## Features

**Regulated Converters**

- Controllable Output
- 1kVDC Isolation
- No Heatsink Required
- UL94V-0 Package Material
- Toroidal Magnetics
- No External Components
- Fully Encapsulated
- Efficiency to 70%

# ECONOLINE
DC/DC-Converter

# RY & RX Series

## 1 Watt SIP7 & DIP14 Single & Dual Output




## Selection Guide

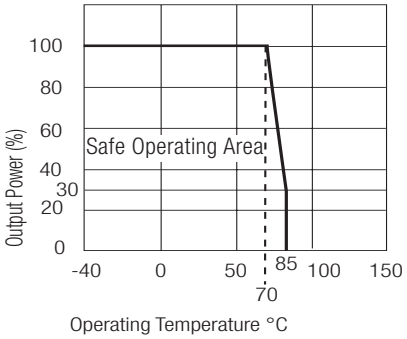
| Part Number SIP 7 | Part Number DIP 14 | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Efficiency (%) |
|---|---|---|---|---|---|
| RY-xx05S | RX-xx05S | 5, 9, 12, 15, 24 | 5 | 180 | 58-60 |
| RY-xx09S | RX-xx09S | 5, 9, 12, 15, 24 | 9 | 111 | 56-62 |
| RY-xx12S | RX-xx12S | 5, 9, 12, 15, 24 | 12 | 84 | 60-66 |
| RY-xx15S | RX-xx15S | 5, 9, 12, 15, 24 | 15 | 66 | 60-66 |
| RY-xx24S | RX-xx24S | 5, 9, 12, 15, 24 | 24 | 42 | 60-68 |
| RY-xx05D | RX-xx05D | 5, 9, 12, 15, 24 | ±5 | ±100 | 50-58 |
| RY-xx09D | RX-xx09D | 5, 9, 12, 15, 24 | ±9 | ±55 | 52-60 |
| RY-xx12D | RX-xx12D | 5, 9, 12, 15, 24 | ±12 | ±42 | 58-68 |
| RY-xx15D | RX-xx15D | 5, 9, 12, 15, 24 | ±15 | ±33 | 62-68 |
| RY-xx24D | RX-xx24D | 5, 9, 12, 15, 24 | ±24 | ±21 | 64-70 |

xx = Input Voltage

## Specifications (Core Operating Area)

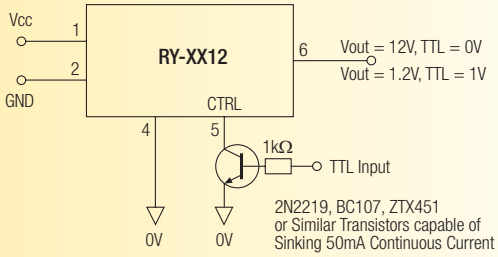
| | | |
|---|---|---|
| Input Voltage Range | | ±5% |
| Output Voltage Accuracy | | ±5% |
| Line Voltage Regulation | | ±1% max. |
| Load Voltage Regulation (10% to 100% full load) | | ±1% max. |
| Output Ripple and Noise (20MHz limited) | | 100mVp-p max. |
| Operating Frequency | | 30kHz min. / 50kHz typ. / 88kHz max. |
| Efficiency at Full Load | | 54% min. / 60% typ. |
| No Load Power Consumption | Single output types | 171mW min. / 232mW typ. / 390mW max. |
| | Dual output types | 188mW min. / 264mW typ. / 350mW max. |
| Isolation Voltage | (tested for 1 second) | 1.000VDC min. |
| Rated Working Voltage | (long term isolation) | see Application Notes |
| Isolation Capacitance | Single output types | 30pF min. / 150pF max. |
| | Dual output types | 40pF min. / 72pF max. |
| Isolation Resistance | | 10 GΩ min. |
| Short Circuit Protection | | 1 Second |
| Operating Temperature Range (free air convection) | | -40°C to +70°C (see Graph) |
| Storage Temperature Range | | -55°C to +125°C |
| Relative Humidity | MSL Level 1 | 95% RH |
| Package Weight | RY Single & Dual output types | 2.8g |
| | RX Single output types | 2.9g |
| | RX Dual output types | 2.7g |
| MTBF (+25°C) } *Detailed Information see Application Notes chapter "MTBF"* | using MIL-HDBK 217F | 924 x $10^3$ hours |
| MTBF (+70°C) } *Detailed Information see Application Notes chapter "MTBF"* | using MIL-HDBK 217F | 135 x $10^3$ hours |

## Derating-Graph
(Ambient Temperature)

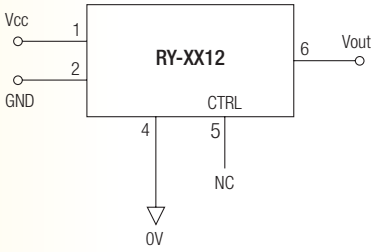


## Typical Applications

### Flash PROM Programming Voltage Control

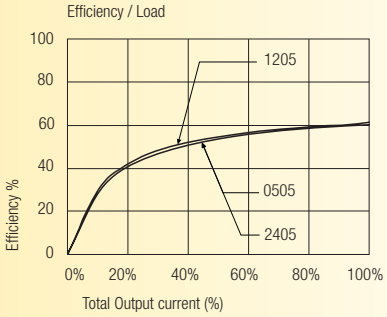



### Normal Isolated Regulated Output

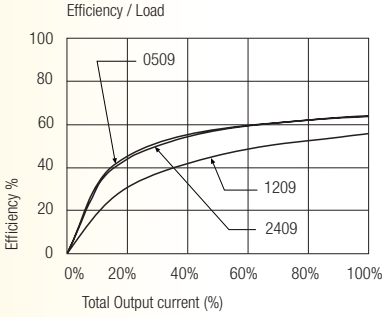



## Typical Characteristics

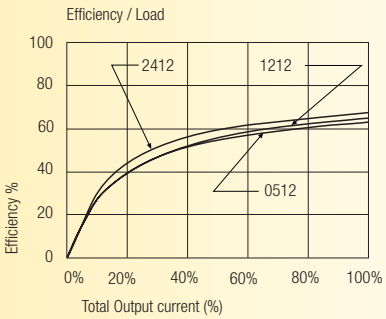
### RY/RX-xx05S



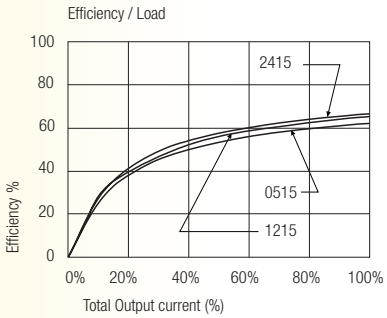

### RY/RX-xx09S



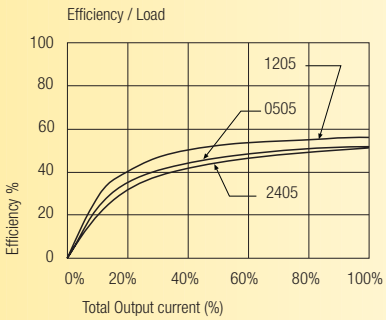

### RY/RX-xx12S



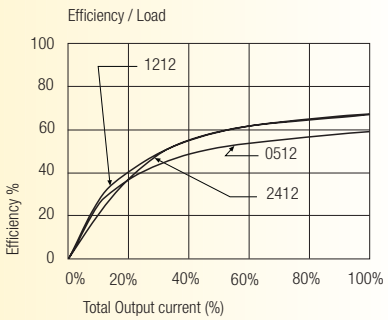

### RY/RX-xx15S



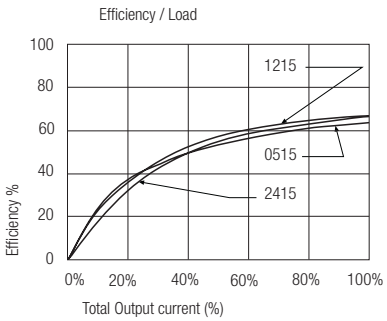

### RY/RX-xx05D




### RY/RX-xx12D



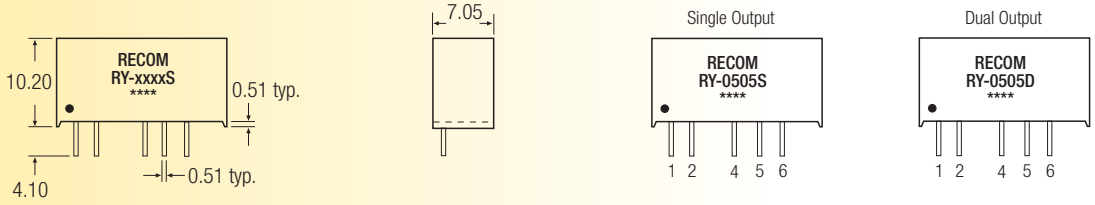

### RY/RX-xx15D



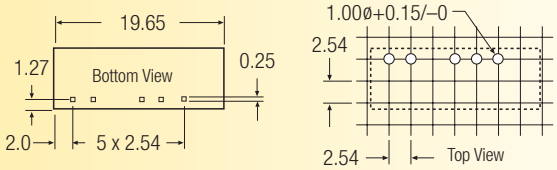
## Package Style and Pinning (mm)

3rd angle projection

### 7 PIN SIP Package




#### Recommended Footprint Details

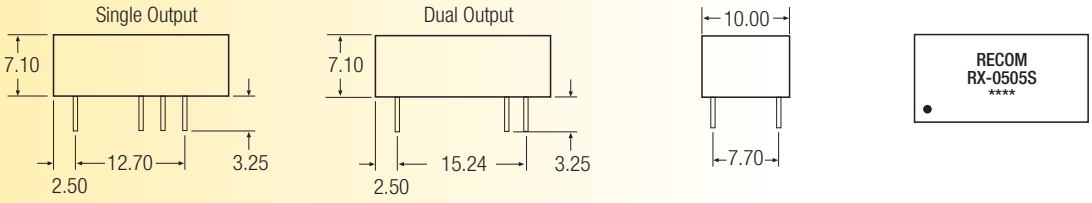



**RX Pin Connections**

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

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

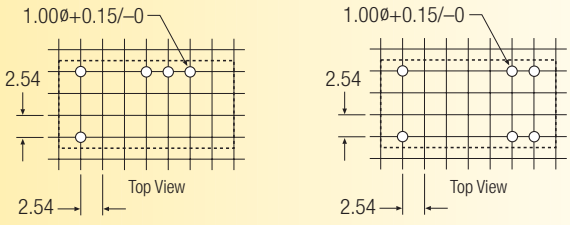
### 14 PIN DIP Package







#### Recommended Footprint Details




**RX Pin Connections**

| Pin # | Single | Dual |
|---|---|---|
| 1 | –Vin | –Vin |
| 6 | No Pin | +Vout |
| 7 | No Pin | Com |
| 8 | No Pin | –Vout |
| 9 | +Vout | Com |
| 10 | CTRL | No Pin |
| 11 | –Vout | No Pin |
| 14 | +Vin | +Vin |

XX.X ± 0.5 mm
XX.XX ± 0.25 mm