

# 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  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  operating temperature range and optional continuous short circuit protection.

### Selection Guide

Part Number	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%)	Max Capacitive Load <sup>(1)</sup>	
RB-xx3.3S	(H)	3.3, 5, 12, 15, 24	3.3	303	75	2200 $\mu\text{F}$
RB-xx05S	(H)	3.3, 5, 12, 15, 24	5	200	70-78	1000 $\mu\text{F}$
RB-xx09S	(H)	3.3, 5, 12, 15, 24	9	111	70-78	1000 $\mu\text{F}$
RB-xx12S	(H)	3.3, 5, 12, 15, 24	12	84	78-80	470 $\mu\text{F}$
RB-xx15S	(H)	3.3, 5, 12, 15, 24	15	66	80-84	470 $\mu\text{F}$
RB-xx24S	(H)	3.3, 5, 12, 15, 24	24	42	74-85	220 $\mu\text{F}$
RB-xx3.3D	(H)	3.3, 5, 12, 15, 24	$\pm 3.3$	$\pm 152$	70	$\pm 1000\mu\text{F}$
RB-xx05D	(H)	3.3, 5, 12, 15, 24	$\pm 5$	$\pm 100$	70-78	$\pm 470\mu\text{F}$
RB-xx09D	(H)	3.3, 5, 12, 15, 24	$\pm 9$	$\pm 56$	76-79	$\pm 470\mu\text{F}$
RB-xx12D	(H)	3.3, 5, 12, 15, 24	$\pm 12$	$\pm 42$	78-82	$\pm 220\mu\text{F}$
RB-xx15D	(H)	3.3, 5, 12, 15, 24	$\pm 15$	$\pm 33$	80-84	$\pm 220\mu\text{F}$
RB-xx24D	(H)	3.3, 5, 12, 15, 24	$\pm 24$	$\pm 21$	80-84	$\pm 100\mu\text{F}$

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		$\pm 10\%$
Output Voltage Accuracy		$\pm 5\%$
Line Voltage Regulation		1.2%/1% of $V_{in}$ typ.
Load Voltage Regulation	3.3V output type	20% max.
(10% to 100% full load)	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	$\pm 75\text{mVp-p}$ max.
Operating Frequency		50kHz min. / 100kHz typ. / 105kHz max.
Efficiency at Full Load		70% min. / 80% typ.
Minimum Load = 0%		Specifications valid for 10% minimum load only.
Isolation Voltage	(tested for 1 second)	1000VDC
	(rated for 1 minute**)	500VAC / 60Hz
Isolation Voltage	H-Suffix (tested for 1 second)	2000VDC
	H-Suffix (rated for 1 minute**)	1000VAC / 60Hz
Isolation Capacitance		20pF min. / 75pF max.
Isolation Resistance		10 $\text{G}\Omega$ min.
Short Circuit Protection		1 Second
P-Suffix		Continuous
Operating Temperature Range (free air convection)		$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ (see Graph)
Storage Temperature Range		$-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$
Relative Humidity		95% RH

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# ECONOLINE

## DC/DC-Converter

with 3 year Warranty

# RECOM

## 1 Watt

## SIP7

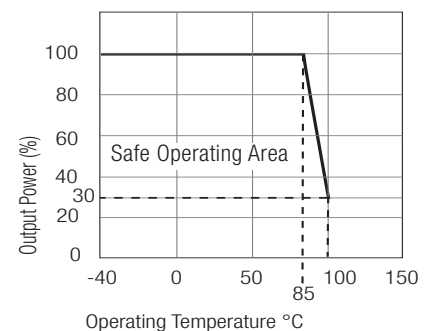
## Single & Dual Output



**EN-60950-1 Certified**  
**UL-60950-1 Certified**  
**EN-60601-1 Certified\***  
 (\* /H suffix)

# RB

## Derating-Graph (Ambient Temperature)



\*\*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.

Refer to Application Notes

**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°C)	} <i>Detailed Information see</i> using MIL-HDBK 217F	} <i>Application Notes chapter "MTBF"</i> using MIL-HDBK 217F	1012 x 10 <sup>3</sup> hours
(+85°C)			151 x 10 <sup>3</sup> hours

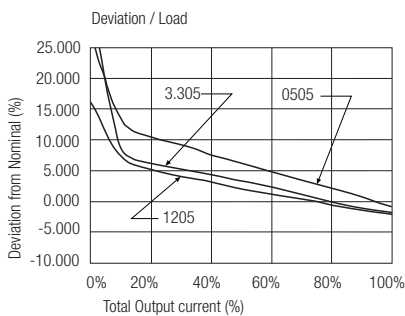
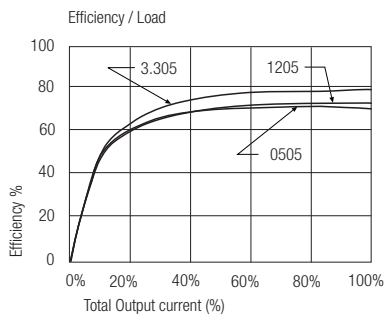
**Certifications**

CB Test Report  
 UL General Safety  
 EN General Safety  
 EN Medical Safety

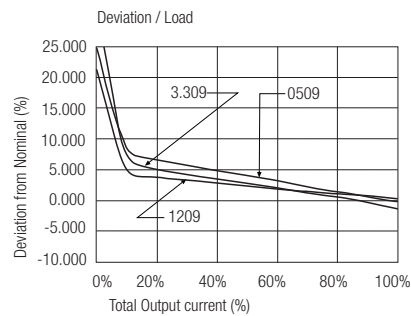
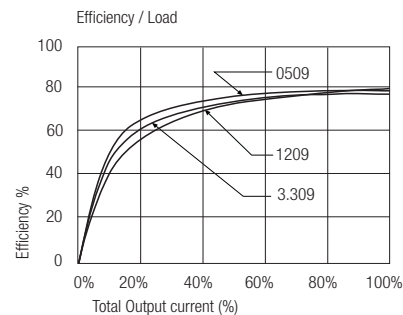
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 Report: E358085 UL 60950-1 2nd Ed.  
 Report: SPCLVD1109103 EN60950-1:2006 + A12:2011  
 Report: MDD1112018 + RM1112018 IEC/EN 60601-1 3rd  
 Edition Medical Report + ISO14971 Risk Assessment

**Typical Characteristics - Single Output**

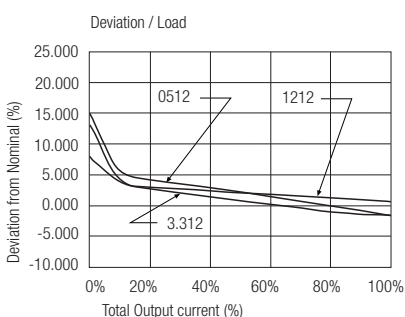
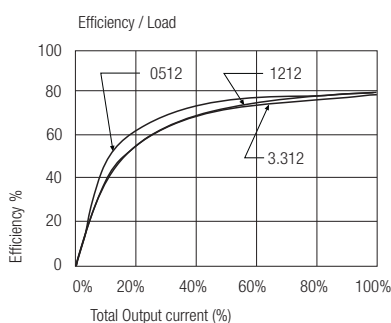
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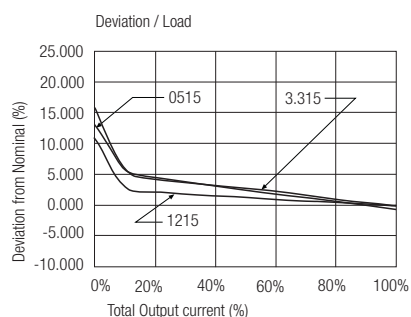
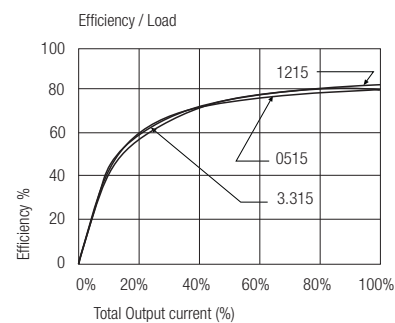
## RB-xx09S



## RB-xx12S

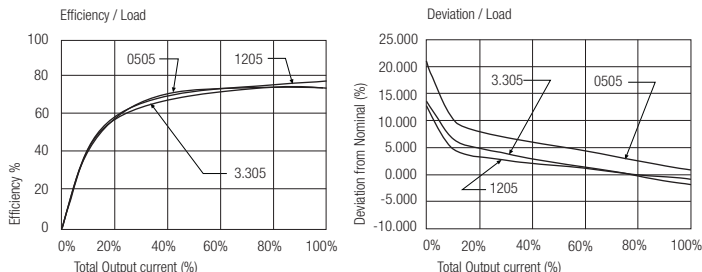


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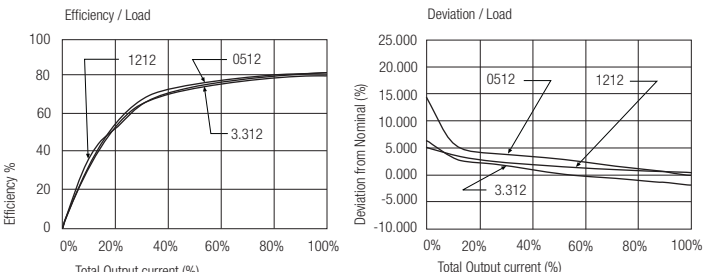


Typical Characteristics - Dual Outputs

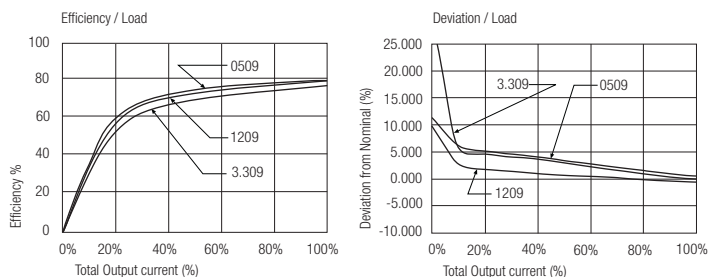
**RB-xx05D**



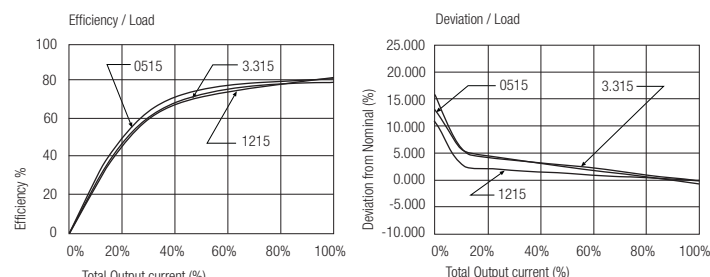
**RB-xx12D**



**RB-xx09D**



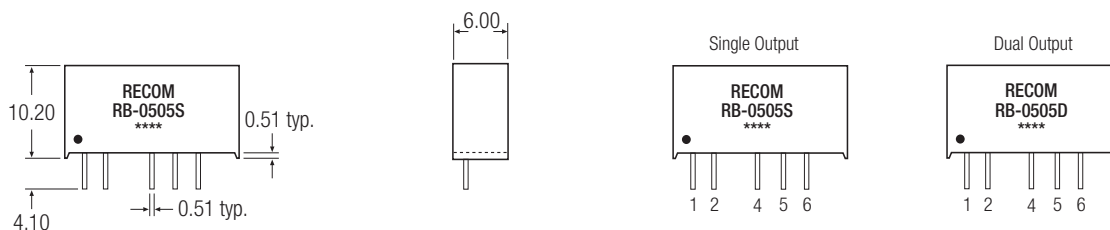
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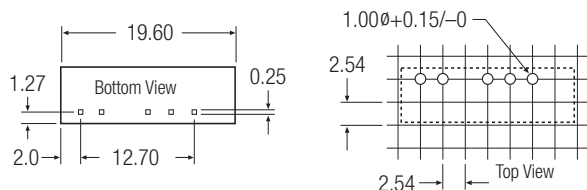
Notes  
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

Package Style and Pinning (mm)

SIP7 Package



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