

## Features

## Unregulated Converters

- Pot-Core Transformer - separated windings
- High 5.2kVDC Isolation in compact size
- Optional Continuous Short Circuit Protected
- Pin Compatible with RH and RK Series
- Approved for Medical and IGBT Applications
- UL and EN Certified
- Efficiency to 82 %

### Description

The RP series has very high isolation of 5.2 kVDC in a compact size. The converters are EN-60601-1 certified, making them suitable for medical as well as IGBT driver applications.

The /X2 version has rearranged pins to permit an input output separation of more than 9mm.

### Selection Guide

| Part Number<br>SIP 7 | Input Voltage<br>(VDC) | Output Voltage<br>(VDC) | Output Current<br>(mA) | Efficiency<br>(%) | Max Capacitive Load <sup>(1)</sup> |
|----------------------|------------------------|-------------------------|------------------------|-------------------|------------------------------------|
| RP-xx3.3S*           | 5, 9, 12, 15, 24       | 3.3                     | 303                    | 70                | 2200µF                             |
| RP-xx05S*            | 5, 9, 12, 15, 24       | 5                       | 200                    | 70-72             | 1000µF                             |
| RP-xx09S*            | 5, 9, 12, 15, 24       | 9                       | 111                    | 75                | 1000µF                             |
| RP-xx12S*            | 5, 9, 12, 15, 24       | 12                      | 84                     | 75-78             | 470µF                              |
| RP-xx15S*            | 5, 9, 12, 15, 24       | 15                      | 66                     | 80                | 470µF                              |
| RP-xx24S*            | 5, 9, 12, 15, 24       | 24                      | 42                     | 80                | 220µF                              |
| RP-xx3.3D*           | 5, 9, 12, 15, 24       | ±3.3                    | ±152                   | 70                | ±1000µF                            |
| RP-xx05D*            | 5, 9, 12, 15, 24       | ±5                      | ±100                   | 74-76             | ±470µF                             |
| RP-xx09D*            | 5, 9, 12, 15, 24       | ±9                      | ±56                    | 75                | ±470µF                             |
| RP-xx12D*            | 5, 9, 12, 15, 24       | ±12                     | ±42                    | 79-82             | ±220µF                             |
| RP-xx15D*            | 5, 9, 12, 15, 24       | ±15                     | ±33                    | 80-82             | ±220µF                             |
| RP-xx24D*            | 5, 9, 12, 15, 24       | ±24                     | ±21                    | 80                | ±100µF                             |
| RP-xx1509D           | 5, 12, 24              | +15/-9                  | ±42                    | 70-85             | ±220µF                             |

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

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

\* add Suffix "/X2" for single output with alternative pinning e.g. RP-0505S/X2, RP-0505S/P/X2

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

|                                                                     |                                                     |
|---------------------------------------------------------------------|-----------------------------------------------------|
| Input Voltage Range                                                 | ±10%                                                |
| Output Voltage Accuracy                                             | ±5%                                                 |
| Line Voltage Regulation                                             | 1.2%/1% of $V_{in}$ typ.                            |
| Load Voltage Regulation                                             | 3.3V output types 20% max.                          |
| (10% to 100% full load)                                             | 5V output type 15% max.                             |
|                                                                     | 9V, 12V, 15V, 24V output types, RP-xx1509D 10% max. |
| Output Ripple and Noise (20MHz limited)                             | 100mVp-p max.                                       |
| Operating Frequency                                                 | 50kHz min. / 100kHz typ. / 120kHz max.              |
|                                                                     | RP-xx1509D 50kHz min / 94kHz 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) 5200VDC                       |
|                                                                     | (rated for 1 minute**) 2600VAC / 60Hz               |
| Isolation Capacitance                                               | 4pF min. / 10pF max.                                |
| Isolation Resistance                                                | 20 GΩ min.                                          |
| Short Circuit Protection                                            | 1 Second                                            |
| P-Suffix                                                            | Continuous                                          |
| Operating Temperature Range (free air convection, without derating) | -40°C to +90°C (see Graph)                          |

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## ECONOLINE

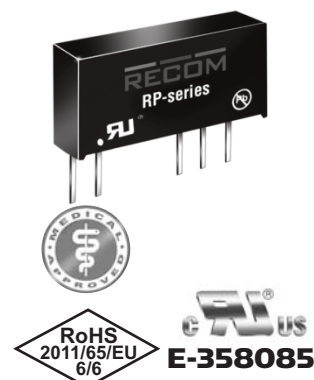
## DC/DC-Converter

with 3 year Warranty

# RECOM

## 1 Watt

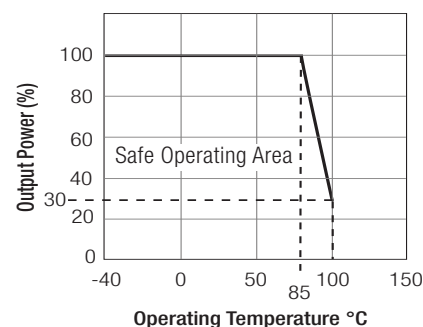
## SIP 7 Single & Dual Output



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

# RP

## 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)

|                           |                                                              |                     |                             |
|---------------------------|--------------------------------------------------------------|---------------------|-----------------------------|
| Storage Temperature Range | -55°C to +125°C                                              |                     |                             |
| Relative Humidity         | 95% RH                                                       |                     |                             |
| Package Weight            | 2.4g                                                         |                     |                             |
| Packing Quantity          | 25 pcs per Tube                                              |                     |                             |
| MTBF (+25°C)              | Detailed Information see<br>Application Notes chapter "MTBF" | using MIL-HDBK 217F | 928 x 10 <sup>3</sup> hours |
| (+85°C)                   |                                                              | using MIL-HDBK 217F | 150 x 10 <sup>3</sup> hours |

#### Certifications

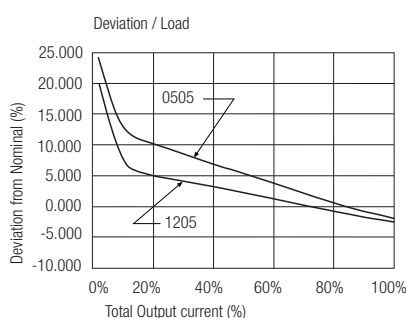
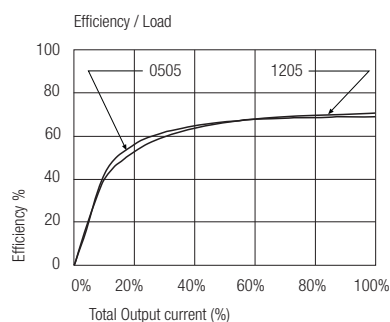
|                    |                        |                                 |
|--------------------|------------------------|---------------------------------|
| CSA General Safety | Report: E358085        | CSA C22.2 No. 60950-1-03        |
| UL General Safety  | Report: E358085        | UL 60950-1 2nd Ed.              |
| EN General Safety  | Report: SPCLVD1109103  | EN60950-1:2006 + A12:2011       |
| EN Medical safety  | Report: SPCMD1205098-4 | IEC/EN60601-1:2006, 3rd Edition |

#### Notes

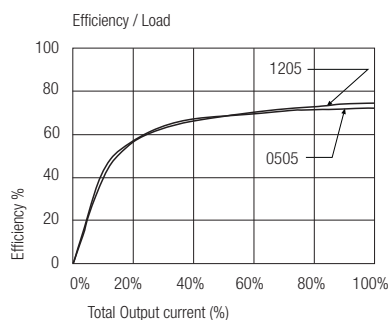
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

### Typical Characteristics

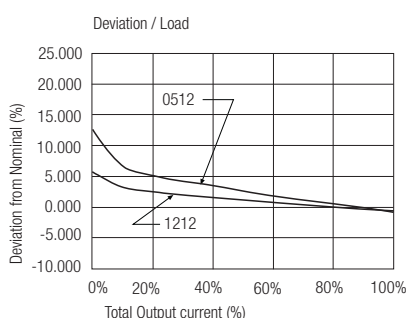
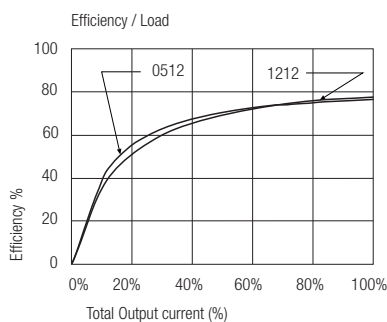
#### RP-xx05S



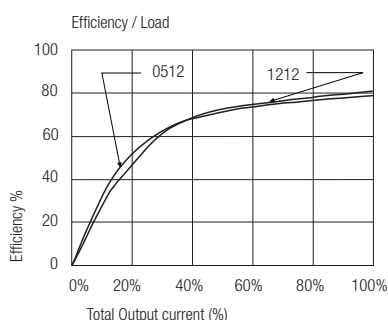
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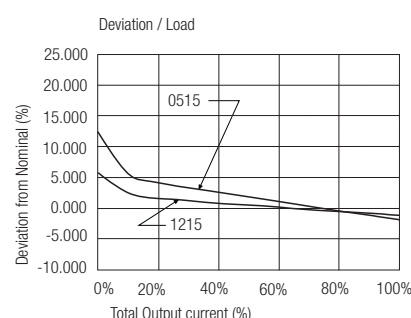
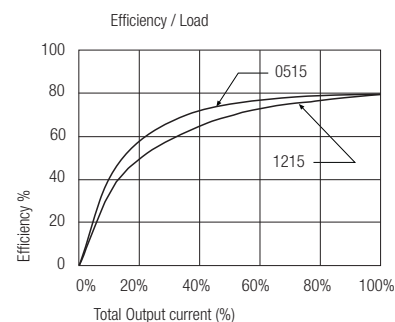
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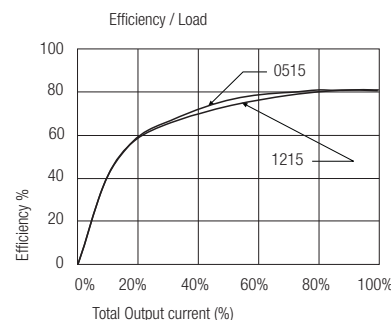
#### RP-xx12D



#### RP-xx15S



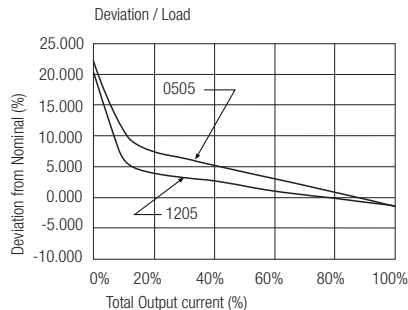
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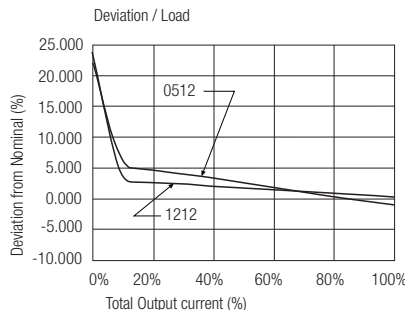
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Typical Characteristics

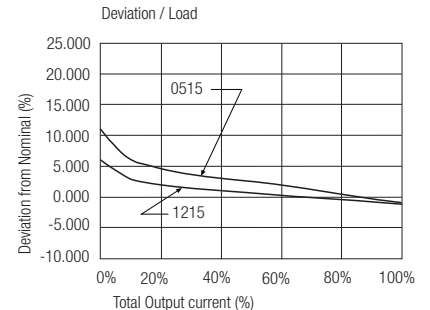
**RP-xx05D**



**RP-xx12D**

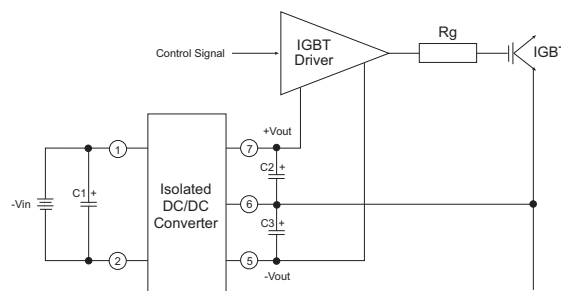


**RP-xx15D**



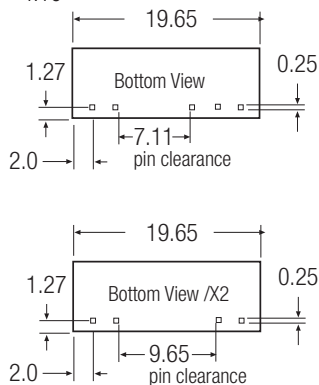
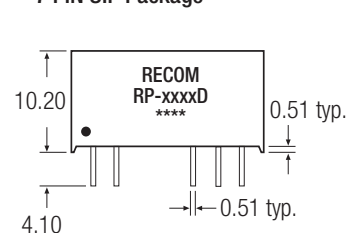
Application

**IGBT Application  
Circuit**

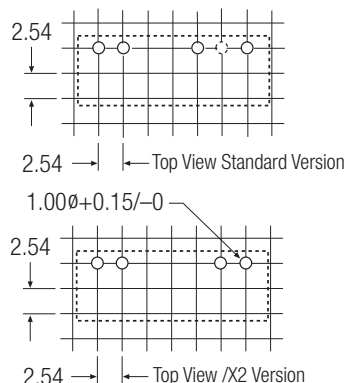


Package Style and Pinning (mm)

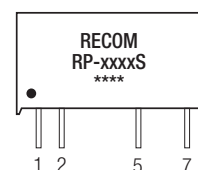
7 PIN SIP Package



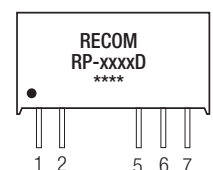
Recommended Footprint Details



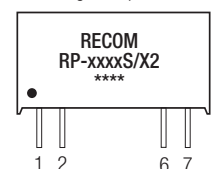
Single Output



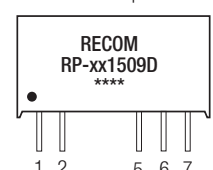
Dual Output



Single Output/X2



Dual Output



Pin Connections

| Pin # | Single | Dual  | /X2    |
|-------|--------|-------|--------|
| 1     | +Vin   | +Vin  | +Vin   |
| 2     | -Vin   | -Vin  | -Vin   |
| 5     | -Vout  | -Vout | No Pin |
| 6     | No Pin | Com   | -Vout  |
| 7     | +Vout  | +Vout | +Vout  |

XX.X ± 0.5 mm

XX.XX ± 0.25 mm