

## Features

## Unregulated Converters

- UL/CSA and EN Safety certified
- EN-60601 for Medical Applications
- Isolation 6.4kVDC
- Optional Continuous Short Circuit Protected
- /X2 Option for >9mm Input/Output Clearance
- Suitable for IGBT Applications

### Description

The RxxPxxS\_D Series of DC/DC Converters are certified to UL/CSA-60950 as well as EN60950 and EN60601. This makes them ideal for medical and safety applications where approved isolation is required.

### Selection Guide

| Part Number<br>SIP 7 | Input Voltage<br>(VDC) | Output Voltage<br>(VDC) | Output Current<br>(mA) | Efficiency<br>Std<br>(%) | Max Capacitive Load <sup>(1)</sup> |
|----------------------|------------------------|-------------------------|------------------------|--------------------------|------------------------------------|
| RxxP3.3S*            | 5, 9, 12, 15, 24       | 3.3                     | 303                    | 70                       | 2200µF                             |
| RxxP05S*             | 5, 9, 12, 15, 24       | 5                       | 200                    | 70-75                    | 1000µF                             |
| RxxP09S*             | 5, 9, 12, 15, 24       | 9                       | 111                    | 70-75                    | 1000µF                             |
| RxxP12S*             | 5, 9, 12, 15, 24       | 12                      | 84                     | 70-75                    | 470µF                              |
| RxxP15S*             | 5, 9, 12, 15, 24       | 15                      | 66                     | 75-80                    | 470µF                              |
| RxxP3.3D*            | 5, 9, 12, 15, 24       | ±3.3                    | ±151                   | 70                       | ±1000µF                            |
| RxxP05D*             | 5, 9, 12, 15, 24       | ±5                      | ±100                   | 70-75                    | ±470µF                             |
| RxxP09D*             | 5, 9, 12, 15, 24       | ±9                      | ±55                    | 70-75                    | ±470µF                             |
| RxxP12D*             | 5, 9, 12, 15, 24       | ±12                     | ±41                    | 70-75                    | ±220µF                             |
| RxxP15D*             | 5, 9, 12, 15, 24       | ±15                     | ±33                    | 75-80                    | ±220µF                             |
| RxxP1509D*           | 12, 24                 | +15/-9                  | +33/-56                | 70-80                    | ±220µF                             |
| R05P1509D*           | 5                      | +15/-9                  | ±42                    | 70-80                    | +68µF/-220µF                       |

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

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. R05P05S/P, R05P05D/P

\* add Suffix "/X2" for single output with alternative pinout, e.g. R05P05S/X2, R05P05S/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, RxxP1509D 10% max.         |
| Output Ripple and Noise (20MHz BW)                                  | 200mVp-p max.                                  |
| Operating Frequency                                                 | 20kHz min. / 50kHz typ. / 85kHz max.           |
|                                                                     | RxxP1509D 20kHz min. / 60kHz typ.              |
| Efficiency at Full Load                                             | 65% min. / 75% typ.                            |
| Minimum Load = 0%                                                   | Specifications valid for 10% minimum load only |
| Isolation Voltages                                                  | (tested for 1 second) 6400VDC                  |
|                                                                     | (rated for 1 minute**) 3200VAC / 60Hz          |
| Isolation Capacitance                                               | 4pF min. / 10pF max.                           |
| Isolation Resistance                                                | 15 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)                     |
| Storage Temperature Range                                           | -55°C to +125°C                                |
| Relative Humidity                                                   | 95% RH                                         |

continued on next page

## ECONOLINE

## DC/DC-Converter

with 3 year Warranty

# RECOM

## 1 Watt

## SIP 7 Single

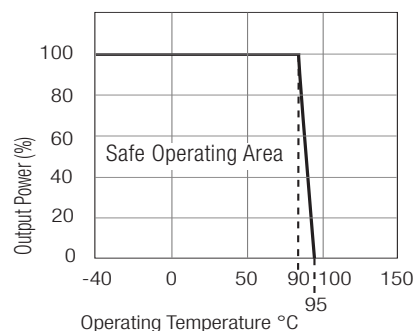
## & Dual Output



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

# RxxPxx

## 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

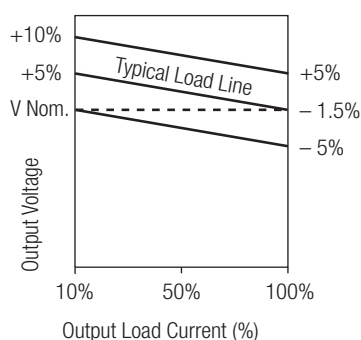
## Specifications (measured at $T_A = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up))

|                             |                                                              |                     |                                 |
|-----------------------------|--------------------------------------------------------------|---------------------|---------------------------------|
| Package Weight              |                                                              |                     | 4.3g                            |
| Packing Quantity            |                                                              |                     | 25 pcs per Tube                 |
| MTBF (+25°C) }<br>(+85°C) } | Detailed Information see<br>Application Notes chapter "MTBF" | using MIL-HDBK 217F | 2974 x 10³ hours                |
|                             |                                                              | using MIL-HDBK 217F | 728 x 10³ hours                 |
| Certifications              |                                                              |                     |                                 |
| UL/cUL General Safety       | Report: E358085-A8                                           |                     | UL 60950-1 2nd Ed.              |
| EN General Safety           | Report: SPCLVD1305069                                        |                     | EN60950-1:2006 + A12: 2011      |
| EN Medical Safety           | Report: SPCMD1205098-4                                       |                     | IEC/EN60601-1:2006, 3rd Edition |

### Notes

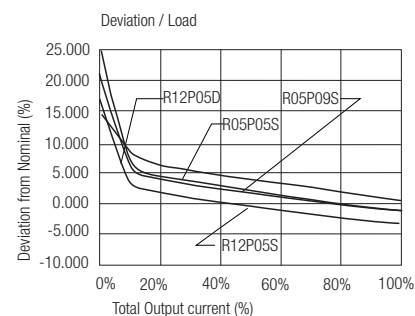
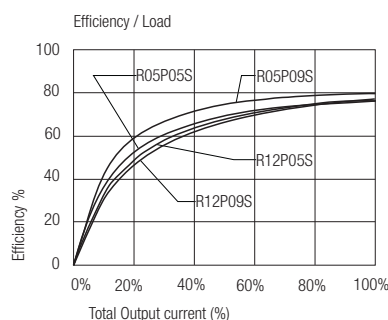
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

## Tolerance Envelope

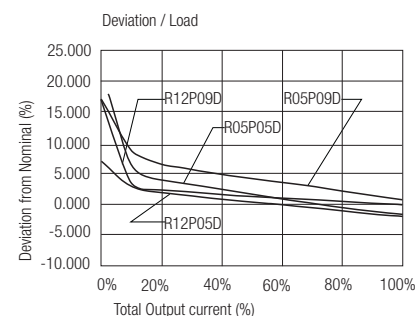
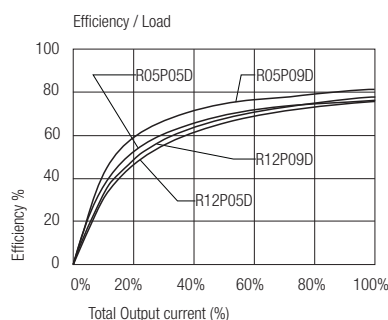


## Typical Characteristics

RxxP05S  
RxxP09S

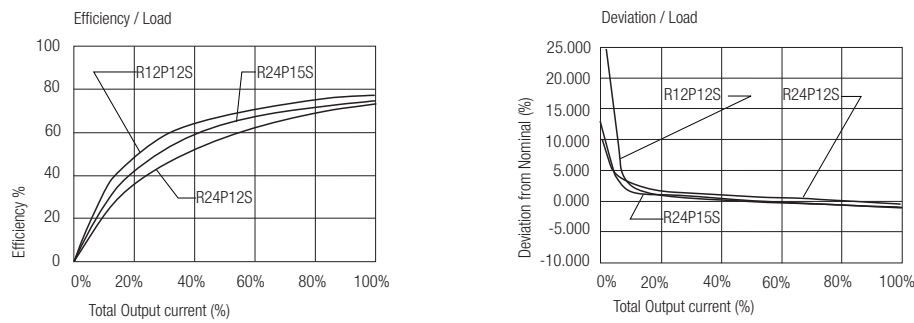


RxxP05D  
RxxP09D

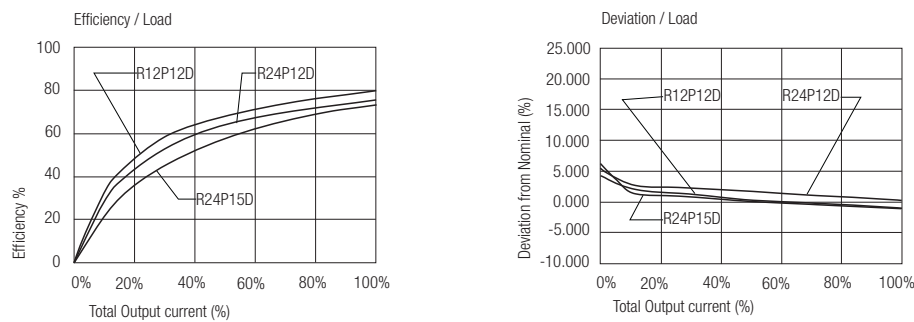


Typical Characteristics

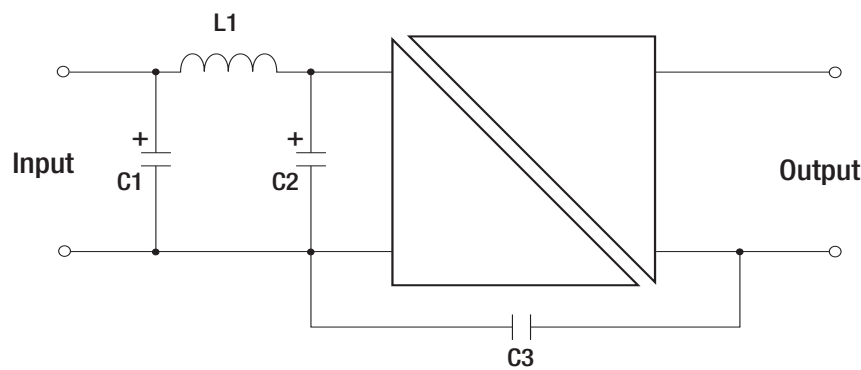
RxxP12S, RxxP15S



RxxP12D, RxxP15D



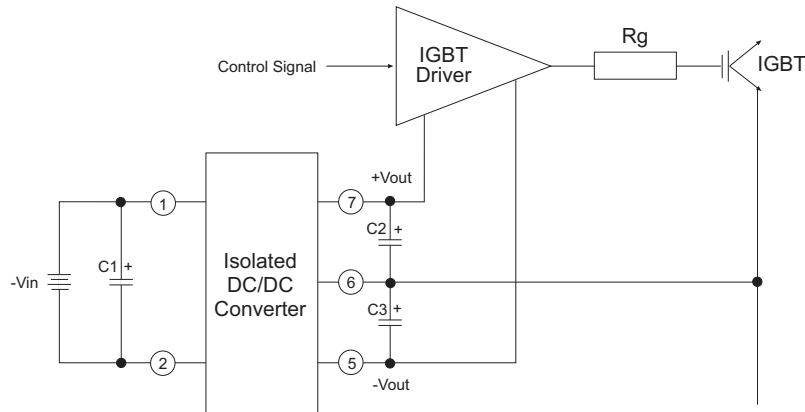
EMC Filter Suggestions for EN55022 Class A and B



|                 | C1   | L1                     | C2   | C3                           |
|-----------------|------|------------------------|------|------------------------------|
| EN55022 Class A | 10µF | NA                     | NA   | NA                           |
| EN55022 Class B | 10µF | 470µH<br>WE 7447471471 | 10µF | 2n2F 8kV<br>Vishay HGZ222MBP |

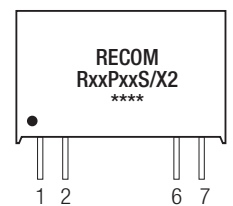
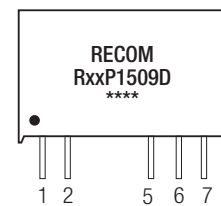
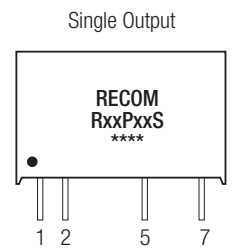
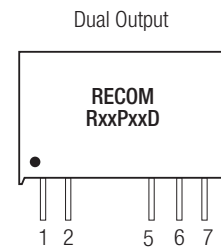
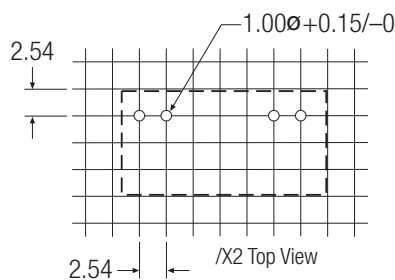
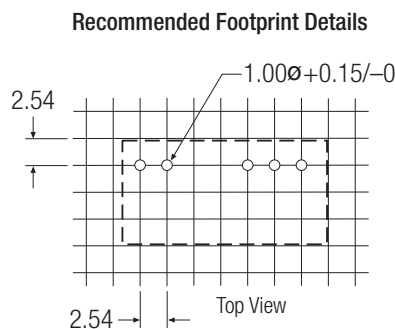
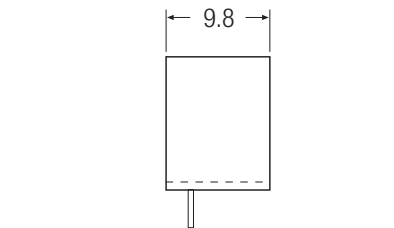
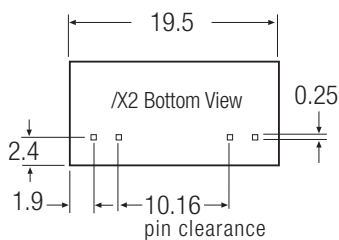
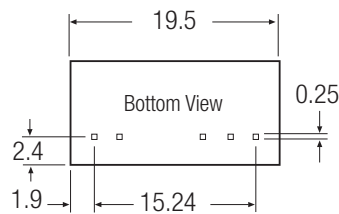
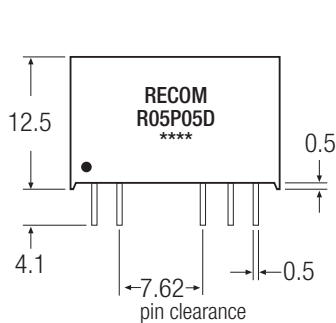
## Application

### IGBT Application Circuit



## Package Style and Pinning (mm)

### 7 PIN SIP Package



#### 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

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## RECOM:

[R05P05S](#) [R05P12S](#) [R12P12S](#) [R24P05S](#) [R24P12S](#) [R05P05D](#) [R05P05D/P](#) [R05P05S/P](#) [R05P09D](#) [R05P09D/P](#)  
[R05P09S](#) [R05P09S/P](#) [R05P12D](#) [R05P12D/P](#) [R05P12S/P](#) [R05P15D](#) [R05P15D/P](#) [R05P15S](#) [R05P15S/P](#)  
[R05P3.3D](#) [R05P3.3D/P](#) [R05P3.3S](#) [R05P3.3S/P](#) [R09P05D](#) [R09P05D/P](#) [R09P05S](#) [R09P05S/P](#) [R09P09D](#)  
[R09P09D/P](#) [R09P09S](#) [R09P09S/P](#) [R09P12D](#) [R09P12D/P](#) [R09P12S](#) [R09P12S/P](#) [R09P15D](#) [R09P15D/P](#) [R09P15S](#)  
[R09P15S/P](#) [R09P3.3D](#) [R09P3.3D/P](#) [R09P3.3S](#) [R09P3.3S/P](#) [R12P05D](#) [R12P05D/P](#) [R12P05S](#) [R12P05S/P](#)  
[R12P09D](#) [R12P09D/P](#) [R12P09S](#) [R12P09S/P](#) [R12P12D](#) [R12P12D/P](#) [R12P12S/P](#) [R12P15D](#) [R12P15D/P](#) [R12P15S](#)  
[R12P15S/P](#) [R12P3.3D](#) [R12P3.3D/P](#) [R12P3.3S](#) [R12P3.3S/P](#) [R15P05D](#) [R15P05D/P](#) [R15P05S](#) [R15P05S/P](#)  
[R15P09D](#) [R15P09D/P](#) [R15P09S](#) [R15P09S/P](#) [R15P12D](#) [R15P12D/P](#) [R15P12S](#) [R15P12S/P](#) [R15P15D](#) [R15P15D/P](#)  
[R15P15S](#) [R15P15S/P](#) [R15P3.3D](#) [R15P3.3D/P](#) [R15P3.3S](#) [R15P3.3S/P](#) [R24P05D](#) [R24P05D/P](#) [R24P05S/P](#)  
[R24P09D](#) [R24P09D/P](#) [R24P09S](#) [R24P09S/P](#) [R24P12D](#) [R24P12D/P](#) [R24P12S/P](#) [R24P15D](#) [R24P15D/P](#) [R24P15S](#)  
[R24P15S/P](#) [R24P3.3D](#) [R24P3.3D/P](#) [R24P3.3S](#) [R24P3.3S/P](#)