

# 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, UL60950, CB Report (pending)
- Low Cost

# RSOE

**1 Watt  
SIP8  
Single Output**



## 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.

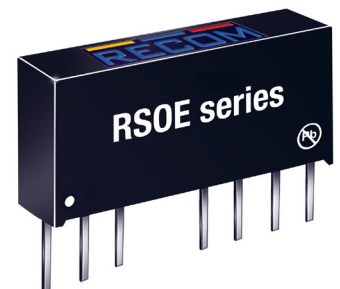
## Selection Guide

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 by nominal input and full load at +25°C ambient.

Note2: Max. cap load is tested by nominal input and full resistive load.



## 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. 5VDC nom. Vin= 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:

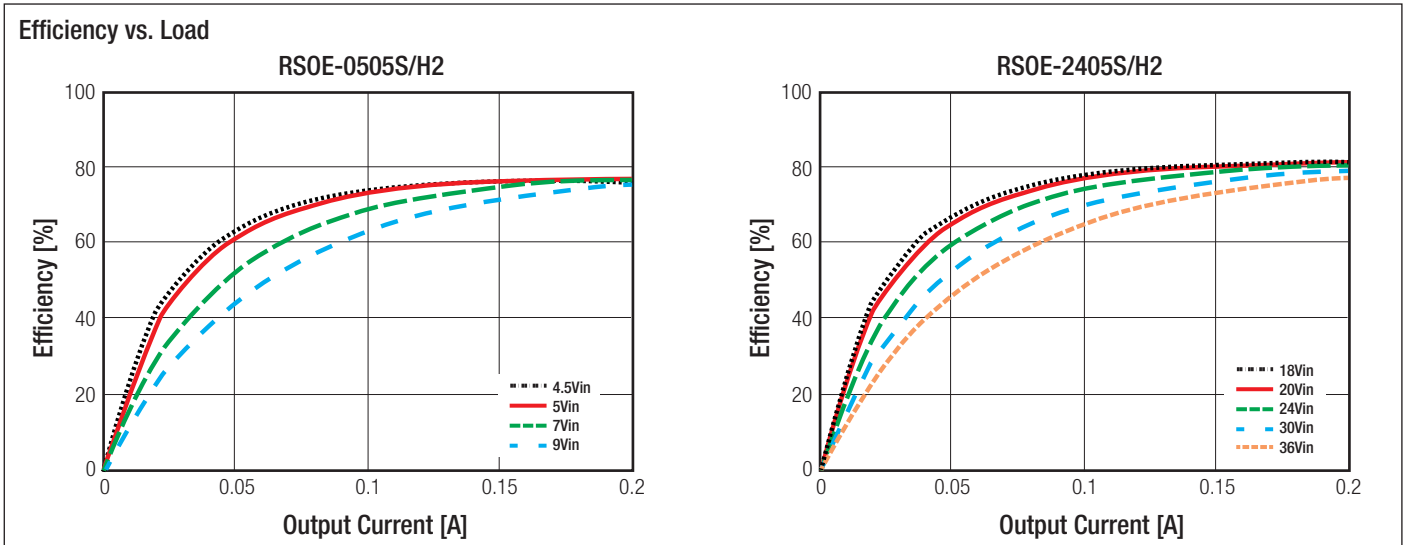
Note3: Measurements are made with a 0.1µF MLCC across output (low ESR).

Note4: Please refer to „Application and Installation“ for CTRL pin circuit.

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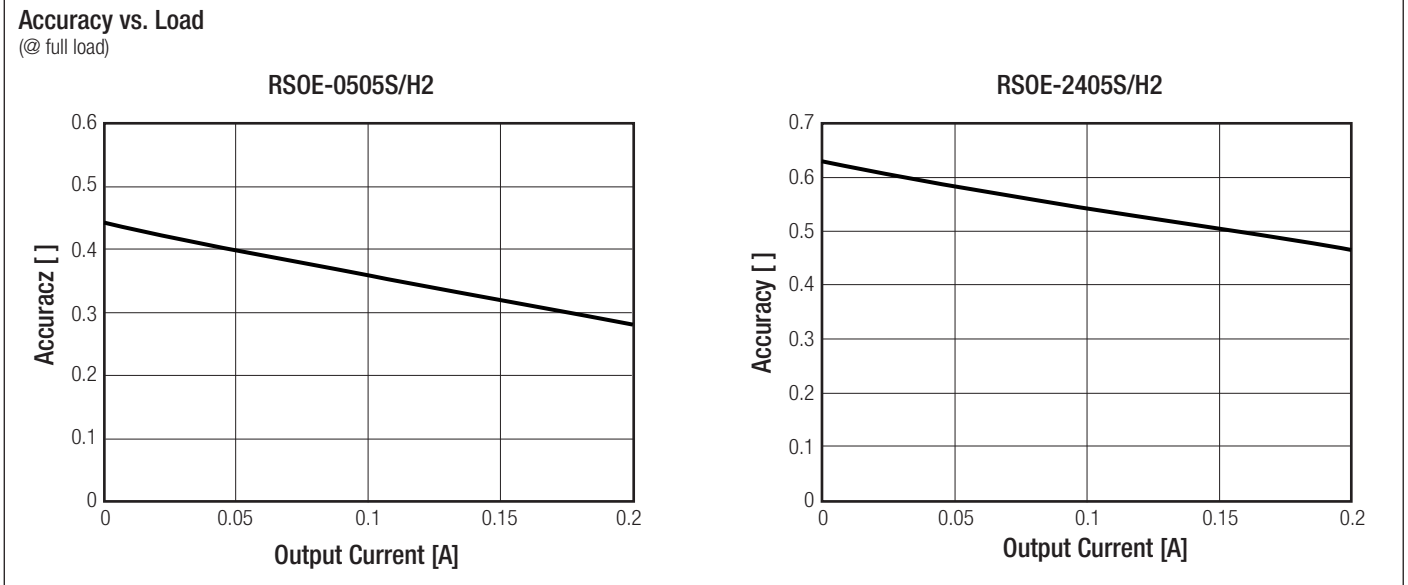
EN55022 Compliant  
EN62368-1 (pending)  
UL62368 (pending)  
UL60950-1 (pending)  
CB Report (pending)

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



**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.



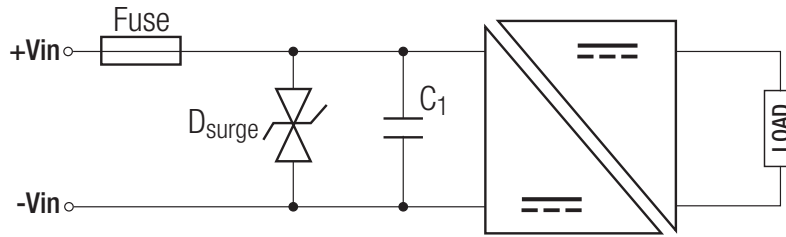
**PROTECTIONS**

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

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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , 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 $\mu$ F/100V

**Notes:**

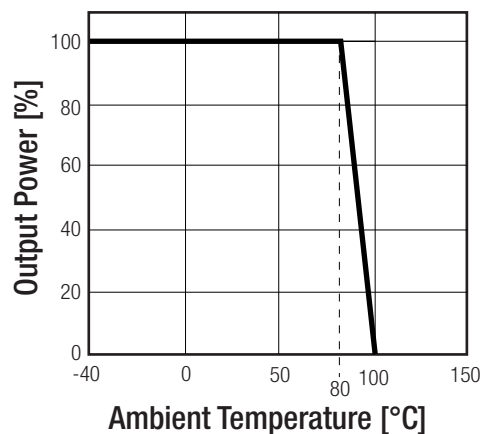
Note5: An input fuse is required if the mains supply is not over-current protected. Recommended fuse: T1A slow blow type.

**ENVIRONMENTAL**

Parameter	Condition	Value
Operating Temperature Range	without derating (see graph)	-40°C to +80°C
Maximum Case Temperature		+105°C
Temperature Coefficient		$\pm 0.05\%/^\circ\text{C}$
Operating Altitude		2000m
Operating Humidity	non-condensing	5% - 95% RH max.
Pollution Degree		PD3
MTBF	according to MIL-HDBK-217F, G.B.	+25°C 845 x 10 <sup>3</sup> hours +85°C 3073 x 10 <sup>3</sup> hours
Vibration		MIL-STD 202G

**Derating Graph**

(@ Chamber and natural convection 0.1m/s)



**SAFETY AND CERTIFICATIONS**

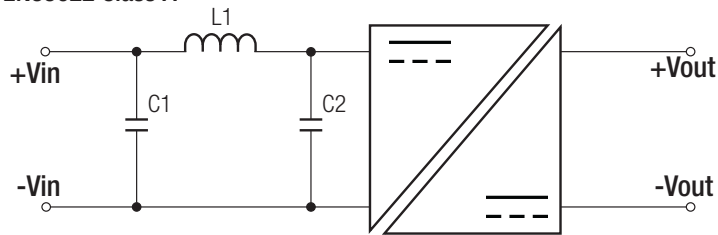
Certificate Type (Safety)	Report / File Number	Standard
Audio/video, information and communication technology equipment - Safety requirements (LVD)	pending	EN62368-1
Audio/video, information and communication technology equipment - Safety requirements (CB Scheme)	pending	UL62368-1
Information Technology Equipment, General Requirements for Safety (LVD)	pending	UL60950-1
RoHS2+		RoHS-2011/65/EU + AM2 (10/10)

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

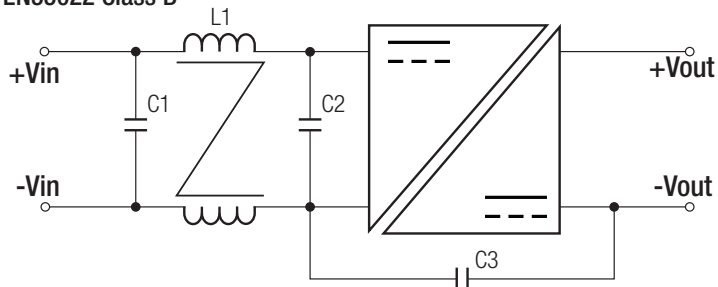
EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external filter	EN55022, Class A/B
ESD Electrostatic discharge immunity test	Air: $\pm 8\text{kV}$ ; Contact: $\pm 4\text{kV}$	EN61000-4-2, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test		EN61000-4-3
Fast Transient and Burst Immunity	$\pm 1\text{kV}$	EN61000-4-4, Criteria A
Surge Immunity	$\pm 1\text{kV}$	EN61000-4-5, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields		EN61000-4-6

**EMC Filtering Suggestions for EN55022 Class A**



nom. $V_{in}$	C1	C2	L1
5VDC	22 $\mu\text{F}$ /50V	22 $\mu\text{F}$ /50V	3 $\mu\text{H}$ Choke
24VDC	MLCC	MLCC	

**EMC Filtering Suggestions for EN55022 Class B**



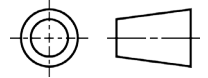
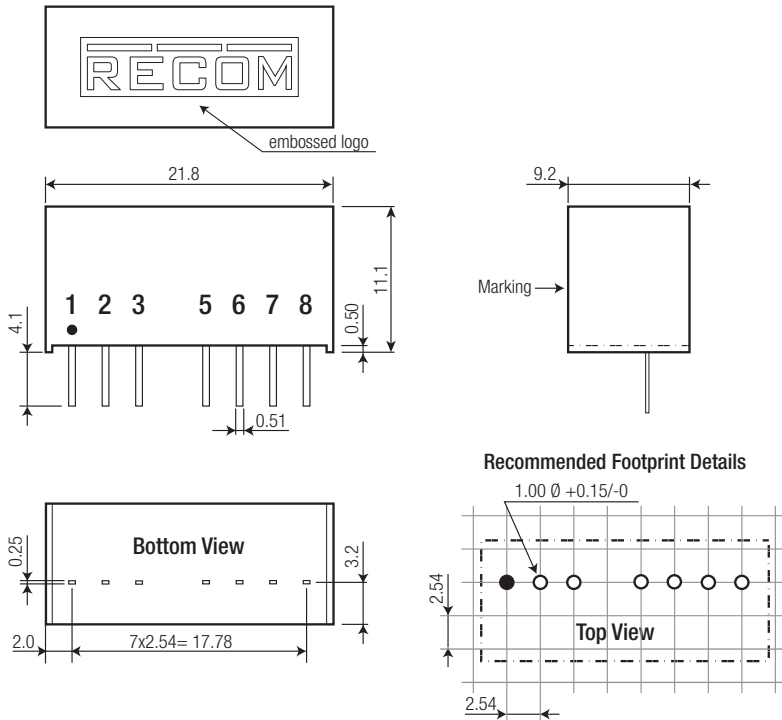
nom. $V_{in}$	C1	C2	C3	L1
5VDC	22 $\mu\text{F}$ /50V	22 $\mu\text{F}$ /50V	1000pF/3kV	0.45mH
24VDC	MLCC	MLCC		CMC

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

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

### Dimension Drawing (mm)



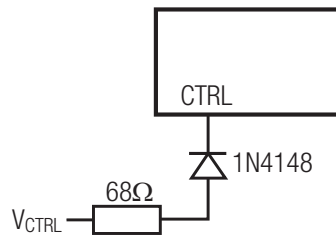
### Pin Connection

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

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



DC-DC ON: Open or  $0V < V_r < 0.8V_{DC}$   
 DC-DC OFF:  $2V < V_r < 6V$

### 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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