

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

CARLO GAVAZZI



- Zero switching AC Solid State Relay
- LED indication
- Clip-on IP protection cover
- Self-lifting terminals
- Housing free of moulding mass
- 2 input ranges: 4.5-32 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

Preliminary data sheet

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 curve 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 safety to IP 20. Protected output terminals can take cables up to 16 mm².

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 - 36 VAC/VDC D: 4.5 - 32 VDC

Selection Guide

Rated operational voltage	Non-rep. voltage	Control voltage	Rated operational current		
			10 A	25 A	40 A
230 VACrms	650 V _p	4.5-32 VDC	RS1A23D10	RS1A23D25	RS1A23D40
		18-36 VAC/DC	RS1A23LA10	RS1A23LA25	RS1A23LA40
400 VACrms	850 V _p	4.5-32 VDC	RS1A40D10	RS1A40D25	RS1A40D40
		18-36 VAC/DC	RS1A40LA10	RS1A40LA25	RS1A40LA40
480 VACrms	1200 V _p	4.5-32 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	$\geq 650 V_p$	$\geq 850 V_p$	$\geq 1200 V_p$
Zero voltage turn-on	$\leq 15 V$	$\leq 15 V$	$\leq 15 V$
Operational frequency range	45 to 65 Hz	45 to 65 Hz	45 to 65 Hz
Power factor	$\geq 0.95 @ 230 VACrms$	$\geq 0.95 @ 400 VACrms$	$\geq 0.95 @ 480 VACrms$
Approvals	UL, CSA	UL, CSA	UL, CSA
CE-marking	Yes	Yes	Yes

Input Specifications

	RS1A..D..	RS1A..LA...
Control voltage	4.5-32 VDC	18-36 VAC/DC
Pick-up voltage	$\leq 4.25 VDC$	$\leq 18 VAC/DC$
Reverse voltage	$\leq 32 VDC$	-
Drop out voltage	$\geq 1 VDC$	$\geq 5 VAC/DC$
Input current @ max input voltage	$\leq 12 mA$	$\leq 15 mA$
Response time pick-up	$\leq 1/2$ cycle	≤ 1 cycle
Response time drop-out	$\leq 1/2$ cycle	≤ 2 cycles

Output Specifications

	RS1A...10	RS1A...25	RS1A...40
Rated operational current AC1 @ 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 Ap	230 Ap	300 Ap
Off-state leakage current @ rated voltage and frequency	$< 3 mArms$	$< 3 mArms$	$< 3 mArms$
I ² t for fusing t=1-10 ms	$\leq 50 A^2s$	$\leq 265 A^2s$	$\leq 450 A^2s$
Critical dV/dt	$\geq 10 A/\mu s$	$\geq 50 A/\mu s$	$\geq 100 A/\mu s$
On-state voltage drop @ rated current	$\leq 1.6 Vrms$	$\leq 1.6 Vrms$	$\leq 1.6 Vrms$
Critical dV/dt off-state	$\geq 250 V/\mu s$	$\geq 250 V/\mu s$	$\geq 250 V/\mu s$

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
Junction temperature	$\leq 125^\circ C$	$\leq 125^\circ C$	$\leq 125^\circ C$
R _{th} junction to case	$\leq 4.80 K/W$	$\leq 1.10 K/W$	$\leq 0.90 K/W$
R _{th} junction to ambient	$\leq 40 K/W$	$\leq 20 K/W$	$\leq 20 K/W$



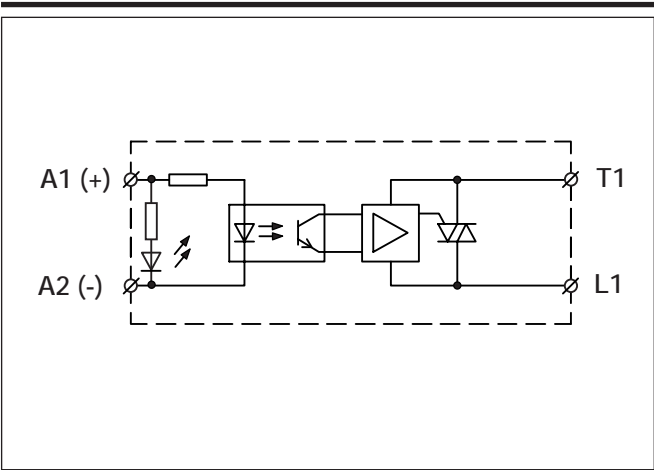
Housing Specifications

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 6
Mounting torque	0.5 Nm
Power terminal	
Mounting screws	M5 x 9
Mounting torque	2.4 Nm

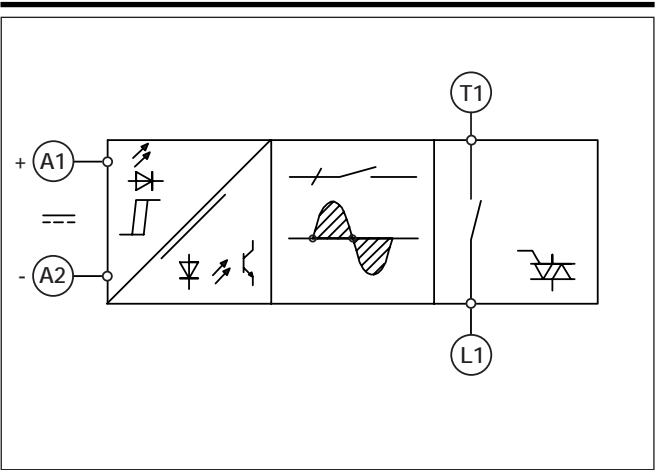
Insulation

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

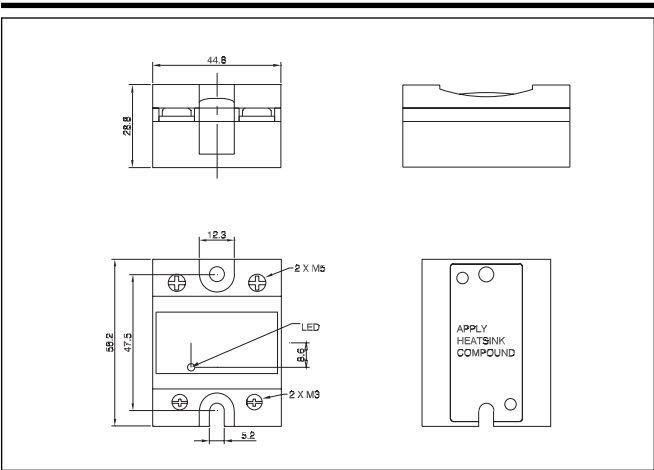
Wiring Diagram



Functional Diagram



Dimensions



Accessories



RM IP20
IP20 cover for RS and RM. This accessory is available in packs of 20 pieces with the above reference.

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	3.14	2.38	1.61	0.84	0.07	-	14
9.0	4.05	3.17	2.29	1.41	0.53	-	12
8.0	5.21	4.18	3.16	2.13	1.11	0.08	11
7.0	6.72	5.50	4.29	3.07	1.86	0.64	9
6.0	8.76	7.29	5.82	4.35	2.88	1.41	7
5.0	11.65	9.82	7.99	6.16	4.33	2.49	6
4.0	16.0	13.7	11.29	8.90	6.52	4.14	5
3.0	23.5	20.1	16.8	13.5	10.23	6.92	3
2.0	38.4	33.2	28.1	22.9	17.7	12.53	2
1.0	-	-	-	-	-	29.5	1

T_A
Ambient temp. [°C]

RS25.

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
	20	30	40	50	60	70	
25.0	1.92	1.61	1.30	1.00	0.69	0.39	33
22.5	2.39	2.04	1.69	1.34	0.99	0.63	28
20.0	3.00	2.59	2.18	1.77	1.36	0.95	24
17.5	3.68	3.19	2.71	2.22	1.74	1.25	21
15.0	4.49	3.90	3.32	2.73	2.14	1.56	17
12.5	5.64	4.91	4.18	3.45	2.72	1.99	14
10.0	7.39	6.44	5.49	4.55	3.60	2.65	11
7.5	10.34	9.03	7.71	6.39	5.07	3.75	8
5.0	16.3	14.2	12.2	10.11	8.05	5.99	5
2.5	-	-	25.7	21.4	17.0	12.7	2

T_A
Ambient temp. [°C]

Junction to ambient thermal resistance, R_{thja}	< 40.0	K/W
Junction to BTB tab thermal resistance, R_{thjt}	< 2.00	K/W
BTB tab to case thermal resistance, R_{thts}	< 2.80	K/W
Case to heatsink thermal resistance, R_{thcs}	< 0.20	K/W
Maximum allowable BTB case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

Junction to ambient thermal resistance, R_{thja}	< 20.0	K/W
Junction to case thermal resistance, R_{thjc}	< 1.10	K/W
Case to heatsink thermal resistance, R_{thcs}	< 0.20	K/W
Maximum allowable case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

RS40..

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
	20	30	40	50	60	70	
40.0	1.10	0.89	0.68	0.47	0.26	0.05	48
36.0	1.41	1.18	0.94	0.70	0.46	0.22	42
32.0	1.81	1.54	1.26	0.98	0.70	0.43	36
28.0	2.33	2.01	1.68	1.35	1.03	0.70	31
24.0	2.95	2.56	2.16	1.77	1.38	0.98	25
20.0	3.71	3.22	2.73	2.24	1.75	1.27	20
16.0	4.85	4.22	3.59	2.96	2.33	1.69	16
12.0	6.78	5.91	5.03	4.16	3.29	2.41	11
8.0	10.65	9.30	7.94	6.58	5.23	3.87	7
4.0	22.3	19.5	16.7	13.9	11.1	8.25	4

T_A
Ambient temp. [°C]

Junction to ambient thermal resistance, R_{thja}	< 20.0	K/W
Junction to case thermal resistance, R_{thjc}	< 0.90	K/W
Case to heatsink thermal resistance, R_{thcs}	< 0.20	K/W
Maximum allowable case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

Heatsink Selection

Carlo Gavazzi Heatsink (see Accessoires)	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