

## Features

## Unregulated Converters

- Industry Standard Pinout
- 1kVDC & 2kVDC Isolation
- UL94V-0 Package Material
- Optional Continuous Short Circuit Protected
- Fully Encapsulated
- Custom Solutions Available
- Efficiency to 85%

**ECONOLINE**

DC/DC-Converter

## RO & RE Series

### Selection Guide

| Part Number |           |       | Input Voltage              | Output Voltage | Output Current | Efficiency |
|-------------|-----------|-------|----------------------------|----------------|----------------|------------|
| SIP 4       | SIP 7     | (2kV) | (VDC)                      | (VDC)          | (mA)           | (%)        |
| RO-xx1.8S   | RE-xx1.8S | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 1.8            | 555            | 70         |
| RO-xx3.3S   | RE-xx3.3S | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 3.3            | 303            | 75         |
| RO-xx05S    | RE-xx05S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 5              | 200            | 70-78      |
| RO-xx09S    | RE-xx09S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 9              | 111            | 76-78      |
| RO-xx12S    | RE-xx12S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 12             | 83             | 78-80      |
| RO-xx15S    | RE-xx15S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 15             | 66             | 80-84      |
| RO-xx24S    | RE-xx24S  | (H)   | 1.8, 3.3, 5, 9, 12, 15, 24 | 24             | 42             | 74-85      |

xx = Input Voltage

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. RO-051.8S/P, RO-051.8S/HP

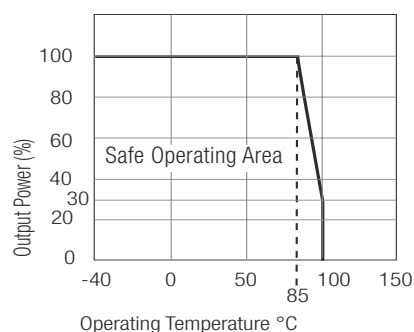
### Specifications (Core Operating Area)

|                                                   |                                                                                 |                       |                                        |
|---------------------------------------------------|---------------------------------------------------------------------------------|-----------------------|----------------------------------------|
| Input Voltage Range                               |                                                                                 |                       | ±10%                                   |
| Output Voltage Accuracy                           |                                                                                 |                       | ±5%                                    |
| Line Voltage Regulation                           |                                                                                 |                       | 1.2%/1% of Vin typ.                    |
| Load Voltage Regulation (10% to 100% full load)   | 1.8V, 3.3V output types                                                         |                       | 20% max.                               |
|                                                   | 5V output type                                                                  |                       | 15% max.                               |
|                                                   | 9V, 12V, 15V, 24V output types                                                  |                       | 10% max.                               |
| Output Ripple and Noise (20MHz limited)           |                                                                                 |                       | 100mVp-p max.                          |
| Operating Frequency                               |                                                                                 |                       | 50kHz min. / 100kHz typ. / 105kHz max. |
| Efficiency at Full Load                           |                                                                                 |                       | 70% min. / 80% typ.                    |
| No Load Power Consumption                         |                                                                                 |                       | 101mW min. / 126mW typ. / 220mW max.   |
| Isolation Voltage                                 | (tested for 1 second)                                                           |                       | 1000VDC min.                           |
| Rated Working Voltage                             | (long term isolation)                                                           |                       | see Application Notes                  |
| Isolation Voltage                                 | H-Suffix                                                                        | (tested for 1 second) | 2000VDC min.                           |
| Rated Working Voltage                             | H-Suffix                                                                        | (long term isolation) | see Application Notes                  |
| Isolation Capacitance                             |                                                                                 |                       | 20pF min. / 75pF max.                  |
| Isolation Resistance                              |                                                                                 |                       | 10 GΩ min.                             |
| Short Circuit Protection                          |                                                                                 |                       | 1 Second                               |
| P-Suffix                                          |                                                                                 |                       | 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                                    | RO types                                                                        |                       | 1.4g                                   |
|                                                   | RE types                                                                        |                       | 2.2g                                   |
| MTBF (+25°C)                                      | } Detailed Information see Application Notes chapter "MTBF" using MIL-HDBK 217F | RO types              | 985 x 10 <sup>3</sup> hours            |
|                                                   |                                                                                 | RE types              | 992 x 10 <sup>3</sup> hours            |
| (+85°C)                                           |                                                                                 | RO types              | 200 x 10 <sup>3</sup> hours            |
|                                                   |                                                                                 | RE types              | 145 x 10 <sup>3</sup> hours            |

## 1 Watt SIP4 & SIP7 Single Output

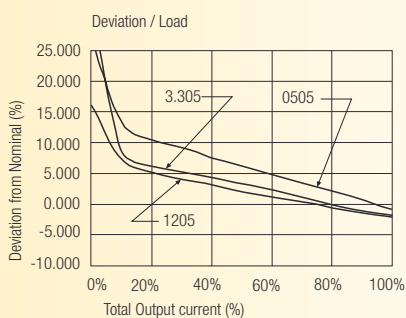
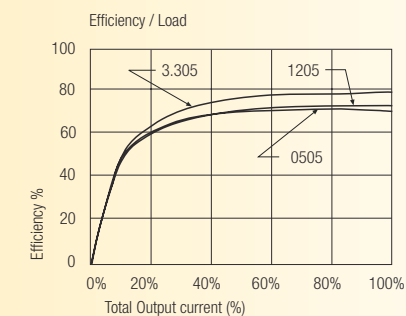


## Derating-Graph (Ambient Temperature)

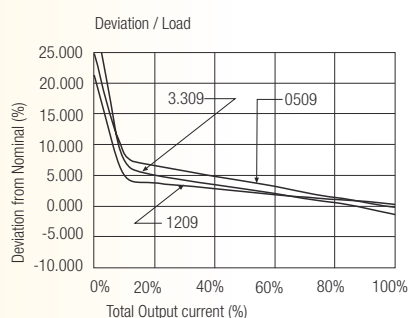
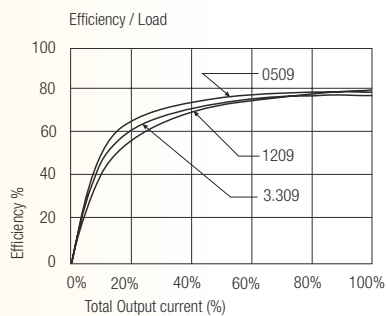


**Typical Characteristics**

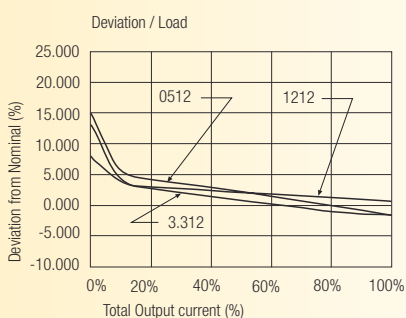
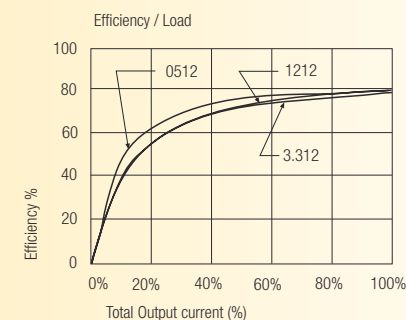
**RO/RE-xx05S**



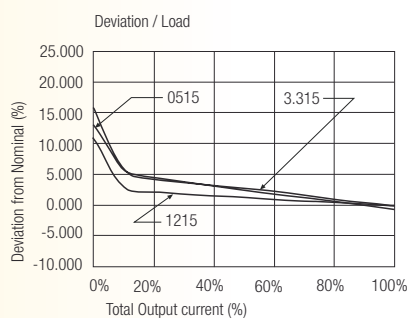
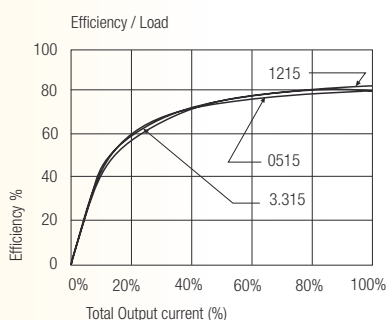
**RO/RE-xx09S**



**RO/RE-xx12S**



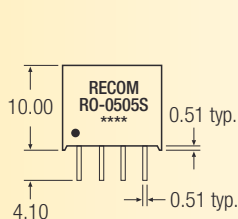
**RO/RE-xx15S**



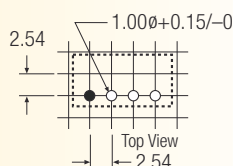
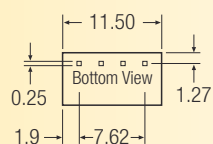
## Package Style and Pinning (mm)

### 4 PIN SIP Package

3rd angle projection 



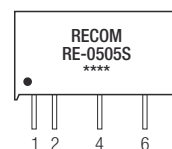
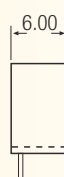
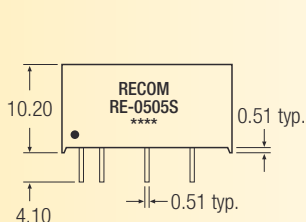
### Recommended Footprint Details



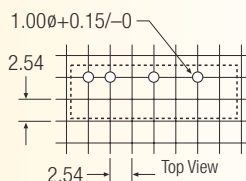
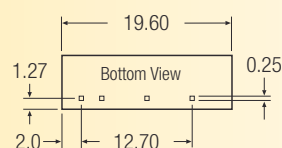
### RO Pin Connections

| Pin #           | Single |
|-----------------|--------|
| 1               | -Vin   |
| 2               | +Vin   |
| 3               | -Vout  |
| 4               | +Vout  |
| XX.X ± 0.5 mm   |        |
| XX.XX ± 0.25 mm |        |

### 7 PIN SIP Package



### Recommended Footprint Details



### RE Pin Connections

| Pin #           | Single |
|-----------------|--------|
| 1               | +Vin   |
| 2               | -Vin   |
| 4               | -Vout  |
| 6               | +Vout  |
| XX.X ± 0.5 mm   |        |
| XX.XX ± 0.25 mm |        |