

# RECOM

## DC/DC Converter

### RxxP2xx

**2 Watt**  
**SIP7**  
**Single and Dual**  
**Output**



IEC/EN62368-1 certified  
 UL/CSA60950-1 certified  
 UL/CSA62368-1 certified  
 EN55032 compliant  
 CB Report



## Features

## Unregulated Converters

- Qualified with 65kV/μs @ common mode =1KV
- Isolation 6.4kVDC
- Optional continuous short circuit protection
- Unique transformer system
- Compact SIP7 package
- /X2 version with >9mm input/output clearance
- Very low isolation capacitance

## Description

The RxxP2xxS\_D series of DC/DC converters are certified to UL/CSA60950-1 and UL/CSA62368-1 as well as IEC/EN62368-1. This makes them ideal for safety applications where approved isolation is required. The /X2 version has an input/output clearance of more than 9mm.

## Selection Guide

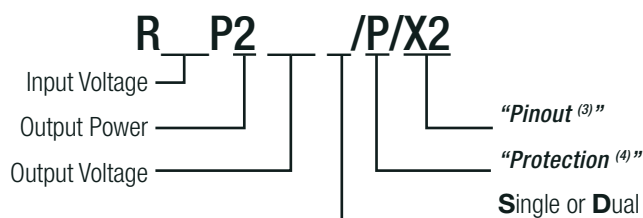
Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [μF]
RxxP23.3S <sup>(3,4)</sup>	5, 12, 15, 24	3.3	600	70	3300
RxxP205S <sup>(3,4)</sup>	5, 12, 15, 24	5	400	70 - 75	1200
RxxP209S <sup>(3,4)</sup>	5, 12, 15, 24	9	222	70 - 75	1200
RxxP212S <sup>(3,4)</sup>	5, 12, 15, 24	12	167	70 - 75	680
RxxP215S <sup>(3,4)</sup>	5, 12, 15, 24	15	133	75 - 80	680
RxxP23.3D <sup>(3,4)</sup>	5, 12, 15, 24	±3.3	±300	70	±1500
RxxP205D <sup>(3,4)</sup>	5, 12, 15, 24	±5	±200	70 - 75	±470
RxxP209D <sup>(3,4)</sup>	5, 12, 15, 24	±9	±111	70 - 75	±470
RxxP212D <sup>(3,4)</sup>	5, 12, 15, 24	±12	±83	70 - 75	±330
RxxP215D <sup>(3,4)</sup>	5, 12, 15, 24	±15	±66	75 - 80	±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



### Notes:

Note3: add suffix „/X2“ for single output with alternative pinout

Note4: add suffix „/P“ for continuous short circuit protection

### Ordering Examples:

R05P205S/P = 5V Input, 5V Output, Single Output, Continuous Short Circuit Protection

R05P23.3D/P = 5V Input, 3.3V Output, Dual Output, Continuous Short Circuit Protection

R05P205S/P/X2 = 5V Input, 5V Output, Single Output, Continuous Short Circuit Protection, Alternative Pinout

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

**BASIC CHARACTERISTICS**

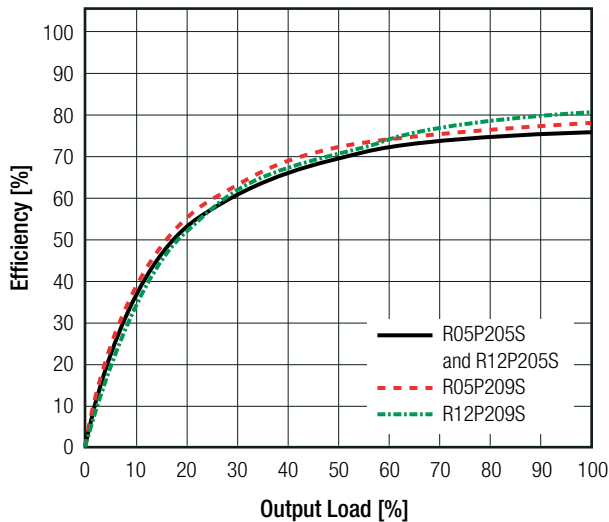
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load			0%	
Internal Operating Frequency		20kHz	50kHz	85kHz
Output Ripple and Noise <sup>(6)</sup>	20MHz BW			200mVp-p

**Notes:**

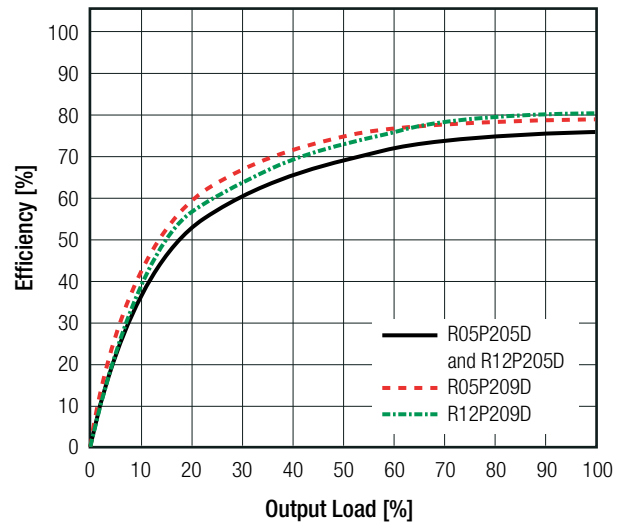
Note5: Measurements are made with a 0.1µF MLCC across output (low ESR)

**Efficiency vs. Load**

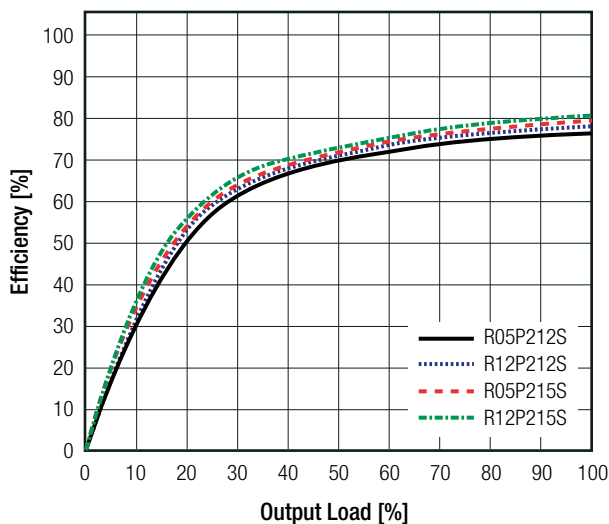
**RxxP205S and RxxP209S**



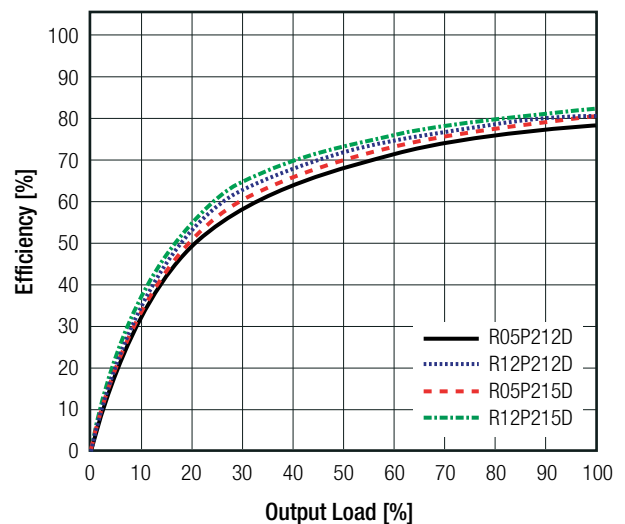
**RxxP205D and RxxP209D**



**RxxP212S and RxxP215S**



**RxxP212D and RxxP215D**



**REGULATIONS**

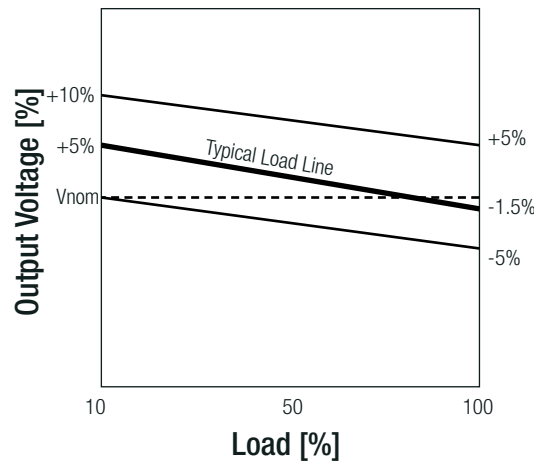
Parameter	Condition	Value
Output Accuracy		±5.0% max.
Line Regulation	low line to high line, full load	1.2%/1% of Vin typ.
Load Regulation <sup>(6)</sup>	10% to 100% load	3.3, 5VDC: 15% typ. 9, 12, 15VDC: 10% typ.

**Notes:**

Note6: Operation below 10% load will not harm the converter, but specifications may not be met

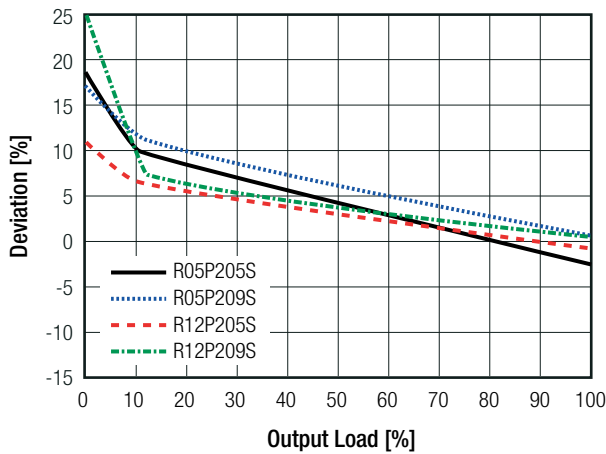
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Tolerance Envelope

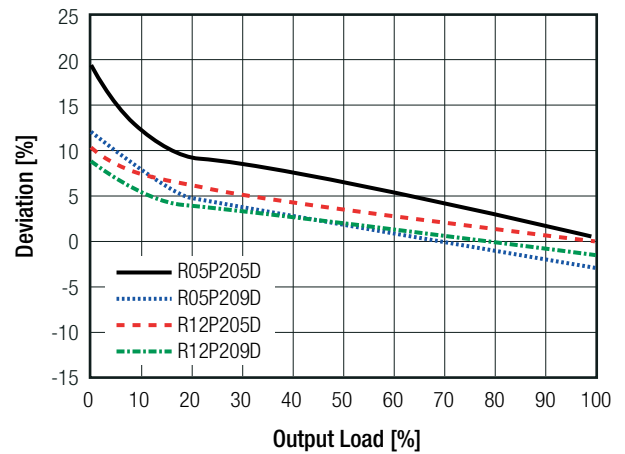


Deviation vs. Load

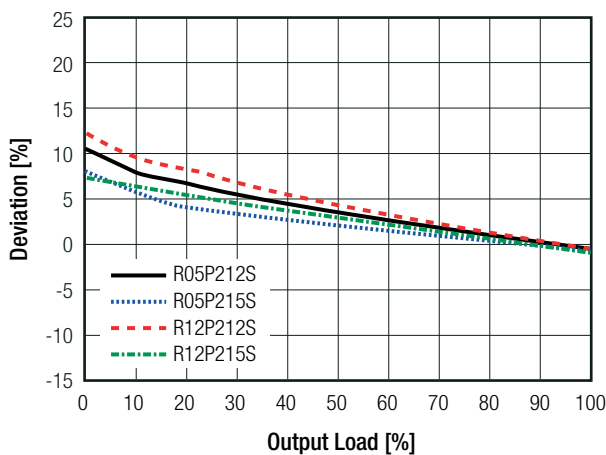
RxxP205S and RxxP209S



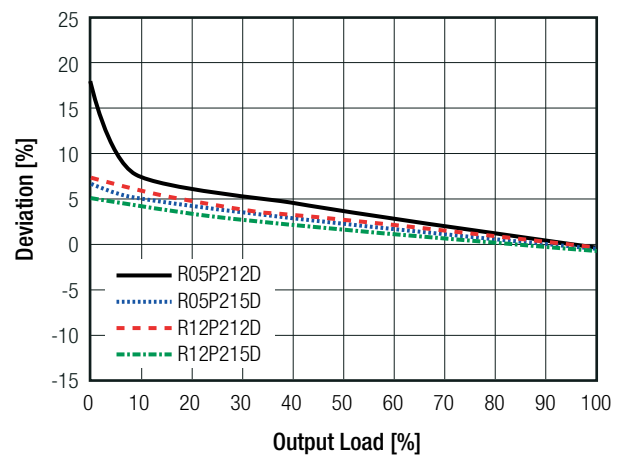
RxxP205D and RxxP209D



RxxP212S and RxxP215S



RxxP212D and RxxP215D



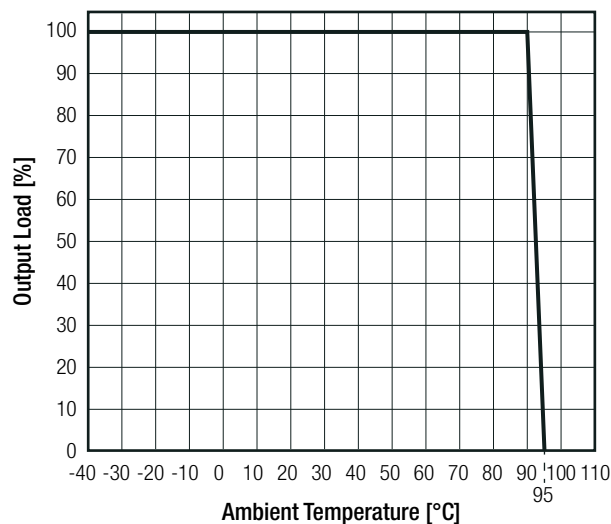
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PROTECTIONS				
Parameter	Type			Value
Short Circuit Protection (SCP)	without Suffix "/P" with Suffix "/P"			1 second continuous
Isolation Voltage <sup>(7)</sup>	I/P to O/P	tested for 1 second		6.4kVDC
		rated for 1 minute		3.2kVAC/60Hz
		working voltage		250VACrms
Isolation Resistance				15GΩ min.
Isolation Capacitance				1.5pF min. / 10pF max.
Insulation Grade				basic (IEC/EN/UL62368-1)
<b>Notes:</b>				
Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage				
Note8: Refer to local safety regulations if input over-current protection is required. Recommended fuse: slow blow type				

ENVIRONMENTAL				
Parameter	Condition			Value
Operating Temperature Range	without derating @ free air convection (see graph)			-40°C to +95°C
Maximum Case Temperature				+105°C
Operating Altitude				2000m (IEC/EN/UL62368-1) 3000m (IEC/EN60601-1)
Operating Humidity	non-condensing			95% RH max.
Pollution Degree				PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	Single Dual	2113 x 10 <sup>3</sup> hours 2434 x 10 <sup>3</sup> hours
		+85°C	Single Dual	299 x 10 <sup>3</sup> hours 334 x 10 <sup>3</sup> hours

**Derating Graph**

(@ Chamber and free air convection)

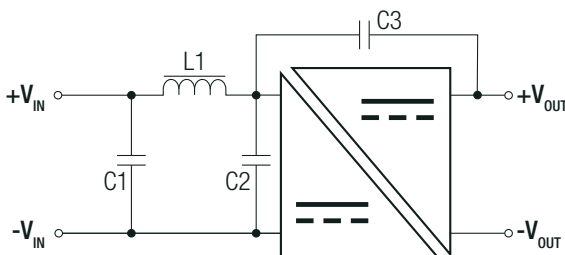


**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E224736-A56-UL	UL60950-1, 2nd Edition, 2014 CAN/CSA C22.2 No. 60950-1, 2nd Edition, 2014
Information Technology Equipment - General Requirements for Safety	LVD1602031	EN60950-1:2006 + A2:2013 IEC60950-1:2005 2nd Edition + A2:2013
Audio/video, information and communication technology equipment. Safety requirements	E224736-A56-UL	UL62368-1, 2nd Edition, 2014 CAN/CSA C22.2 No. 62368-1, 2nd Edition, 2014
Audio/video, information and communication technology equipment. Safety requirements	ATTCB106076	EN62368-1:2014 +A11:2017
Audio/video, information and communication technology equipment. Safety requirements (CB Scheme)		IEC62368-1:2014, 2nd Edition
Medical electrical equipment Part 1: General requirements for basic safety and essential performance	WD-SE-R-180541-A0	EN60601-1:2006 + A12:2014 IEC60601-1:2005 + A1:2012, 3rd Edition
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter	EN55032, Class A and B

**EMC Filtering Suggestions according to EN55032 Class A and Class B**



**Component List Class A**

C1	L1	C3
10µF 100V MLCC	-	-

**Component List Class B**

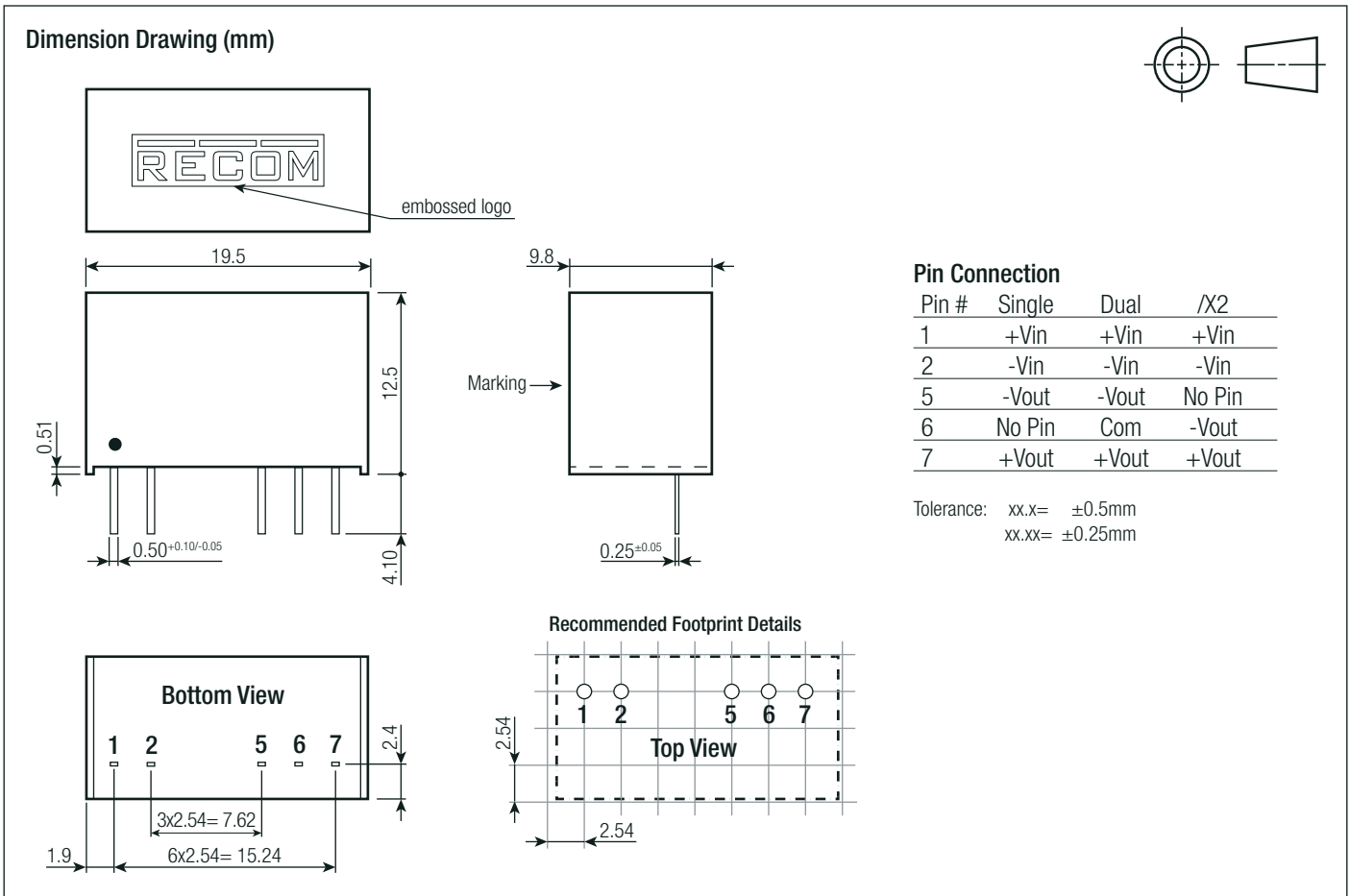
C1	C2	L1	C3
10µF 100V MLCC	10µF 100V MLCC	12µH choke WE 744 045 120	2n2F 8kV

**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)
Package Dimension (LxWxH)		19.5 x 9.8 x 12.5mm
Package Weight		4.3g 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 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.