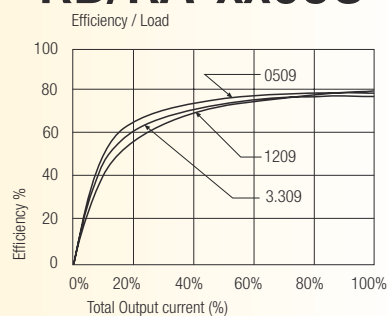
|                           |                                                              |                     |                              |
|---------------------------|--------------------------------------------------------------|---------------------|------------------------------|
| Storage Temperature Range | -55°C to +125°C                                              |                     |                              |
| Relative Humidity         | 95% RH                                                       |                     |                              |
| Package Weight            | RB types                                                     | 2.2g                |                              |
|                           | RA types                                                     | 2.6g                |                              |
| 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**

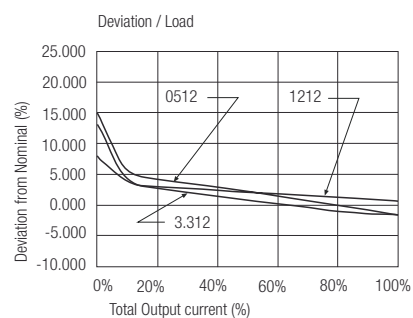
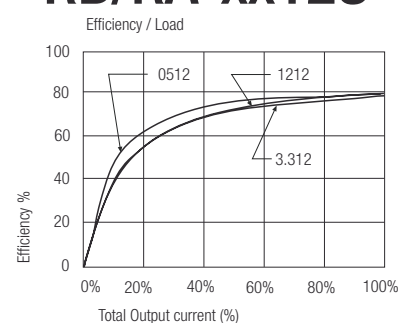
**RB/RA-xx05S**



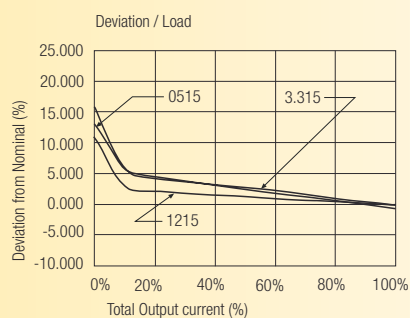
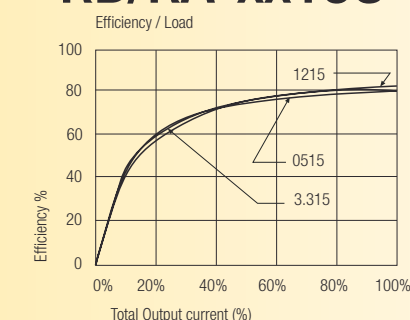
**RB/RA-xx09S**



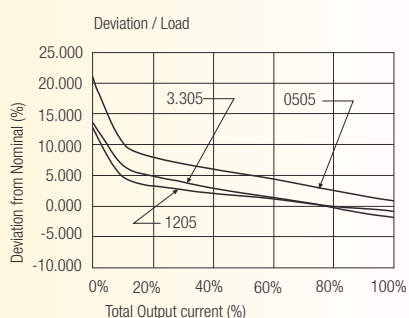
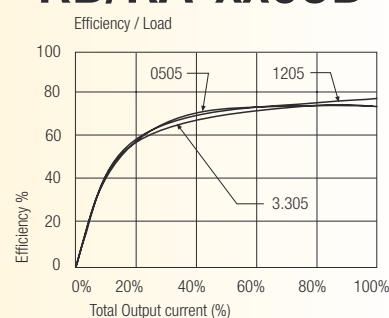
**RB/RA-xx12S**



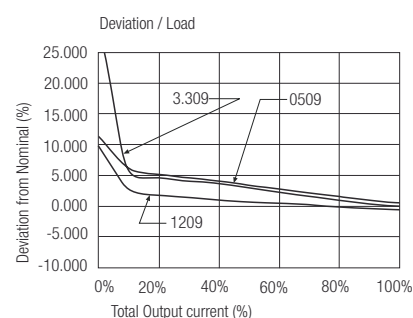
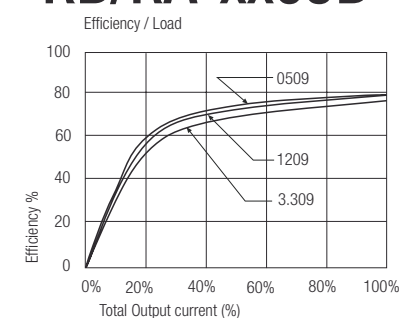
**RB/RA-xx15S**



**RB/RA-xx05D**

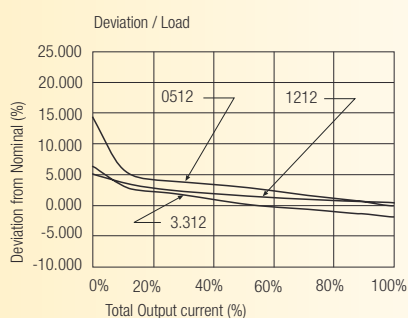
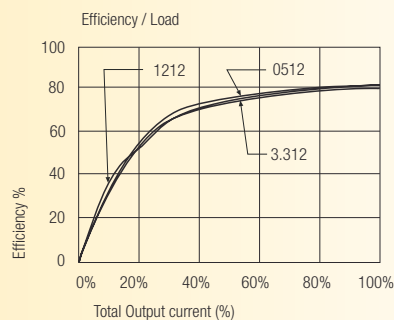


**RB/RA-xx09D**

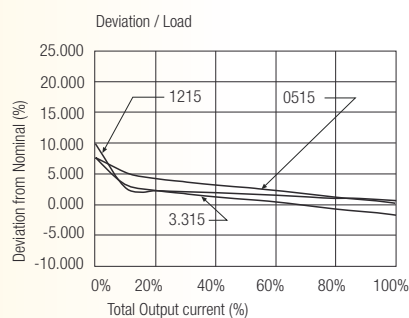
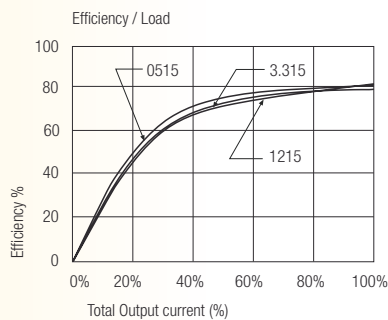


## Typical Characteristics

### RB/RA-xx12D



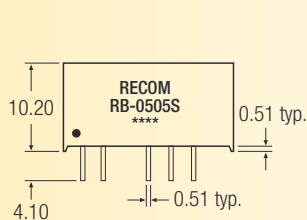
### RB/RA-xx15D



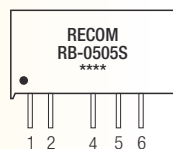
## Package Style and Pinning (mm)

### 7 PIN SIP Package

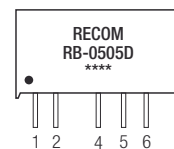
3rd angle projection



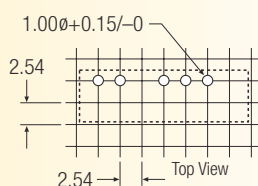
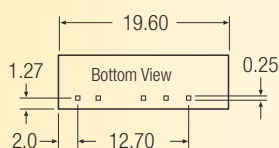
#### Single Output



#### Dual Output



### Recommended Footprint Details



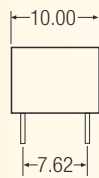
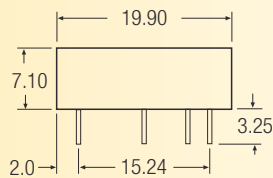
#### Pin Connections

| 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

## Package Style and Pinning (mm)

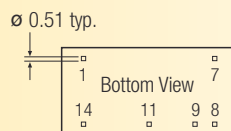
### 14 PIN DIP Package



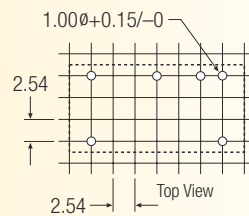
Single Output



Dual Output



### 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