

## Features

## Regulated Converters

- On/Off Pin
- 1kVDC Isolation
- UL94V-0 Package Material
- Optional Continuous Short Circuit Protected
- Internal linear regulator
- Efficiency to 70 %
- Adjustable Output Voltage

### Description

The RY series DC/DC converter is a low cost general purpose isolated converter with a built-in linear regulator to give a regulated, load-independent output. It is available with single or dual outputs. A useful feature is the CTRL pin on the single output version which allows the converter to be adjusted or controlled by an external enable signal.

### Selection Guide

| Part Number<br>SIP 7 | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Efficiency (%) | Max Capacitive Load <sup>(1)</sup> |
|----------------------|---------------------|----------------------|---------------------|----------------|------------------------------------|
| RY-xx05S             | 5, 9, 12, 15, 24    | 5                    | 200                 | 58-60          | 1200µF                             |
| RY-xx09S             | 5, 9, 12, 15, 24    | 9                    | 111                 | 56-62          | 1200µF                             |
| RY-xx12S             | 5, 9, 12, 15, 24    | 12                   | 84                  | 60-66          | 680µF                              |
| RY-xx15S             | 5, 9, 12, 15, 24    | 15                   | 66                  | 60-66          | 680µF                              |
| RY-xx24S             | 5, 9, 12, 15, 24    | 24                   | 42                  | 60-68          | 220µF                              |
| RY-xx05D             | 5, 9, 12, 15, 24    | ±5                   | ±100                | 50-58          | ±470µF                             |
| RY-xx09D             | 5, 9, 12, 15, 24    | ±9                   | ±55                 | 52-60          | ±470µF                             |
| RY-xx12D             | 5, 9, 12, 15, 24    | ±12                  | ±42                 | 58-68          | ±330µF                             |
| RY-xx15D             | 5, 9, 12, 15, 24    | ±15                  | ±33                 | 62-68          | ±330µF                             |
| RY-xx24D             | 5, 9, 12, 15, 24    | ±24                  | ±21                 | 64-70          | ±100µF                             |

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

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

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

|                                                   |                                                             |                                                 |
|---------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------|
| Input Voltage Range                               | ±5%                                                         |                                                 |
| Output Voltage Accuracy                           | ±5%                                                         |                                                 |
| Line Voltage Regulation                           | ±1% max.                                                    |                                                 |
| Load Voltage Regulation (10% to 100% full load)   | ±1% max.                                                    |                                                 |
| Minimum Load                                      | 10% <sup>(2)</sup>                                          |                                                 |
| Output Ripple and Noise (20MHz limited)           | 100mVp-p max.                                               |                                                 |
| Operating Frequency                               | 30kHz min. / 50kHz typ. / 88kHz max.                        |                                                 |
| Efficiency at Full Load                           | 54% min. / 60% typ.                                         |                                                 |
| Isolation Voltage                                 | (tested for 1 second)<br>(rated for 1 minute**)             | 1000VDC<br>1500VAC / 60Hz                       |
| Isolation Capacitance                             | Single output types<br>Dual output types                    | 30pF min. / 150pF max.<br>40pF min. / 72pF max. |
| Isolation Resistance                              | 10 GΩ min.                                                  |                                                 |
| Short Circuit Protection                          | 1 Second                                                    |                                                 |
| P-Suffix                                          | Continuous                                                  |                                                 |
| Operating Temperature Range (free air convection) | -40°C to +70°C (see Graph)                                  |                                                 |
| Storage Temperature Range                         | -55°C to +125°C                                             |                                                 |
| Relative Humidity                                 | 95% RH                                                      |                                                 |
| Package Weight                                    | RY Single & Dual output types                               | 2.8g                                            |
| Packing Quantity                                  | 25 pcs per Tube                                             |                                                 |
| MTBF (+25°C)                                      | } Detailed Information see Application Notes chapter "MTBF" | using MIL-HDBK 217F 924 x 10 <sup>3</sup> hours |
| (+70°C)                                           |                                                             | using MIL-HDBK 217F 135 x 10 <sup>3</sup> hours |

### Certifications

|                   |                       |                           |
|-------------------|-----------------------|---------------------------|
| EN General Safety | Report: SPCLVD1109103 | EN60950-1:2006 + A12:2011 |
|-------------------|-----------------------|---------------------------|

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## ECONOLINE

## DC/DC-Converter

with 3 year Warranty

RECOM

## 1 Watt

## SIP7

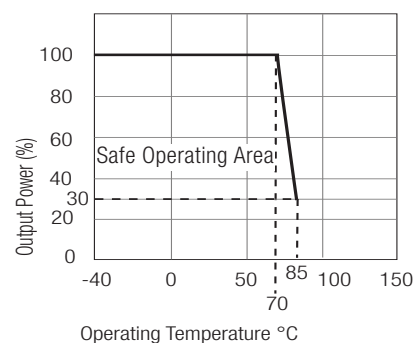
## Single & Dual Output



### EN-60950-1 Certified

**RY**

## Derating-Graph (Ambient Temperature)



\*\*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.

Refer to Application Notes

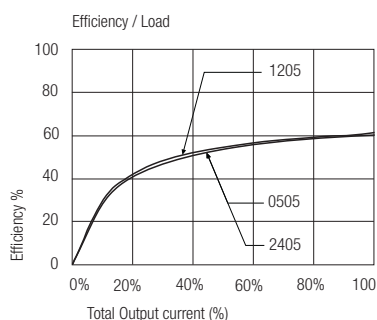
### Specifications (measured at $T_A = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

#### Notes

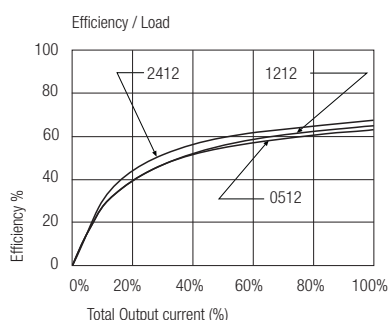
- Note 1: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter
- Note 2: The RY series requires a minimum of 10% load on the output to maintain specified regulation. Operating under no-load conditions will not damage these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

### Typical Characteristics

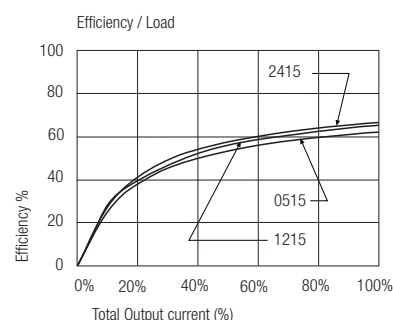
#### RY-xx05S



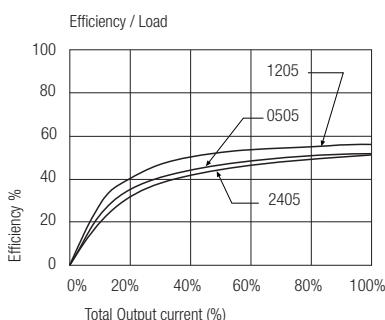
#### RY-xx12S



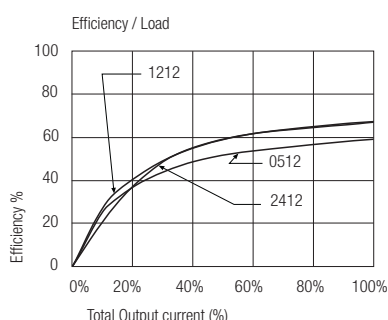
#### RY-xx15S



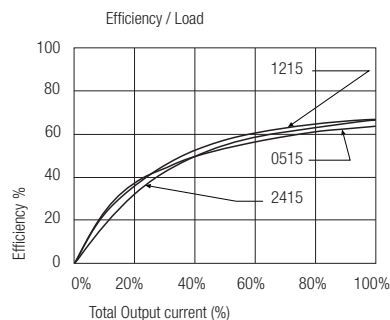
#### RY-xx05D



#### RY-xx12D

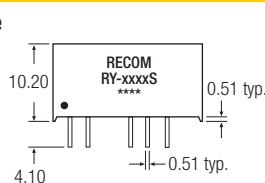


#### RY-xx15D

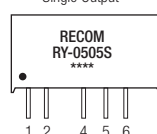


### Package Style and Pinning (mm)

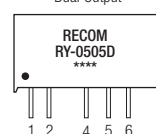
#### SIP7 Package



#### Single Output



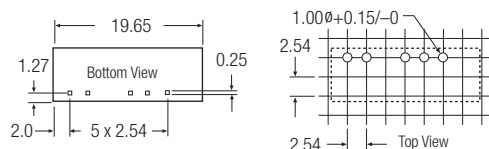
#### Dual Output



#### Pin Connections

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | +Vin   | +Vin  |
| 2     | -Vin   | -Vin  |
| 4     | -Vout  | -Vout |
| 5     | CTRL   | Com   |
| 6     | +Vout  | +Vout |

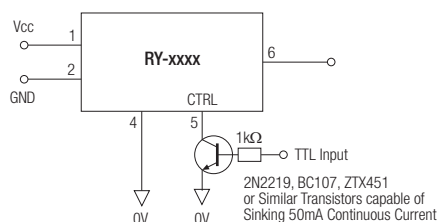
#### Recommended Footprint Details



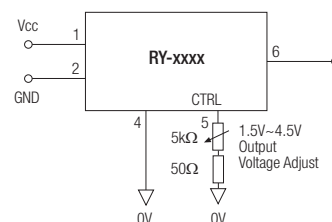
XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

### Typical On/Off Control and Adjustable Output Applications

#### On/Off Control



#### Adjustable Output



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