

## Features

## Unregulated Converters

- 1kVDC and 3kVDC Isolation Options
- Approved for Medical Applications
- Suitable for Automated Assembly
- High Power Density
- Optional Continuous Short Circuit Protection
- Efficiency to 85 %
- RoHS 5/6 Conform

### Description

Compared to standard 2 Watt packages, space savings of 80% and 77% respectively are achieved by these RTS & RTD 2 Watts SMD-Miniature DC/DC Converters. They have been specifically designed for applications where board space is at a premium since these 2 Watt converters have only a slightly larger foot print than conventional 1 Watt converters. With efficiencies up to 85%, external cooling is not needed, as the full output power is available over the operating temperature range -40°C to +85°C. All converters have an I/O-Isolation of 1kVDC, or optionally 3kV, making them suitable for many industrial and medical applications.

### Selection Guide

| Part Number  |     | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Efficiency (%) | Max Capacitive Load <sup>(1)</sup> |
|--------------|-----|---------------------|----------------------|---------------------|----------------|------------------------------------|
| RTS** -xx3.3 | (H) | 5, 12, 15, 24       | 3.3                  | 606                 | 70-75          | 3300µF                             |
| RTS** -xx05  | (H) | 5, 12, 15, 24       | 5                    | 400                 | 80-85          | 1200µF                             |
| RTS** -xx09  | (H) | 5, 12, 15, 24       | 9                    | 222                 | 80-85          | 1200µF                             |
| RTS** -xx12  | (H) | 5, 12, 15, 24       | 12                   | 167                 | 80-85          | 680µF                              |
| RTS** -xx15  | (H) | 5, 12, 15, 24       | 15                   | 133                 | 80-85          | 680µF                              |
| RTS** -xx24  | (H) | 5, 12, 15, 24       | 24                   | 83                  | 80-85          | 220µF                              |
| RTD** -xx05  | (H) | 5, 12, 15, 24       | ±5                   | ±200                | 70-75          | ±470µF                             |
| RTD** -xx09  | (H) | 5, 12, 15, 24       | ±9                   | ±111                | 75-78          | ±470µF                             |
| RTD** -xx12  | (H) | 5, 12, 15, 24       | ±12                  | ±83                 | 75-83          | ±220µF                             |
| RTD** -xx15  | (H) | 5, 12, 15, 24       | ±15                  | ±66                 | 75-85          | ±220µF                             |
| RTD** -xx24  | (H) | 5, 12, 15, 24       | ±24                  | ±42                 | 78-85          | ±100µF                             |

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

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. RTS-0505/P, RTD-0505/HP

\* add suffix -R for tape&reel packing e.g. RTS-0505-R. For more details see Tapes Section.

### Case and Pinning Options (note restrictions on /H option)

RTS\*\* : \*\* without marking denotes 5 pins out of 8 fitted (includes /H option)  
 \*\* with marking 8 denotes 8 pins out of 8 fitted (/H option not available)

RTD\*\* : \*\* without marking denotes 6 pins out of 10 fitted (includes /H option)  
 \*\* with marking 10 denotes with 10 pins out of 10 fitted (/H option not available)

### Specifications (measured at T<sub>A</sub> = 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 max.                  |
| 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)         |   | 150mVp-p max.                        |
| Operating Frequency                             |   | 20kHz min. / 50kHz typ. / 85kHz max. |
| Efficiency at Full Load                         |   | 70% min. / 80% typ.                  |
| Minimum Load = 0%                               | Specifications valid for 10% minimum load only. |                                      |

cont.

## ECONOLINE

DC/DC-Converter

with 3 year Warranty

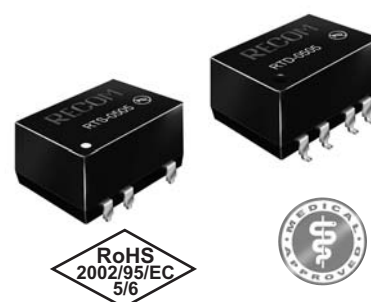
**RECOM**

**2 Watt**

**SMD**

**Single &**

**Dual Output**



**EN-60950-1 Certified (All Suffixes)**

**EN-60601-1 Certified (Suffix H3)**

## RTS-RTD

## EOL Dec.2011

END OF LIFE: Please do not use for new design, replace with new SMD converter R2S (single output) and/or R2D (dual output).

Refer to Application Notes

Refer to Application Notes

# RTS & RTD Series

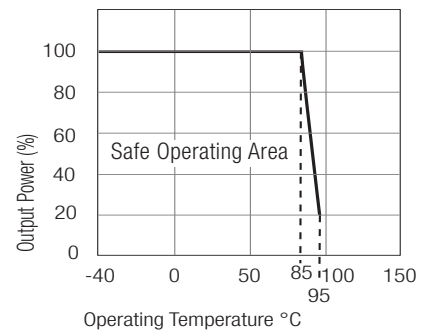
## ECONOLINE

### DC/DC-Converter

#### Specifications - Continued

|   |   |                       |                             |
|---|---|-----------------------|-----------------------------|
| Isolation Voltage                                 |   | (tested for 1 second) | 1000VDC min.                |
|   | H-Suffix  | (tested for 1 second) | 3000VDC min.                |
| Rated Working Voltage                             |   | (long term isolation) | see Application Notes       |
| Isolation Capacitance                             |   |                       | 40pF min. / 115pF 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             |
| Reflow Temperature                                | ROHS compliant  |                       | 245°C (30 sec) max.         |
| Vapour Phase Process                              | (for more details see Application Notes)                    |                       | 230°C (90 sec) max.         |
| Relative Humidity                                 |   |                       | 95% RH                      |
| Package Weight                                    | RTS types   |                       | 2.1g                        |
|   | RTD types   |                       | 2.5g                        |
| Packing Quantity                                  | RTS, RTS8   |                       | 40 pcs per Tube             |
|   | RTS12, RTD  |                       | 33 pcs per tube             |
|   | All Types   |                       | 500 pcs per Reel            |
| MTBF (+25°C)                                      | } Detailed Information see Application Notes chapter "MTBF" | using MIL-HDBK 217F   | 886 x 10 <sup>3</sup> hours |
| (+85°C)   |   | using MIL-HDBK 217F   | 128 x 10 <sup>3</sup> hours |

## Derating-Graph (Ambient Temperature)

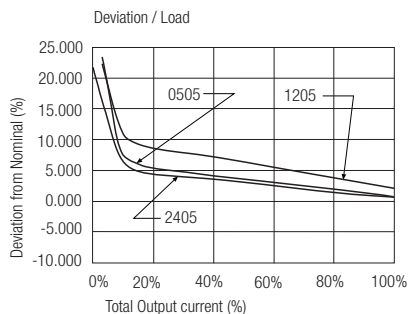
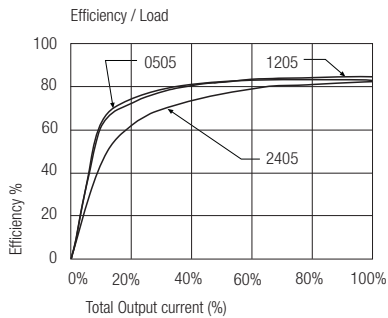


#### Notes

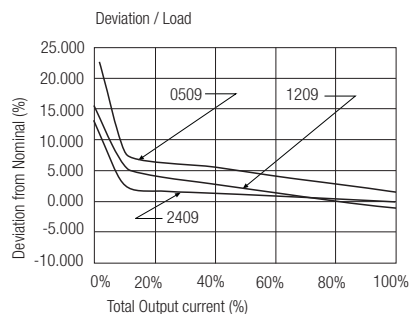
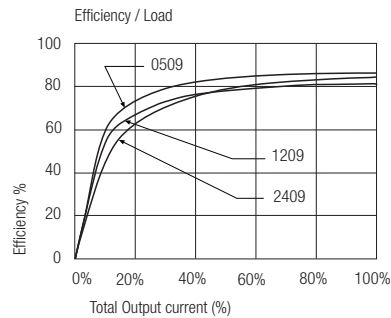
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

#### Typical Characteristics

### RTS-xx05

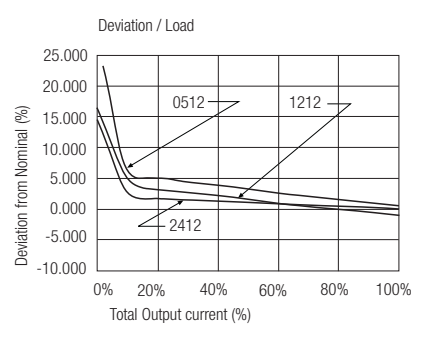
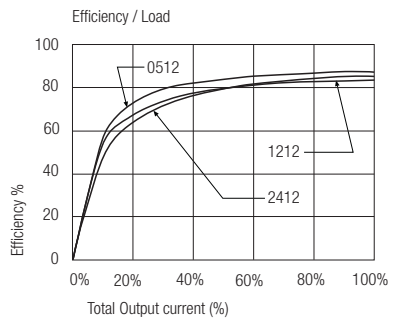


### RTS-xx09

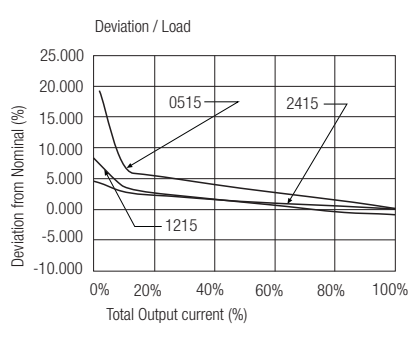
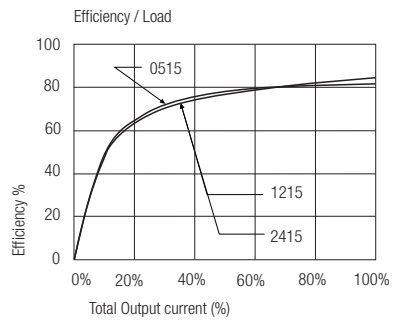


**Typical Characteristics**

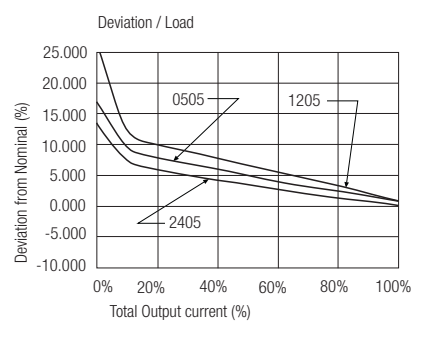
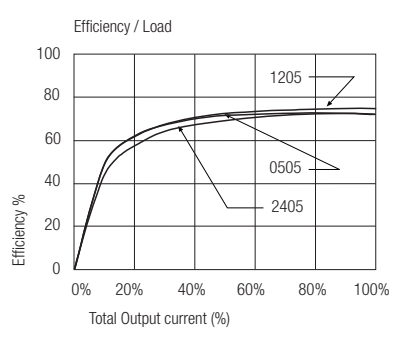
**RTS-xx12**



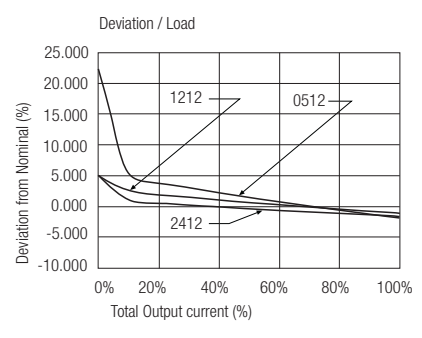
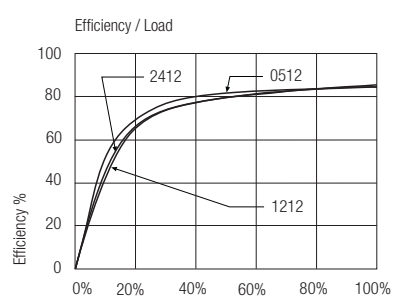
**RTS-xx15**



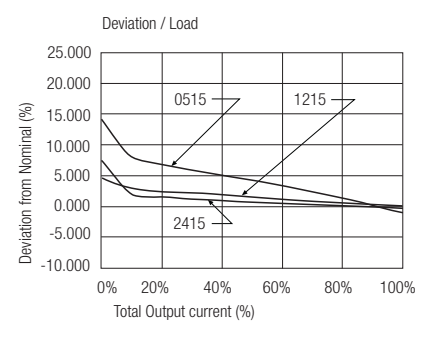
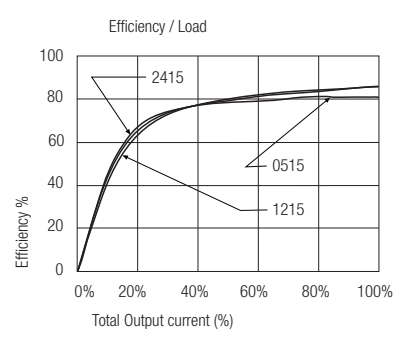
**RTD-xx05**



**RTD-xx12**



**RTD-xx15**



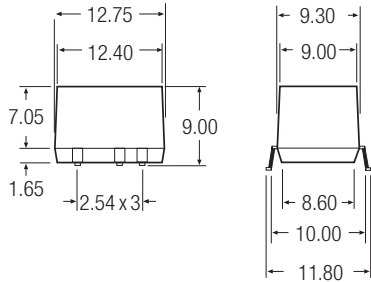
# ECONOLINE

DC/DC-Converter

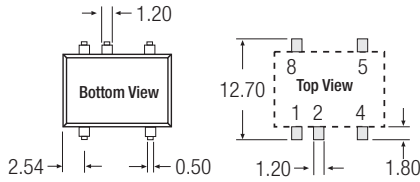
# RTS & RTD Series

## Package Style and Pinning (mm)

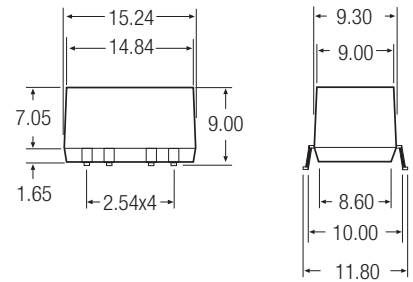
8 PIN Single SMD Package



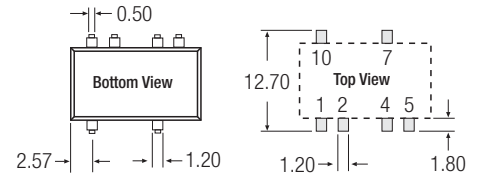
Recommended Footprint Details



10 PIN Dual SMD Package



Recommended Footprint Details



**Pin Connections**

| Pin # | Single | Dual   |
|-------|--------|--------|
| 1     | -Vin   | -Vin   |
| 2     | +Vin   | +Vin   |
| 4     | -Vout  | Com    |
| 5     | +Vout  | -Vout  |
| 7     | No Pin | +Vout  |
| 8     | NC     | No Pin |
| 10    | No Pin | NC     |

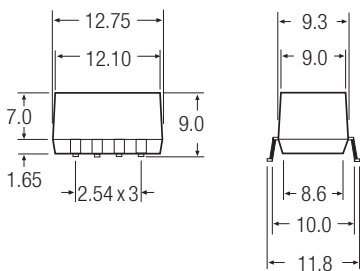
NC = No Connection

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

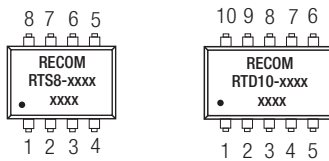
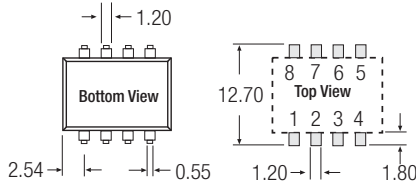
Full 8 PIN Single SMD Package

Note: /H option is not available in these pin packages

Full 10 PIN Dual SMD Package



Recommended Footprint Details

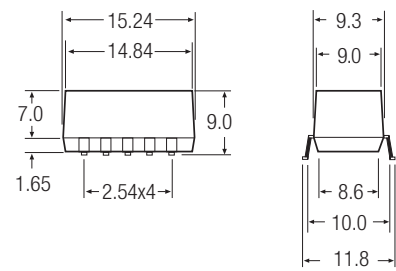


**Pin Connections**

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | -Vin   | -Vin  |
| 2     | +Vin   | +Vin  |
| 3     | NC     | NC    |
| 4     | -Vout  | Com   |
| 5     | +Vout  | -Vout |
| 6     | NC     | NC    |
| 7     | NC     | +Vout |
| 8     | NC     | NC    |
| 9     | -      | NC    |
| 10    | -      | NC    |

NC = No Connection

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm



Recommended Footprint Details

