

## 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 with Current Foldback
- 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 RSO 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

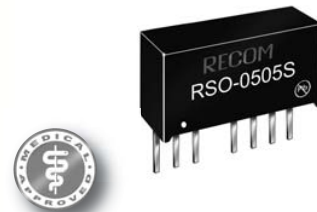
Part Number	Input Voltage Range (VDC)	Rated Output Voltage (VDC)	Output Current (mA)	Efficiency typ. (%)	Capacitive Load max.
<b>SIP8</b>					
RSO-xx3.3S (H2/H3)	4.5-9, 9-18 18-36, 36-72	3.3	300	68-72 70	470µF
RSO-xx05S (H2/H3)	4.5-9, 9-18 18-36, 36-72	5	200	73-75 75-78	470µF
RSO-xx09S (H2/H3)	4.5-9, 9-18 18-36, 36-72	9	111	74-78 78-81	220µF
RSO-xx12S (H2/H3)	4.5-9, 9-18 18-36, 36-72	12	83	75-80 80-83	100µF
RSO-xx15S (H2/H3)	4.5-9, 9-18 18-36, 36-72	15	67	75-80 80-83	47µF
RSO-xx3.3D (H2/H3)	4.5-9, 9-18 18-36, 36-72	±3.3	±150	68-72 70	±220µF
RSO-xx05D (H2/H3)	4.5-9, 9-18 18-36, 36-72	±5	±100	73-75 75-76	±220µF
RSO-xx09D (H2/H3)	4.5-9, 9-18 18-36, 36-72	±9	±56	74-78 78	±100µF
RSO-xx12D (H2/H3)	4.5-9, 9-18 18-36, 36-72	±12	±42	75-79 79-80	±47µF
RSO-xx15D (H2/H3)	4.5-9, 9-18 18-36, 36-72	±15	±34	75-79 79-80	±22µF
RSO-xx3.3SZ (H2/H3)	9-36 18-72	3.3	300	70 70	470µF
RSO-xx05SZ (H2/H3)	9-36 18-72	5	200	78 75	470µF
RSO-xx09SZ (H2/H3)	9-36 18-72	9	111	81 78	220µF
RSO-xx12SZ (H2/H3)	9-36 18-72	12	83	83 80	100µF
RSO-xx15SZ (H2/H3)	9-36 18-72	15	67	83 80	47µF
RSO-xx3.3DZ (H2/H3)	9-36 18-72	±3.3	±150	74 70	±220µF
RSO-xx05DZ (H2/H3)	9-36 18-72	±5	±100	77 75	±220µF
RSO-xx09DZ (H2/H3)	9-36 18-72	±9	±56	78 78	±100µF
RSO-xx12DZ (H2/H3)	9-36 18-72	±12	±42	80 80	±47µF
RSO-xx15DZ (H2/H3)	9-36 18-72	±15	±34	80 80	±22µF

# ECONOLINE

DC/DC-Converter

# RSO-S\_D(Z) Series

## 1 Watt SIP8 Isolated Single & Dual Output



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

# RECOM

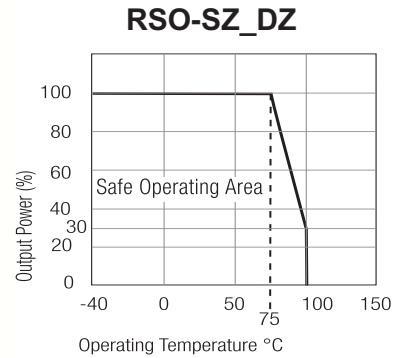
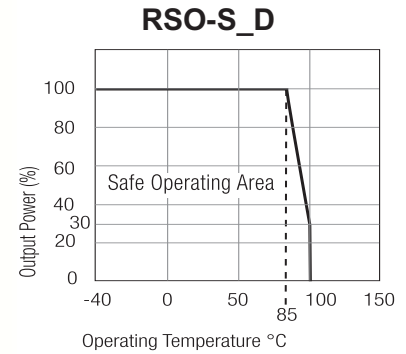
**2:1 Input**  
(RSO-S/D)  
xx = 4.5-9Vin = 05  
xx = 9-18Vin = 12  
xx = 18-36Vin = 24  
xx = 36-72Vin = 48

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

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

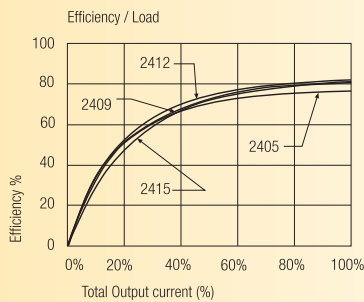
Input Voltage Range	2:1 and 4:1		
Output Voltage Accuracy	±2% typ.		
Line Voltage Regulation	2:1	±0.2% max.	
	4:1	±0.5% max.	
Load Voltage Regulation	2:1	±0.4% max.	
(10% to 100% full load)	4:1	±0.5% typ.	
Output Ripple and Noise (20MHz limited)	50mVp-p max.		
Operating Frequency	2:1	200kHz min. / 500kHz max.	
	4:1	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_D	15mA typ.	
CTRL Pin drive current /see Notes)	3mA typ, 6mA max.		
Quiescent Input Current when Converter is OFF	10mA max.		
Isolation Voltage	(tested for 1 second)	1000VDC min.	
	H2	2000VDC min.	
	H3	3000VDC min.	
Rated Working Voltage	(long term isolation)	see Application Notes	
Isolation Capacitance (1kV 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 (1kV 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	>1GΩ min.		
Short Circuit Protection	Continuous		
Operating Temperature Range (free air convection)	-40°C to +85°C (see Graph)		
Storage Temperature Range	-55°C to +125°C		
Relative Humidity	95% RH		
Package Weight	4.7g		
MTBF (+25°C)	} Detailed Information see Application Notes chapter "MTBF"	using MIL-HDBK 217F	1685 x 10 <sup>3</sup> hours
(+85°C)		using MIL-HDBK 217F	254 x 10 <sup>3</sup> hours

**Derating-Graph**  
(Ambient Temperature)

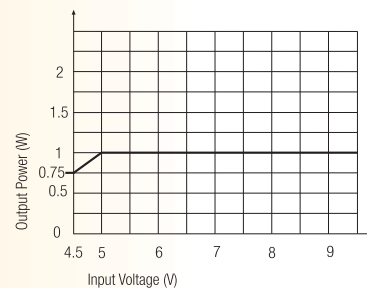


**Typical Characteristics**

**RSO-24xxS**

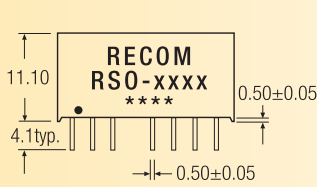


**RSO-all types**



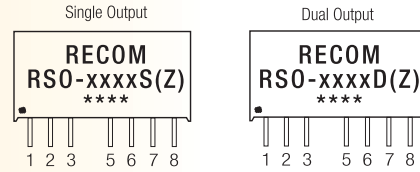
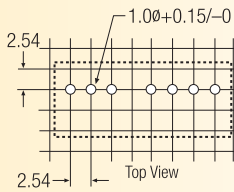
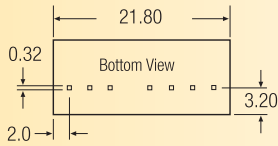
**Package Style and Pinning (mm)**

**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)**

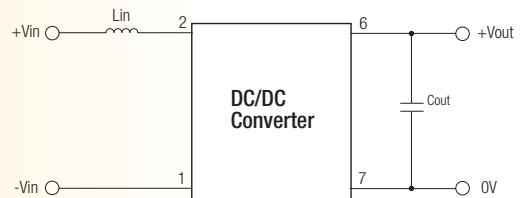
This pin provides an Off function which puts the converter into a low power mode. When the pin is 'high' the converter is OFF and when the pin is high 'Z' the converter is ON. There is no allowed low state for this pin.

**Application Example**

**EMC Filter**

use low ESR capacitor  $C_{out}$  and input inductor  $L_{in}$  to reduce output ripple and input inrush current.

$L_{in}$	RSO- types	4.7µH ~ 100µH
$C_{out}$	RSO- types	22µF ~ 100µF/25V

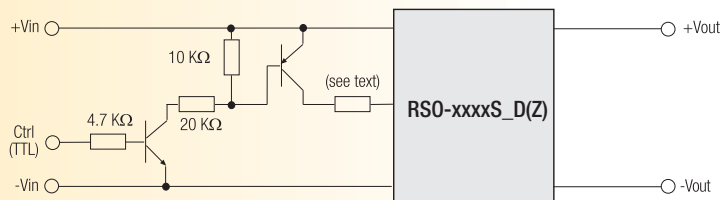


**TTL Remote CTRL Circuit**

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 RSO-05xx; 3.3K for RSO-12xx; RSO-24xx and 10K for RSO-48xx.