

# Features

## Regulated Converters

- 2:1 and 3:1 Wide Input Voltage Ranges
- 1kVDC, 2kVDC and 3kVDC Isolation
- UL94V-0 Package Material
- Continuous Short Circuit Protection
- Low Ripple and Noise
- Remote On/Off Control
- Efficiency to 83 %

### Description

Very high power density, 2:1 or 3:1 input voltage range and a wide operating temperature range -40°C~+71°C and extra features such as On/Off control are just some of the characteristics of this converter which is ideal for highly sophisticated industrial designs. The RS3 is available with 2kV or 3kV isolation options (1kVDC is standard)

### Selection Guide

| Part Number         |  | Input Voltage Range (VDC) | Rated Output Voltage (VDC) | Output Current Full Load (mA) | Efficiency typ. (%) | Max Capacitive Load <sup>(1)</sup> |
|---------------------|--|---------------------------|----------------------------|-------------------------------|---------------------|------------------------------------|
| RS3-xx3.3S (H2/H3)  |  | 4.5-9, 9-18               | 3.3                        | 600                           | 73-75               | 4700µF                             |
|                     |  | 18-36, 36-72              |                            |                               | 77-78               |                                    |
| RS3-xx05S (H2/H3)   |  | 4.5-9, 9-18               | 5                          | 600                           | 76-79               | 4700µF                             |
|                     |  | 18-36, 36-72              |                            |                               | 80-81               |                                    |
| RS3-xx09S (H2/H3)   |  | 4.5-9, 9-18               | 9                          | 333                           | 77-80               | 3300µF                             |
|                     |  | 18-36, 36-72              |                            |                               | 81-82               |                                    |
| RS3-xx12S (H2/H3)   |  | 4.5-9, 9-18               | 12                         | 250                           | 80-81               | 2200µF                             |
|                     |  | 18-36, 36-72              |                            |                               | 83                  |                                    |
| RS3-xx15S (H2/H3)   |  | 4.5-9, 9-18               | 15                         | 200                           | 80-81               | 2200µF                             |
|                     |  | 18-36, 36-72              |                            |                               | 83                  |                                    |
| RS3-xx3.3D (H2/H3)  |  | 4.5-9, 9-18               | ±3.3                       | ±300                          | 73-75               | ±2200µF                            |
|                     |  | 18-36, 36-72              |                            |                               | 75                  |                                    |
| RS3-xx05D (H2/H3)   |  | 4.5-9, 9-18               | ±5                         | ±300                          | 76-80               | ±2200µF                            |
|                     |  | 18-36, 36-72              |                            |                               | 80-81               |                                    |
| RS3-xx09D (H2/H3)   |  | 4.5-9, 9-18               | ±9                         | ±167                          | 77-81               | ±2200µF                            |
|                     |  | 18-36, 36-72              |                            |                               | 81                  |                                    |
| RS3-xx12D (H2/H3)   |  | 4.5-9, 9-18               | ±12                        | ±125                          | 78-83               | ±1000µF                            |
|                     |  | 18-36, 36-72              |                            |                               | 83                  |                                    |
| RS3-xx15D (H2/H3)   |  | 4.5-9, 9-18               | ±15                        | ±100                          | 79-83               | ±1000µF                            |
|                     |  | 18-36, 36-72              |                            |                               | 83                  |                                    |
| RS3-xx3.3SZ (H2/H3) |  | 9-27                      | 3.3                        | 600                           | 73                  | 4700µF                             |
|                     |  | 20-60                     |                            |                               | 74                  |                                    |
| RS3-xx05SZ (H2/H3)  |  | 9-27                      | 5                          | 600                           | 76-79               | 4700µF                             |
|                     |  | 20-60                     |                            |                               | 78                  |                                    |
| RS3-xx09SZ (H2/H3)  |  | 9-27                      | 9                          | 333                           | 77                  | 3300µF                             |
|                     |  | 20-60                     |                            |                               | 79                  |                                    |
| RS3-xx12SZ (H2/H3)  |  | 9-27                      | 12                         | 250                           | 80                  | 2200µF                             |
|                     |  | 20-60                     |                            |                               | 80                  |                                    |
| RS3-xx15SZ (H2/H3)  |  | 9-27                      | 15                         | 200                           | 80                  | 2200µF                             |
|                     |  | 20-60                     |                            |                               | 80                  |                                    |
| RS3-xx3.3DZ (H2/H3) |  | 9-27                      | ±3.3                       | ±300                          | 73                  | ±2200µF                            |
|                     |  | 20-60                     |                            |                               | 74                  |                                    |
| RS3-xx05DZ (H2/H3)  |  | 9-27                      | ±5                         | ±300                          | 77                  | ±2200µF                            |
|                     |  | 20-60                     |                            |                               | 78                  |                                    |
| RS3-xx09DZ (H2/H3)  |  | 9-27                      | ±9                         | ±167                          | 79                  | ±2200µF                            |
|                     |  | 20-60                     |                            |                               | 79                  |                                    |
| RS3-xx12DZ (H2/H3)  |  | 9-27                      | ±12                        | ±125                          | 80                  | ±1000µF                            |
|                     |  | 20-60                     |                            |                               | 80                  |                                    |
| RS3-xx15DZ (H2/H3)  |  | 9-27                      | ±15                        | ±100                          | 80                  | ±1000µF                            |
|                     |  | 20-60                     |                            |                               | 80                  |                                    |

No suffix is standard isolation (1kVDC) e.g, RS3-0505S

\*add suffix /H2 or /H3 for 2kVDC or 3kVDC isolation, e.g, RS3-0505S/H2, R3S-0505DZ/H3

# ECONOLINE

## DC/DC-Converter

with 3 year Warranty



# 3 Watt SIP8 Isolated Single & Dual Output



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

# RS3

**2:1 Input**  
(RS3-S/D)

xx = 4.5-9Vin = 05  
xx = 9-18Vin = 12  
xx = 18-36Vin = 24  
xx = 36-72Vin = 48

**3:1 Input**  
(RS3-SZ/DZ)

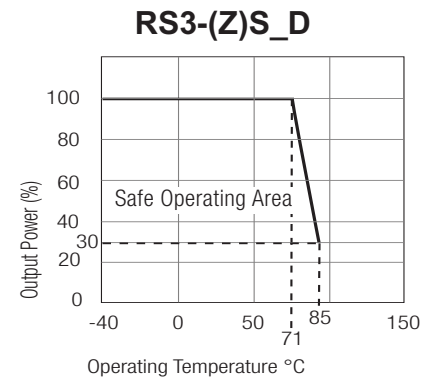
xx = 9-27Vin = 24  
xx = 20-60Vin = 48

Refer to Application Notes

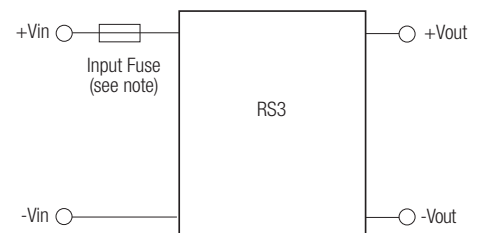
**Electrical Specifications** (measured at  $T_A = 25^\circ\text{C}$ , at nominal input voltage and rated output current unless otherwise specified)

|                                                           |                                                                |                                                                                             |                             |
|-----------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------|
| Input Voltage Range                                       | 2:1 and 3:1                                                    |                                                                                             |                             |
| Output Accuracy                                           | Nominal $V_{in}$ and full load                                 | $\pm 2\%$ typ.                                                                              |                             |
| Line Voltage Regulation                                   | LL to HL, full load                                            | $\pm 0.5\%$ max.                                                                            |                             |
| Load Voltage Regulation                                   | 20% to 100% full load                                          | $\pm 0.5\%$ typ.                                                                            |                             |
| Minimum Load                                              | 0%                                                             |                                                                                             |                             |
| Output Ripple and Noise                                   | 20MHz limited                                                  | 50mVp-p max.                                                                                |                             |
| Switching Frequency                                       | 20% to 100% full load                                          | 200kHz typ.                                                                                 |                             |
| Efficiency at Full Load                                   | see Selection Guide                                            |                                                                                             |                             |
| Quiescent Current                                         | RS3-05xxS_D                                                    | 35mA typ.                                                                                   |                             |
| Nominal input Voltage<br>(Standard, /H2 and /H3)          | RS3-12xxS_D                                                    | 25mA typ.                                                                                   |                             |
|                                                           | RS3-24xxS_D, SZ_DZ                                             | 20mA typ.                                                                                   |                             |
|                                                           | RS3-48xxS_D, SZ_DZ                                             | 10mA typ.                                                                                   |                             |
|                                                           |                                                                |                                                                                             |                             |
| Isolation Voltage                                         | Standard                                                       | (tested for 1 second)<br>1000VDC                                                            |                             |
|                                                           | /H2 Version                                                    | (rated for 1 minute)<br>500VAC / 60Hz<br>2000VDC                                            |                             |
|                                                           | /H3 Version                                                    | (rated for 1 minute)<br>1000VAC / 60Hz<br>3000VDC<br>(rated for 1 minute)<br>1500VAC / 60Hz |                             |
| Isolation Capacitance (2:1 and 3:1)<br>(tested at 100kHz) | H1                                                             | 200pF max.                                                                                  |                             |
|                                                           | H2/H3                                                          | 30pF max.                                                                                   |                             |
| Isolation Resistance                                      | 1G $\Omega$ min.                                               |                                                                                             |                             |
| Short Circuit Protection (see note)                       | Continuous                                                     |                                                                                             |                             |
| Operating Temperature Range                               | $-40^\circ\text{C}$ to $+71^\circ\text{C}$                     |                                                                                             |                             |
| Storage Temperature Range                                 | $-55^\circ\text{C}$ to $+125^\circ\text{C}$                    |                                                                                             |                             |
| Relative Humidity                                         | 95% RH                                                         |                                                                                             |                             |
| Package Weight                                            | 4.7g                                                           |                                                                                             |                             |
| Packing Quantity                                          | 22 pcs per Tube                                                |                                                                                             |                             |
| MTBF ( $+25^\circ\text{C}$ )<br>( $+71^\circ\text{C}$ )   | } Detailed Information see<br>Application Notes chapter "MTBF" | using MIL-HDBK 217F                                                                         | 3303 x10 <sup>3</sup> hours |
|                                                           |                                                                | using MIL-HDBK 217F                                                                         | 745 x10 <sup>3</sup> hours  |

## Derating-Graph (Ambient Temperature)



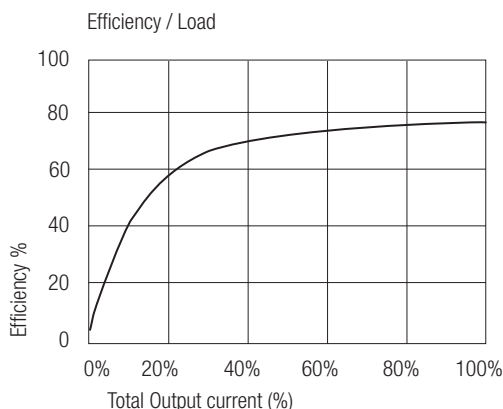
### Typical Application



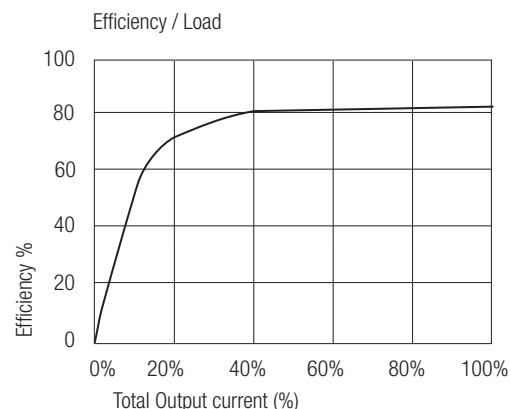
Note: To protect the converter under all fault conditions, an input fuse is required. Quick-blow fuses should be rated at 2x-3x the normal input current, time-delay fuses at 1.5x the normal input current.

## Typical Characteristics

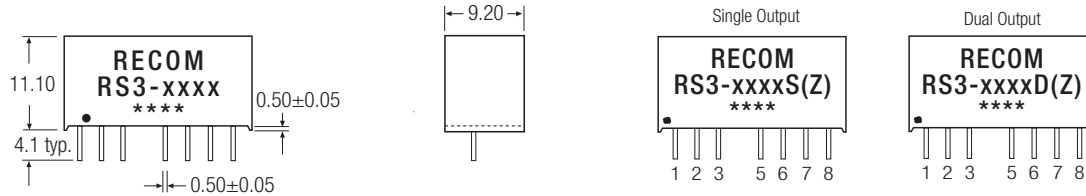
### RS3-0505S



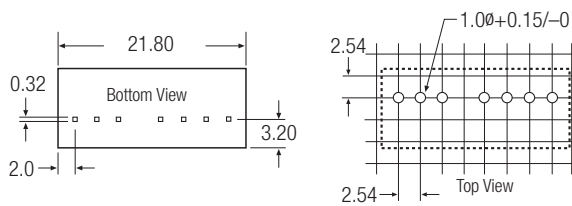
### RS3-4805D



**Package Style and Pinning (mm)**



**Recommended Footprint Details**



XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

**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

**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

**Certifications**

|                   |                     |                           |
|-------------------|---------------------|---------------------------|
| EN General Safety | Report: IL-R7109    | EN60950-1:2001 + A11:2004 |
| EN Medical Safety | Report: PS071001601 | EN60601-1:1990 + A11:1996 |

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

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

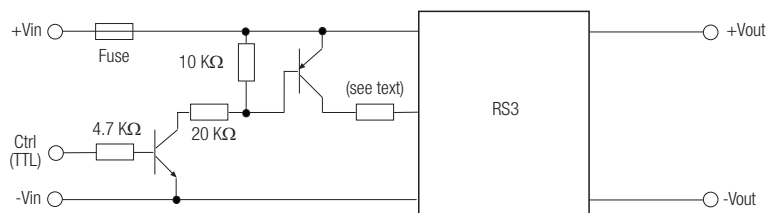
**Pin 3 (CTRL)**

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 OV: typ. 3mA max. 6mA



Voltage to be applied via a limiting resistor with a recommended value of 1K for RS3-05xx; 3.3K for RS3-12xx; 4.7K for RS3-24xx and 10K for RS3-48xx.

**Isolated Remote CTRL Circuit**

