

# Features

# Unregulated Converters

- 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%



# 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



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

### 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

## Model Numbering



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

**BASIC CHARACTERISTICS**

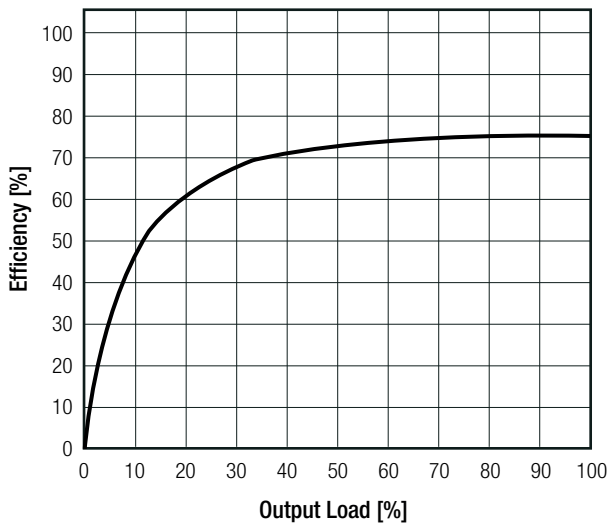
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitors
Input Voltage Range			±10%	
Minimum Load		0%		
Internal Operating Frequency		20kHz	45kHz	
Output Ripple and Noise <sup>(3)</sup>	20MHz BW		150mVp-p	200mVp-p

**Notes:**

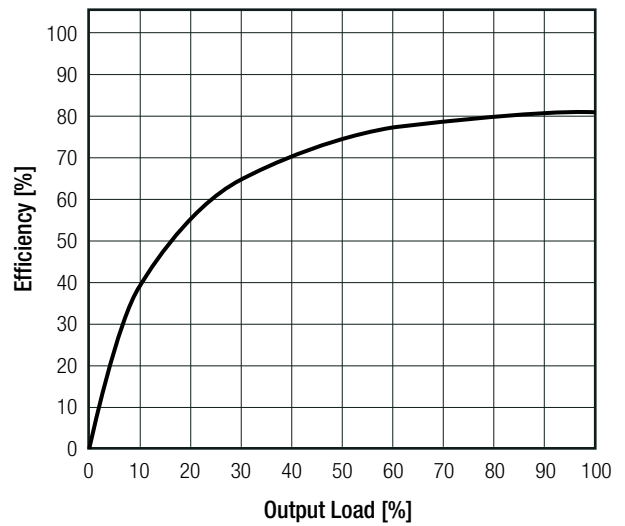
Note3: Measurements are made with a 0.1µF MLCC across output (low ESR)

**Efficiency vs. Load**

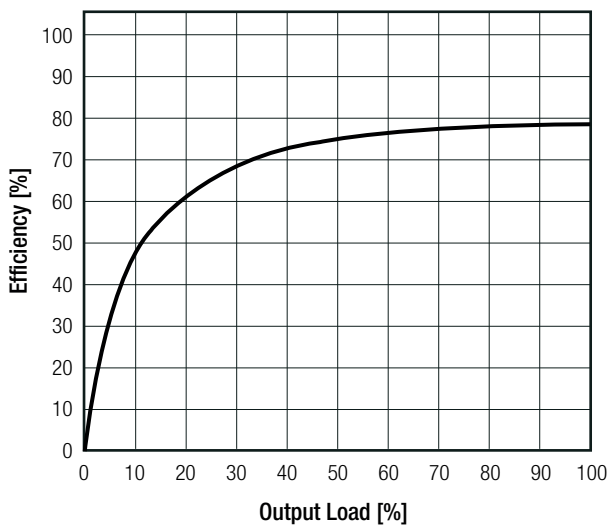
**RHV3-0505S/R20**



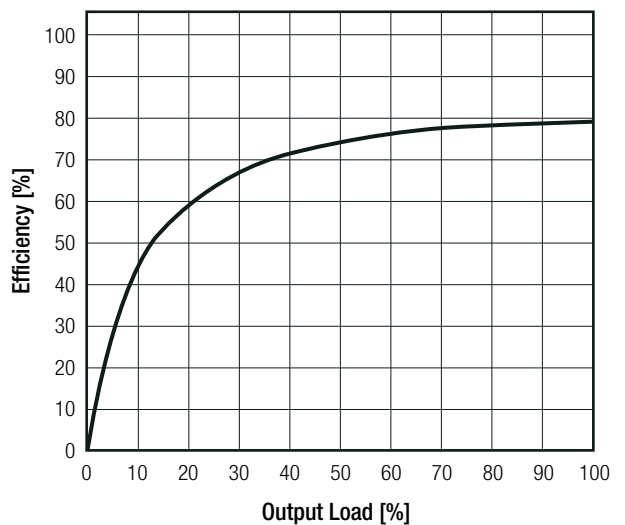
**RHV3-2424S/R20**



**RHV3-0505D/R20**



**RHV3-1205S/R20**



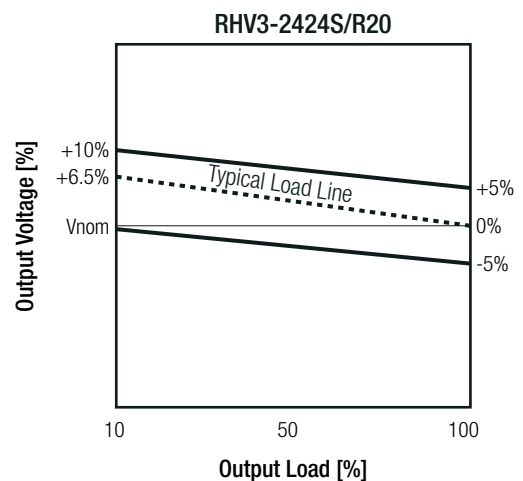
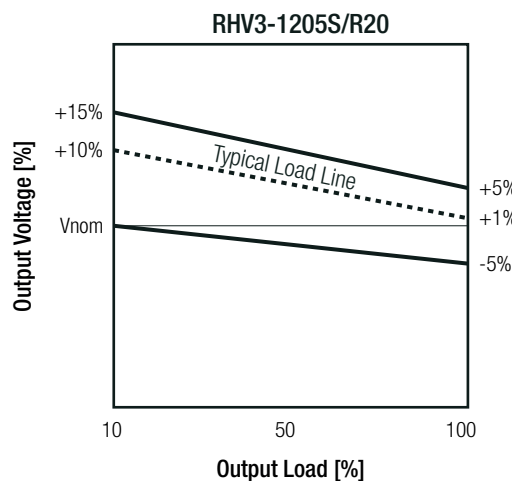
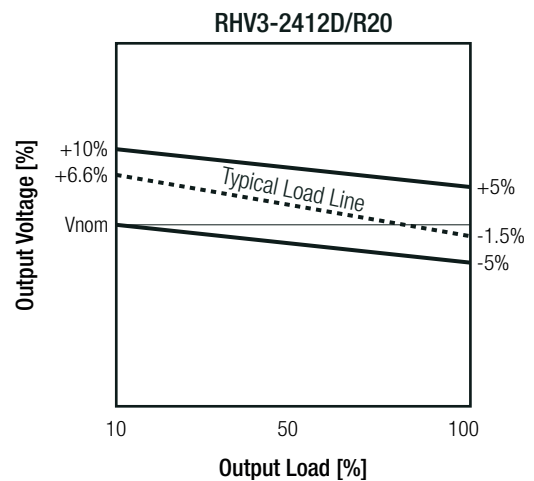
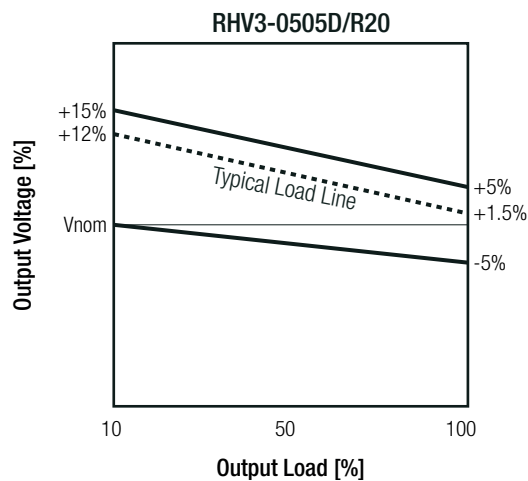
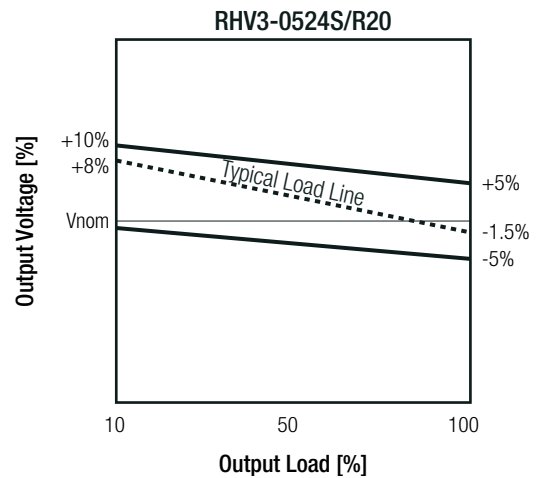
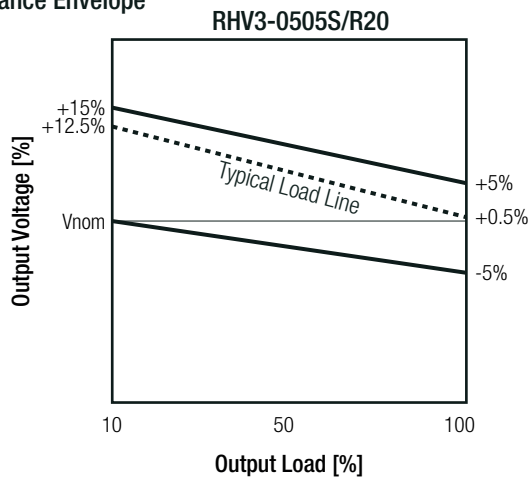
**Specifications** (measured @  $T_a = 25^\circ\text{C}$ , nom.  $V_{in}$ , full load and after warm-up unless otherwise stated)

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

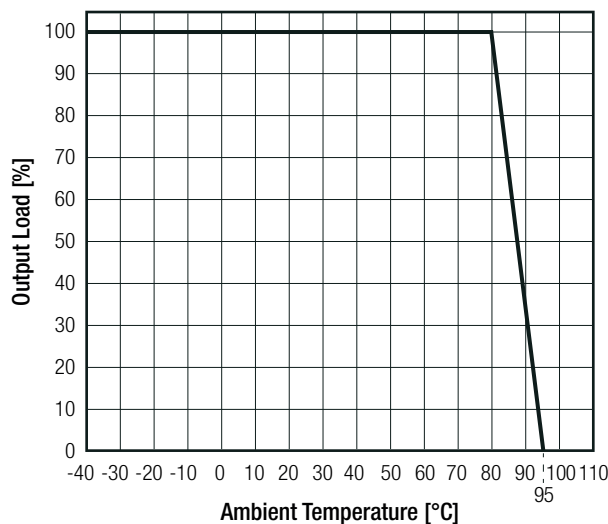
**Notes:**

- 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)



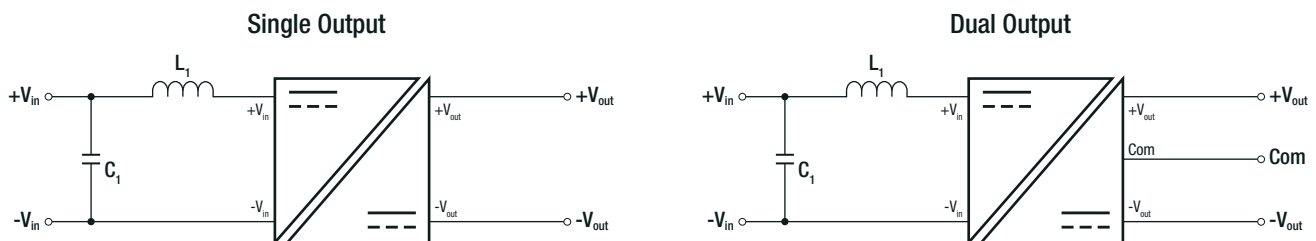
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

**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	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements	refer to <b>“EMC Filtering Suggestions”</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**

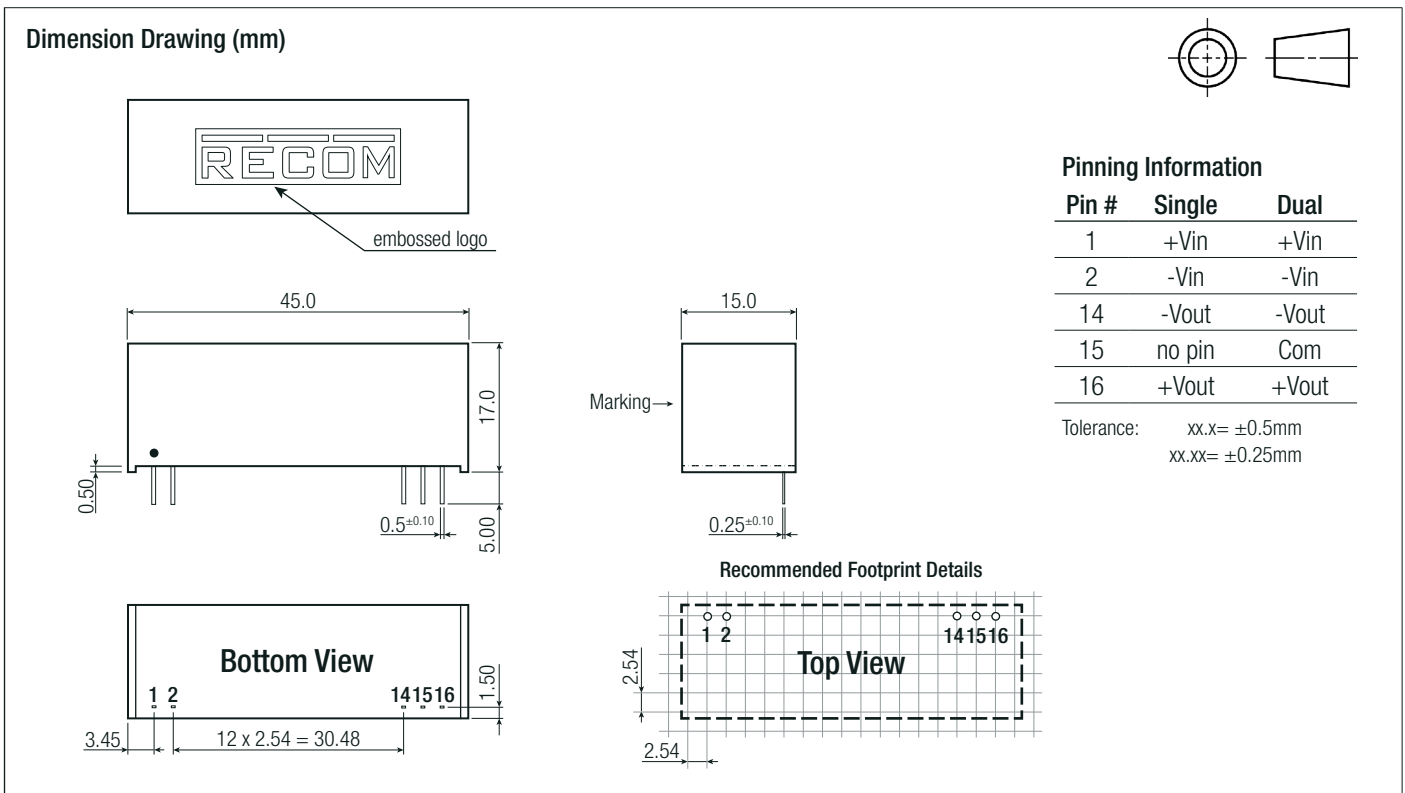
nom. Input Voltage	C <sub>1</sub>	L <sub>1</sub>
5VDC, 12VDC, 24VDC	10µF, 50VDC MLCC	<a href="#">18µH choke RLS-226</a>

**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.

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