

# Features

# Unregulated Converters

- UL/CSA/IEC/EN safety certified and CB report
- 6kVDC/1s isolation
- Optional continuous short circuit protection
- Efficiency up to 82%
- Space saving package
- Very low isolation capacitance
- Suitable for IGBT application



## RV

**2 Watt  
DIP24  
miniature  
Single and Dual  
Output**

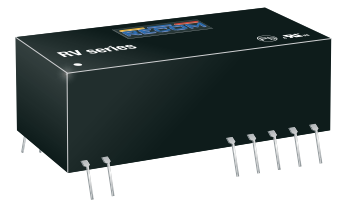


### Description

Very high isolation in a small size are the main features of this miniature DIP24 converter, ideal for highly sophisticated industrial, test and measurement and medical designs where board space is at a premium.

### 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]
RV-xx3.3S <sup>(3)</sup>	3.3, 5, 12, 15, 24	3.3	600	70	3300
RV-xx05S <sup>(3)</sup>	3.3, 5, 12, 15, 24	5	400	70-75	1200
RV-xx09S <sup>(3)</sup>	3.3, 5, 12, 15, 24	9	222	70-75	1200
RV-xx12S <sup>(3)</sup>	3.3, 5, 12, 15, 24	12	167	70-75	680
RV-xx15S <sup>(3)</sup>	3.3, 5, 12, 15, 24	15	132	75-80	680
RV-xx24S <sup>(3)</sup>	3.3, 5, 12, 15, 24	24	83	75-80	220
RV-xx3.3D <sup>(3)</sup>	3.3, 5, 12, 15, 24	±3.3	±300	70	±1500
RV-xx05D <sup>(3)</sup>	3.3, 5, 12, 15, 24	±5	±200	70-75	±470
RV-xx09D <sup>(3)</sup>	3.3, 5, 12, 15, 24	±9	±111	70-75	±470
RV-xx12D <sup>(3)</sup>	3.3, 5, 12, 15, 24	±12	±85	70-75	±220
RV-xx15D <sup>(3)</sup>	3.3, 5, 12, 15, 24	±15	±66	75-80	±220
RV-xx24D <sup>(3)</sup>	3.3, 5, 12, 15, 24	±24	±42	75-80	±100
RV-xx1509D	5, 12, 24	+15/-9	+67/-111	70-82	±330



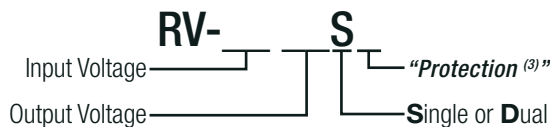
#### Notes:

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

UL60950-1 certified  
 CAN/CSA-C22.2 No. 60950-1-07 certified  
 IEC/EN60950-1 certified  
 UL62368-1 certified  
 CAN/CSA-C22.2 No. 62368-1-14 certified  
 IEC/EN62368-1 certified  
 CB report

### Model Numbering



#### Notes:

Note3: standard part is without continuous short circuit protection  
 add suffix „/P“ for continuous short circuit protection

#### Ordering Examples

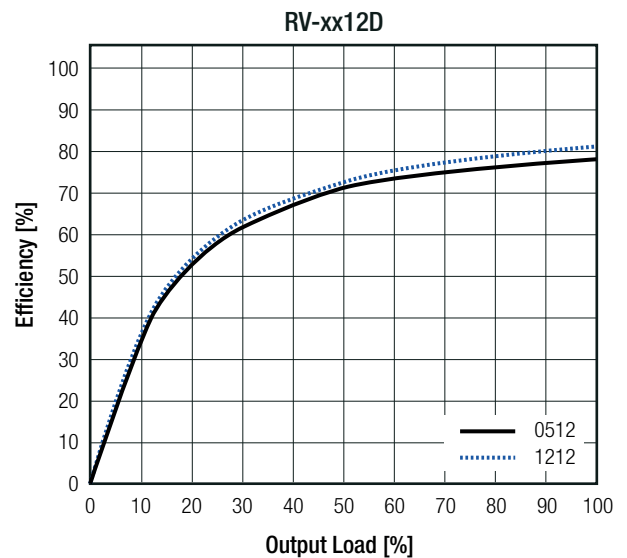
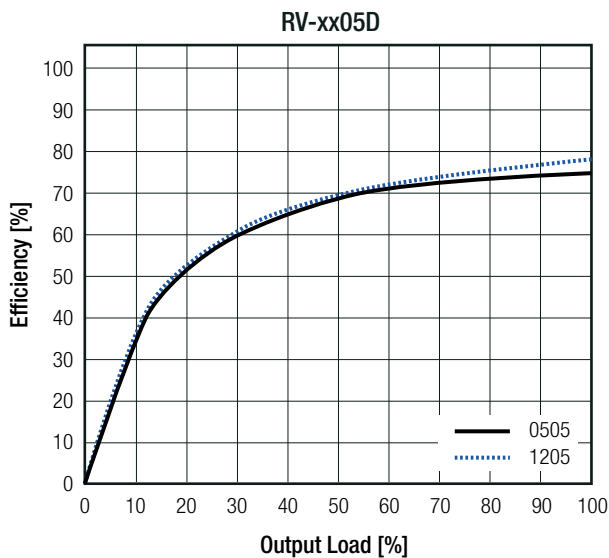
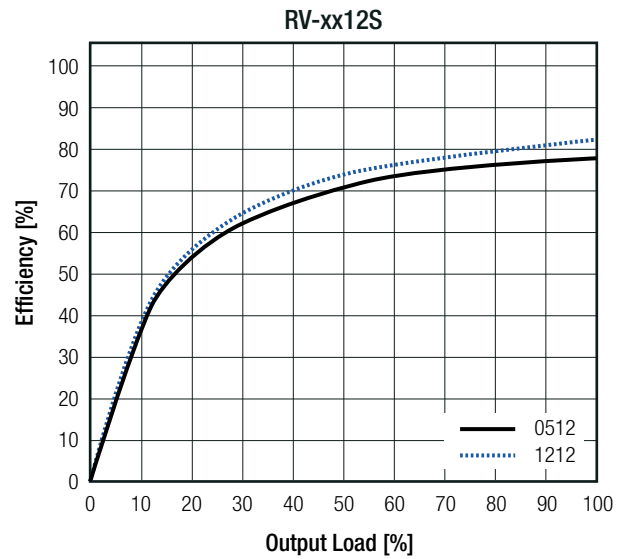
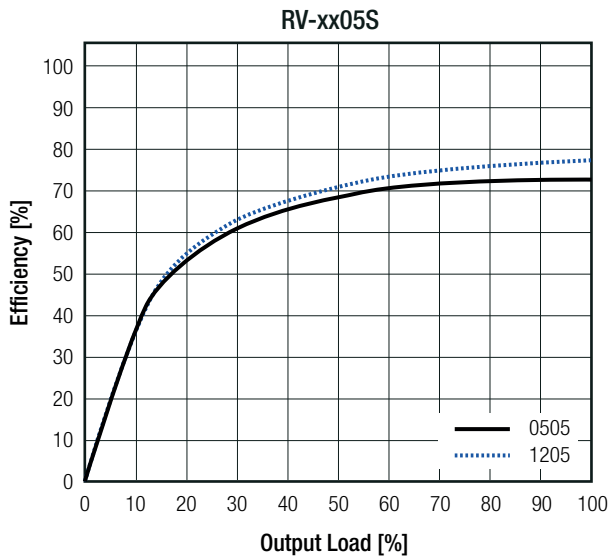
RV-053.3S/P = 5V Input, 3.3V Output, Single, short circuit protection  
 RV-1212D = 12V Input, 12V Output, Dual

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

### BASIC CHARACTERISTICS

Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load		0%		
Internal Operating Frequency	all others RV-XX1509D	20kHz 20kHz	50kHz 47kHz	85kHz
Output Ripple and Noise	20MHz BW			200mVp-p

### Efficiency vs. Load



### REGULATIONS

Parameter	Condition		Value
Output Accuracy			±5.0% typ.
Line Regulation	low line to high line		±1.2% of 1.0% Vin typ.
Load Regulation <sup>(4)</sup>	10% to 100% load	3.3Vout	20.0% max.
		5Vout	15.0% max.
		9, 12, 15, 24 and +15/-9Vout	10.0% max.

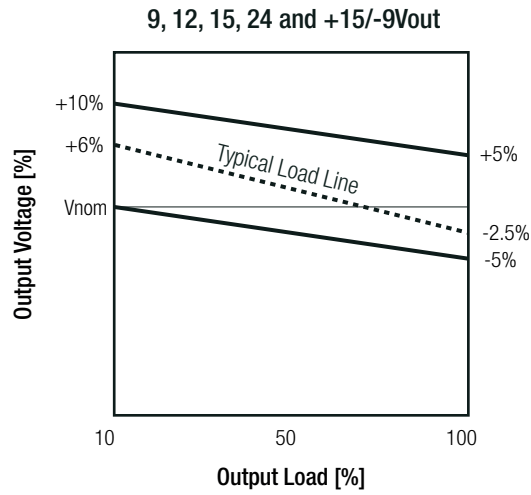
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**Specifications** (measured @  $T_a = 25^\circ\text{C}$ , nom.  $V_{in}$ , full load and after warm-up unless otherwise stated)

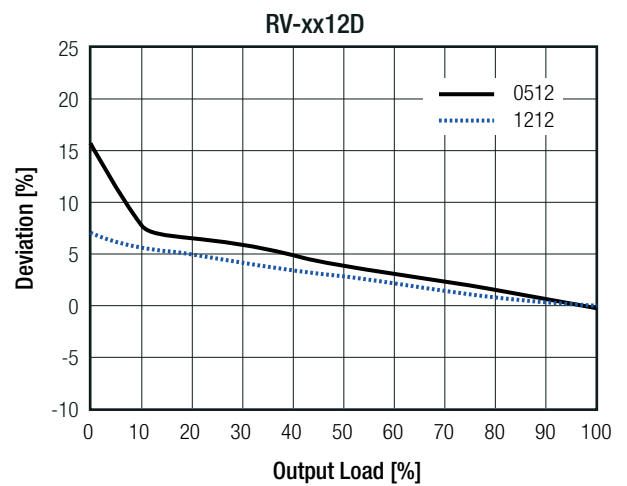
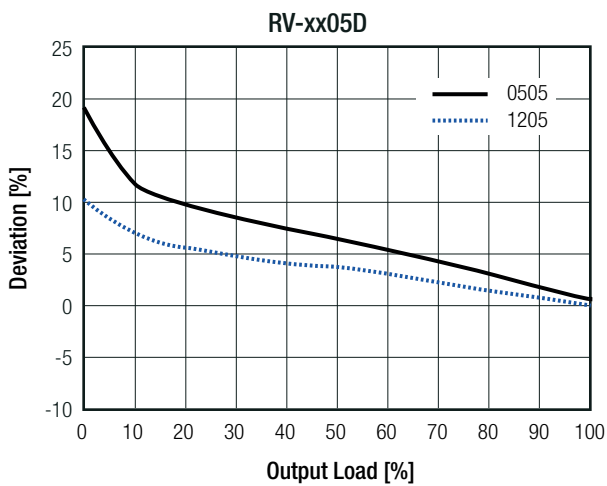
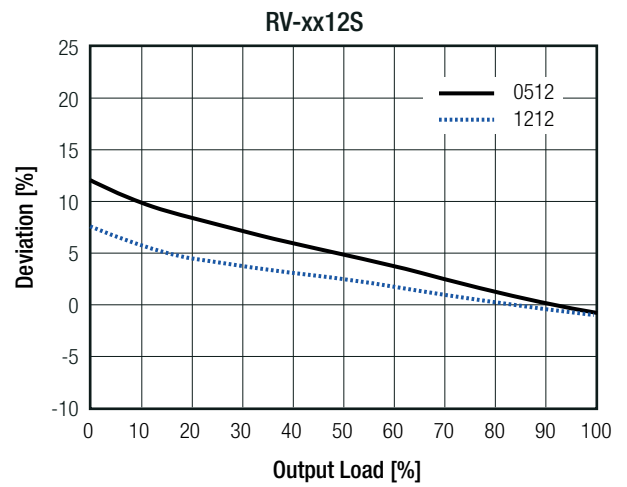
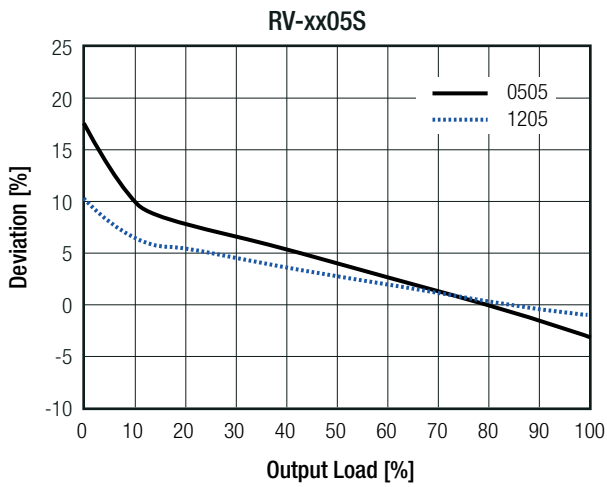
**Notes:**

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

**Tolerance Envelope**



**Deviation vs. Load**

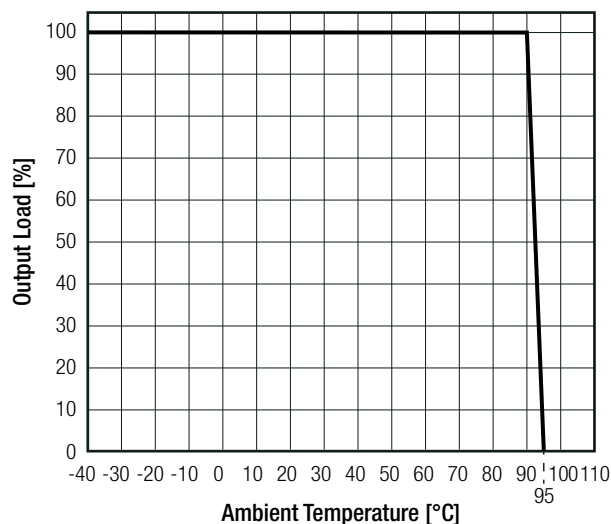


**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PROTECTIONS			
Parameter	Type		Value
Short Circuit Protection (SCP)	without suffix with suffix "/P"		1 second continuous
Isolation Voltage <sup>(5)</sup>	I/P to O/P	tested for 1 second rated for 1 minute	6kVDC 3kVAC/60Hz
Isolation Resistance			15GΩ min.
Isolation Capacitance			2pF min. / 12pF max.
Insulation Grade			basic (IEC/EN60950-1, IEC/EN62368-1) functional (IEC/EN60601-1)
<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 required. Recommended fuse: slow blow type			

ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	full load @ free air convection (see graph)		-40°C to +90°C
Operating Altitude			3000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +85°C	1154 x 10 <sup>3</sup> hours 168 x 10 <sup>3</sup> hours

**Derating Graph**  
(@ free air convection)



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

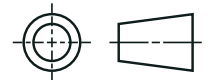
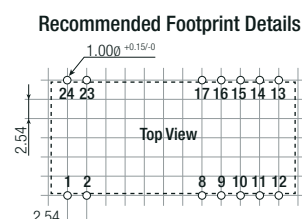
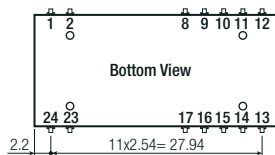
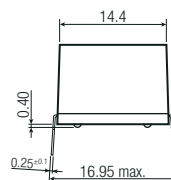
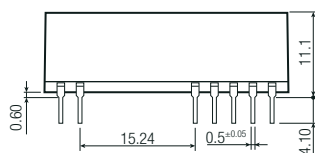
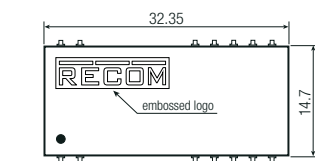
#### SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E224736-A56-UL	CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition, 2014 UL No. 60950-1, 2nd Edition, 2014
Information Technology Equipment, General Requirements for Safety (LVD)	LVD1602031	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
Audio/Video, information and communication technology equipment - Part1: Safety requirements	E224736-A56-UL	CAN/CSA-C22.2 No. 62368-1-14, 2nd Edition UL62368-1, 2nd Edition, 2014
Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	WD-SE-R-180541-A0	IEC60601-1:2005 + A1:2012, 3rd Edition EN60601-1:2006 + A12:2014
Audio/Video, information and communication technology equipment - Part1: Safety requirements	ATTCB106076	EN62368-1:2014 + A11:2017
Audio/Video, information and communication technology equipment - Part1: Safety requirements (CB Scheme)		IEC62368-1:2014 2nd Edition
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS 2		RoHS-2011/65/EU + AM-2015/863

#### DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case potting PCB	non-conductive black plastic, (UL94 V-0) epoxy, (UL94 V-0) FR4, (UL94 V-0)
Dimension (LxWxH)		32.35 x 14.7 x 11.1mm
Weight		9.0g typ.

#### Dimension Drawing (mm)



#### Pinning Information

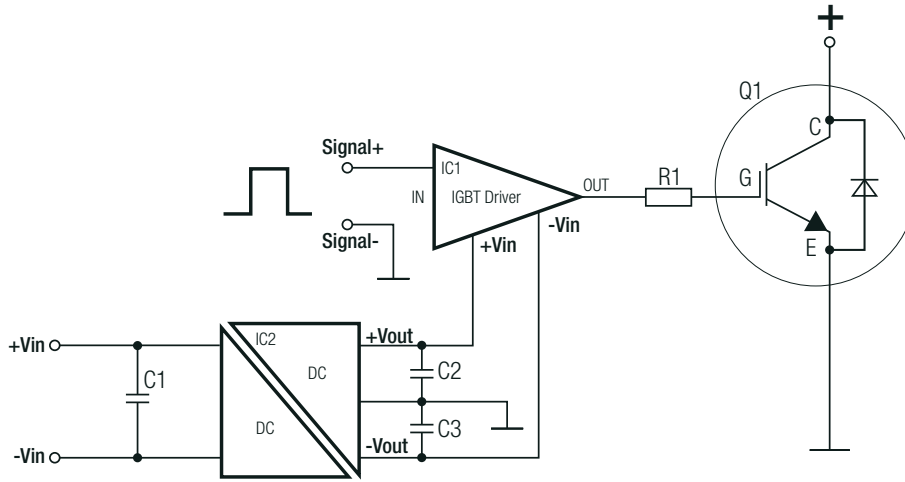
Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
8, 17	NC	-Vout
9, 11, 14	NC	NC
10, 15	-Vout	Com
12, 13	+Vout	+Vout
16, 23, 24	NC	NC

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)

**INSTALLATION AND APPLICATION**

**IGBT Application Circuit**



**PACKAGING INFORMATION**

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	530.0 x 21.0 x 18.0mm
Packaging Quantity	tube	15pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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