



**THE DATASHEET OF  
RHV3-2412S/R20**



# Features

- 12.5kVAC/1 minute isolation
- Compact SIP16 case with >30mm pin separation
- Low 4pF max. isolation capacitance
- Wide operating temperature range from -40°C to +80°C at full load
- Efficiency up to 81%

# Unregulated Converters

## RHV3

**3 Watt  
SIP16  
Single and Dual  
Output**



### Description

The RHV3 is a DC/DC converter with exceptionally high 20kVDC (12.5kVAC/1 minute) isolation in a compact SIP16 case. Input voltages can be 5, 12 or 24VDC and outputs 5V, 12V, 24V, ±5V or ±12V. The operating temperature is -40°C to +80°C without derating. Applications include high vacuum monitoring, X-Ray equipment, HVAC dust extraction systems and other high voltage industrial applications where a very high isolation remote power supply is required.

### Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [µF]
RHV3-0505S/R20	5	5	600	76	1000
RHV3-0512S/R20	5	12	250	78	330
RHV3-0524S/R20	5	24	125	80	100
RHV3-1205S/R20	12	5	600	78	1000
RHV3-1212S/R20	12	12	250	79	330
RHV3-1224S/R20	12	24	125	80	100
RHV3-2405S/R20	24	5	600	80	1000
RHV3-2412S/R20	24	12	250	80	330
RHV3-2424S/R20	24	24	125	81	100
RHV3-0505D/R20	5	±5	±300	78	±680
RHV3-0512D/R20	5	±12	±125	80	±150
RHV3-1205D/R20	12	±5	±300	78	±680
RHV3-1212D/R20	12	±12	±125	81	±150
RHV3-2405D/R20	24	±5	±300	80	±680
RHV3-2412D/R20	24	±12	±125	80	±150



#### Notes:

- Note1: Efficiency is tested at nominal input and full load at +25°C ambient  
 Note2: The capacitive load is tested at minimum input and constant resistive load



IEC/EN62368-1 certified  
IEC/EN61010-1 certified

### Model Numbering



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

### BASIC CHARACTERISTICS

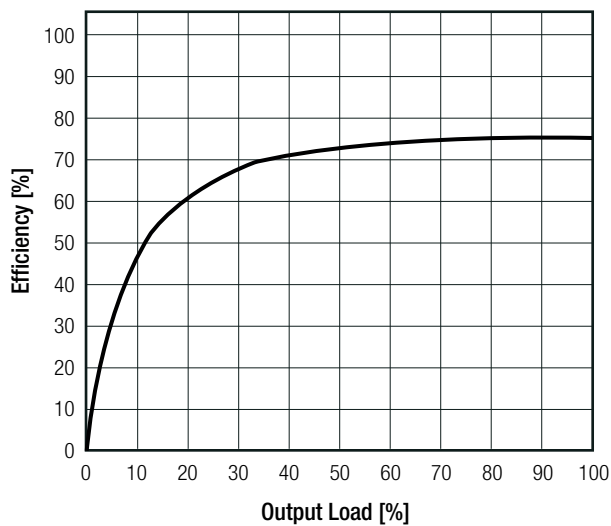
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitors
Input Voltage Range			±10%	
Minimum Load		0%		
Internal Operating Frequency		20kHz	45kHz	
Output Ripple and Noise <sup>(3)</sup>	20MHz BW		150mVp-p	200mVp-p

**Notes:**

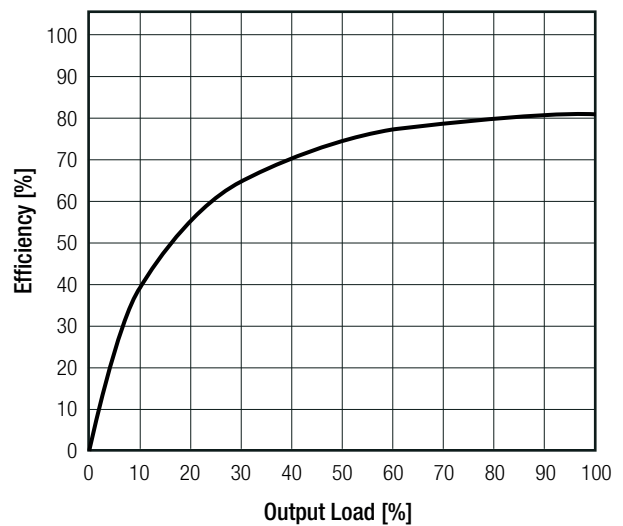
Note3: Measurements are made with a 0.1µF MLCC across output (low ESR)

### Efficiency vs. Load

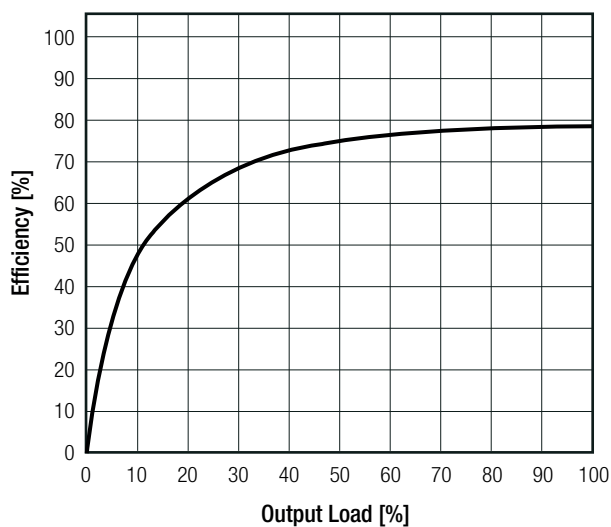
RHV3-0505S/R20



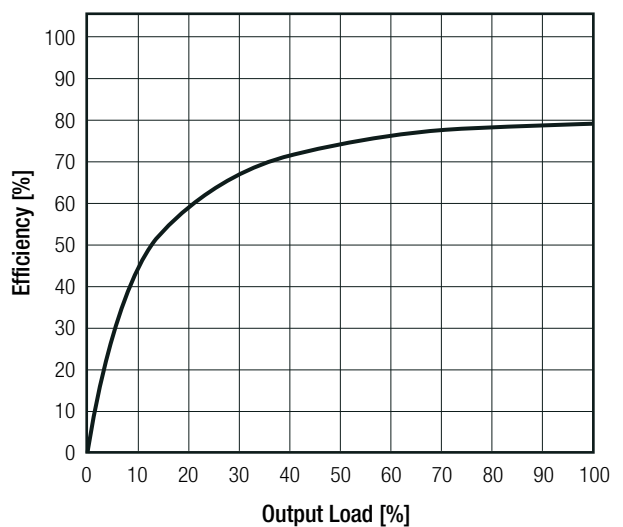
RHV3-2424S/R20



RHV3-0505D/R20



RHV3-1205S/R20



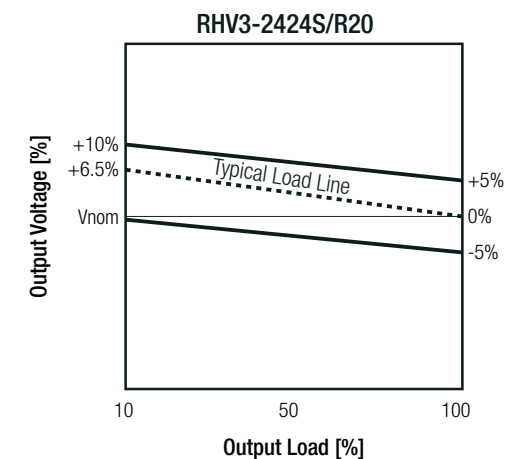
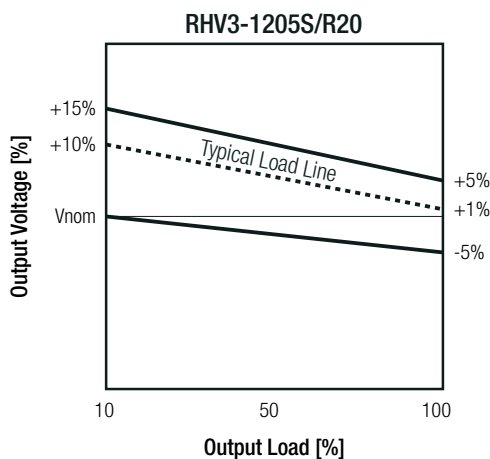
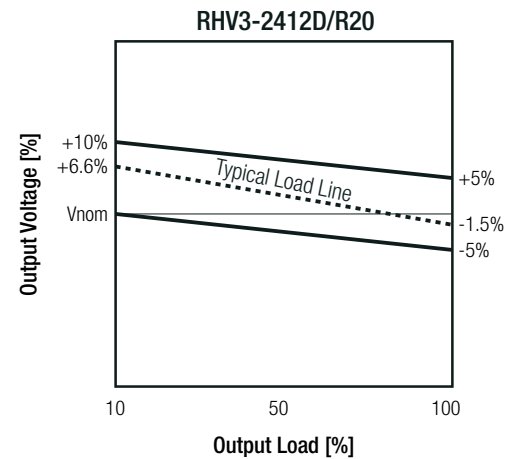
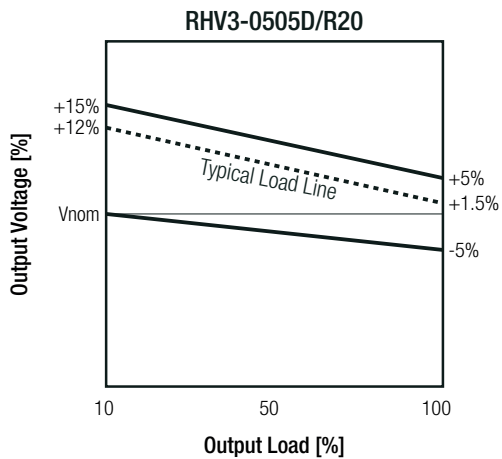
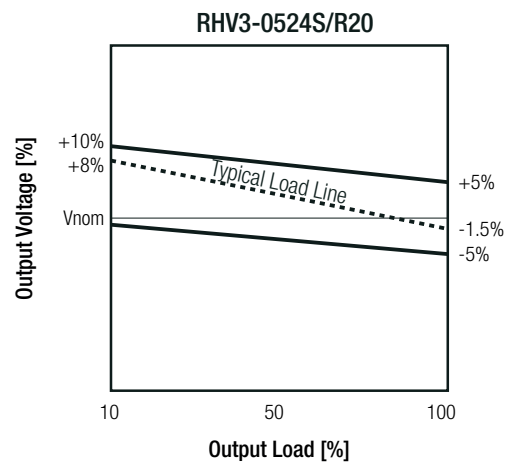
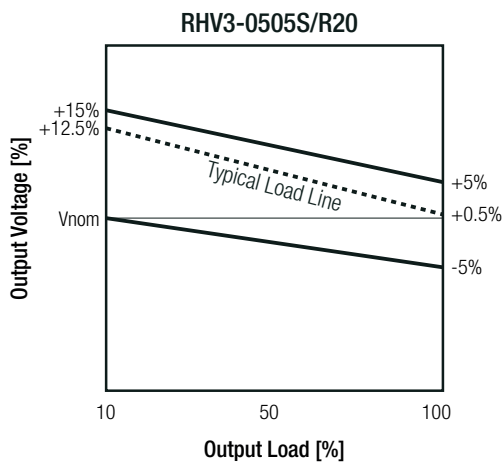
### Specifications (measured @ $T_a = 25^\circ\text{C}$ , nom. $V_{in}$ , full load and after warm-up unless otherwise stated)

REGULATIONS			
Parameter	Condition	Value	
Output Accuracy		$\pm 5.0\%$ max.	
Line Regulation	low line to high line, full load	$\pm 1.2\%$ of $1.0\% V_{in}$ typ.	
Load Regulation <sup>(4)</sup>	10% to 100% load	5Vin	15.0% max.
		others	10.0% max.
Cross Regulation	10% to 100% load	$\pm 7.5\%$ typ.	

#### Notes:

Note4: Operation below 10% load will not harm the converter, but specifications may not be met

#### Tolerance Envelope



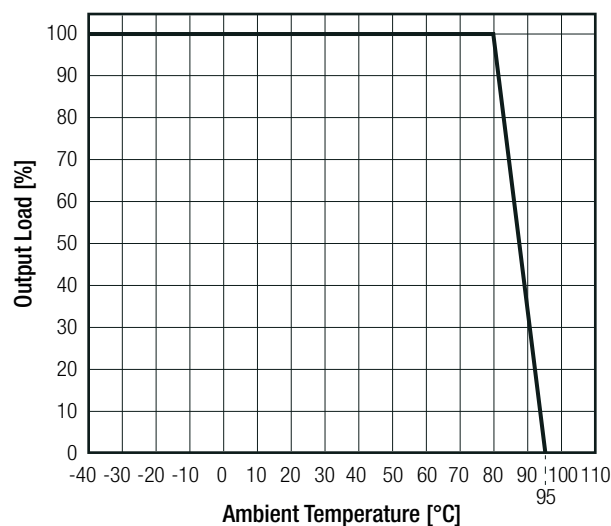
### Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PROTECTIONS			
Parameter	Type		Value
Isolation Voltage <sup>(5)</sup>	I/P to O/P	tested for 1 second tested for 1 minute	20kVDC 12.5kVAC
Isolation Resistance			15GΩ min.
Isolation Capacitance			3.5pF typ./ 4pF max.
Insulation Grade			reinforced
Working Voltage			1400Vrms
<b>Notes:</b>			
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			

ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	without derating @ natural convection 0.1m/s (see graph)		-40°C to +80°C
Maximum Case Temperature			+105°C
Temperature Coefficient			0.02%/K max.
Thermal Impedance			12K/W typ.
Operating Altitude			5000m
Operating Humidity	non-condensing		5% - 95% RH max.
Pollution Degree			PD2
Vibration			MIL-STD-202G
MTBF	according to MIL-HDBK-217F,G.B.	+25°C +80°C	13400 x 10 <sup>3</sup> hours 3600 x 10 <sup>3</sup> hours

#### Derating Graph

(@ Chamber and natural convection 0.1 m/s)



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

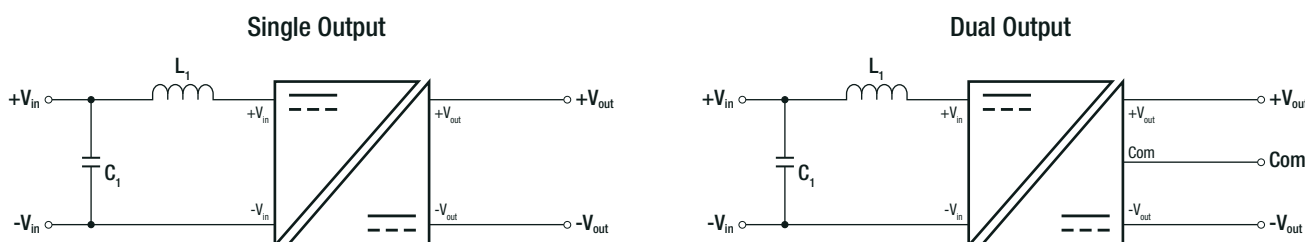
### SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements	WD-SE-R-190305-A0	IEC62368-1:2014 2nd Edition EN62368-1:2014+AC:2015
Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements	WD-SE-R-190305-B0	IEC61010:2010 EN61010:2010
RoHS 2		RoHS 2011/65/EU + AM2015/863

### EMC Compliance

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements	refer to <b>“EMC Filtering Suggestions according to EN55032”</b>	EN55032, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010 + A1:2015
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8kV, Contact: ±2, 4kV	IEC61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	IEC61000-4-3:2006+A2:2010, Criteria A
Fast Transient and Burst Immunity	DC Power Port: ±0.5kV, ±1kV	IEC61000-4-4:2012, Criteria A
Surge Immunity	DC Power (Output) Port: ±0.5kV	IEC61000-4-5:2014+A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	DC Power (Output) Port: 3V	IEC61000-4-6:2013+C1:2015, Criteria A
Power Magnetic Field Immunity	50Hz, 1A/m	IEC61000-4-8:2010, Criteria A

### EMC Filtering Suggestions according to EN55032



#### Component List Class B

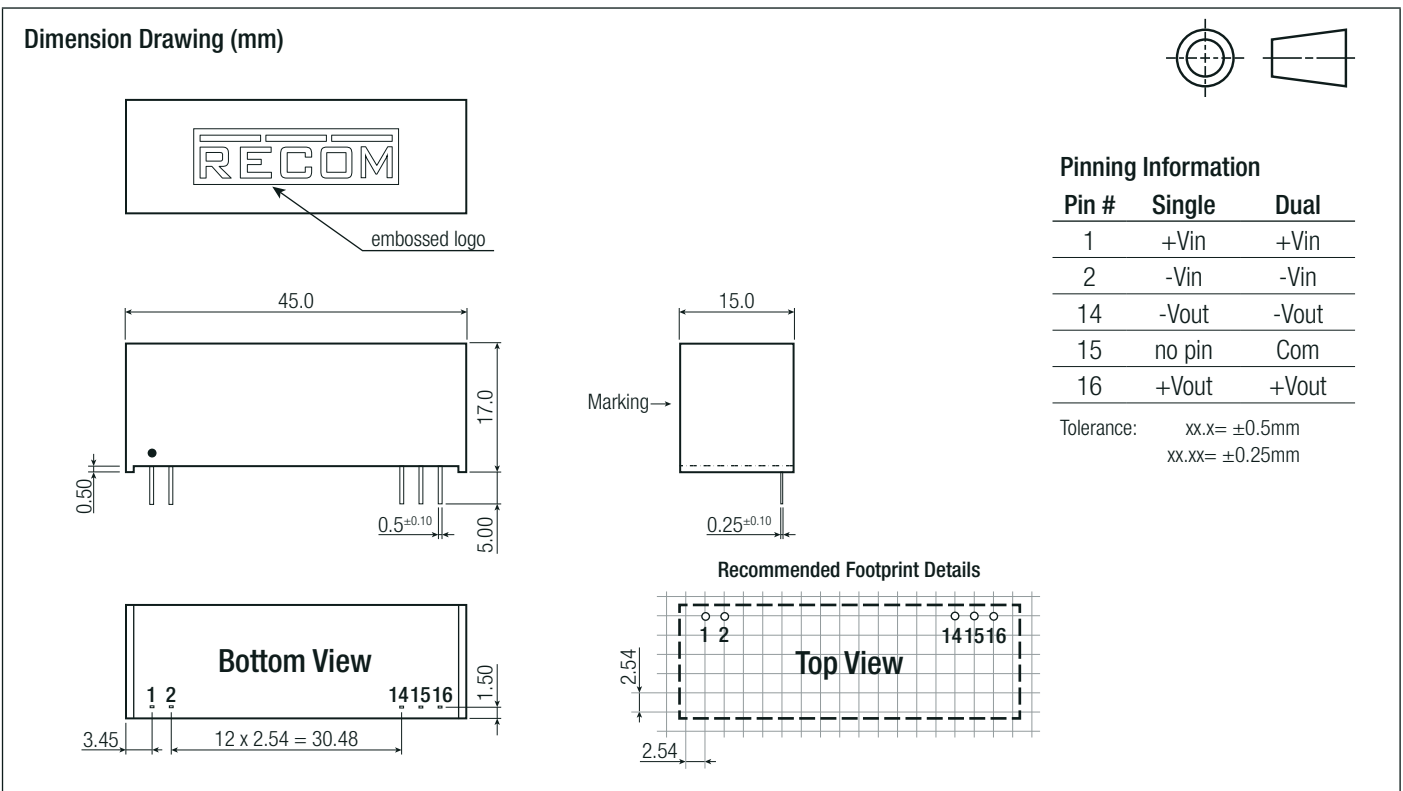
nom. Input Voltage	C <sub>1</sub>	L <sub>1</sub>
5VDC, 12VDC, 24VDC	10µF, MLCC	<a href="#">18µH choke RLS-186</a>

### DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	black plastic, (UL94V-0)
	PCB	FR4, (UL94V-0)
	potting	epoxy, (UL94V-0)
Package Dimension (LxWxH)		45.0 x 15.0 x 17.0mm
Weight		19.7g typ.

continued on next page

### 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 26.9 x 17.9mm
Packaging Quantity		10pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	5% - 95% RH max.

The product information and specifications may be subject to changes even without prior written notice. The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant 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.

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