

Features

Unregulated Converters

- Fully RoHS 6/6 Conform
- Full Power at 100°C Ambient Temperature
- 1kVDC and 3kVDC Isolation Options
- /H Version Certified for Medical Applications
- UL/EN/CSA Certified, CB Report
- Suitable for Fully Automated Assembly (including Vapour Phase Soldering)
- Optional Continuous Short Circuit Protection
- Efficiency to 85%

Description

The R2S and R2D converters are of the enclosed open frame type, meaning that they are unpotted. 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 ~ +100°C without derating and optional continuous short circuit protection. In addition to 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	SMD	(3kV)	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%)
R2S**	-xx3.3	(H)	5, 12, 15, 24	3.3	606	70-75
R2S**	-xx05	(H)	5, 12, 15, 24	5	400	76-85
R2S**	-xx09	(H)	5, 12, 15, 24	9	222	76-85
R2S**	-xx12	(H)	5, 12, 15, 24	12	167	76-85
R2S**	-xx15	(H)	5, 12, 15, 24	15	133	76-85
R2S**	-xx24	(H)	5, 12, 15, 24	24	83	76-85
R2D**	-xx05	(H)	5, 12, 15, 24	±5	±200	75-80
R2D**	-xx09	(H)	5, 12, 15, 24	±9	±111	75-80
R2D**	-xx12	(H)	5, 12, 15, 24	±12	±83	75-83
R2D**	-xx15	(H)	5, 12, 15, 24	±15	±66	75-85
R2D**	-xx24	(H)	5, 12, 15, 24	±24	±42	75-85

xx = Input Voltage. Other input and output voltage combinations available on request.

* add Suffix "P" for Continuous Short Circuit Protection, e.g. R2S-0505/P, R2D-0505/HP

* add suffix -R for tape&reel packing e.g. R2S-0505-R. For more details see Tapes Section.

Case and Pinning Options (note restrictions on /H option)

- R2S** : ** without marking denotes 5 pins out of 8 fitted (/H option available)
 ** with marking **8** denotes 8 pins out of 8 fitted (/H option not available)
 ** with marking **12** denotes 10 pins out of 12 fitted (/H option available)
- R2D** : ** without marking denotes 6 pins out of 10 fitted (/H option available)
 ** with marking **10** denotes with 10 pins out of 10 fitted (/H option not available)
 ** with marking **12** denotes with 10 pins out of 12 fitted (/H option available)

Specifications (measured at $T_A = 25^\circ\text{C}$, nominal input voltage, full load and after warm-up)

Input Voltage Range			±10%
Output Voltage Accuracy			±5%
Line Voltage Regulation			1.2%/1% of V_{in} max.
Load Voltage Regulation (10% to 100% full load)	3.3V output types		20% max.
	5V output type		15% max.
	9V, 12V, 15V, 24V output types		10% max.
Output Ripple and Noise (20MHz limited)			150mVp-p max.
Operating Frequency			20kHz min. / 40kHz typ. / 85kHz max.
Efficiency at Full Load			70% min. / 80% typ.
No Load Power Consumption	RTS typ.	124mW min. / 186mW typ. / 350mW max.	
	RTD typ.	159mW min. / 192mW typ. / 350mW max.	

cont.

ECONOLINE

DC/DC-Converter

RECOM

2 Watt

SMD Single & Dual Output



E-224736

UL-60950-1 Certified
EN-60950-1 Certified
EN-60601-1 Certified
(Suffix /H)

R2S-R2D

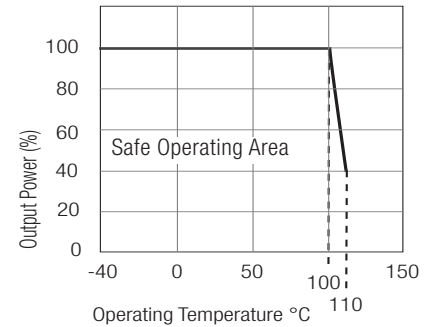
Refer to Application Notes

Specifications - Continued

Isolation Voltage		(tested for 1 second)	1000VDC min.
	H-Suffix	(tested for 1 second)	3000VDC min.
Rated Working Voltage		(long term isolation)	see Application Notes
Isolation Capacitance			20pF min. / 115pF max.
Isolation Resistance			10 GΩ min.
Short Circuit Protection			1 Second
P-Suffix			Continuous
Operating Temperature Range (free air convection)			-40°C to +100°C (see Graph)
Storage Temperature Range			-55°C to +125°C
Reflow Temperature	ROHS compliant		245°C (30 sec), peak 255°C (5 sec) max.
Vapour Phase Process	(for more details see Application Notes)		230°C (90 sec) max.
Relative Humidity			95% RH
Package Weight	R2S, R2S8		1.4g
	R2D, R2D10		1.6g
	R2S12, R2D12		2.0g
Packing Quantity	R2S, R2S8		39 pcs per Tube
	R2S12, R2D, R2D10, R2D12		33 pcs per tube
	All Types		250 pcs per Reel
MTBF (+25°C)	} Detailed Information see Application Notes chapter "MTBF"	using MIL-HDBK 217F	886 x 10 ³ hours
(+85°C)		using MIL-HDBK 217F	128 x 10 ³ hours
Certifications			
CB Test Report	Report: US/14402/UL		
UL General Safety	Report: E322406		UL 60950-1 1st Ed.
CUL General Safety			C22.2 No. 60950-1-03
EN General Safety			EN-60950-1 2rd Ed.
EN Medical Safety			EN-60601-1

Derating-Graph (Ambient Temperature)

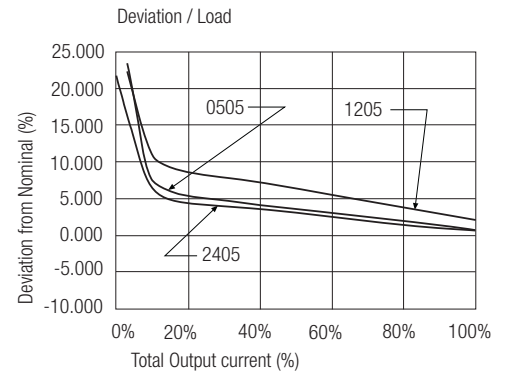
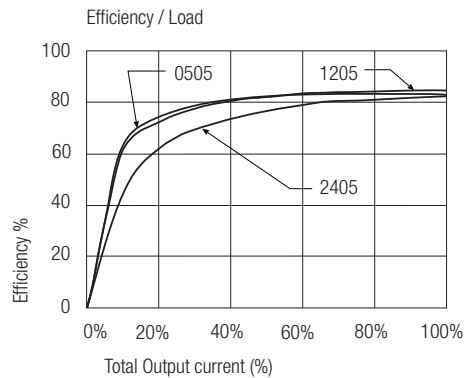
R2S-0505, R2D-0505



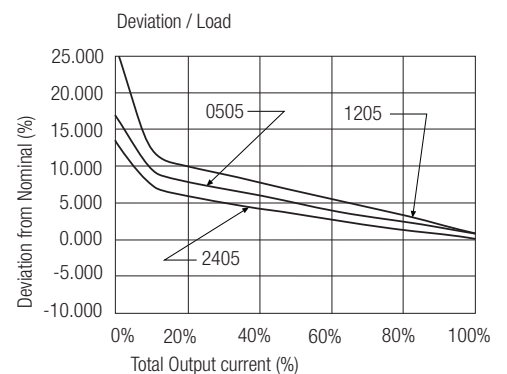
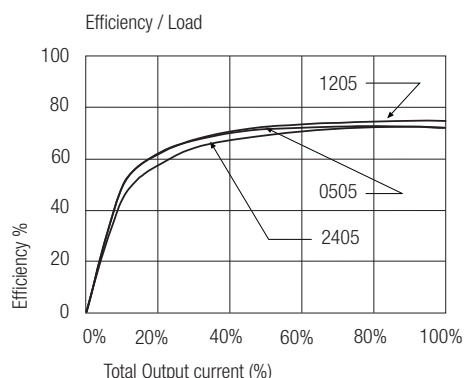
The derating graph is valid only for the shown part numbers. The converters have been tested at full load with 100°C ambient temperature and all internal component temperatures are within limits. However, Recom can only guarantee continuous operation of up to +85°C to maintain the validity of the UL certificates.

Typical Characteristics

R2S-xx05

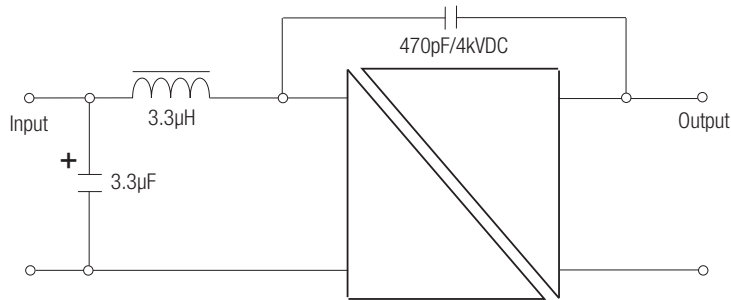


R2D-xx05

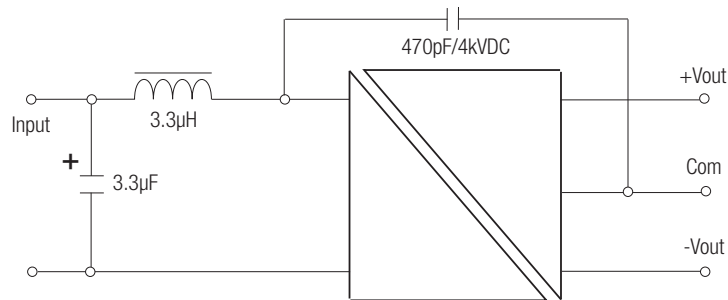


EMC Filtering - Suggestion for EN55022 Class B (Conducted and Emitted)

R2S**



R2D**

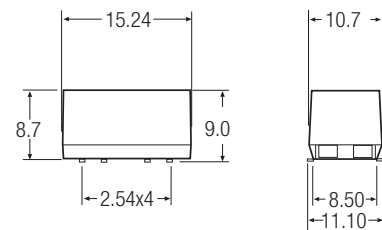
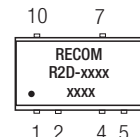
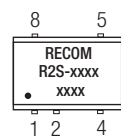
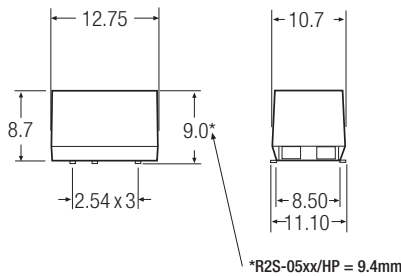


Package Style and Pinning (mm)

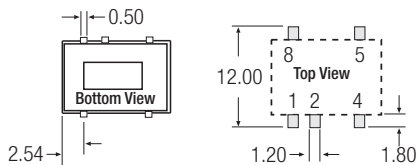
8 PIN Single SMD Package

10 PIN Dual SMD Package

3rd angle projection



Recommended Footprint Details



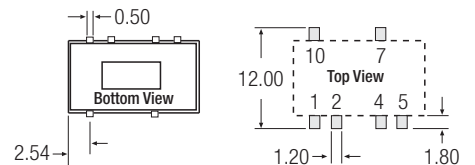
Pin Connections

Pin #	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
4	-Vout	Com
5	+Vout	-Vout
7	No Pin	+Vout
8	NC	No Pin
10	No Pin	NC

NC = No Connection

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

Recommended Footprint Details



R2S** : ** 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)

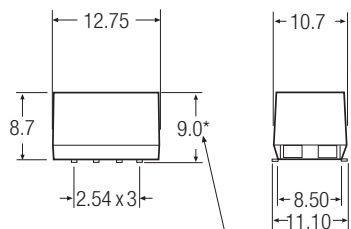
e.g. R2S-0505, R2S-0505/H, R2S-0505/HP
e.g. R2S8-0505, R2S8-0505/P

R2D** : ** without marking denotes 6 pins out of 10 fitted (includes /H option)
** with marking **10** denotes with 10 pins out of 10 fitted (/H option not available)

e.g. R2D-0505, R2D-0505/H, R2D-0505/HP
e.g. R2D10-0505, R2D10-0505/P

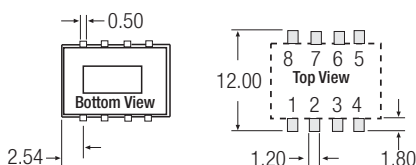
Package Style and Pinning (mm)

Full 8 PIN Single SMD Package



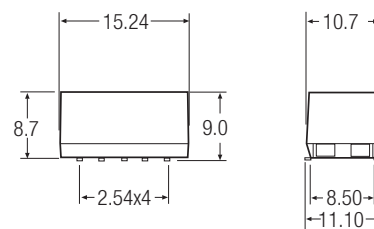
*R2S8-05xx/HP = 9.4mm

Recommended Footprint Details



Note: /H option is not available in these pin packages

Full 10 PIN Dual SMD Package



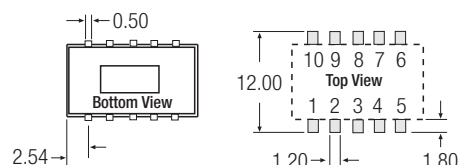
Pin Connections

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

NC = No Connection

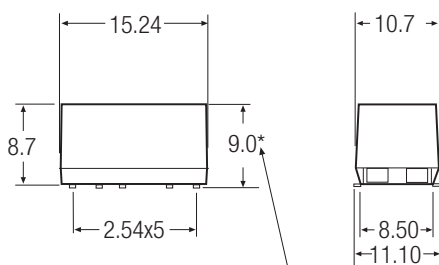
XX.X ± 0.5 mm
XX.XX ± 0.25 mm

Recommended Footprint Details

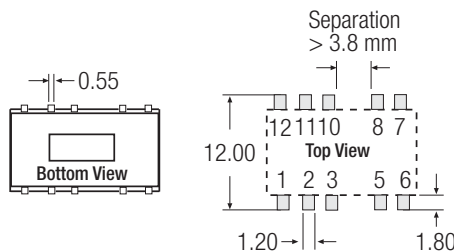


12 PIN Single and Dual SMD Package

Note: /H option is available in this pin package



*R2S12-05xx/HP = 9.4mm



Recommended Footprint Details

Pin Connections

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

XX.X ± 0.5 mm
XX.XX ± 0.25 mm



R2S**: ** with marking 12 denotes 10 pins out of 12 fitted (includes /H option)

R2D**: ** with marking 12 denotes 10 pins out of 12 fitted (includes /H option)

e.g. R2S12-0505, R2S12-0505/H, R2S12-0505/HP

e.g. R2D12-0505, R2D12-0505/H, R2D12-0505/HP