

# Features

# Unregulated Converters

- 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

# RECOM

## DC/DC Converter

# R1SX

# 1 Watt SMD Single Output



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

## 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.

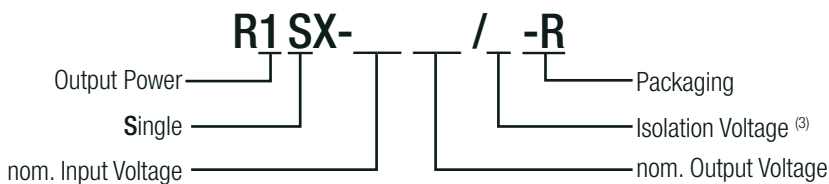
## Selection Guide

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
R1SX-1205	12	5	200	79	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



[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

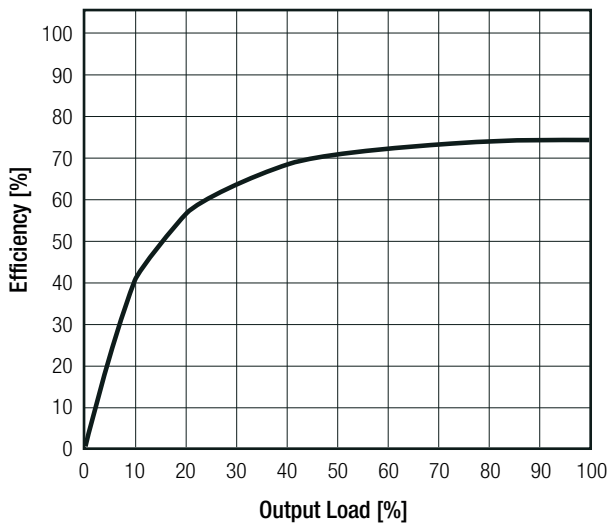
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitor
Input Voltage Range			±10.0%	
Quiescent Current				40mA
Minimum Load		0%		
Internal Operating Frequency		20kHz	60kHz	100kHz
Output Ripple and Noise <sup>(4)</sup>	20MHz BW			100mVp-p

**Notes:**

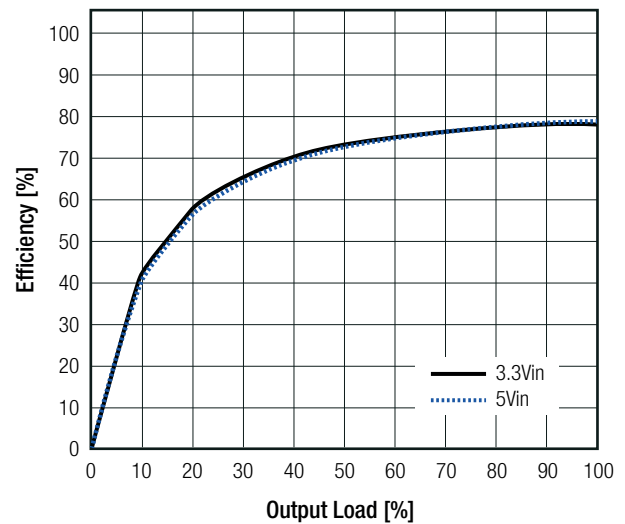
Note4: Measurements are made with a 0.1µF MLCC across output (low ESR)

### Efficiency vs. Load

R1SX-3.33.3(/H)



R1SX-xx05(/H)

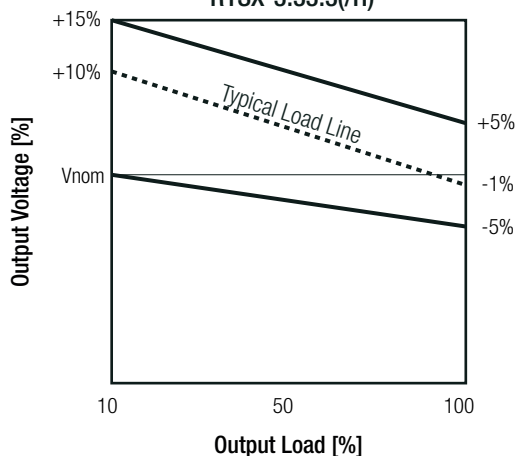


### REGULATIONS

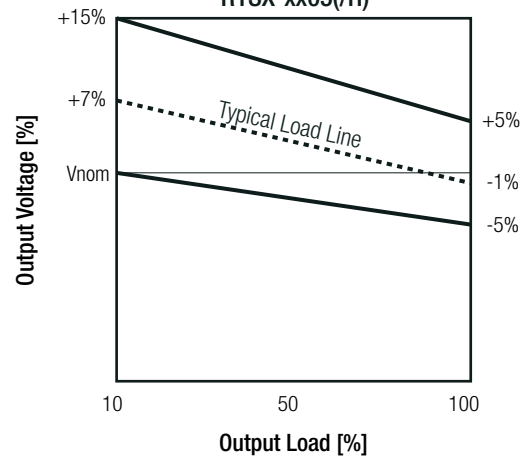
Parameter	Condition	Value
Output Accuracy		±5.0% max.
Line Regulation	low line to high line	±1.2% typ. at 1.0% of Vin typ.
Load Regulation	10% to 100% load	3.3Vout: 10.0% typ. / 15.0% max. 5Vout: 7.0% typ. / 15.0% max.

### Tolerance Envelope

R1SX-3.33.3(/H)



R1SX-xx05(/H)



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

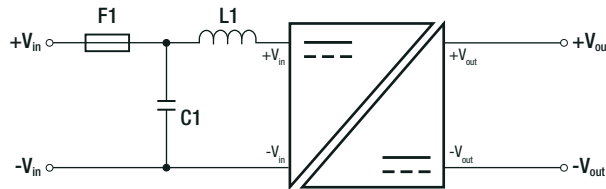
**PROTECTIONS**

Parameter	Type		Value
	I/P to O/P		
Isolation Voltage	I/P to O/P	standard	1kVDC 500VAC
		with suffix "/H"	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**

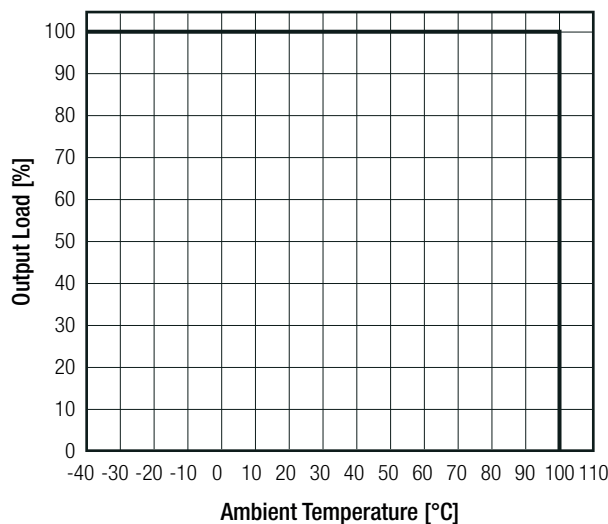


**ENVIRONMENTAL**

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)



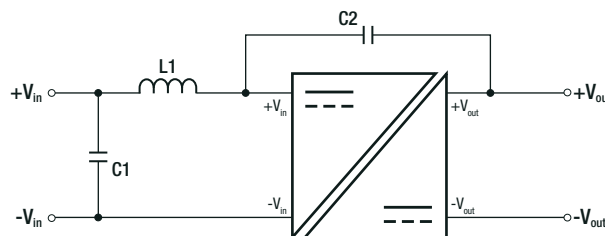
**Specifications** (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

### 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

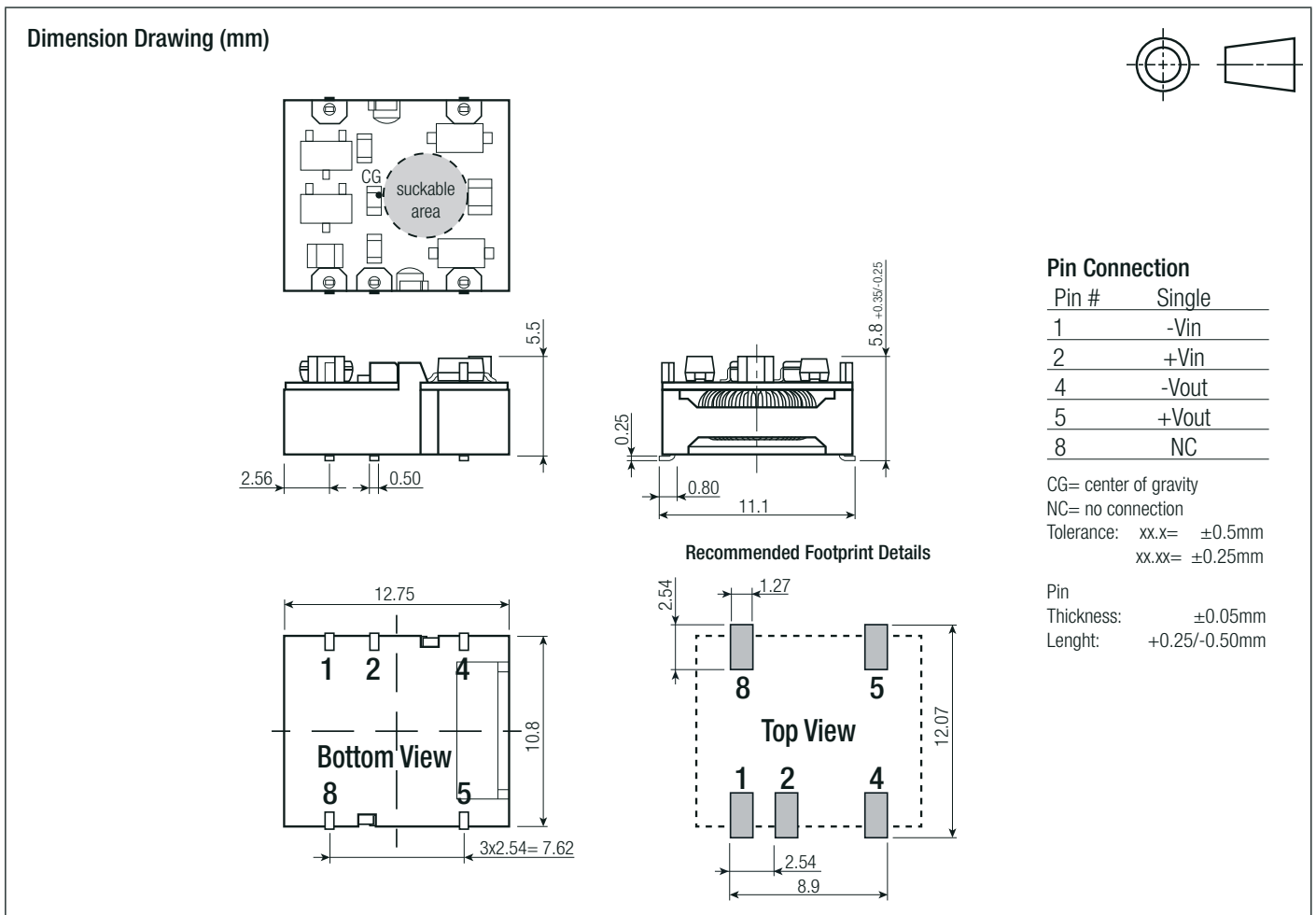
Model	C1	C2	L1
R1SX-3.3xxS	22µF MLCC	470pF/4kVDC	3.3µH SMD Inductor
R1SX-05xxS			4.7µH SMD Inductor
R1SX-12xxS	4.7µF MLCC		22µH SMD Inductor

### 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.

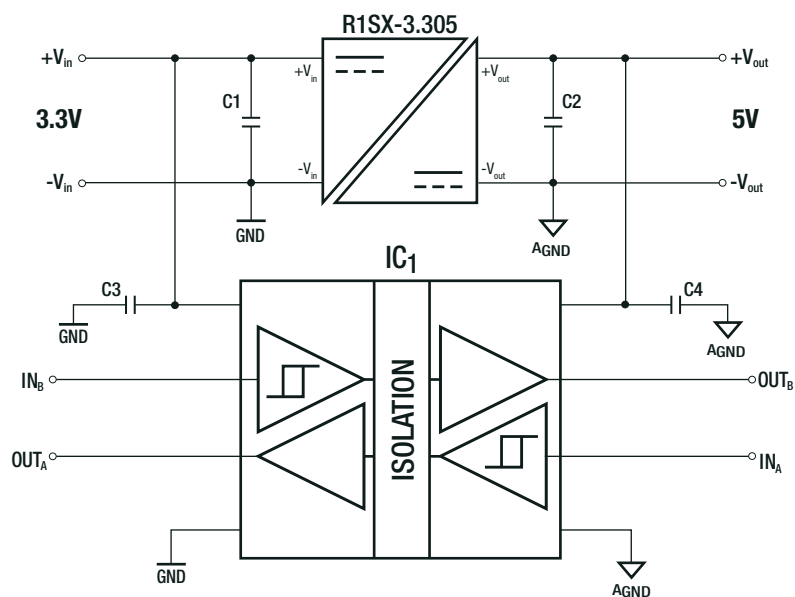
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Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)



## 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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