THE DATASHEET OF

RS3-2405D

Features

Regulated Converters

- 2:1 and 3:1 wide input voltage ranges
- 1kVDC, 2kVDC and 3kVDC isolation
- UL94V-0 package material
- Continuous short circuit protection
- Low ripple and noise
- CTRL On/Off
- Efficiency up to 83%

RECOM

DC/DC Converter

RS3-S(D)(Z)

3 Watt SIP8 Single and Dual Output

Description

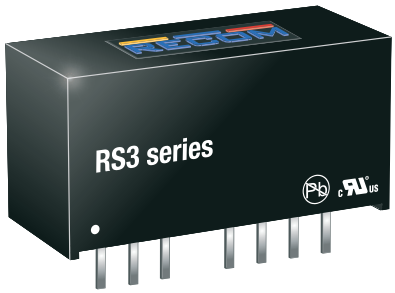
Very high power density, 2:1 or 3:1 input voltage range and a wide operating temperature range -40°C to +71°C and extra features such as On/Off control are just some of the characteristics of this converter which is ideal for highly sophisticated industrial designs. The RS3 is available with 2kV or 3kV isolation options (1kVDC is standard).

Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. [%]	max. Capacitive Load (1) [µF]
RS3-xx3.3S	4.5-9, 9-18 18-36, 36-72	3.3	600	73-75 77-78	4700
RS3-xx05S	4.5-9, 9-18 18-36, 36-72	5	600	76-79 80-81	4700
RS3-xx09S	4.5-9, 9-18 18-36, 36-72	9	333	77-80 81-82	3300
RS3-xx12S	4.5-9, 9-18 18-36, 36-72	12	250	80-81 83	2200
RS3-xx15S	4.5-9, 9-18 18-36, 36-72	15	200	80-81 83	2200
RS3-xx3.3D	4.5-9, 9-18 18-36, 36-72	±3.3	±300	73-75 75	±2200
RS3-xx05D	4.5-9, 9-18 18-36, 36-72	±5	±300	76-80 80-81	±2200
RS3-xx09D	4.5-9, 9-18 18-36, 36-72	±9	±167	77-81 81	±2200
RS3-xx12D	4.5-9, 9-18 18-36, 36-72	±12	±125	78-83 83	±1000
RS3-xx15D	4.5-9, 9-18 18-36, 36-72	±15	±100	79-83 83	±1000
RS3-xx3.3SZ	9-27 20-60	3.3	600	73 74	4700
RS3-xx05SZ	9-27 20-60	5	600	76-79 78	4700
RS3-xx09SZ	9-27 20-60	9	333	77 79	3300
RS3-xx12SZ	9-27 20-60	12	250	80 80	2200
RS3-xx15SZ	9-27 20-60	15	200	80 80	2200
RS3-xx3.3DZ	9-27 20-60	±3.3	±300	73 74	±2200
RS3-xx05DZ	9-27 20-60	±5	±300	77 78	±2200
RS3-xx09DZ	9-27 20-60	±9	±167	79 79	±2200
RS3-xx12DZ	9-27 20-60	±12	±125	80 80	±1000
RS3-xx15DZ	9-27 20-60	±15	±100	80 80	±1000

Notes:

Note1: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage on the converter

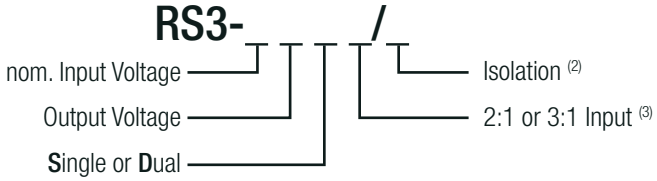


E224736

UL60950-1 certified
CAN/CSA C22.2 No. 60950-1-07 certified
IEC/EN60950-1 certified
IEC/EN60601-1 certified
CB Report

RS3-S(D)(Z) Series

Model Numbering



Notes:

Note2: add „**Z**" for 3:1 Input Voltage (24= 9-27VDC or 48= 20-60VDC)

Note3: add suffix „**/H2**" for 2kVDC isolation or „**/H3**" for 3kVDC isolation, without suffix = standard 1kVDC isolation

Ordering Examples:

RS3-053.3S	4.5-9Vin	3.3Vout	Single	2:1 Input Voltage	1kVDC Isolation
RS3-1212D/H2	9-18Vin	±12Vout	Dual	2:1 Input Voltage	2kVDC Isolation
RS3-2415D/H3	9-27Vin	±15Vout	Dual	3:1 Input Voltage	3kVDC Isolation

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

BASIC CHARACTERISTICS

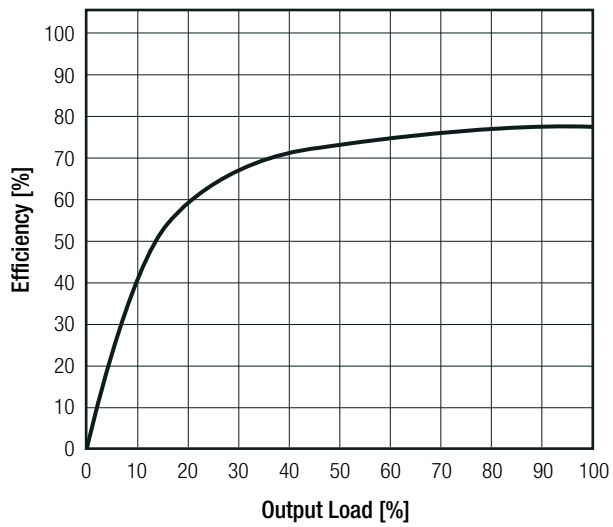
Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range	2:1 Input	nom. Vin= 5VDC	4.5VDC		9VDC
		nom. Vin= 12VDC	9VDC		18VDC
		nom. Vin= 24VDC	18VDC		36VDC
		nom. Vin= 48VDC	36VDC		72VDC
	3:1 Input	nom. Vin= 24VDC	9VDC		27VDC
		nom. Vin= 48VDC	20VDC		60VDC
Quiescent Current	nom. Vin= 5VDC			35mA	
	nom. Vin= 12VDC			25mA	
	nom. Vin= 24VDC			20mA	
	nom. Vin= 48VDC			10mA	
Minimum Load (4)			10%		
ON/OFF CTRL	DC-DC ON		open or high impedance		
	DC-DC OFF		external V_{CTRL}= 5-12VDC + 1N4148 and 68Ω resistor		
Internal Operating Frequency	20% to 100% full load			200kHz	
Output Ripple and Noise	20MHz BW				50mVp-p

Notes:

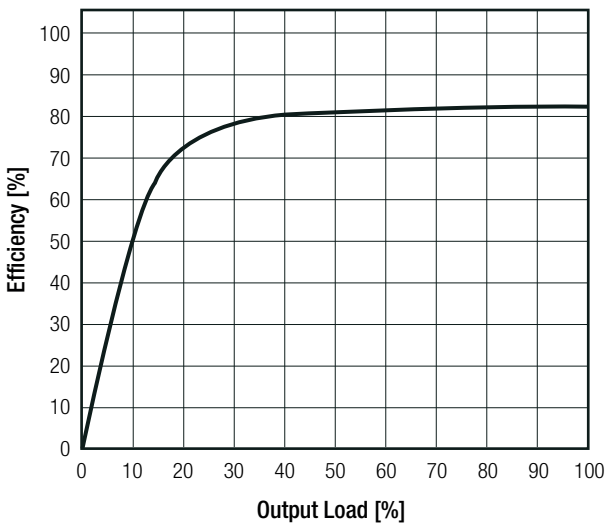
Note4: Operation below 10% load won't harm the converter, but specifications may not be met

Efficiency vs. Load

RS3-0505S



RS3-4805D



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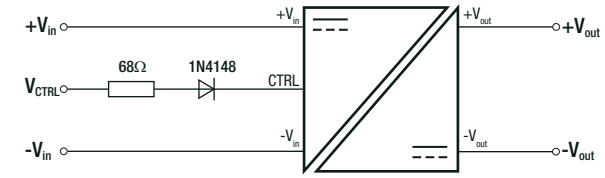
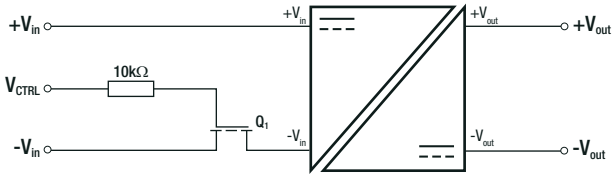
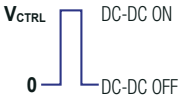
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

ON/OFF CTRL



DC-DC ON: Open or high impedance
DC-DC OFF: V_{CTRL}= 5-12VDC + 1N4148 and 68Ω resistor





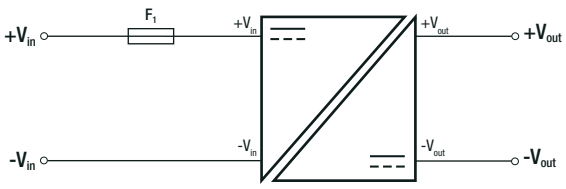
REGULATIONS

Parameter	Condition	Value
Output Accuracy		±2.0% typ.
Line Regulation	low line to high line, full load	±0.5% max.
Load Regulation	20% to 100% load	0.5% typ.

PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)	below 100mΩ		continuous, auto recovery
Isolation Voltage [5]	standard without suffix	tested for 1 second rated for 1 minute	1kVDC 500VAC/60Hz
	/H2 version	tested for 1 second rated for 1 minute	2kVDC 1kVAC/60Hz
	/H3 version	tested for 1 second rated for 1 minute	3kVDC 1.5kVAC/60Hz
Isolation Resistance			1GΩ min.
Isolation Capacitance	standard version without suffix /H2 and /H3 version		200pF max. 30pF max.
Insulation Grade			functional (CB-IEC/EN60601-1) basic (CB-IEC/EN60950-1)

Protection Circuit



Notes:

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

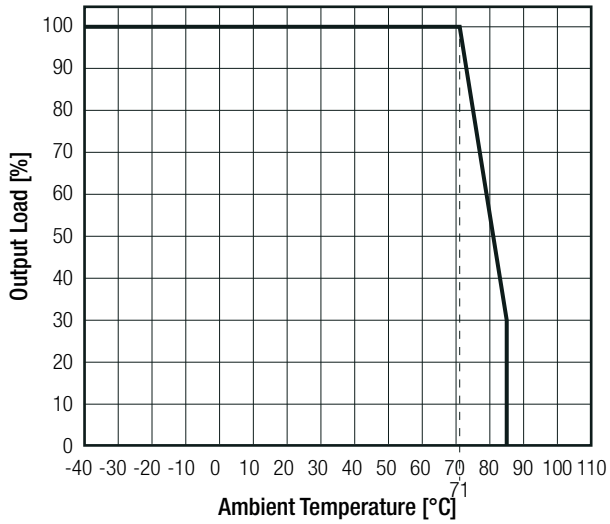
Note6: To protect the converter under all fault conditions, an input fuse is required. Quick-fuses should be rated at 2x-3x the nominal input current, time -delay fuses at 1.5x the nominal input current

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

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	full load @ free air convection (see graph)		-40°C to +71°C
Operating Altitude			5000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +71°C	3303 x 10^3 hours 745 x 10^3 hours

Derating Graph
(@ Chamber and free air convection)



SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety (LVD)	SPCLVD1605077-10	IEC60950-1, 2nd Edition, AM2: 2013 EN60950-1, 2nd Edition, A2:2013
Information Technology Equipment, General Requirements for Safety (CB)	L0339L49-CB-1-B1	IEC60950-1:2005, 2nd Edition + A2:2013
Information Technology Equipment, General Requirements for Safety	E224736-A33-UL	UL60950-1, 2nd Edition, 2014 CAN/CSA C22.2 No. 60950-1-07
Medical Electric Equipment, General Requirements for Safety and Essential Performance	WD-SE-R-180675-A0	IEC60601-1:2005 + C2:2007 + A1:2012, 3rd Edition EN60601-1:2006 + A1:2013 + A12:2014
EAC	RU-AT.AB49.B.09571	TP TC 004/2011
RoHS2		RoHS 2011/65/EU + AM2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements [7]	with external filter (see filter suggestion below)	EN55032, Class A EN55032, Class B

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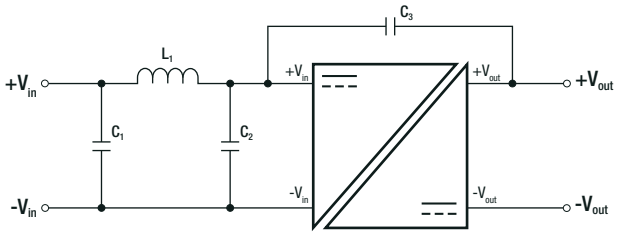
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

EMC Filtering Suggestions according to EN55032



Notes:

Note8: Filter suggestions are valid for indicated part numbers only.
For other part numbers, please contact RECOM tech support for advice.

Component List Class A

MODEL	C1	C2, C3	L1
RS3-0505S	10µF	N/A	3.9µH choke RLS-397
RS3-0512S			
RS3-243.3S			
RS3-4805S			

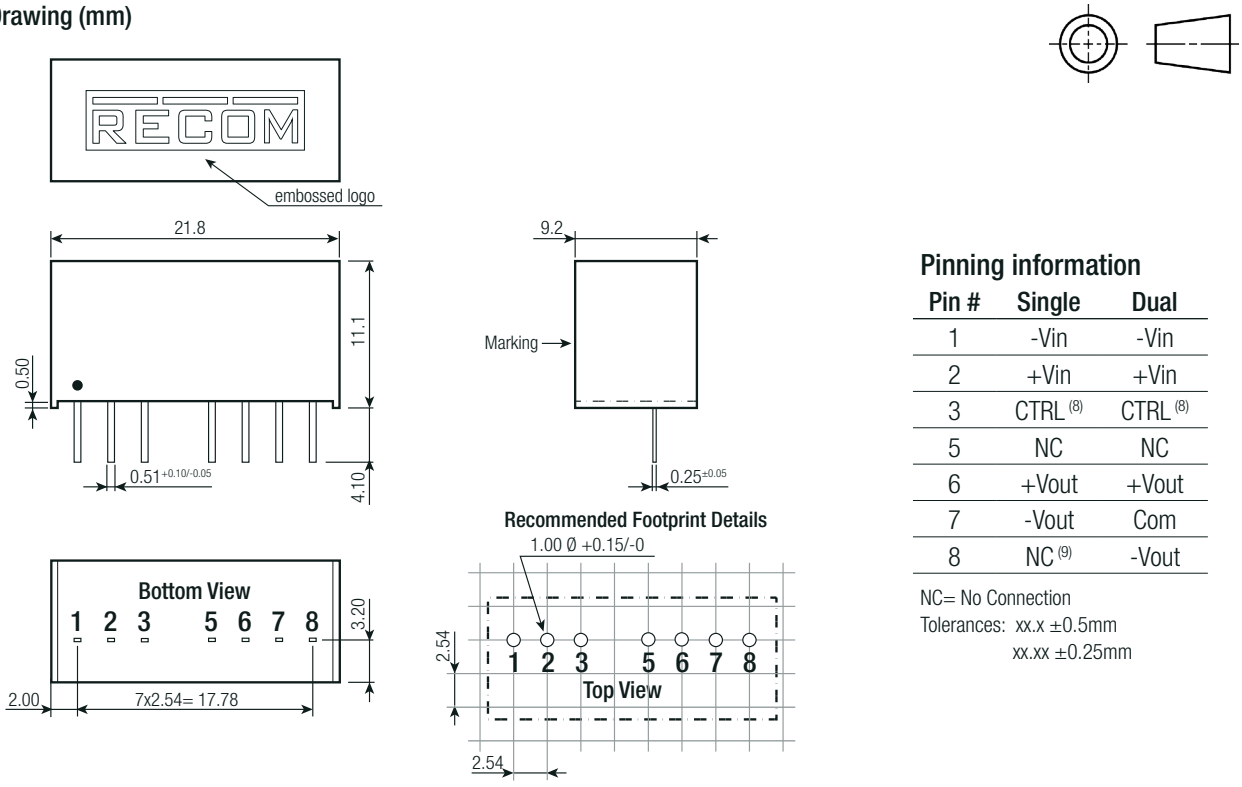
Component List Class B

MODEL	C1	C2	C3	L1
RS3-0505S	10µF	N/A	N/A	5.6µH choke RLS-567
RS3-0512S				
RS3-243.3S		10µF	330pF	
RS3-4805S				

DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	non-conductive black plastic, (UL94V-0)
	potting	epoxy, (UL94V-0)
	PCB	FR4, (UL94V-0)
Dimension (LxWxH)		21.8 x 9.2 x 11.1mm
Weight		4.7g typ.

Dimension Drawing (mm)



Pinning information

Pin #	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
3	CTRL (8)	CTRL (8)
5	NC	NC
6	+Vout	+Vout
7	-Vout	Com
8	NC (9)	-Vout

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

Notes:

Note8: This pin provides an Off function which puts the converter into a low power mode. When the pin is 'high' the converter is OFF and when the pin is open the converter is ON. There is no allowed low state for this pin. (refer to „ON/OFF CTRL" on page 3)

Note9: This pin is used internally. No external connection allowed

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

PACKAGING INFORMATION		
Parameter	**Type**	**Value**
Packaging Dimension (LxWxH)	tube	520.0 x 17.0 x 10.0mm
Packaging Quantity	tube	22pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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