

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.

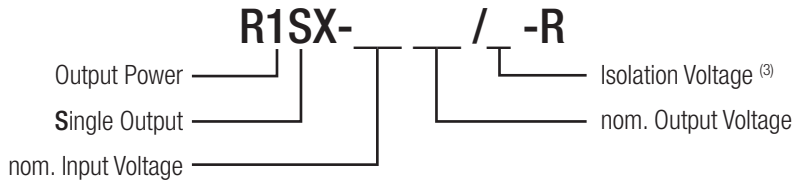
Selection Guide

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

continued on next page

R1SX

1 Watt SMD Single Output



- IEC/EN62368-1 (pending)
 UL62368-1 (pending)
 UL60950-1 (pending)
 CB Report (pending)
 EN55022

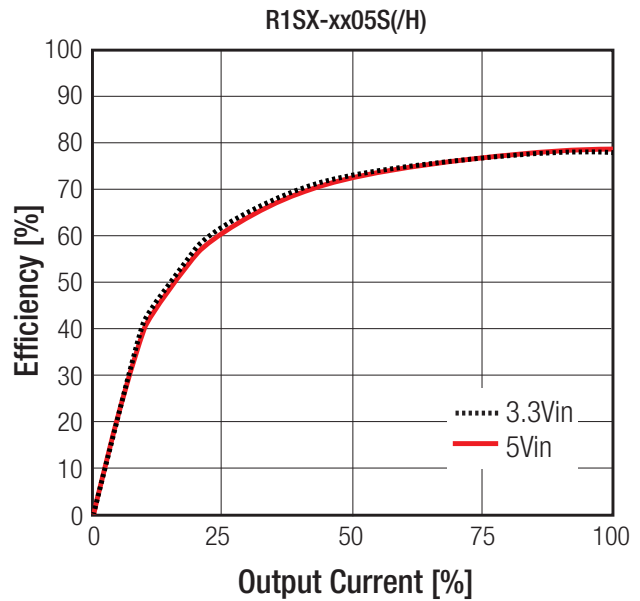
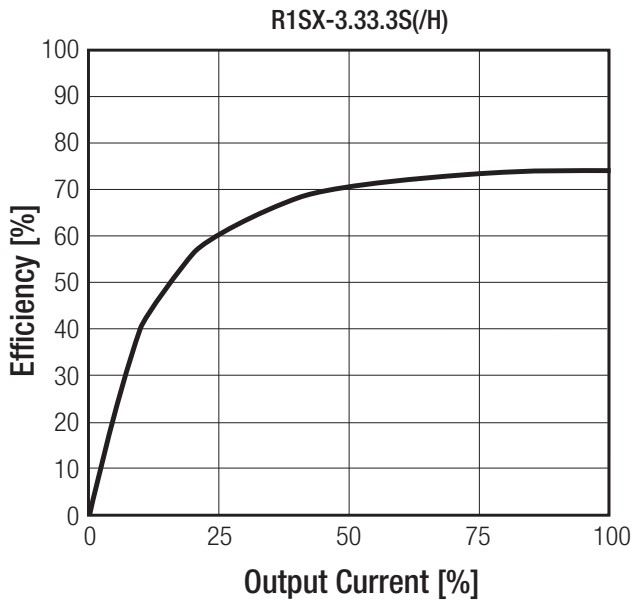
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

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).

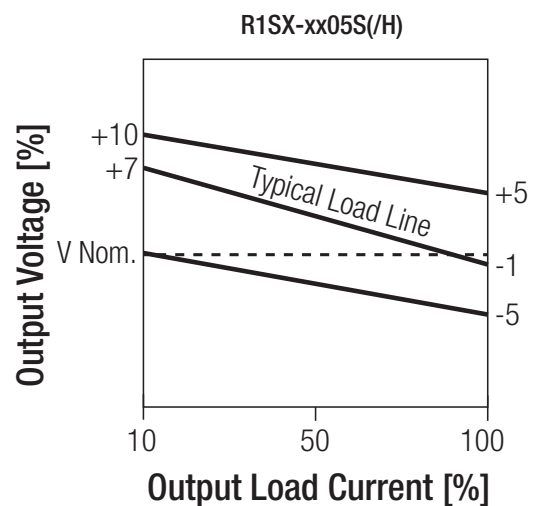
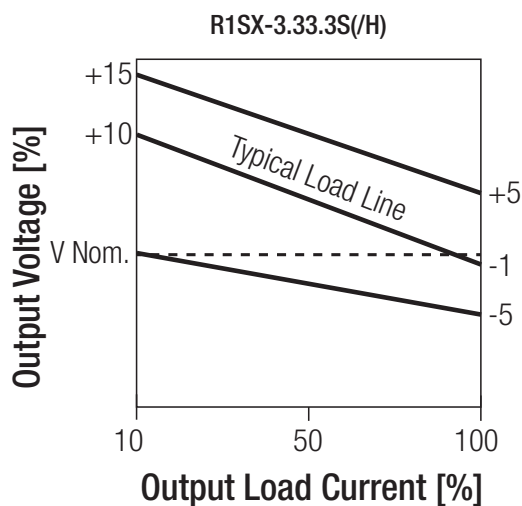
Efficiency vs. Load



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 5VDC	$\pm 10.0\%$ typ. / $\pm 15.0\%$ max. $\pm 7.0\%$ typ. / $\pm 15.0\%$ max.

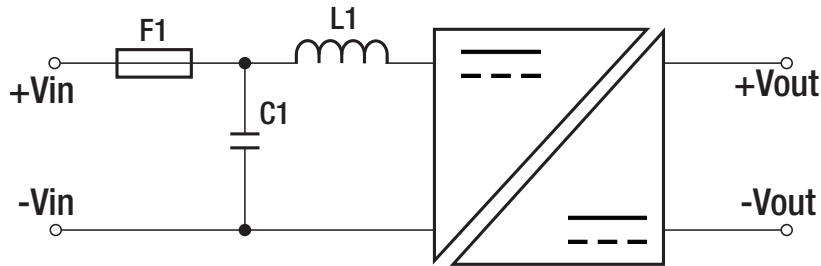
Tolerance Envelope



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			10GΩ min.
Isolation Capacitance			70pF max.
Insulation Grade			functional

Protection Circuit



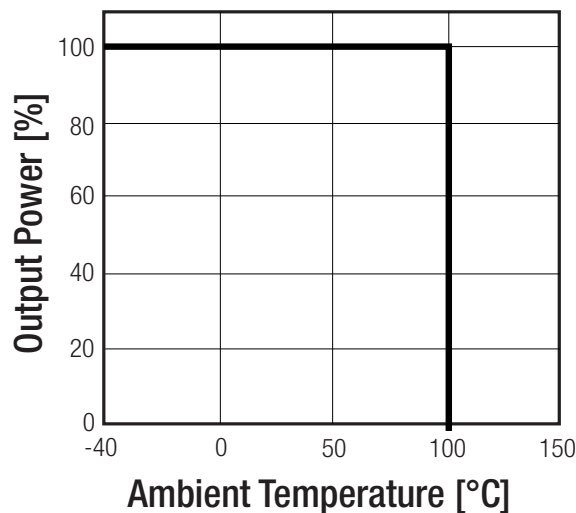
Notes:

- 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 ³ hours
		+100°C	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)

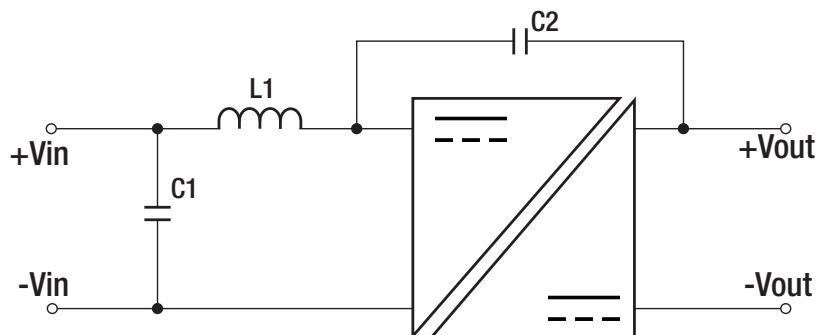
SAFETY AND CERTIFICATIONS

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

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

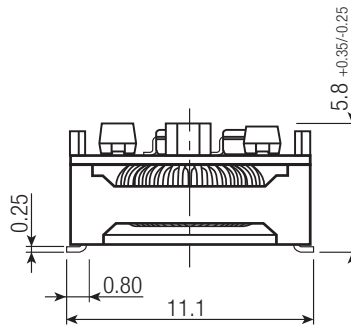
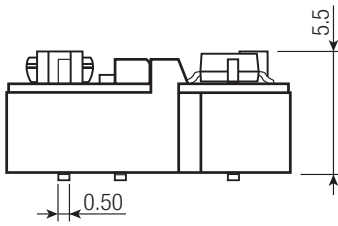
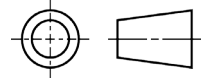
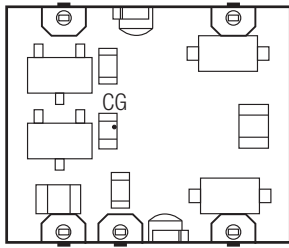
DIMENSION and PHYSICAL CHARACTERISTICS

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

continued on next page

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

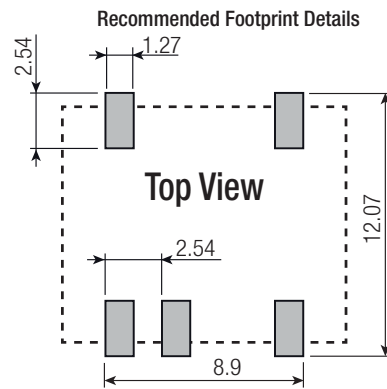
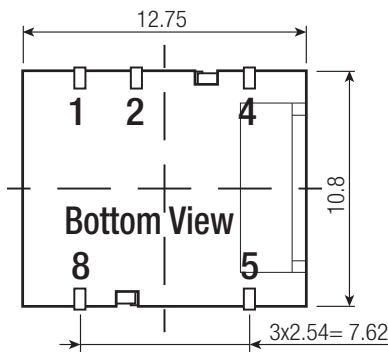
CG= central gravity

NC= no connection

Tolerance: xx.x= ±0.5mm

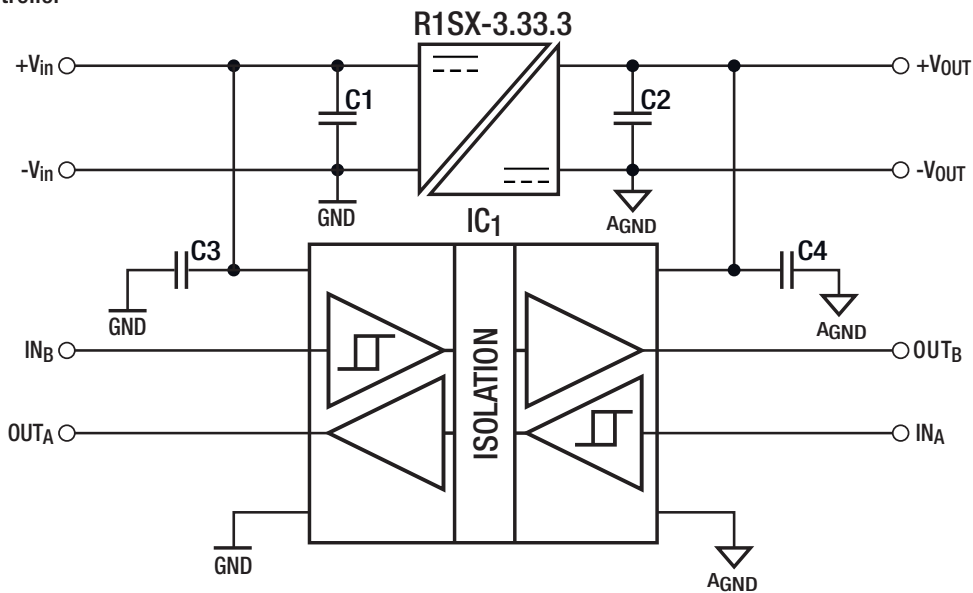
xx.xx= ±0.25mm

Pin dimension: ±0.1mm



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.