

# Features

## Unregulated Converter

- 3kVDC or 4kVDC Isolation
- Optional Continuous Short Circuit Protected
- Custom Solutions Available
- UL94V-0 Package Material
- Efficiency to 84 %
- Suitable for IGBT Applications

### Description

The RK and RH Series DC/DC-Converter complements Recom's industrial range of converters with very high isolations of 3KV and 4kVDC. The extended operating temperature range covering  $-40^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$  is a standard feature. The converters are EN-60601-1 certified, making them suitable for medical as well as IGBT driver applications.

### Selection Guide

Part Number	(4kV)	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%)	Max Capacitive Load <sup>(1)</sup>
RK-xx05S*	(H)	5, 12, 15, 24	5	200	70-78	1000 $\mu\text{F}$
RK-xx09S*	(H)	5, 12, 15, 24	9	111	70-80	1000 $\mu\text{F}$
RK-xx12S*	(H)	5, 12, 15, 24	12	84	78-82	470 $\mu\text{F}$
RK-xx15S*	(H)	5, 12, 15, 24	15	66	80-82	470 $\mu\text{F}$
RH-xx05D*	(H)	5, 12, 15, 24	$\pm 5$	$\pm 100$	74-78	$\pm 470\mu\text{F}$
RH-xx09D*	(H)	5, 12, 15, 24	$\pm 9$	$\pm 56$	76-79	$\pm 470\mu\text{F}$
RH-xx12D*	(H)	5, 12, 15, 24	$\pm 12$	$\pm 42$	78-84	$\pm 220\mu\text{F}$
RH-xx15D*	(H)	5, 12, 15, 24	$\pm 15$	$\pm 33$	80-84	$\pm 220\mu\text{F}$
RH-xx1509D*	(H)	5, 12, 24	+15/-9	+33/-56	70-81	+220/-470 $\mu\text{F}$

xx = Input Voltage. Other input and output voltage combinations available on request.

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. RK-0505S/P, RK-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	5V output type	15% max.
(10% to 100% full load)	9V, 12V, 15V, 24V output types	10% max.
	RH-xx1509D	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	RK types	50kHz min. / 100kHz typ. / 105kHz max.
	RH types	57kHz min. / 100kHz typ. / 105kHz max.
	RK-xx1509D	50kHz min. / 88kHz typ.
Efficiency at Full Load		70% min. / 80% typ.
Minimum Load = 0%		Specifications valid for 10% minimum load only.
Isolation Voltage	(tested for 1 second)	3000VDC
	(rated for 1 minute <sup>***</sup> )	1500VAC / 60Hz
Isolation Voltage	H-Suffix (tested for 1 second)	4000VDC
	H-Suffix (rated for 1 minute <sup>***</sup> )	2000VAC / 60Hz
Isolation Capacitance	RK types	20pF min. / 75pF max.
	RH types	20pF min. / 65pF max.
Isolation Resistance		15 G $\Omega$ min.
Short Circuit Protection		1 Second
P-Suffix		Continuous
Operating Temperature Range (free air convection, without derating)		$-40^{\circ}\text{C}$ to $+90^{\circ}\text{C}$ (see Graph)
Storage Temperature Range		$-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$
Relative Humidity		95% RH

continued on next page

# ECONOLINE

## DC/DC-Converter

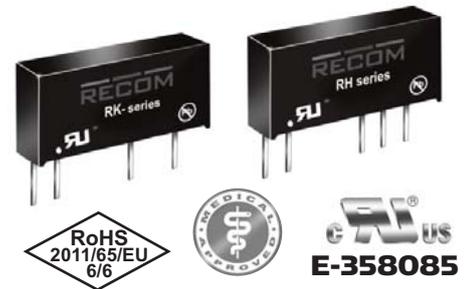
with 3 year Warranty

# RECOM

## 1 Watt

## SIP7

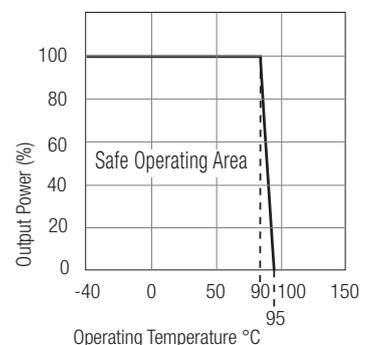
## Single & Dual Output



**EN-60950-1 Certified**  
**IEC/EN-60601-1 Certified\*\***  
**UL-60950-1 Certified\*\***  
**\*\* +15/-9 Version excluded**

# RK\_RH

## 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.

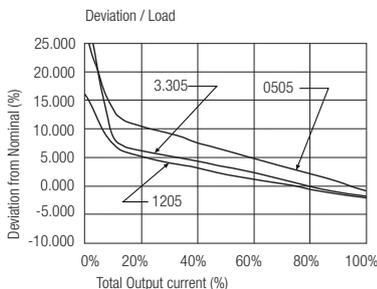
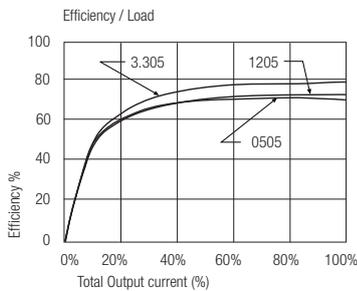
Refer to Application Notes

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

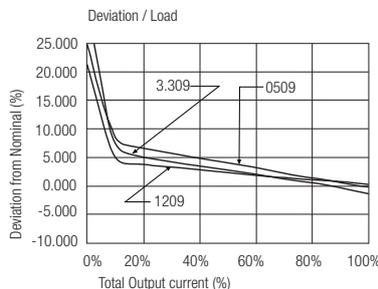
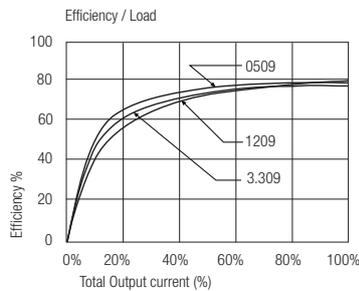
Package Weight		2.6g
H-Suffix		2.8g
Packing Quantity		25 pcs per Tube
MTBF (+25°C)	} Detailed Information see Application Notes chapter "MTBF"	RK types 992 x 10 <sup>3</sup> hours
(+85°C)		RH types 1012 x 10 <sup>3</sup> hours
using MIL-HDBK 217F		RK types 145 x 10 <sup>3</sup> hours
		RH types 151 x 10 <sup>3</sup> hours
Certifications		
EN General Safety	Report: SPCLVD1109103	EN60950-1: 2006 + A12:2011
EN Medical Safety	Report: SPCMDD1205098-4	IEC/EN 60601-1: 2006, 3rd Edition
UL General Safety	Report: E358085	UL60950-1, 2nd Edition

## Typical Characteristics

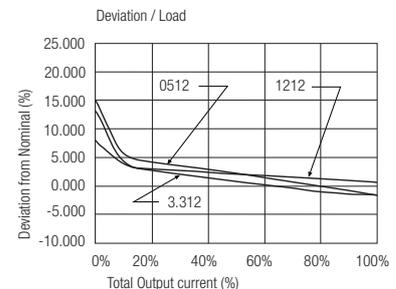
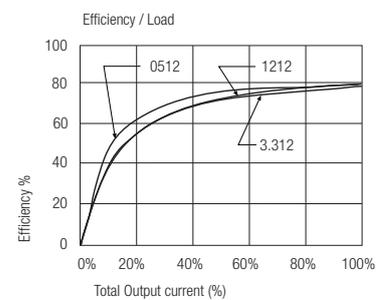
### RK-xx05S



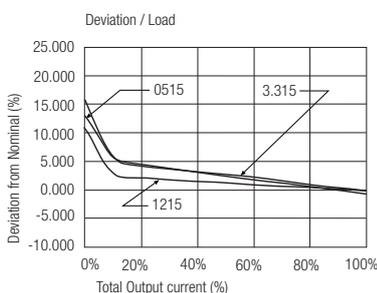
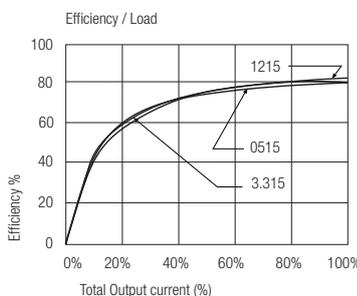
### RK-xx09S



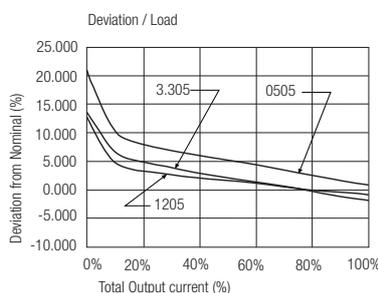
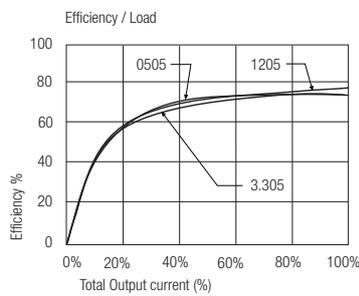
### RK-xx12S



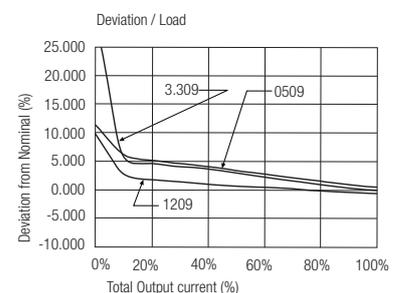
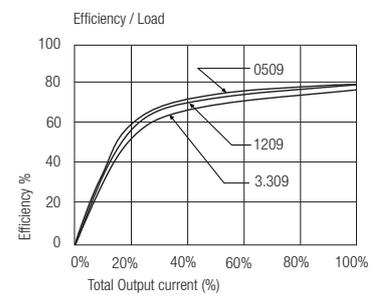
### RK-xx15S



### RH-xx05D



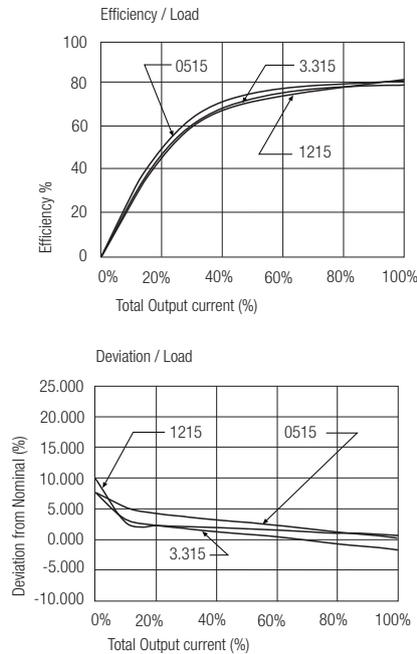
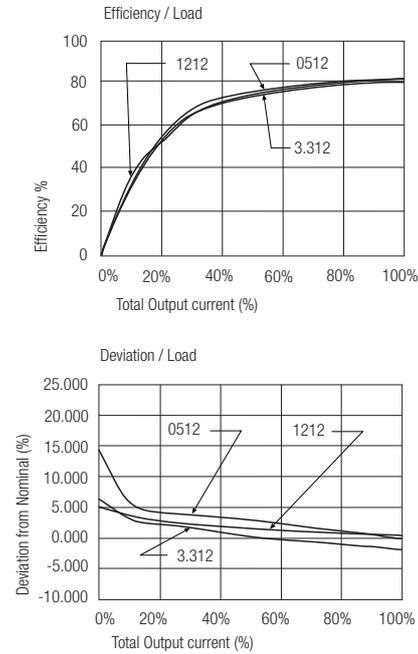
### RH-xx09D



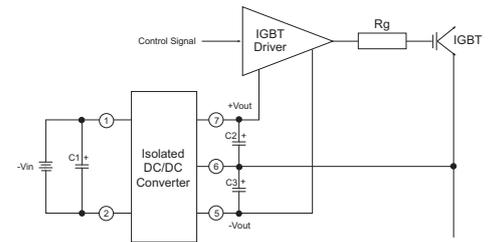
**Typical Characteristics**

**RH-xx12D**

**RH-xx15D**



**IGBT Application Circuit**

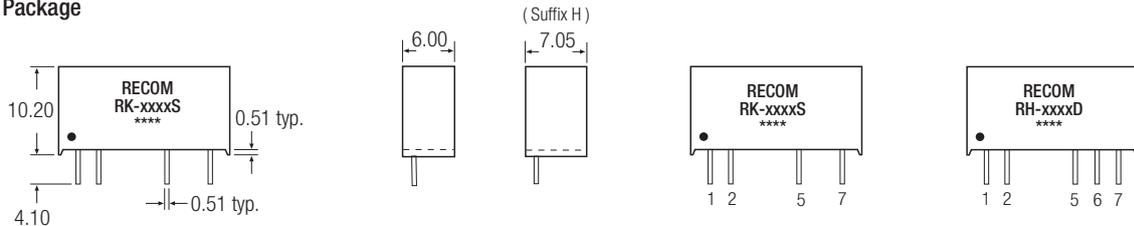


**Notes**

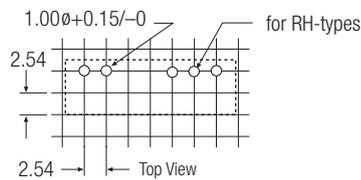
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

**Package Style and Pinning (mm)**

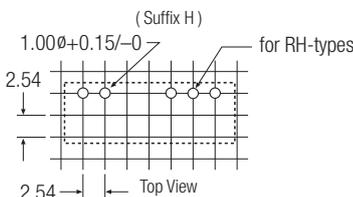
**7 PIN SIP Package**



**Recommended Footprint Details**



**Recommended Footprint Details**



**Pin Connections**  
RK-xxxxS

Pin #	Single
1	+Vin
2	-Vin
5	-Vout
7	+Vout

**Pin Connections**  
RH-xxxxD

Pin #	Dual
1	+Vin
2	-Vin
5	-Vout
6	Com
7	+Vout

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.

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