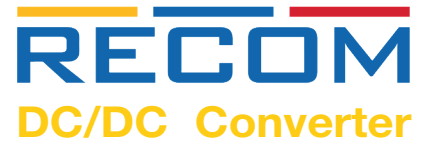


Features

- Industry standard pinout
- 1kVDC/1s or 2kVDC/1s isolation
- UL94 V-0 package material
- Fully encapsulated
- Efficiency up to 85%

Unregulated Converters



RO

1 Watt
SIP4
Single Output



Description

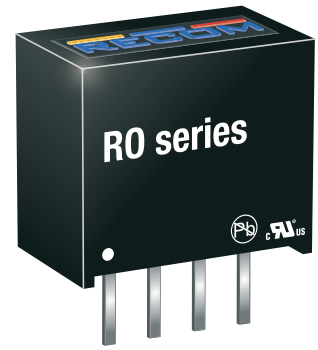
The RO DC/DC converters are typically used in general purpose power isolation and voltage matching applications, and feature a full industrial operating temperature range of -40°C to +85°C without derating.

Selection Guide

| Part Number | nom. Input Voltage [VDC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ. ⁽¹⁾ [%] | max. Capacitive Load ⁽²⁾ [µF] |
|----------------------------|--------------------------|----------------------|---------------------|------------------------------------|--|
| RO-xx3.3S ^(3,4) | 3.3, 5, 12, 15, 24 | 3.3 | 303 | 75 | 2200 |
| RO-xx05S ^(3,4) | 3.3, 5, 12, 15, 24 | 5 | 200 | 78-80 | 1000 |
| RO-xx09S ^(3,4) | 3.3, 5, 12, 15, 24 | 9 | 111 | 78-80 | 1000 |
| RO-xx12S ^(3,4) | 3.3, 5, 12, 15, 24 | 12 | 83 | 80-84 | 470 |
| RO-xx15S ^(3,4) | 3.3, 5, 12, 15, 24 | 15 | 66 | 80-84 | 470 |
| RO-xx24S ^(3,4) | 3.3, 5, 12, 15, 24 | 24 | 42 | 78-85 | 220 |

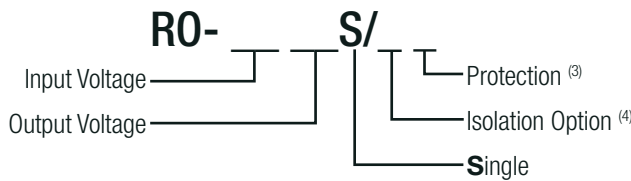
Notes:

- Note1: Efficiency is tested at nominal input and full load at +25°C ambient
 Note2: Max Cap Load is tested at nominal input and full resistive load and is defined as the capacitive load that will allow start up in under 1s without damage to the converter



UL60950-1 certified
 CAN/CSA-C22.2 No 60950-1 certified
 EN60950-1 certified
 IEC60950-1 certified
 EN55032 compliant
 CB report

Model Numbering



Notes:

- Note3: standard part is without continuous short circuit protection
 add suffix „/P“ for continuous short circuit protection
 Note4: add suffix „/H“ for 2kVDC/1s isolation
 or add suffix „/HP“ for continuous short circuit protection and 2kVDC/1s isolation

Ordering Examples:

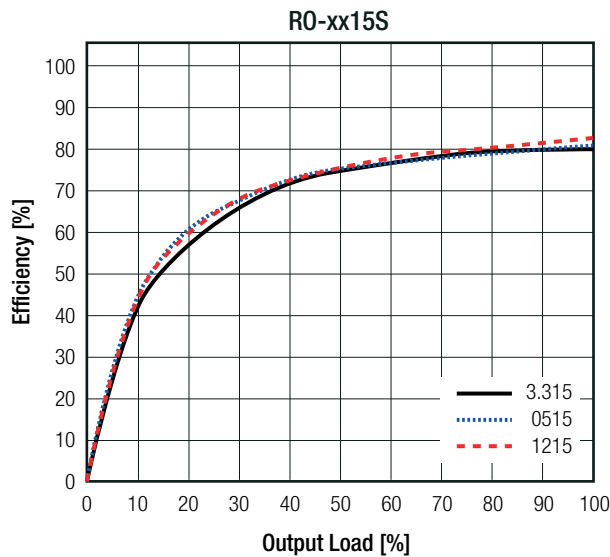
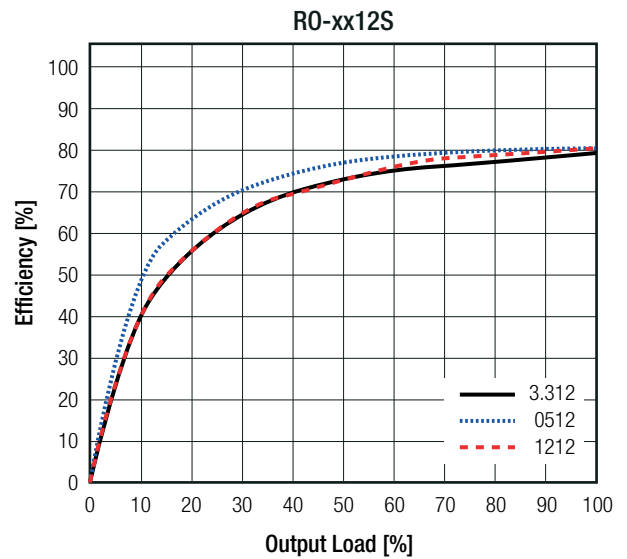
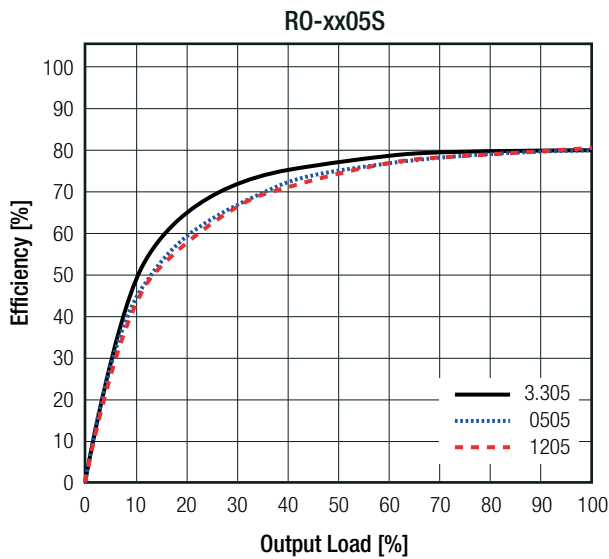
RO-123.3S/P: 12V Input Voltage, 3.3V Output Voltage, Single Output with continuous short circuit protection
 RO-0509S/HP: 5V Input Voltage, 9V Output Voltage, Single Output with 2kVDC/1s Isolation and continuous short circuit protection

Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

BASIC CHARACTERISTICS

| Parameter | Condition | Min. | Typ. | Max. |
|------------------------------|-----------|-------|--------|-----------|
| Internal Input Filter | | | | capacitor |
| Input Voltage Range | | | ±10% | |
| Minimum Load | | 0% | | |
| Internal Operating Frequency | | 50kHz | 100kHz | 105kHz |
| Output Ripple and Noise | 20MHz BW | | | 100mVp-p |

Efficiency vs. Load



REGULATIONS

| Parameter | Condition | Value |
|-----------------|-----------------------|------------------------|
| Output Accuracy | | -2% typ. / ±5.0% max. |
| Line Regulation | low line to high line | ±1.2% of 1.0% Vin typ. |

continued on next page

Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

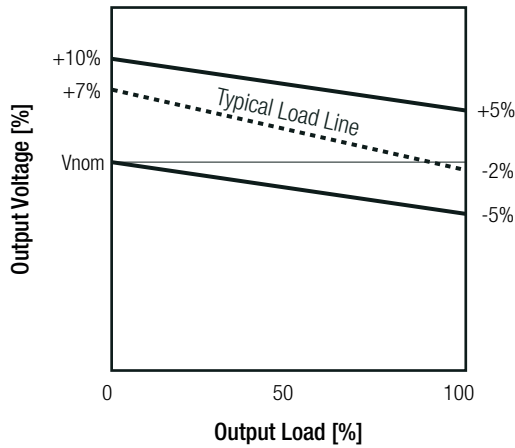
| Parameter | Condition | | Value |
|--------------------------------|------------------|----------------|------------|
| Load Regulation ⁽⁵⁾ | 10% to 100% load | 3.3Vout | 20.0% max. |
| | | 5Vout | 15.0% max. |
| | | 12, 15, 24Vout | 10.0% max. |

Notes:

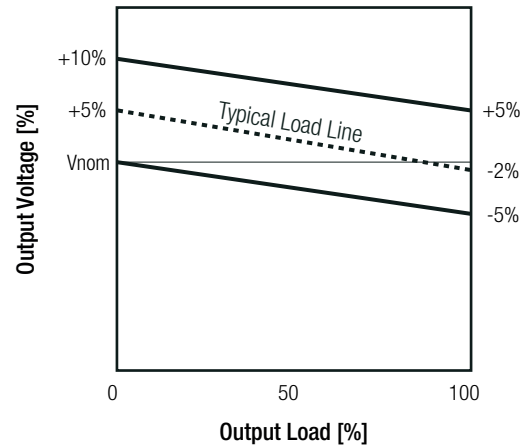
Note5: Operation below 10% load will not harm the converter, but specifications may not be met

Tolerance Envelope

RO-xx3.3S and RO-xx05S

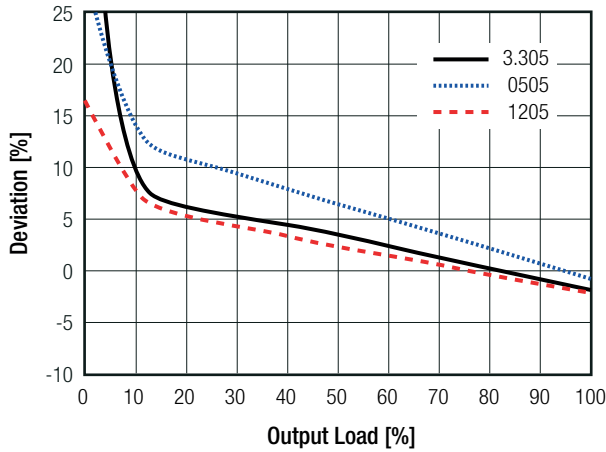


RO-xx12S and RO-xx15S

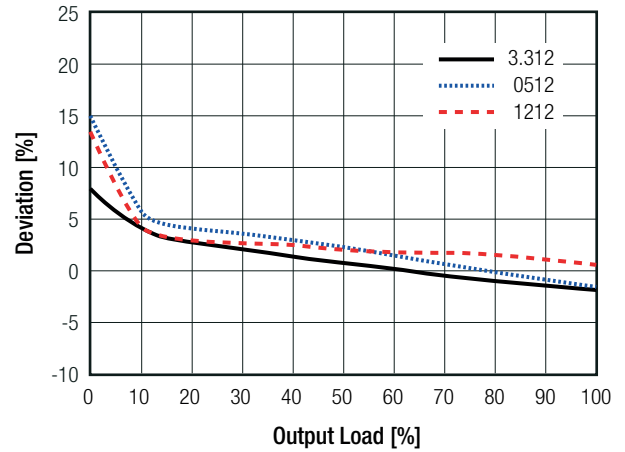


Deviation vs. Load

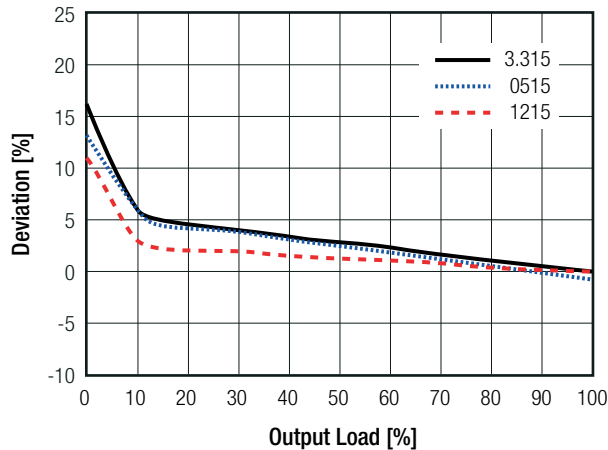
RO-xx05S



RO-xx12S



RO-xx15S



Specifications (measured @ Ta= 25°C, nom. Vin, full load 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 | without suffix | 1kVDC 500VAC/60Hz |
| | | with suffix "/H" | 2kVDC 1kVAC/60Hz |
| Isolation Resistance | | | 10GΩ min. |
| Isolation Capacitance | | | 20pF min. / 75pF max. |
| Insulation Grade | | | functional |

Notes:

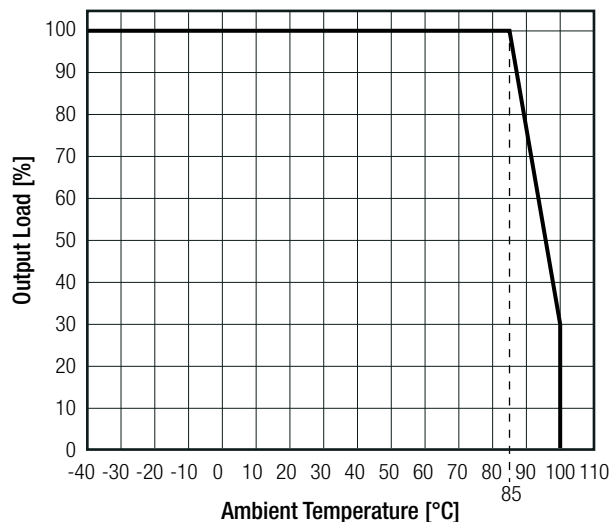
Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note7: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

ENVIRONMENTAL

| Parameter | Condition | | Value |
|-----------------------------|----------------------------------|-------|-------------------------------|
| Operating Temperature Range | full load (see graph) | | -40°C to +85°C |
| Maximum Case Temperature | | | +110°C |
| Temperature Coefficient | | | ±0.03%/K typ. |
| Thermal Impedance | | | 67K/W |
| Operating Altitude | | | 2000m |
| Operating Humidity | non-condensing | | 95% RH max. |
| Pollution Degree | | | PD2 |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C | 11800 x 10 ³ hours |
| | | +85°C | 4800 x 10 ³ hours |

Derating Graph



Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

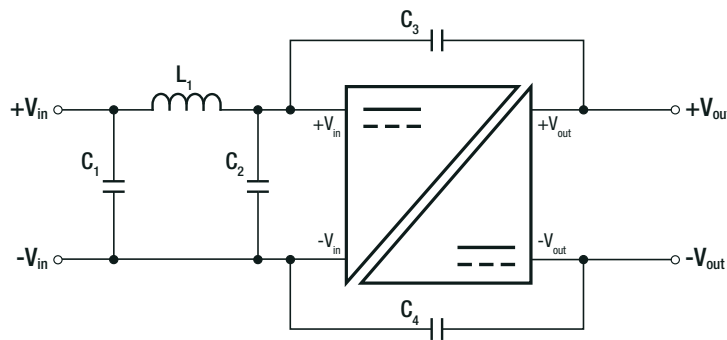
SAFETY AND CERTIFICATIONS

| Certificate Type (Safety) | Report / File Number | Standard |
|--|----------------------|---|
| Information Technology Equipment, General Requirements for Safety | SPCLVD1602031 | IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013 |
| Information Technology Equipment, General Requirements for Safety | E358085-A4-UL | UL60950-1, 2nd Edition:2007 CAN/CSA C22.2 No. 60950-1-03, 2nd Edition:2007 |
| Information Technology Equipment, General Requirements for Safety (CB) | E322406-A4-CB-1 | IEC60950-1:2005, 2nd Edition |
| EAC | RU-AT.49.09571 | TP TC 004/2011 |
| RoHS 2+ | | RoHS-2011/65/EU + AM-2015/863 |

EMC Compliance

| Condition | Standard / Criterion |
|---|--------------------------------------|
| Electromagnetic compatibility of multimedia equipment - Emission requirements | EN55032, Class B EN55032, Class A |

EMC Filter Suggestion according to EN55032



Component List Class A

| MODEL | C1 | L1 | G2 | C4 (safety) |
|----------|-------------------|-----|-----------------|-------------|
| RO-0505S | 10µF 100V MLCC | N/A | 1nF 50V MLCC | N/A |
| RO-1205S | | | | 2.2nF |
| RO-2405S | | | | N/A |

Component List Class B

| MODEL | C1 | L1 | C3 (safety) | C4 (safety) |
|----------|-------------------|-----------------------|-----------------|-------------|
| RO-0505S | 10µF 100V MLCC | 22µH choke RLS-226 | 1nF 50V MLCC | 2.2nF |
| RO-1205S | | | | |
| RO-2405S | | | | |

Notes:

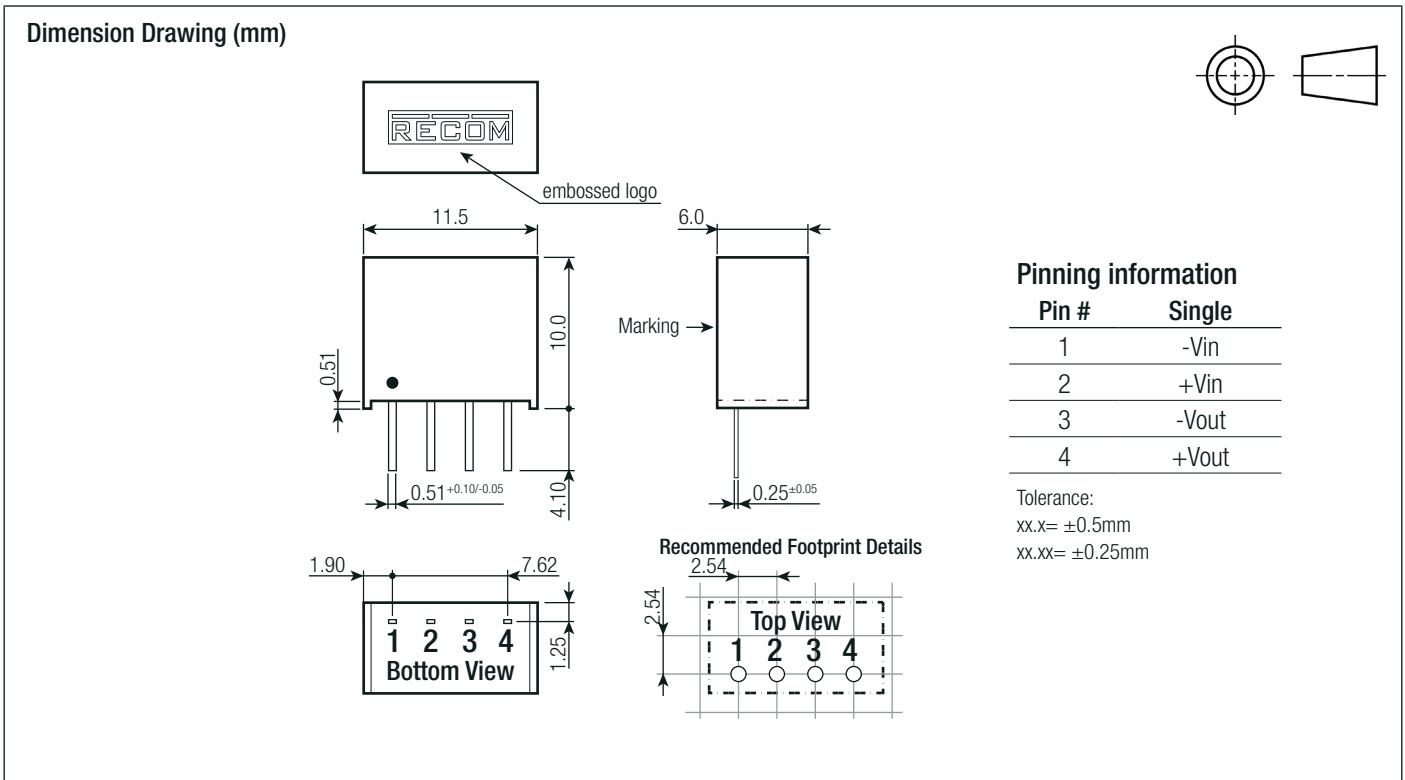
Note8: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

DIMENSION AND PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|-------------------|------------------------|--|
| Material | case potting PCB | non-conductive black plastic (UL94V-0) epoxy, (UL94V-0) FR4, (UL94V-0) |
| Dimension (LxWxH) | | 11.5 x 6.0 x 10.0mm |
| Weight | | 1.4g typ. |

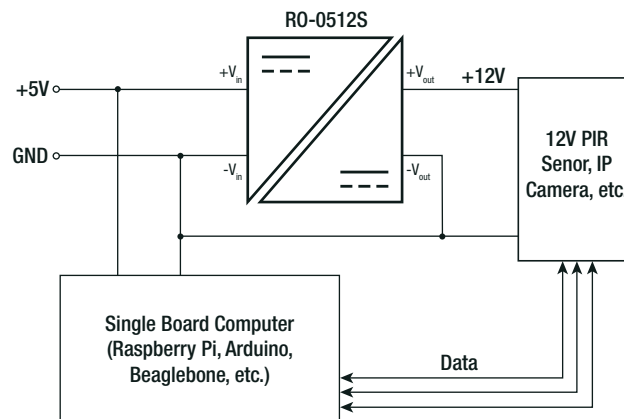
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Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)



INSTALLATION AND APPLICATION

Typical Application



PACKAGING INFORMATION

| Parameter | Type | Value |
|-----------------------------|----------------|----------------------|
| Packaging Dimension (LxWxH) | tube | 520.0 x 16.0 x 9.0mm |
| Packaging Quantity | tube | 42pcs |
| Storage Temperature Range | | -55°C to +125°C |
| Storage Humidity | non-condensing | 95% RH max. |

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