Features

Unregulated Converters

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

RECOM
DC/DC Converter

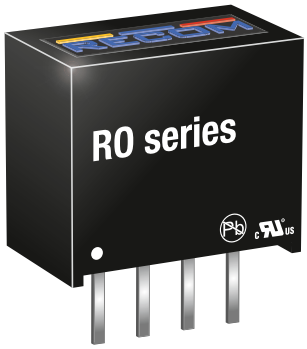
RO

1 Watt SIP4 Single Output

3 YEAR Warranty

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:

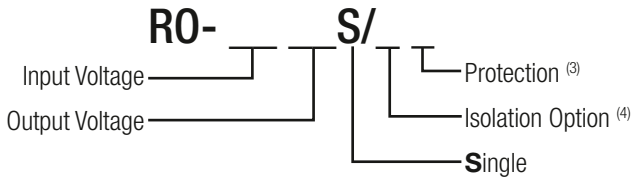
Note1: Efficiency is tested at nominal input and full load at +25°C ambient

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

RoHS 2+ compliant 10 from 10 — REACH compliant — c UL us E358085

IEC60950-1 certified
EN60950-1 certified
UL60950-1 certified
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 Isolation
or add suffix „/HP“ for Continuous Short Circuit Protection and 2kVDC 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 Isolation and continuous short circuit protection

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

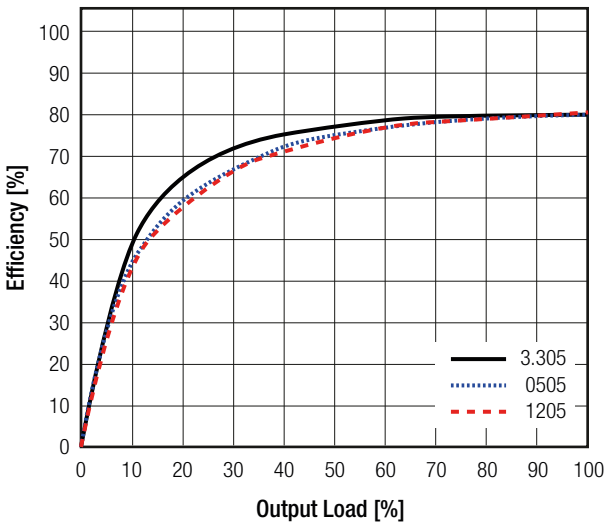
BASIC CHARACTERISTICS				
Parameter	**Condition**	**Min.**	**Typ.**	**Max.**
Internal Input Filter				capacitor
Input Voltage Range			±10%	
Minimum Load [5]		0%		
Start-up time				250ms
Internal Operating Frequency		50kHz	100kHz	105kHz
Output Ripple and Noise	20MHz BW			100mVp-p

Notes:

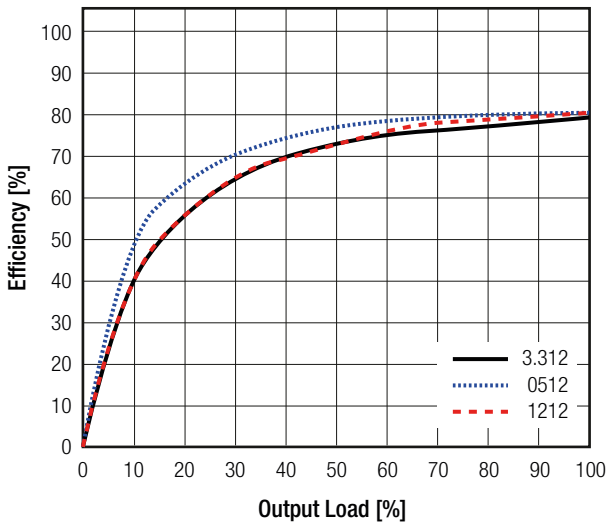
Note5: Operation below 10% load will not harm the converter, but specifications may not be met

Efficiency vs. Load

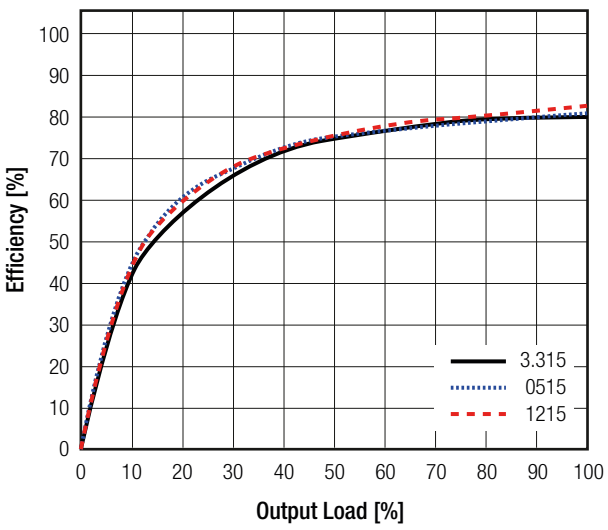
RO-xx05S



RO-xx12S



RO-xx15S



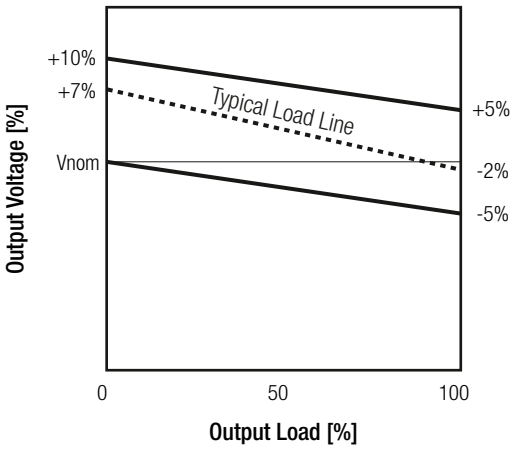
Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

REGULATIONS

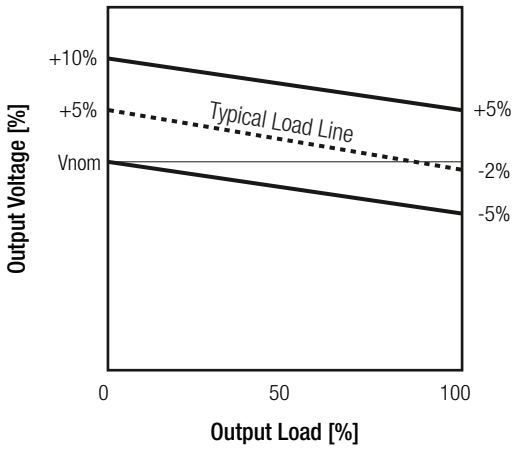
Parameter	Condition		Value
Output Accuracy			-2% typ. / ±5.0% max.
Line Regulation	low line to high line		±1.2% of 1.0% Vin typ.
Load Regulation	10% to 100% load	3.3Vout 5Vout 12, 15, 24Vout	20.0% max. 15.0% max. 10.0% max.

Tolerance Envelope

RO-xx3.3S and RO-xx05S

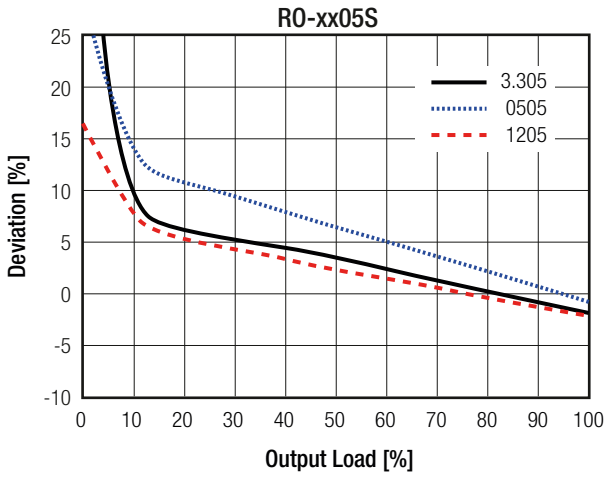


RO-xx12S and RO-xx15S

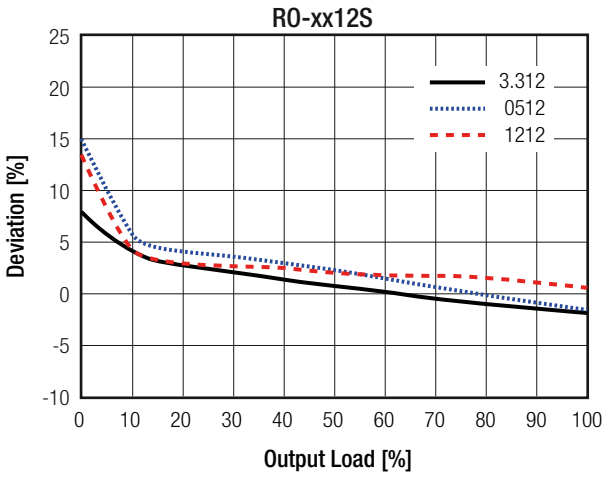


Deviation vs. Load

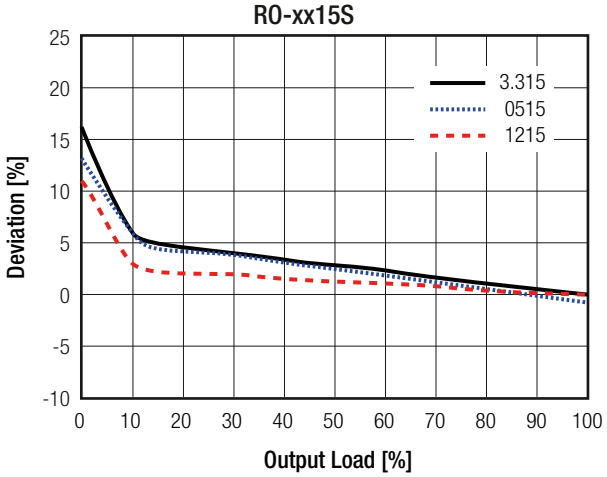
RO-xx05S



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	tested for 1 second rated for 1 minute	1kVDC 500VAC/60Hz
		with suffix "/H"	tested for 1 second rated for 1 minute	2kVDC 1kVAC/60Hz
Isolation Resistance				10GΩ min.
Isolation Capacitance				15pF min. / 120pF max.
Insulation Grade				functional

Notes:

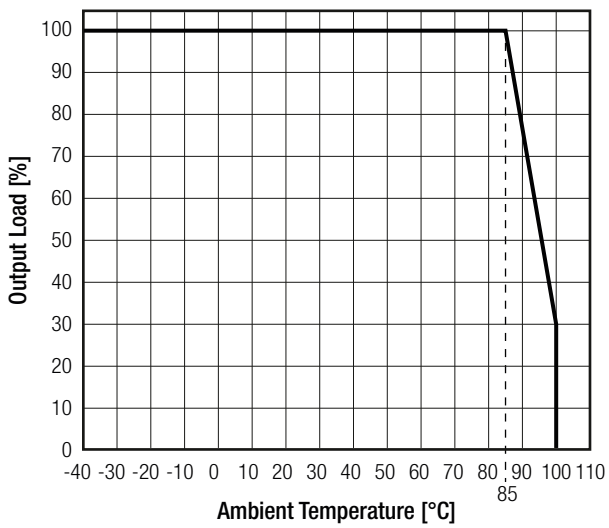
Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note7: Refer to local wiring regulations if input over-current protection is also required. Recommended fuse: T1A 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%/°C
Thermal Impedance			67°C/W
Operating Altitude			2000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +85°C	11800 x 10^3 hours 4800 x 10^3 hours

Derating Graph



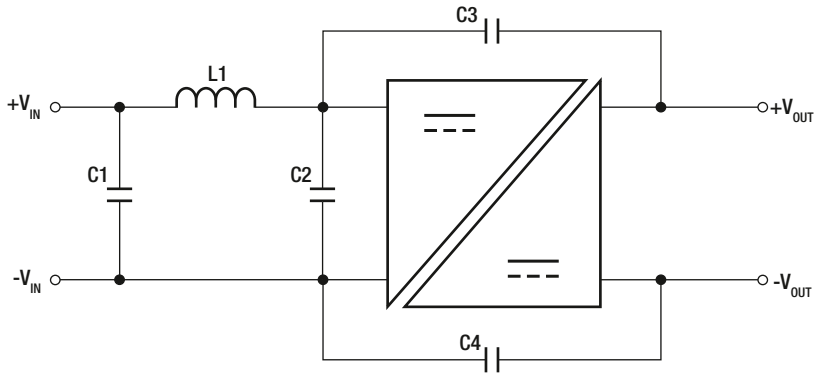
Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	1602031	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
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external filter	EN55032, Class B EN55032, Class A

EMC Filtering Suggestions according to EN55032



Component List Class A

Model	C1	C2	C4 (safety)
3.3, 5, 9Vin	10µF 100V, MLCC	1nF 50V, MLCC	-
12, 15, 24Vin			2.2nF, 5KV, Johanson

Component List Class B

Model	L1	C1	C3 (safety)	C4(safety)
all types	22µH choke RP4532Z-220K	10µF MLCC, 100V	1nF 5KV, Johanson	2.2nF 5KV, Johanson

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)		11.5 x 6.0 x 10.0mm
Weight		1.4g typ.

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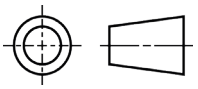
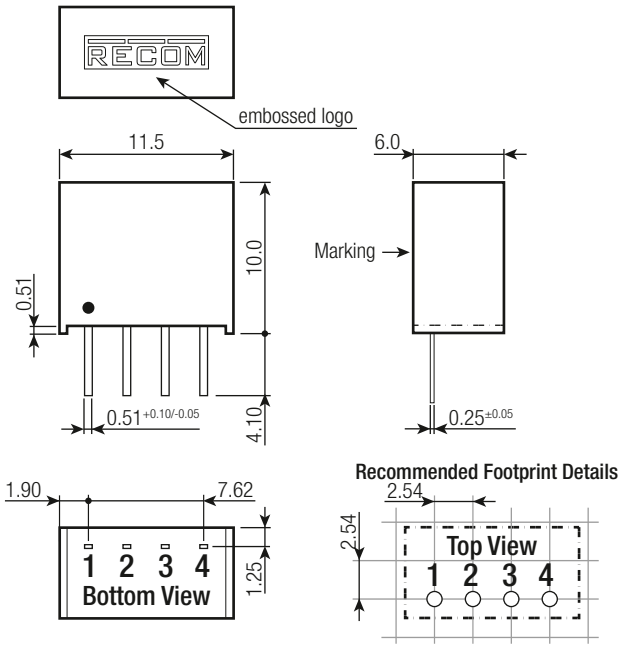
Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

Dimension Drawing (mm)





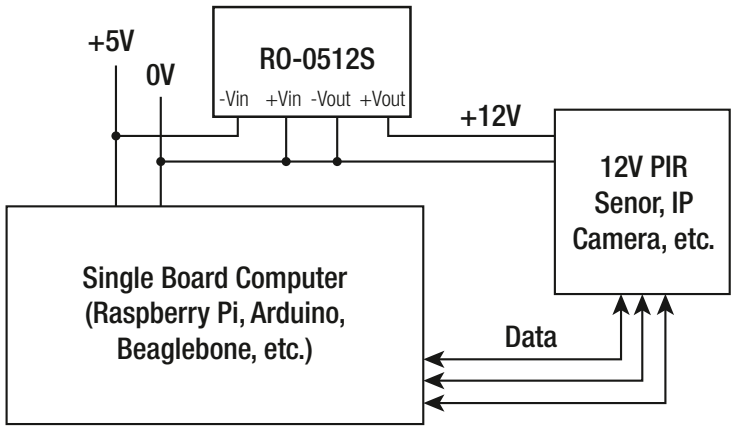
Pinning information

Pin #	Single
1	-Vin
2	+Vin
3	-Vout
4	+Vout

Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

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		95% RH max.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

RECOM:

RO-0505S/H RO-0505S/HP RO-0505S/P RO-0509S RO-0509S/H RO-0509S/HP RO-0509S/P RO-0512S/H RO-0512S/HP RO-0512S/P RO-0515S/H RO-0515S/HP RO-0515S/P RO-0524S RO-0524S/H RO-0524S/HP RO-0524S/P RO-053.3S RO-053.3S/H RO-053.3S/HP RO-053.3S/P RO-1205S/H RO-1205S/HP RO-1205S/P RO-1209S RO-1209S/H RO-1209S/HP RO-1209S/P RO-1212S/H RO-1212S/HP RO-1212S/P RO-1215S RO-1215S/H RO-1215S/HP RO-1215S/P RO-1224S RO-1224S/H RO-1224S/HP RO-1224S/P RO-123.3S RO-123.3S/H RO-123.3S/HP RO-123.3S/P RO-1505S RO-1505S/H RO-1505S/HP RO-1505S/P RO-1509S RO-1509S/H RO-1509S/HP RO-1509S/P RO-1512S RO-1512S/H RO-1512S/HP RO-1512S/P RO-1515S RO-1515S/H RO-1515S/HP RO-1515S/P RO-1524S RO-1524S/H RO-1524S/HP RO-1524S/P RO-153.3S RO-153.3S/H RO-153.3S/HP RO-153.3S/P RO-2405S/H RO-2405S/HP RO-2405S/P RO-2409S RO-2409S/H RO-2409S/HP RO-2409S/P RO-2412S/H RO-2412S/HP RO-2412S/P RO-2415S RO-2415S/H RO-2415S/HP RO-2415S/P RO-2424S/H RO-2424S/HP RO-2424S/P RO-243.3S RO-243.3S/H RO-243.3S/HP RO-243.3S/P RO-3.305S RO-3.305S/H RO-3.305S/HP RO-3.305S/P RO-3.309S RO-3.309S/H RO-3.309S/HP RO-3.309S/P RO-3.312S RO-3.312S/H RO-3.312S/HP RO-3.312S/P