

## Features

### Unregulated Converters

- UL/CSA and EN-60950-1 Safety certified
- EN-60601 for Medical Applications
- 6kVDC Isolation
- Optional Continuous Short Circuit Protection
- Efficiency up to 82%
- Space Saving „Skinny DIP“ Package
- Very Low Isolation Capacitance
- Suitable for IGBT Applications

### Selection Guide

| Part Number | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Efficiency Std (%) | Max Capacitive Load <sup>(1)</sup> |
|-------------|---------------------|----------------------|---------------------|--------------------|------------------------------------|
| RV-xx3.3S*  | 3.3, 5, 12, 15, 24  | 3.3                  | 600                 | 70                 | 3300µF                             |
| RV-xx05S*   | 3.3, 5, 12, 15, 24  | 5                    | 400                 | 70-75              | 1200µF                             |
| RV-xx09S*   | 3.3, 5, 12, 15, 24  | 9                    | 222                 | 70-75              | 1200µF                             |
| RV-xx12S*   | 3.3, 5, 12, 15, 24  | 12                   | 167                 | 70-75              | 680µF                              |
| RV-xx15S*   | 3.3, 5, 12, 15, 24  | 15                   | 132                 | 75-80              | 680µF                              |
| RV-xx24S*   | 3.3, 5, 12, 15, 24  | 24                   | 83                  | 75-80              | 220µF                              |
| RV-xx3.3D*  | 3.3, 5, 12, 15, 24  | ±3.3                 | ±300                | 70                 | ±1500µF                            |
| RV-xx05D*   | 3.3, 5, 12, 15, 24  | ±5                   | ±200                | 70-75              | ±470µF                             |
| RV-xx09D*   | 3.3, 5, 12, 15, 24  | ±9                   | ±111                | 70-75              | ±470µF                             |
| RV-xx12D*   | 3.3, 5, 12, 15, 24  | ±12                  | ±85                 | 70-75              | ±220µF                             |
| RV-xx15D*   | 3.3, 5, 12, 15, 24  | ±15                  | ±66                 | 75-80              | ±220µF                             |
| RV-xx24D*   | 3.3, 5, 12, 15, 24  | ±24                  | ±42                 | 75-80              | ±100µF                             |
| RV-xx1509D  | 5, 12, 24           | +15/-9               | +67/-111            | 70-82              | ±330µF                             |

xx = Input Voltage. Other input and output voltage combinations available on request.

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. RV-0505S/P, RV-0505D/P

### Specifications (measured at $T_A = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

|                                                                     |                                                 |                         |
|---------------------------------------------------------------------|-------------------------------------------------|-------------------------|
| Input Voltage Range                                                 | ±10%                                            |                         |
| Output Voltage Accuracy                                             | ±5%                                             |                         |
| Line Voltage Regulation                                             | 1.2%/1% of $V_{in}$ typ.                        |                         |
| Load Voltage Regulation (10% to 100% full load)                     | 3.3V output types                               | 20% max.                |
|                                                                     | 5V output type                                  | 15% max.                |
|                                                                     | 9V, 12V, 15V, 24V output types, RV-xx1509D      | 10% max.                |
| Output Ripple and Noise (20MHz limited)                             | 200mVp-p max.                                   |                         |
| Operating Frequency                                                 | 20kHz min. / 50kHz typ. / 85kHz max.            |                         |
|                                                                     | RV-xx1509D                                      | 20kHz min. / 47kHz typ. |
| Efficiency at Full Load                                             | 70% min. / 75% typ.                             |                         |
| Minimum Load = 0%                                                   | Specifications valid for 10% minimum load only. |                         |
| Isolation Voltage                                                   | (tested for 1 second)                           | 6000VDC                 |
|                                                                     | (rated for 1 minute)                            | 3000VAC / 60Hz          |
| Isolation Capacitance                                               | 2pF min. / 12pF max.                            |                         |
| Isolation Resistance                                                | 15 GΩ min.                                      |                         |
| Short Circuit Protection                                            | 1 Second                                        |                         |
| P-Suffix                                                            | Continuous                                      |                         |
| Operating Temperature Range (free air convection, without derating) | -40°C to +90°C (see Graph)                      |                         |
| Storage Temperature Range                                           | -55°C to +125°C                                 |                         |
| Relative Humidity                                                   | 95% RH                                          |                         |
| Package Weight                                                      | 9g                                              |                         |
| Packing Quantity                                                    | 15 pcs per Tube                                 |                         |
|                                                                     | cont.                                           |                         |

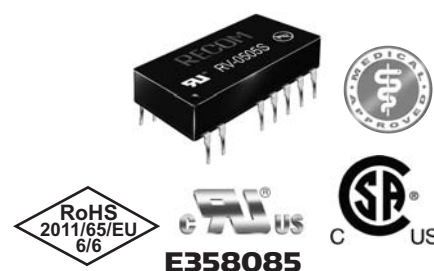
## ECONOLINE

### DC/DC-Converter

with 3 year Warranty

RECOM

## 2 Watt DIP24 Miniature Single & Dual Output



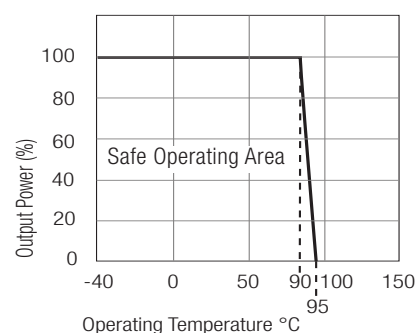
**EN-60950-1 Certified**  
**IEC/EN-60601-1 Certified\***  
**UL/CSA 60950-1 Certified\***  
**\* ±15/-9 Version excluded**

## RV

### Description

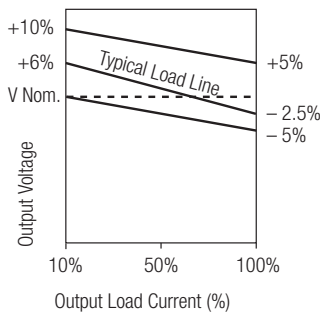
Very high isolation in a small size are the main features of this miniature DIP24 converter, ideal for highly sophisticated industrial, test and measurement and medical designs where board space is at a premium.

## Derating-Graph (Ambient Temperature)



Refer to Application Notes

### Tolerance Envelope



### Specifications (continued)

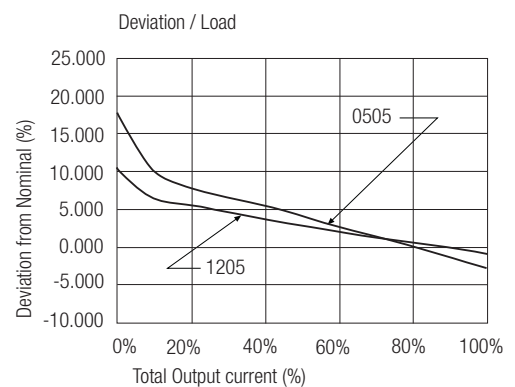
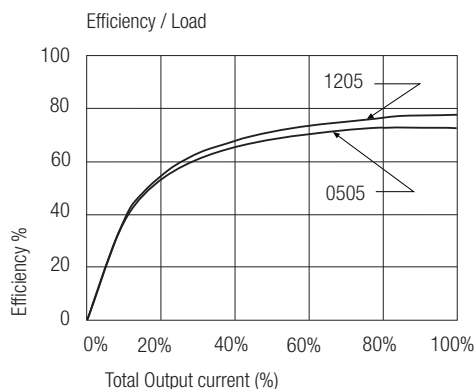
|                |                                                           |                         |                                 |
|----------------|-----------------------------------------------------------|-------------------------|---------------------------------|
| MTBF (+25°C)   | Detailed Information see Application Notes chapter "MTBF" | using MIL-HDBK 217F     | 1154 x 10 <sup>3</sup> hours    |
| (+85°C)        |                                                           | using MIL-HDBK 217F     | 168 x 10 <sup>3</sup> hours     |
| Certifications | UL/cUL General Safety                                     | Report: E358085         | UL 60950-1 2nd Ed.              |
|                | EN General Safety                                         | Report: SPCLVD1109103   | EN60950-1:2006 + A12: 2011      |
|                | EN Medical Safety                                         | Report: SPCMDD1205098-4 | IEC/EN60601-1:2006, 3rd Edition |

### Notes

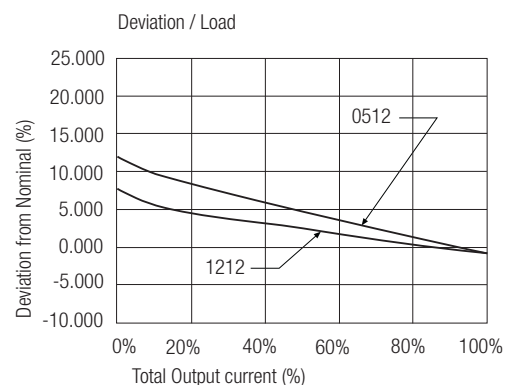
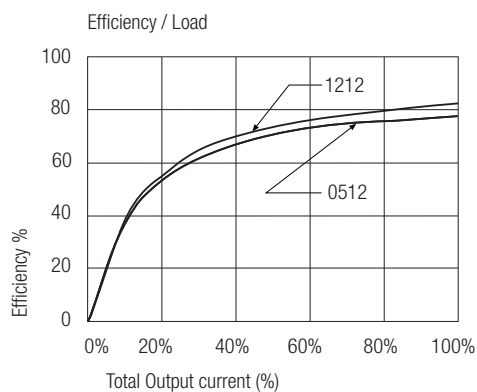
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

### Typical Characteristics

## RV-xx05S

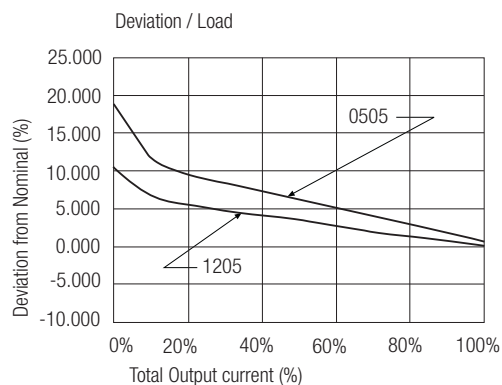
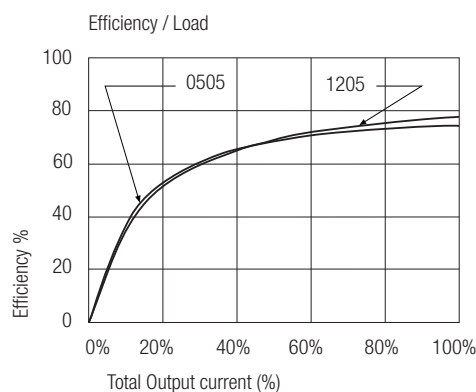


## RV-xx12S

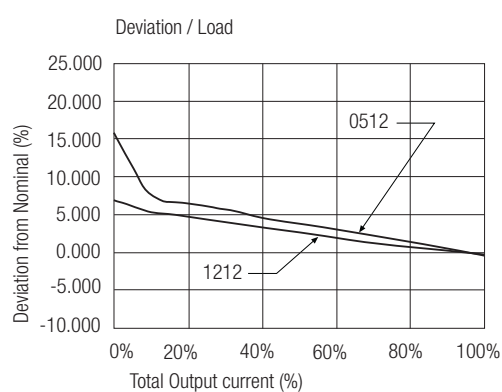
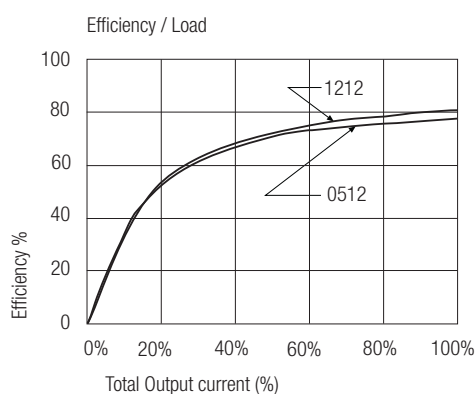


Typical Characteristics

## RV-xx05D

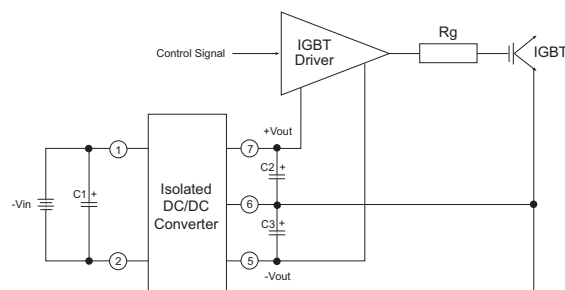


## RV-xx12D



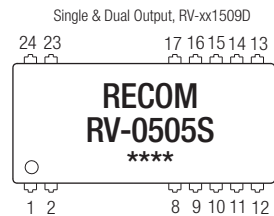
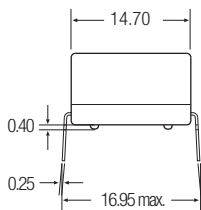
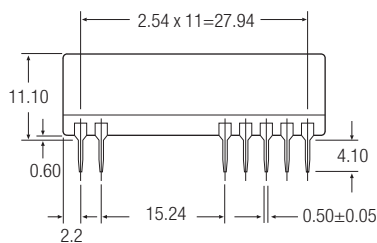
Applications

## IGBT Application Circuit

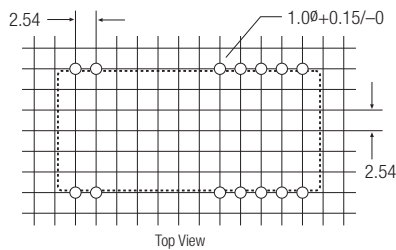
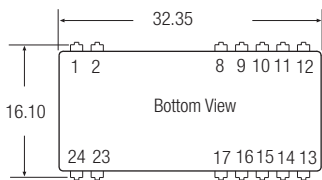


Package Style and Pinning (mm)

24 PIN DIP Miniature Package Style



Recommended Footprint Details



Pin Connections

| Pin #          | Single |
|----------------|--------|
| 1              | +Vin   |
| 2              | -Vin   |
| 8, 9, 11, 14   | NC     |
| 10, 15         | -Vout  |
| 12 & 13        | +Vout  |
| 16, 17, 23, 24 | NC     |

NC = No Connection

Pin Connections

| Pin #                 | Dual  |
|-----------------------|-------|
| 1                     | +Vin  |
| 2                     | -Vin  |
| 8, 17                 | -Vout |
| 9, 11, 14, 16, 23, 24 | NC    |
| 10 & 15               | Com   |
| 12, 13                | +Vout |

NC = No Connection

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm