

Features

Unregulated Converters

- IEC60601-1 for medical applications
- UL/CSA/IEC/EN safety certified and CB report
- 6.4kVDC/1s or 8kVDC/1s reinforced isolation
- Optional continuous short circuit protection
- Efficiency up to 88%
- Space saving package
- Very low isolation capacitance

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

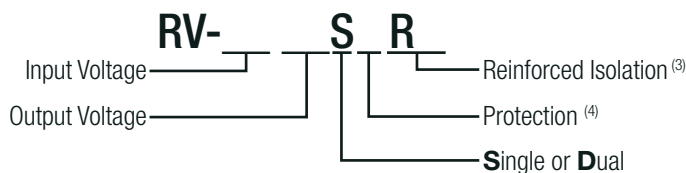
Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	max. Capacitive Load ⁽²⁾ [μF]
RV-xx3.3S ^(3,4)	3.3, 5, 12, 15, 24	3.3	600	70-78	3300
RV-xx05S ^(3,4)	3.3, 5, 12, 15, 24	5	400	76-80	1200
RV-xx09S ^(3,4)	3.3, 5, 12, 15, 24	9	222	78-85	1200
RV-xx12S ^(3,4)	3.3, 5, 12, 15, 24	12	167	78-85	680
RV-xx15S ^(3,4)	3.3, 5, 12, 15, 24	15	132	78-88	680
RV-xx3.3D ^(3,4)	3.3, 5, 12, 15, 24	±3.3	±300	70-78	±1500
RV-xx05D ^(3,4)	3.3, 5, 12, 15, 24	±5	±200	75-82	±470
RV-xx09D ^(3,4)	3.3, 5, 12, 15, 24	±9	±111	76-84	±470
RV-xx12D ^(3,4)	3.3, 5, 12, 15, 24	±12	±85	78-86	±220
RV-xx15D ^(3,4)	3.3, 5, 12, 15, 24	±15	±66	78-86	±220

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

Model Numbering



Notes:

Note3: add suffix „/R6.4“ for 6.4kVDC/1second isolation
or „/R8“ for 8kVDC/1second isolation

Note4: standard part is without continuous short circuit protection
add suffix „/P“ for continuous short circuit protection

Ordering Examples

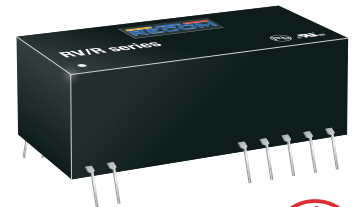
RV-1212D/R6.4 = 12V Input, 12V Output, Dual, 6.4kVDC/1s isolation

RV-053.3S/P/R8 = 5V Input, 3.3V Output, Single, short circuit protection, 8kVDC/1s isolation

RECOM
DC/DC Converter

RV/R

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



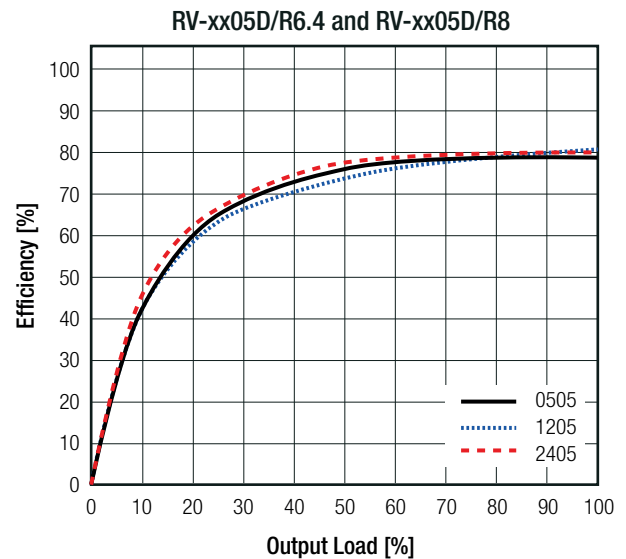
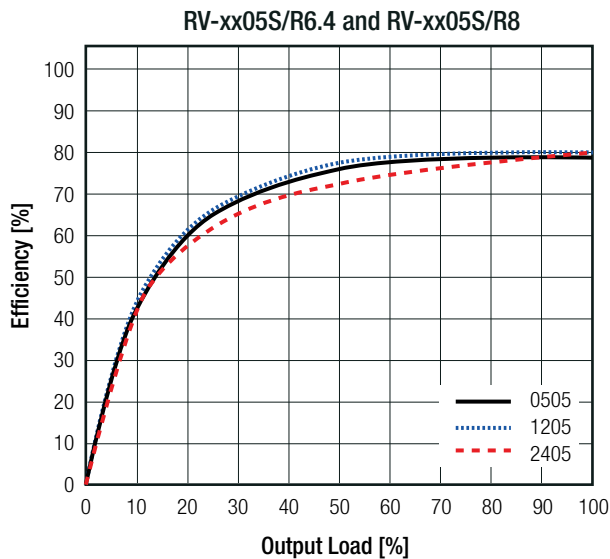
UL60950-1 certified
CAN/CSA-C22.2 No. 60950-1 certified
IEC/EN60950-1 certified
ANSI/AAMI ES60601-1 certified
CAN/CSA-C22.2 No. 60601-1 certified
IEC/EN60601-1 certified
IEC/EN61010 certified
CB report

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		20kHz	50kHz	85kHz
Output Ripple and Noise	20MHz BW			200mVp-p

Efficiency vs. Load



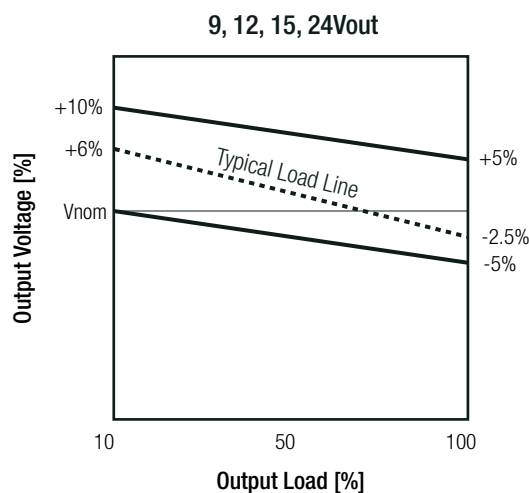
REGULATIONS

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

Notes:

Note5: Operation below 10% load will not harm the converter, but specifications may not be met

Tolerance Envelope

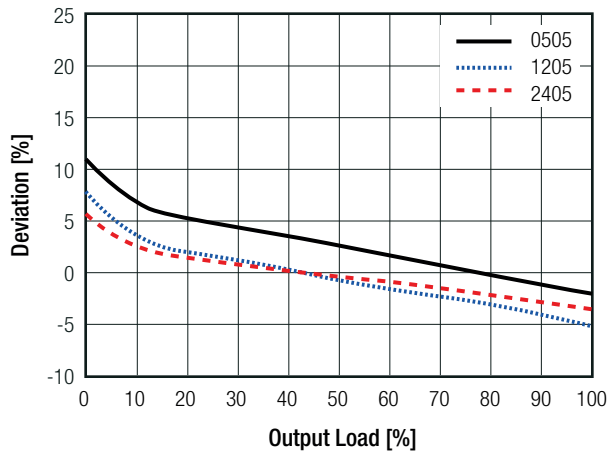


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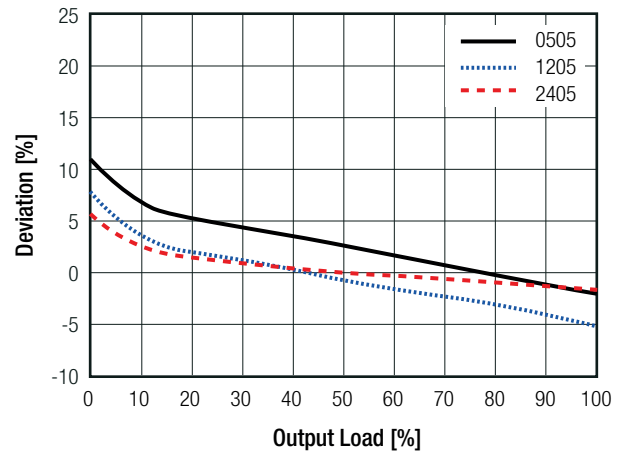
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Deviation vs. Load

RV-xx05S/R6.4 and RV-xx05S/R8



RV-xx05D/R6.4 and RV-xx05D/R8



PROTECTIONS

Parameter	Type			Value
Short Circuit Protection (SCP)	without suffix with suffix "/P"			1 second continuous
Isolation Voltage ⁽⁶⁾	I/P to O/P	"/R6.4"	tested for 1 second rated for 1 minute	6.4kVDC 3.2kVAC/60Hz
		"/R8"	tested for 1 second rated for 1 minute	8kVDC 4kVAC/60Hz
Isolation Resistance				15GΩ min.
Isolation Capacitance				2pF min. / 12pF max.
Insulation Grade				reinforced
Means of Protection	34Vr.m.s.			2MOPP
Internal	clearance/creepage			>4.8mm
External	clearance/creepage			>4.8mm

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 required. Recommended fuse: slow blow type

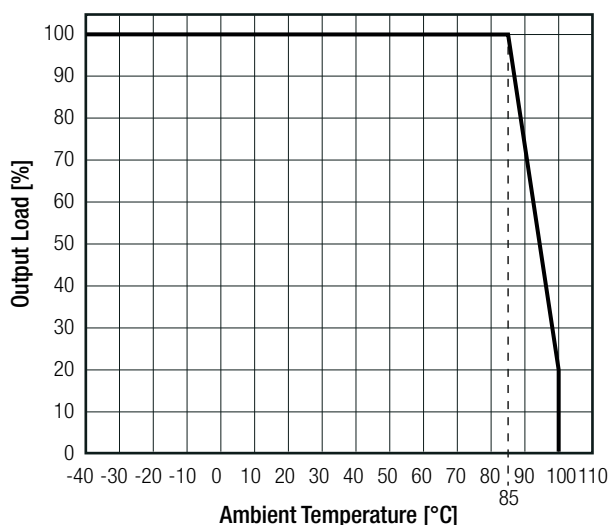
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

ENVIRONMENTAL

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

Derating Graph

(@ free air convection)



SAFETY AND CERTIFICATIONS

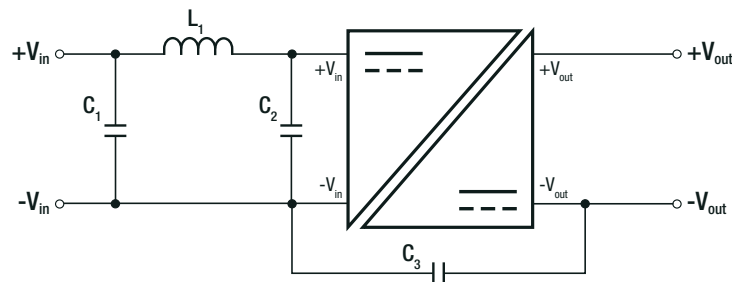
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	2236395	ANSI/UL60950-1, 1st Edition CAN/CSA C22.2 No. 60950-1-03
Information Technology Equipment, General Requirements for Safety	LVD1605077-14	IEC60950-1-2005, 2nd Edition + A2:2013 EN60950-1: 2006 + A2:2013
Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	E314885-A5-UL	ANSI/AAMI ES60601-1:2005 + A2:10 CAN/CSA-C22.2 No. 60601-1:2008
Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance (CB Scheme)	E314885-A5-CB-1	IEC60601-1:2005 + C2:2007
Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	WD-SE-R-180539-A0	IEC60601-1:2005 + A1:2012, 3rd Edition EN60601-1:2006 + A12:2014
Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements	T1301251-313	EN61010:2010 IEC61010:2010
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS 2+		RoHS-2011/65/EU + AM-2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter (refer to "EMC Filter Suggestion" below)	EN55032, Class A EN55032, Class B

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

EMC Filter Suggestion according to EN55032



Component List Class A

Model	C1	C2	C3	L1
RV/R6.4	N/A	10 μF	2n2F 8kV	N/A
RV/R8			2n5F 10kV	

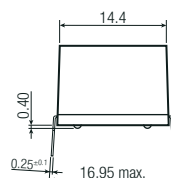
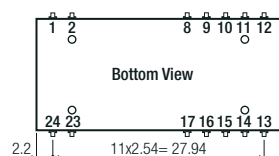
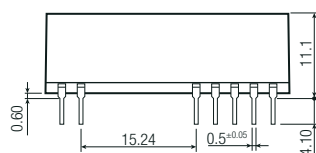
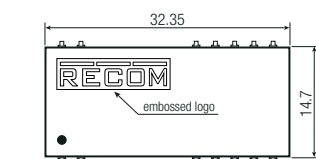
Component List Class B

Model	C1	C2	C3	L1
RV/R6.4	10 μF	10 μF	2n2F 8kV	470 μH
RV/R8			2n5F 10kV	WE7447471471

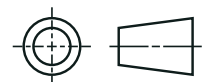
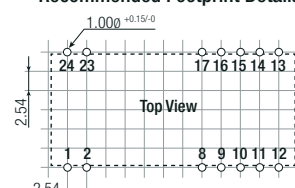
DIMENSION AND PHYSICAL CHARACTERISTICS

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

Dimension Drawing (mm)



Recommended Footprint Details



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= $\pm 0.5\text{mm}$

xx.xx= $\pm 0.25\text{mm}$

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	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.

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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