# Features

## Unregulated Converters

- UL/CSA and EN Safety certified
- EN-61010 for Test, Measurement and Lab. Use
- EN-60601 for Medical Applications
- Standard 6kVDC Isolation
- Optional 6.4kVDC or 8kV Reinforced Isolation
- Optional Continuous Short Circuit Protection
- Unique Transformer System (Patent Pending)
- Efficiency to 88%

## Selection Guide

| Part Number SIP 7 | Standard Isolation (kVDC) | Reinforced Isolation (kVDC) | Input Voltage (VDC) | Output Voltage (mA) | Output Current (%) | Efficiency Std(/R) (%) | Max Capacitive Load[1] |
|---|---|---|---|---|---|---|---|
| RV-xx3.3S | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | 3.3 | 600 | 70 (70-78) | 3300µF |
| RV-xx05S | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | 5 | 400 | 70-75 (76-80) | 1200µF |
| RV-xx09S | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | 9 | 222 | 70-75 (78-85) | 1200µF |
| RV-xx12S | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | 12 | 167 | 70-75 (78-85) | 680µF |
| RV-xx15S | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | 15 | 132 | 75-80 (78-88) | 680µF |
| RV-xx3.3D | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | ±3.3 | ±300 | 70 (70-78) | ±1500µF |
| RV-xx05D | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | ±5 | ±200 | 70-75 (75-82) | ±470µF |
| RV-xx09D | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | ±9 | ±111 | 70-75 (76-84) | ±470µF |
| RV-xx12D | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | ±12 | ±85 | 70-75 (78-86) | ±220µF |
| RV-xx15D | 6 | /R6.4 & /R8 | 3.3, 5, 12, 15, 24 | ±15 | ±66 | 75-80 (78-86) | ±220µF |

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

No suffix is 6kVDC functional isolation

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

* add Suffix "/R6.4"or "/R8" for Reinforced Isolation, e.g. RV-0505S/R6.4, RV-0505D/P/R8

## Specifications (measured at $T_A$ = 25°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 Vin 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 | 10% max. |
| Output Ripple and Noise (20MHz limited) | | 200mVp-p max. |
| Operating Frequency | | 20kHz min. / 50kHz typ. / 85kHz max. |
| Efficiency at Full Load | | 70% min. / 75% typ. |
| Minimum Load = 0% | | Specifications valid for 10% minimum load only. |
| Isolation Voltage - Standard Part | (tested for 1 second) | 6000VDC |
| | (rated for 1 minute) | 3000VAC / 60Hz |
| /R6.4 | (tested for 1 second) | 6400VDC |
| | (rated for 1 minute) | 3200VAC / 60Hz |
| /R8 | (tested for 1 second) | 8000VDC |
| | (rated for 1 minute) | 4000VAC / 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) | | -40°C to +85°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

RoHS 2002/95/EC 6/6

E-224736

**EN-60950-1 Certified**
**UL/CSA-60950-1 Certified**
**UL/CSA-60601-1 Certified**
**EN-61010-1 Certified (/R only)**

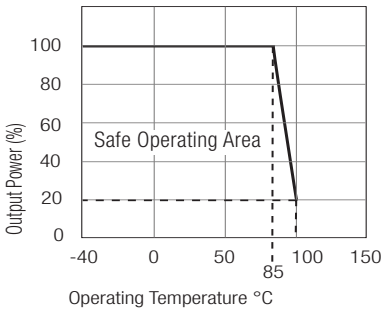
# RV (R)

## 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.

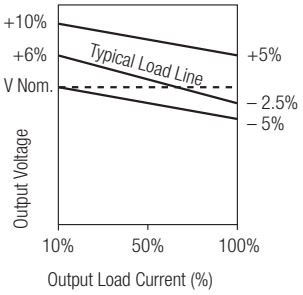
## Derating-Graph

(Ambient Temperature)




**Refer to Application Notes**

## Tolerance Envelope




## Specifications (continued)

| | | | |
|---|---|---|---|
| MTBF (+25°C) | *Detailed Information see* | using MIL-HDBK 217F | 1154 x $10^3$ hours |
| (+85°C) | *Application Notes chapter "MTBF"* | using MIL-HDBK 217F | 168 x $10^3$ hours |
| Reinforced Isolation | Transformer Creepage | /R6.4 Types | 5.5 mm min. |
| | Transformer Clearance | /R6.4 Types | 5.5 mm min. |
| | PCB Creepage & Clearance | /R6.4 Types | 4.8 mm min. |
| Certifications | CB Report: Medical Safety | Ref: CA/11158/CSA | IEC60601-1:1988 + A1: 1991 + A2:1995 |
| Reinforced Part | CSA Medical Safety | Report: 227629 | C22.2 601-1 2nd Ed. |
| | | | UL 60601-1 1st Ed. |
| | CSA General Safety | Report: 2219431 | C22.2 No. 60950-1-03 |
| | | | UL 60950-1 1st Ed. |
| | | Recognised as Reinforced Isolation | Supplement to Report: 2219431 |
| Measurement, Control and Laboratory Use Safety | | Report: IL091212010M1 | EN 61010-1 : 2001 |
| Certifications | UL General Safety | Report: E248550 | UL 60950-1 1st Ed. |
| Standard Part | | | C22.2 No. 60950-1-03 |
| | EN General Safety | Report: LVD-2K02066 | EN60950-1:2000 |
| | EN Medical Safety | Report: PS090301601 | EN60601-1:1990 + A13: 1996 |

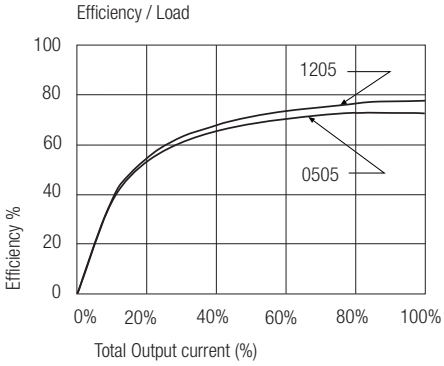
Notes

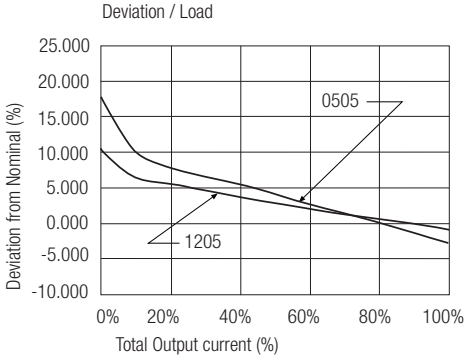
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

## Typical Characteristics

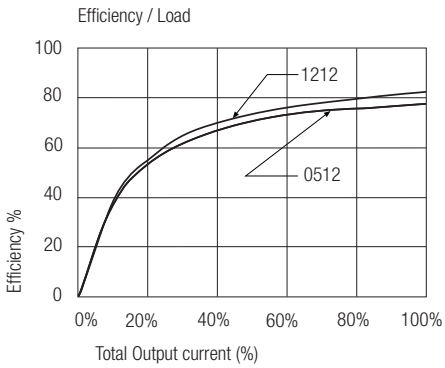
RV (R)

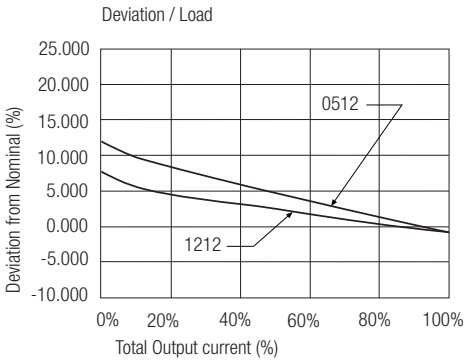
### RV-xx05S



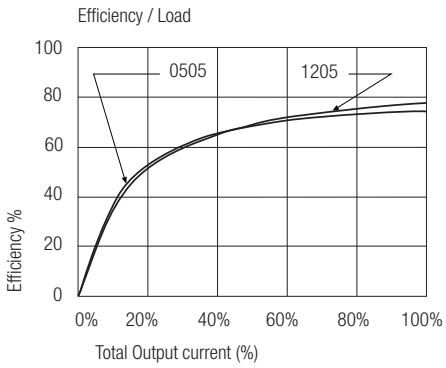

### RV-xx12S

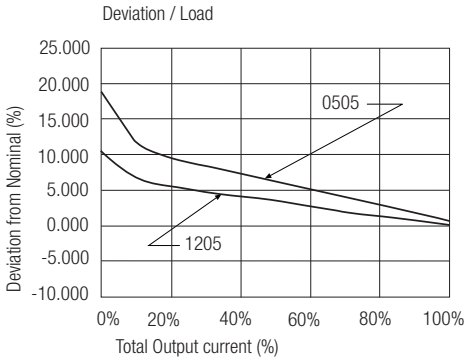


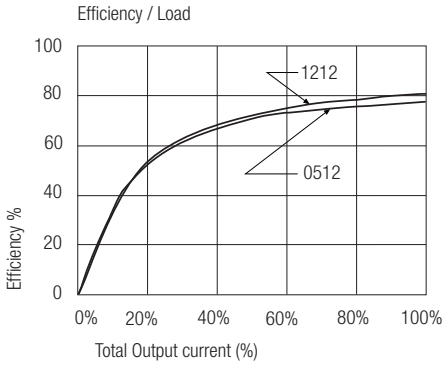
## Typical Characteristics

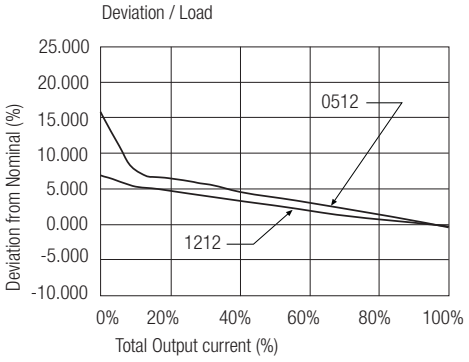
### RV-xx05D



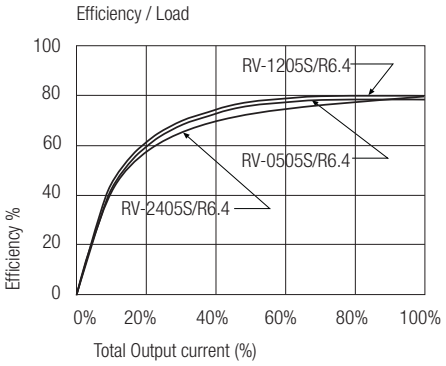

### RV-xx12D

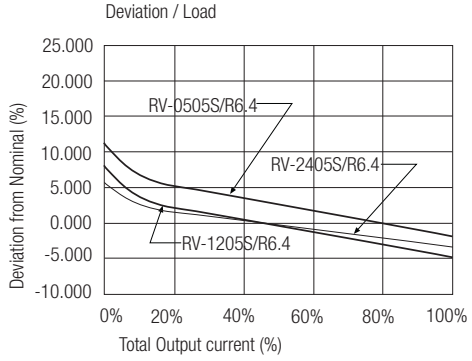


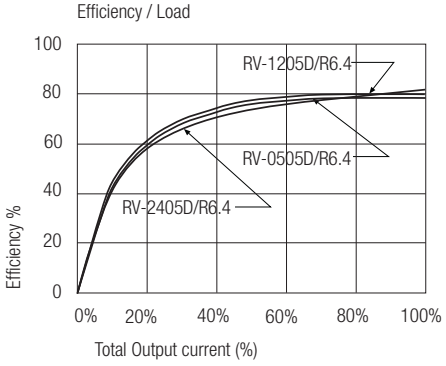

## Typical Characteristics - Reinforced Isolation Versions

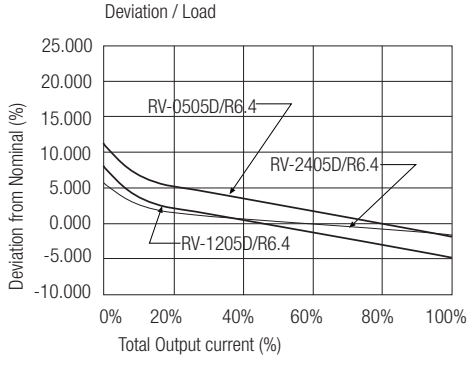
### RV-xx05S/R6.4
### RV-xx05S/R8




### RV-xx05D/R6.4
### RV-xx05D/R8

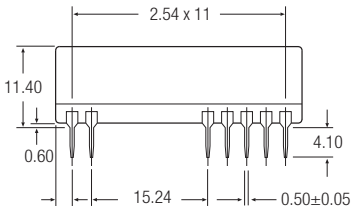


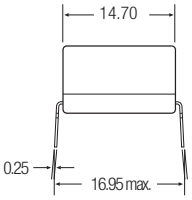



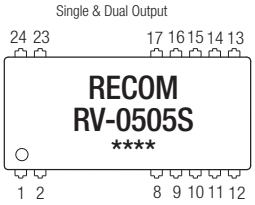
## Package Style and Pinning (mm)

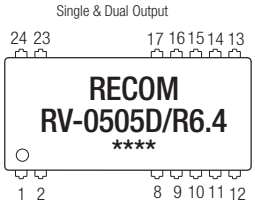
3rd angle projection

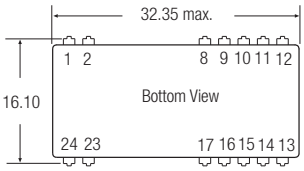
### 24 PIN DIP Miniature Package Style



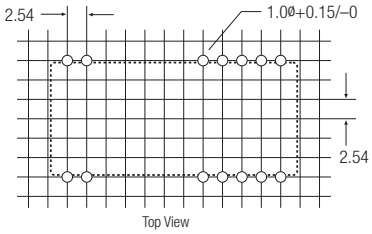




### Recommended Footprint Details




| 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

RV (R)