

## Features

## Unregulated Converters

- UL/CSA and EN Safety certified
- EN-61010 for Test, Measurement and Lab Use
- EN-60601 for Medical Applications
- Reinforced Isolation 6.4kVDC or 8kVDC
- Optional Continuous Short Circuit Protected
- Unique Reinforced Isolation Transformer System
- /X2 Option for >9mm Input/Output Clearance

### Description

The RxxPxxS\_D Series of DC/DC Converters are certified to UL/CSA-60950. This makes them ideal for safety applications where approved or reinforced isolation is required. The reinforced versions are also EN61010-1 certified for Lab Equipment Safety.

### Selection Guide

| Part Number<br>SIP 7 | Reinforced Isolation<br>(kVDC) | Input Voltage<br>(VDC) | Output Voltage<br>(VDC) | Output Current<br>(mA) | Efficiency Std<br>(%) | Max Capacitive Load <sup>(1)</sup> |
|----------------------|--------------------------------|------------------------|-------------------------|------------------------|-----------------------|------------------------------------|
| RxxP3.3S*            | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | 3.3                     | 303                    | 70~80                 | 2200µF                             |
| RxxP05S*             | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | 5                       | 200                    | 75-80                 | 1000µF                             |
| RxxP09S*             | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | 9                       | 111                    | 75-82                 | 1000µF                             |
| RxxP12S*             | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | 12                      | 84                     | 75-82                 | 470µF                              |
| RxxP15S*             | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | 15                      | 66                     | 75-83                 | 470µF                              |
| RxxP3.3D*            | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | ±3.3                    | ±151                   | 72-79                 | ±1000µF                            |
| RxxP05D*             | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | ±5                      | ±100                   | 75-82                 | ±470µF                             |
| RxxP09D*             | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | ±9                      | ±55                    | 75-82                 | ±470µF                             |
| RxxP12D*             | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | ±12                     | ±41                    | 75-82                 | ±220µF                             |
| RxxP15D*             | /R6.4 & /R8                    | 5, 9, 12, 15, 24       | ±15                     | ±33                    | 75-83                 | ±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

\* add Suffix "/R6.4" or "/R8" for Reinforced Isolation, e.g. R05P05D/R6.4, R05P05S/P/X2/R8

### 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                              | 10% max.       |
| Output Ripple and Noise (20MHz BW)                | 200mVp-p max.                                   |                |
| Operating Frequency                               | 20kHz min. / 50kHz typ. / 85kHz max.            |                |
| Efficiency at Full Load                           | 65% min. / 75% typ.                             |                |
| Minimum Load = 0%                                 | Specifications valid for 10% minimum load only. |                |
| Reinforced Isolation /R6.4                        | (tested for 1 second)                           | 6400VDC        |
|                                                   | (rated for 1 minute**)                          | 3200VAC / 60Hz |
| Reinforced Isolation /R8                          | (tested for 1 second)                           | 8000VDC        |
|                                                   | (rated for 1 minute**)                          | 4000VAC / 60Hz |
| Isolation Capacitance                             | 4pF min. / 10pF max.                            |                |
| Isolation Resistance                              | 15 $\Omega$ min.                                |                |
| Short Circuit Protection                          | 1 Second                                        |                |
| P-Suffix                                          | Continuous                                      |                |
| Operating Temperature Range (free air convection) | -40°C to +85°C (see Graph)                      |                |
| Case Temperature                                  | 105°C max.                                      |                |
| Storage Temperature Range                         | -55°C to +125°C                                 |                |
| Relative Humidity                                 | 95% RH                                          |                |
| Package Weight                                    | 4.3g                                            |                |
| Packing Quantity                                  | 25 pcs per Tube                                 |                |

continued on next page

## ECONOLINE

### DC/DC-Converter

with 3 year Warranty

# RECOM

## 1 Watt

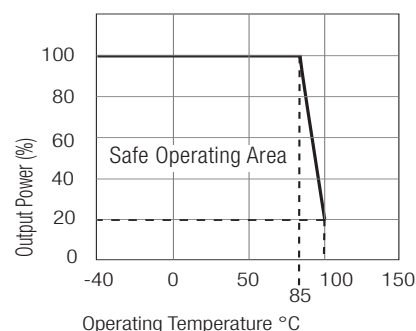
## SIP 7 Single & Dual Output



**EN-60950-1 Certified**  
**EN-60601-1 Certified**  
**UL/CSA 60950-1 Certified**  
**UL-60601-1 Certified**  
**EN-61010-1 Certified**  
**IEC-60601-1 CB Report**

# RxxPxx/R

## Derating-Graph (Ambient Temperature)



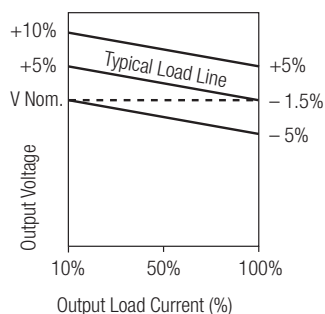
\*\*Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

**Refer to Application Notes**

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

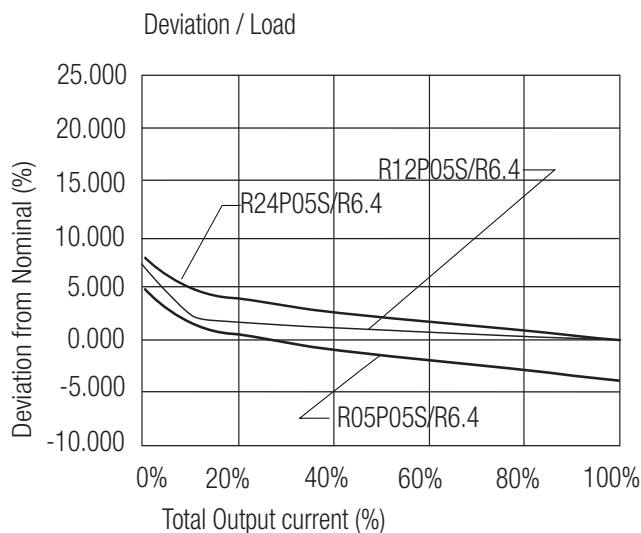
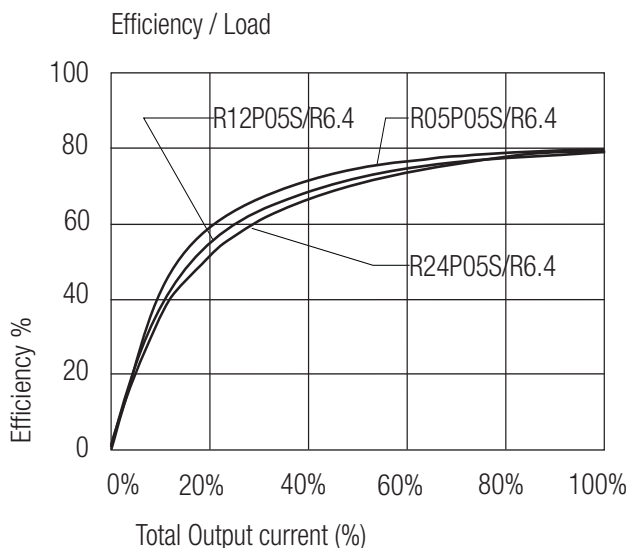
|                                                |                                                                                                                                       |                                    |                                            |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------|
| Potting Material                               |                                                                                                                                       | Silicone Rubber Compound (UL94V-0) |                                            |
| MTBF (+25°C)                                   | } Detailed Information see<br>Application Notes chapter "MTBF"                                                                        | using MIL-HDBK 217F                | 2974 x 10³ hours                           |
| (+85°C)                                        |                                                                                                                                       | using MIL-HDBK 217F                | 728 x 10³ hours                            |
| Reinforced Isolation                           |                                                                                                                                       |                                    |                                            |
| Transformer Clearance                          | Reinforced Types                                                                                                                      |                                    | 5.5 mm min.                                |
| PCB Creepage & Clearance                       | Reinforced Types                                                                                                                      |                                    | 4.6 mm min.                                |
| Certifications                                 |                                                                                                                                       |                                    |                                            |
| Measurement, Control and Laboratory Use Safety |                                                                                                                                       | Report: T1301251-313               | EN61010-1 : 2010                           |
| CSA General Safety                             |                                                                                                                                       | Report: 2207629                    | UL 60950-1 1st Ed.<br>C22.2 No. 60950-1-03 |
| UL/cUL Medical Safety                          |                                                                                                                                       | Report: E314885-A5                 | UL60601-1 1st Edition                      |
| CSA Medical Safety                             |                                                                                                                                       | Report: 2207629                    | CAN/CSA-22.2 No 601.1-M90                  |
| EN General Safety                              |                                                                                                                                       | Report: SPCLVD1310079-1            | EN60950-1 : 2006                           |
| CB/EN Medical Safety                           |                                                                                                                                       | Report: CA-10169-A1-UL             | IEC/EN 60601-1 3rd Edition                 |
| ANSI/AAMI Medical Safety                       |                                                                                                                                       | Report: E314885-A5                 | ES60601-1 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**

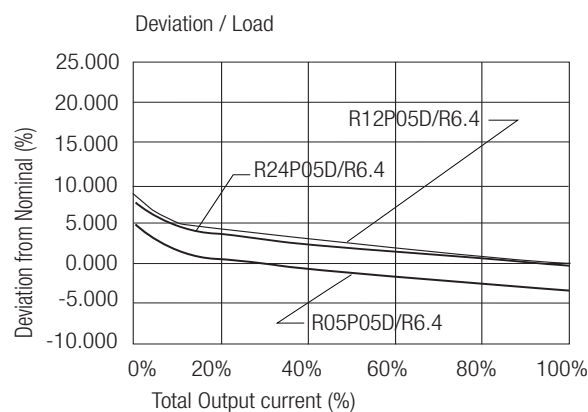
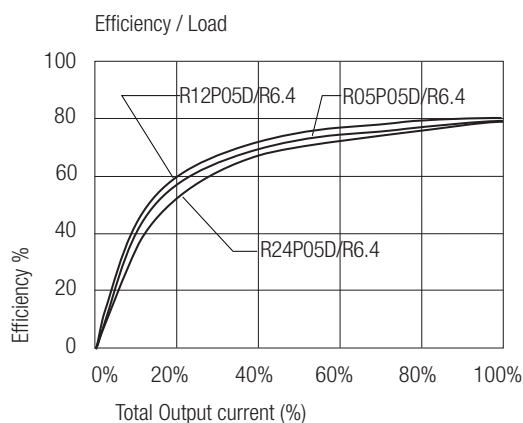


**Typical Characteristics - Reinforced Version**

## RxxP05S/R6.4 RxxP05S/R8

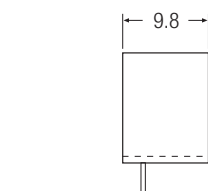
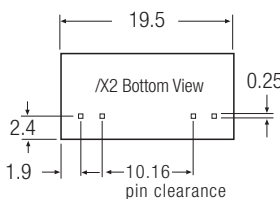
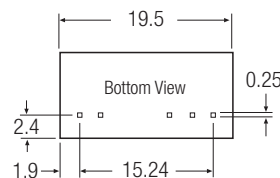
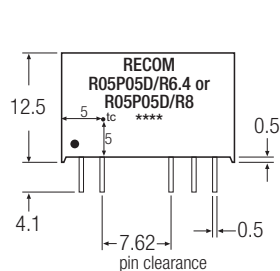


## RxxP05D/R6.4 RxxP05D/R8

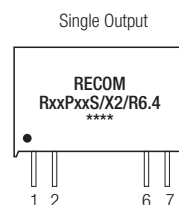
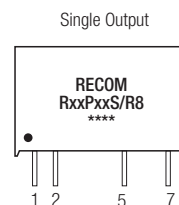
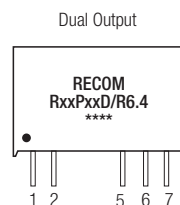
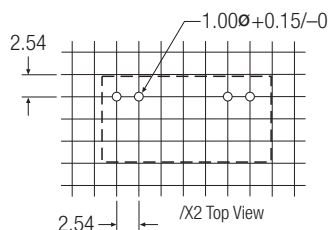
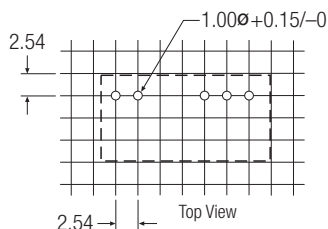


### Package Style and Pinning (mm)

#### 7 PIN SIP Package



#### 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