



**THE DATASHEET OF  
RSH2-3.33.3S/H3**



# Features

# Regulated Converters

- 2W power in compact SMD package
- Operating temperature from -40°C to +85°C with no derating
- 2kVDC or 3kVDC/1minute isolation voltage
- IEC/EN 62368-1 (pending)
- UL/CSA/CAN 62368-1 certified
- Fully protected- OCP & SCP



# RSH2

2 Watt  
SMD DIP14  
Single Output



UL62368-1 certified  
CAN/CSA-C22.2 No. 62368-1 certified  
IEC/EN62368-1 (pending)  
EN55032 compliant

## Description

High power density 2W SMD isolated DC/DC single output converters. The RSH2 is available with three different input ranges and offers single regulated output. There is no minimum load requirement. Standard isolation is 2kVDC/1min and a /H3 version with 3kVDC/1min is available. The operating temperature is from -40°C up to +85°C without derating. The DIP14 SMD pin-out is industry standard, and the converters come equipped with ON/OFF control and, short circuit protection, and over current protection, making them ideal for highly sophisticated industrial designs. The converters are fully certified to IEC/EN/UL62368 a and are 10/10 RoHS conform.

## Selection Guide

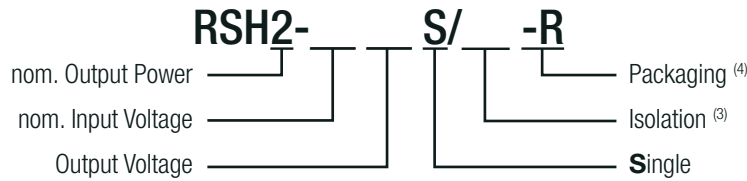
Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [µF]
RSH2-3.33.3S <sup>(3,4)</sup>	2.8-5.5	3.3	500	76	1680
RSH2-3.305S <sup>(3,4)</sup>	2.8-5.5	5	400	78	1680
RSH2-3.312S <sup>(3,4)</sup>	2.8-5.5	12	167	80	820
RSH2-3.315S <sup>(3,4)</sup>	2.8-5.5	15	134	80	680
RSH2-3.324S <sup>(3,4)</sup>	2.8-5.5	24	83	80	470
RSH2-053.3S <sup>(3,4)</sup>	4.5-13.2	3.3	500	78	1680
RSH2-0505S <sup>(3,4)</sup>	4.5-13.2	5	400	81	1680
RSH2-0512S <sup>(3,4)</sup>	4.5-13.2	12	167	82	820
RSH2-0515S <sup>(3,4)</sup>	4.5-13.2	15	134	83	680
RSH2-0524S <sup>(3,4)</sup>	4.5-13.2	24	83	83	470
RSH2-123.3S <sup>(3,4)</sup>	9-18	3.3	500	79	1680
RSH2-1205S <sup>(3,4)</sup>	9-18	5	400	81	1680
RSH2-1212S <sup>(3,4)</sup>	9-18	12	167	82	820
RSH2-1215S <sup>(3,4)</sup>	9-18	15	134	83	680
RSH2-1224S <sup>(3,4)</sup>	9-18	24	83	83	470
RSH2-243.3S <sup>(3,4)</sup>	18-36	3.3	500	75	1680
RSH2-2405S <sup>(3,4)</sup>	18-36	5	400	81	1680
RSH2-2412S <sup>(3,4)</sup>	18-36	12	167	82	820
RSH2-2415S <sup>(3,4)</sup>	18-36	15	134	83	680
RSH2-2424S <sup>(3,4)</sup>	18-36	24	83	83	470

### Notes:

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Max Cap Load is tested at minimum input and full resistive load

**Model Numbering**



**Notes:**

- Note3: add suffix "/H2" for 2kVDC isolation  
 add suffix "/H3" for 3kVDC isolation, for more information refer to **"Isolation Voltage (6)"**
- Note4: without suffix = standard tube packaging  
 add suffix „-R“ for tape and reel packaging for more details, refer to **"PACKAGING INFORMATION"**

**Ordering Examples:**

RSH2-0505S/H2	4.5-13.2Vin	5Vout	single output	2kVDC/1sec isolation	tube packaging (25pcs)
RSH2-2405S/H2-R	18-36Vin	5Vout	single output	2kVDC/1sec isolation	Tape and Reel (150pcs)
RSH2-1212S/H3	9-18Vin	12Vout	single output	3kVDC/1sec isolation	tube packaging (25pcs)

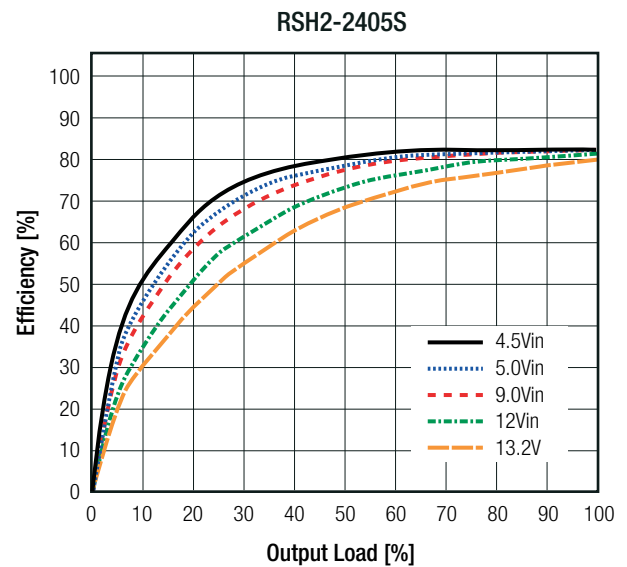
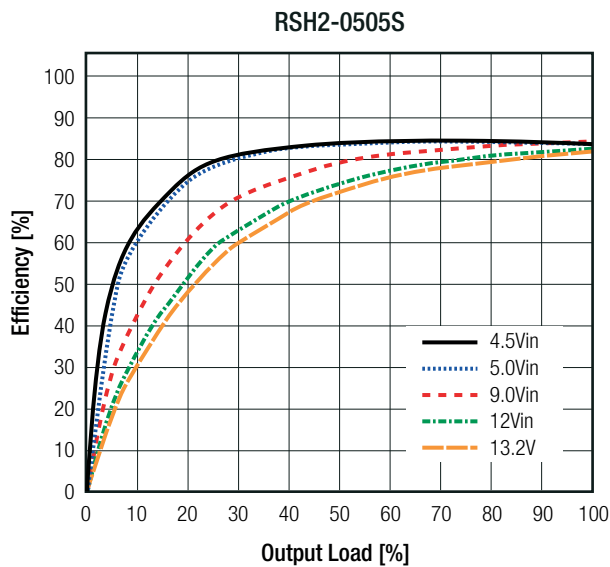
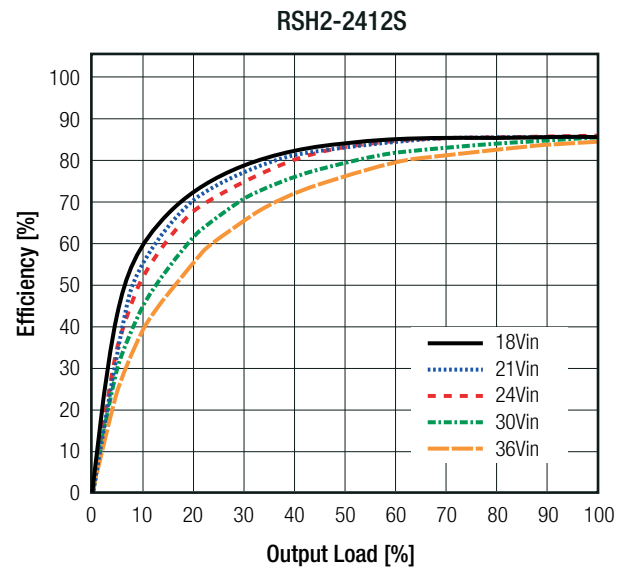
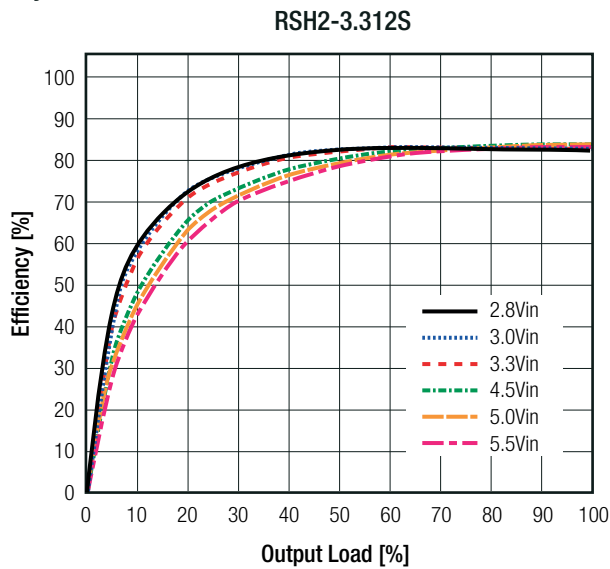
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter			Pi type		
Input Voltage Range	nom. Vin= 3.3VDC 5VDC 12VDC 24VDC		2.8VDC 4.5VDC 9VDC 18VDC		5.5VDC 13.2VDC 18VDC 36VDC
Input Surge Voltage (100ms max.)	nom. Vin= 3.3VDC 5VDC, 12VDC 24VDC				10VDC 25VDC 50VDC
Input Current	nom. Vin= 3.3VDC 5VDC 12VDC 24VDC			0.8A 0.5A 0.2A 0.1A	
Minimum Load			0%		
ON/OFF CTRL refer to <b>"ON/OFF CTRL"</b>	nom. Vin= 3.3VDC	DC-DC ON DC-DC OFF	open or high impedance external V <sub>CTRL</sub> = 2.8VDC		
	nom. Vin= 5, 12VDC	DC-DC ON DC-DC OFF	open or high impedance external V <sub>CTRL</sub> = 4.5VDC + 1N4148		
	nom. Vin= 24VDC	DC-DC ON DC-DC OFF	open or high impedance external V <sub>CTRL</sub> = 4.5VDC + 68Ω resistor		
Internal Operating Frequency				200kHz	
Output Ripple and Noise (5)	20MHz BW				50mVp-p
<b>Notes:</b>					
Note5: Measurements are made with a 0.1µF MLCC across output. (low ESR)					

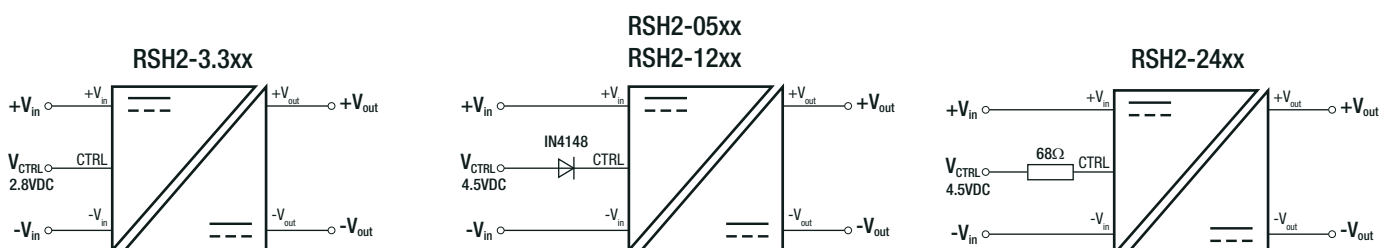
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Specifications (measured @  $T_a = 25^\circ\text{C}$ , nom.  $V_{in}$ , full load and after warm-up unless otherwise stated)

### Efficiency vs. Load



### ON/OFF CTRL

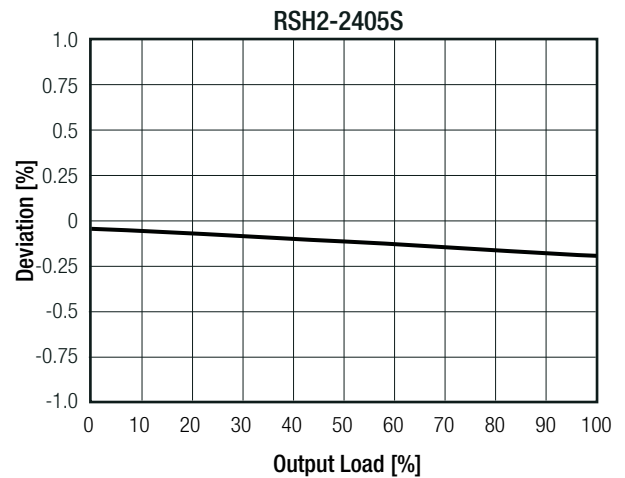
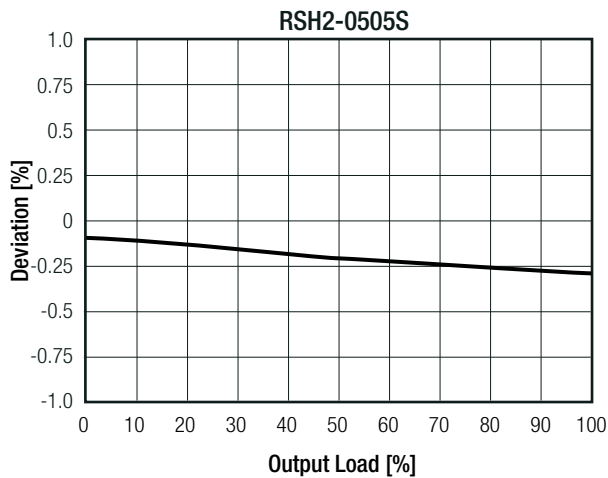
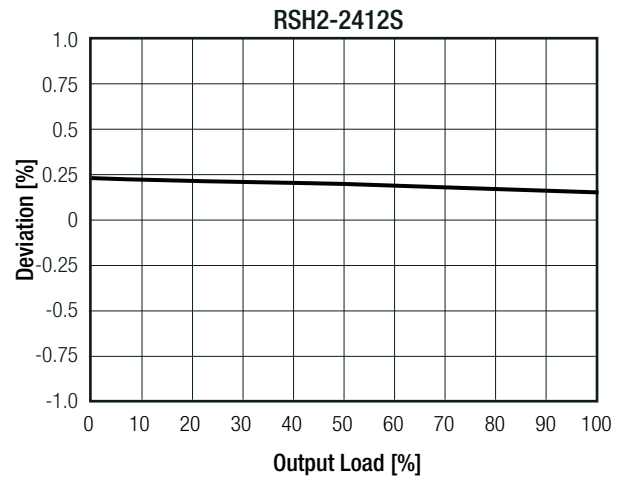
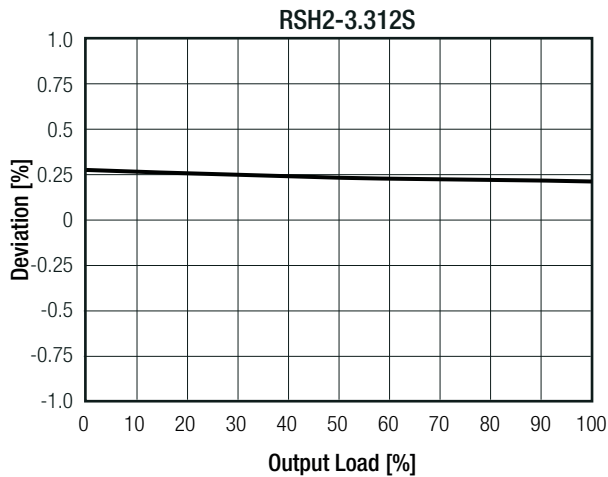


**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

**REGULATIONS**

Parameter	Condition	Value
Output Accuracy		±1.0% max.
Line Regulation	low line to high line, full load	±0.2% max.
Load Regulation	20% to 100% load	0.5% max.

**Deviation vs. Load**



**PROTECTIONS**

Parameter	Type		Value
Short Circuit Protection (SCP)	below 100mΩ		continuous, auto recovery
Over Current Protection (OCP)			160% typ., hiccup mode
Isolation Voltage <sup>(6)</sup>	I/P to O/P	tested for 1 minute	2kVDC 500VAC
			with suffix "H2" with suffix "H3"
Isolation Resistance			1GΩ typ.
Isolation Capacitance			50pF typ.

**Notes:**

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

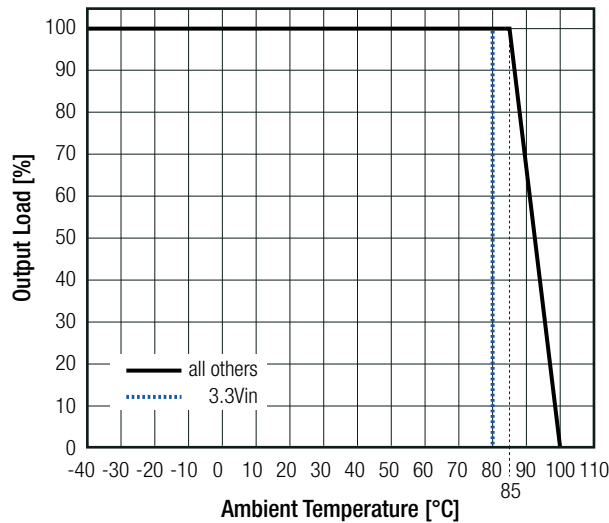
Note7: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	with derating	-40°C to +100°C
Maximum Case Temperature			105°C
Temperature Coefficient			±0.05%/K
Operating Altitude			5000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
Vibration			MIL-STD-202G
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +80°C	4140 x 10 <sup>3</sup> hours 1206 x 10 <sup>3</sup> hours

**Derating Graph**

(@ Chamber and natural convection 0.1 m/s)

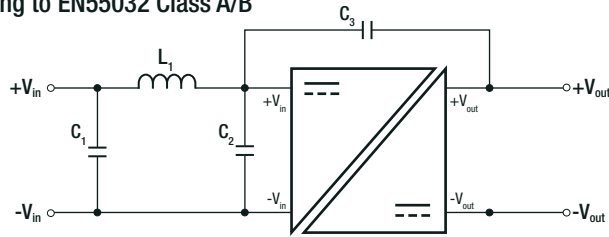


SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	File Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements	E224736-A6025-UL	UL62368-1:2014 CAN/CSA-C22.2 No. 62368-1:2014
Audio/Video, information and communication technology equipment - Part1: Safety requirements	pending	IEC62368-1:2014 2nd Edition EN62368-1:2014 + A11:2017
RoHS2		RoHS 2011/65/EU + AM2015/863
EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter refer to (" <i>EMC Filtering</i> ")	EN55032
Electromagnetic compatibility of multimedia equipment - Immunity requirements		EN55035
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024
ESD Electrostatic Discharge Immunity Test		IEC/EN61000-4-2
Radiated, Radio-Frequency, Electromagnetic Field Immunity Test		IEC/EN61000-4-3
Fast Transient and Burst Immunity		IEC/EN61000-4-4
Surge Immunity		IEC/EN61000-4-5
Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields		IEC/EN61000-4-6

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**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

**EMC Filtering Suggestions according to EN55032 Class A/B**



**Component List Class A**

MODEL	C1	C2	C3	L1
RSH2-3.312S/SMD	10µF	N/A	N/A	3.9µH
RSH2-0505S/SMD				
RSH2-2405S/SMD				
RSH2-2412S/SMD				

**Component List Class B**

MODEL	C1	C2	C3	L1
RSH2-3.312S/SMD	10µF	10µF	1nF	3.9µH
RSH2-0505S/SMD				
RSH2-2405S/SMD				
RSH2-2412S/SMD				

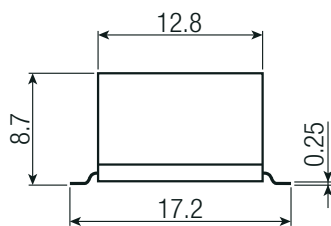
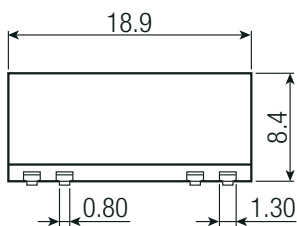
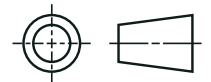
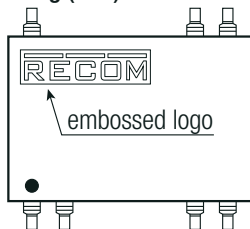
**Notes:**

Note8: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

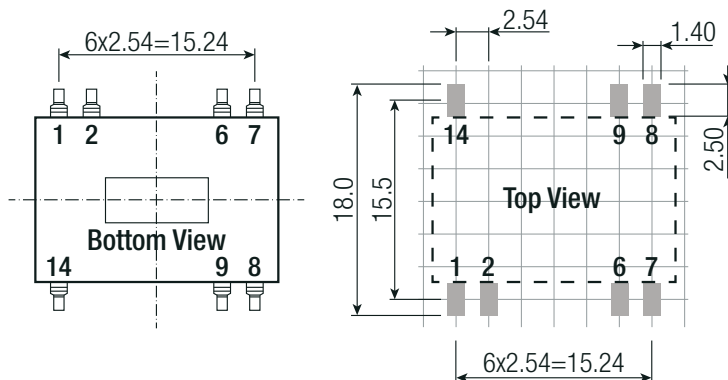
**DIMENSION AND PHYSICAL CHARACTERISTICS**

Parameter	Type	Value
Material	case & base	non-conductive black plastic
Dimension (LxWxH)		18.9 x 17.2 x 8.7mm
Weight		2.5g typ.

**Dimension Drawing (mm)**



**Recommended Footprint Details**



**Pinning Information**

Pin #	Single
1	-Vin
2	CTRL
6	NC
7	NC
8	+Vout
9	-Vout
14	+Vin

NC= no connection  
Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.25mm



**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PACKAGING INFORMATION		
Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 22.20 x 11.80mm
	tape and reel (carton)	385.0 x 375.0 70.0mm
	reel (diameter + width)	Ø330.0 x 44.0mm
Packaging Quantity	tube	25pcs
	tape and reel	150pcs
Tape Width		44mm
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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