



# THE DATASHEET OF RS-2409S



# 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 at Full Load (mA)	Efficiency typ. (%)	Max Capacitive Load
SIP8 RS-xx3.3S (H2/H3)	4.5-9, 9-18	3.3	500	68-69 70-73	4700µF
	18-36, 36-72				
RS-xx05S (H2/H3)	4.5-9, 9-18	5	400	73-75 78	1000µF
	18-36, 36-72				
RS-xx09S (H2/H3)	4.5-9, 9-18	9	222	74-78 81	1000µF
	18-36, 36-72				
RS-xx12S (H2/H3)	4.5-9, 9-18	12	166	75-80 83	1000µF
	18-36, 36-72				
RS-xx15S (H2/H3)	4.5-9, 9-18	15	134	75-80 83	1000µF
	18-36, 36-72				
RS-xx3.3D (H2/H3)	4.5-9, 9-18	±3.3	±250	68-69 70-73	±2200µF
	18-36, 36-72				
RS-xx05D (H2/H3)	4.5-9, 9-18	±5	±200	73-75 78	±680µF
	18-36, 36-72				
RS-xx09D (H2/H3)	4.5-9, 9-18	±9	±111	74-78 81	±680µF
	18-36, 36-72				
RS-xx12D (H2/H3)	4.5-9, 9-18	±12	±83	75-80 83	±680µF
	18-36, 36-72				
RS-xx15D (H2/H3)	4.5-9, 9-18	±15	±67	75-80 83	±680µF
	18-36, 36-72				
RS-xx3.3SZ (H2/H3)	9-36	3.3	500	75 75	4700µF
	18-72				
RS-xx05SZ (H2/H3)	9-36	5	400	80 80	1000µF
	18-72				
RS-xx09SZ (H2/H3)	9-36	9	222	80 80	1000µF
	18-72				
RS-xx12SZ (H2/H3)	9-36	12	166	83 83	1000µF
	18-72				
RS-xx15SZ (H2/H3)	9-36	15	134	84 84	1000µF
	18-72				
RS-xx3.3DZ (H2/H3)	9-36	±3.3	±250	73 73	±2200µF
	18-72				
RS-xx05DZ (H2/H3)	9-36	±5	±200	77 77	±680µF
	18-72				
RS-xx09DZ (H2/H3)	9-36	±9	±111	80 80	±680µF
	18-72				
RS-xx12DZ (H2/H3)	9-36	±12	±83	81 81	±680µF
	18-72				
RS-xx15DZ (H2/H3)	9-36	±15	±67	83 83	±680µF
	18-72				

No suffix is standard isolation (1kVDC) e.g, RS-0505S

\*add suffix /H2 or /H3 for 2kVDC or 3kVDC isolation, e.g, RS-0505S/H2, RS-0505DZ/H3

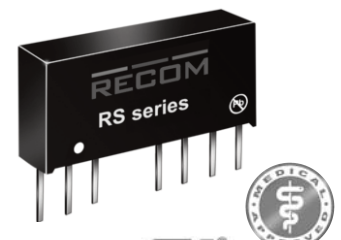
# ECONOLINE

## DC/DC-Converter

with 3 year Warranty

# RECOM

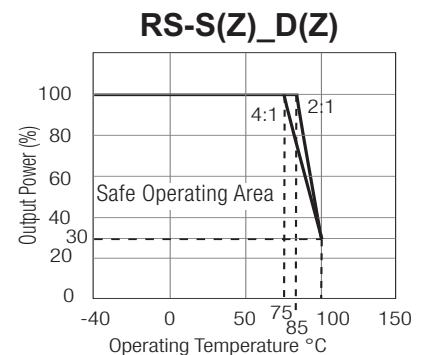
## 2 Watt SIP8 Isolated Single & Dual Output



**UL-60950-1 Certified**  
**EN-60950-1 Certified**  
**EN-60601-1 Certified\***  
(\* /H suffix)

# RS

## Derating-Graph (Ambient Temperature)



**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

**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.
Minimum Load			10% <sup>(2)</sup>
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	Standard	(tested for 1 second)	1000VDC
		(rated for 1 minute**)	500VAC / 60Hz
	/H2 Version	(tested for 1 second)	2000VDC
		(rated for 1 minute**)	1000VAC / 60Hz
/H3 Version	(tested for 1 second)	3000VDC	
	(rated for 1 minute**)	1500VAC / 60Hz	
Isolation Capacitance	Standard	2:1 Single	10pF min. / 40pF typ. / 60pF max.
		/H2 and /H3	5pF min. / 30pF typ. / 60pF max.
	Standard	2:1 Dual	120pF min. / 170pF typ. / 250pF max.
		/H2 and /H3	5pF min. / 30pF typ. / 60pF max.
	Standard	4:1 Single/Dual	200pF max.
		/H2 and /H3	4:1 Single/Dual
Isolation Resistance			1G $\Omega$ min.
Short Circuit Protection			Continuous
Operating Temperature Range (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) (+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
Certifications			
EN General Safety	Report: SPCLVD1605077-10		EN60950-1, AM2:2013
EN Medical Safety	Report: MDD1205098-3 + RM1205098-3		IEC/EN 60601-1 3rd Edition
			Medical Report + ISO14971 Risk Assessment
UL General Safety	Report: E224736-A35		UL60950-1, 2nd Edition 2014
			CSA C22.2 60950-1-07, 2nd Edition 2014

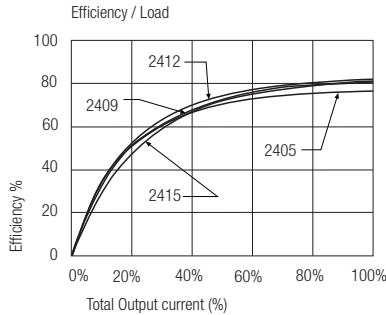
\*\*Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

Notes

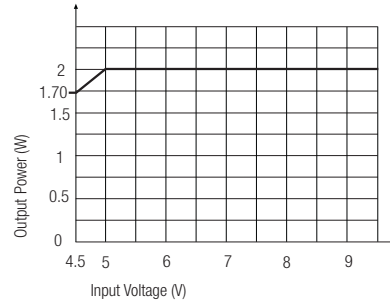
Note 1:	Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter
Note 2:	The RS series requires a minimum of 10% load on the output to maintain specified regulation. Operating under no-load conditions will not damage these devices; however, they may not meet all listed specifications.

**Typical Characteristics**

**RS-24xx**

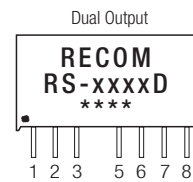
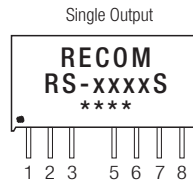
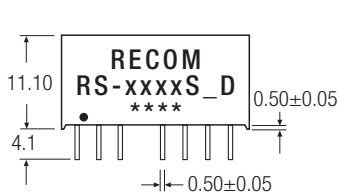


**RS-05xx types**

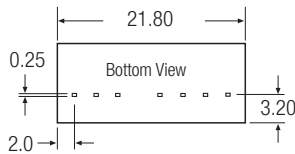


**Package Style and Pinning (mm)**

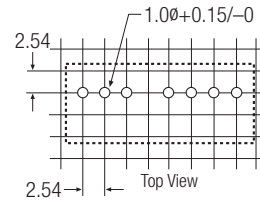
**8 PIN SIP Package**



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.

**Pin 8 (NC\*)** This pin is used internally and must have no external connection.

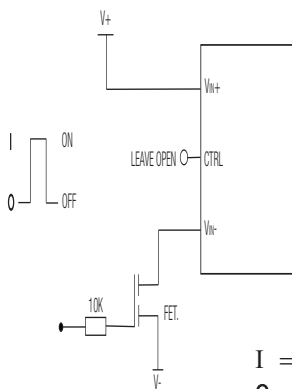
**Pin 5 (NC)** Not connected internally.

**Pin 3 (CTRL)**

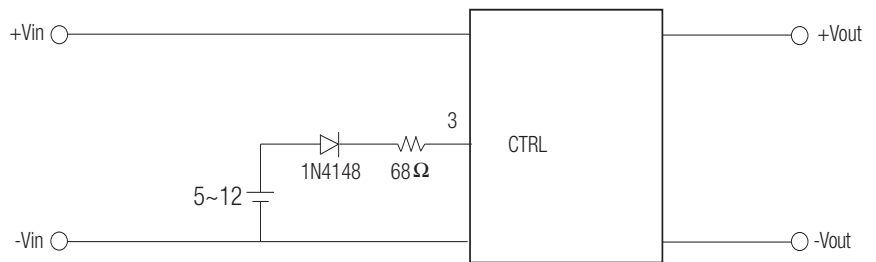
This pin provides an Off function which puts the converter into a low power mode. When the pin is 'high' the converter is OFF and when the pin is high 'Z' the converter is ON. There is no allowed low state for this pin.

**Application Examples**

**ON/OFF CONTROL**



I = 3V  
O = 0.5V or GND



Remote ON/OFF



ON: open or high impedance

OFF: external 5~12 Vdc and 1N4148+ 68Ω resistor

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