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

3 YEAR Warranty

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. (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

c UL us 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

Model Numbering

R1 SX- ___ ___ / _ -R

- Output Power
- Single
- nom. Input Voltage
- nom. Output Voltage
- Isolation Voltage (3)
- Packaging

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

REF DESIGN available

www.recom-power.com/eval-ref-boards

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

BASIC CHARACTERISTICS

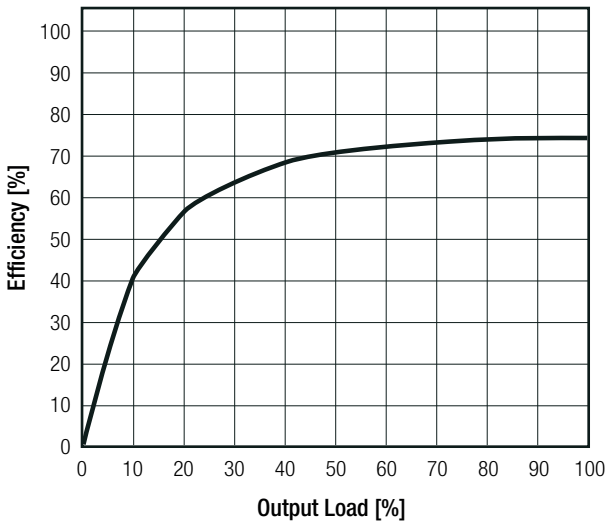
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitor
Input Voltage Range			±10.0%	
Quiescent Current				40mA
Minimum Load		0%		
Internal Operating Frequency		20kHz	60kHz	100kHz
Output Ripple and Noise [4]	20MHz BW			100mVp-p

Notes:

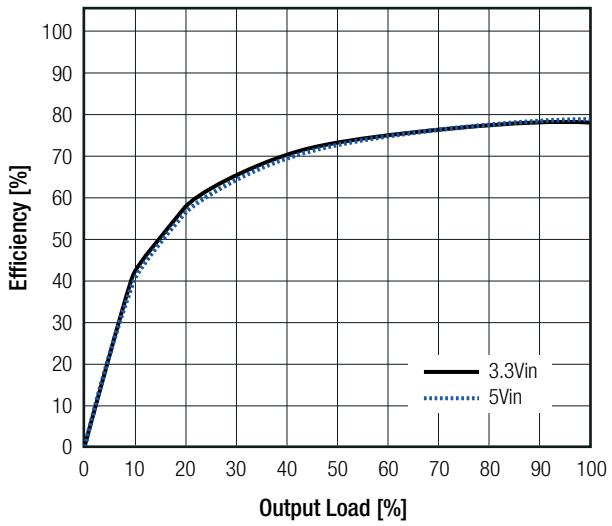
Note4: Measurements are made with a 0.1µF MLCC across output (low ESR)

Efficiency vs. Load

R1SX-3.33.3(/H)



R1SX-xx05(/H)

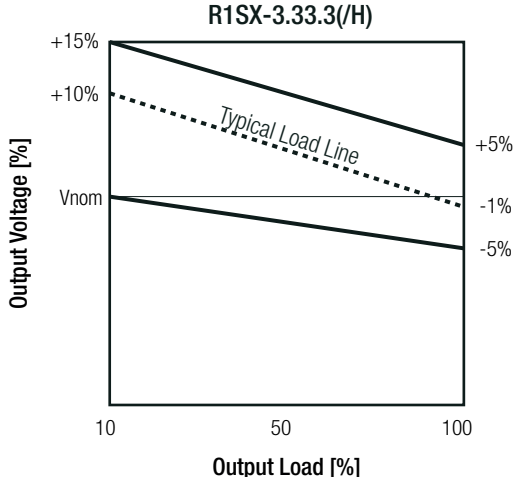


REGULATIONS

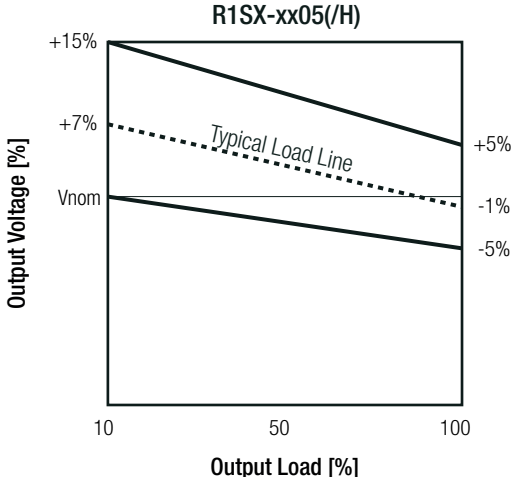
Parameter	Condition		Value
Output Accuracy			±5.0% max.
Line Regulation	low line to high line		±1.2% typ. at 1.0% of Vin typ.
Load Regulation	10% to 100% load	3.3Vout	10.0% typ. / 15.0% max.
		5Vout	7.0% typ. / 15.0% max.

Tolerance Envelope

R1SX-3.33.3(/H)



R1SX-xx05(/H)



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

PROTECTIONS

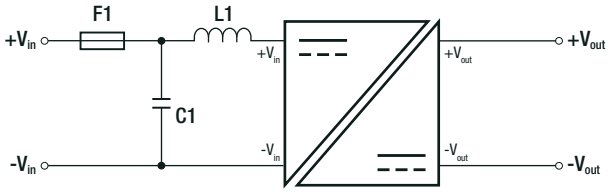
Parameter	Type			Value
Isolation Voltage	I/P to O/P	standard	tested for 1 second rated for 1 minute (5)	1kVDC 500VAC
		with suffix "/H"	tested for 1 second rated for 1 minute (5)	3kVDC 1.5kVAC
Isolation Resistance				10GΩ min.
Isolation Capacitance				70pF max.
Leakage Current	standard with suffix "/H"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

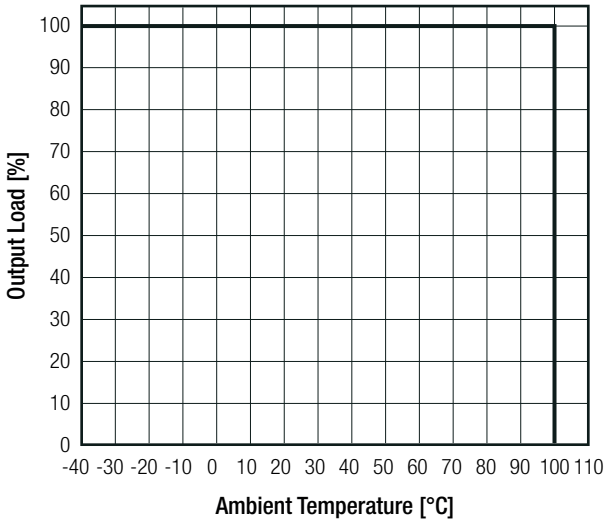


ENVIRONMENTAL

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 +100°C	21400 x 10³ hours 7800 x 10³ hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)



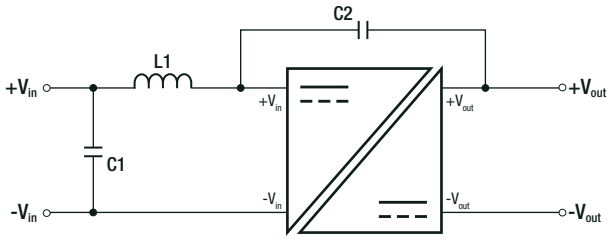
Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

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		4.7µH SMD Inductor

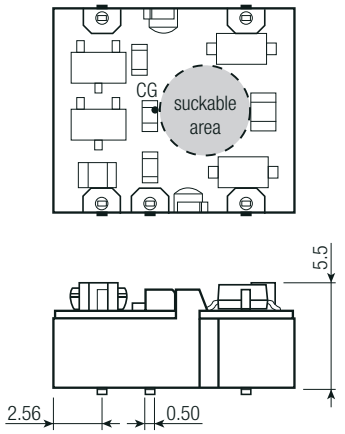
DIMENSION and PHYSICAL CHARACTERISTICS

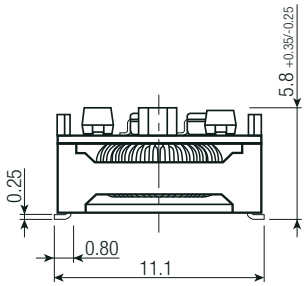
Parameter	Type	Value
Material	case PCB	black plastic (UL94V-0) FR4 (UL94V-0)
Dimension (LxWxH)		12.75 x 11.10 x 5.80mm
Weight		1.0g typ.

continued on next page

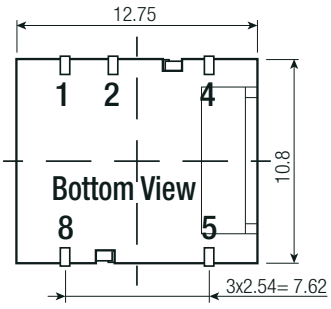
Specifications (measured @ Ta= 25°C, nominal input voltage, full load unless otherwise specified)

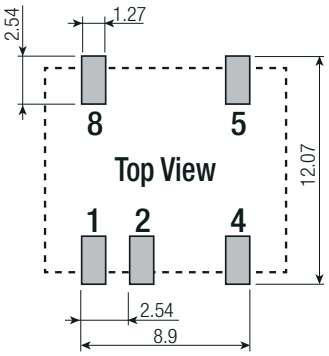
Dimension Drawing (mm)





Recommended Footprint Details





Pin Connection

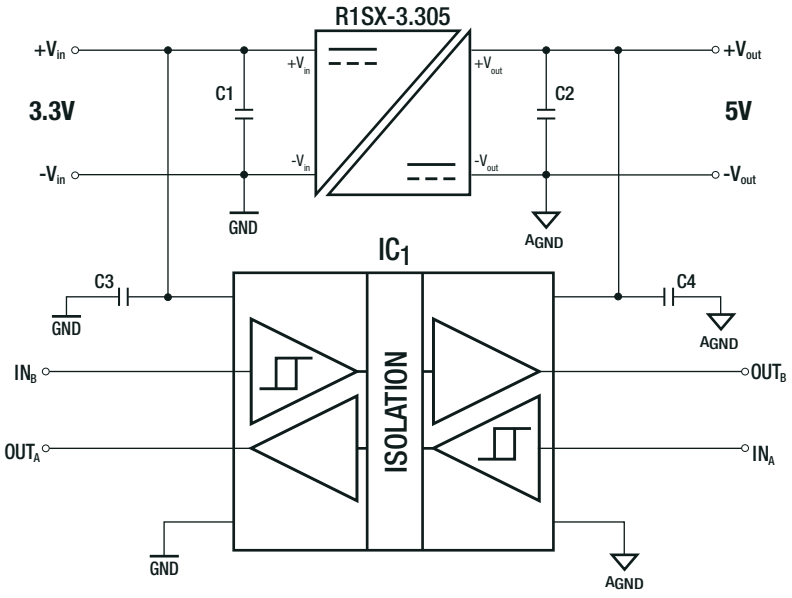
Pin #	Single
1	-Vin
2	+Vin
4	-Vout
5	+Vout
8	NC

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

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

INSTALLATION and APPLICATION

Isolated Bus



Block diagram of an isolated data interface with 3.3V to 5V logic level shifting. Typcial 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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