# 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

## 1 Watt SIP7 & DIP14 Single & Dual Output


RECOM

## 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 |

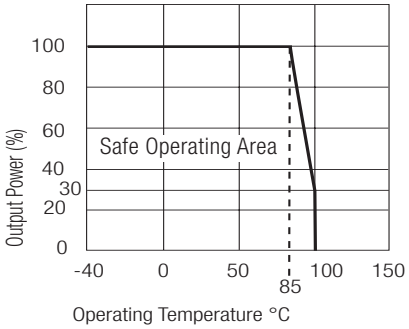
xx = Input Voltage

## 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<br>5V output type<br>9V, 12V, 15V, 24V output types | 20% max.<br>15% max.<br>10% max. |
| Output Ripple and Noise (20MHz limited) | Single output types<br>Dual output types | 100mVp-p max.<br>±75mVp-p max. |
| Operating Frequency | | 50kHz min. / 100kHz typ. / 105kHz max. |
| Efficiency at Full Load | | 70% min. / 80% typ. |
| No Load Power Consumption | Single<br>Dual | 101mW min. / 126mW typ. / 171mW max.<br>87mW min. / 130mW typ. / 190mW max. |
| Isolation Voltage<br>Rated Working Voltage | (tested for 1 second)<br>(long term isolation) | 1.000VDC min.<br>see Application Notes |
| Isolation Voltage H-Suffix<br>Rated Working Voltage H-Suffix | (tested for 1 second)<br>(long term isolation) | 2.000VDC min.<br>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

## Derating-Graph
(Ambient Temperature)

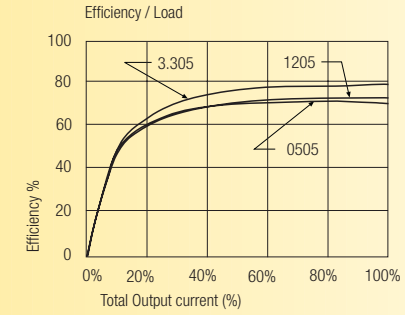


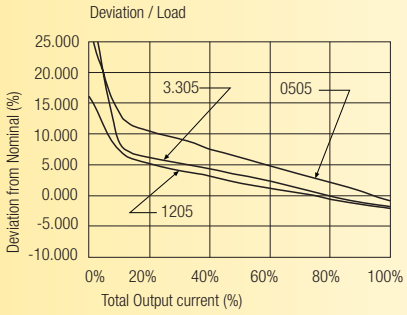
## Specifications (Core Operating Area)

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

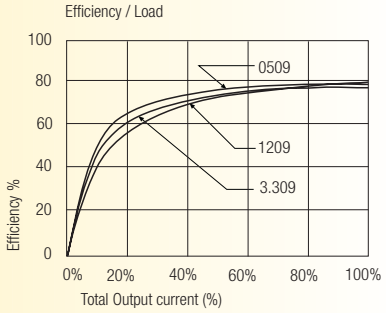
## Typical Characteristics

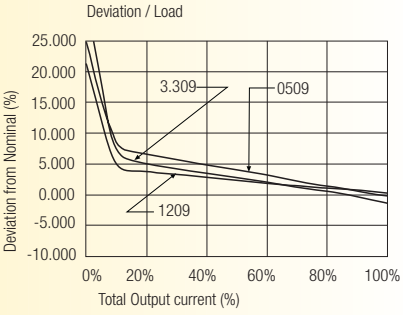
### RB/RA-xx05S



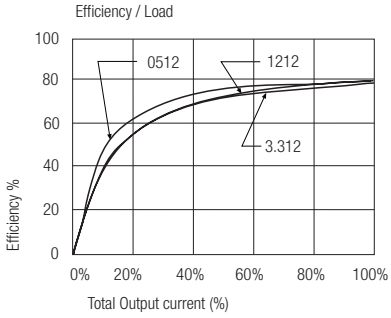



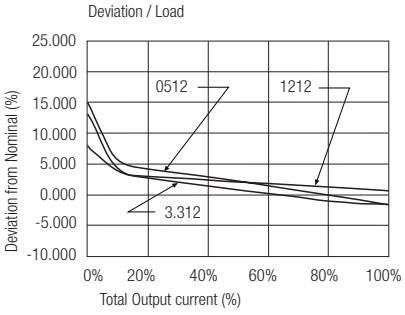

### RB/RA-xx09S



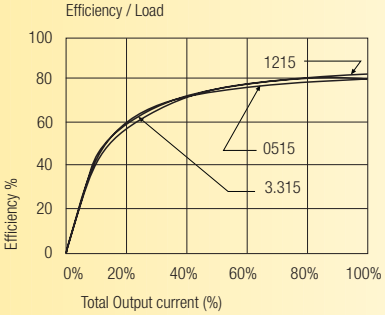



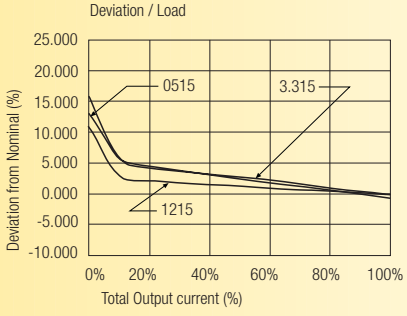

### RB/RA-xx12S



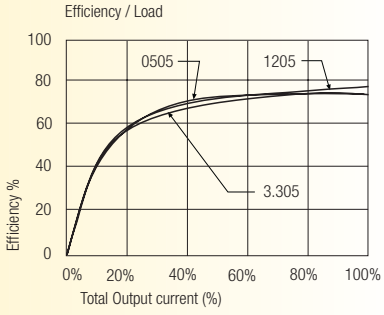



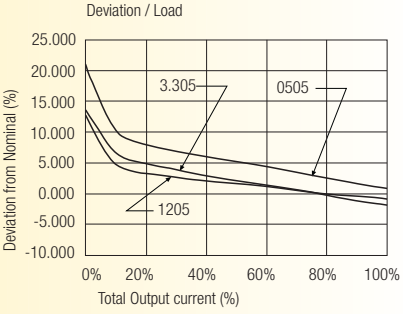

### RB/RA-xx15S



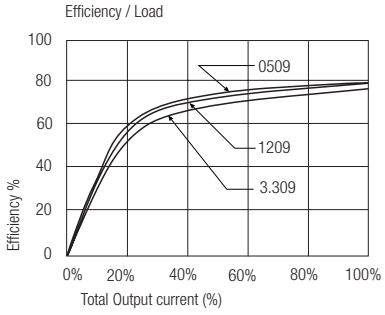



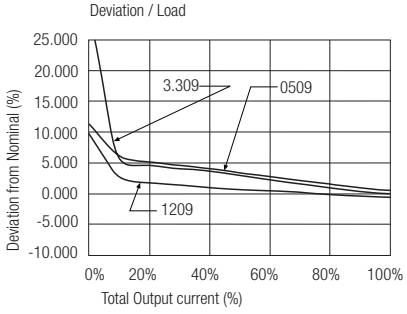

### RB/RA-xx05D



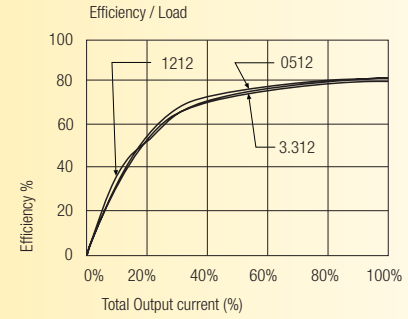

### RB/RA-xx09D

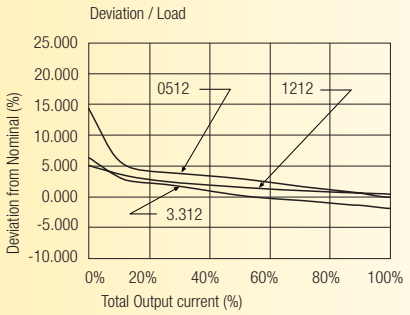


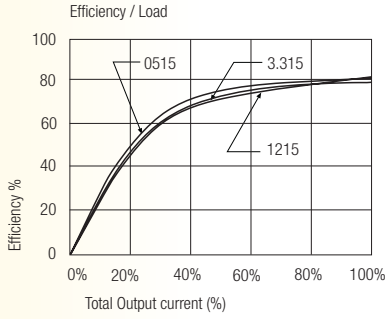
## Typical Characteristics

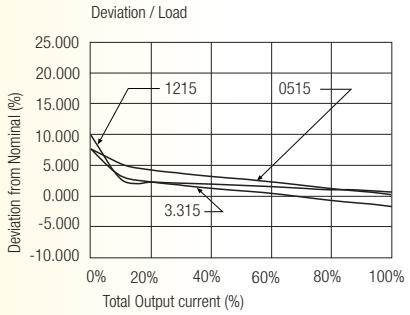
### RB/RA-xx12D




### RB/RA-xx15D

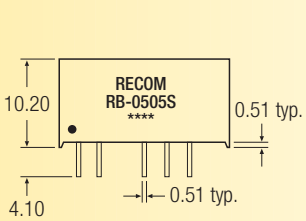


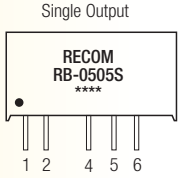

## Package Style and Pinning (mm)

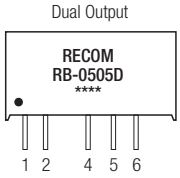
3rd angle projection

**7 PIN SIP Package**

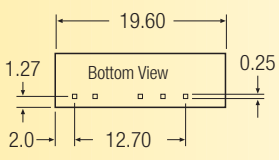


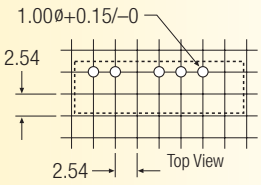





**Recommended Footprint Details**




**Pin Connections**

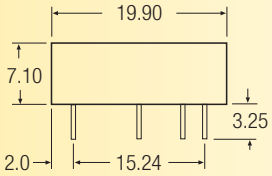
| Pin # | Single | Dual |
|---|---|---|
| 1 | +Vin | +Vin |
| 2 | –Vin | –Vin |
| 4 | NC | –Vout |
| 5 | –Vout | Com |
| 6 | +Vout | +Vout |

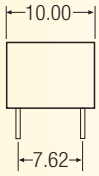
NC = No Connection
XX.X ± 0.5 mm
XX.XX ± 0.25 mm

## Package Style and Pinning (mm)

3rd angle projection

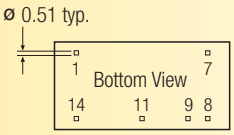
### 14 PIN DIP Package



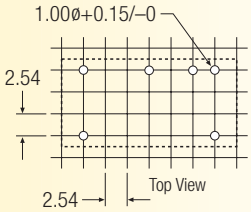




Single Output


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