

# 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

## 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:

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

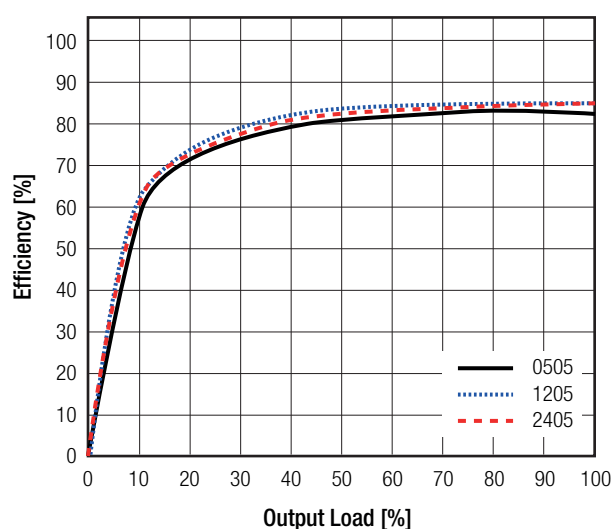
| Parameter                    | Condition | Min.  | Typ.  | Max.     |
|------------------------------|-----------|-------|-------|----------|
| Input Voltage Range          |           |       | ±10%  |          |
| Minimum Load <sup>(4)</sup>  |           | 0%    |       |          |
| Internal Operating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

#### Notes:

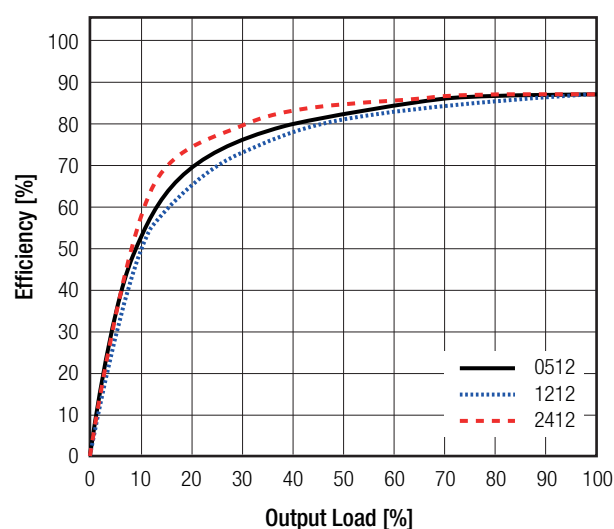
Note4: Operation below 10% load will not harm the converter, but specifications may not be met

### Efficiency vs. Load

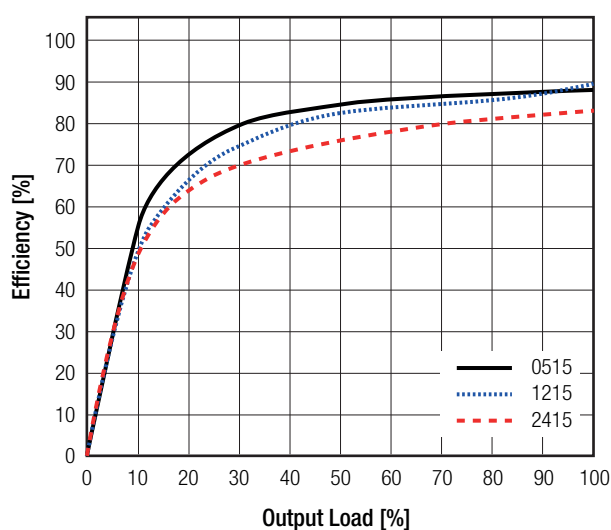
RI-xx05S



RI-xx12S



RI-xx15S

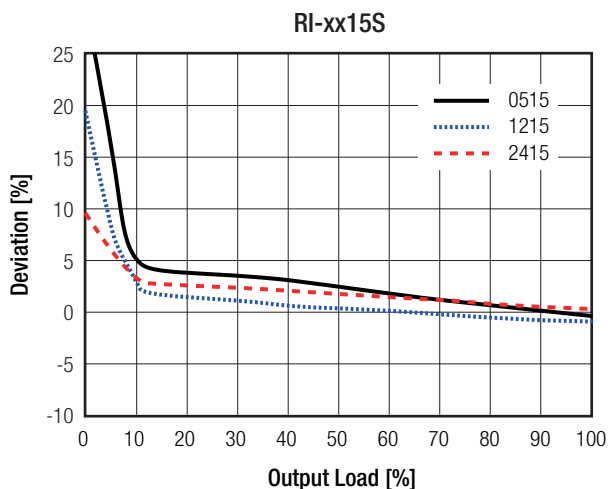
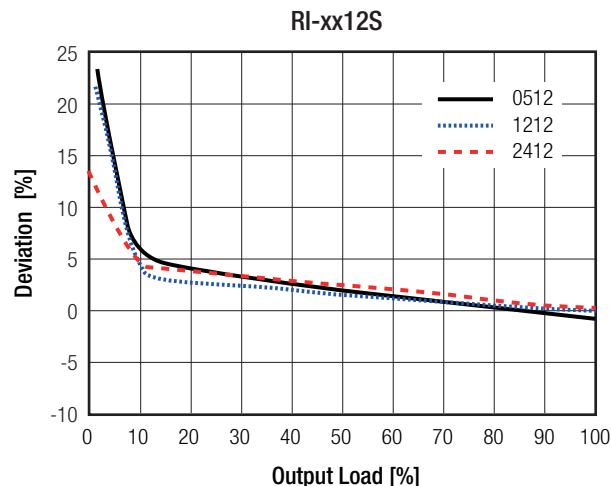
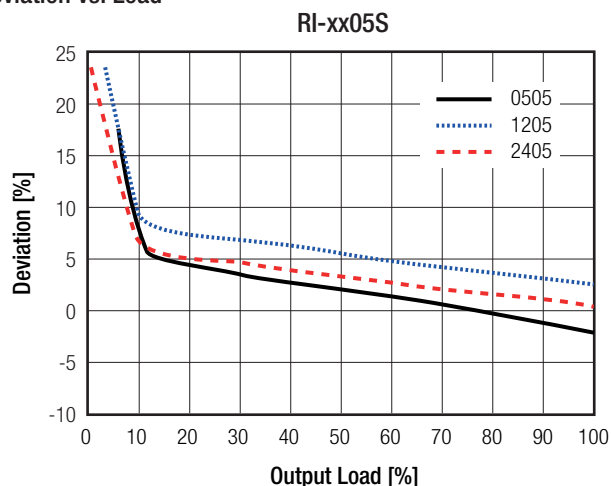


### Specifications (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

#### 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<br>with suffix "/P" |                                            | 1 second<br>continuous |
| Isolation Voltage <sup>(5)</sup> | I/P to O/P                         | tested for 1 second<br>tested for 1 minute | 1kVDC<br>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

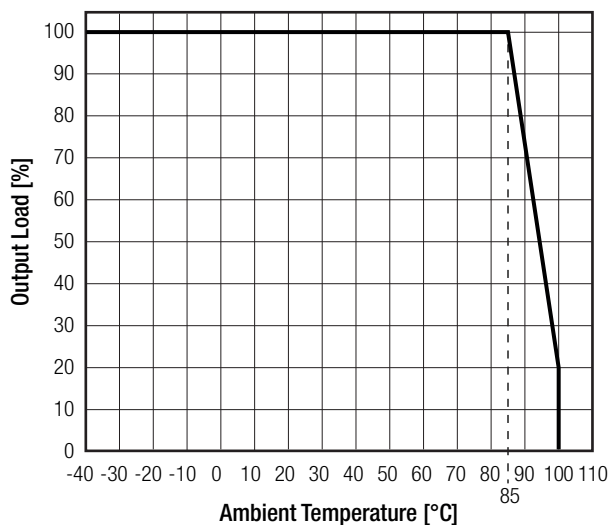
**Specifications** (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

**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<br>EN60950-1:2006 + A2:2013 |
| EAC                                                               | RU-AT.49.09571       | TP TC 004/2011                                                     |
| RoHS2                                                             |                      | RoHS-2011/65/EU + AM-2015/863                                      |

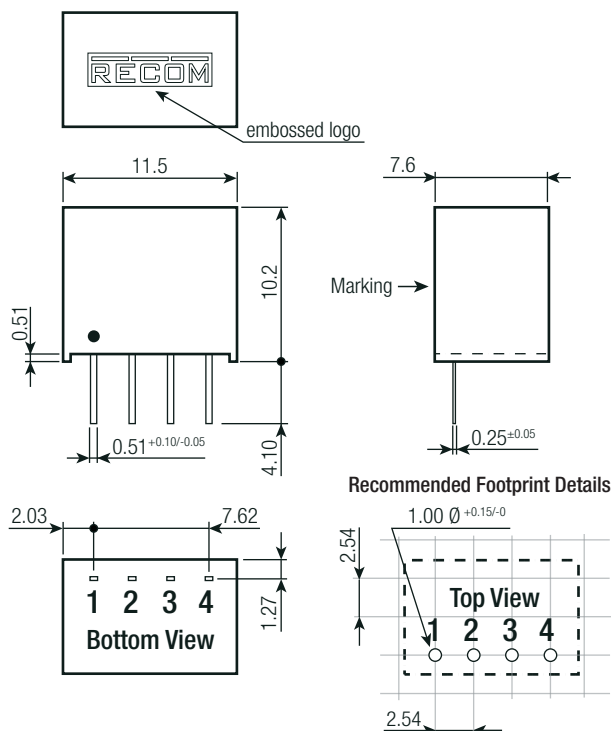
**DIMENSION AND PHYSICAL CHARACTERISTICS**

| Parameter         | Type                   | Value                                                                           |
|-------------------|------------------------|---------------------------------------------------------------------------------|
| Material          | case<br>potting<br>PCB | non-conductive black plastic (UL94 V-1)<br>epoxy, (UL94 V-0)<br>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)

#### Dimension Drawing (mm)



#### Pinning information

| Pin # | Function |
|-------|----------|
| 1     | -Vin     |
| 2     | +Vin     |
| 3     | -Vout    |
| 4     | +Vout    |

Tolerance:  
 xx.x= ±0.5mm  
 xx.xx= ±0.25mm

#### 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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