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**
- **LED indication**
- **Clip-on IP 20 protection cover**
- **Self-lifting terminals**
- **Housing free of moulding mass**
- **2 input ranges: 3-32 VDC and 18-36 VAC/VDC**
- **Operational ratings up to 40 AACrms and 480 VAC**
- **Non-repetitive voltage: Up to 1200 V_p**
- **Opto-insulation: > 4000 VACrms**
- **Integrated snubber network in 25 A and 40 A types**

Product Description

The zero switching relay with triac (10 A) or alternistor output (25 A, 40 A) is an inexpensive solution for resistive loads. 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 cover is securing touch protection to IP 20. Output terminals can handle cables up to 16 mm^2.

Ordering Key

RS 1 A 23 D 25

- **Solid State Relay**
- **Number of poles**
- **Switching mode**
- **Rated operational voltage**
- **Control voltage**
- **Rated operational current**

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 480VAC types

Selection Guide

Rated operational voltage	Non-rep. voltage	Control voltage	Rated operational current 10 A	25 A	40 A
230 VACrms	650 V_p	3-32 VDC	**RS1A23D10**	**RS1A23D25**	**RS1A23D40**
		18-36 VAC/DC	**RS1A23LA10**	**RS1A23LA25**	**RS1A23LA40**
400 VACrms	850 V_p	3-32 VDC	**RS1A40D10**	**RS1A40D25**	**RS1A40D40**
		18-36 VAC/DC	**RS1A40LA10**	**RS1A40LA25**	**RS1A40LA40**
480 VACrms	1200 V_p	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
Non-rep. peak voltage	≥ 650 V_p	≥ 850 V_p	≥ 1000 V_p
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	UL, cUL, CSA	UL, cUL, CSA	UL, cUL, CSA
CE-marking (external filter for EN 50081-1 needed)	Yes	Yes	Yes

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Input Specifications

	RS1A..D..	RS1A..LA...
Control voltage		18-36 VAC/DC
RS1.23..,RS1.40.	3-32 VDC	
RS1.48..	4-32 VDC	
Pick-up voltage		≤ 18 VAC/DC
RS1.23..,RS1.40.	≤ 2.75 VDC	
RS1.48..	≤ 3.75 VDC	
Reverse voltage	≤ 32 VDC	-
Drop out voltage	≥ 2 VDC	≥ 5 VAC/DC
Input current @ max input voltage	≤ 12 mA	≤ 15 mA
Response time pick-up	≤ 1/2 cycle	≤ 1 cycle
Response time drop-out	≤ 1/2 cycle	≤ 2 cycles

Output Specifications

	RS1A...10	RS1A...25	RS1A...40
Rated operational current			
AC51 @ Ta=25°C	10 Arms	25 Arms	40 Arms
Min. operational current	150 mA	150 mA	150 mA
Rep. overload current t=1 s	< 12 AACrms	< 37 AACrms	< 60 AACrms
Non-rep. surge current t=10 ms	100 A_p	230 A_p	300 A_p
Off-state leakage current @ rated voltage and frequency	< 3 mArms	< 3 mArms	< 3 mArms
I^2t for fusing t=1-10 ms	≤ 50 A^2s	≤ 310 A^2s	≤ 450 A^2s
Critical dI/dt	≥ 10 A/µs	≥ 50 A/µs	≥ 100 A/µs
On-state voltage drop @ rated current	≤ 1.6 Vrms	≤ 1.6 Vrms	≤ 1.6 Vrms
Critical dV/dt off-state	≥ 250 V/µs	≥ 250 V/µs	≥ 250 V/µs

Thermal Specifications

	RS1A...10	RS1A...25	RS1A...40
Operating temperature	-20° to 70°C	-20° to 70°C	-20° to 70°C
Storage temperature	-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

Insulation

Rated insulation voltage Input to output	≥ 4000 VACrms
Rated insulation voltage Output to case	≥ 4000 VACrms

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Heatsink Dimensions (load current versus ambient temperature)

RS10.

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
	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	-	-	-	-	-	29.7	0.9

T_A Ambient temp. [°C]

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 40.0	K/W
Junction to BTB tab thermal resistance, $R_{th\ j\text{-}t}$	< 2.00	K/W
BTB tab to case thermal resistance, $R_{th\ t\text{-}s}$	< 2.60	K/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	K/W
Maximum allowable BTB case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

RS25.

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
	20	30	40	50	60	70	
25.0	2.31	1.96	1.62	1.28	0.93	0.59	29
22.5	2.85	2.45	2.06	1.66	1.27	0.87	25
20.0	3.49	3.03	2.56	2.10	1.64	1.18	22
17.5	4.17	3.63	3.08	2.53	1.99	1.44	18
15.0	5.11	4.44	3.78	3.12	2.45	1.79	15
12.5	6.43	5.60	4.77	3.95	3.12	2.29	12
10.0	8.45	7.37	6.29	5.21	4.12	3.04	9
7.5	11.85	10.35	8.84	7.33	5.83	4.32	7
5.0	18.7	16.4	14.0	11.63	9.27	6.90	4
2.5	-	-	-	24.6	19.7	14.7	2

T_A Ambient temp. [°C]

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 20.0	K/W
Junction to case thermal resistance, $R_{th\ j\text{-}c}$	< 1.10	K/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	K/W
Maximum allowable case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

Heatsink Dimensions (cont.)

RS40..

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
	20	30	40	50	60	70	
40.0	1.25	1.04	0.82	0.61	0.39	0.18	47
36.0	1.59	1.35	1.10	0.85	0.60	0.36	41
32.0	2.02	1.74	1.45	1.16	0.87	0.58	35
28.0	2.53	2.19	1.85	1.51	1.17	0.83	29
24.0	3.12	2.70	2.29	1.87	1.46	1.04	24
20.0	3.95	3.43	2.91	2.39	1.87	1.35	19
16.0	5.21	4.53	3.85	3.18	2.50	1.83	15
12.0	7.33	6.39	5.45	4.51	3.57	2.62	11
8.0	11.63	10.16	8.68	7.20	5.72	4.24	7
4.0	24.6	21.5	18.4	15.3	12.2	9.12	3

T_A Ambient temp. [°C]

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 20.0	K/W
Junction to case thermal resistance, $R_{th\ j\text{-}c}$	< 0.80	K/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	K/W
Maximum allowable case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

Heatsink Selection

Carlo Gavazzi Heatsink (see Accessories)	**Thermal resistance...**	**...for power dissipation**
No heatsink required	---	N/A
RHS 300	5.00 K/W	> 0 W
RHS 100	3.00 K/W	> 25 W
RHS 45A	2.70 K/W	> 60 W
RHS 45B	2.00 K/W	> 60 W
RHS 90	1.35 K/W	> 60 W
RHS 45A plus fan	1.25 K/W	> 0 W
RHS 45B plus fan	1.20 K/W	> 0 W
RHS 112	1.10 K/W	> 100 W
RHS 301	0.80 K/W	> 70 W
RHS 90 plus fan	0.45 K/W	> 0 W
RHS 112 plus fan	0.40 K/W	> 0 W
RHS 301 plus fan	0.25 K/W	> 0 W
Consult your distribution	> 0.25 K/W	N/A
Infinite heatsink - No solution	---	N/A

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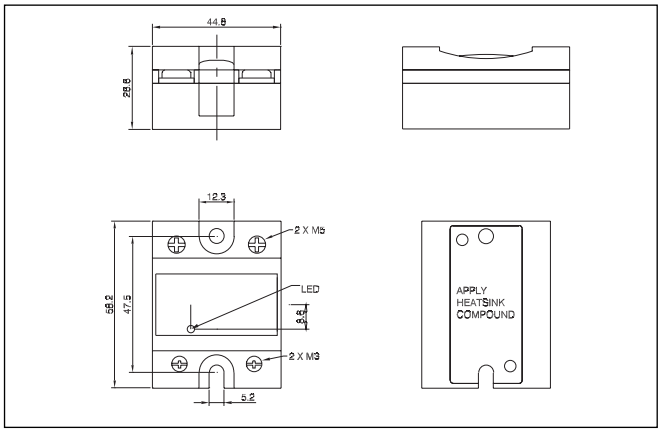
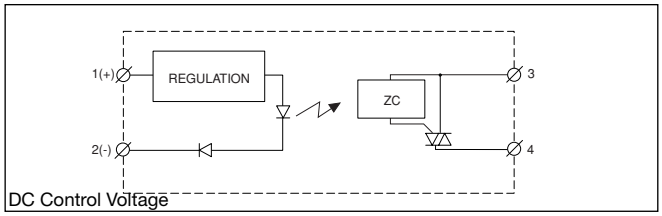
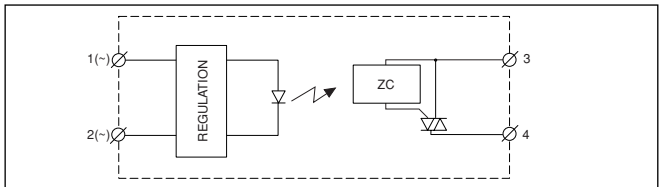
Dimensions



Functional Diagram



DC Control Voltage



AC Control Voltage

Fast-on terminals

- Fast-on tabs
- Type R..F.
- Screw mounted fast-on terminals
- Flat (0°) and angled (45°) orientation
- Input tab width: 4.8mm
- Output tab with: 6.3mm
- Tab dimensions according to DIN 46342 part 1
- Pure tin-plated brass

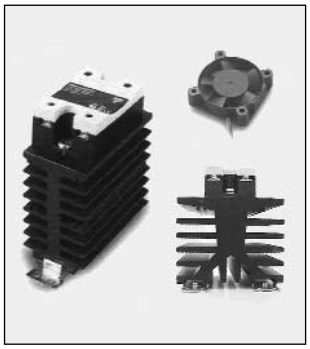
Ordering Key

RS1A48D40 | F 4*

RS, RM Solid State Relay
Fast-on terminals
Tab orientation

*** 0: Flat (0º)**
4: Angled (45º)

Other Accessories



- Heatsinks and fans
- Type RHS....
- 0.25 to 5.00 k/W
- Single and dual relay types

- 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, fuses, varistors and spacers.
For futher information refer to Accessories datasheets.