

# Solid State Relays Industrial, 1-Phase ZS w. LED Types RS 23, RS 40, RS 48

CARLO GAVAZZI



- Zero switching AC Solid State Relay
- Direct copper bonding (DCB) technology in 25 A and 40 A types
- LED indication
- Clip-on IP 20 protection cover
- Self-lifting terminals
- Housing free of moulding mass
- 2 input ranges: 4-32 VDC and 18-36 VAC/VDC
- Operational ratings up to 40 AACrms and 480 VAC
- Blocking voltage: Up to 1200 V<sub>p</sub>
- Opto-isolation: > 4000 VACrms
- Integrated snubber network in 25 A and 40 A types



## Product Description

The zero switching relay with triac (10 A) or thyristor output (25 A, 40 A) offer a solution for resistive load switching. The zero switching relay switches ON when the sinusoidal voltage crosses zero and switches OFF when the current crosses zero. The

LED indicates the status of the control input. The clip-on protection cover is securing touch protection to IP 20. Output terminals can handle cables up to 16 mm<sup>2</sup>.

## Ordering Key

**RS 1 A 23 D 25**

Solid State Relay	RS
Number of poles	1
Switching mode	A
Rated operational voltage	23
Control voltage	D
Rated operational current	25

## Type Selection

Switching mode	Rated operational voltage	Rated operational current	Control voltage
A: Zero Switching	23: 230 VACrms 40: 400 VACrms 48: 480 VACrms	10: 10 AACrms 25: 25 AACrms 40: 40 AACrms	LA: 18 to 36 VAC/VDC D: 3 to 32 VDC* *4 to 32 VDC for 400 VAC and 480 VAC types

## Selection Guide

Rated operational voltage	Blocking voltage	Control voltage	Rated operational current		
			10 A	25 A	40 A
230 VACrms	650 V <sub>p</sub>	3-32 VDC	RS1A23D10	RS1A23D25	RS1A23D40
		18-36 VAC/DC	RS1A23LA10	RS1A23LA25	RS1A23LA40
400 VACrms	800 V <sub>p</sub>	4-32 VDC	RS1A40D10	RS1A40D25	RS1A40D40
		18-36 VAC/DC	RS1A40LA10	RS1A40LA25	RS1A40LA40
480 VACrms	1200 V <sub>p</sub>	4-32 VDC	RS1A48D10	RS1A48D25	RS1A48D40
		18-36 VAC/DC	RS1A48LA10	RS1A48LA25	RS1A48LA40

## General Specifications

	RS1A23...	RS1A40...	RS1A48...
Operational voltage range	42 to 265 VACrms	42 to 440 VACrms	42 to 530 VACrms
Blocking voltage	≥ 650 V <sub>p</sub>	≥ 800 V <sub>p</sub>	≥ 1200 V <sub>p</sub>
Zero voltage turn-on	≤ 15 V	≤ 15 V	≤ 15 V
Operational frequency range	45 to 65 Hz	45 to 65 Hz	45 to 65 Hz
Power factor	≥ 0.95 @ 230 VACrms	≥ 0.95 @ 400 VACrms	≥ 0.95 @ 480 VACrms
Approvals	UR, cUR, CSA, EAC	UR, cUR, CSA, EAC	UR, cUR, CSA, EAC
CE-marking	Yes	Yes	Yes
UKCA-marking	Yes	Yes	Yes

## Input Specifications

	RS1A..D..	RS1A..LA...
<b>Control voltage</b> RS1A23.., RS1A40.., RS1A48..	3-32 VDC 4-32 VDC	18-36 VAC/DC
<b>Pick-up voltage</b> RS1A23.., RS1A40.., RS1A48..	≤ 2.75 VDC ≤ 3.75 VDC	≤ 18 VAC/DC
<b>Reverse voltage</b>	≤ 32 VDC	-
<b>Drop out voltage</b>	≥ 1.2 VDC	≥ 5 VAC/DC
<b>Input current @ max input voltage</b>	≤ 12 mA	≤ 15 mA
<b>Response time pick-up</b>	≤ 1/2 cycle	≤ 1 cycle
<b>Response time drop-out</b>	≤ 1/2 cycle	≤ 2 cycles

## Output Specifications

	RS1A...10	RS1A...25	RS1A...40
<b>Rated operational current</b> AC51 @ Ta=25°C	10 Arms	25 Arms	40 Arms
<b>Min. operational current</b> RS1A23.., RS1A40.. RS1A48..	65 mA 150 mA	150 mA 150 mA	250 mA 250 mA
<b>Rep. overload current t=1 s</b>	< 12 AACrms	< 55 AACrms	< 125 AACrms
<b>Non-rep. surge current t=10 ms</b> RS1A23.., RS1A40.. RS1A48..	100 A <sub>p</sub> 325 A <sub>p</sub>	325 A <sub>p</sub> 325 A <sub>p</sub>	600 A <sub>p</sub> 600 A <sub>p</sub>
<b>Off-state leakage current @ rated voltage and frequency</b>	< 3 mArms	< 3 mArms	< 3 mArms
<b>I<sup>2</sup>t for fusing t=10 ms</b> RS1A23.., RS1A40.. RS1A48..	≤ 50 A <sup>2</sup> s ≤ 525 A <sup>2</sup> s	≤ 525 A <sup>2</sup> s ≤ 525 A <sup>2</sup> s	≤ 1800 A <sup>2</sup> s ≤ 1800 A <sup>2</sup> s
<b>On-state voltage drop @ rated current</b>	≤ 1.6 Vrms	≤ 1.6 Vrms	≤ 1.6 Vrms
<b>Critical dV/dt off-state</b>	≥ 500 V/μs	≥ 500 V/μs	≥ 500 V/μs

## Thermal Specifications

	RS1A...10	RS1A...25	RS1A...40
<b>Operating temperature</b>	-20° to 70°C	-20° to 70°C	-20° to 70°C
<b>Storage temperature</b>	-40° to 100°C	-40° to 100°C	-40° to 100°C

## Housing Specifications

Weight	Approx. 60 g
Housing material	Noryl GFN 1, black
Baseplate	Aluminium
Potting compound	None
Relay	
Mounting screws	M5
Mounting torque	1.5-2.0 Nm
Control terminal	
Mounting screws	M3 x 9
Mounting torque	0.5 Nm
Power terminal	
Mounting screws	M5 x 9
Mounting torque	2.4 Nm

## Isolation

<b>Rated isolation voltage</b> Input to output	≥ 4000 VACrms
<b>Rated isolation voltage</b> Output to case	≥ 4000 VACrms



## Electromagnetic Compatibility

<b>Immunity</b>	EN60947-4-3	<b>Radiated Radio Frequency Immunity</b>	IEC/EN 61000-4-3
<b>Electrostatic Discharge (ESD) Immunity</b> Air discharge, 8kV Contact, 4kV	IEC/EN 61000-4-2 Performance Criteria 2 Performance Criteria 2	10V/m, 80 - 1000 MHz 10V/m, 1.4 - 2.0GHz 3V/m, 2.0 - 2.7GHz	Performance Criteria 1 Performance Criteria 1 Performance Criteria 1
<b>Electrical Fast Transient (Burst) Immunity</b> Output: 2kV, 5kHz Input: 1kV, 5kHz	IEC/EN 61000-4-4 Performance Criteria 2 Performance Criteria 2	<b>Conducted Radio Frequency Immunity</b> 10V/m, 0.15 - 80MHz	IEC/EN 61000-4-6 Performance Criteria 1
<b>Electrical Surge Immunity</b> Output, line to line, 1kV Output, line to earth, 1kV Output, line to earth, 2kV  Input, line to line, 1kV Input, line to earth, 2kV	IEC/EN 61000-4-5 Performance Criteria 2 Performance Criteria 2 Performance Criteria 2 Performance Criteria 2 with external varistor Performance Criteria 2 Performance Criteria 2	<b>Voltage Dips Immunity</b> 0% for 0.5, 1 cycle 40% for 10 cycles 70% for 25 cycles 80% for 250 cycles	IEC/EN 61000-4-11 Performance Criteria 2 Performance Criteria 2 Performance Criteria 2 Performance Criteria 2
<b>EMC Emission</b>	EN60947-4-3	<b>Voltage Interruptions Immunity</b> 0% for 5000ms	IEC/EN 61000-4-11 Performance Criteria 2
<b>Radio Interference Voltage Emission (Conducted) 0.15 - 30MHz</b>	IEC/EN 55011 Class A (industrial) with filters IEC/EN 60947-4-3 Class A (no filtering needed up to 75AAC)	<b>Radio Interference Field Emission (Radiated) 30 - 1000MHz</b>	IEC/EN 55011 Class B

Notes:

- Use of AC solid state relays may, according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where the user must meet E.M.C requirements. The capacitor values given inside the filtering specification tables should be taken only as indications, the filter attenuation will depend on the final application.
- Control input lines must be installed together to maintain products' susceptibility to Radio Frequency interference.
- Performance Criteria 1: No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2: During the test, degradation of performance or partial loss of function is allowed. However, when the test is complete the product should return operating as intended by itself.
- Performance Criteria 3: Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.

## Heatsink Dimensions (load current versus ambient temperature)

### RS1A23..10, RS1A40..10

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]	T <sub>A</sub> Ambient temp. [°C]
	20	30	40	50	60	70		
10.0	3.34	2.58	1.81	1.04	0.27	-	13.0	
9.0	4.25	3.37	2.49	1.61	0.73	-	11.3	
8.0	5.41	4.38	3.36	2.33	1.31	0.28	9.7	
7.0	6.92	5.70	4.49	3.27	2.06	0.84	8.2	
6.0	8.96	7.49	6.02	4.55	3.08	1.61	6.8	
5.0	11.9	10.0	8.19	6.36	4.53	2.69	5.5	
4.0	16.2	13.9	11.5	9.10	6.72	4.34	4.2	
3.0	23.7	20.3	17.0	13.7	10.4	7.12	3.0	
2.0	38.6	33.4	28.3	23.1	17.9	12.7	1.9	
1.0	-	-	-	-	-	-	0.9	

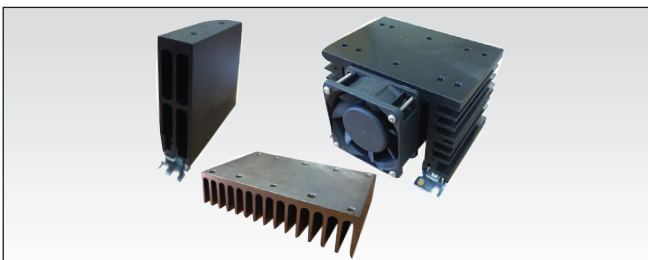
### RS1A48..10, RS..25

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]	T <sub>A</sub> Ambient temp. [°C]
	20	30	40	50	60	70		
25.0	3.23	2.80	2.37	1.94	1.51	1.09	0.66	23
22.5	3.70	3.21	2.73	2.24	1.75	1.26	0.78	21
20.0	4.30	3.74	3.17	2.61	2.05	1.49	0.92	18
17.5	5.07	4.41	3.76	3.10	2.44	1.78	1.12	15
15.0	6.12	5.33	4.54	3.75	2.96	2.17	1.38	13
12.5	7.58	6.61	5.64	4.66	3.69	2.72	1.75	10
10.0	9.80	8.55	7.30	6.05	4.80	3.55	2.30	8
7.5	13.5	11.80	10.09	8.37	6.66	4.94	3.23	6
5.0	-	18.3	15.7	13.04	10.39	7.74	5.09	4
2.5	-	-	-	-	-	16.2	10.7	2

### RS...40

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]	T <sub>A</sub> Ambient temp. [°C]
	20	30	40	50	60	70		
40	1.73	1.49	1.25	1.01	0.77	0.52	0.28	41
36	2.00	1.73	1.45	1.18	0.90	0.63	0.35	36
32	2.35	2.03	1.71	1.39	1.08	0.76	0.44	31
28	2.80	2.43	2.05	1.68	1.30	0.93	0.55	27
24	3.41	2.96	2.51	2.05	1.60	1.15	0.70	22
20	4.26	3.71	3.15	2.59	2.03	1.47	0.92	18
16	5.56	4.84	4.12	3.40	2.68	1.96	1.24	14
12	7.74	6.74	5.75	4.76	3.77	2.78	1.78	10
8	12.12	10.58	9.04	7.50	5.96	4.42	2.88	6
4	-	-	-	15.74	12.56	9.37	6.18	3

## Heatsink Selection



## Ordering Key

**RHS..**

- Heatsinks and fans
- 5.40°C/W to 0.12°C/W thermal resistance
- DIN, panel or thru wall mounting
- Single or multiple SSR mounting

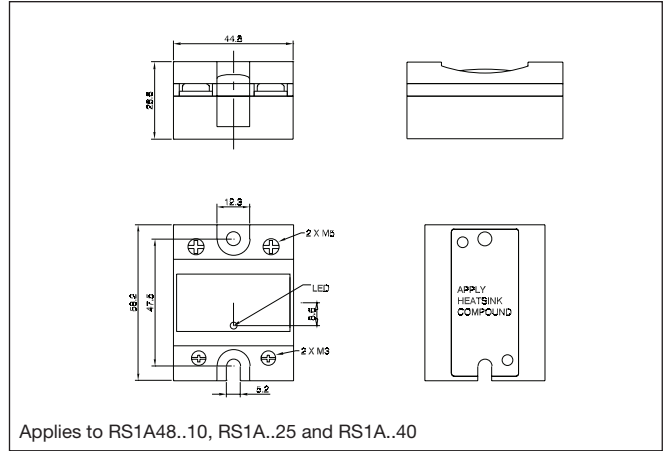
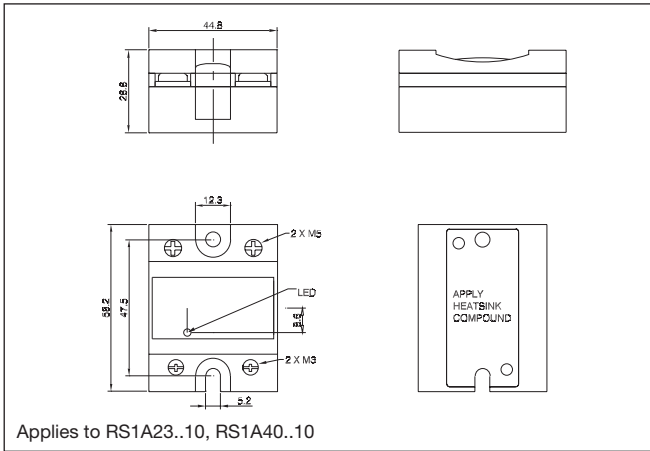
Heatsink Range Overview:

[https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR\\_Accessories.pdf](https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SSR_Accessories.pdf)

Heatsink Selector Tool:

[https://gavazziautomation.com/nsc/HQ/EN/solid\\_state\\_relays](https://gavazziautomation.com/nsc/HQ/EN/solid_state_relays)

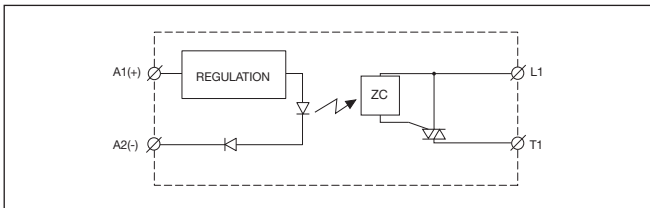
## Dimensions



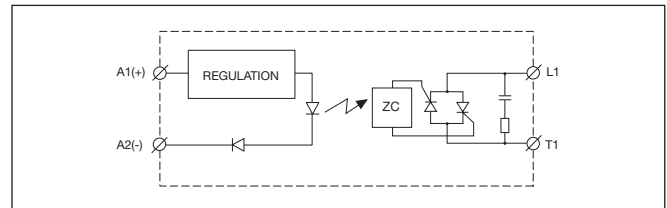
All dimensions in mm.

## Functional Diagram

### DC Control Voltage

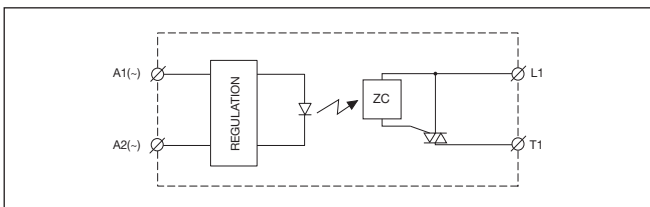


Note: Applies only to RS1A23D10, RS1A40D10

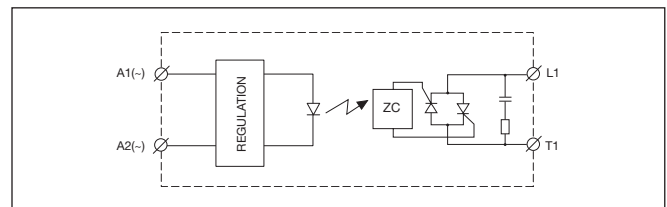


Note: Applies only to RS1A48D10, RS1A..D25, RS1A..D40

### AC Control Voltage



Note: Applies only to RS1A23LA10, RS1A40LA10



Note: Applies only to RS1A48LA10, RS1A..LA25, RS1A..LA40

## Environmental Information

The declaration in this section is prepared in compliance with People's Republic of China Electronic Industry Standard SJ/T11364-2014: Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products.

Part Name	Toxic or Harardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Power Unit Assembly	x	○	○	○	○	○

O: Indicates that said hazardous substance contained in homogeneous materials for this part are below the limit requirement of GB/T 26572.

X: Indicates that said hazardous substance contained in one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

## 环境特性

这份申明根据中华人民共和国电子工业标准 SJ/T11364-2014：标注在电子电气产品中限定使用的有害物质

零件名称	有毒或有害物质与元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴化联苯 (PBB)	多溴联苯醚 (PBDE)
功率单元	x	○	○	○	○	○

O:此零件所有材料中含有的该有害物低于GB/T 26572的限定。

X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。



## Faston terminals



- Fast-on tabs
- Tab dimensions according to DIN 46342 part 1
- Pure tin-plated brass

## Ordering Key

### Screw mounted Faston terminals

**RS1A48D25 | F 4**

RS, RM Solid State Relay

Faston terminals

Tab orientation

Input Tab width: 4.8mm

Output Tab width: 6.3mm

### Faston terminals in packs of 20

**RM48<sup>\*\*</sup> | F 4**

RS, RM Solid State Relay

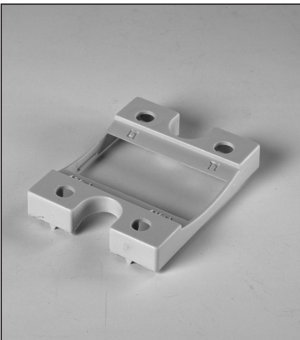
Tab orientation

\* 0: Flat (0°)

4: Angled (45°)

 \*\* 48: 4.8mm faston for input  
 63: 6.3mm faston for output

## Other Accessories



- Touch safety cover
- Type RMIP20
- IP20 protection degree
- Pack size: 20 pieces

All accessories can be ordered pre-assembled with Solid State Relays.  
 Other accessories include DIN rail adaptors, varistors and spacers.  
 For further information refer to Accessories datasheets.

## X-ON Electronics

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[RN1F12V50](#) [RJ1P60I30E](#) [RJ1P60V30E](#) [SO967860](#) [SMT8628521](#) [SO869970](#) [SOD867180](#) [SAL961360](#) [SO867970](#) [SOB863860](#)  
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