

# 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

# Unregulated Converters

## Description

The R1SX is a low cost, 1W, low profile, open-frame, SMD isolated DC/DC converter. It 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. Isolation is 1kVDC or 3kVDC and the operating temperature is -40°C up to +100°C (without derating). The pin-out is industry standard and compatible with the R1S series, but at half the height. The converter is fully certified to IEC/EN/UL62368 and 60950 and is 10/10 RoHS-conform. Class B EMC conformity can be reached with a simple external LC filter.

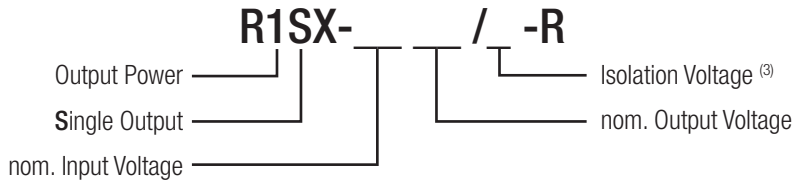
## Selection Guide

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 = nom.Vin= 3.3VDC, nom. Vout= 5VDC, standard 1kVDC/1 second isolation in tape and reel packaging  
 R1SX-0505/H-R = nom.Vin= 5DC, nom. Vout= 5VDC, high 3kVDC/1 second isolation in tape and reel packaging  
 R1SX-3.33.3/H-R = nom. Vin= 3.3VDC, nom. Vout= 3.3VDC, high 3kVDC/1 second isolation in tape and reel packaging

## Specifications (measured @ ta= 25°C, nominal Vin, full load and after warm up unless otherwise specified)

BASIC CHARACTERISTICS				
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitor
Input Voltage Range	nom. Vin= 3.3VDC 5VDC	2.97VDC 4.5VDC	3.3VDC 5VDC	3.63VDC 5.5VDC

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## R1SX

# 1 Watt SMD Single Output



IEC/EN62368-1 Certified  
 UL62368-1 Certified  
 C22.2 No. 62368-1-14 Certified  
 CB Report  
 EN55022 Compliant  
 EN55024 Compliant

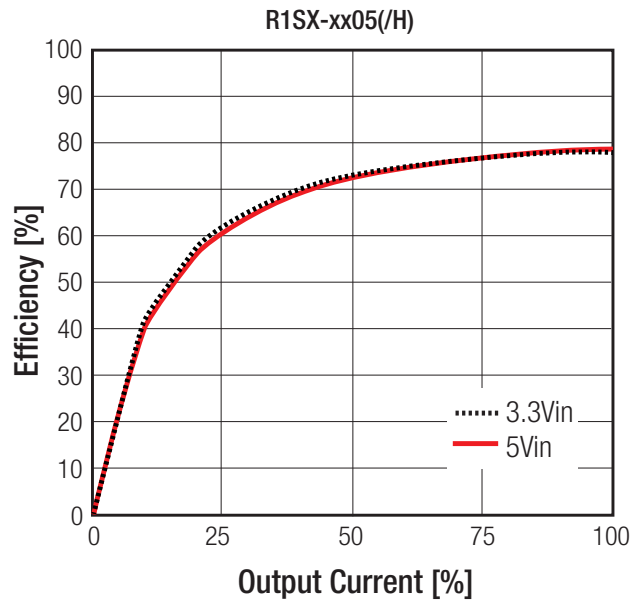
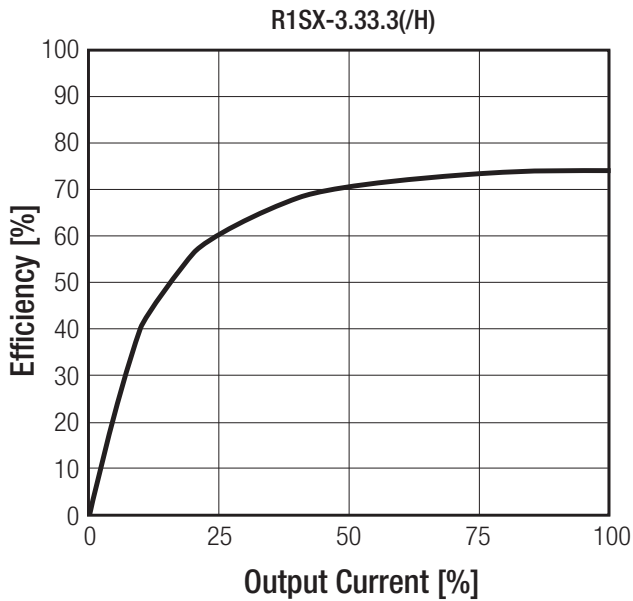
**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load and after warm up unless otherwise specified)

Parameter	Condition	Min.	Typ.	Max.
Quiescent Current			30mA	50mA
Internal Operating Frequency		20kHz	60kHz	100kHz
Minimum Load		0%		
Output Ripple and Noise <sup>(4)</sup>	20MHz BW			100mVp-p

**Notes:**

Note4: Measurements are made with a 0.1 $\mu\text{F}$  MLCC across output. (low ESR).

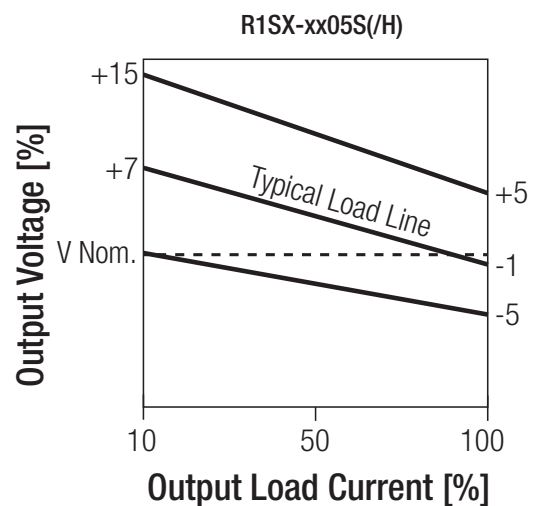
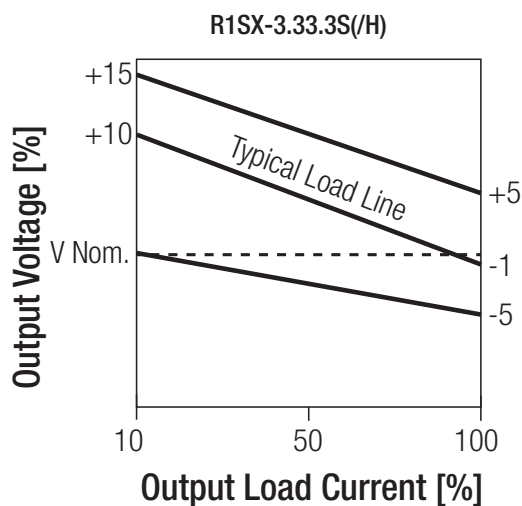
**Efficiency vs. Load**



**REGULATIONS**

Parameter	Condition	Value
Output Accuracy		$\pm 5.0\%$ max.
Line Regulation	low line to high line, full load	$\pm 1.2\%$ typ. at $\pm 1.0\%$ of $V_{in}$ typ.
Load Regulation	10% to 100% load	3.3VDC: $\pm 10.0\%$ typ. / $\pm 15.0\%$ max. 5VDC: $\pm 7.0\%$ typ. / $\pm 15.0\%$ max.

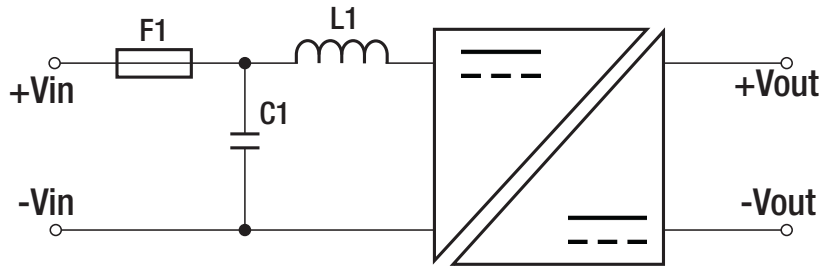
**Tolerance Envelope**



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

PROTECTIONS			
Parameter	Type		Value
Isolation Voltage	I/P to O/P	without suffix	tested for 1 second rated for 1 minute <sup>(6)</sup> 1kVDC 500VAC
	I/P to O/P	with suffix "/H"	tested for 1 second rated for 1 minute <sup>(6)</sup> 3kVDC 1.5kVAC
Isolation Resistance			10GΩ min.
Isolation Capacitance			70pF max.
Insulation Grade			functional

**Protection Circuit**



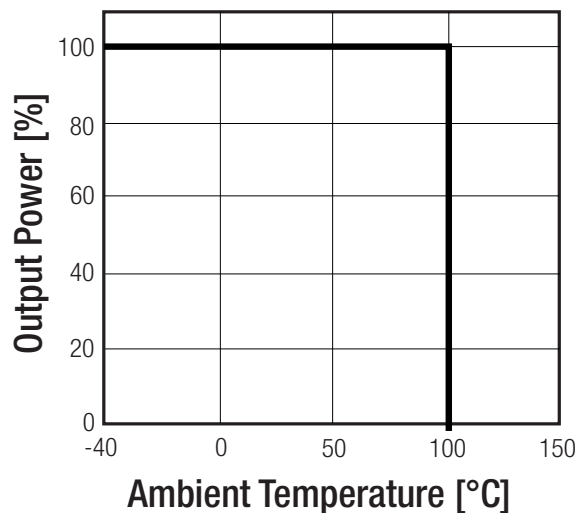
**Notes:**

- Note5: Customers are allowed to test once in their production. Thereafter the test voltage and time must be reduced for any repeat testing
- Note6: An input fuse is required if the mains supply is not over-current protected. Recommended fuse: T1A slow blow type

ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	without derating (see 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)



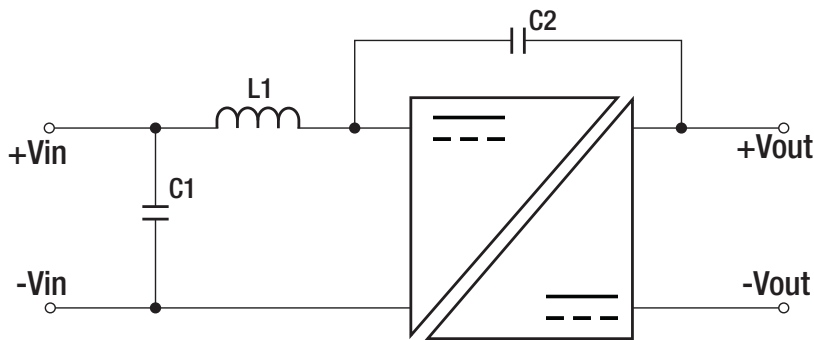
Specifications (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load and after warm up unless otherwise specified)

**SAFETY AND CERTIFICATIONS**

Certificate Type (Safety)	Report / File Number	Standard
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 (CB Scheme)	L0339m29-CB-1-B	IEC62368-1, 2nd Edition, 2014 EN62368-1, 2014
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 below)	EN55022, Class A or B
Information technology equipment - Immunity characteristics Limits and methods of measurement		EN55024, 2010
ESD Electrostatic discharge immunity test	Air $\pm 8\text{kV}$ and Contact $\pm 4\text{kV}$	EN61000-4-2, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	3 V/m	EN61000-4-3, Criteria A
Fast Transient and Burst Immunity	$\pm 0.5\text{kV}$	EN61000-4-4, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	3V	EN61000-4-6, Criteria A
Power Magnetic Field Immunity	50Hz / 1A/m	EN61000-4-8, Criteria A

**EMC Filtering Suggestions for EN55022**



according to EN55022 Class A			
Input Voltage	C1	C2	L1
3.3VDC	22 $\mu\text{F}$ MLCC	470pF/4kVDC	N/A
5VDC			

according to EN55022 Class B			
Input Voltage	C1	C2	L1
3.3VDC	22 $\mu\text{F}$ MLCC	470pF/4kVDC	3.3 $\mu\text{H}$ SMD Inductor
5VDC			10 $\mu\text{F}$ MLCC

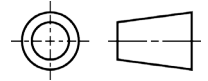
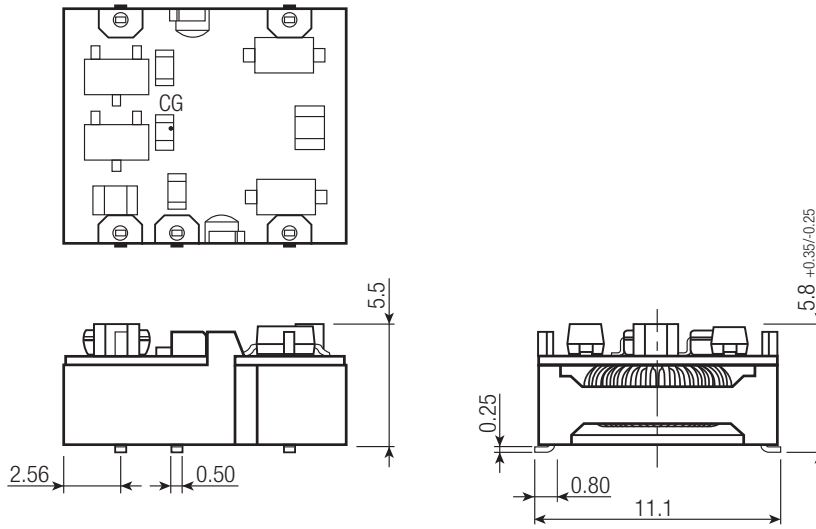
**DIMENSION and PHYSICAL CHARACTERISTICS**

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

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

### Dimension Drawing (mm)



### Pin Connection

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

CG= central gravity

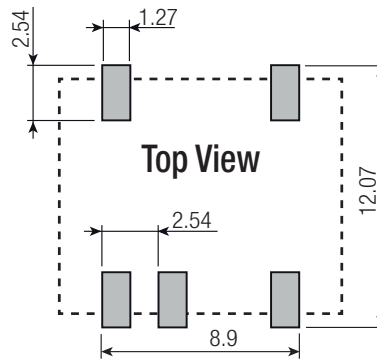
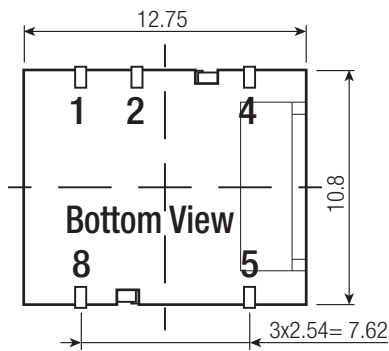
NC= no connection

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

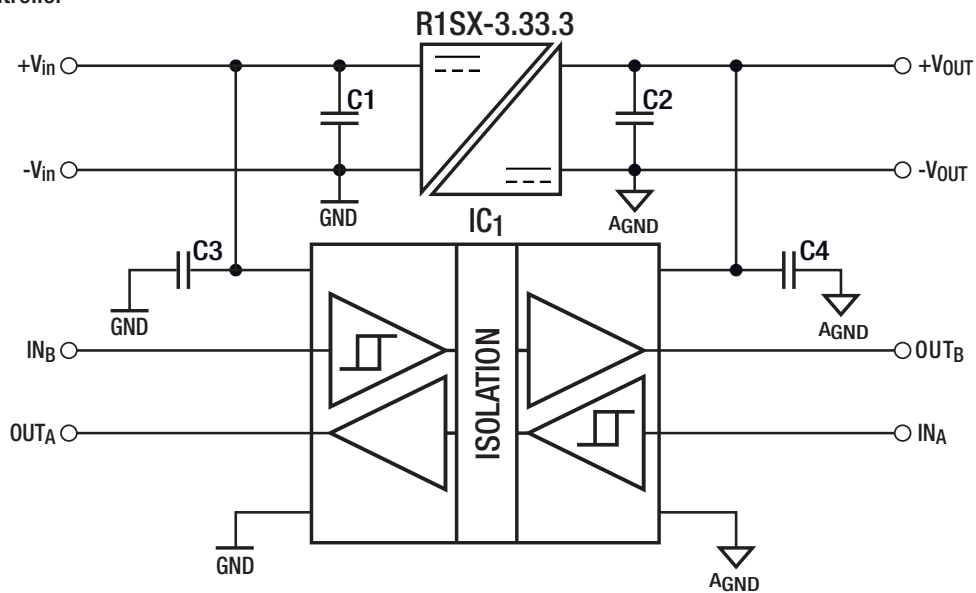
Pin dimension: ±0.1mm

### Recommended Footprint Details



## INSTALLATION and APPLICATION

### Isolated Microcontroller



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

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

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