

# Features

- 1W Power in SMD package
- Pin compatible with R1S series
- -40°C to +100°C operating temperature @ full load
- High 3kVDC/1 second or 1kVDC/1 second isolation
- IEC/EN/UL62368-1 certified, CB Report
- 5000m operation

# Unregulated Converters

## Description

Low cost, low profile, open-frame 1W SMD isolated DC/DC single output converters. The R1SX is available with 3.3V or 5V inputs and offers a single unregulated 3.3V or 5V output. There is no minimum load requirement and the quiescent consumption is less than 150mW. Standard isolation is 1kVDC/1s and a /H version with 3kVDC/1s is available. The operating temperature is from -40°C up to +100°C without derating. The pin-out is industry standard and compatible with the R1S/R1D series, but at half the height. The converters are fully certified to IEC/EN/UL62368 and IEC/EN/UL60950 and are 10/10 RoHS-conform. Class A EMC conformity requires only an input capacitor and a simple low cost LC filter is all that is needed for Class B EMC. Standard packaging is tape and reel.

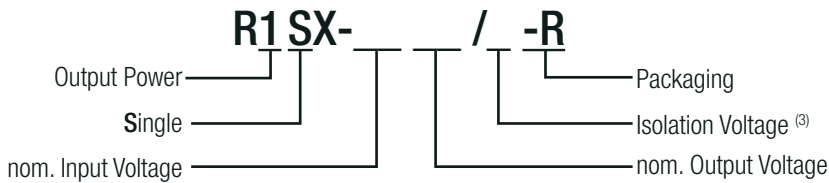
## Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [µF]
R1SX-3.33.3	3.3	3.3	303	74	2200
R1SX-3.305	3.3	5	200	78	2200
R1SX-0505	5	5	200	78	2200

### 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

## Model Numbering



### Notes:

- Note3: without suffix, standard isolation voltage (1kVDC/1 second)  
 with suffix „/H“, high isolation voltage (3kVDC/1 second)

### Ordering Examples:

R1SX-3.305-R	3.3Vin	5Vout	1kVDC/1 second isolation	tape and reel packaging
R1SX-0505/H-R	5Vin	5Vout	3kVDC/1 second isolation	tape and reel packaging

**RECOM**  
DC/DC Converter

## R1SX

1 Watt  
SMD  
Single Output



**UL**  
E224736

- IEC/EN62368-1 certified
- UL62368-1 certified
- IEC/EN60950-1 certified
- C22.2 No. 62368-1-14 certified
- CB Report
- EN55032 compliant
- EN55024 compliant



[www.recom-power.com/eval-ref-boards](http://www.recom-power.com/eval-ref-boards)

Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

### BASIC CHARACTERISTICS

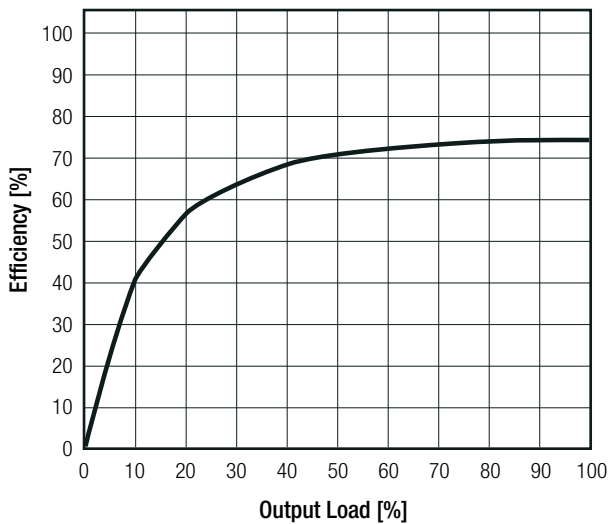
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitor
Input Voltage Range			±10.0%	
Quiescent Current				40mA
Minimum Load		0%		
Internal Operating Frequency		20kHz	60kHz	100kHz
Output Ripple and Noise <sup>(4)</sup>	20MHz BW			100mVp-p

**Notes:**

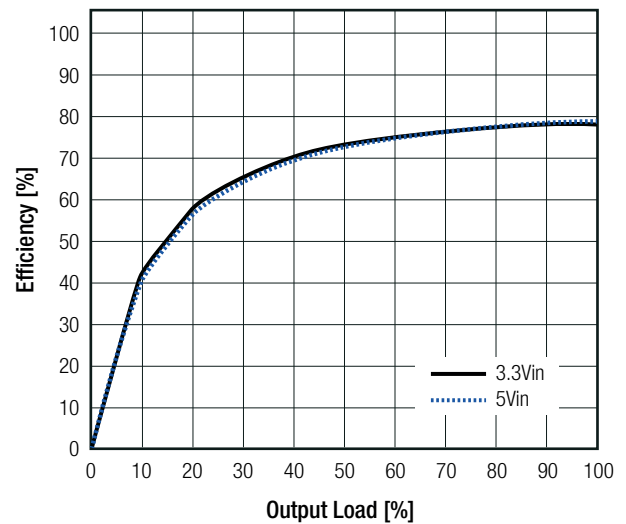
Note4: Measurements are made with a 0.1µF MLCC across output (low ESR)

### Efficiency vs. Load

R1SX-3.33.3(/H)



R1SX-xx05(/H)

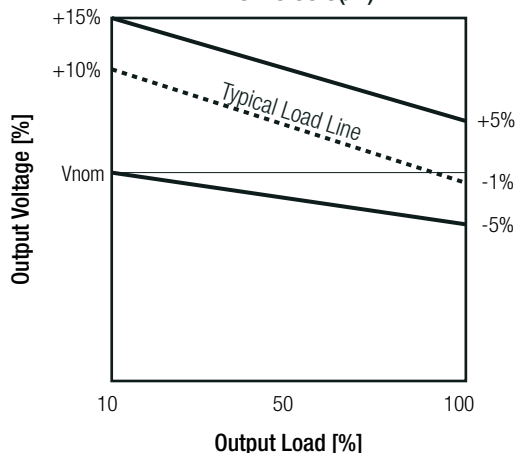


### REGULATIONS

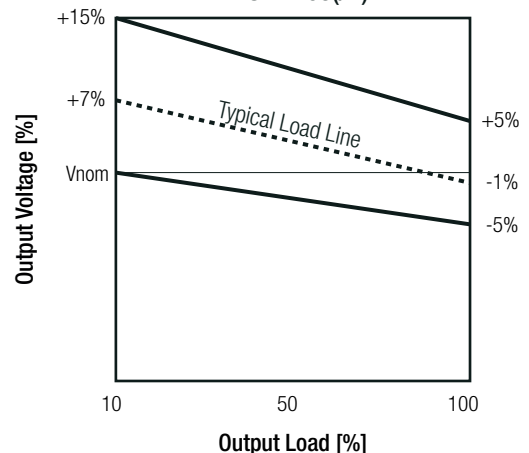
Parameter	Condition	Value
Output Accuracy		±5.0% max.
Line Regulation	low line to high line	±1.2% typ. at 1.0% of Vin typ.
Load Regulation	10% to 100% load	3.3Vout: 10.0% typ. / 15.0% max. 5Vout: 7.0% typ. / 15.0% max.

### Tolerance Envelope

R1SX-3.33.3(/H)



R1SX-xx05(/H)



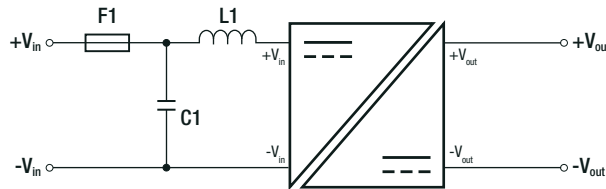
**Specifications** (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

PROTECTIONS			
Parameter	Type		Value
Isolation Voltage	I/P to O/P	standard	tested for 1 second rated for 1 minute <sup>(5)</sup> 1kVDC 500VAC
		with suffix "/H"	tested for 1 second rated for 1 minute <sup>(5)</sup> 3kVDC 1.5kVAC
Isolation Resistance			10GΩ min.
Isolation Capacitance			70pF max.
Leakage Current	standard		1μA max.
	with suffix "/H"		3μA max.
Insulation Grade			functional

**Notes:**

- Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage  
 Note6: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

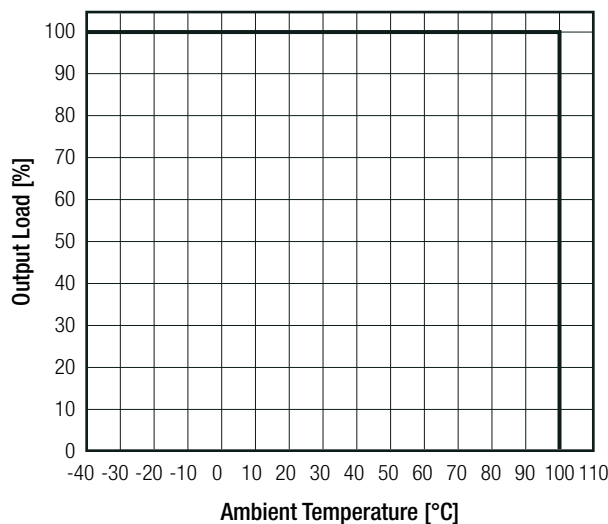
**Protection Circuit**



ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	@ natural convection and full load (refer to derating graph)		-40°C to +100°C
Operating Altitude			5000m
Operating Humidity	non-condensing		5% - 95% RH max.
Pollution Degree			PD2
Vibration			according to MIL-STD-202G
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	21400 x 10 <sup>3</sup> hours
		+100°C	7800 x 10 <sup>3</sup> hours

**Derating Graph**

(@ Chamber and natural convection 0.1m/s)



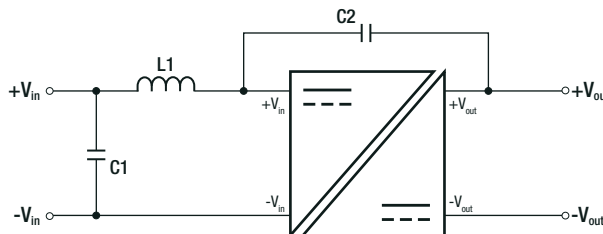
**Specifications** (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

### SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E224736	UL60950-1, 2nd Edition 2014 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition 2014
Information Technology Equipment, General Requirements for Safety (CB Scheme)	E224736-4788277362-2	IEC60950-1:2005 2nd Edition + A2:2013
Information Technology Equipment, General Requirements for Safety		EN60950-1:2006 + A2:2013
Audio/video, information and communication technology equipment - Safety requirements (LVD)	E224736	UL62368, 2nd Edition, 2014 CAN/CSA -C22.2 No. 62368-1-14, 2nd Edition, 2014
Audio/video, information and communication technology equipment - Safety requirements	E224736-4788277362-1	EN62368-1:2014 + A11:2017
Audio/video, information and communication technology equipment - Safety requirements (CB Scheme)		IEC62368-1:2014 2nd Edition
RoHS2+		RoHS 2011/65/EU + AM2015/863

EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external filter (see filter suggestion)	EN55032:2015, Class A and B
Information technology equipment - Immunity characteristics Limits and methods of measurement		EN55024:2010 +A1:2015
ESD Electrostatic discharge immunity test	Air: ±2, 4, 6, 8kV Contact: ±2, 4kV	IEC61000-4-2:2008, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	3 V/m	IEC61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	±0.5kV	IEC61000-4-4:2012, Criteria A
Surge Immunity	±0.5kV	IEC61000-4-5:2014, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	3V r.m.s.	IEC61000-4-6:2013, Criteria A
Power Magnetic Field Immunity	50Hz / 1A/m	IEC61000-4-8:2009, Criteria A

### EMC Filtering Suggestions for EN55032



Component List Class A			
Model	C1	C2	L1
R1SX-3.3xxS	22µF MLCC	470pF/4kVDC	N/A
R1SX-05xxS			

Component List Class B			
Model	C1	C2	L1
R1SX-3.3xxS	22µF MLCC	470pF/4kVDC	3.3µH SMD Inductor
R1SX-05xxS			10µF MLCC

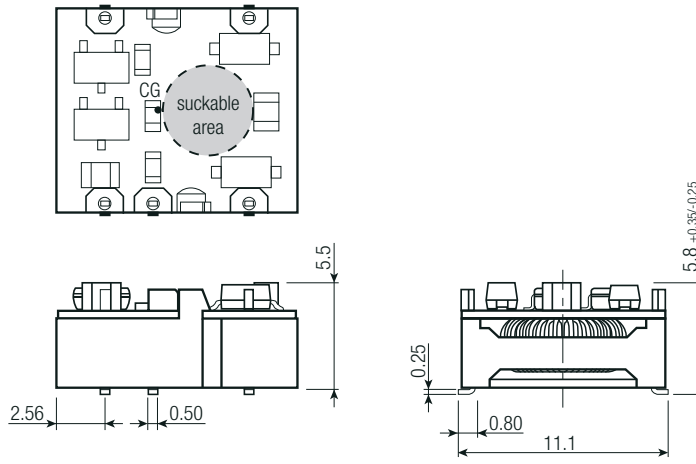
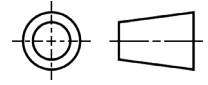
### DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case PCB	black plastic (UL94V-0) FR4 (UL94V-0)
Dimension (LxWxH)		12.75 x 11.10 x 5.80mm
Weight		1.0g typ.

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Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

Dimension Drawing (mm)



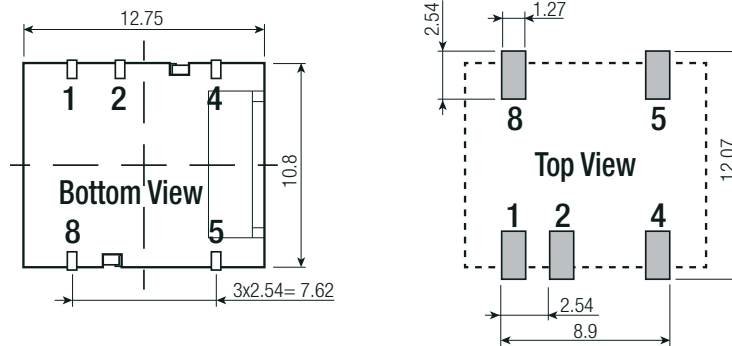
Pin Connection

Pin #	Single
1	-Vin
2	+Vin
4	-Vout
5	+Vout
8	NC

CG= center of gravity  
NC= no connection  
Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.25mm

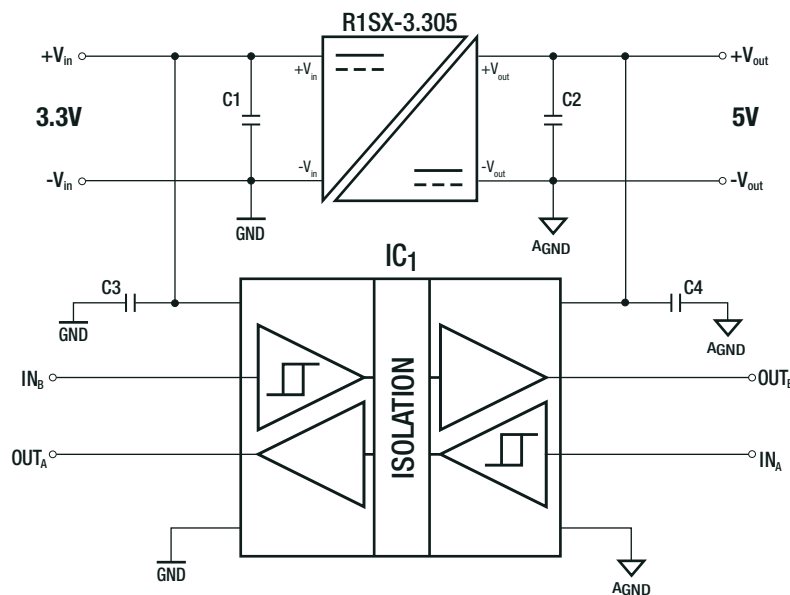
Pin  
Thickness: ±0.05mm  
Length: +0.25/-0.50mm

Recommended Footprint Details



INSTALLATION and APPLICATION

Isolated Bus



Block diagram of an isolated data interface with 3.3V to 5V logic level shifting. Typical Applications include microcontroller interfacing, logic level translation and multi-channel test and measurement systems.

**Specifications** (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

PACKAGING INFORMATION		
Packaging Dimension (LxWxH)	tape and reel (carton) reel	355.0 x 340.0 x 35.0mm 330.2 x 330.2 x 30.0mm
Packaging Quantity	tape and reel	450pcs
Tape Width		24.0mm
Storage Temperature Range		-55°C to +125°C
Storage Humidity		5% - 95% RH max.

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