Features

Unregulated Converters

- Fully RoHS 10/10 conform
- Full power at 100°C ambient temperature
- 1kVDC or 3kVDC isolation option
- Suitable for fully automated assembly (including vapor phase soldering)
- Optional continuous short circuit protection

RECOM
DC/DC Converter

R0.25S & R0.25D(A)

0.25 Watt SMD Single, Dual and Independent Outputs

3 YEAR warranty





RoHS 2+ compliant 10 from 10 — RECOM-CONVERTER COMPLIANT PRODUCER

REACH compliant — RECOM-CONVERTER COMPLIANT PRODUCER

IECEE CB SCHEME

c UL us
E224736

UL60950-1 certified
CAN/CSA-C22.2 No. 60950-1-07 certified
IEC/EN60950-1 certified
EN55032 compliant
CB report

Description

The R0.25S and R0.25D(A) converters are of the enclosed open frame type, i.e. they are not potted. The converters are typically used in general purpose and industrial low power isolation and voltage matching applications where an SMD converter is required. The converter series feature an extended ambient temperature operating range of -40°C to +100°C without derating and optional continuous short circuit protection. In addition to single, dual and independent outputs, two isolation options and three different case formats, the converters are also available prepacked as tape and reel for use with automatic insertion machines.

Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	max. Capacitive Load(2) [µF]
R0.25S (3)-xx3.3 (4,5)	3.3, 5, 12, 15, 24	3.3	76	1000
R0.25S (3)-xx05 (4,5)	3.3, 5, 12, 15, 24	5	50	470
R0.25S (3)-xx09 (4,5)	3.3, 5, 12, 15, 24	9	28	470
R0.25S (3)-xx12 (4,5)	3.3, 5, 12, 15, 24	12	21	150
R0.25S (3)-xx15 (4,5)	3.3, 5, 12, 15, 24	15	17	68
R0.25S (3)-xx24 (4,5)	3.3, 5, 12, 15, 24	24	10.4	68
R0.25D (3)-xx3.3 (4,5)	3.3, 5, 12, 15, 24	±3.3	±38	470
R0.25D (3)-xx05 (4,5)	3.3, 5, 12, 15, 24	±5	±25	220
R0.25D (3)-xx09 (4,5)	3.3, 5, 12, 15, 24	±9	±14	68
R0.25D (3)-xx12 (4,5)	3.3, 5, 12, 15, 24	±12	±10.4	68
R0.25D (3)-xx15 (4,5)	3.3, 5, 12, 15, 24	±15	±8.3	68
R0.25D (3)-xx24 (4,5)	3.3, 5, 12, 15, 24	±24	±5.2	33
R0.25DA (3)-xx0505 (4,5)	3.3, 5, 12, 15, 24	5/5	25/25	220/220
R0.25DA (3)-xx1212 (4,5)	3.3, 5, 12, 15, 24	12/12	10/10	68/68

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

Model Numbering

R0.25 _ - _ _ / _

- **S**ingle, **D**ual or Independent **DA**
- "Pinning (3)"
- nom. Input Voltage
- Output Voltage
- "Protection and Isolation Option (4)"
- "Packaging (5)"

Notes:

Note3: R0.25S: 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)
with marking "12" denotes 10 pins out of 12 fitted (includes /H option)

R0.25D: without marking denotes "6" pins out of 10 fitted (includes /H option)
with marking "10" denotes 10 pins out of 10 fitted (/H option not available)
with marking "12" denotes 10 pins out of 12 fitted (includes /H option)

R0.25DA: without marking denotes 7 pins out of 10 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 3kVDC isolation (not available for R0.25S8, R0.25D10, R0.25DA)
or add suffix „/HP" for 3kVDC isolation and continuous short circuit protection

Note5: add suffix „-R" for tape and reel packaging (compatible with all other suffixes)

PREFERRED ALTERNATIVES
For new medical applications:
REM2A

R0.25S & R0.25D(A) Series

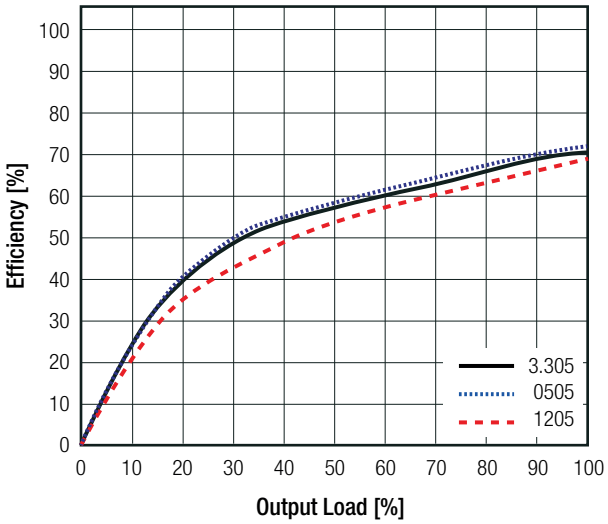
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

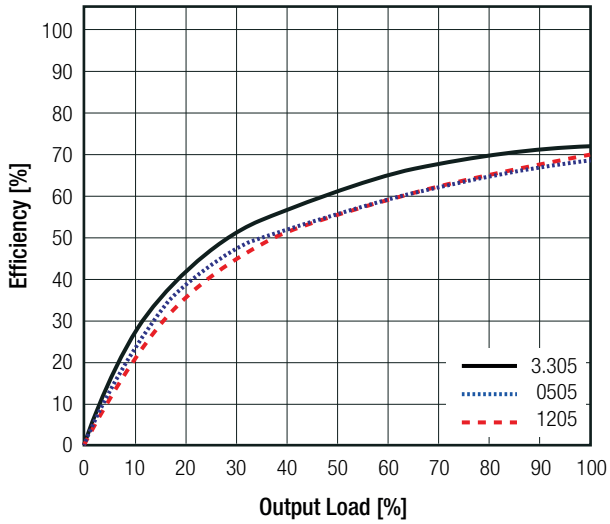
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range			±10%	
Efficiency		60%		70%
Minimum Load		0%		
Internal Operating Frequency		20kHz	50kHz	90kHz
Output Ripple and Noise	20MHz BW			100mVp-p

Efficiency vs. Load

R0.25S-xx05



R0.25D-xx05



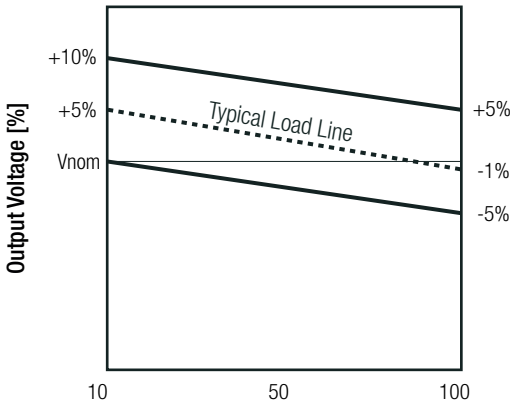
REGULATIONS

Parameter	Condition		Value
Output Accuracy			±5.0% typ. / ±7.0% max.
Line Regulation	low line to high line, full load		2.0% max.
Load Regulation [6]	10% to 100% load	3.3Vout	15.0% typ. / 20.0% max.
		5, 5/5Vout	12.0% typ. / 15.0% max.
		9Vout	7.0% typ. / 10.0% max.
		12, 12/12, 15, 24Vout	6.0% typ. / 10.0% max.

Notes:

Note6: Operation below 10% load will not harm the converter, but specifications may not be met

Tolerance Envelope

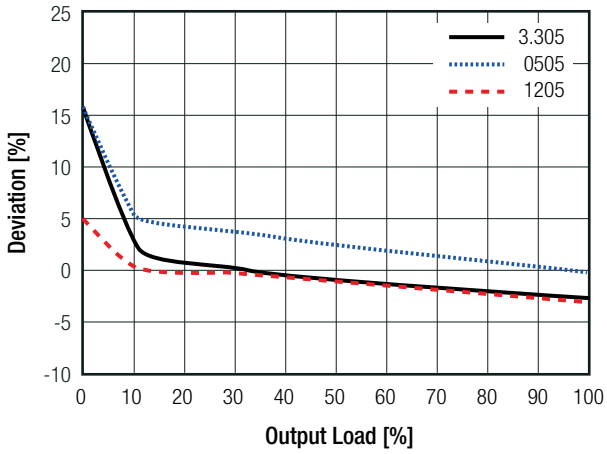


continued on next page

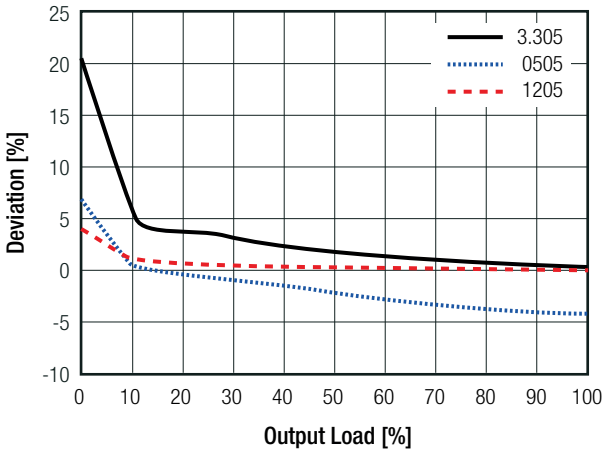
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Deviation vs. Load

R0.25S-xx05



R0.25D-xx05



PROTECTIONS				
Parameter	**Type**			**Value**
Short Circuit Protection (SCP)	below 100mΩ	without suffix with suffix "/P"		1 second continuous
Isolation Voltage[7]	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	3kVDC 1.5kVAC/60Hz
	O/P to O/P	R0.25DA	tested for 1 second	1kVDC
Isolation Resistance	Viso=500V			10GΩ min.
Isolation Capacitance				75pF max.
Insulation Grade	according to 60950-1			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	according to 60950-1		2000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +85°C	4423 x 10^3 hours 2161 x 10^3 hours

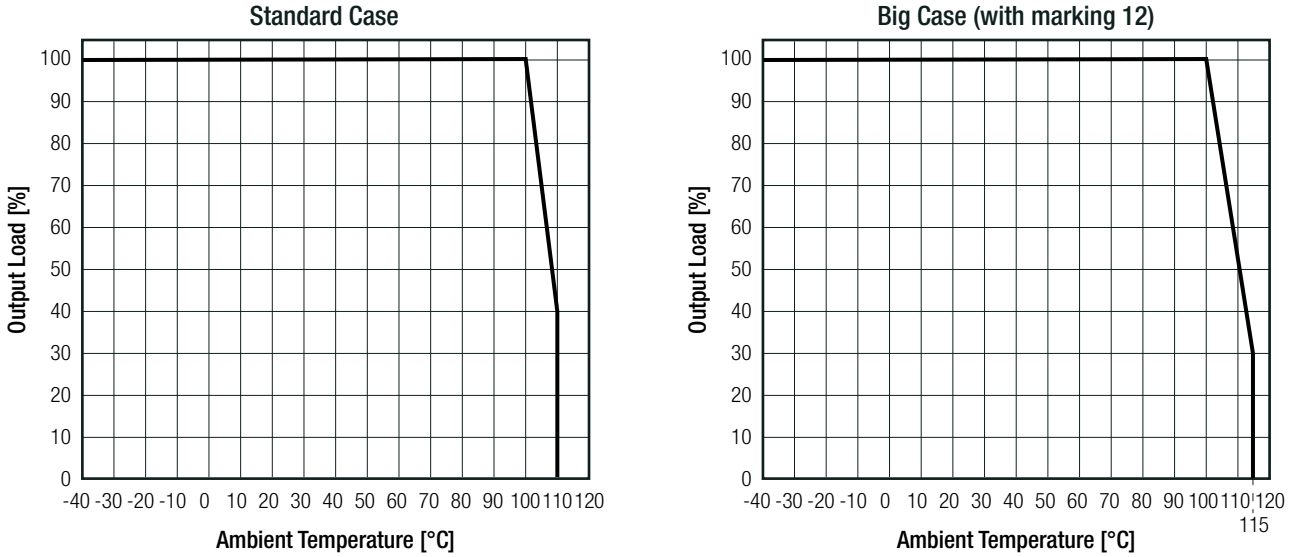
continued on next page

R0.25S & R0.25D(A) Series

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

Derating Graph

(@ Chamber and free air convection)

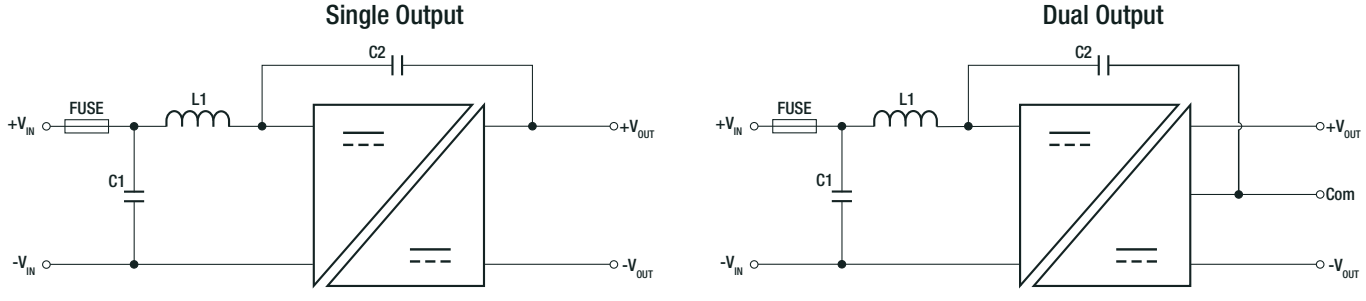


SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report 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
Information Technology Equipment, General Requirements for Safety (CB Scheme)	E322406-A2-CB-1	IEC60950-1:2001, 1st Edition
Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	SPC1005061	IEC60601-1:1988 + A2:1995 EN 60601-1:1990 +A13:1996
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter (see filter suggestion below)	EN55032, Class B

EMC Filtering Suggestions according to EN55032 Class B



Component List Class B

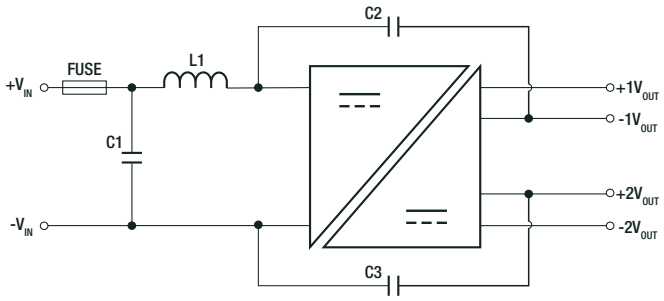
nom. Vin	C1	C2	L1
3.3VDC	2.2µF MLCC	470pF/4kVDC	3.3µH SMD Inductor
5VDC			4.7µH SMD Inductor
12, 15VDC	1.0µF MLCC		2.2µH SMD Inductor
24VDC	470nF MLCC		47µH SMD Inductor

R0.25S & R0.25D(A) Series

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

EMC Filtering Suggestions according to EN55032 Class B

Dual Independent Output



Component List Class B

nom. Vin	C1	C2	C3	L1
3.3VDC	2.2µF MLCC	470pF 2kVDC	470pF 2kVDC	3.3µH SMD Inductor
5VDC				4.7µH SMD Inductor
12, 15VDC	1.0µF MLCC			2.2µH SMD Inductor
24VDC	470nF MLCC			47µH SMD Inductor

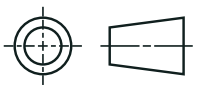
DIMENSION AND PHYSICAL CHARACTERISTICS

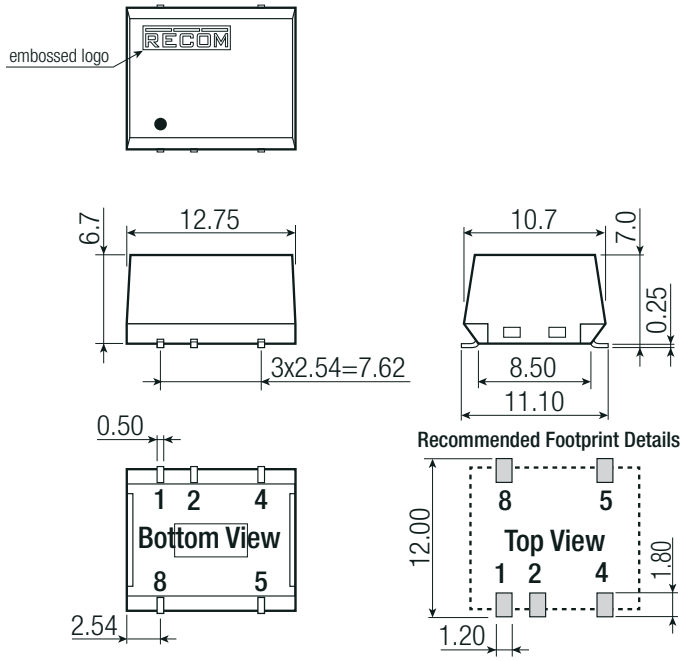
Parameter	Type	Value
Material	case	non-conductive black plastic, (UL94 V-0)
Dimension (LxWxH)	R0.25S, R0.25S8	12.75 x 10.7 x 7.0mm
	R0.25S12, R0.25D, R0.25D10, R0.25D12, R0.25DA	15.24 x 10.7 x 7.0mm
Weight	R0.25S	1.0g typ.
	R0.25S8	1.1g typ.
	R0.25S12, R0.25D, R0.25D10, R0.25D12, R0.25DA	1.2g typ.

Dimension Drawing (mm)

5 Pin Single SMD Package

/H option is available in this pin package





Pinning Information

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

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

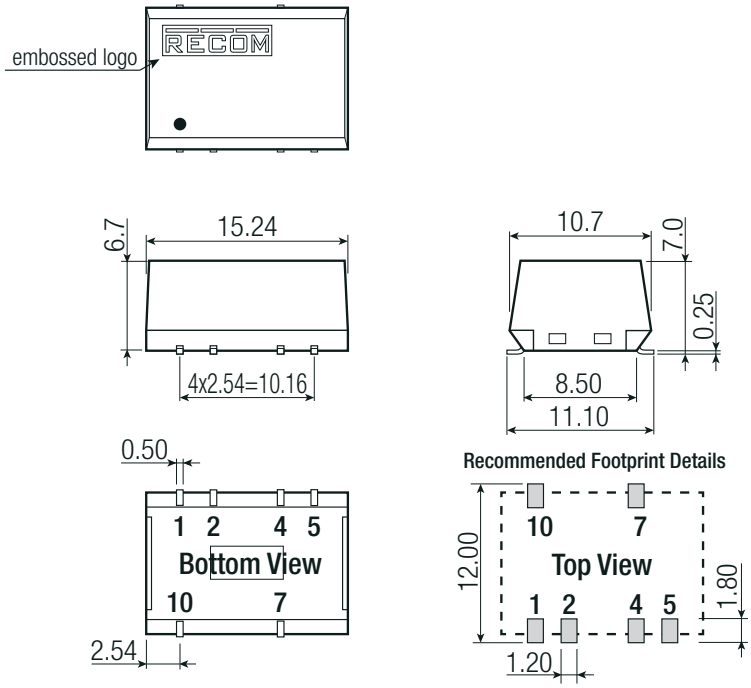
continued on next page

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

Dimension Drawing (mm)

6 Pin Dual SMD Package

/H option is available in this pin package



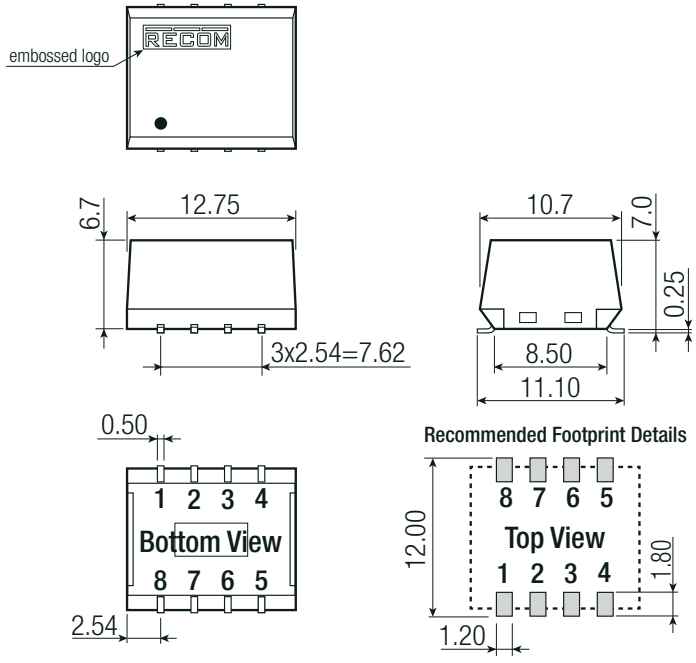
Pinning Information

Pin #	Dual
1	-Vin
2	+Vin
4	Com
5	-Vout
7	+Vout
10	NC

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

8 Pin Single SMD Package

/H option is not available in this 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.x= ±0.5mm
xx.xx= ±0.25mm

continued on next page

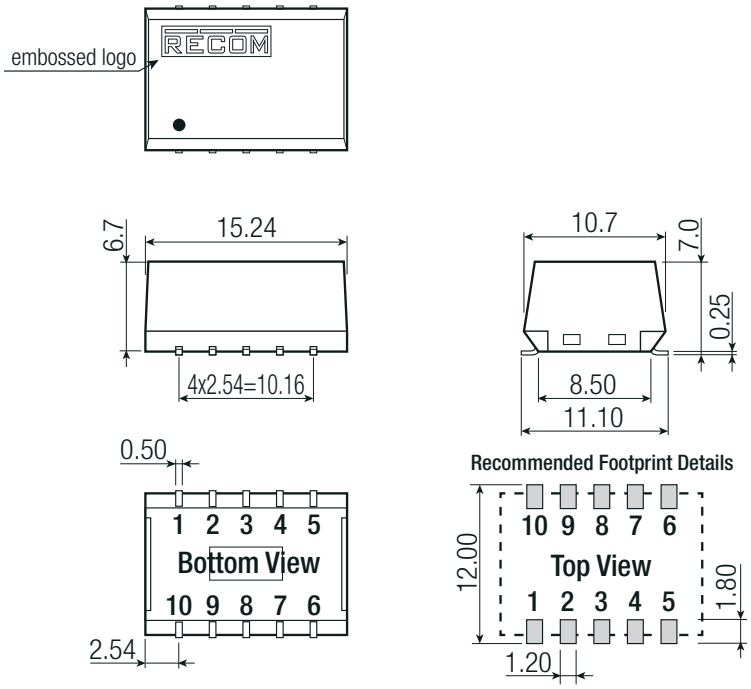
R0.25S & R0.25D(A) Series

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

Dimension Drawing (mm)

10 Pin Dual SMD Package

/H option is not available in this pin package



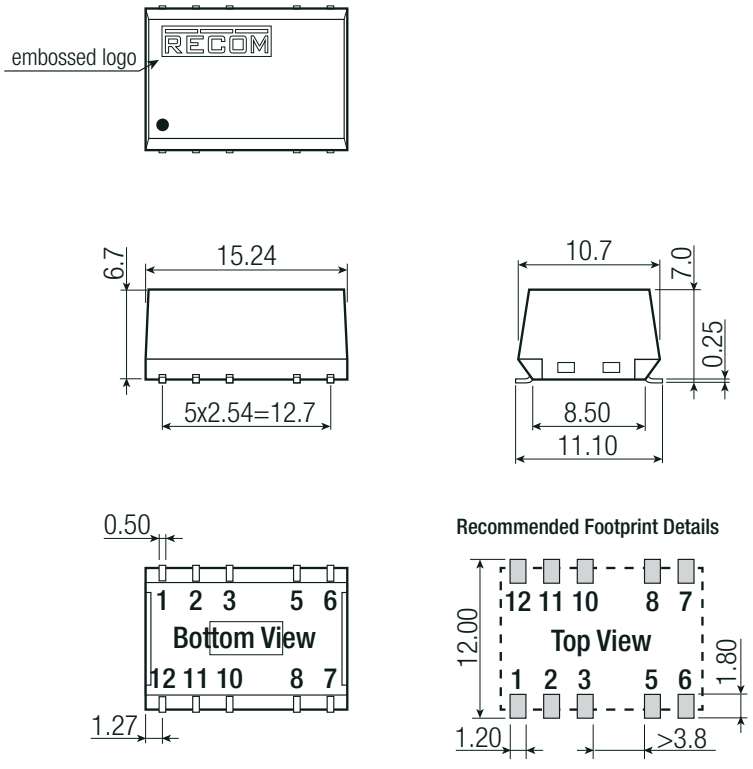
Pinning Information

Pin #	Dual	R0.25DA
1	-Vin	-Vin
2	+Vin	+Vin
3	NC	no pin
4	Com	-Vout1
5	-Vout	+Vout1
6	NC	-Vout2
7	+Vout	+Vout2
8	NC	no pin
9	NC	no pin
10	NC	NC

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

12 Pin Single and Dual SMD Package

/H option is available in this pin package



Pinning Information

Pin #	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
3	NC	NC
5	-Vout	Com
6	NC	-Vout
7	NC	NC
8	+Vout	+Vout
10	NC	NC
11	NC	NC
12	NC	NC

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

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

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	R0.25S, R0.25S8 R0.25S12, R0.25D, R0.25D10, R0.25D12, R0.25DA	40pcs 33pcs
	tape and reel		500pcs
Tape Width			24mm
Storage Temperature Range			-55°C to +125°C
Storage Humidity	non-condensing		95% RH max.

The product information and specifications may be subject to changes even without prior written notice.The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.