

## Features

## Regulated Converters

Rev.1

- 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 %

## 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 SIP8	Input	Rated Output	Output Current	Efficiency	Capacitive
	Voltage Range (VDC)	Voltageat (VDC)	Full Load (mA)	typ. (%)	Load
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)**

**RECOM**

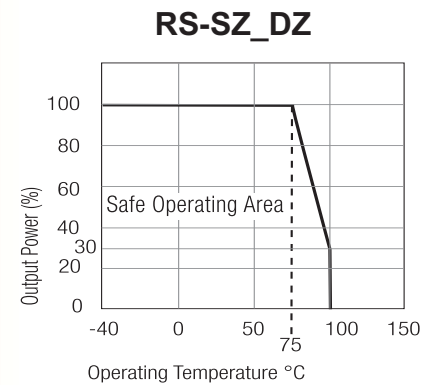
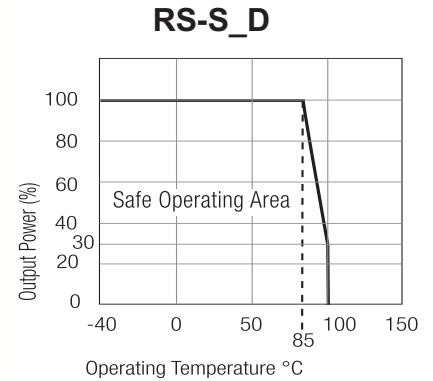
**2:1 Input**  
(RS-S/D)  
xx = 4.5-9Vin = 05  
xx = 9-18Vin = 12  
xx = 18-36Vin = 24  
xx = 36-72Vin = 48

**4:1 Input**  
(RS-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)

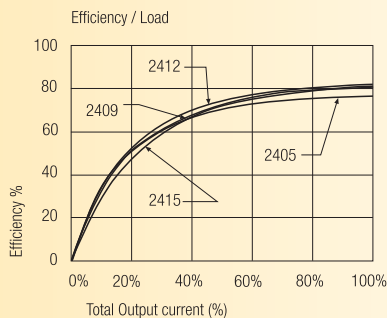
Input Voltage Range	2:1 and 4:1		
Output Accuracy	$\pm 2\%$ typ.		
Line Voltage Regulation	$\pm 0.5\%$ max.		
Load Voltage Regulation	20%-100% Load	$\pm 0.5\%$ max.	
Output Ripple and Noise (20MHz limited)	50mVp-p max.		
Switching Frequency	Full Load	100kHz min. / 300kHz max.	
Efficiency at Full Load	See Selection Guide		
Quiescent Current	RS-05xxS_D	40mA typ.	
Nominal input Voltage (Standard, /H2 and /H3)	RS-12xxS_D	32mA typ.	
	RS-24xxS_D, SZ_DZ	25mA typ.	
	RS-48xxS_D, SZ_DZ	15mA typ.	
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 $\Omega$ min.		
Short Circuit Protection	Continuous		
Operating Temperature Range (No Derating)	2:1	$-40^\circ\text{C}$ to $+85^\circ\text{C}$	
	4:1	$-40^\circ\text{C}$ to $+75^\circ\text{C}$	
Storage Temperature Range	$-55^\circ\text{C}$ to $+125^\circ\text{C}$		
Relative Humidity	95% RH		
Package Weight	4.7g		
MTBF (+25°C) (+85°C)	} Detailed Information see Application Notes chapter "MTBF"	using MIL-HDBK 217F	1398 x 10 <sup>3</sup> hours
		using MIL-HDBK 217F	210 x 10 <sup>3</sup> hours

**Derating-Graph  
(Ambient Temperature)**

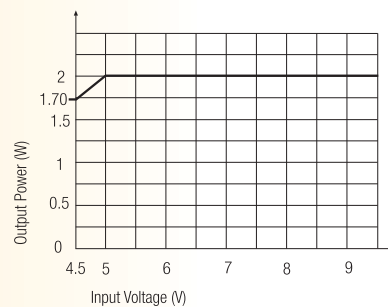


**Typical Characteristics**

**RS-24xx**

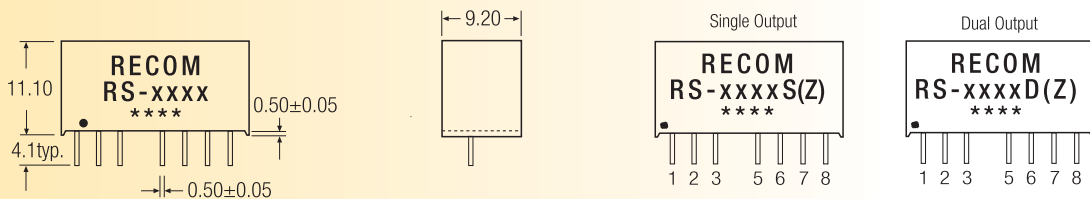


**RS-05xx types**

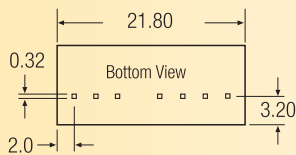


**Package Style and Pinning (mm)**

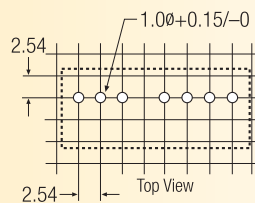
**8 PIN SIP Package**



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)**

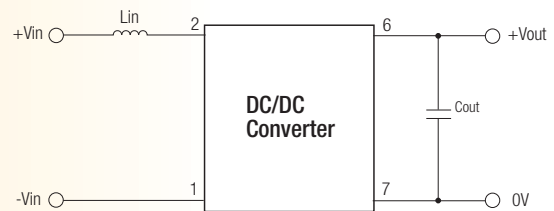
This pin provides an Off function which puts the converter into a low power mode. When the pin is 'high' the converter is OFF and when the pin is high 'Z' the converter is ON. There is no allowed low state for this pin.

**Application Example**

**EMC Filter**

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

<b>Lin</b>	RS- types	4.7µH ~ 100µH
<b>Cout</b>	RS- types	22µF ~ 100µF/25V

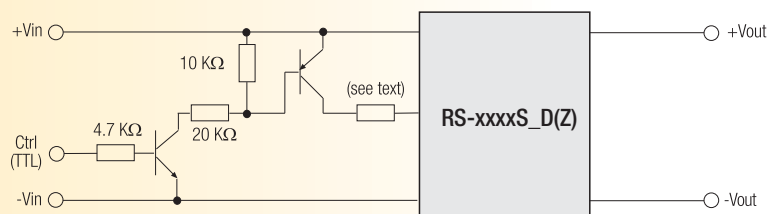


**TTL Remote CTRL Circuit**

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.