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

RECOM
DC/DC Converter

RxxP2xx

2 Watt SIP7 Single and Dual Output

3 YEAR warranty



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

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) [µF]
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	±3.3	±300	70	±1500
RxxP205D (3,4)	5, 12, 15, 24	±5	±200	70 - 75	±470
RxxP209D (3,4)	5, 12, 15, 24	±9	±111	70 - 75	±470
RxxP212D (3,4)	5, 12,15, 24	±12	±83	70 - 75	±330
RxxP215D (3,4)	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

R__P2___/P/X2

- Input Voltage
- Output Power
- Output Voltage
- **"Pinout (3)"**
- **"Protection (4)"**
- **S**ingle or **D**ual

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

PREFERRED ALTERNATIVES
For new medical applications:
REM2

REF DESIGN available
www.recom-power.com/eval-ref-boards

dv/dt ADVISORY REPORT AVAILABLE
www.recom-power.com/bier

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

BASIC CHARACTERISTICS

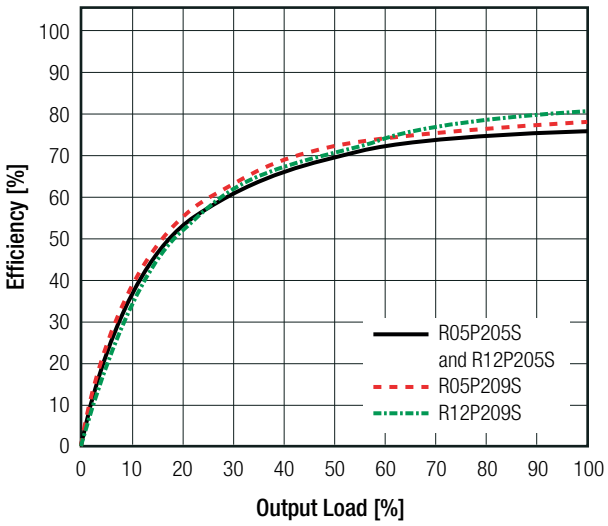
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load			0%	
Internal Operating Frequency		20kHz	50kHz	85kHz
Output Ripple and Noise [5]	20MHz BW			200mVp-p

Notes:

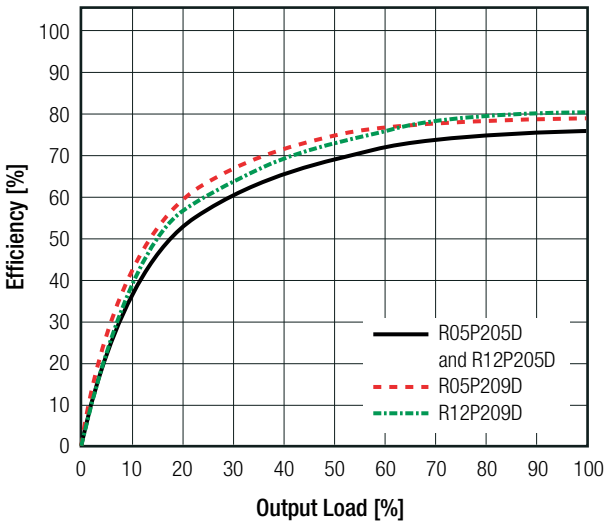
Note5: Measurements are made with a 0.1µF MLCC across output (low ESR)

Efficiency vs. Load

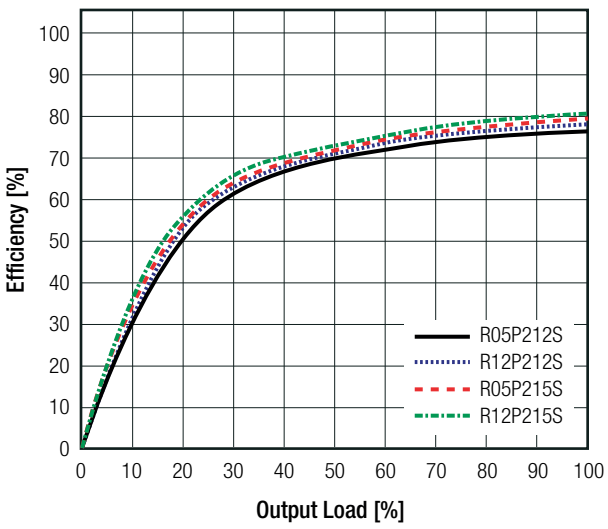
RxxP205S and RxxP209S



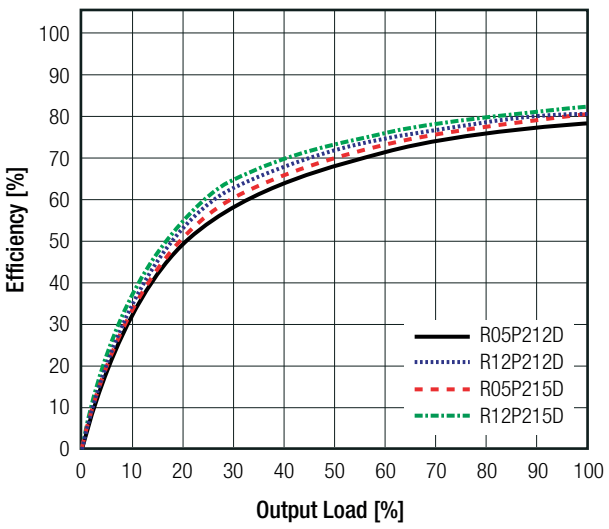
RxxP205D and RxxP209D



RxxP212S and RxxP215S



RxxP212D and RxxP215D



REGULATIONS

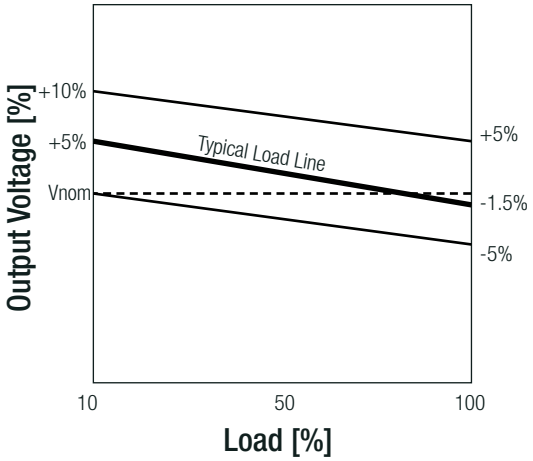
Parameter	Condition		Value
Output Accuracy			±5.0% max.
Line Regulation	low line to high line, full load		1.2%/1% of Vin typ.
Load Regulation [6]	10% to 100% load	3.3, 5VDC 9, 12, 15VDC	15% typ. 10% typ.

Notes:

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

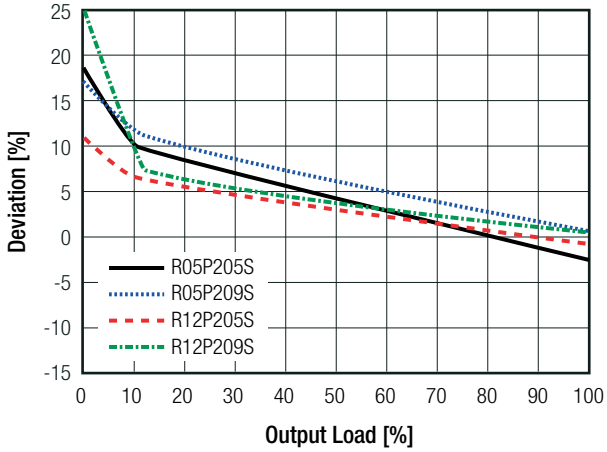
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Tolerance Envelope

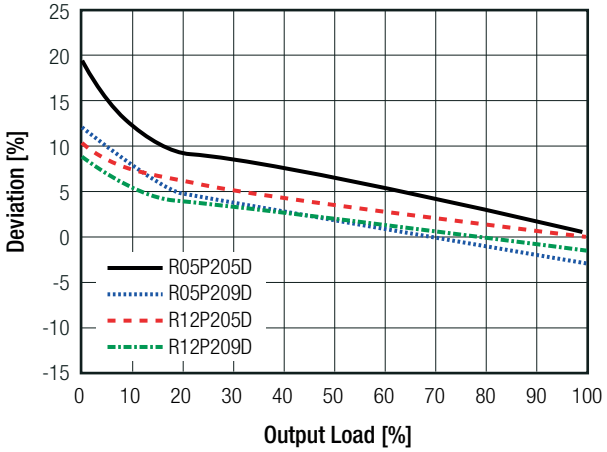


Deviation vs. Load

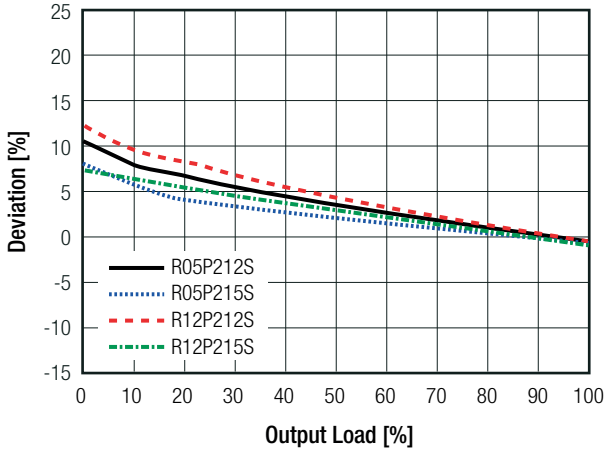
RxxP205S and RxxP209S



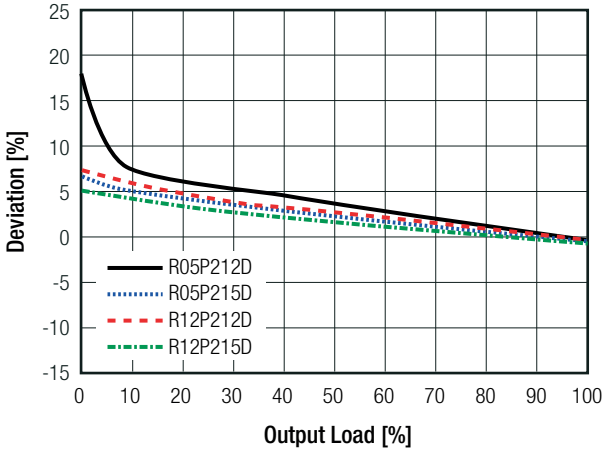
RxxP205D and RxxP209D



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 (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	according to 62368-1		basic

Notes:

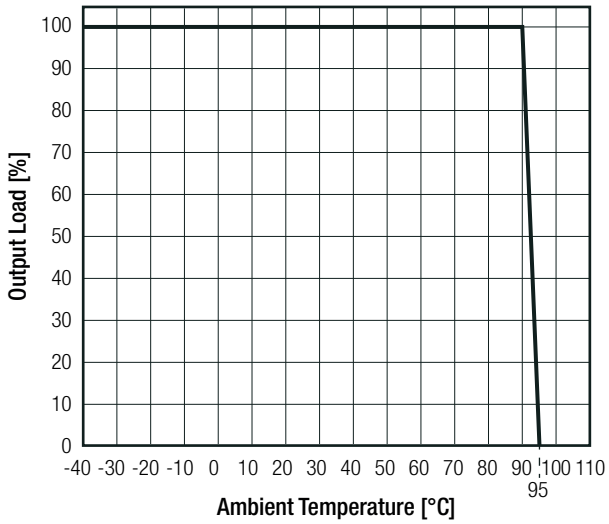
Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

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	according to 62368-1 according to 60601-1			2000m 3000m
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)



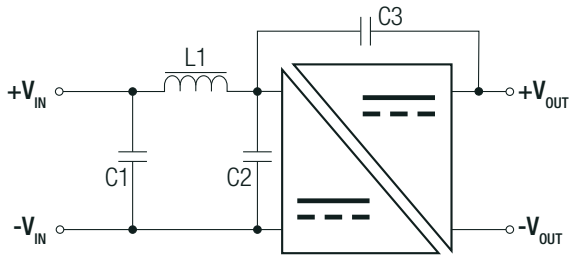
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

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	SPC1007090	IEC 60601-1:1988 + A2:1995 EN 60601-1:1990 + A13 :1996
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	C2	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

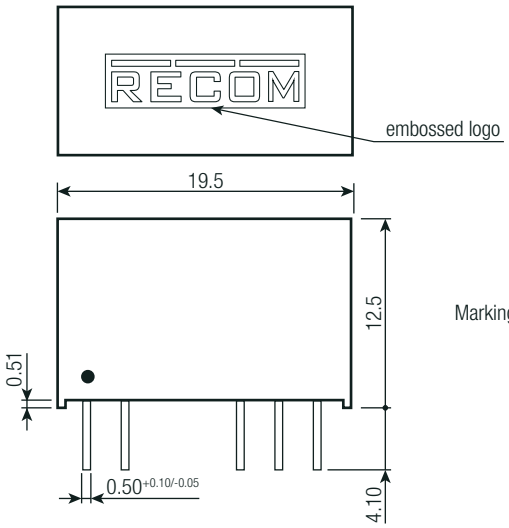
DIMENSION AND PHYSICAL CHARACTERISTICS

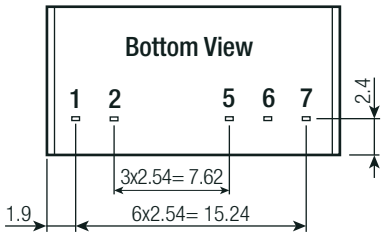
Parameter	Type	Value
Material	case potting PCB	non-conductive black plastic, (UL94 V-0) epoxy, (UL94 V-0) FR4, (UL94 V-0)
Package Dimension (LxWxH)		19.5 x 9.8 x 12.5mm
Package Weight		4.3g typ.

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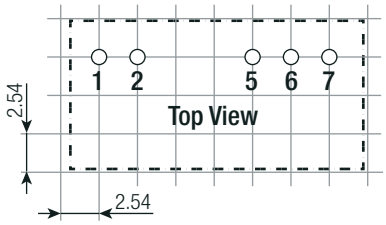
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm)





Recommended Footprint Details



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		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.