

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 CB Report (pending)

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.

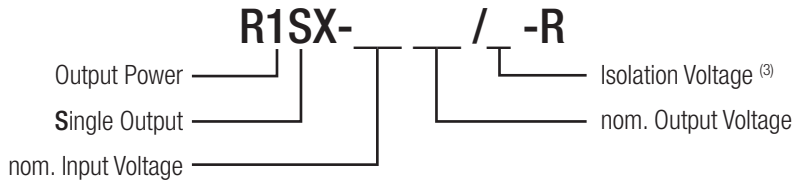
Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	max. Capacitive Load ⁽²⁾ [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 (pending)
 UL62368-1 (pending)
 UL60950-1 (pending)
 CB Report (pending)
 EN55022

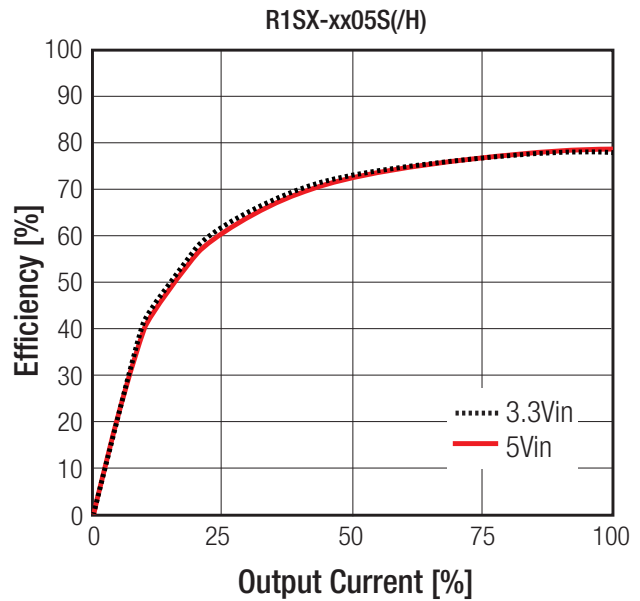
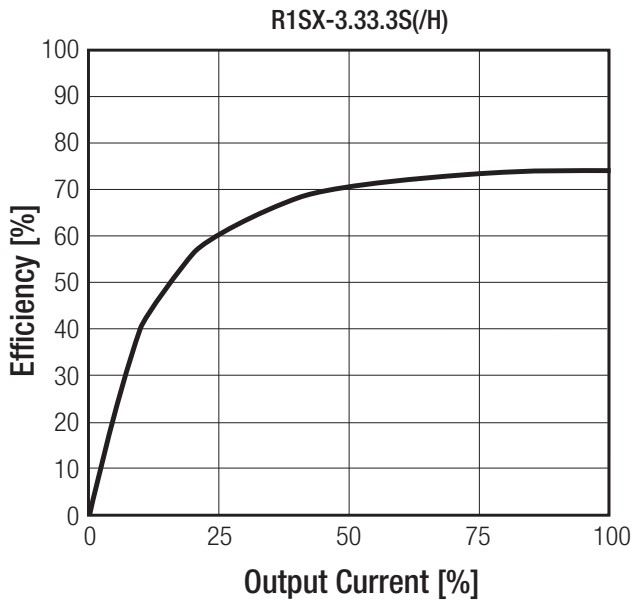
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

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

Notes:

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

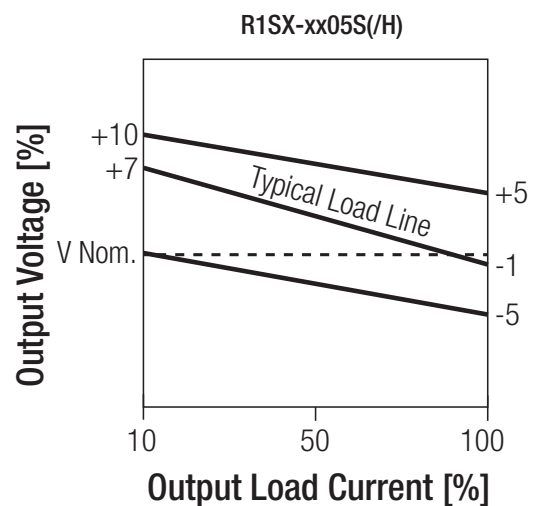
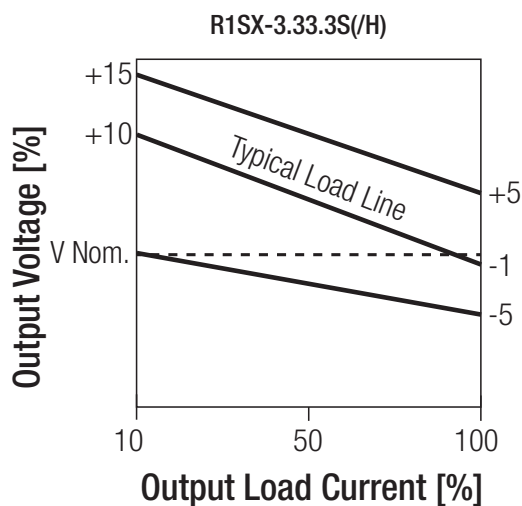
Efficiency vs. Load



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.

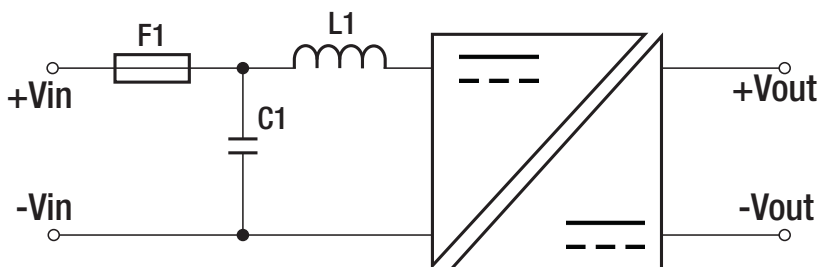
Tolerance Envelope



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 ⁽⁶⁾ 1kVDC 500VAC
	I/P to O/P	with suffix "/H"	tested for 1 second rated for 1 minute ⁽⁶⁾ 3kVDC 1.5kVAC
Isolation Resistance			10G Ω min.
Isolation Capacitance			70pF max.
Insulation Grade			functional

Protection Circuit



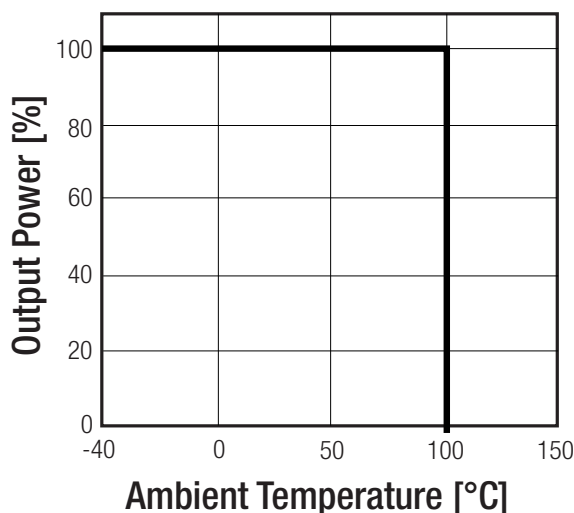
Notes:

- 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 +100°C	21400 x 10 ³ hours 7800 x 10 ³ hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)



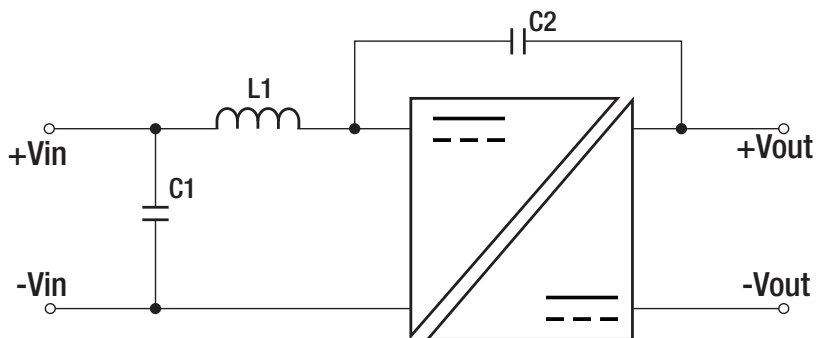
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Audio/video, information and communication technology equipment - Safety requirements (LVD)	(pending)	UL62368, 2nd Edition CAN/CSA -C22.2 No. 62368-1-14, 2nd Edition
Audio/video, information and communication technology equipment - Safety requirements (CB Scheme)	(pending)	IEC62368-1, 2nd Edition, 2014 EN62368-1, 2014
Information Technology Equipment, General Requirements for Safety	(pending)	UL60950-1, 2nd Edition, 2014 CSA/CAN-C22.2 No. 60950-1-07, 2nd Edition, 2014
RoHS2+		RoHS-2011/65/EU + AM2 (10/10)

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
ESD Electrostatic discharge immunity test	Air $\pm 8\text{kV}$ and Contact $\pm 4\text{kV}$	EN61000-4-2, Criteria A
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
Surge Immunity	$\pm 0.5\text{kV}$	EN61000-4-5, 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 μF MLCC	470pF/4kVDC	N/A
5VDC			

according to EN55022 Class B

Input Voltage	C1	C2	L1
3.3VDC	22 μF MLCC	470pF/4kVDC	3.3 μH SMD Inductor
5VDC	10 μF MLCC		4.7 μH SMD Inductor

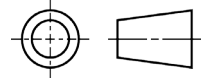
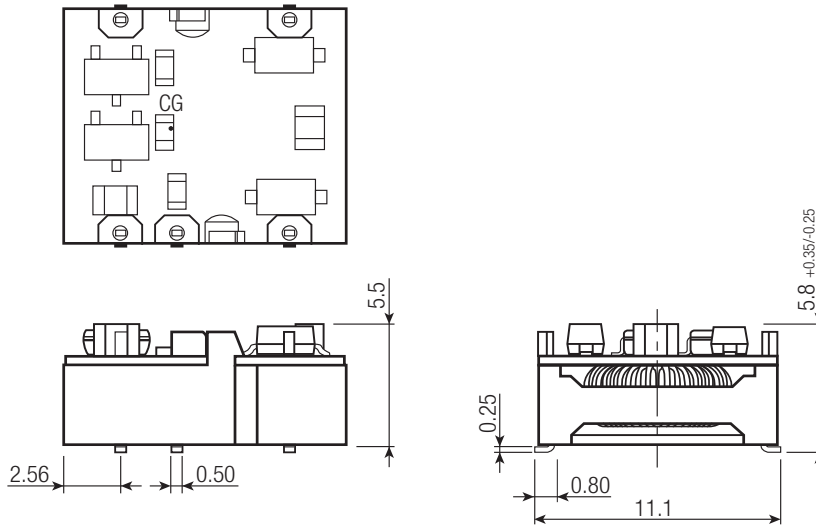
DIMENSION and PHYSICAL CHARACTERISTICS

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

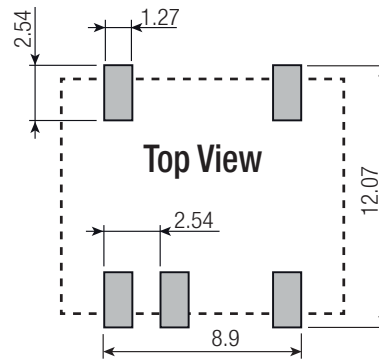
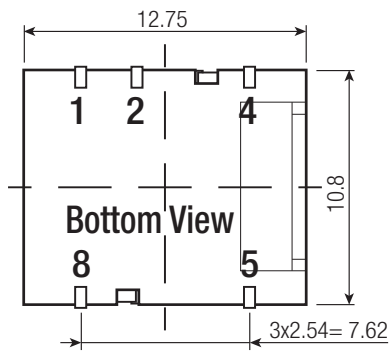
NC= no connection

Tolerance: xx.x= $\pm 0.5\text{mm}$

xx.xx= $\pm 0.25\text{mm}$

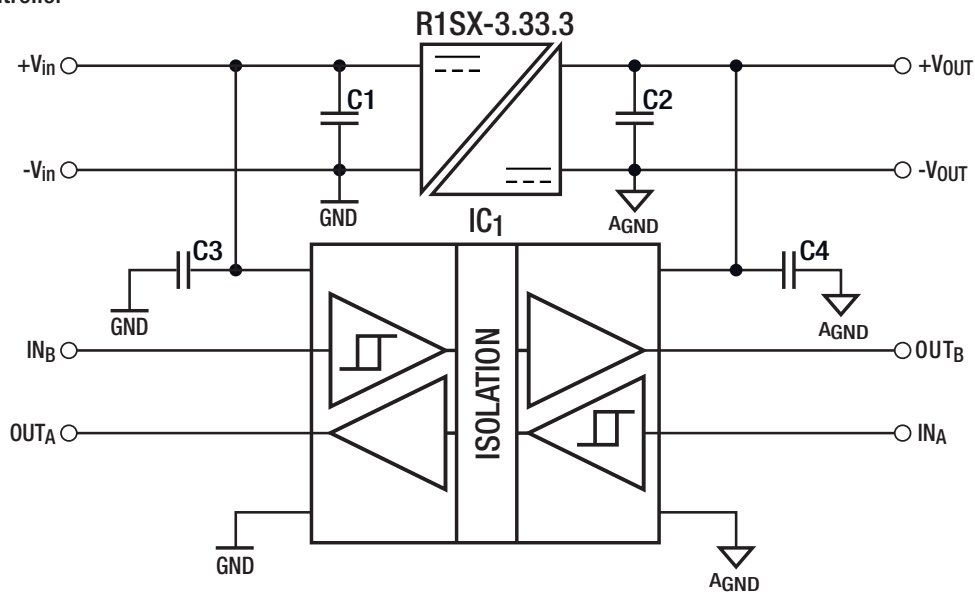
Pin dimension: $\pm 0.1\text{mm}$

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) reel	355.0 x 340.0 x 35.0mm 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.