

# Features

# Unregulated Converters

- 1kVDC/1 second basic isolation
- Optional continuous short circuit protection
- UL94 V-0 package material
- No heat sink required
- Efficiency up to 85%

## RI

**2 Watt**  
**SIP4**  
**Single Output**



EN60950-1 certified  
IEC60950-1 certified

## Description

The RI series has 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 the RO series 1 Watt converters. With efficiencies up to 85%, the full output power is available over the operating temperature range -40°C to +85°C and the converters can be used in ambient temperatures of up to 100°C with derating. The wide selection of input voltage and output voltage options plus an I/O-Isolation of 1kVDC as standard makes these converters suitable for many industrial applications.

## Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [µF]
RI-xx05S <sup>(3)</sup>	5, 12, 15, 24	5	400	78-83	1200
RI-xx12S <sup>(3)</sup>	5, 12, 15, 24	12	167	80-85	680
RI-xx15S <sup>(3)</sup>	5, 12, 15, 24	15	133	80-85	680

### Notes:

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Max Cap Load is tested at nominal input and full resistive load and is defined as the capacitive load that will allow start up in under 1s without damage to the converter

## Model Numbering



### Notes:

Note3: standard part is without Continuous Short Circuit Protection  
add suffix „/P“ for Continuous Short Circuit Protection

### Ordering Examples:

RI-123.3S/P: 12V Input Voltage, 3.3V Output Voltage, Single Output with continuous short circuit protection  
RI-0509S: 5V Input Voltage, 9V Output Voltage, Single Output

**Specifications** (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

**BASIC CHARACTERISTICS**

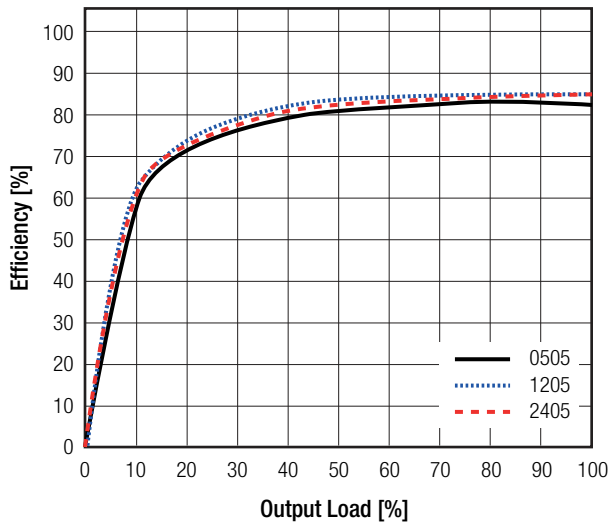
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load <sup>(4)</sup>		0%		
Internal Operating Frequency		20kHz	50kHz	85kHz
Output Ripple and Noise	20MHz BW			200mVp-p

**Notes:**

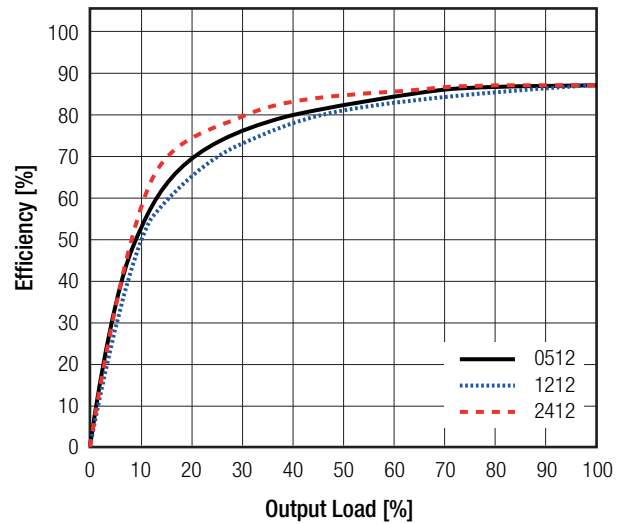
Note4: Operation below 10% load will not harm the converter, but specifications may not be met

**Efficiency vs. Load**

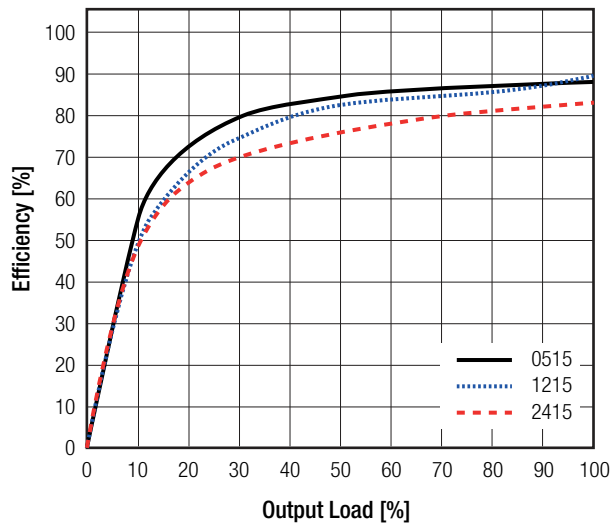
**RI-xx05S**



**RI-xx12S**



**RI-xx15S**

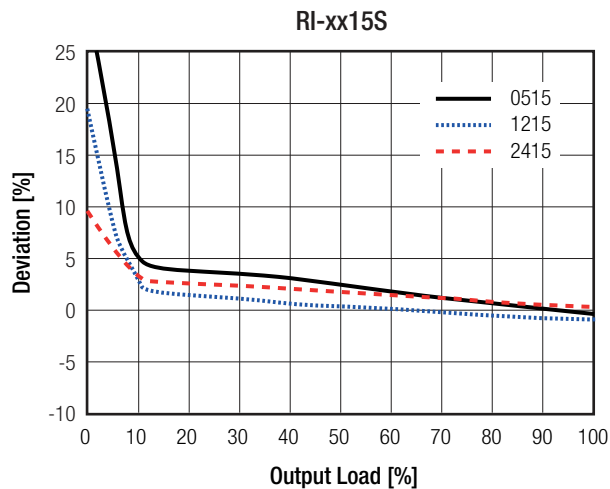
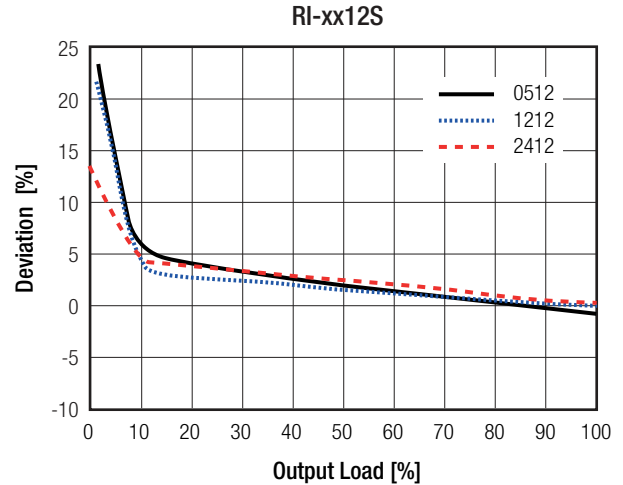
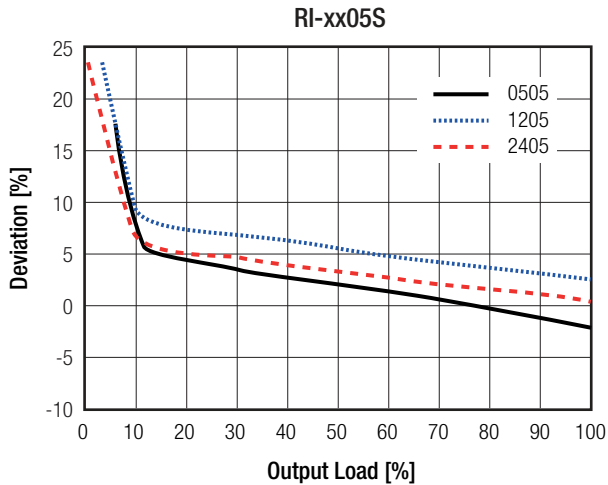


### Specifications (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

#### REGULATIONS

Parameter	Condition		Value
Output Accuracy			±5.0% max.
Line Regulation	low line to high line, full load		±1.2% of 1.0% Vin typ.
Load Regulation	10% to 100% load	5Vout	15.0% max.
		12, 15Vout	10.0% max.

#### Deviation vs. Load



#### PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)	without suffix with suffix "/P"		1 second continuous
Isolation Voltage <sup>(5)</sup>	I/P to O/P	tested for 1 second tested for 1 minute	1kVDC 500VAC/60Hz
Isolation Resistance			10GΩ min.
Isolation Capacitance			30pF min./ 85pF max.
Insulation Grade			basic

#### Notes:

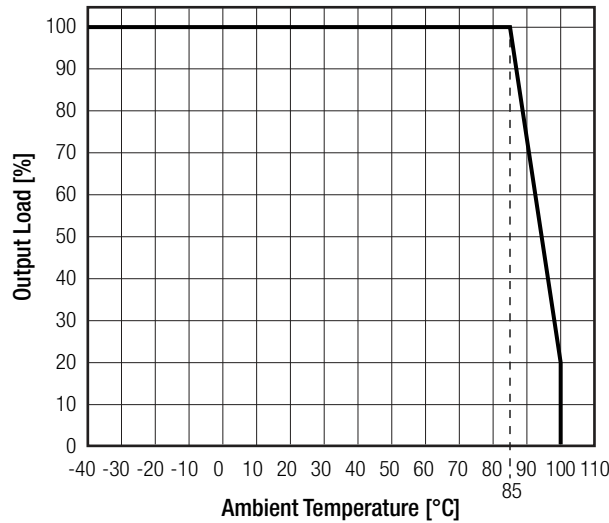
Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note6: Refer to local wiring regulations if input over-current protection is also required. Recommended fuse: T2A slow blow type

**Specifications** (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	full load @ free air convection (see graph)		-40°C to +85°C
Operating Altitude			2000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	17900 x 10 <sup>3</sup> hours
		+85°C	7800 x 10 <sup>3</sup> hours

**Derating Graph**  
(@ free air convection)

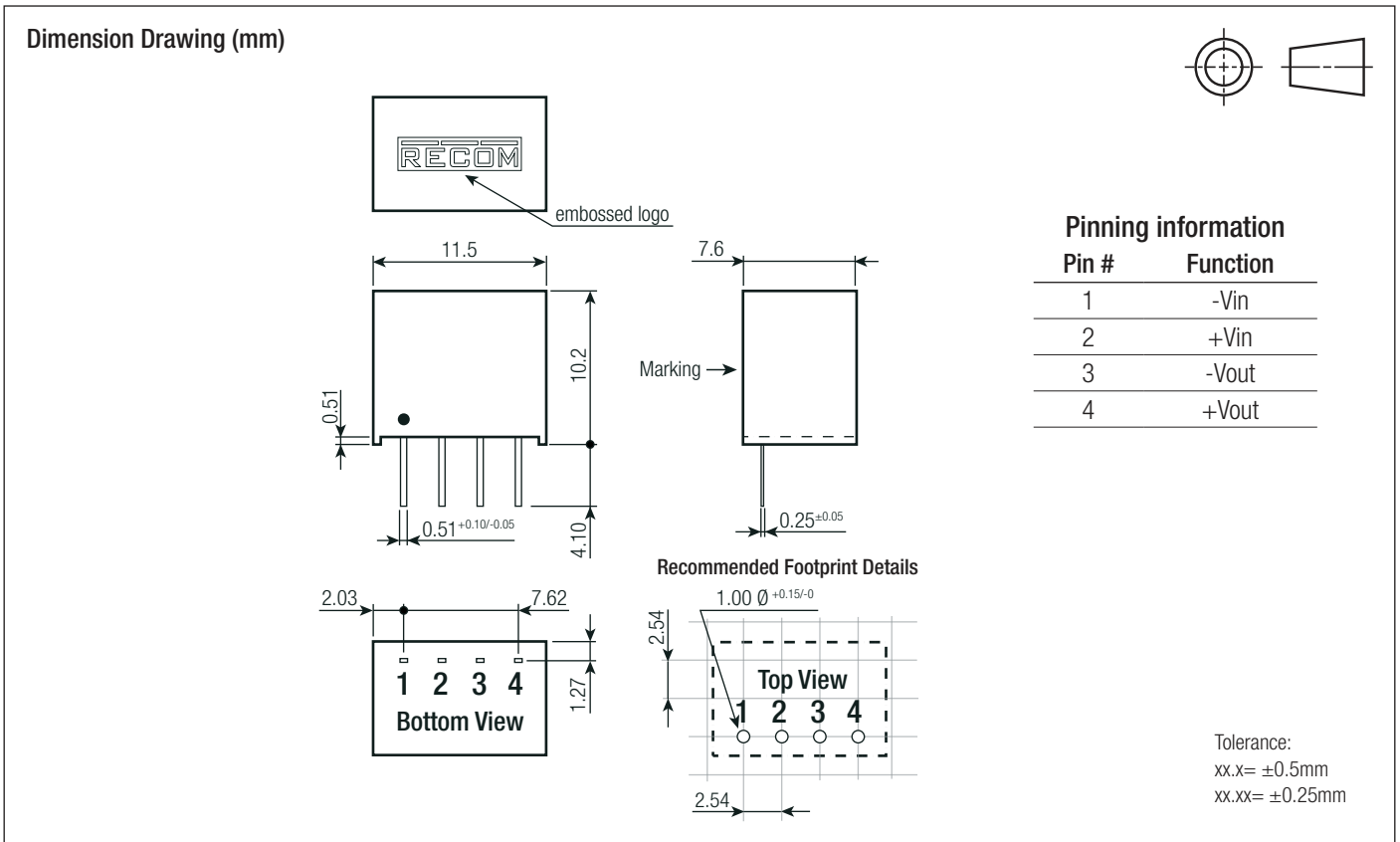


SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	1602031	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

DIMENSION AND PHYSICAL CHARACTERISTICS		
Parameter	Type	Value
Material	case	non-conductive black plastic (UL94 V-1)
	potting	epoxy, (UL94 V-0)
	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		11.5 x 7.6 x 10.2mm
Weight		1.4g typ.

continued on next page

**Specifications** (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)



**PACKAGING INFORMATION**

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 17.7 x 10.4mm
Packaging Quantity		42pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity		95% RH max.

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