

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



- Zero switching AC Solid State Relay
- Direct copper bonding (DCB) technology
- Alternistor power unit
- 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
- Non-repetitive voltage: Up to 850 V_p
- Opto-isolation: > 4000 VACrms

Product Description

The zero switching relay with alternistor output 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 protection (IP 20). Output terminals can handle cables up to 16 mm².

Ordering Key

RS 1 A 23 A2- 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 | 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 | 650V _p | 110 VAC ± 15% | RS1A23A1-25 | RS1A23A1-40 |
| | | 230 VAC ± 15% | RS1A23A2-25 | RS1A23A2-40 |
| | | 400 VAC ± 15% | RS1A23A4-25 | RS1A23A4-40 |
| 400 VACrms | 850V _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 |
| Non-rep. peak 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 | UL, cUL, CSA | UL, cUL, CSA |
| CE-marking (external filter for EN 61000-6-4) | Yes | Yes |

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 | 30VAC | 70VAC | 160VAC |
| 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 | 150 mA |
| Rep. overload current t=1 s | < 37 AACrms | < 60 AACrms |
| Non-rep. surge current t=10 ms | 300 A _p | 390 A _p |
| Off-state leakage current @ rated voltage and frequency | < 3 mArms | < 3 mArms |
| I ² t for fusing t=1-10 ms | ≤ 450 A ² s | ≤ 760 A ² s |
| Critical di/dt | ≥ 50 A/μs | ≥ 50 A/μs |
| 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 K/W | ≤ 0.8 K/W |
| R _{th} junction to ambient | ≤ 20 K/W | ≤ 20 K/W |

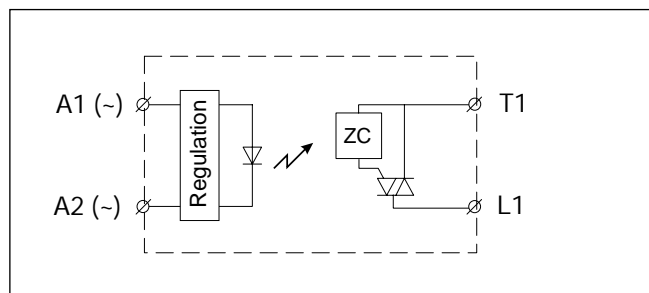
Housing Specifications

| | |
|------------------|--------------------|
| 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 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 |
| Output to case | ≥ 4000 VACrms |

Functional Diagram



Heatsink Dimensions (load current versus ambient temperature)

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]

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]

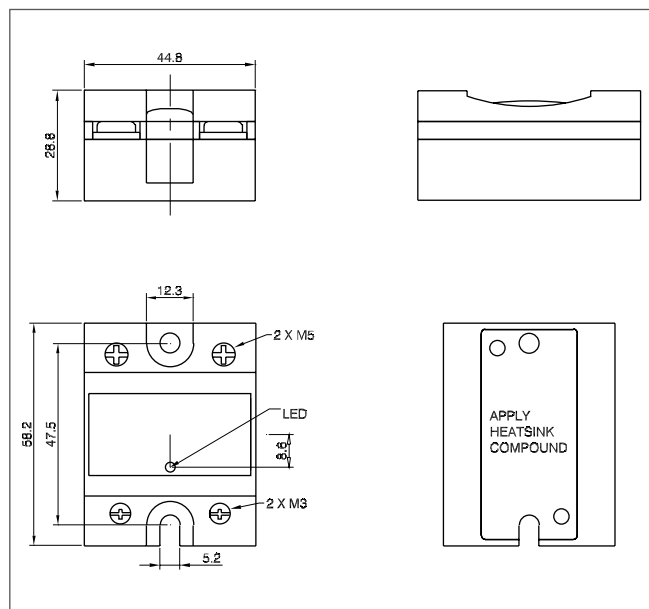
| | | |
|---|--------|-------|
| Junction to ambient thermal resistance, R _{th j-a} | < 20.0 | K/W |
| Junction to case thermal resistance, R _{th j-c} | < 1.10 | K/W |
| Case to heatsink thermal resistance, R _{th c-s} | < 0.20 | K/W |
| Maximum allowable case temperature | 100 | deg.C |
| Maximum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

| | | |
|---|--------|-------|
| Junction to ambient thermal resistance, R _{th j-a} | < 20.0 | K/W |
| Junction to case thermal resistance, R _{th j-c} | < 0.80 | K/W |
| Case to heatsink thermal resistance, R _{th c-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 45C | 2.70 K/W | > 60 W |
| RHS 45B | 2.00 K/W | > 60 W |
| RHS 90A | 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 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

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***

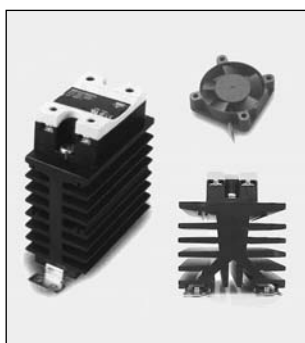
RS, RM Solid State Relay

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.