Features

Unregulated Converters

- Fully RoHS 6/6 Conform
- Full Power at 100°C Ambient Temperature
- 1kVDC or 3kVDC Isolation Options
- Suitable for Fully Automated Assembly (including Vapor Phase Soldering)
- Optional Continuous Short Circuit Protection
- Built-In EN55022 Class A Filter

ECONOLINE
DC/DC-Converter

RECOM

0.25 Watt SMD Single, Dual & Independent Outputs

RoHS 2011/65/EU 6/6

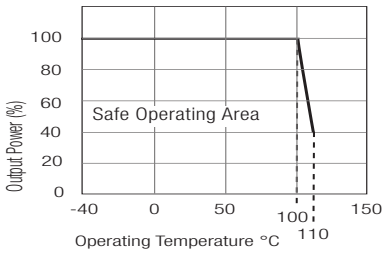
E358085

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

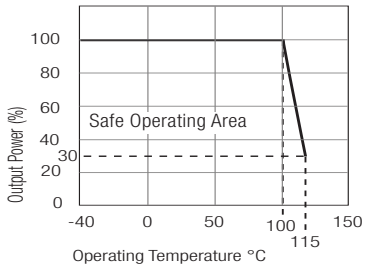
R0.25S R0.25D(A)

Derating-Graph
(Ambient Temperature)

Standard Case



Big Case (with marking 12)



Refer to Application Notes

Description

The R0.25S and R0.25D 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 ower 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 SMD	(3kV)	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Capacitive Load (max.)
R0.25S**-xx3.3	(H)	3.3, 5, 12, 15, 24	3.3	76	1000µF
R0.25S**-xx05	(H)	3.3, 5, 12, 15, 24	5	50	470µF
R0.25S**-xx09	(H)	3.3, 5, 12, 15, 24	9	28	470µF
R0.25S**-xx12	(H)	3.3, 5, 12, 15, 24	12	21	150µF
R0.25S**-xx15	(H)	3.3, 5, 12, 15, 24	15	17	68µF
R0.25S**-xx24	(H)	3.3, 5, 12, 15, 24	24	10.4	68µF
R0.25D**-xx3.3	(H)	3.3, 5, 12, 15, 24	±3.3	±38	470µF
R0.25D**-xx05	(H)	3.3, 5, 12, 15, 24	±5	±25	220µF
R0.25D**-xx09	(H)	3.3, 5, 12, 15, 24	±9	±14	68µF
R0.25D**-xx12	(H)	3.3, 5, 12, 15, 24	±12	±10.4	68µF
R0.25D**-xx15	(H)	3.3, 5, 12, 15, 24	±15	±8.3	68µF
R0.25D**-xx24	(H)	3.3, 5, 12, 15, 24	±24	±5.2	33µF
R0.25DA**-xx0505		3.3, 5, 12, 15, 24	5/5	25/25	220µF/220µF
R0.25DA**-xx1212		3.3, 5, 12, 15, 24	12/12	10/10	68µF/68µF

xx = Input Voltage (other input and output voltage combinations available on request)
* add Suffix "H" for 3kV Isolation, e.g. R0.25S-0505/H, R0.25D-0505/H, R0.25S12-0505/H, R0.25D12-0505/H
* add Suffix "P" for Continuous Short Circuit Protection, e.g. R0.25S8-0505/P, R0.25S-0505/HP, R0.25D12-0505/HP
* add suffix -R for tape & reel packing e.g. R0.25S-0505-R. For more details see Application Notes.

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

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, no DA option)
R0.25D(A): ** with marking **10** denotes with 10 pins out of 10 fitted (/H option not available)
R0.25D(A): ** with marking **12** denotes 10 pins out of 12 fitted (includes /H option - except R0.25DA)

Specifications (measured at T_A = 25°C, nominal input voltage, full load and after warm-up)

Input Voltage Range		±10%
Output Voltage Accuracy		±5% typ., ±7% max.
Line Voltage Regulation	(low line to high line at max. load)	2% max.
Load Voltage Regulation	3.3V output types	15% typ., 20% max.
(10% to 100% full load)	5V, 5/5V output types	12% typ., 15% max.
	9V output type	7% typ., 10% max.
	12V, 12/12V, 15V, 24V output types	6% typ., 10% max.
Output Ripple and Noise (20MHz BW limited)		100mVp-p max.
Operating Frequency		20kHz min. / 50kHz typ. / 90kHz max.

continued on next page

Specifications (measured at T_A = 25°C, nominal input voltage, full load and after warm-up)

Efficiency at Full Load			60%-70%
Minimum Load = 0%			Specifications valid for 10% minimum load only
Isolation Voltage		(tested for 1 second)	1000VDC
		(rated for 1 minute***)	500VAC / 60Hz
	H-Suffix	(tested for 1 second)	3000VDC
		(rated for 1 minute***)	1500VAC / 60Hz
R0.25DA Output/ Output Isolation Voltage		(tested for 1 second)	1000VDC
Isolation Capacitance			75pF max.
Isolation Resistance		V_{iso}=500V	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			-50°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.
Relative Humidity			95% RH
Humidity Susceptibility Test			1000 hrs / 90% humidity / +85°C ambient
Package weight			1.0g (R0.25S), 1.2g (R0.25D(A))
Packing Quantity		R0.25S, R0.25S8	40 pcs per Tube
		R0.25S12, R0.25D, R0.25D10	33 pcs per tube
		R0.25D12, R0.25DA	33 pcs per tube
		All Types	500 pcs per Reel
MTBF (+25°C)	*Detailed Information see Application Notes chapter "MTBF"*	using MIL-HDBK 217F	4423 x 10^3 hours
(+85°C)		using MIL-HDBK 217F	2161 x 10^3 hours
Certifications			
Conducted / Radiated Emissions		EN55022	Level A
CB Test Report		Report: US/14402A/UL	IEC 60950-1:2001 1st Ed.
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 Edition
		Medical Report + ISO14971 Risk Assessment	
EN General Safety		Report: SPCLVD1211033-3	EN60950-1:2006 + A12:2011

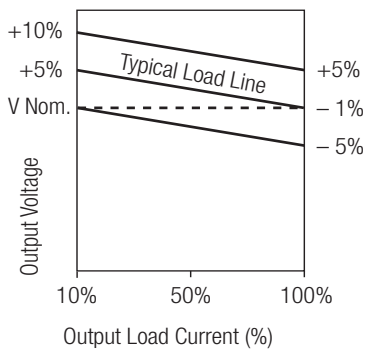
***Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

Notes

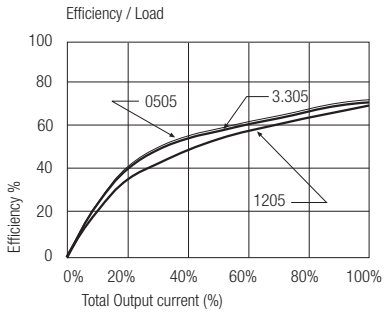
Note 1: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

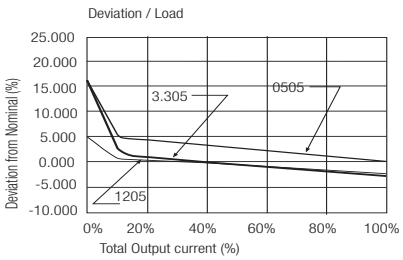
Typical Characteristics

Tolerance Envelope

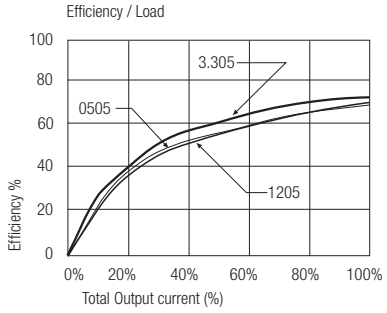


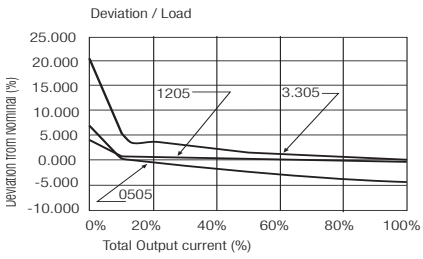
R0.25S**-xx05





R0.25D**-xx05





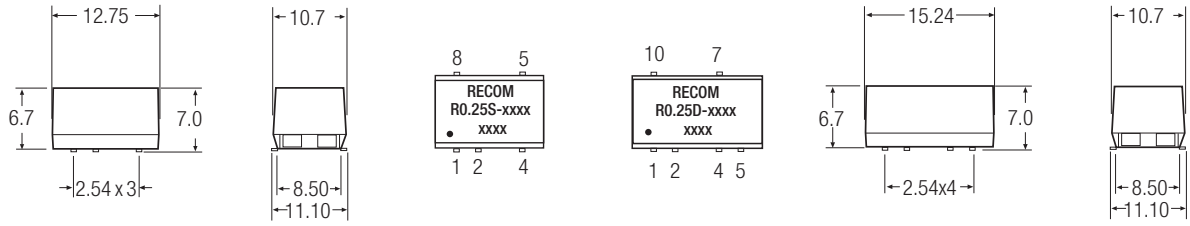
R0.25S_R0.25D Series

Package Style and Pinning (mm)

5 PIN Single SMD Package

Note: /H option is available in these pin packages

6 PIN Dual SMD Package



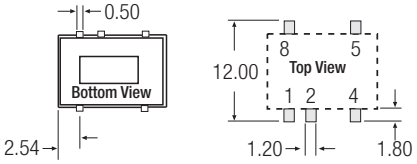
Pin Connections

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

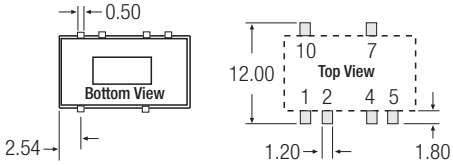
NC = No Connection

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

Recommended Footprint Details



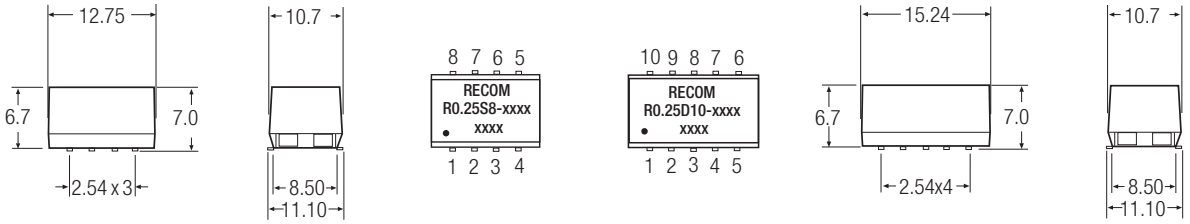
Recommended Footprint Details



8 PIN Single SMD Package

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

10 PIN Dual SMD Package



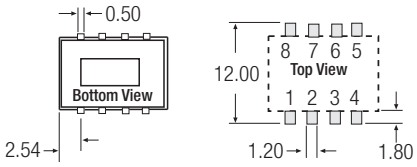
Pin Connections

Pin #	Single	Dual	Dual Independent
1	–Vin	–Vin	–Vin
2	+Vin	+Vin	+Vin
3	NC	NC	No Pin
4	–Vout	Com	-Vout1
5	+Vout	–Vout	+Vout1
6	NC	NC	-Vout2
7	NC	+Vout	+Vout2
8	NC	NC	No Pin
9	-	NC	No Pin
10	-	NC	NC

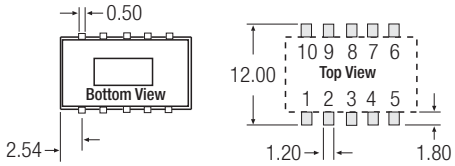
NC = No Connection

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

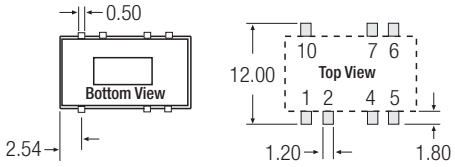
Recommended Footprint Details



Recommended Footprint Details (Dual)



Recommended Footprint Details Dual Independent



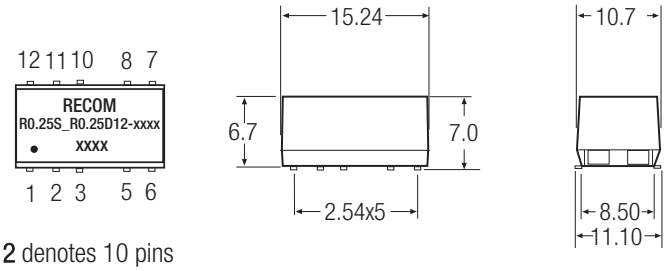
R0.25S** :** without marking denotes 5 pins out of 8 fitted (includes /H option) e.g. R0.25S-0505, R0.25S-0505/H, R0.25S-0505/HP
** with marking **8** denotes 8 pins out of 8 fitted (/H option not available) e.g. R0.25S8-0505, R0.25S8-0505/P

R0.25D** :** without marking denotes 6 pins out of 10 fitted (includes /H option) e.g. R0.25D-0505, R0.25D-0505/H, R0.25D-0505/HP
** with marking **10** denotes with 10 pins out of 10 fitted (/H option not available) e.g. R0.25D10-0505, R0.25D10-0505/P

Package Style and Pinning (mm)

12 PIN Single and Dual SMD Package

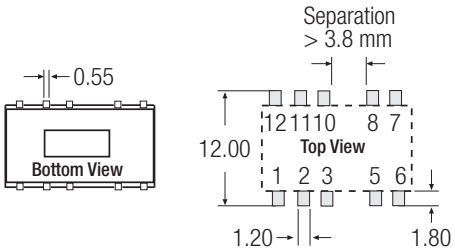
Note: /H option is available in this pin package



R0.25S** :** with marking **12** denotes 10 pins out of 12 fitted (includes /H option)
e.g. R0.25S12-0505
R0.25S12-0505/H
R0.25S12-0505/HP

R0.25D** :** with marking **12** denotes 10 pins out of 12 fitted (includes /H option)
e.g. R0.25D12-0505
R0.25D12-0505/H
R0.25D12-0505/HP

Recommended Footprint Details



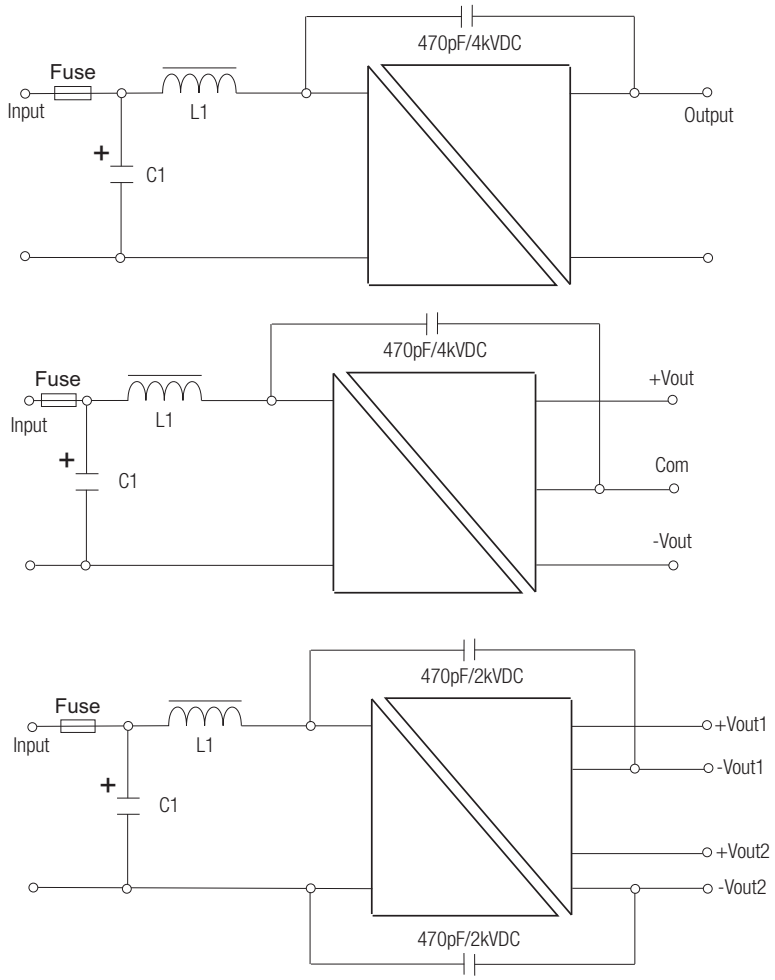
Pin Connections

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

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



Standard and /H versions

C1	L1	Vin
2.2µF	3.3µH	3.3V
2.2µF	4.7µH	5V
1.0µF	22µH	12V
1.0µF	22µH	15V
470nF	47µH	24V

/P and /HP versions

C1	L1	Vin
2.2µF	3.3µH	3.3V
2.2µF	4.7µH	5V
1.0µF	22µH	12V
1.0µF	22µH	15V
470nF	47µH	24V

C1 = MLCC
L1 = SMD Inductor

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