

# Features

# Unregulated Converters

- Efficiency up to 84%
- Low deviation (10%-100% load)
- 1kVDC and 2kVDC isolation option
- IEC/EN/UL60950-1 safety certified
- -40°C to +100°C operating temperature range
- 1W SIP4 package



# RO/E

**1 Watt  
SIP4  
Single Output**



## Description

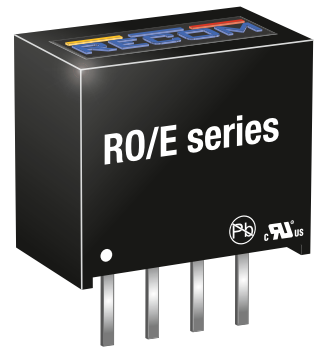
The RO/E series is an unregulated DC/DC converter in standard SIP4 package style. This series has been designed to offer exceptionally high efficiency at low loads, an extended operating temperature range and low deviation (10% to 100% load). Uses include applications with restricted energy budget and industrial applications where a high efficiency level is required.

## Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [µF]
RO-3.305S/E <sup>(3,4)</sup>	3.3	5	200	83	2200
RO-0505S/E <sup>(3,4)</sup>	5	5	200	84	2200
RO-1205S/E <sup>(3,4)</sup>	12	5	200	84	2200
RO-2405S/E <sup>(3,4)</sup>	24	5	200	81	2200

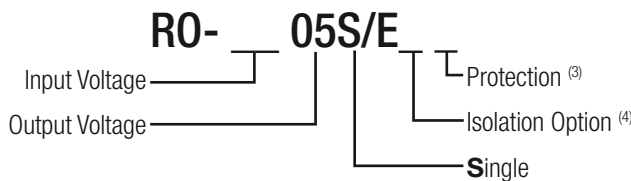
### Notes:

- 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  
 IEC60950-1 certified  
 EN60950-1 certified

## 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-3.305S/EP: 3.3V Input Voltage, 5V Output Voltage, Single Output with continuous short circuit protection  
 RO-0505S/EHP: 5V Input Voltage, 5V Output Voltage, Single Output with 2kVDC Isolation and continuous short circuit protection

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

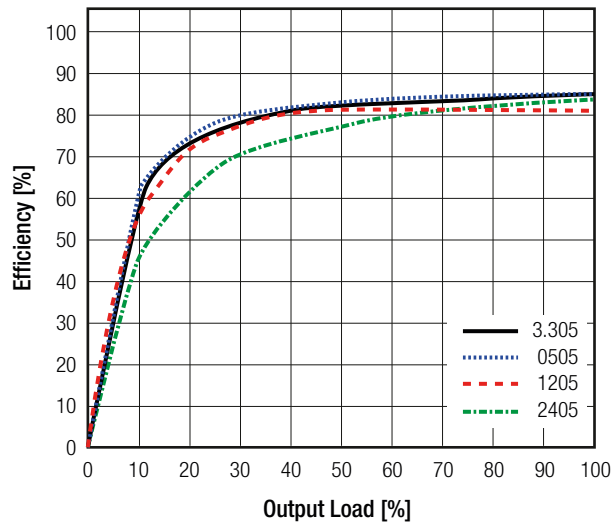
**BASIC CHARACTERISTICS**

Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Minimum Load <sup>(5)</sup>		0%		
Internal Operating Frequency		20kHz		90kHz
Output Ripple and Noise	20MHz BW		50mVp-p	100mVp-p

**Notes:**

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

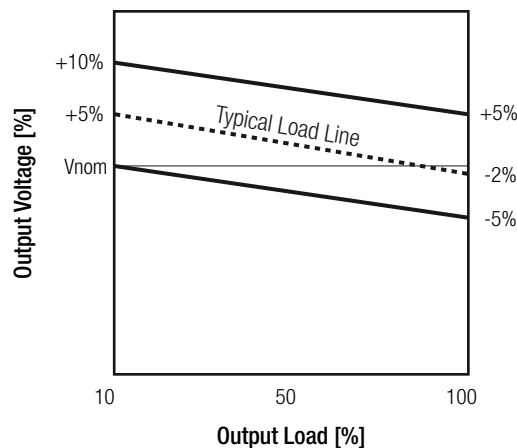
**Efficiency vs. Load**



**REGULATIONS**

Parameter	Condition	Value
Output Accuracy		±5.0% max.
Line Regulation	low line to high line	±1.2% max.
Load Regulation	10% to 100% load	12.0% max.

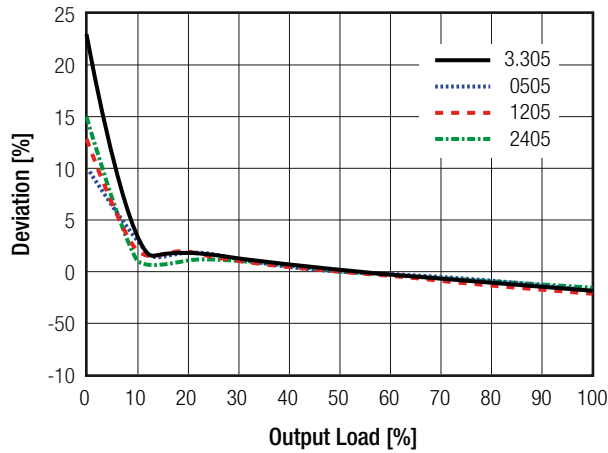
**Tolerance Envelope**



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

Deviation vs. Load



**PROTECTIONS**

Parameter	Type		Value
Short Circuit Protection (SCP)	without suffix with suffix "/P"		1 second continuous
Isolation Voltage <sup>(6)</sup>	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			75pF 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

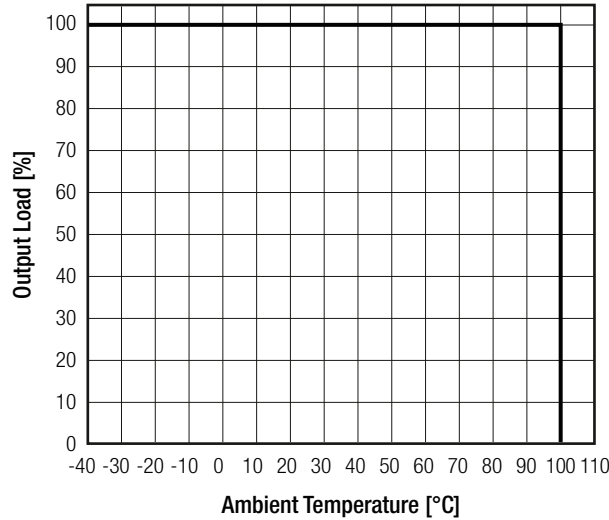
**ENVIRONMENTAL**

Parameter	Condition		Value
Operating Temperature Range	full load (see graph)		-40°C to +100°C
Operating Altitude			2000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	3459 x 10 <sup>3</sup> hours
		+85°C	756 x 10 <sup>3</sup> hours

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

Derating Graph



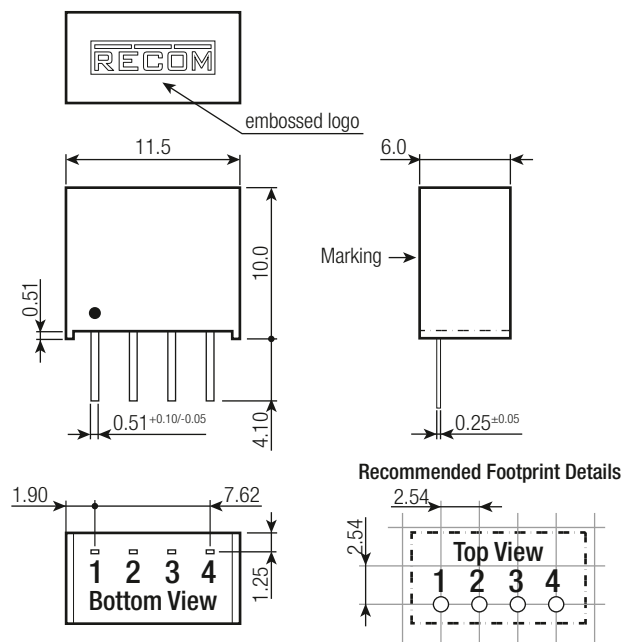
**SAFETY AND CERTIFICATIONS**

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
EAC	RU-AT.49.09571	TP TC 004/2011
RoHs 2+		RoHS-2011/65/EU + AM-2015/863

**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.

Dimension Drawing (mm)



**Pinning information**

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

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

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

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.

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