

Features

Regulated Converters

- 2:1 Wide Input Range
- 2kVDC/1 Second Isolation
- -40°C To +80°C Operating Temperature @ Full Load
- Industry Standard Pinout (SIP8)
- EN/UL62368 and UL60950 Certified, CB Report
- Low Cost

Description

The RSOE is a low cost isolated, regulated and short-circuit protected DC/DC converter designed for industrial applications. A compact SIP8 case size, 2:1 input, 2kVDC isolation and a wide operating temperature range of -40°C to +80°C without derating makes the RSOE series ideal for industrial, transport and general-purpose on-board 5V power supplies. Industrial Class A EMC levels can be met with a simple Pi-filter and the converters come with a three year warranty.

Selection Guide

Part Number	Input Voltage Range [VDC]	Input Current @ full load [mA]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	max. Capacitive Load ⁽²⁾ [μF]
RSOE-0505S/H2	4.5 - 9	265	5	200	76	6800
RSOE-2405S/H2	18 - 36	52	5	200	80	6800

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

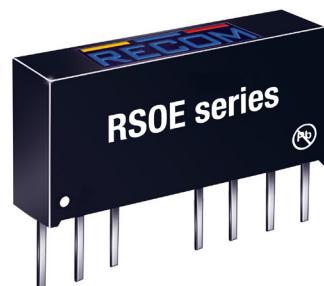
RECOM
DC/DC Converter

RSOE

1 Watt
SIP8



Single Output



UL
E224736

UL62368-1 certified
C22.2 No. 62368-1-14 certified
UL60950 certified
C22.2 No. 60950-1-07 certified
IEC/EN62368-1 certified
EN55022/55024 compliant
CB Report

Specifications (measured @ ta= 25°C, nominal Vin, full load unless otherwise specified)

BASIC CHARACTERISTICS

Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter			capacitor		
Input Voltage Range	nom. Vin=	5VDC 24VDC	4.5VDC 18VDC	5VDC 24VDC	9VDC 36VDC
Maximum Reverse Voltage					0VDC
Input Surge Voltage	100ms max.	nom. Vin=	5VDC 24VDC	15VDC 50VDC	
Quiescent Current		nom. Vin=	5VDC 24VDC	40mA 3mA	
Start-up time				500μs	
Rise time				450μs	
Hold-up time				10μs	
Internal Operating Frequency			130kHz		
Minimum Load			0%		
Output Ripple and Noise ⁽³⁾	20MHz BW, 0-100% load				75mVp-p
ON/OFF CTRL ⁽⁴⁾	DC-DC ON DC-DC OFF		Open or 0V < Vr < 0.8VDC 2V < Vr < 6VDC		
Input Current of CTRL Pin	5V VCTRL 3.3V VCTRL			15mA 10mA	
Standby Current				0.75mA	1.5mA

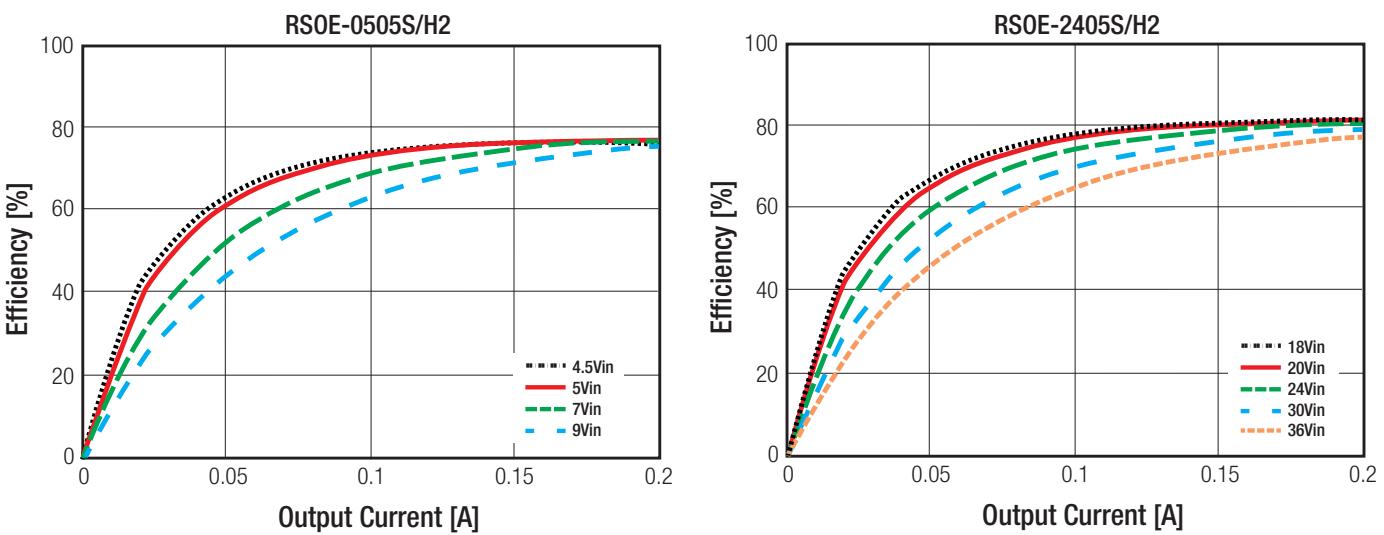
Notes:

Note3: Measurements are made with a 0.1μF MLCC across output (low ESR)

Note4: Please refer to „Application and Installation“

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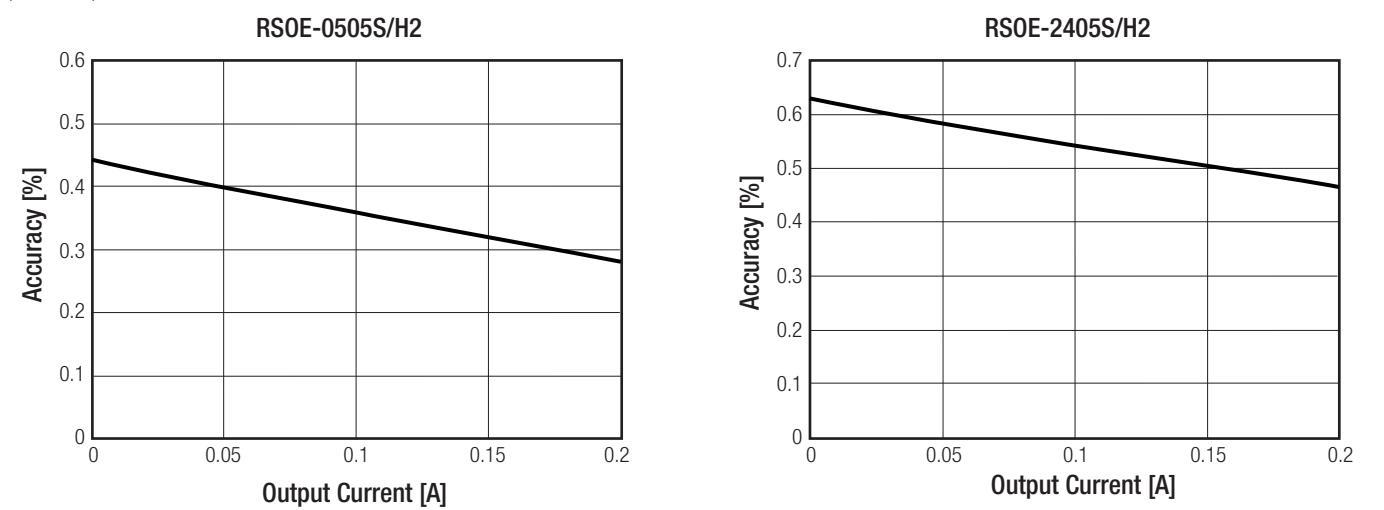
Specifications (measured @ $ta = 25^\circ\text{C}$, nominal V_{in} , full load unless otherwise specified)

Efficiency vs. Load

REGULATIONS

Parameter	Condition	Value
Output Accuracy	0-100% load	$\pm 2.0\%$ max.
Line Regulation	low line to high line, full load	$\pm 0.2\%$ max.
Load Regulation	0% to 100% load	$\pm 0.5\%$ max.

Accuracy vs. Load

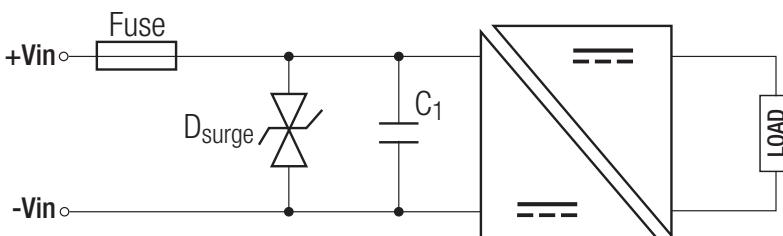
(@ full load)


PROTECTIONS

Parameter	Type	Value	
Short Circuit Protection (SCP)	below 100m Ω	continuous, auto recovery	
Isolation Voltage ⁽⁵⁾	I/P to O/P	tested for 1 second	2kVDC
Isolation Resistance		1G Ω min.	
Isolation Capacitance		100pF max.	
Insulation Grade		functional	

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Specifications (measured @ $ta = 25^\circ\text{C}$, nominal V_{in} , full load unless otherwise specified)

Surge Protection Circuit according to EN61000-4-5, Criteria A


nom. V_{in}	TVS	C1
5VDC	P4SMAJ11A	N/A
24VDC	P4SMAJ36A	220 μ F/100V

Notes:

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

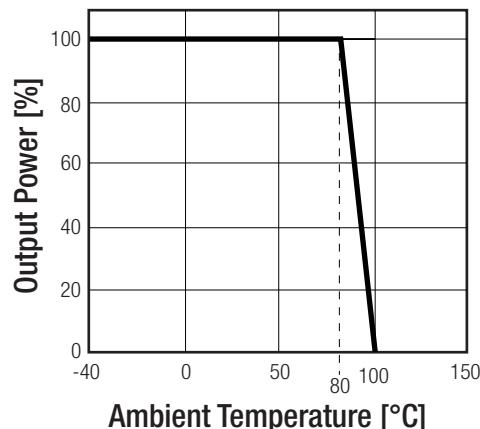
Note6: An input fuse is required if the mains supply is not over-current protected. Recommended fuse: T1A slow blow type

ENVIRONMENTAL

Parameter	Condition	Value
Operating Temperature Range	without derating (see graph)	-40°C to +80°C
Maximum Case Temperature		+105°C
Temperature Coefficient		$\pm 0.05\%/\text{°C}$
Operating Altitude		5000m
Operating Humidity	non-condensing	5% - 95% RH max.
Pollution Degree		PD2
MTBF	according to MIL-HDBK-217F, G.B.	$+25^\circ\text{C}$ $+80^\circ\text{C}$
Vibration		MIL-STD 202G

Derating Graph

(@ Chamber and natural convection 0.1m/s)

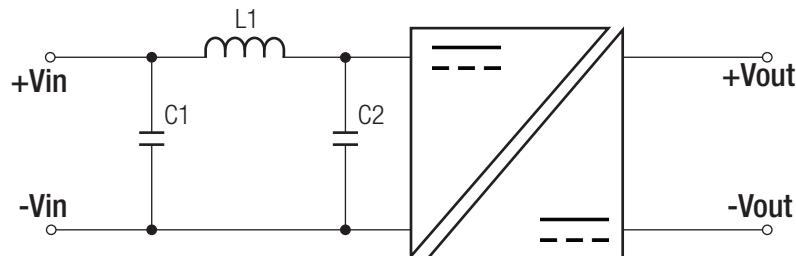

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E224736-A48	UL60950-1, 2nd Edition, 2014
Audio/Video, information and communication technology equipment - Safety requirements		CSA C22.2 No. 60950-1-07, 2nd Ed. 2014
Audio/Video, information and communication technology equipment - Safety requirements (CB Scheme)	L0339m37-CB-1-B1	UL62368-1, 2nd Edition, 2014
RoHS2		CSA C22.2 Nr. 62368-1-14, 2nd Ed. 2014
		IEC/EN62368-1, 2nd Edition, 2014
		RoHS 2011/65/EU + AM2015/863

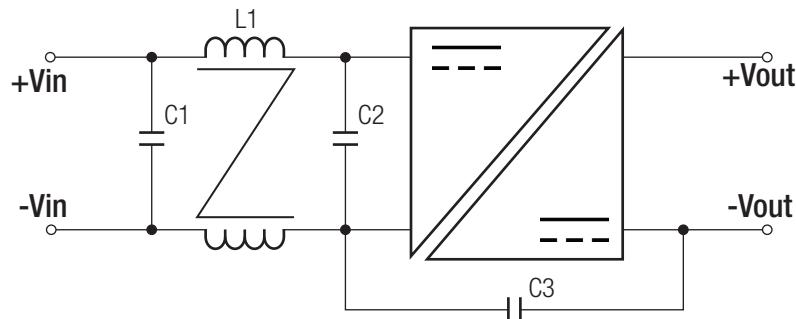
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Specifications (measured @ $ta = 25^\circ\text{C}$, nominal V_{in} , full load unless otherwise specified)

EMC Compliance	Conditions	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external components (see filter suggestion below)	EN55022, Class A EN55022, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024, 2015
ESD Electrostatic discharge immunity test	$\pm 8\text{kV}$ Air; $\pm 4\text{kV}$ Contact	IEC6100-4-2, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	IEC6100-4-3, Criteria A
Fast Transient and Burst Immunity	DC Power Port: $\pm 0.5\text{kV}$	IEC6100-4-4, Criteria A
Surge Immunity	DC Power Port: $\pm 0.5\text{kV}$	IEC6100-4-5, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	DC Power Port: 3V	IEC6100-4-6, Criteria A
Power Magnetic Field	50Hz, 1A/m	IEC6100-4-8, Criteria A

EMC Filtering Suggestions for EN55022 Class A


nom. Vin	C1	C2	L1
5VDC	22 μF /50V MLCC	22 μF /50V MLCC	3 μH Choke
24VDC			

EMC Filtering Suggestions for EN55022 Class B


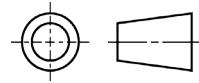
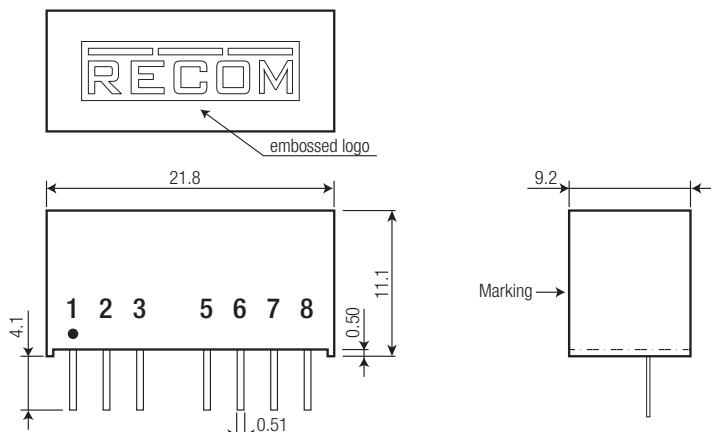
nom. Vin	C1	C2	C3	L1
5VDC	22 μF /50V MLCC	22 μF /50V MLCC	1000pF/3kV	0.45mH CMC
24VDC				

DIMENSION and PHYSICAL CHARACTERISTICS

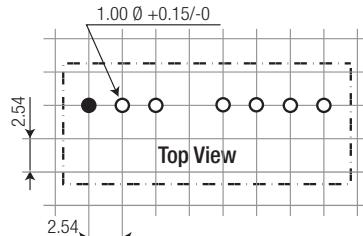
Parameter	Type	Value
Material	Case Potting PCB	non-conductive black plastic (UL94V-0) epoxy (UL94V-0) FR4 (UL94V-0)
Package Dimension (LxWxH)		21.8 x 9.2 x 11.1mm
Package Weight		4.7g typ.

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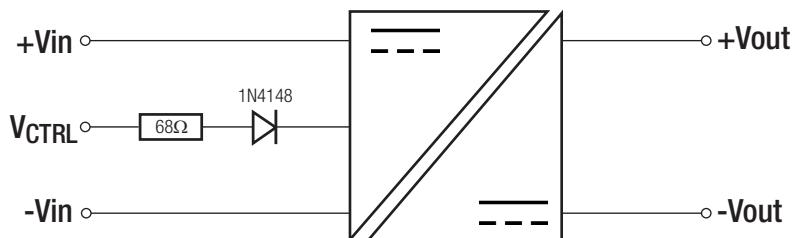
Dimension Drawing (mm)

Pin Connection

Pin #	Single
1	-Vin
2	+Vin
3	CTRL
5	NC
6	+Vout
7	-Vout
8	NC

Recommended Footprint Details


NC = no connection

Tolerance: $xx.x = \pm 0.5\text{mm}$
 $xx.xx = \pm 0.25\text{mm}$

Pin dimension: $\pm 0.1\text{mm}$
INSTALLATION and APPLICATION
ON/OFF CTRL Circuit

PACKAGING INFORMATION

Packaging Dimension (LxWxH)	tube	520.0 x 11.2 x 18.2mm
Packaging Quantity		22pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity		5% - 95% RH max.

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