

## Features

## Unregulated Converters

- UL/CSA and EN Safety certified
- EN-60601 for Medical Applications
- Isolation 6.4kVDC
- Optional Continuous Short Circuit Protected
- Unique Transformer System
- Compact SIP7 Package
- /X2 Version with >9mm Input/Output Clearance
- Suitable for IGBT Applications
- Very Low Isolation Capacitance

### Description

The RxxP2xxS\_D Series of DC/DC Converters are certified to UL/CSA-60950 and UL/CSA 60601 as well as EN-60950 and EN60601. This makes them ideal for medical and safety applications where approved isolation is required. The /X2 version has an input/output clearance of more than 9mm.

### Selection Guide

| Part Number<br>SIP 7 | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Efficiency Std (%) | Max Capacitive Load <sup>(1)</sup> |
|----------------------|---------------------|----------------------|---------------------|--------------------|------------------------------------|
| RxxP23.3S*           | 5, 12, 15, 24       | 3.3                  | 600                 | 70                 | 3300µF                             |
| RxxP205S*            | 5, 12, 15, 24       | 5                    | 400                 | 70-75              | 1200µF                             |
| RxxP209S*            | 5, 12, 15, 24       | 9                    | 222                 | 70-75              | 1200µF                             |
| RxxP212S*            | 5, 12, 15, 24       | 12                   | 167                 | 70-75              | 680µF                              |
| RxxP215S*            | 5, 12, 15, 24       | 15                   | 132                 | 75-80              | 680µF                              |
| RxxP23.3D*           | 5, 12, 15, 24       | ±3.3                 | ±300                | 70                 | ±1500µF                            |
| RxxP205D*            | 5, 12, 15, 24       | ±5                   | ±200                | 70-75              | ±470µF                             |
| RxxP209D*            | 5, 12, 15, 24       | ±9                   | ±111                | 70-75              | ±470µF                             |
| RxxP212D*            | 5, 12, 15, 24       | ±12                  | ±85                 | 70-75              | ±330µF                             |
| RxxP215D*            | 5, 12, 15, 24       | ±15                  | ±66                 | 75-80              | ±330µF                             |
| RxxP21509D*          | 5, 12, 24           | +15/-9               | +67/-111            | 70-82              | ±330µF                             |

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

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. R05P205S/P, R05P205D/P

\* add Suffix "/X2" for single output with alternative pinout, e.g. R05P205S/X2, R05P205D/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            | 3.3, 5V output types 15% max.                   |
| (10% to 100% full load)            | other output types, RxxP21509D 10% max.         |
| Output Ripple and Noise (20MHz BW) | 200mVp-p max.                                   |
| Operating Frequency                | 20kHz min. / 50kHz typ. / 85kHz max.            |
|                                    | RxxP21509D 20kHz min. / 50kHz typ.              |
| Efficiency at Full Load            | 65% min. / 80% max.                             |
| Minimum Load = 0%                  | Specifications valid for 10% minimum load only. |
| Isolation Voltage                  | (tested for 1 second) 6400VDC                   |
|                                    | (rated for 1 minute**) 3200VAC / 60Hz           |
| Isolation Capacitance              | 1.5pF min / 10pF max.                           |
| Isolation Resistance               | 15 GΩ min.                                      |
| Short Circuit Protection           | 1 Second                                        |
| P-Suffix                           | Continuous                                      |

continued on next page

\*\*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.

## ECONOLINE

## DC/DC-Converter

with 3 year Warranty

# RECOM

## 2 Watt

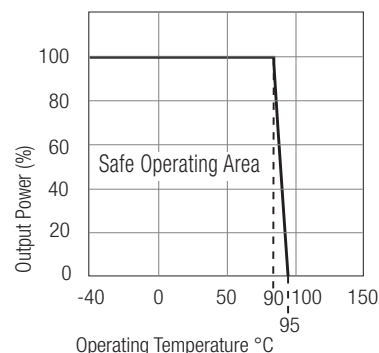
## SIP 7 Single & Dual Output



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

# RxxP2xx

## Derating-Graph (Ambient Temperature)



Refer to Application Notes

www.recom-power.com

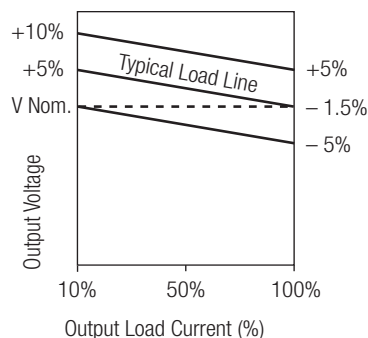
**Specifications** (measured at  $T_A = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

|                                                                     |                                                              |                                 |                                   |
|---------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------|-----------------------------------|
| Operating Temperature Range (free air convection, without derating) | -40°C to +90°C (see Graph)                                   |                                 |                                   |
| Storage Temperature Range                                           | -55°C to +125°C                                              |                                 |                                   |
| Relative Humidity                                                   | 95% RH                                                       |                                 |                                   |
| Package Weight                                                      | 4.3g                                                         |                                 |                                   |
| Packing Quantity                                                    | 25 pcs per Tube                                              |                                 |                                   |
| MTBF (+25°C)                                                        | Detailed Information see<br>Application Notes chapter "MTBF" | Single/Dual using MIL-HDBK 217F | 2113/2434 x 10 <sup>3</sup> hours |
| (+85°C)                                                             |                                                              | Single/Dual using MIL-HDBK 217F | 299/334 x 10 <sup>3</sup> hours   |
| Certifications                                                      |                                                              |                                 |                                   |
| UL/cUL General Safety                                               | Report: E358085                                              | UL 60950-1 2nd Ed.              |                                   |
| EN General Safety                                                   | Report: SPCLVD1109103                                        | EN60950-1:2006 + A12: 2011      |                                   |
| EN Medical Safety                                                   | Report: SPCMDD1205098-4                                      | IEC/EN60601-1:2006, 3rd Edition |                                   |

Notes

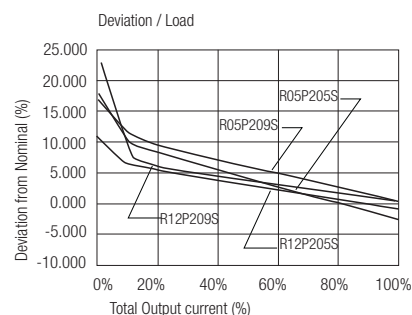
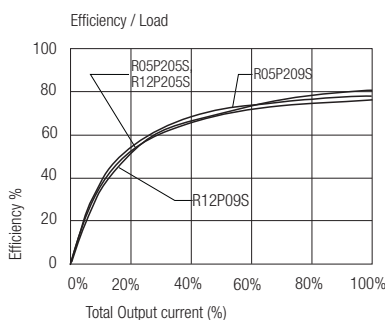
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

**Tolerance Envelope**

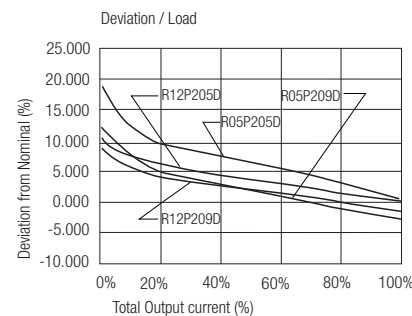
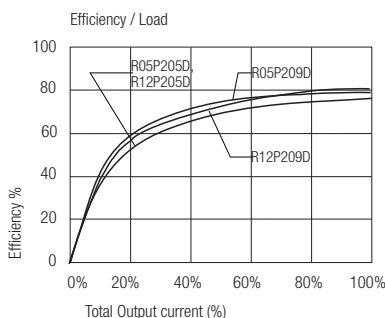


**Typical Characteristics**

**RxxP205S**  
**RxxP209S**

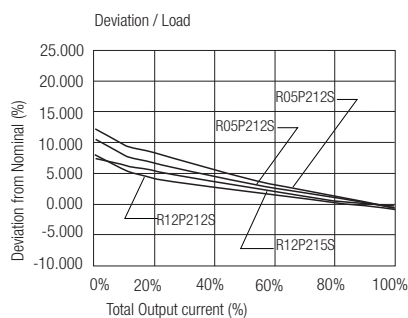
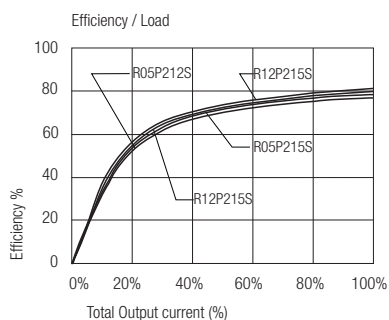


**R05P205D**  
**R05P209D**

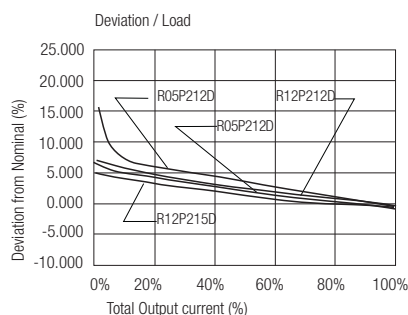
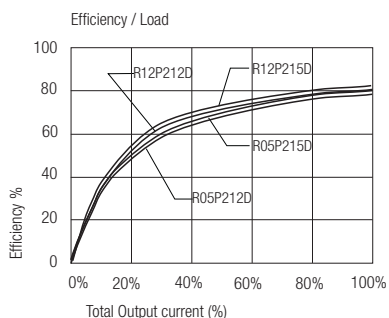


## Typical Characteristics

### RxxP212S RxxP215S



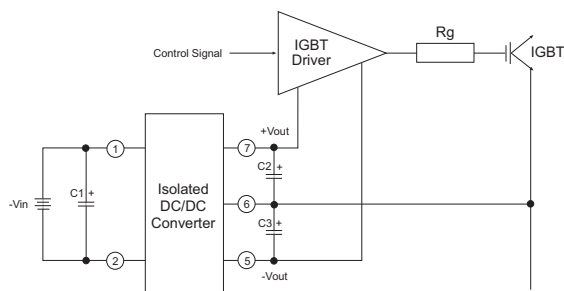
### RxxP212D RxxP215D



RxxP2xx

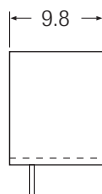
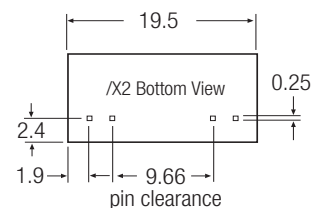
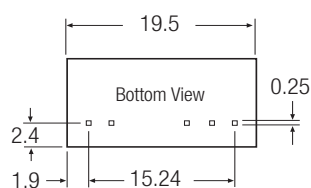
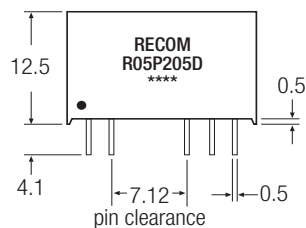
## Application

### IGBT Application Circuit

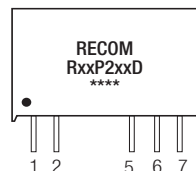


### Package Style and Pinning (mm)

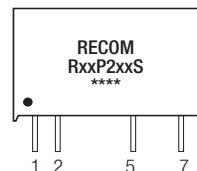
#### 7 PIN SIP Package



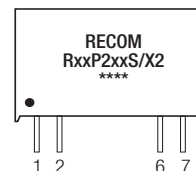
Dual Output



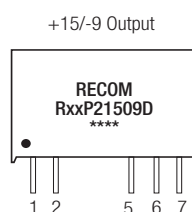
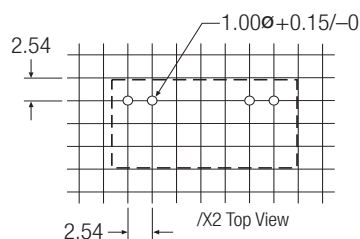
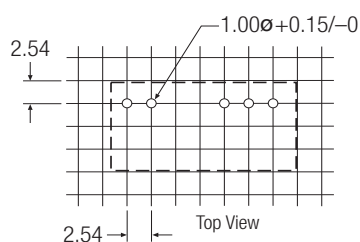
Single Output



/X2 Single Output



#### Recommended Footprint Details



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