

Features

Unregulated Converters

- Qualified with 65kV/ μ s @ Vcommon mode =1KV
- UL/CSA and IEC/EN safety certified
- High isolation 6.4kVDC/1s
- Optional continuous short circuit protection
- /X2 version with >9mm input/output clearance
- Suitable for IGBT applications

Description

The RxxPxxS_D Series of DC/DC Converters are certified to UL/CSA60950-1 as well as EN60950-1. This makes them ideal for safety applications where approved isolation is required.

Selection Guide

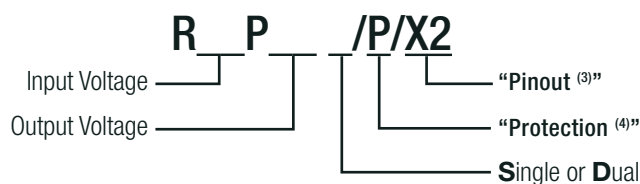
Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	max. Capacitive Load ⁽²⁾ [μ F]
RxxP3.3S ^(3,4)	5, 9, 12, 15, 24	3.3	303	70	2200
RxxP05S ^(3,4)	5, 9, 12, 15, 24	5	200	70 - 75	1000
RxxP09S ^(3,4)	5, 9, 12, 15, 24	9	111	70 - 75	1000
RxxP12S ^(3,4)	5, 9, 12, 15, 24	12	84	70 - 75	470
RxxP15S ^(3,4)	5, 9, 12, 15, 24	15	66	75 - 80	470
RxxP3.3D ⁽⁴⁾	5, 9, 12, 15, 24	$\pm$ 3.3	$\pm$ 151	70	$\pm$ 1000
RxxP05D ⁽⁴⁾	5, 9, 12, 15, 24	$\pm$ 5	$\pm$ 100	70 - 75	$\pm$ 470
RxxP09D ⁽⁴⁾	5, 9, 12, 15, 24	$\pm$ 9	$\pm$ 55	70 - 75	$\pm$ 470
RxxP12D ⁽⁴⁾	5, 9, 12, 15, 24	$\pm$ 12	$\pm$ 41	70 - 75	$\pm$ 220
RxxP15D ⁽⁴⁾	5, 9, 12, 15, 24	$\pm$ 15	$\pm$ 33	75 - 80	$\pm$ 220
RxxP1509D ⁽⁴⁾	12, 24	+15/-9	+33/-56	70 - 80	$\pm$ 220
R05P1509D ⁽⁴⁾	5	+15/-9	$\pm$ 42	70 - 80	+68/-220

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:

R05P05S/P = 5V Input, 5V Output, Single Output, Continuous Short Circuit Protection

R05P3.3D/P = 5V Input, 3.3V Output, Dual Output, Continuous Short Circuit Protection

R05P05S/P/X2 = 5V Input, 5V Output, Single Output, Continuous Short Circuit Protection, Alternative Pinout

RECOM
DC/DC Converter

RxxPxx

1 Watt

SIP7

Single and Dual Output



UL
E224736



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

PREFERRED ALTERNATIVES

For new medical applications:

REM1



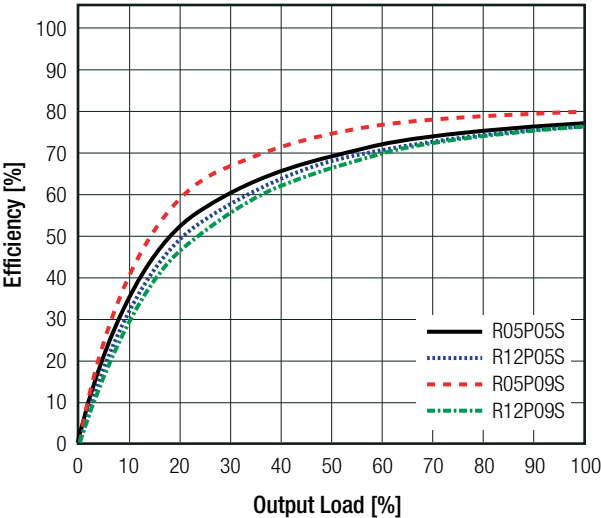
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

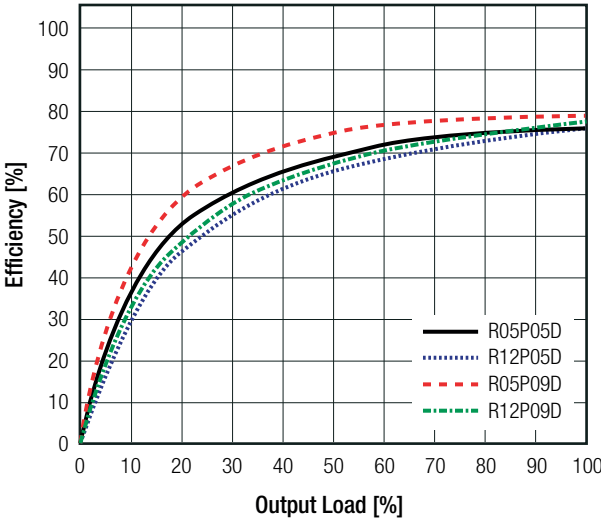
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load		0%		
Internal Operating Frequency	all types PxxP1509D	20kHz 20kHz	50kHz 60kHz	85kHz
Output Ripple and Noise	20MHz BW			200mVp-p

Efficiency vs. Load

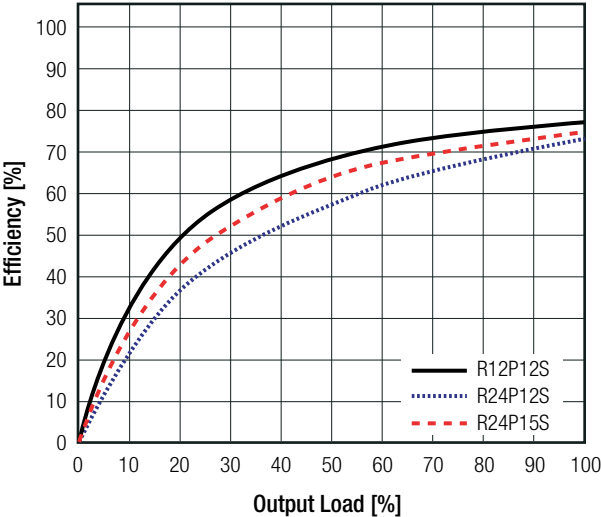
RxxP05S and RxxP09S



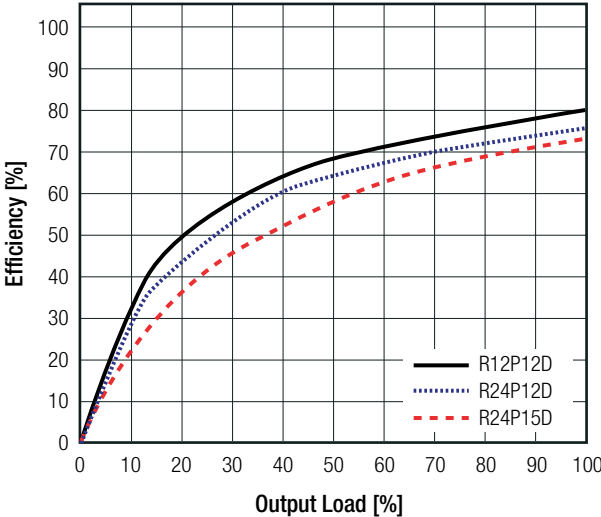
RxxP05D and RxxP09D



RxxP12S and RxxP15S



RxxP12D and RxxP15D



REGULATIONS

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

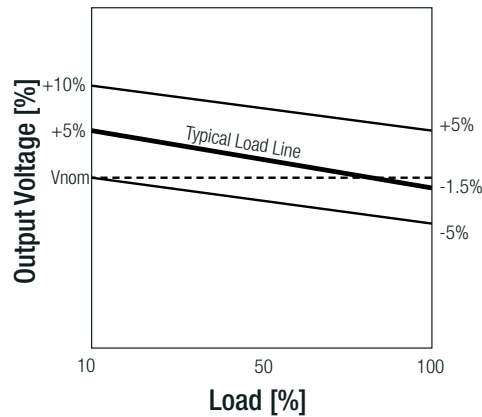
Notes:

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

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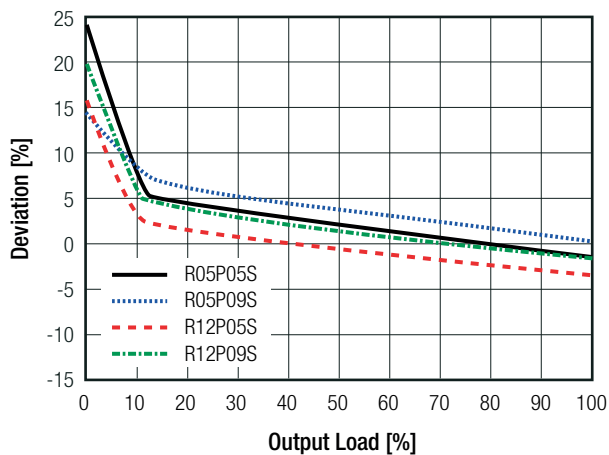
Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

Tolerance Envelope

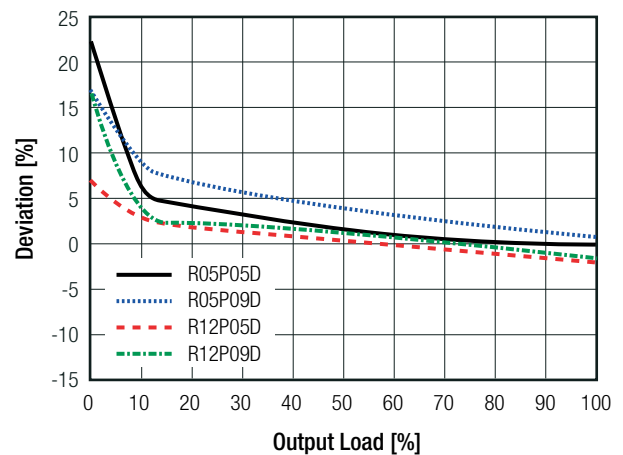


Deviation vs. Load

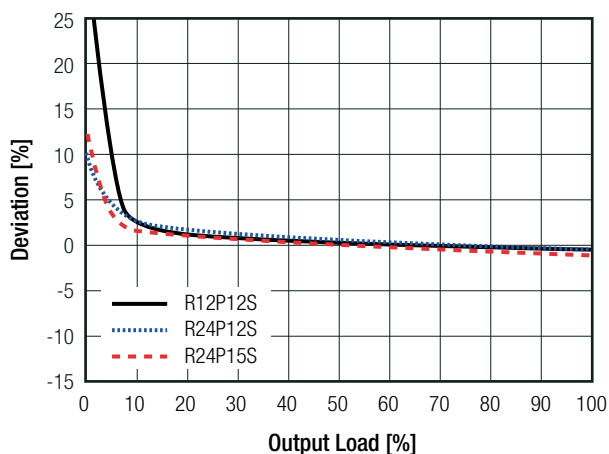
RxxP05S and RxxP09S



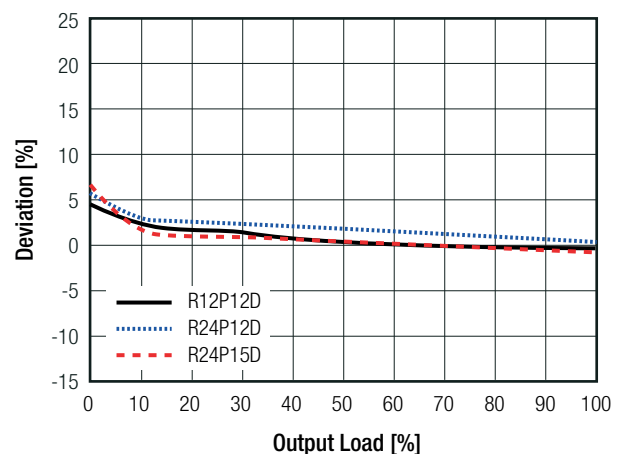
RxxP05D and RxxP09D



RxxP12S and RxxP15S



RxxP12D and RxxP15D



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 with suffix "/P"		1 second continuous
Isolation Voltage ⁽⁶⁾	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			4.0pF min. / 10pF max.
Insulation Grade	according to 62368-1		basic

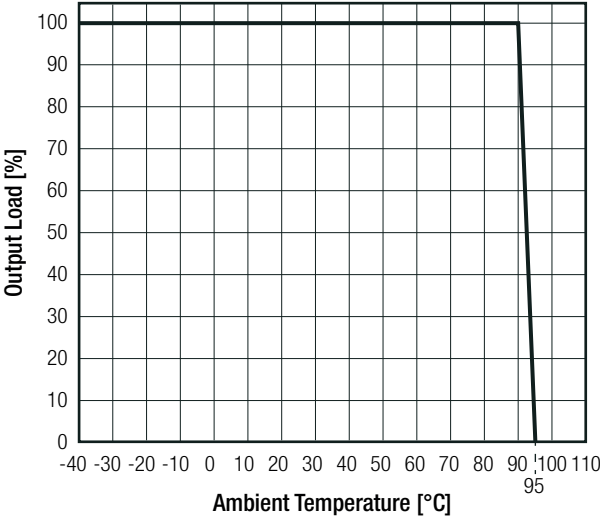
Notes:

- 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

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	without derating @ free air convection		-40°C to +90°C
Operating Altitude	according to 62368-1		2000m
	according to 60601-1		3000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	2974 x 10 ³ hours
		+85°C	728 x 10 ³ hours

Derating Graph
(@ Chamber and free air convection)



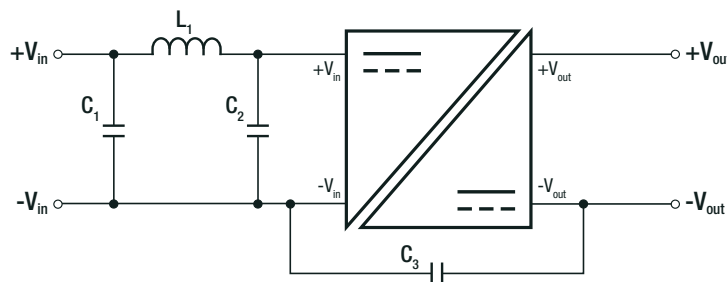
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

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 - Part1: Safety requirements	ATTCB106076	EN62368-1: 2014 + A11:2017
Audio/Video, information and communication technology equipment - Part1: 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 (see filter suggestion below)	EN55032, Class A and B

EMC Filtering Suggestions according to EN55032



Component List Class A

MODEL	C1	L1	C2	C3 (safety)	MODEL	C1	L1	C2	C3 (safety)
R05P05S	22μF	N/A	N/A	N/A	R05P05S	10μF MLCC	22μH choke RLS-226	N/A	1nF
R05P12S	MLCC		N/A		R05P12S				
R12P05S	10μF		4.7μF		R12P05S				
R24P05S	MLCC		MLCC		R24P05S				

Notes:

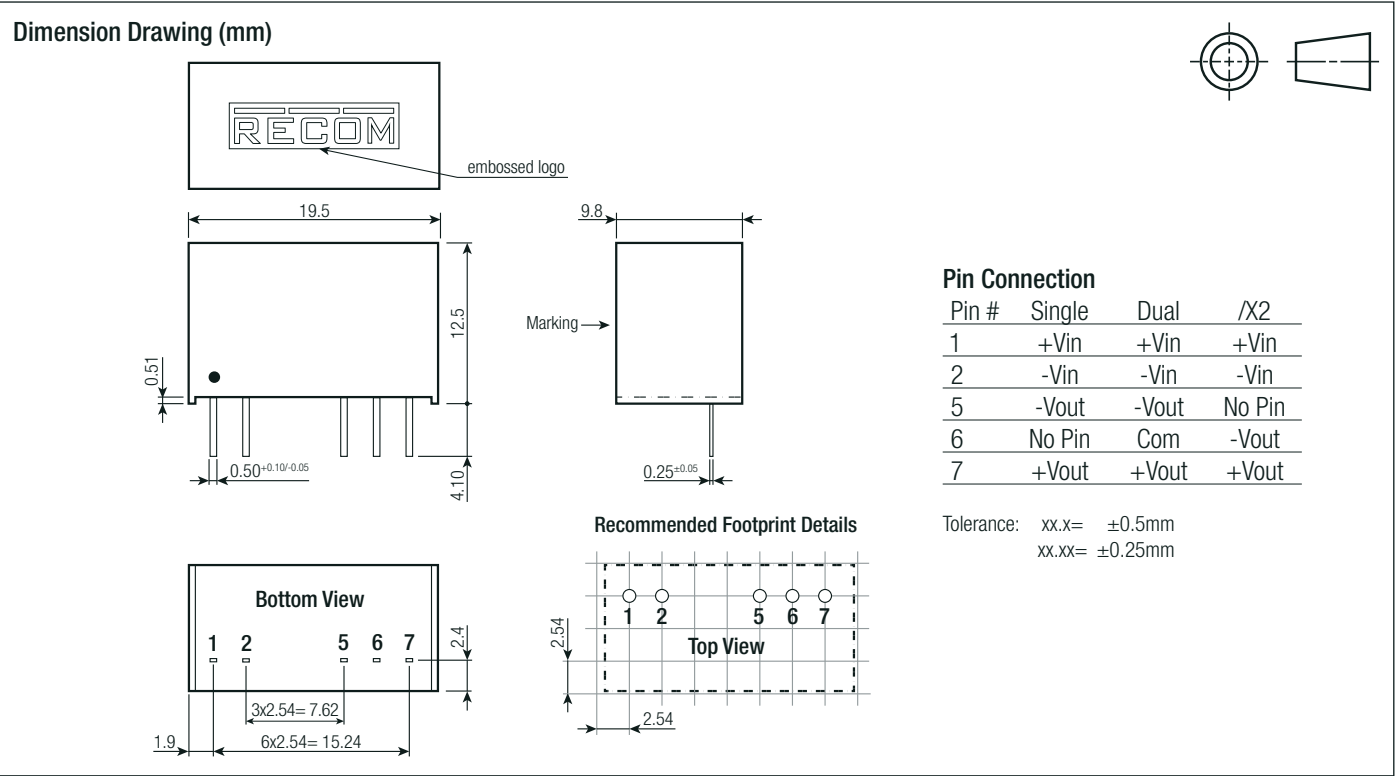
Note8: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

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

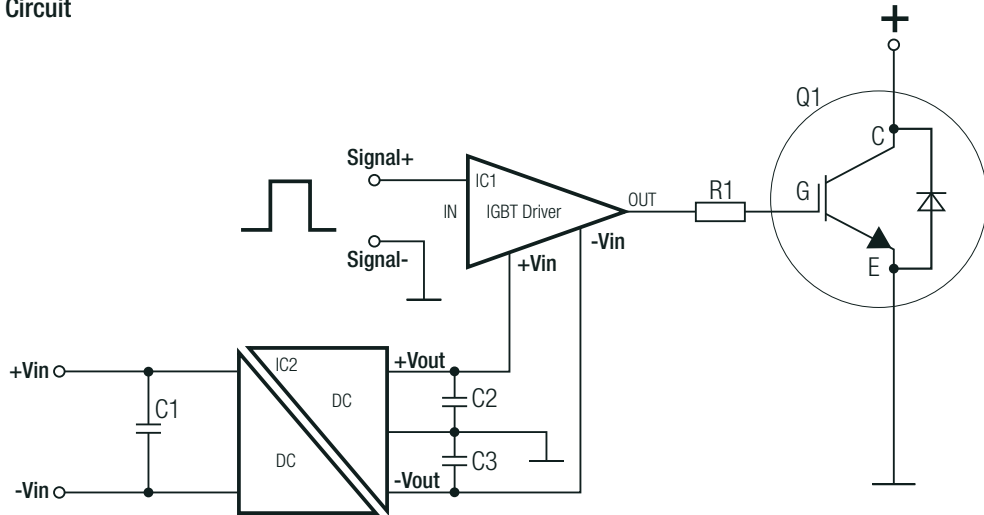
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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)



INSTALLATION AND APPLICATION

IGBT Application Circuit



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.

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