

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from, Europe, America and south Asia, supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts, Customers Priority, Honest Operation, and Considerate Service", our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip, ALPS, ROHM, Xilinx, Pulse, ON, Everlight and Freescale. Main products comprise IC, Modules, Potentiometer, IC Socket, Relay, Connector. Our parts cover such applications as commercial, industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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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 Vapor Phase Soldering)
- Optional Continuous Short Circuit Protection
- Efficiency to 85%
- Built-In EN55022 Class A Filter

Description

The R2S and R2D converters are of the enclosed open frame type, meaning that they are un-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 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 (%)	Max Capacitive Load ⁽¹⁾
R2S**-xx3.3	(H)	5, 12, 15, 24	3.3	606	70-75	3300µF
R2S**-xx05	(H)	5, 12, 15, 24	5	400	76-84	1200µF
R2S**-xx09	(H)	5, 12, 15, 24	9	222	76-84	1200µF
R2S**-xx12	(H)	5, 12, 15, 24	12	167	76-85	680µF
R2S**-xx15	(H)	5, 12, 15, 24	15	133	76-85	680µF
R2S**-xx24	(H)	5, 12, 15, 24	24	83	76-85	220µF
R2D**-xx05	(H)	5, 12, 15, 24	±5	±200	75-80	±470µF
R2D**-xx09	(H)	5, 12, 15, 24	±9	±111	75-80	±470µF
R2D**-xx12	(H)	5, 12, 15, 24	±12	±83	75-83	±330µF
R2D**-xx15	(H)	5, 12, 15, 24	±15	±66	75-85	±330µF
R2D**-xx24	(H)	5, 12, 15, 24	±24	±42	75-85	±330µF

- 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 $T_A = 25$ °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 Vin max.
Load Voltage Regulation	3.3V output types	20% max.
(10% to 100% full load)	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. / 4	10kHz typ. / 85kHz max.
Efficiency at Full Load		70% min. / 80% typ.
Minimum Load = 0%	Specifications valid for 1	0% minimum load only.

continued on next page

ECONOLINE

DC/DC-Converter with 3 year Warranty

RECOM

2 Watt SMD Single & **Dual Output**

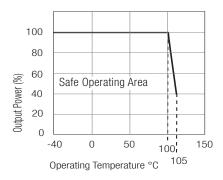


UL-60950-1 Certified EN-60950-1 Certified EN-60601-1 Certified* (*/H suffix)

R25-R2D

Derating-Graph

(Ambient Temperature)



^{***}Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

Refer to Application Notes

ECONOLINE

DC/DC-Converter

R25 & R2D Series

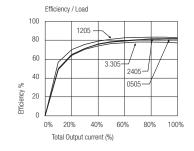
Solation Voltage (asted for 1 second) 1000VDC (asted for 1 minute***) 500VAc / 60Nz 500VAc / 60Nz	Specifications - Co	ntinued		
Solation Voltage Rested for 1 second) 3000VDC (rated for 1 minute***) 1500WaC / 60Hz	Isolation Voltage		for 1 second)	1000VDC
Soldsion Capacitance (riated for 1 minute***) 1500Mc/ 60Hz Soldsion Capacitance (viso 500V) 10 6Ω min. Soldsion Resistance (viso 600V)		(rated	for 1 minute***)	500VAC / 60Hz
Solation Capacitance (Viso 500V) 115pF max. Isolation Resistance (Viso 500V) 10 cΩ min. Short Circuit Protection 1 Second P-Suffix Continuous 1	Isolation Voltage	(testec	for 1 second)	3000VDC
Solation Resistance (Viso 500V) 10 GΩ min.		(rated	for 1 minute***)	1500VAC / 60Hz
Short Circuit Protection 1 Second P-Suffix Continuous Operating Temperature Range (free air convection) 40°C to +100°C (see Graph) Storage Temperature Range Feelow Temperature Range 55°C to +125°C Reflow Temperature ROHS compliant 245°C (30 sec), peak 255°C (5 sec) max. Vapor Phase Process (for more details see Application Notes) 230°C (90 sec) max. Package Weight R2S, R2S8 1.4g R2D, R2D10 1.5g 1.5g R2S12, R2D12 1.6g 39 pcs per Tube R2Si12, R2D12 33 pcs per tube 39 pcs per Tube R2S12, R2D, R2D10, R2D12 33 pcs per tube 39 pcs per Tube R2S12, R2D, R2D10, R2D12 886 x 10° hours 886 x 10° hours R2S12, R2D, R2D10, R2D12 886 x 10° hours 886 x 10° hours R2S12, R2D, R2D10, R2D12 886 x 10° hours 886 x 10° hours R2S12, R2D, R2D10, R2D12 886 x 10° hours 886 x 10° hours R2S12, R2D, R2D10, R2D12 886 x 10° hours 886 x 10° hours R2S12, R2D, R2D10, R2D12 886 x 10° hours 886 x 10° hours R	Isolation Capacitance			115pF max.
P-Suffix Continuous Operating Temperature Ranger (fire air convertion) 40°C to +100°C (see Graph) Storage Temperature Ranger 75°C to +125°C Reflow Temperature ROHS compliant 245°C (30 sec), peak 255°C (5 sec) max. Package Process (for more details see Application Notes) 230°C (90 sec) max. Package Weight R2S, R2S8 39 cs per tube. R2S, R2D10 1.69 1.69 Packing Quantity R2S, R2S8 39 pcs per tube. R2S, R2SB 39 pcs per tube. R2S, R2SB,	Isolation Resistance	(Viso 5	500V)	10 GΩ min.
Operating Temperature Range (free air convection) -40°C to +100°C (see Graph) Storage Temperature Range -55°C to +125°C Reffow Temperature ROHS compliant 245°C (30 sec), peak 255°C (5 sec) max. Vapor 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 1.5g R2Shig, R2SB, R2SB	Short Circuit Protection			1 Second
Storage Temperature Range	P-Suffix			Continuous
Reflow Temperature ROHS compliant 245°C (30 sec), peak 255°C (5 sec) max. Vapor 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 1.5g R2S12, R2D12 1.6g Packing Quantity R2S, R2S8 39 pcs per Tube R2S12, R2D, R2D10, R2D12 33 pcs per Tube ALI Types 250 pcs per Reel MTBF (+25°C) Detailed Information see using MIL-HDBK 217F 886 x 10³ hours Certifications Certifications 250 pcs per Reel Certifications Certifications UL 60950-1 2nd Ed. CB Test Report Report: US/14402/UL UL 60950-1 2nd Ed. CUL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. EN General Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. EN General Safety Report: SCLUD 1211033-3 EN60950-1: 2006 + A12:2011	Operating Temperature	Range (free air convection)		-40°C to +100°C (see Graph)
Vapor 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 1.5g R2S12, R2D12 1.6g 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 10³ hours C+85°C) Application Notes chapter "MTBF" using MIL-HDBK 217F 128 x 10³ hours CB Test Report Report: US/14402/UL UL 60950-1 2nd Ed. CUL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60050-1 -03 EN Medical Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60001-1 3rd Ed. Medical Report + IS014971 Risk Assessment EN60950-1: 2006 + A12:2011	Storage Temperature Ra	ange		-55°C to +125°C
Relative Humidity 95% RH Package Weight R2S, R2S8 1.4g R2D, R2D10 1.5g R2S12, R2D12 1.6g 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) (+85°C) Detailed Information see Application Notes chapter "MTBF" using MIL-HDBK 217F 886 x 10³ hours Certifications 886 x 10³ hours 128 x 10³ hours Certifications UL General Safety Report: US/14402/UL UL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. EN Medical Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. Medical Report + ISO14971 Risk Assessment EN60950-1: 2006 + A12:2011	Reflow Temperature	ROHS	compliant	245°C (30 sec), peak 255°C (5 sec) max.
Package Weight R2S, R2S8 1.4g R2D, R2D10 1.5g R2S12, R2D12 1.6g 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) (+85°C) (+85°C) Application Notes chapter "MTBF" using MIL-HDBK 217F 886 x 10³ hours Certifications 128 x 10³ hours CB Test Report Report: US/14402/UL UL 60950-1 2nd Ed. UL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. Medical Report + IS014971 Risk Assessment EN60950-1: 2006 + A12:2011	Vapor Phase Process	(for mo	ore details see Application Notes)	230°C (90 sec) max.
R2D, R2D10 1.5g R2S12, R2D12 1.5g 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) Application Notes chapter "MTBF" Using MIL-HDBK 217F 886 x 10³ hours Certifications CB Test Report Report: US/14402/UL UL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety Report: MDD1205098-2 + RM1205098-2 LEC/EN 60601-1 3rd Ed. EN Medical Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. EN General Safety Report: MDD14971 Risk Assessment EN General Safety Report: SPCLVD 1211033-3 EN 60950-1: 2006 + A12:2011	Relative Humidity			95% RH
R2S12, R2D12 1.6g Packing Quantity R2S, R2S8 39 pcs per Tube R2S12, R2D, R2D10, R2D12 33 pcs per tube ARITypes 250 pcs per Reel MTBF (+25°C) Application Notes chapter "MTBF" Using MIL-HDBK 217F 886 x 10³ hours Certifications Certifications CB Test Report Report: US/14402/UL UL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety Report: MDD1205098-2 + RM1205098-2 LEC/EN 60601-1 3rd Ed. EN Medical Safety Report: MDD1205098-2 + RM1205098-2 JEC/EN 60601-1 3rd Ed. EN General Safety Report: SPCLVD 1211033-3 EN60950-1: 2006 + A12:2011	Package Weight	R2S, F	32\$8	1.4g
Packing Quantity R2S, R2S8 39 pcs per Tube R2S12, R2D, R2D10, R2D12 33 pcs per tube MTBF (+25°C) Detailed Information see (+85°C) Using MIL-HDBK 217F Using MIL-HDBK 217F 886 x 10³ hours Certifications 128 x 10³ hours CB Test Report Report: US/14402/UL UL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety C22.2 No. 60950-1-03 EN Medical Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. Medical Report + IS014971 Risk Assessment EN60950-1: 2006 + A12:2011		R2D, F	R2D10	1.5g
R2S12, R2D, R2D10, R2D12 33 pcs per tube All Types 250 pcs per Reel MTBF (+25°C)		R2S12	2, R2D12	1.6g
All Types 250 pcs per Reel MTBF (+25°C) (+85°C)	Packing Quantity	R2S, F	32\$8	39 pcs per Tube
MTBF (+25°C) (+85°C)		R2S12	2, R2D, R2D10, R2D12	33 pcs per tube
Certification see CB Test Report Report: US/14402/UL UL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety C22.2 No. 60950-1-03 EN Medical Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. Medical Report + IS014971 Risk Assessment EN60950-1: 2006 + A12:2011		All Typ	es	250 pcs per Reel
(+85°C)	MTBF (+25°C) Deta	iled Information see	using MIL-HDBK 217F	886 x 10 ³ hours
CB Test Report Report: US/14402/UL UL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety C22.2 No. 60950-1-03 EN Medical Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. Medical Report + IS014971 Risk Assessment EN60950-1: 2006 + A12:2011	>		using MIL-HDBK 217F	128 x 10 ³ hours
UL General Safety Report: E358085 UL 60950-1 2nd Ed. CUL General Safety C22.2 No. 60950-1-03 EN Medical Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. Medical Report + IS014971 Risk Assessment Medical Report: SPCLVD 1211033-3 EN60950-1: 2006 + A12:2011	Certifications			
CUL General Safety C22.2 No. 60950-1-03 EN Medical Safety Report: MDD1205098-2 + RM1205098-2 IEC/EN 60601-1 3rd Ed. Medical Report + IS014971 Risk Assessment EN General Safety Report: SPCLVD 1211033-3 EN 60950-1: 2006 + A12:2011	CB Test Report	Report: US/14402/UL		
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EN General Safety Report: SPCLVD 1211033-3 EN60950-1: 2006 + A12:2011	CUL General Safety			C22.2 No. 60950-1-03
EN General Safety Report: SPCLVD 1211033-3 EN60950-1: 2006 + A12:2011	EN Medical Safety	Report: MDD1205098-	2 + RM1205098-2	IEC/EN 60601-1 3rd Ed.
		Medical Report + ISO14	4971 Risk Assessment	
Conducted / Radiated Emissions EN55022 Level A	EN General Safety	Report: SPCLVD 12110	33-3	EN60950-1: 2006 + A12:2011
	Conducted / Radiated E	missions EN550	022	Level A

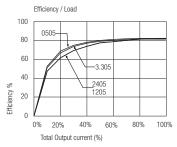
 $\frac{\text{Notes}}{\text{Note 1}}$

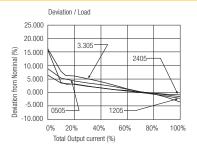
Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

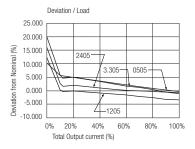
Typical Characteristics

R2S-xx05







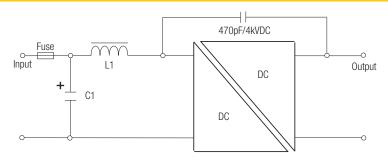


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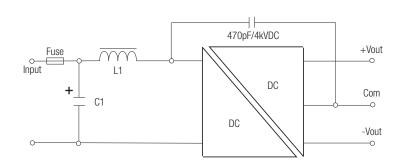
DC/DC-Converter

R25 & R2D Series

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



Standar	d and /H	versions
C1	L1	Vin
2.2µF	4.7µH	5V
2.2µF	10μH	12V
2.2µF	22µH	15V
4.7µF	22μΗ	24V



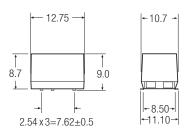
/P and .	/HP version:	S
C1	L1	Vin
10μF	10μΗ	5V
4.7µF	22μΗ	12\
4.7µF	22μΗ	15\
10μF	47μΗ	24\

C1 = MLCC L1 = SMD Inductor

Package Style and Pinning (mm)

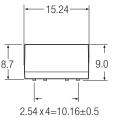
8 PIN Single SMD Package

10 PIN Dual SMD Package



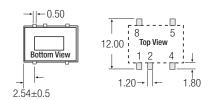








Recommended Footprint Details

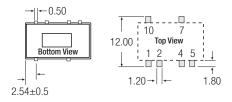


Pin #	Single	Dual
1	–Vin	–Vin
2	+Vin	+Vin
4	-Vout	Com
5	+Vout	-Vout
7	No Pin	+Vout
8	NC	No Pin
10	No Pin	NC
NC = No Connection		

XX.X ± 0.5 mm XX.XX ± 0.25 mm

Pin Connections

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)

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. R2S-0505, R2S-0505/H, R2S-0505/HP

e.g. R2S8-0505, R2S8-0505/P

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

e.g. R2D10-0505, R2D10-0505/P

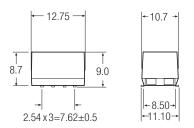
ECONOLINE

DC/DC-Converter

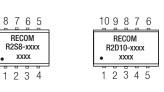
R25 & R2D Series

Package Style and Pinning (mm)

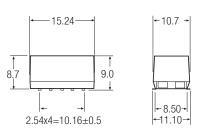
Full 8 PIN Single SMD Package



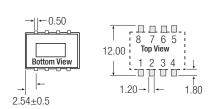
Note: /H option is not available in these pin packages



Full 10 PIN Dual SMD Package



Recommended Footprint Details



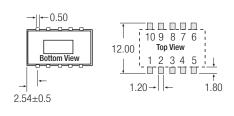
Pin Connections

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

NC = No Connection

 $\begin{array}{cc} \text{XX.X} & \pm \ 0.5 \ \text{mm} \\ \text{XX.XX} & \pm \ 0.25 \ \text{mm} \end{array}$

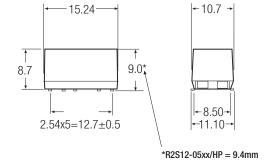
Recommended Footprint Details

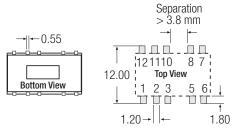


12 PIN Single and Dual SMD Package

Note: /H option is available in this pin package







Pin Connections

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

NC = No Connection

 $\begin{array}{cc} \text{XX.X} & \pm \ 0.5 \ \text{mm} \\ \text{XX.XX} & \pm \ 0.25 \ \text{mm} \end{array}$

Recommended Footprint Details

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

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