

Features

- 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

Unregulated Converters



RxxPxx

**1 Watt
SIP7
Single and Dual
Output**



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, 12, 15, 24 | 3.3 | 303 | 70 | 2200 |
| RxxP05S ^(3,4) | 5, 12, 15, 24 | 5 | 200 | 70 - 75 | 1000 |
| RxxP09S ^(3,4) | 5, 12, 15, 24 | 9 | 111 | 70 - 75 | 1000 |
| RxxP12S ^(3,4) | 5, 12, 15, 24 | 12 | 84 | 70 - 75 | 470 |
| RxxP15S ^(3,4) | 5, 12, 15, 24 | 15 | 66 | 75 - 80 | 470 |
| RxxP3.3D ^(3,4) | 5, 12, 15, 24 | \pm 3.3 | \pm 151 | 70 | \pm 1000 |
| RxxP05D ^(3,4) | 5, 12, 15, 24 | \pm 5 | \pm 100 | 70 - 75 | \pm 470 |
| RxxP09D ^(3,4) | 5, 12, 15, 24 | \pm 9 | \pm 55 | 70 - 75 | \pm 470 |
| RxxP12D ^(3,4) | 5, 12, 15, 24 | \pm 12 | \pm 41 | 70 - 75 | \pm 220 |
| RxxP15D ^(3,4) | 5, 12, 15, 24 | \pm 15 | \pm 33 | 75 - 80 | \pm 220 |
| RxxP1509D ^(3,4) | 12, 24 | +15/-9 | +33/-56 | 70 - 80 | \pm 220 |
| R05P1509D ^(3,4) | 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



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

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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

PxxP05S and PxxP09S



PxxP05D and PxxP09D



PxxP12S and PxxP15S



PxxP12D and PxxP15D



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

Tolerance Envelope



Deviation vs. Load

PxxP05S and PxxP09S



PxxP05D and PxxP09D



PxxP12S and PxxP15S



PxxP12D and PxxP15D



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 |
| Isolation Resistance | | 15GΩ min. | |
| Isolation Capacitance | | 4.0pF min. / 10pF max. | |
| Insulation Grade | | 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(see graph) | -40°C to +90°C | |
| Operating Altitude | | 2000m | |
| 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)

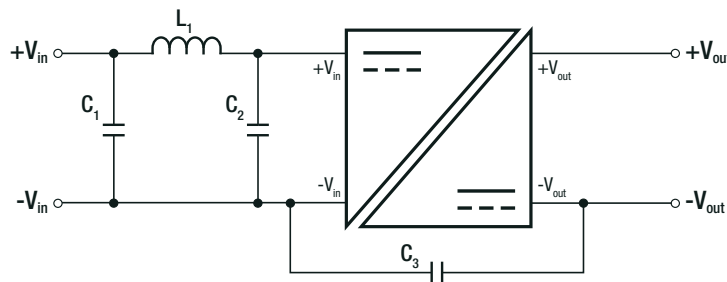


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

| 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 | SPCLVD1602031 | EN60950-1:2006 +AM:2013 IEC60950-1:2005, 2nd Edition +AM: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 (CB Scheme) | ATTCB106076 | IEC62368-1:2014, 2nd Edition |
| Audio/Video, information and communication technology equipment - Part1: Safety requirements | | EN62368-1: 2014 + A11:2017 |
| EAC | RU-AT.49.09571 | TP TC 004/2011 |
| RoHS 2+ | | 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 B EN55032, Class A |

EMC Filter Suggestion according to EN55032



Component List Class A

| MODEL | C1 | L1 | C2 | C3 (safety) |
|---------|-----------|-----|----------|-------------|
| R05P05S | 22µF | N/A | N/A | N/A |
| R05P12S | 50V MLCC | | N/A | |
| R12P05S | 10µF | | 4.7µF | |
| R24P05S | 100V MLCC | | 50V MLCC | |

Component List Class B

| MODEL | C1 | L1 | C2 | C3 (safety) |
|---------|-------------------|-----------------------|-----|-------------|
| R05P05S | 10µF 100V MLCC | 22µH choke RLS-226 | N/A | 1nF |
| R05P12S | | | | |
| R12P05S | | | | |
| R24P05S | | | | |

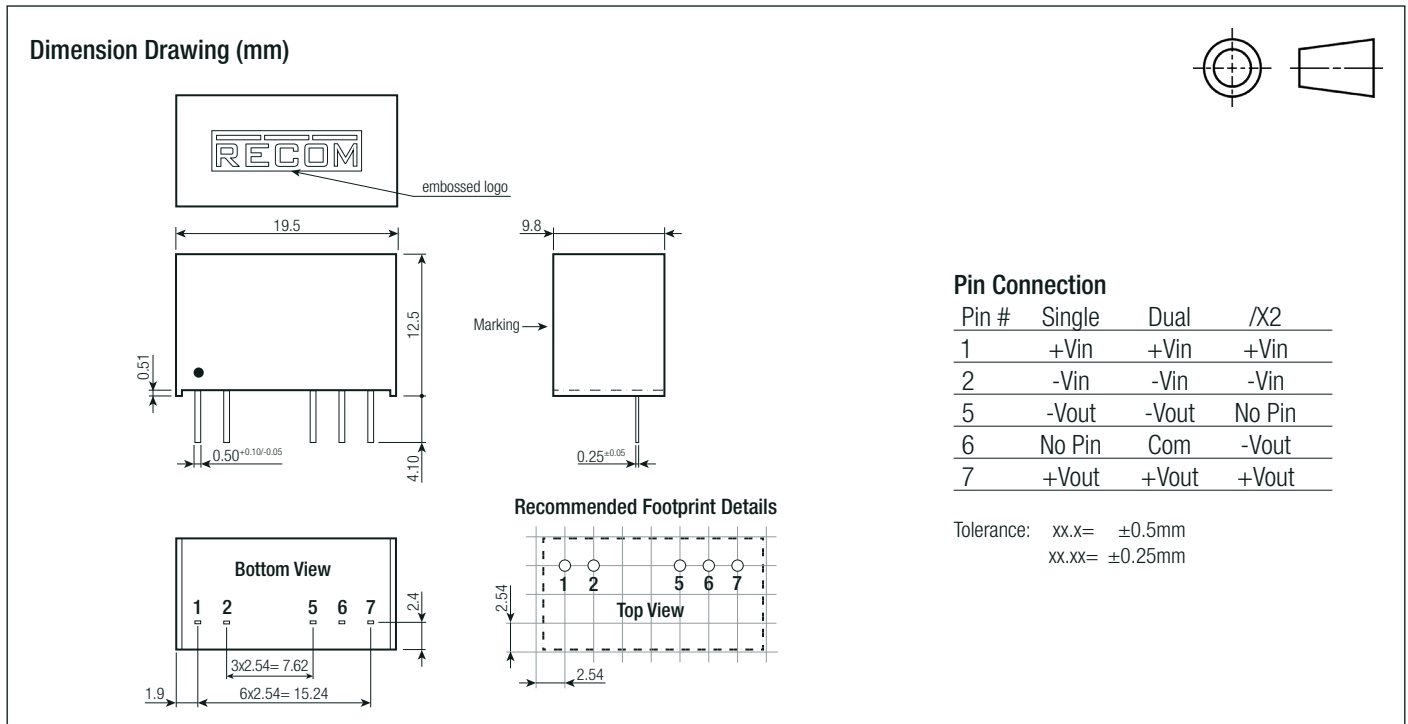
Notes:

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) silicon rubber compound, (UL94 V-0) FR4, (UL94 V-0) |
| Dimension (LxWxH) | | 19.5 x 9.8 x 12.5mm |
| Weight | | 4.3g typ. |

continued on next page

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 | tube | 25pcs |
| Storage Temperature Range | | -55°C to +125°C |
| Storage Humidity | | 95% RH max. |

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