

Features

Regulated Converters

Rev.0

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

ECONOLINE

DC/DC-Converter

RS-S_D(Z) Series

2 Watt

SIP8 Isolated Single & Dual Output

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



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

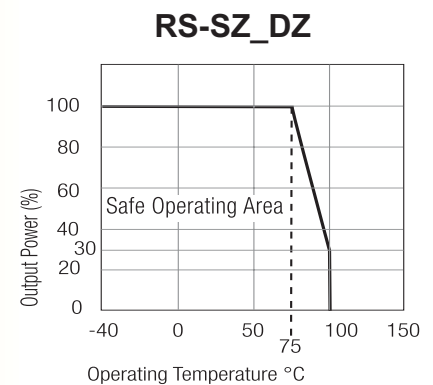
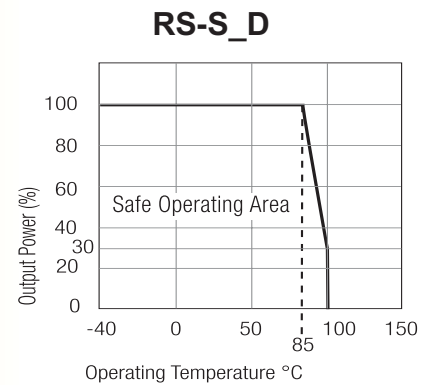
2:1 Input
(RS0-S/D)
xx = 4.5-9Vin = 05
xx = 9-18Vin = 12
xx = 18-36Vin = 24
xx = 36-72Vin = 48

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

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

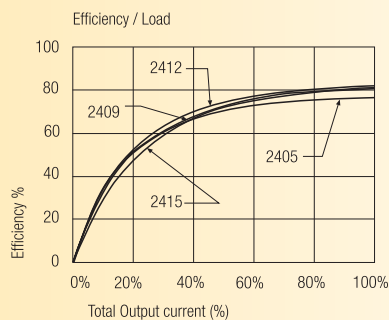
| | | | |
|--|--|--|------------------------------|
| Input Voltage Range | 2:1 and 4:1 | | |
| Output Accuracy | $\pm 2\%$ typ. | | |
| Line Voltage Regulation | $\pm 0.5\%$ max. | | |
| Load Voltage Regulation | 20%-100% Load | $\pm 0.5\%$ max. | |
| Output Ripple and Noise (20MHz limited) | 50mVp-p max. | | |
| Switching Frequency | Full Load | 100kHz min. / 300kHz max. | |
| Efficiency at Full Load | See Selection Guide | | |
| No Load Power Consumption | 50mW min. / 139mW typ. / 250mW max. | | |
| Isolation Voltage (tested for 1 second) | H1 | 1000VDC min. | |
| | 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 Ω min. | | |
| Short Circuit Protection | Continuous | | |
| Operating Temperature Range (No Derating) | 2:1 | -40°C to $+85^\circ\text{C}$ | |
| | 4:1 | -40°C to $+75^\circ\text{C}$ | |
| Storage Temperature Range | -55°C to $+125^\circ\text{C}$ | | |
| Relative Humidity | 95% RH | | |
| Package Weight | 4.7g | | |
| MTBF ($+25^\circ\text{C}$) | } Detailed Information see Application Notes chapter "MTBF" | using MIL-HDBK 217F | 1398 x 10 ³ hours |
| ($+85^\circ\text{C}$) | | using MIL-HDBK 217F | 210 x 10 ³ hours |

Derating-Graph (Ambient Temperature)

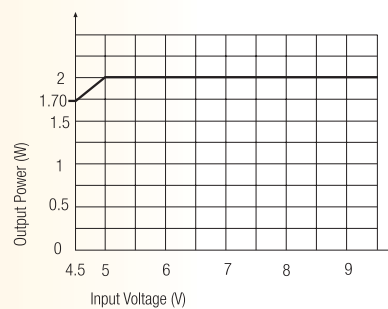


Typical Characteristics

RS-24xx



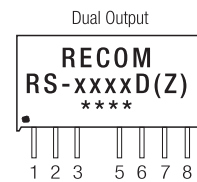
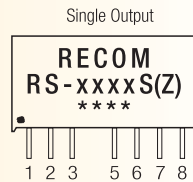
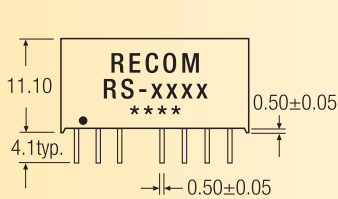
RS-05xx types



Package Style and Pinning (mm)

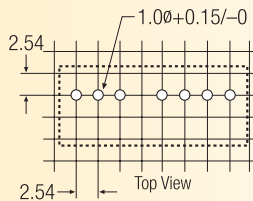
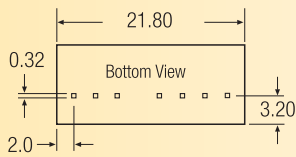


8 PIN SIP Package



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)

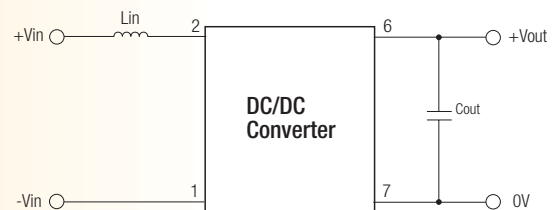
This pin provides an Off function which puts the converter into a low power mode. When the pin is 'high' the converter is OFF and when the pin is high 'Z' the converter is ON. There is no allowed low state for this pin.

Application Example

EMC Filter

use low ESR capacitor Cout and input inductor Lin to reduce output ripple and input inrush current.

| | | |
|------------------|-----------|------------------|
| L _{in} | RS- types | 4.7µH ~ 100µH |
| C _{out} | RS- types | 22µF ~ 100µF/25V |

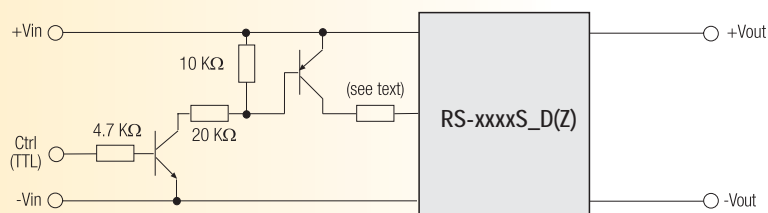


TTL Remote CTRL Circuit

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.