

# Features

## Unregulated Converters

- 3 Watt in a SIP4 Package
- 1-3kVDC Isolation
- Efficiency up to 90%
- -40°C to +100°C Operating Temperature Range
- IEC/EN/UL60950 Certified
- CB Report
- Industry Standard Pinout

### Description

The RI3 series has been specifically designed for applications where board space is at a premium since these 3 Watt converters have the same foot print as the RI series 2 Watt converters. With efficiencies up to 90%, 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, 2kVDC or 3kVDC makes these converters suitable for many industrial applications.

### Selection Guide

Part Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. @ full load [%]	max. Capacitive Load <sup>(1)</sup> [µF]
RI3-0505S <sup>(2)</sup>	5	5	600	83	2200
RI3-0509S <sup>(2)</sup>	5	9	333	86	1200
RI3-0512S <sup>(2)</sup>	5	12	250	87	1000
RI3-0515S <sup>(2)</sup>	5	15	200	88	820
RI3-1205S <sup>(2)</sup>	12	5	600	85	2000
RI3-1209S <sup>(2)</sup>	12	9	333	88	1200
RI3-1212S <sup>(2)</sup>	12	12	250	89	1000
RI3-1215S <sup>(2)</sup>	12	15	200	89	820
RI3-1505S <sup>(2)</sup>	15	5	600	85	2000
RI3-1509S <sup>(2)</sup>	15	9	333	88	1200
RI3-1512S <sup>(2)</sup>	15	12	250	88	1000
RI3-1515S <sup>(2)</sup>	15	15	200	88	820
RI3-2405S <sup>(2)</sup>	24	5	600	86	2000
RI3-2409S <sup>(2)</sup>	24	9	333	89	1200
RI3-2412S <sup>(2)</sup>	24	12	250	90	1000
RI3-2415S <sup>(2)</sup>	24	15	200	90	820

#### Notes:

Note1: Max. capacitive load is tested at nominal input and constant resistive load.

### Model Numbering



#### Notes:

Note2: add suffix "H2" for 2kVDC/1second or "H3" for 3kVDC/1second isolation. without suffix standard 1kVDC/1second isolation.

#### Examples:

- e.g. RI3-1212S, Single Output, 12Vin and 12Vout, 1kVDC isolation
- e.g. RI3-1212S/H2, Single Output, 12Vin and 12Vout, 2kVDC isolation
- e.g. RI3-1212S/H3, Single Output, 12Vin and 12Vout, 3kVDC isolation

- e.g. RI3-2405S, Single Output, 24Vin and 5Vout, 1kVDC isolation
- e.g. RI3-2405S/H2, Single Output, 24Vin and 5Vout, 2kVDC isolation
- e.g. RI3-2405S/H3, Single Output, 24Vin and 5Vout, 3kVDC isolation

**RECOM**  
DC/DC Converter

## RI3

3 Watt  
SIP4  
Single Output



**RECOM**  
E224736

IEC/EN60950-1 Certified  
UL60950-1 Certified  
CSA C22.2 NO. 60950 Certified  
EN55022

**Specifications** (measured at  $T_a=25^\circ\text{C}$ , nominal input voltage, full load and after warm up unless otherwise specified)

### BASIC CHARACTERISTICS

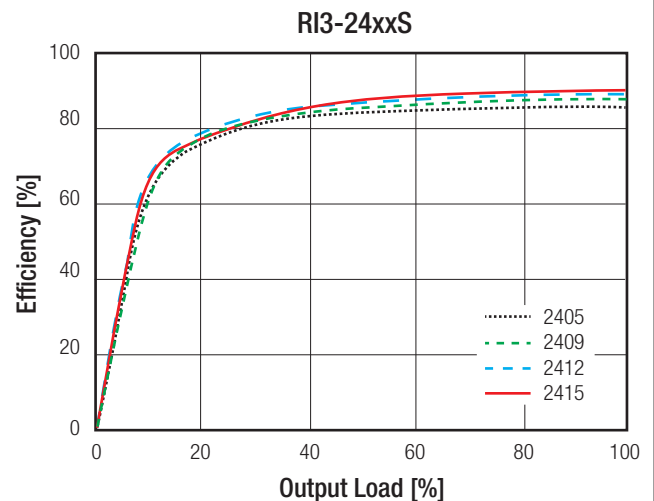
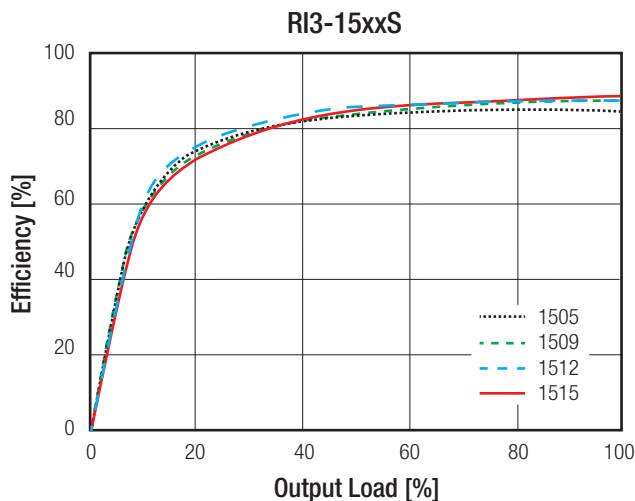
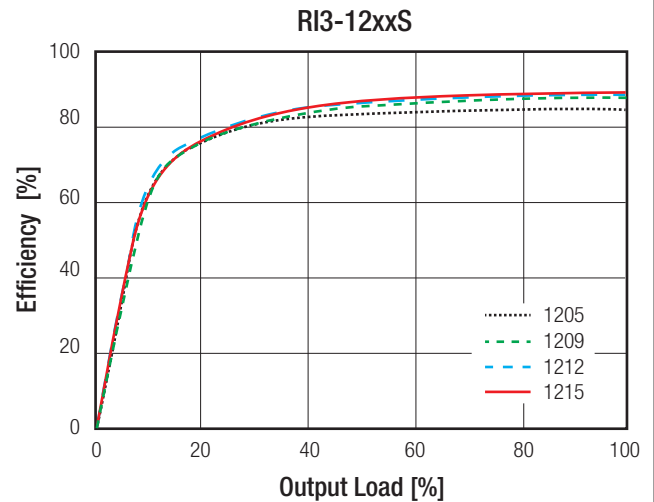
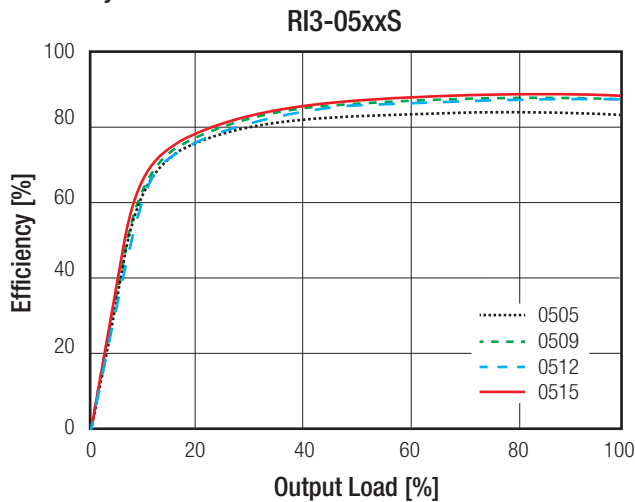
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range		-10%		+10%
Operating Frequency	nominal $V_{in}$	20kHz	40kHz	
Minimum Load <sup>(3)</sup>			0%	
Output Ripple and Noise <sup>(4)</sup>	20MHz BW	50mVp-p	100mVp-p	

#### Notes:

Note3: Operation below no load won't harm the converter, but specifications may not be met.

Note4: Measurements are made with a 100nF MLCC across output. (low ESR).

#### Efficiency vs. Load

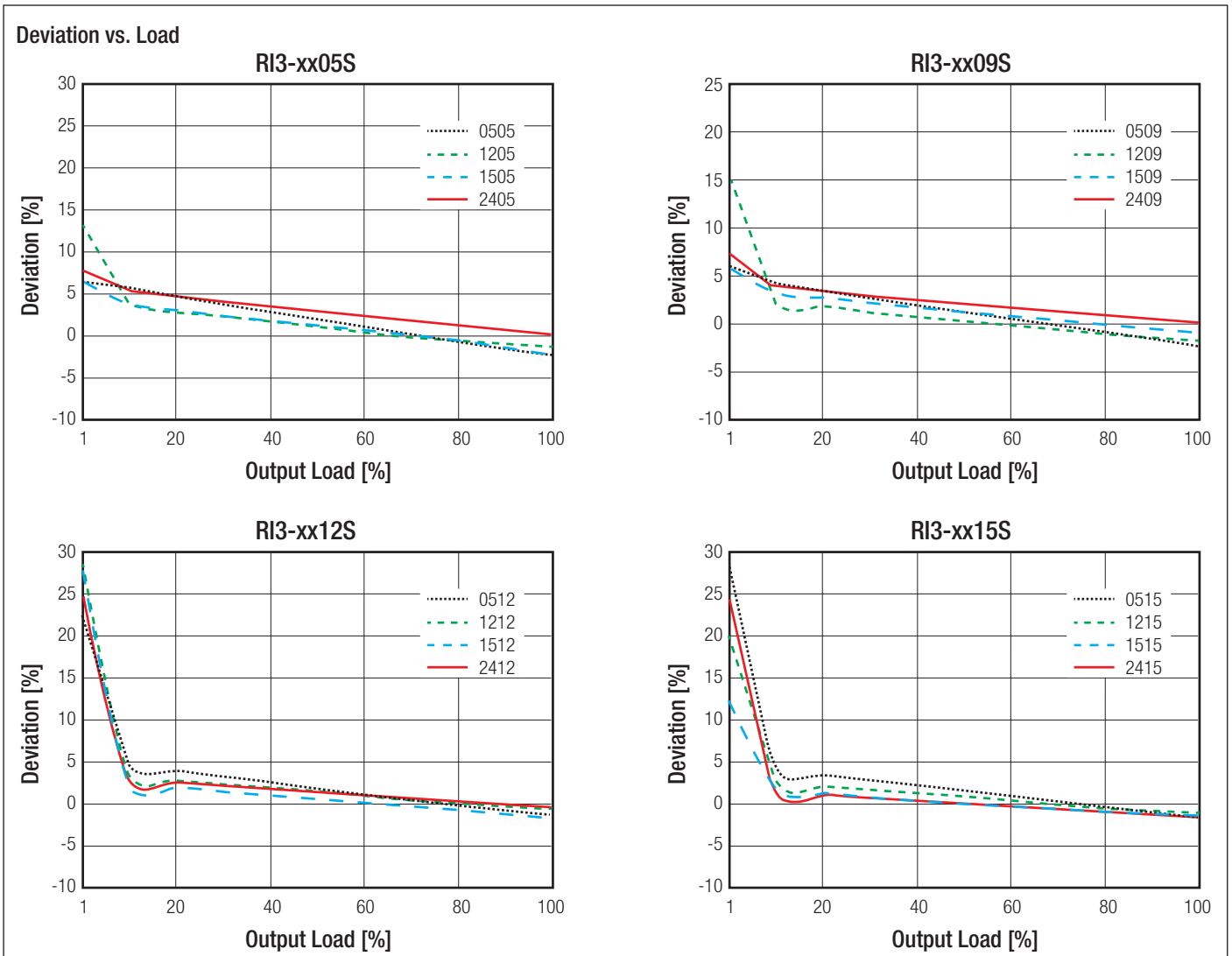


### REGULATIONS

Parameter	Condition	Values
Output Voltage Accuracy	5V <sub>out</sub> all other	3% min. / ±4% typ. 2% min. / ±3% typ.
Line Voltage Regulation	low line to high line, load @1% of $V_{in}$	±1.2% max.
Load Voltage Regulation	10% to 100% load 5V <sub>out</sub> all other	±8% typ. / ±10% max. ±6% typ. / ±10% max.

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Specifications (measured at  $T_a = 25^\circ\text{C}$ , nominal input voltage, full load and after warm up unless otherwise specified)



### PROTECTIONS

Parameter	Condition	Value
Isolation Voltage	standard without suffix with suffix "H2" with suffix "H3"	1kVDC / tested for 1 second 2kVDC / tested for 1 second 3kVDC / tested for 1 second
Isolation Capacitance		37pF typ. / 130pF max.
Isolation Resistance		10GΩ min.

### ENVIRONMENTAL

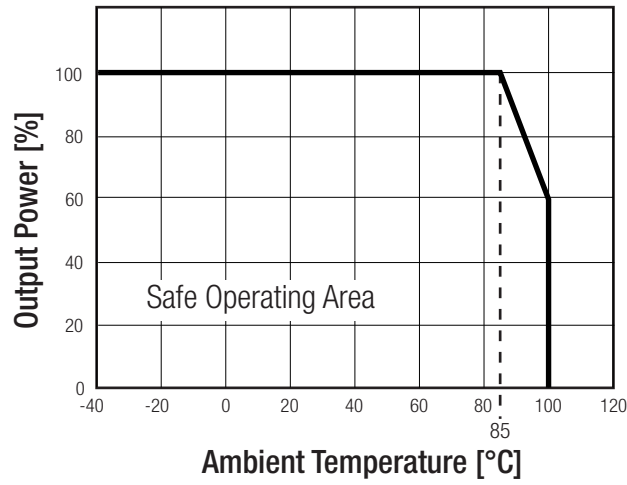
Parameter	Condition	Value
Operating Temperature Range	free air convection, without derating with derating	-40°C to +85°C -40°C to +100°C
Maximum Case Temperature		+115°C
Operating Humidity	non-condensing	5% - 95% RH max.
Vibration		MIL-STD-202G
MTBF	according to MIL-HDBK-217F	+25°C: 4395 x 10 <sup>3</sup> hours +85°C: 1740 x 10 <sup>3</sup> hours

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**Specifications** (measured at  $T_a=25^\circ\text{C}$ , nominal input voltage, full load and after warm up unless otherwise specified)

**Derating Graph**

(@ Chamber and natural convection)



**Notes:**

Note5: For more details, please contact our technical support service at TechsupportAT@recom-power.com.

**SAFETY AND CERTIFICATIONS**

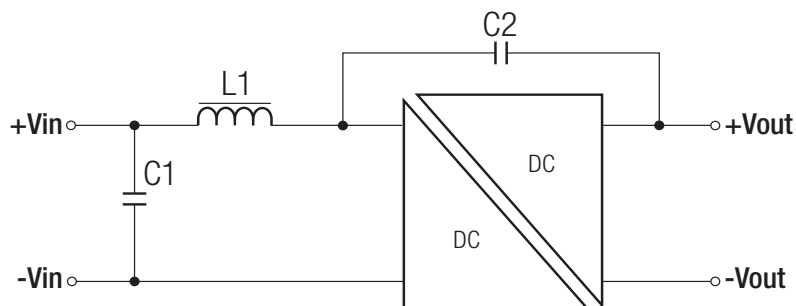
Certificate Type	Report / File Number	Standard
CB General Safety	E224736-A31	IEC60950-1, 2nd Edition, 2013 EN60950-1, 2nd Edition, 2013
UL General Safety	E224736-A32	UL60950-1, 2nd Edition, 2014
CAN/CSA General Safety		C22.2 No. 60950-1-07, 2nd Edition, 2014

EMC Compliance	Condition	Standard / Criterion
EMI <sup>(6)</sup>		EN55022, Class B

**Notes:**

Note6: RI3 Series can meet EN55022 Class A without any external filter.

**EMC Filtering - Suggestions for Class B**

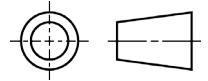
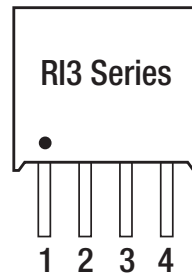
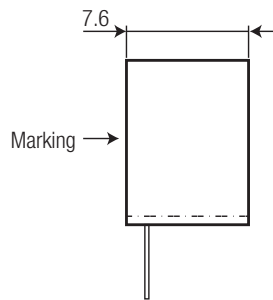
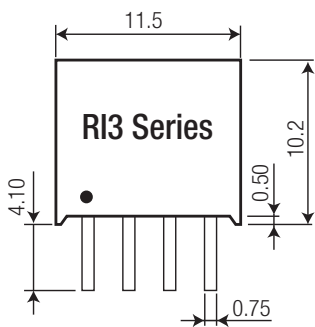


MODEL	C1	C2	L1
RI3-05xxS	4.7 $\mu\text{F}$	470pF/4kV	10 $\mu\text{H}$
RI3-12xxS	4.7 $\mu\text{F}$	470pF/4kV	10 $\mu\text{H}$
RI3-15xxS RI3-24xxS	2.2 $\mu\text{F}$	470pF/4kV	10 $\mu\text{H}$

**Specifications** (measured at  $T_a=25^{\circ}\text{C}$ , nominal input voltage, full load and after warm up unless otherwise specified)

DIMENSION and PHYSICAL CHARACTERISTICS		
Parameter	Type	Value
Material	Case Potting	non conductive plastic (UL94V-0) silicone (UL94V-0)
Package Dimension (LxWxH)		11.5 x 10.2 x 7.6mm
Package Weight		2.2g

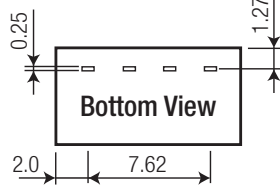
Dimension Drawing (mm)



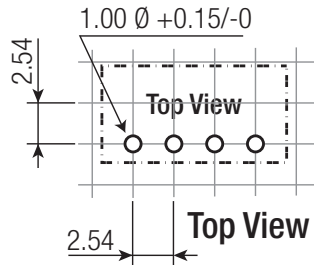
**Pin Connections**

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

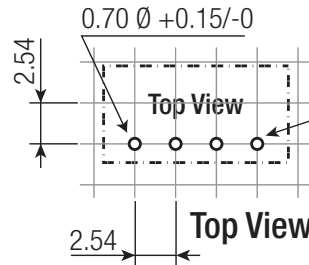
Tolerance: xx.x= ±0.5mm  
 xx.xx= ±0.35mm  
 Pin dimension: ±0.05mm  
 Pin pitch: ±0.25mm



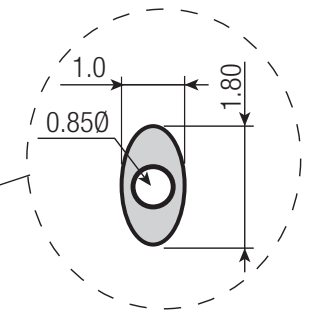
**Recommended Footprint Details for standard and /H2**



**Recommended Footprint Details for /H3**



**solder pad for /H3 models**



PACKAGING INFORMATION		
Packaging Dimension (LxWxH)	Tube	520.0 x 9.3 x 16.5mm
Packaging Quantity		42pcs
Storage Temperature Range		-55°C to +125°C

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