

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



- 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
- Fixed AC control input
- Operational ratings up to 40 AACrms and 400 VAC
- Blocking voltage: Up to 850 V_p
- Opto-isolation: > 4000 VACrms



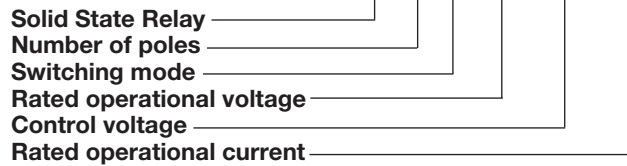
Product Description

The zero switching relay 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 indi-

cates the status of the control input. The clip-on cover is securing touch protection (IP 20). Output terminals can handle cables up to 16 mm².

Ordering Key

RS 1 A 23 A2- 25



Type Selection

Switching mode	Rated operational voltage	Rated operational current	Control voltage
A: Zero Switching	23: 230 VACrms 40: 400 VACrms	25: 25 AACrms 40: 40 AACrms	A1: 110VAC ± 15% A2: 230VAC ± 15% A4: 400VAC ± 15%

Selection Guide

Rated operational voltage	Non-rep. voltage	Control voltage	Rated operational current	
			25 A	40 A
230 VACrms	650 V _p	110 VAC ± 15%	RS1A23A1-25	RS1A23A1-40
		230 VAC ± 15%	RS1A23A2-25	RS1A23A2-40
		400 VAC ± 15%	RS1A23A4-25	RS1A23A4-40
400 VACrms	850 V _p	230 VAC ± 15%	RS1A40A2-25	RS1A40A2-40
		400 VAC ± 15%	RS1A40A4-25	RS1A40A4-40

General Specifications

	RS1A23...	RS1A40...
Operational voltage range	42 to 265 VACrms	42 to 440 VACrms
Blocking voltage	650 V _p	850 V _p
Zero voltage turn-on	15 V	15 V
Operational frequency range	45 to 65 Hz	45 to 65 Hz
Power factor	≥ 0.95 @ 230 VACrms	≥ 0.95 @ 400 VACrms
Approvals	UR, cUR, CSA, EAC	UR, cUR, CSA, EAC
CE-marking	Yes	Yes
UKCA - marking	Yes	Yes

Specifications are subject to change without notice (10.05.2023)

Input Specifications

	RS1A..A1	RS1A..A2	RS1A..A4
Control voltage	80 to 130VAC	200 to 260 VAC	360 to 440 VAC
Control frequency	50Hz / 60Hz	50Hz / 60Hz	50Hz / 60Hz
Pick-up voltage	70VAC	190VAC	350VAC
Drop out voltage	10VAC	20VAC	40VAC
Input current @ max input voltage	13mA	13mA	13mA
Typical response time pick-up	20ms	20ms	20ms
Typical response time drop-out	20ms	20ms	20ms

Output Specifications

	RS1A..25	RS1A..40
Rated operational current AC51 @ Ta=25°C	25 Arms	40 Arms
Min. operational current	150 mA	250 mA
Rep. overload current t=1 s	< 55 AACrms	< 125 AACrms
Non-rep. surge current t=10 ms	325 Ap	600 Ap
Off-state leakage current @ rated voltage and frequency	< 3 mArms	< 3 mArms
I ² t for fusing t=10 ms	525 A ² s	1800 A ² s
On-state voltage drop @ rated current	1.6 Vrms	1.6 Vrms
Critical dV/dt off-state	500 V/μs	500 V/μs

Thermal Specifications

	RS1A..25	RS1A..40
Operating temperature	-30° to 70°C	-30° to 70°C
Storage temperature	-40° to 100°C	-40° to 100°C
Junction temperature	125°C	125°C
R _{th} junction to case	1.10 °C/W	0.80 °C/W
R _{th} junction to ambient	20 °C/W	20 °C/W

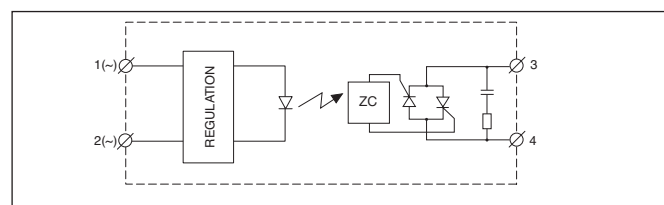
Housing Specifications

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

Isolation

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

Functional Diagram



Electromagnetic Compatibility

Immunity	EN60947-4-3	Radiated Radio Frequency Immunity	IEC/EN 61000-4-3
Electrostatic Discharge (ESD) Immunity	IEC/EN 61000-4-2	10V/m, 80 - 1000 MHz	Performance Criteria 1
Air discharge, 8kV	Performance Criteria 2	10V/m, 1.4 - 2.0GHz	Performance Criteria 1
Contact, 4kV	Performance Criteria 2	3 V/m, 2.0 - 2.7GHz	Performance Criteria 1
Electrical Fast Transient (Burst) Immunity	IEC/EN 61000-4-4	Conducted Radio Frequency Immunity	IEC/EN 61000-4-6
Output: 2kV, 5kHz	Performance Criteria 2	10V/m, 0.15 - 80 MHz	Performance Criteria 1
Input: 1kV, 5kHz	Performance Criteria 2	Voltage Dips Immunity	IEC/EN 61000-4-11
Electrical Surge Immunity	IEC/EN 61000-4-5	0% for 0.5, 1 cycle	Performance Criteria 2
Output, line to line, 1kV	Performance Criteria 2	40% for 10 cycles	Performance Criteria 2
Output, line to earth, 2kV	Performance Criteria 2	70% for 25 cycles	Performance Criteria 2
	Performance Criteria 2 with external suppression	80% for 250 cycles	Performance Criteria 2
Input, line to line, 1kV	Performance Criteria 2	Voltage Interruptions Immunity	IEC/EN 61000-4-11
Input, line to earth, 2kV	Performance Criteria 2	0% for 5000ms	Performance Criteria 2
EMC Emission	EN60947-4-3	Radio Interference Field Emission (Radiated)	IEC/EN 55011
Radio Interference Voltage Emission (Conducted)	IEC/EN 55011	30 - 1000MHz	Class B
0.15 - 30MHz	Class A (industrial) with filters		

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.
- The control terminals A1, A2 (RS1..A) shall be supplied by a secondary circuit where power is limited by a transformer, rectifier, voltage divider, or similar device that derives power from a primary circuit, and where the short-circuit limit between conductors of the secondary circuit or between conductors and ground is 1500 VA or less. The short-circuit volt ampere limit is the product of the open circuit voltage and the short circuit ampere.
- 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)

RS....25

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]
	20	30	40	50	60	70	
25.0	2.70	2.34	1.98	1.61	1.25	0.89	28
22.5	3.10	2.69	2.28	1.86	1.45	1.04	24
20.0	3.61	3.13	2.65	2.18	2.03	1.47	21
17.5	4.26	3.70	3.14	2.59	2.03	1.47	18
15.0	5.14	4.47	3.80	3.14	2.47	1.80	15
12.5	6.38	5.56	4.73	3.91	3.09	2.27	12
10.0	8.25	7.19	6.14	5.08	4.02	2.97	9
7.5	11.4	9.94	8.49	7.04	5.59	4.14	7
5.0	17.7	15.4	13.2	11.0	8.74	6.51	4
2.5	-	-	-	-	18.2	13.6	2

T_A
Ambient temp. [°C]

RS....40

Load current [A]	Thermal resistance [°C/W]						Power dissipation [W]
	20	30	40	50	60	70	
40.0	1.54	1.32	1.10	0.89	0.67	0.45	28
36.0	1.78	1.53	1.28	1.04	0.79	0.54	24
32.0	2.08	1.79	1.51	1.22	0.94	0.65	21
28.0	2.47	2.14	1.80	1.47	1.13	0.80	30
24.0	2.99	2.59	2.19	1.80	1.40	1.00	25
20.0	3.73	3.24	2.75	2.26	1.77	1.27	20
16.0	4.84	4.21	3.58	2.95	2.32	1.69	16
12.0	6.71	5.85	4.98	4.12	3.25	2.39	12
8.0	10.46	9.12	7.79	6.46	5.13	3.80	8
4.0	---	---	16.2	13.5	10.8	8.0	2

T_A
Ambient temp. [°C]

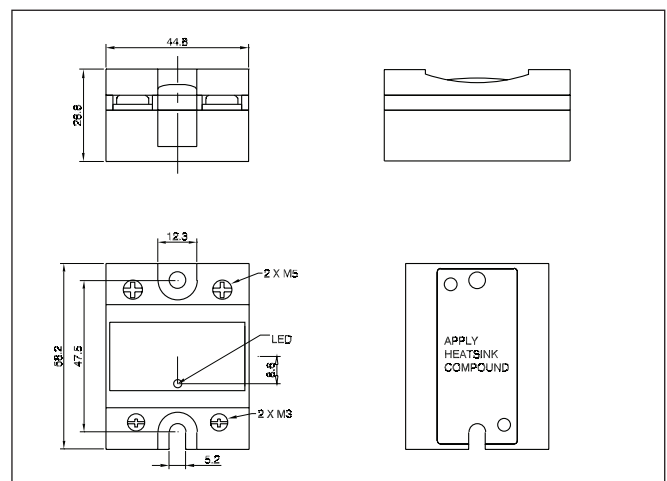
Junction to ambient thermal resistance, R _{th j-a}	< 20.0	°C/W
Junction to case thermal resistance, R _{th j-c}	< 1.10	°C/W
Case to heatsink thermal resistance, R _{th c-s} ²	< 0.20	°C/W
Maximum allowable case temperature	100	°C
Maximum allowable junction temperature	125	°C

Junction to ambient thermal resistance, R _{th j-a}	< 20.0	°C/W
Junction to case thermal resistance, R _{th j-c}	< 0.80	°C/W
Case to heatsink thermal resistance, R _{th c-s} ²	< 0.20	°C/W
Maximum allowable case temperature	100	°C
Maximum allowable junction temperature	125	°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 45C	2.70 K/W	> 60 W
RHS 45B	2.00 K/W	> 60 W
RHS 90A	1.35 K/W	> 60 W
RHS 45C plus fan	1.25 K/W	> 0 W
RHS 45B plus fan	1.20 K/W	> 0 W
RHS 112A	1.10 K/W	> 100 W
RHS 301	0.80 K/W	> 70 W
RHS 90A plus fan	0.45 K/W	> 0 W
RHS 112A 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

Dimensions



All dimensions in mm.

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

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	○	○	○	○	○
<p>O: 此零件所有材料中含有的该有害物低于GB/T 26572的限定。</p> <p>X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。</p>						



Faston terminals



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

Ordering Key

Screw mounted Faston terminals

RS1A23A2-25 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 F4***

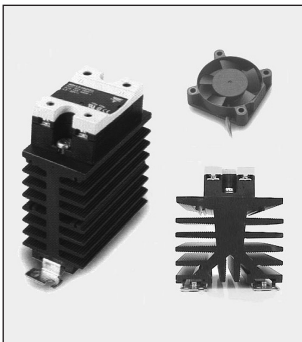
RS, RM Solid State Relay

Tab orientation

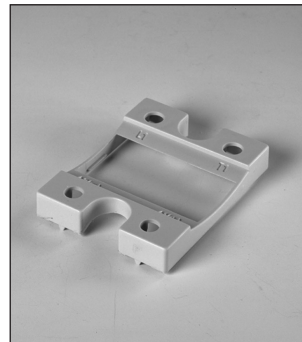
- * 0: Flat (0°)
- 4: Angled (45°)

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

Other Accessories



- 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 further information refer to Accessories datasheets.