



**THE DATASHEET OF  
TD1509PR**



## 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

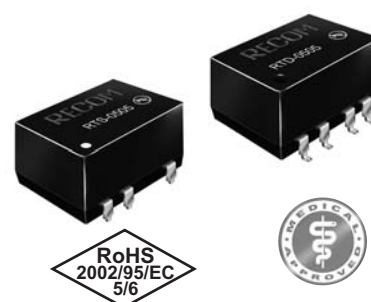
**RECOM**

**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

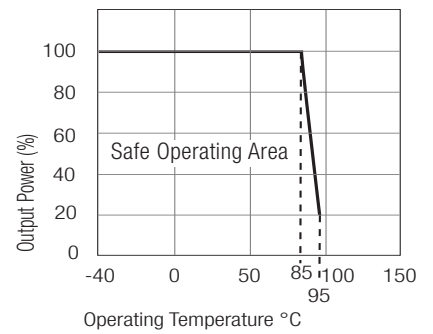
## ECONOLINE

### 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)

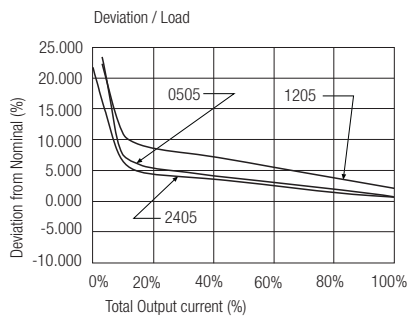
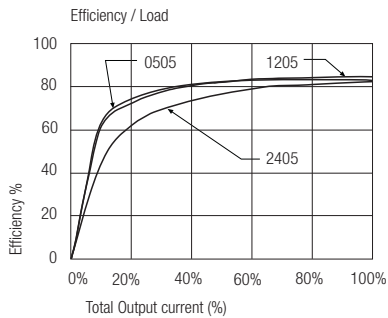


#### Notes

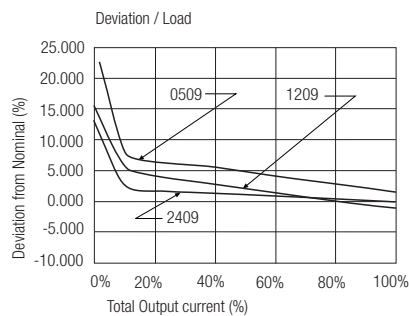
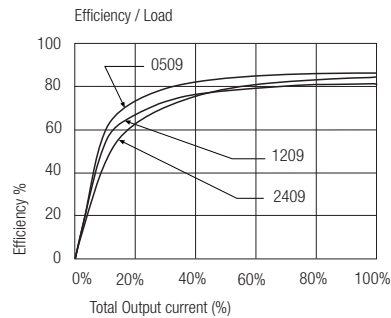
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

#### Typical Characteristics

### RTS-xx05

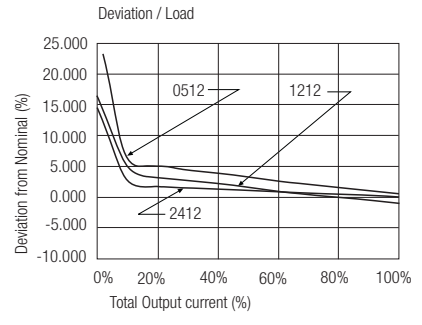
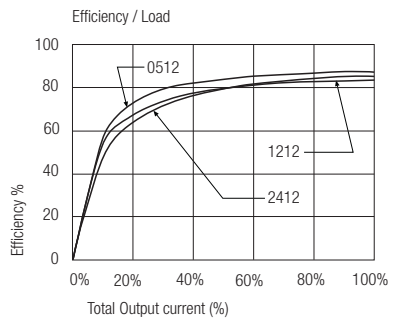


### RTS-xx09

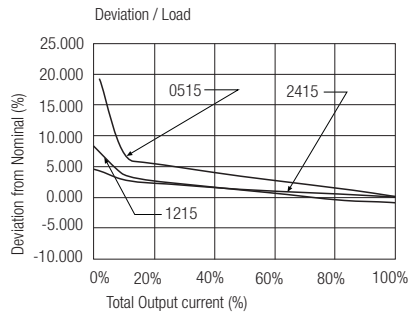
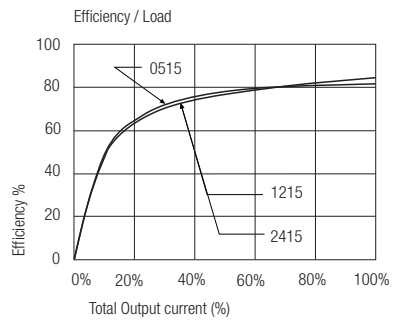


**Typical Characteristics**

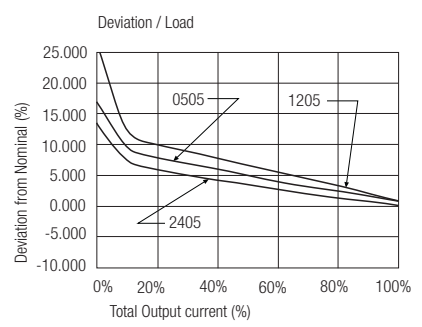
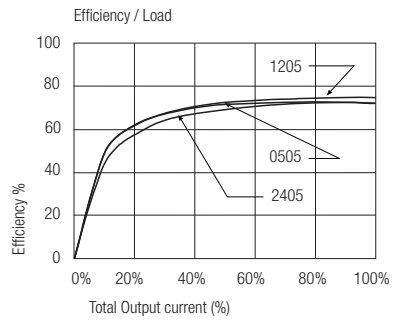
**RTS-xx12**



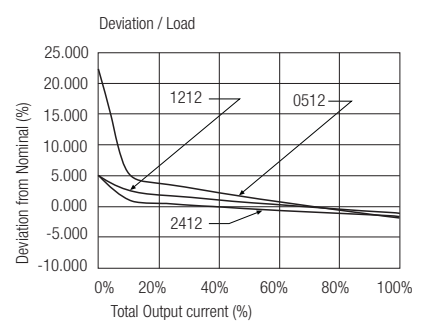
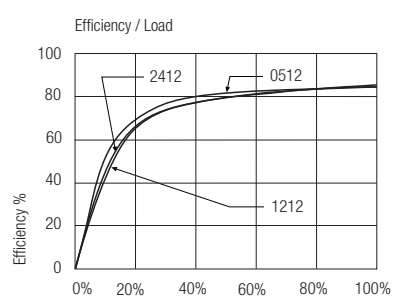
**RTS-xx15**



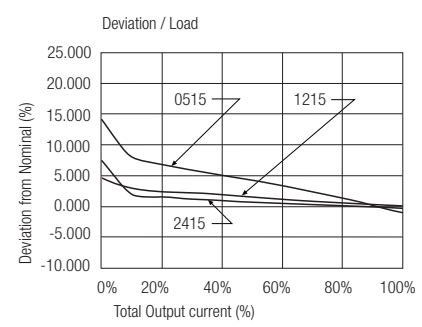
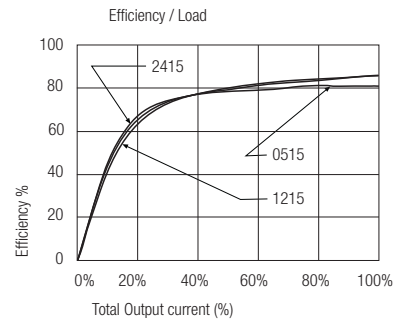
**RTD-xx05**



**RTD-xx12**



**RTD-xx15**



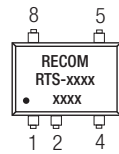
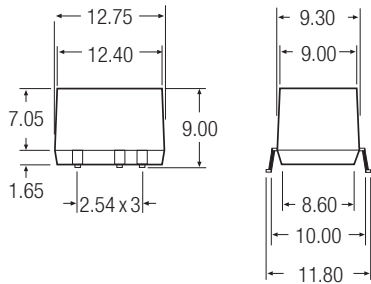
# ECONOLINE

DC/DC-Converter

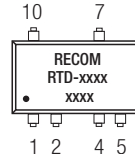
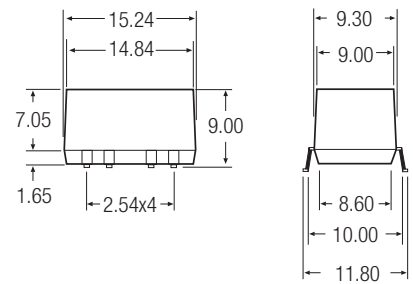
# RTS & RTD Series

## Package Style and Pinning (mm)

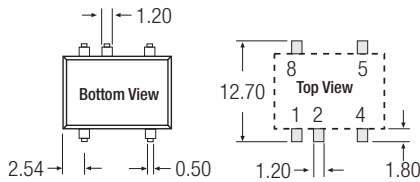
8 PIN Single SMD Package



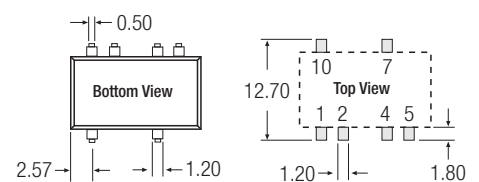
10 PIN Dual SMD Package



Recommended Footprint Details



Recommended Footprint Details



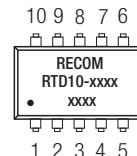
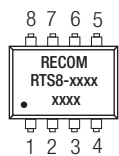
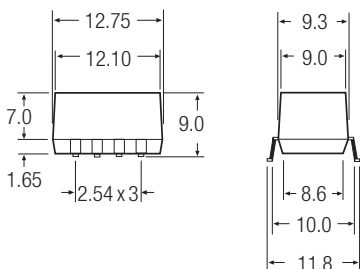
Pin Connections

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

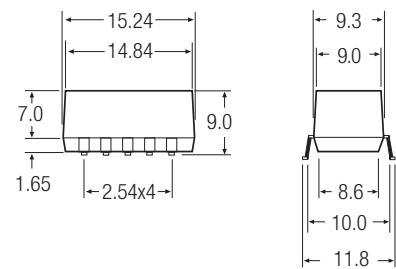
NC = No Connection

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

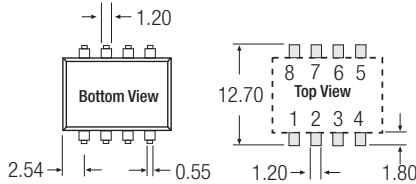
Full 8 PIN Single SMD Package



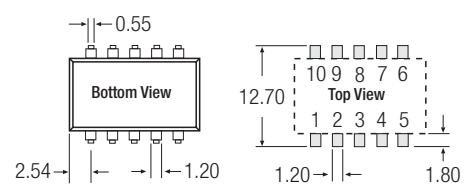
Full 10 PIN Dual SMD Package



Recommended Footprint Details



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

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

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