



**THE DATASHEET OF
R12P212S/R8**



Features

- Qualified with 65kV/μs @ Vcommon mode =1KV
- IEC/EN61010 for test, measurement and lab use
- IEC/EN60601 for medical applications
- Reinforced isolation 6.4kVDC or 8kVDC
- Optional continuous short circuit protection
- Very low isolation capacitance
- /X2 Option for >9mm input/output clearance

Unregulated Converters



RxxP2xx/R

2 Watt
SIP 7
Single and Dual Output



Description

The RxxP2xx/R Series of DC/DC Converters are certified to IEC/EN/UL/CSA-60950. This makes them ideal for safety applications where approved or reinforced isolation is required. These versions are also EN61010-1 certified for lab equipment. The /X2 version has an input/output clearance of more than 9mm.

Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	max. Capacitive Load ⁽²⁾ [μF]
RxxP23.3S/R ^(3,4,5)	5, 12, 15, 24	3.3	600	72 - 78	3300
RxxP205S/R ^(3,4,5)	5, 12, 15, 24	5	400	79 - 84	1200
RxxP209S/R ^(3,4,5)	5, 12, 15, 24	9	222	80 - 87	1200
RxxP212S/R ^(3,4,5)	5, 12, 15, 24	12	167	80 - 87	680
RxxP215S/R ^(3,4,5)	5, 12, 15, 24	15	133	80 - 88	680
RxxP23.3D/R ^(3,4,5)	5, 12, 15, 24	±3.3	±300	73 - 80	±1500
RxxP205D/R ^(3,4,5)	5, 12, 15, 24	±5	±200	79 - 85	±470
RxxP209D/R ^(3,4,5)	5, 12, 15, 24	±9	±111	80 - 87	±470
RxxP212D/R ^(3,4,5)	5, 12, 15, 24	±12	±85	80 - 87	±330
RxxP215D/R ^(3,4,5)	5, 12, 15, 24	±15	±66	80 - 87	±330



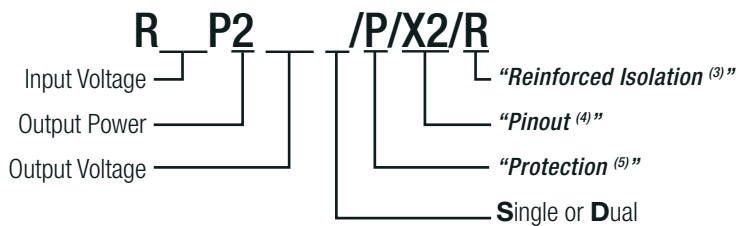
Notes:

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

Note2: Max. Capacitive Load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter



Model Numbering



UL/CSA60950-1 certified
IEC/EN60950-1 certified
UL/ES/CSA60601-1 certified
IEC/EN60601-1 certified
IEC/EN61010-1 certified
CB report

Notes:

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

Note4: add suffix „/X2“ for single output with alternative pinout

Note5: add suffix „/P“ for continuous short circuit protection

Ordering Examples:

R05P23.3S/R8/P = 5V Input, 3.3V Output, Single Output, 8kVDC/1s isolation, Continuous Short Circuit Protection
R24P205S/R6.4/P/X2 = 24V Input, 5V Output, Single Output, 6.4kVDC/1s isolation, Continuous SCP, Alternative Pinout
R12P205D/R8/X2 = ±12V Input, ±5V Output, Dual Output, 8kVDC/1s isolation, Alternative Pinout



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Specifications (measured at Ta= 25°C, nominal input voltage, full load)

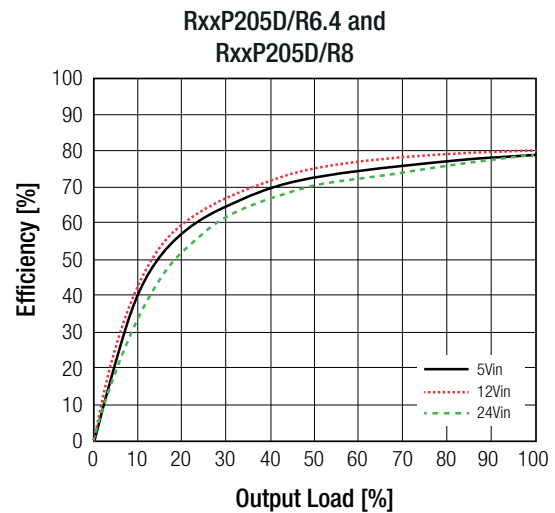
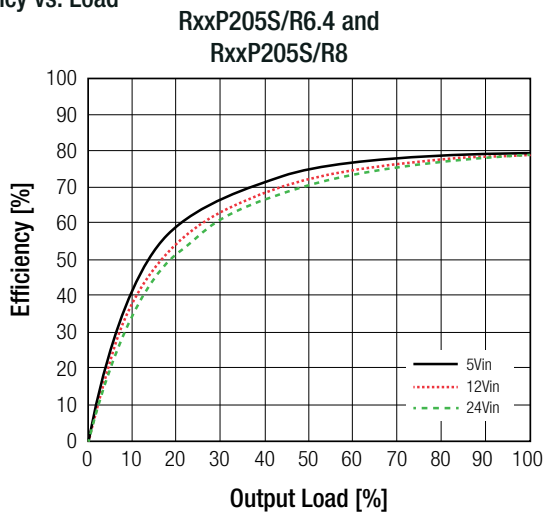
BASIC CHARACTERISTICS

Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load		0%		
Internal Operating Frequency		20kHz	50kHz	85kHz
Output Ripple and Noise ⁽⁶⁾	20MHz BW			200mVp-p

Notes:

Note6: Measurements are made with a 0.1µF MLCC across output (low ESR)

Efficiency vs. Load



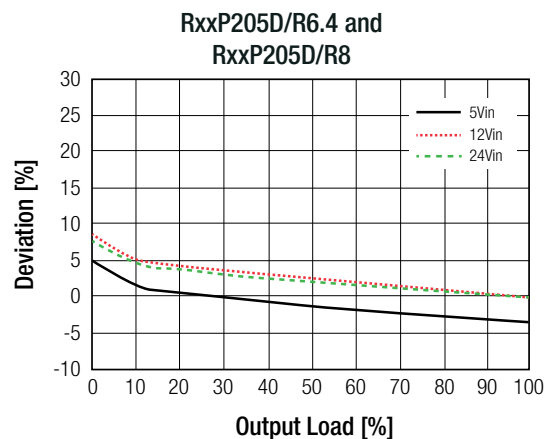
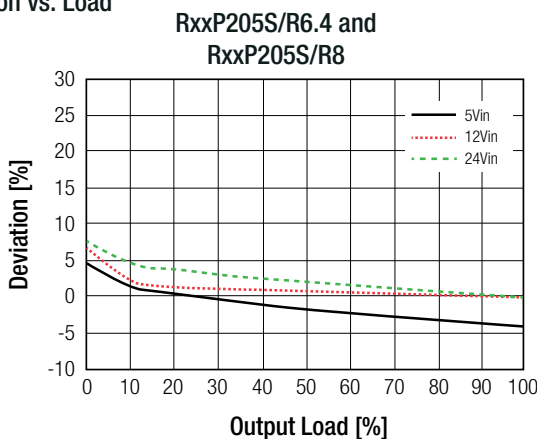
REGULATIONS

Parameter	Condition		Value
Output Accuracy			±5.0% max.
Line Regulation	low line to high line, full load		1.2%/1% of Vin typ.
Load Regulation ⁽⁷⁾	10% to 100% load	3.3Vout, 5Vout	15.0% typ.
		9Vout, 12Vout, 15Vout	10.0% typ.

Notes:

Note7: Operation below 10% load won't harm the converter, but specifications may not be met

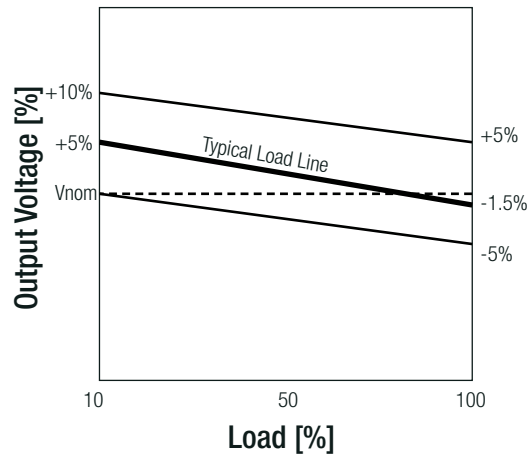
Deviation vs. Load



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Specifications (measured at Ta= 25°C, nominal input voltage, full load)

Tolerance Envelope



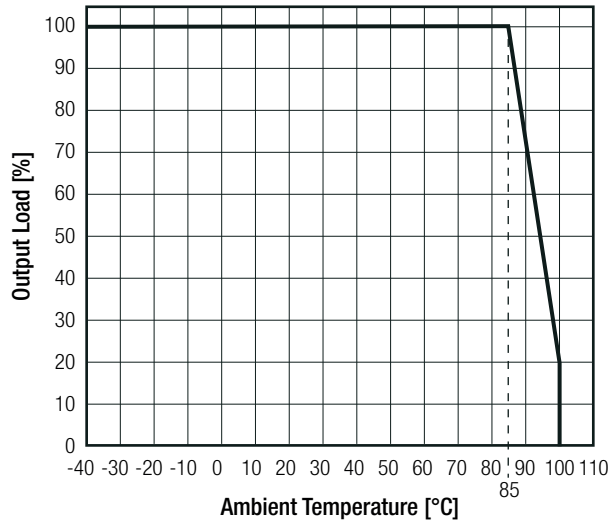
PROTECTIONS				
Parameter	Type			Value
Short Circuit Protection (SCP)	without Suffix "P" with Suffix "P"			1 second continuous
Isolation Voltage ⁽⁸⁾	I/P to O/P	tested for 1 second	"/R6.4" "/R8"	6.4kVDC 8kVDC
		rated for 1 minute	"/R6.4" "/R8"	3.2kVAC/60Hz 4kVAC/60Hz
Isolation Resistance				15GΩ min.
Isolation Capacitance				1.5pF min./10.0pF max.
Leakage Current				<0.01μA max.
Insulation Grade				reinforced
Means of Protection	34Vrms			2MOPP
Internal	clearance/creepage			>4.8mm
External	clearance/creepage			>4.8mm
Notes:				
Note8: For repeat Hi-Pot testing, reduce the time and/or the test voltage				

ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	without derating @ natural convection 0.1m/s (see graph)		-40°C to +85°C
Maximum Case Temperature			+105°C
Operating Altitude			3000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	23429 x 10 ³ hours
		+85°C	9818 x 10 ³ hours
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Specifications (measured at Ta= 25°C, nominal input voltage, full load)

Derating Graph

(@ Chamber and natural convection 0.1 m/s)



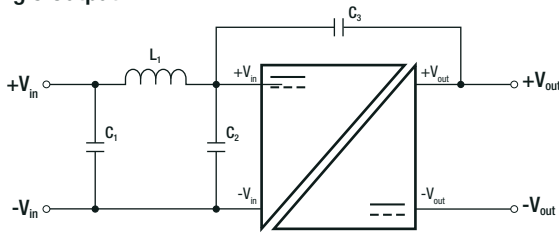
SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	LVD1605077-14	EN60950-1: 2006 + A2:2013 IEC60950-1-2005 , 2nd Edition + A2:2013
Information Technology Equipment, General Requirements for Safety	2236395	ANSI/UL60950-1, 1st Edition CAN/CSA-C22.2 No. 60950-1
Information Technology Equipment, General Requirements for Safety	2207629	ANSI/UL60950-1, 1st Edition CAN/CSA C22.2 No. 60950-1
Medical Electric Equipment, General Requirements for Safety and Essential Performance	2207629	UL60601-1, 1st Edition CAN/CSA-C22.2 No. 601.1-M90
Medical Electric Equipment, General Requirements for Safety and Essential Performance	E314885-A5-UL	ANSI/AAMI ES60601-1:2005 +A2:10 CAN/CSA-C22.2 No. 60601-1:2008
Medical Electric Equipment, General Requirements for Safety and Essential Performance. (CB Scheme)	E314885-A5-CB-1	IEC60601-1:2005 + C2:2007
Medical Electric Equipment, General Requirements for Safety and Essential Performance	WD-SE-R-180539-A0	EN60601-1:2006 + A12:2014 IEC60601-1:2005 + A1:2012, 3rd Edition
Safety requirements for electrical equipment for measurement, control and laboratory use	T1301251-313	EN61010:2010 IEC61010:2010, 3rd Edition
EAC	RU-AT.37.02367	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 Filtering")	EN55032, Class A and B

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Specifications (measured at Ta= 25°C, nominal input voltage, full load)

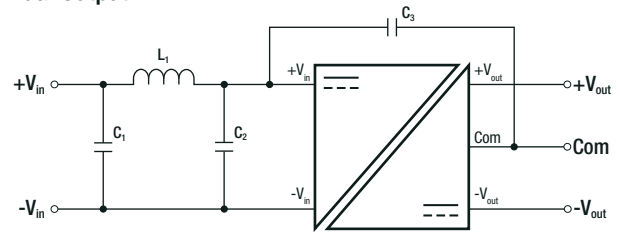
EMC Filtering Suggestion according to EN55032 Class A and Class B
Single Output



Component List Class A

C1	L1	C3
10µF 100V MLCC	3.9µH choke WE 744 045 0039	470pF

Dual Output



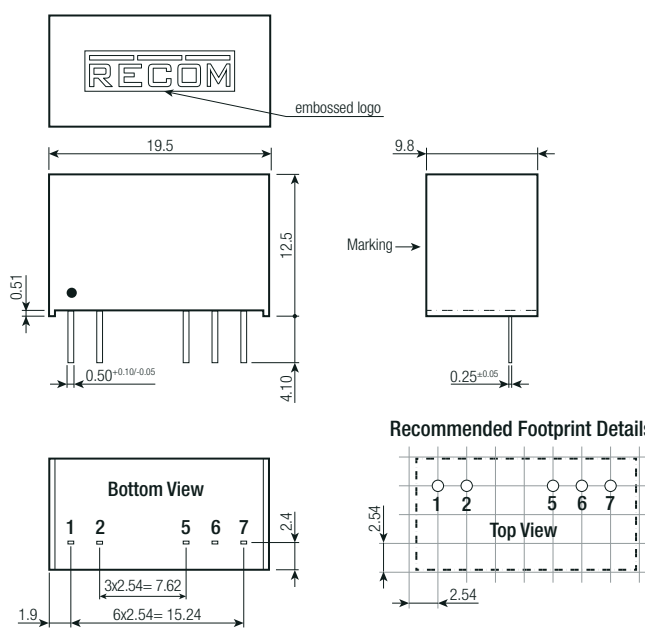
Component List Class B

C1	C2	L1	C3
10µF 100V MLCC	2.2µF 100V MLCC	12µH choke WE 744 045 120	470pF

DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case potting PCB	non-conductive black plastic, (UL94 V-0) silicon rubber compound, (UL94 V-0) FR4, (UL94 V-0)
Dimension (LxWxH)		19.5 x 9.8 x 12.5mm
Weight		4.3g typ.

Dimension Drawing (mm)



Pin Connection

Pin #	Single	Dual	/X2
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
5	-Vout	-Vout	No Pin
6	No Pin	Com	-Vout
7	+Vout	+Vout	+Vout

Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 22.3 x 12.0mm
Packaging Quantity	tube	25pcs
Storage Temperature Range		- 55°C to +125°C
Storage Humidity		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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