

Features

Unregulated Converters

- Qualified with 65kV/ μ s @ 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

RECOM
DC/DC Converter

RxxP2xx

**2 Watt
SIP7
Single and Dual
Output**



UL US
E224736



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



www.recom-power.com/eval-ref-boards

www.recom-power.com/bier

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

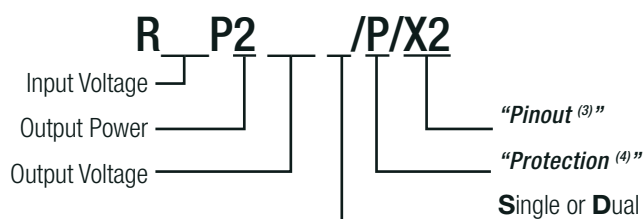
Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	max. Capacitive Load ⁽²⁾ [μ F]
RxxP23.3S ^(3,4)	5, 12, 15, 24	3.3	600	70	3300
RxxP205S ^(3,4)	5, 12, 15, 24	5	400	70 - 75	1200
RxxP209S ^(3,4)	5, 12, 15, 24	9	222	70 - 75	1200
RxxP212S ^(3,4)	5, 12,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

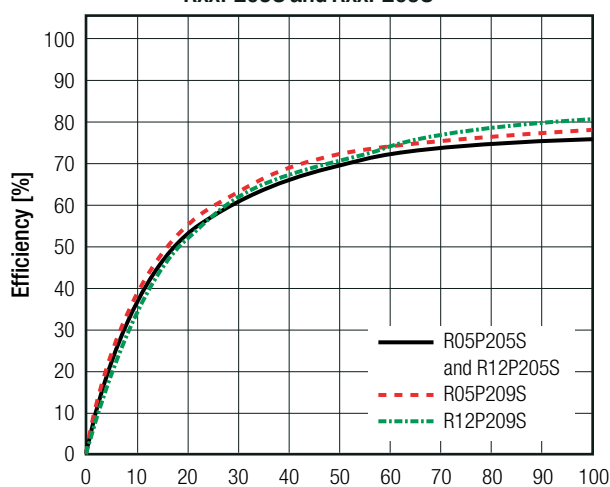
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load			0%	
Internal Operating Frequency		20kHz	50kHz	85kHz
Output Ripple and Noise ⁽⁶⁾	20MHz BW			200mVp-p

Notes:

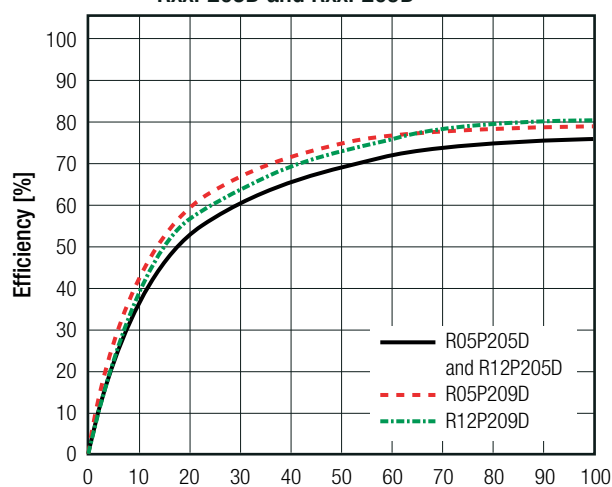
Note5: Measurements are made with a 0.1µF MLCC across output (low ESR)

Efficiency vs. Load

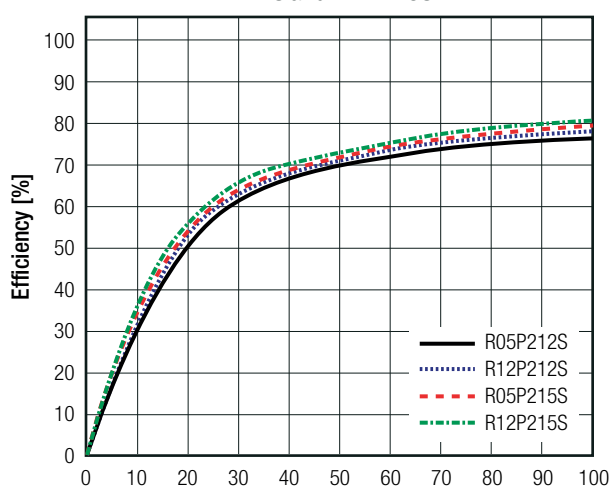
RxxP205S and RxxP209S



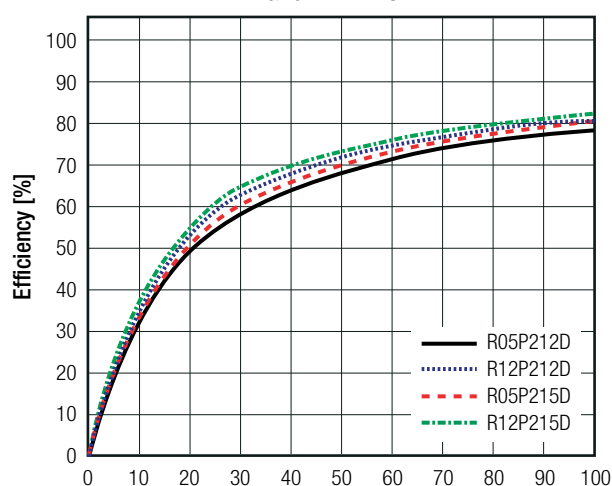
RxxP205D and RxxP209D



RxxP212S and RxxP215S



RxxP212D and RxxP215D



REGULATIONS

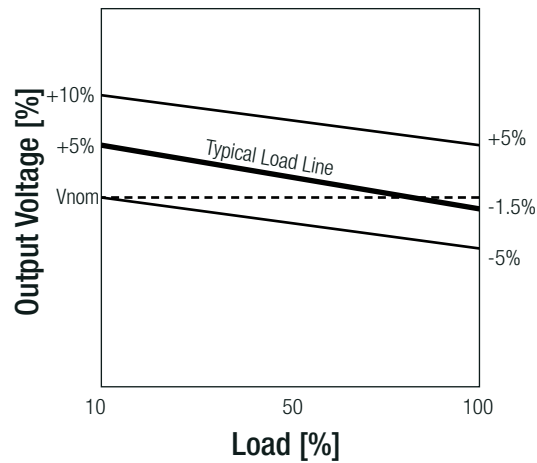
Parameter	Condition		Value
Output Accuracy			±5.0% max.
Line Regulation	low line to high line, full load		1.2%/1% of Vin typ.
Load Regulation ⁽⁶⁾	10% to 100% load	3.3, 5VDC 9, 12, 15VDC	15% typ. 10% typ.

Notes:

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

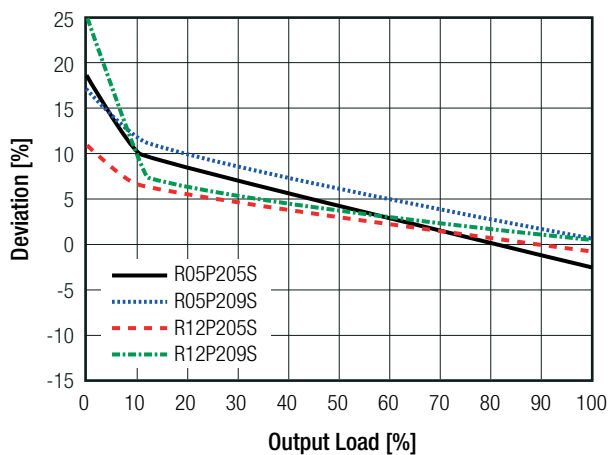
Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

Tolerance Envelope

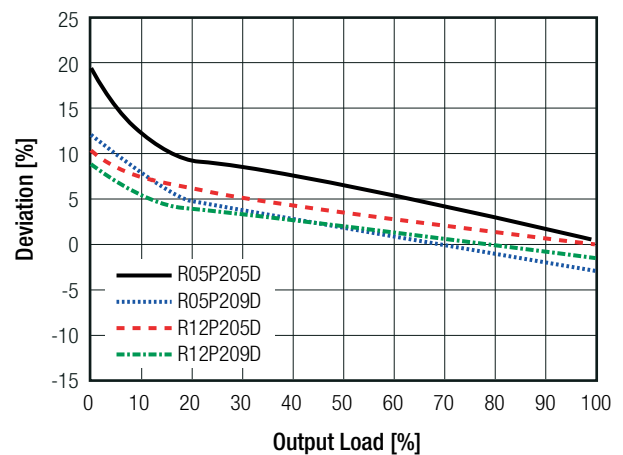


Deviation vs. Load

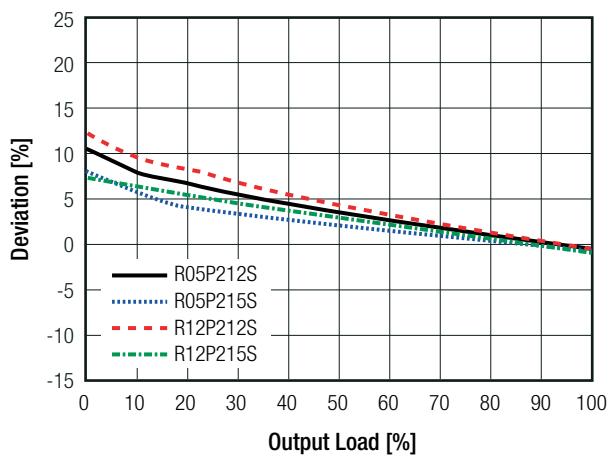
RxxP205S and RxxP209S



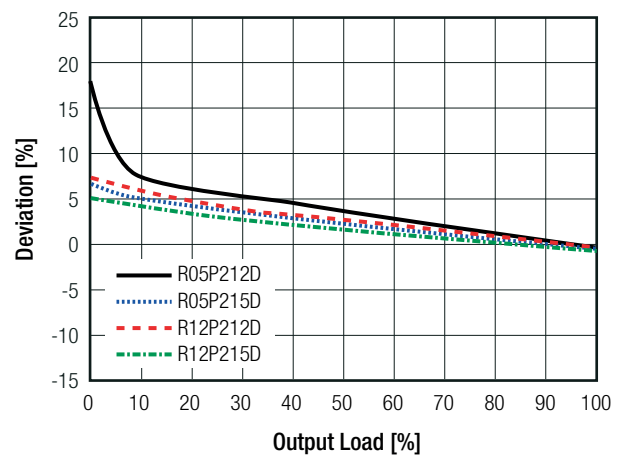
RxxP205D and RxxP209D



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 ⁽⁷⁾	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)

Notes:

Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

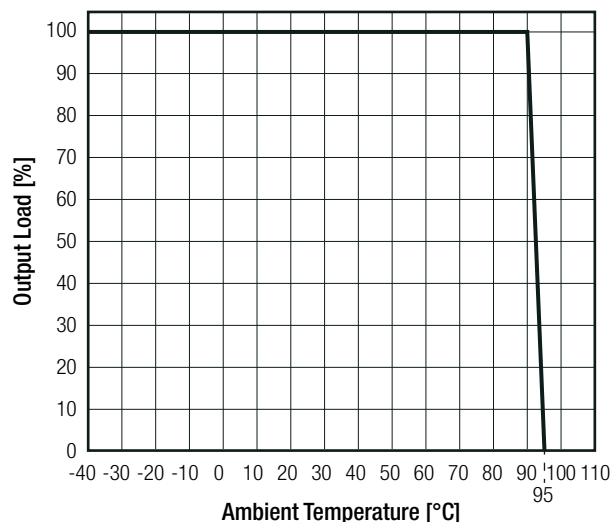
Note8: Refer to local safety regulations if input over-current protection is required. Recommended fuse: slow blow type

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 ³ hours 2434 x 10 ³ hours
		+85°C	Single Dual	299 x 10 ³ hours 334 x 10 ³ hours

Derating Graph

(@ Chamber and free air convection)



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

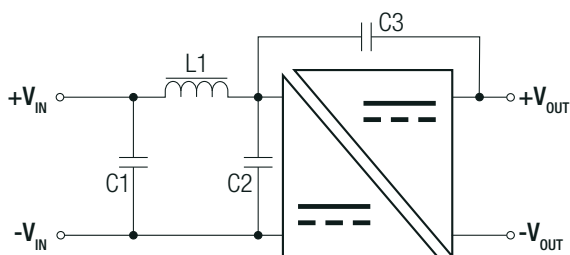
SAFETY AND CERTIFICATIONS

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

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

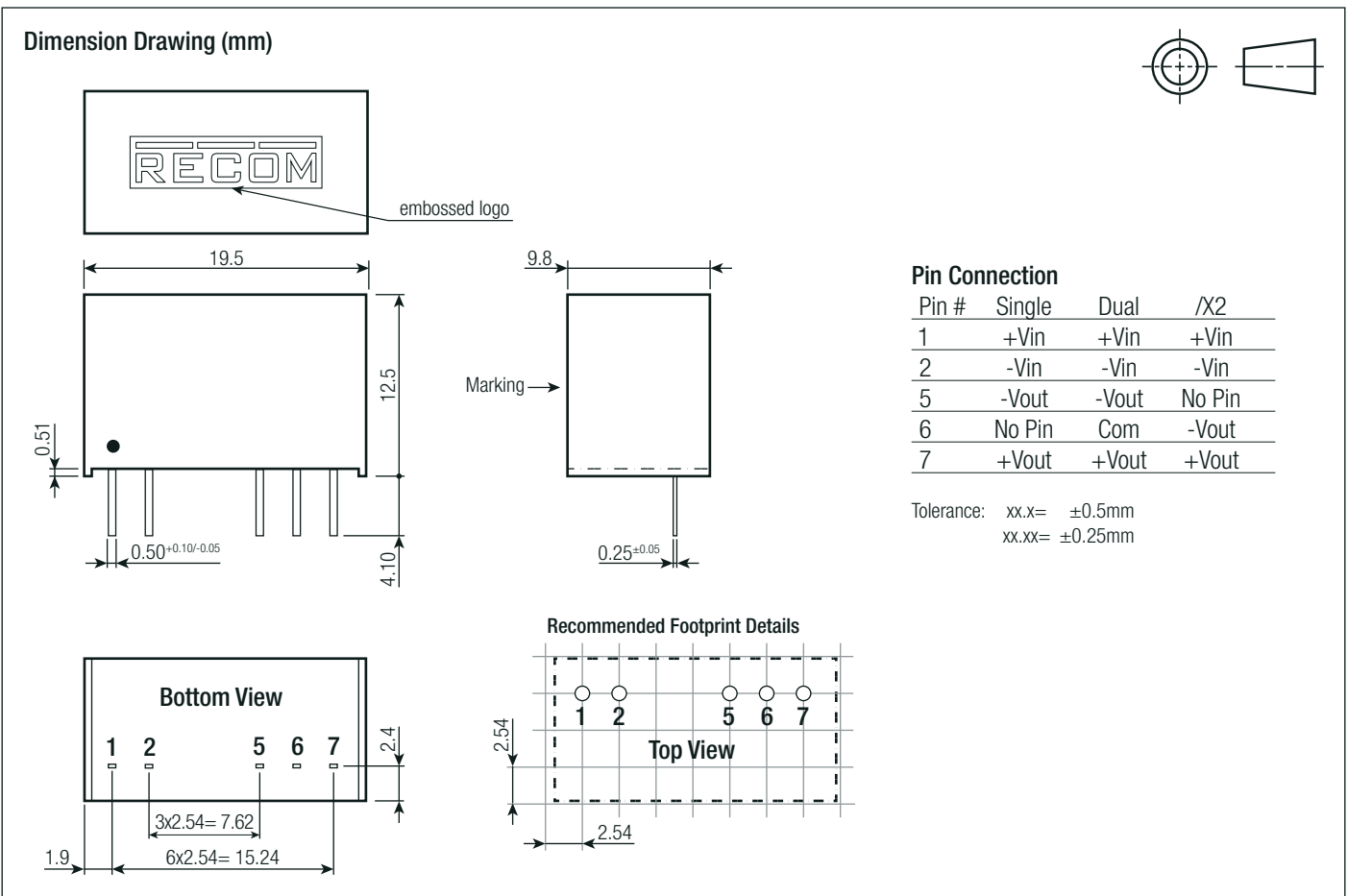
C1	C2	L1	C3
10µF 100V MLCC	10µF 100V MLCC	12µH choke WE 744 045 120	2n2F 8kV

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.

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