

## Features

### Regulated Converters

- 2:1 and 4:1 Wide Input Voltage Ranges
- 1kVDC, 2kVDC & 3kVDC Isolation
- UL94V-0 Package Material
- Continuous Short Circuit Protection
- Low Noise
- No External Capacitor needed
- Efficiency to 83 %

### Description

High power-density, an industrial temperature range of -40°C to +85°C and extra features like Remote-On-Off-control are just some of the characteristics of this converter, ideal for highly sophisticated industrial designs. The RS series is available with isolation of 2kV or 3kV by choosing option "/H2" or "/H3" in which case it is also ideal for medical applications which additionally require EN-60601-1 certification.

### Selection Guide 5V, 12V, 24V and 48V Input Types

| Part Number        | Input Voltage Range (VDC)   | Rated Output Voltage (VDC) | Output Current Full Load (mA) | Efficiency typ. (%) | Capacitive Load max. |
|--------------------|-----------------------------|----------------------------|-------------------------------|---------------------|----------------------|
| <b>SIP8</b>        |                             |                            |                               |                     |                      |
| RS-xx3.3S (H2/H3)  | 4.5-9, 9-18<br>18-36, 36-72 | 3.3                        | 500                           | 68-69<br>70-73      | 1000µF               |
| RS-xx05S (H2/H3)   | 4.5-9, 9-18<br>18-36, 36-72 | 5                          | 400                           | 73-75<br>78         | 1000µF               |
| RS-xx09S (H2/H3)   | 4.5-9, 9-18<br>18-36, 36-72 | 9                          | 222                           | 74-78<br>81         | 470µF                |
| RS-xx12S (H2/H3)   | 4.5-9, 9-18<br>18-36, 36-72 | 12                         | 166                           | 75-80<br>83         | 220µF                |
| RS-xx15S (H2/H3)   | 4.5-9, 9-18<br>18-36, 36-72 | 15                         | 134                           | 75-80<br>83         | 100µF                |
| RS-xx3.3D (H2/H3)  | 4.5-9, 9-18<br>18-36, 36-72 | ±3.3                       | ±250                          | 68-69<br>70-73      | ±470µF               |
| RS-xx05D (H2/H3)   | 4.5-9, 9-18<br>18-36, 36-72 | ±5                         | ±200                          | 73-75<br>78         | ±470µF               |
| RS-xx09D (H2/H3)   | 4.5-9, 9-18<br>18-36, 36-72 | ±9                         | ±111                          | 74-78<br>81         | ±220µF               |
| RS-xx12D (H2/H3)   | 4.5-9, 9-18<br>18-36, 36-72 | ±12                        | ±83                           | 75-80<br>83         | ±100µF               |
| RS-xx15D (H2/H3)   | 4.5-9, 9-18<br>18-36, 36-72 | ±15                        | ±67                           | 75-80<br>83         | ±47µF                |
| RS-xx3.3SZ (H2/H3) | 9-36<br>18-72               | 3.3                        | 500                           | 75<br>75            | 1000µF               |
| RS-xx05SZ (H2/H3)  | 9-36<br>18-72               | 5                          | 400                           | 80<br>80            | 1000µF               |
| RS-xx09SZ (H2/H3)  | 9-36<br>18-72               | 9                          | 222                           | 80<br>80            | 470µF                |
| RS-xx12SZ (H2/H3)  | 9-36<br>18-72               | 12                         | 166                           | 83<br>83            | 220µF                |
| RS-xx15SZ (H2/H3)  | 9-36<br>18-72               | 15                         | 134                           | 84<br>84            | 100µF                |
| RS-xx3.3DZ (H2/H3) | 9-36<br>18-72               | ±3.3                       | ±250                          | 73<br>73            | ±470µF               |
| RS-xx05DZ (H2/H3)  | 9-36<br>18-72               | ±5                         | ±200                          | 77<br>77            | ±470µF               |
| RS-xx09DZ (H2/H3)  | 9-36<br>18-72               | ±9                         | ±111                          | 80<br>80            | ±220µF               |
| RS-xx12DZ (H2/H3)  | 9-36<br>18-72               | ±12                        | ±83                           | 81<br>81            | ±100µF               |
| RS-xx15DZ (H2/H3)  | 9-36<br>18-72               | ±15                        | ±67                           | 83<br>83            | ±47µF                |

**ECONOLINE**  
DC/DC-Converter

**RECOM**

## 2 Watt SIP8 Isolated Single & Dual Output



**EN-60950-1 Certified**  
**EN-60601-1 Certified**  
**(Suffix H2/H3)**

**RS**

**2:1 Input**  
(RS0-S/D)  
xx = 4.5-9Vin = 05  
xx = 9-18Vin = 12  
xx = 18-36Vin = 24  
xx = 36-72Vin = 48

**4:1 Input**  
(RS0-SZ/DZ)  
xx = 9-36Vin = 24  
xx = 18-72Vin = 48

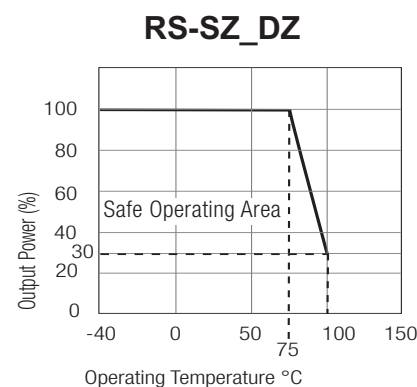
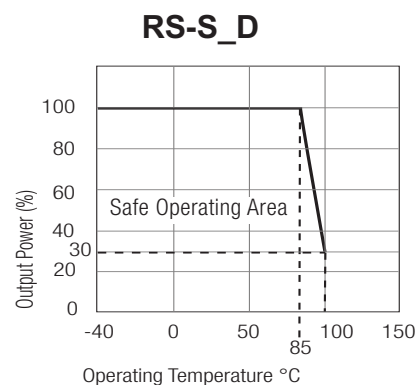
Refer to Application Notes

www.recom-electronic.com

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

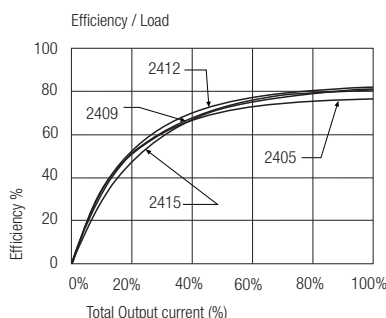
|                                              |                                                                |                                                  |
|----------------------------------------------|----------------------------------------------------------------|--------------------------------------------------|
| Input Voltage Range                          | 2:1 and 4:1                                                    |                                                  |
| Output Accuracy                              | $\pm 2\%$ typ.                                                 |                                                  |
| Line Voltage Regulation                      | $\pm 0.5\%$ max.                                               |                                                  |
| Load Voltage Regulation                      | 20%-100% Load                                                  | $\pm 0.5\%$ max.                                 |
| Output Ripple and Noise (20MHz limited)      | 50mVp-p max.                                                   |                                                  |
| Switching Frequency                          | Full Load                                                      | 100kHz min. / 300kHz max.                        |
| Efficiency at Full Load                      | See Selection Guide                                            |                                                  |
| Quiescent Current                            | RS-05xxS_D                                                     | 40mA typ.                                        |
| Nominal input Voltage                        | RS-12xxS_D                                                     | 32mA typ.                                        |
| (Standard, /H2 and /H3)                      | RS-24xxS_D, SZ_DZ                                              | 25mA typ.                                        |
|                                              | RS-48xxS_D, SZ_DZ                                              | 15mA typ.                                        |
| Isolation Voltage                            | H1                                                             | 1000VDC min.                                     |
| (tested for 1 second)                        | H2                                                             | 2000VDC min.                                     |
|                                              | H3                                                             | 3000VDC min.                                     |
| Rated Working Voltage                        | (long term isolation)                                          | see Application Notes                            |
| Isolation Capacitance (1000V version)        | 2:1 Single                                                     | 10pF min. / 40pF typ. / 60pF max.                |
| Isolation Capacitance (H2 and H3)            | 2:1 Single                                                     | 5pF min. / 30pF typ. / 60pF max.                 |
| Isolation Capacitance (1000V version)        | 2:1 Dual                                                       | 120pF min. / 170pF typ. / 250pF max.             |
| Isolation Capacitance (H2 and H3)            | 2:1 Dual                                                       | 5pF min. / 30pF typ. / 60pF max.                 |
| Isolation Capacitance (1kV version)          | 4:1 Single/Dual                                                | 200pF max.                                       |
| Isolation Capacitance (H2 and H3)            | 4:1 Single/Dual                                                | 30pF max.                                        |
| Isolation Resistance                         | 1G $\Omega$ min.                                               |                                                  |
| Short Circuit Protection                     | Continuous                                                     |                                                  |
| Operating Temperature Range<br>(No Derating) | 2:1                                                            | -40°C to +85°C                                   |
|                                              | 4:1                                                            | -40°C to +75°C                                   |
| Storage Temperature Range                    | -55°C to +125°C                                                |                                                  |
| Relative Humidity                            | 95% RH                                                         |                                                  |
| Package Weight                               | 4.7g                                                           |                                                  |
| Packing Quantity                             | 22 pcs per Tube                                                |                                                  |
| MTBF (+25°C)                                 | } Detailed Information see<br>Application Notes chapter "MTBF" | using MIL-HDBK 217F 1398 x 10 <sup>3</sup> hours |
| (+85°C)                                      |                                                                | using MIL-HDBK 217F 210 x 10 <sup>3</sup> hours  |

## Derating-Graph (Ambient Temperature)

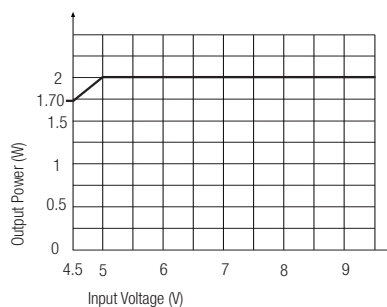


## Typical Characteristics

### RS-24xx



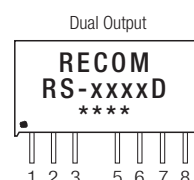
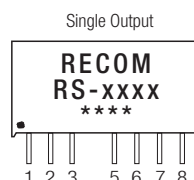
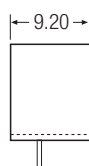
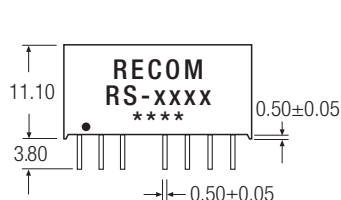
### RS-05xx types



## Package Style and Pinning (mm)

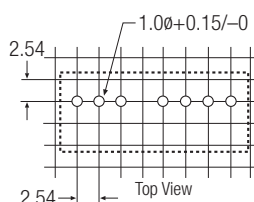
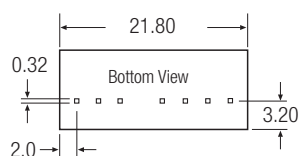
### 8 PIN SIP Package

3rd angle projection



XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

### Recommended Footprint Details



### Pin Connections

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | -Vin   | -Vin  |
| 2     | +Vin   | +Vin  |
| 3     | CTRL   | CTRL  |
| 5     | NC     | NC    |
| 6     | +Vout  | +Vout |
| 7     | -Vout  | Com   |
| 8     | NC*    | -Vout |

NC = No Connection

NC\* = NC, but no external Connection allowed.

### Notes

#### Pin 8 (NC\*)

This pin is used internally and must have no external connection.

#### Pin 5 (NC) Not connected internally..

#### Pin 3 (CTRL)

This pin provides an Off function which puts the converter into a low power mode. When the pin is 'high' the converter is OFF and when the pin is high 'Z' the converter is ON. There is no allowed low state for this pin.

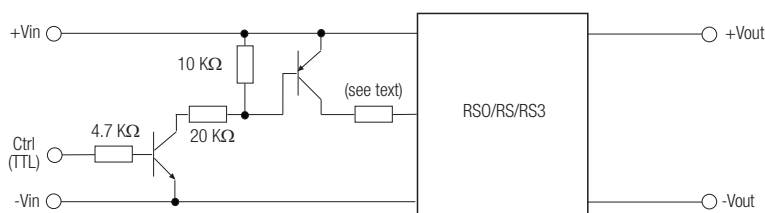
## Application Examples

### TTL Remote CTRL Circuit

Control Pin Input Current: 10mA

Voltage Set Point Accuracy with external input/output capacitors refer to recommended test circuit: typ. ± 1% max. ±2%

Control Pin (CTRL) Input Current, control voltage applied via 1K resistor, output voltage must reduce to 0V: typ. 3mA max. 6mA



Voltage to be applied via a limiting resistor with a recommended value of 1K for RS-05xx; 3.3K for RS-12xx; RS-24xx and 10K for RS-48xx.

### Isolated Remote CTRL Circuit

