

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

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

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 V _{CTRL} 3.3V V _{CTRL}			15mA 10mA	
Standby Current				0.75mA	1.5mA

Notes:

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

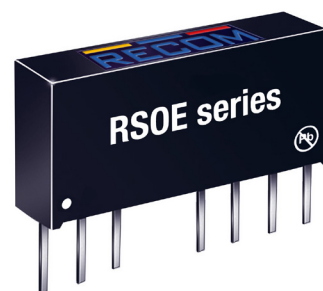
Note4: Please refer to „Application and Installation“

continued on next page

RECOM
DC/DC Converter

RSOE

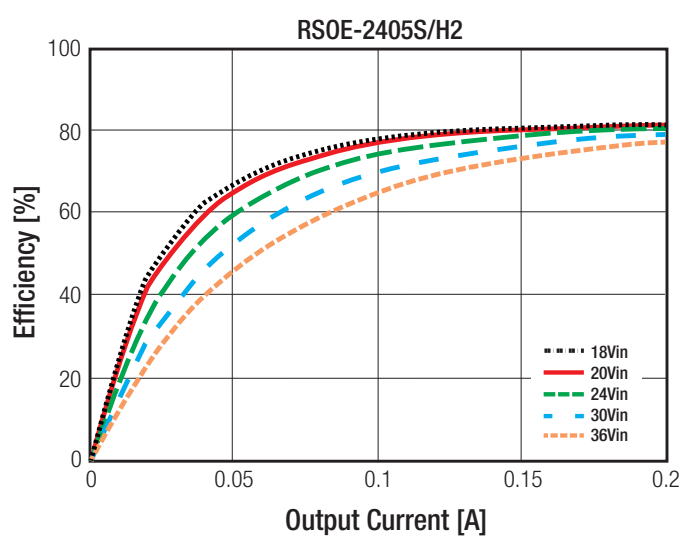
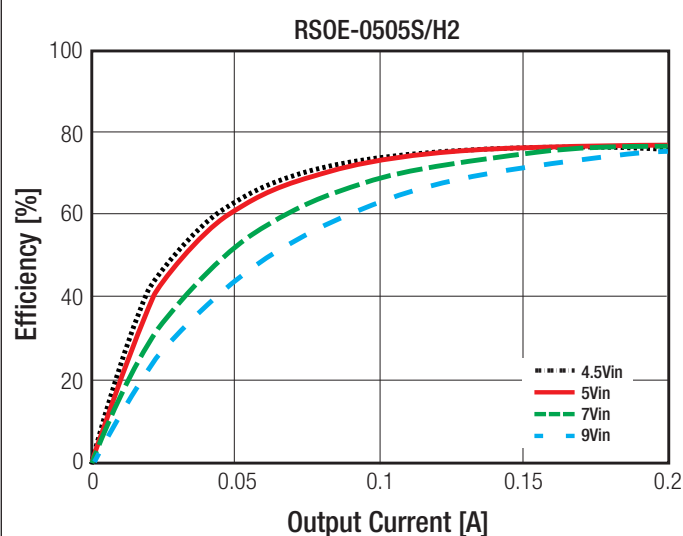
1 Watt
SIP8
Single Output



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

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

Efficiency vs. Load

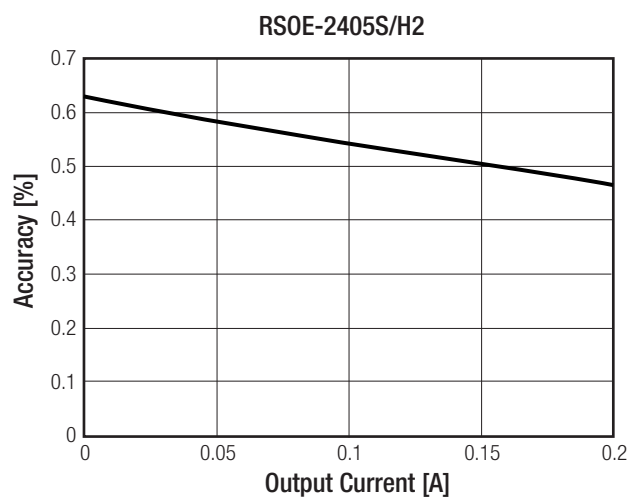
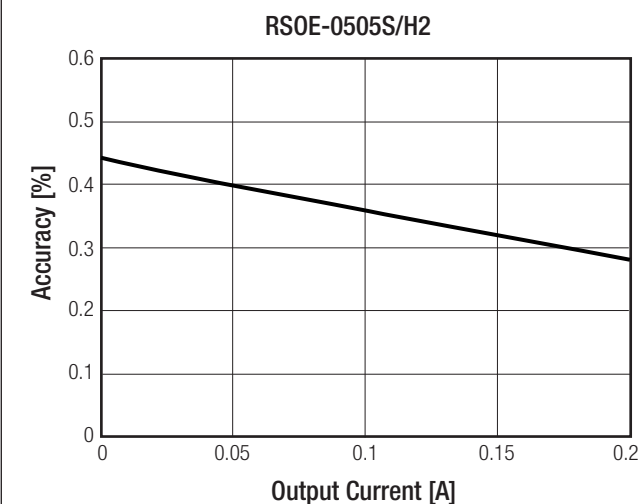


REGULATIONS

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)



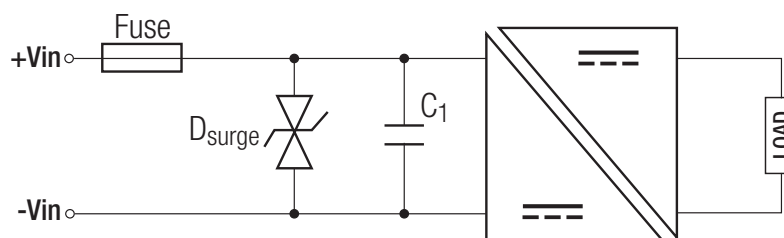
PROTECTIONS

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

continued on next page

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 $\mu\text{F}/100\text{V}$

Notes:

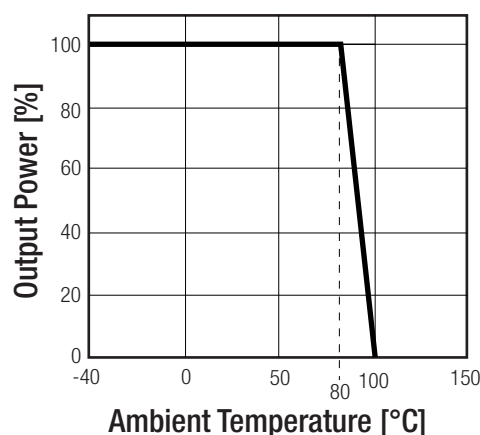
Note5: An input fuse is required if the mains supply is not over-current protected. Recommended fuse: T1A slow blow type

ENVIRONMENTAL

Parameter	Condition	Value
Operating Temperature Range	without derating (see graph)	-40°C to $+80^\circ\text{C}$
Maximum Case Temperature		$+105^\circ\text{C}$
Temperature Coefficient		$\pm 0.05\%/^\circ\text{C}$
Operating Altitude		5000m
Operating Humidity	non-condensing	5% - 95% RH max.
Pollution Degree		PD2
MTBF	according to MIL-HDBK-217F, G.B. $+25^\circ\text{C}$ $+80^\circ\text{C}$	3073×10^3 hours 845×10^3 hours
Vibration		MIL-STD 202G

Derating Graph

(@ Chamber and natural convection 0.1m/s)



SAFETY AND CERTIFICATIONS

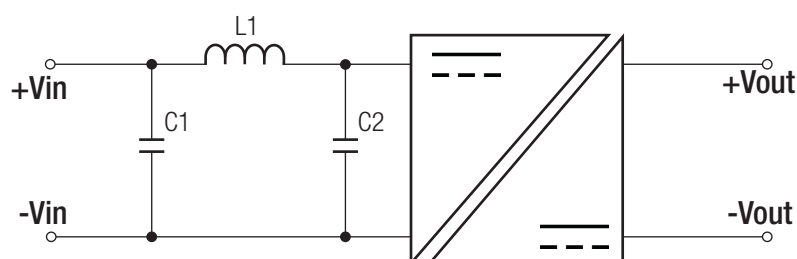
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	pending	UL60950-1, 2nd Edition, 2014 CSA C22.2 No. 60950-1-07, 2nd Ed. 2014
Audio/Video, information and communication technology equipment - Safety requirements	E224736-A48	UL62368-1,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

continued on next page

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

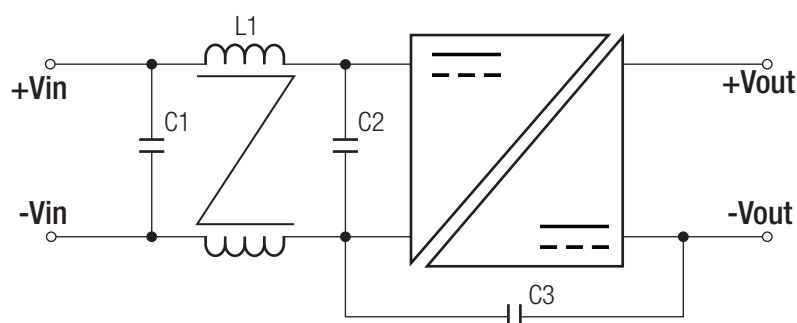
EMC Compliance	Conditions	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external components (see filter suggestion below)	EN55022, Class A EN55022, Class B
Information technology equipment - Immunity characteristics - 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. V_{in}	C1	C2	L1
5VDC	22 μF /50V	22 μF /50V	3 μH Choke
24VDC	MLCC	MLCC	

EMC Filtering Suggestions for EN55022 Class B



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

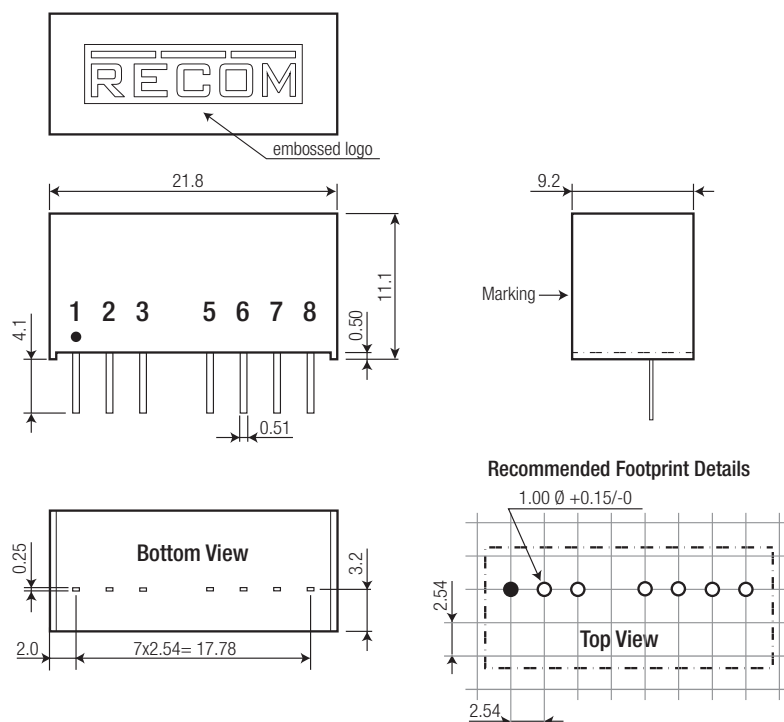
DIMENSION and PHYSICAL CHARACTERISTICS

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.

continued on next page

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

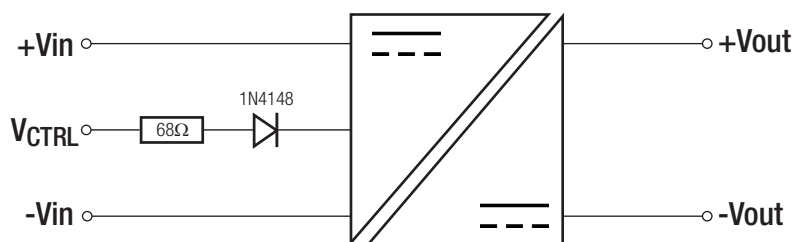
Tolerance: xx.x= $\pm 0.5\text{mm}$

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 $0V < V_r < 0.8\text{VDC}$
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 $^\circ\text{C}$ to +125 $^\circ\text{C}$
Storage Humidity		5% - 95% RH max.

The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.