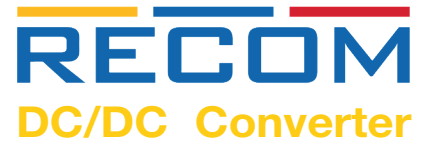


# Features

# Unregulated Converters

- 1:1 input range
- Efficiency up to 82%
- 1kVDC/1s or 2kVDC/1s isolation option
- Wide operating temperature range from -40°C to +100°C at full load
- UL60950-1 and IEC/EN60950-1 certified
- 1W SMD package



## R1S/E

**1 Watt  
SMD  
Single Output**



### Description

The R1S/E series is an unregulated DC/DC converter in fully encapsulated open Frame package style. This series has been designed to offer exceptionally high efficiency at low loads and an extended operating temperature range. Uses include battery powered supplies, green energy applications and general isolating/converting DC power where board space and high efficiency is a premium.

### 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]
R1S <sup>(3)</sup> -3.305/E <sup>(4,5)</sup>	3.3	5	200	81	2200
R1S <sup>(3)</sup> -0505/E <sup>(4,5)</sup>	5	5	200	81	2200
R1S <sup>(3)</sup> -1205/E <sup>(4,5)</sup>	12	5	200	82	2200
R1S <sup>(3)</sup> -2405/E <sup>(4,5)</sup>	24	5	200	80	2200



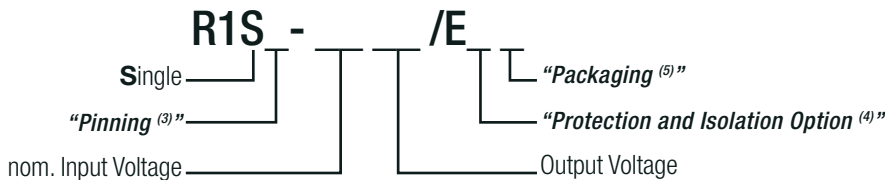
#### Notes:

- 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  
 CAN/CSA-C22.2 No. 60950-1-07 certified  
 IEC/EN60950-1 certified  
 EN55032 compliant

### Model Numbering



#### Notes:

- Note3: without marking denotes 5 pins out of 8 fitted (includes /H option)  
 with marking "8" denotes 8 pins out of 8 fitted (/H option not available)  
 Note4: standard part is without continuous short circuit protection  
 add suffix „/P“ for continuous short circuit protection  
 add suffix „/H“ for 2kVDC/1s isolation (not available for R1S8)  
 or add suffix „/HP“ for 2kVDC/1s isolation and continuous short circuit protection  
 Note5: add suffix „-R“ for tape and reel packaging (compatible with all other suffixes)

#### Ordering Examples:

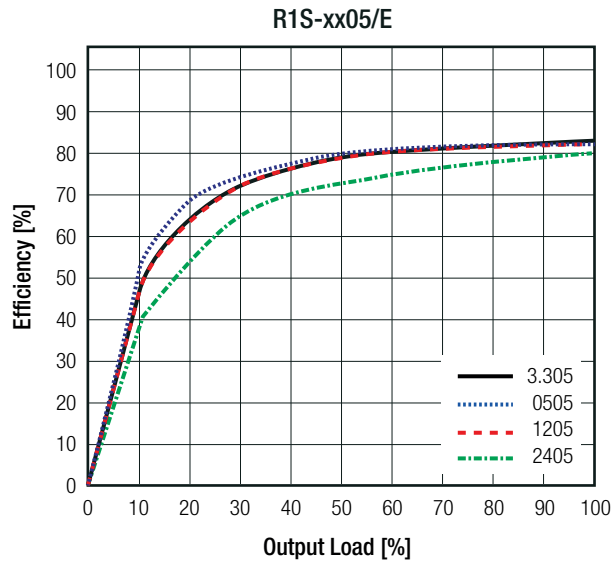
- R1S8-3.305/E = Single Output, 8 pins out of 8 fitted, 3.3Vin, 5Vout  
 R1S-3.305/EH = Single Output, 5 pins out of 8 fitted, 3.3Vin, 5Vout with 2kVDC/1s isolation  
 R1S8-0505/EP = Single Output, 8 pins out of 8 fitted, 5Vin, 5Vout with continuous short circuit protection  
 R1S-0505/EHP-R = Single Output, 8 pins out of 8 fitted, 5Vin, 5Vout with 2kVDC/1s isolation, continuous short circuit protection and tape and reel packaging

**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 <sup>(5)</sup>		0%		
Internal Operating Frequency		20kHz		90kHz
Output Ripple and Noise	20MHz BW		50mVp-p	100mVp-p

**Efficiency vs. Load**



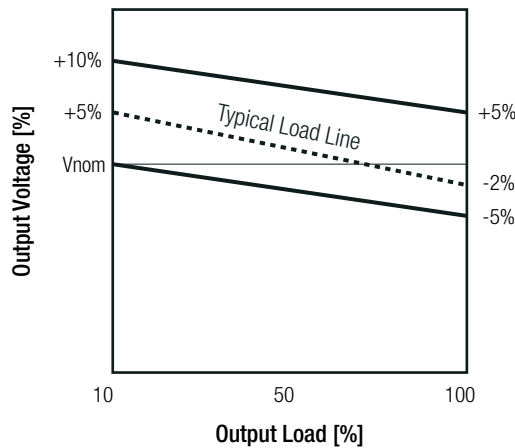
**REGULATIONS**

Parameter	Condition	Value
Output Accuracy		±5.0% max.
Line Regulation	low line to high line, full load	±1.2% typ.
Load Regulation	10% to 100% load	15.0% max.

**Notes:**

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

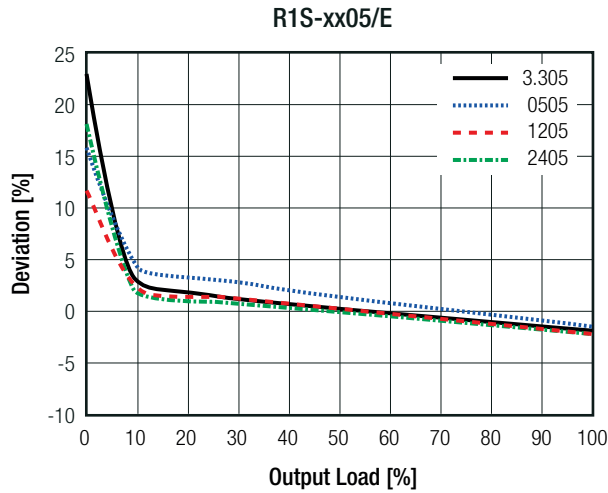
**Tolerance Envelope**



continued on next page

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

Deviation vs. Load



**PROTECTIONS**

Parameter	Type		Value
Short Circuit Protection (SCP)	below 100mΩ	without suffix with suffix "/P"	1 second continuous
Isolation Voltage <sup>(7)</sup>	I/P to O/P	without suffix	1kVDC 500VAC/60Hz
		with suffix "/H"	2kVDC 1kVAC/60Hz
Isolation Resistance			10GΩ min.
Isolation Capacitance			75pF max.
Insulation Grade			functional

**Notes:**

Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note8: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

**ENVIRONMENTAL**

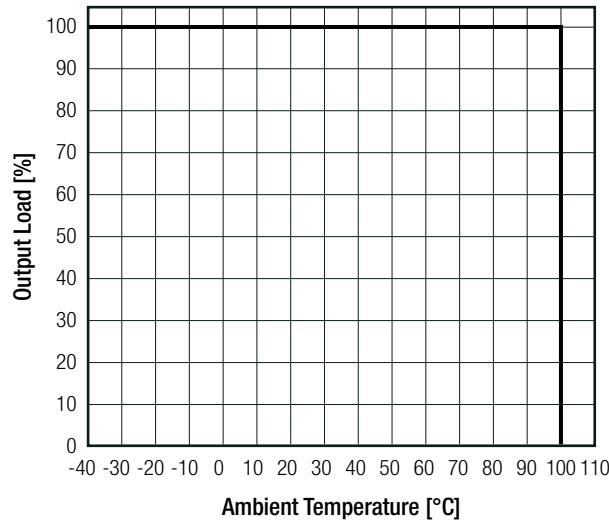
Parameter	Condition		Value
Operating Temperature Range	full load @ free air convection, refer to "Derating Graph"		-40°C to +100°C
Operating Altitude			2000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	3459 x 10 <sup>3</sup> hours
		+100°C	756 x 10 <sup>3</sup> hours

continued on next page

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

**Derating Graph**

(@ Chamber and free air convection)



**SAFETY AND CERTIFICATIONS**

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E358085-A2-UL	UL60950-1, 2nd Edition:2007 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition:2007
Information Technology Equipment, General Requirements for Safety	LVD1605077-08	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
Medical electrical equipment Part 1: General requirements for basic safety and essential performance	WD-SE-R-180674-A0	EN60601-1:2006 + A12:2014 IEC60601-1:2005 + A1:2012, 3rd Edition
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

**DIMENSION AND PHYSICAL CHARACTERISTICS**

Parameter	Type	Value
Material	case	non-conductive black plastic, (UL94 V-0)
Dimension (LxWxH)		12.75 x 10.7 x 6.7mm
Weight		1.0g typ.

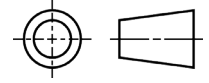
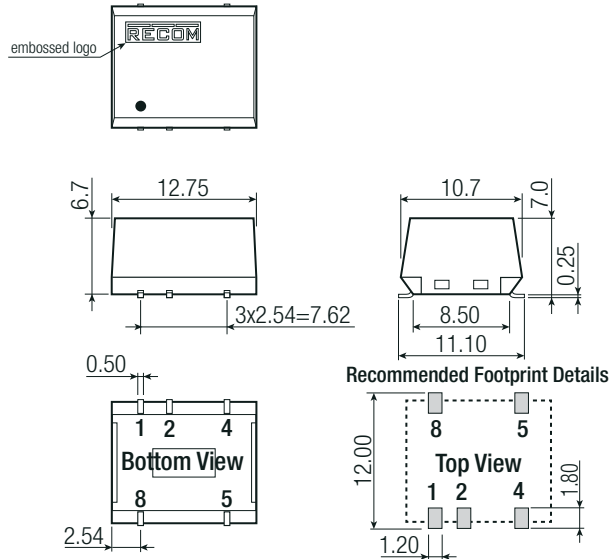
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**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

### Dimension Drawing (mm)

#### 5 Pin Single SMD Package

/H option is available in these pin package



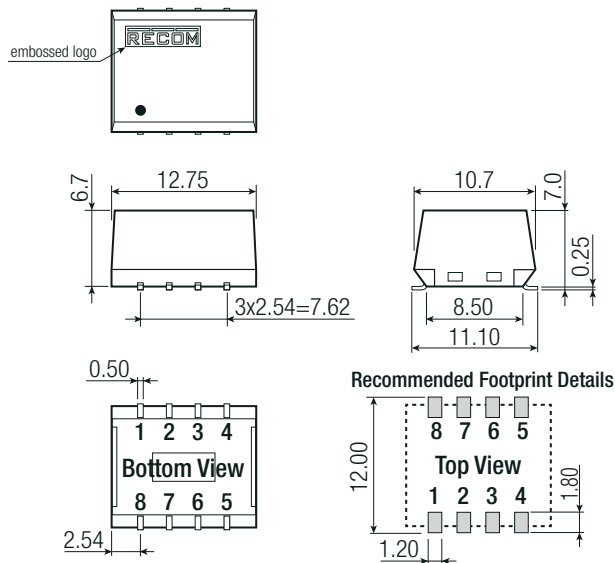
#### Pinning Information

Pin #	Single
1	-Vin
2	+Vin
4	-Vout
5	+Vout
8	NC

NC = No Connection  
Tolerance:  
xx.xx= ±0.25mm

#### 8 Pin Single SMD Package

/H option is not available in these pin package



#### Pinning Information

Pin #	Single
1	-Vin
2	+Vin
3	NC
4	-Vout
5	+Vout
6	NC
7	NC
8	NC

NC = No Connection  
Tolerance:  
xx.xx= ±0.25mm

### PACKAGING INFORMATION

Packaging Dimension (LxWxH)	tube tape and reel (carton)	530.0 x 17.0 x 14.0mm 355.0 x 342.0 x 36.0mm
Packaging Quantity	tube tape and reel	40pcs 500pcs
Tape Width		24.0mm
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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