

# Solid State Relays Industrial, 3-Phase ZS Type RZ3A



- 3-phase Solid State Relay
- Zero switching
- Rated operational current: 3 x 25, 55 or 75 A
- Rated operational voltage: Up to 600 VAC
- Control voltage 5 VDC, 4-32 VDC or 24-275 VAC
- Integral snubber network
- Built-in varistor
- Over-temperature protection option with alarm output
- IP 10 back-of-hand protection
- LED indication of control input and over-temperature alarm status

## Product Description

A Solid State Relay family designed to switch various loads such as heating elements, motors and transformers. The relay is capable of switching high voltages up to 600 VACrms. The built-in varistor secures transient protection for heavy industrial applications.

For higher reliability and load cycle capability three semiconductor power units are soldered directly on to the direct

copper bonded (DCB) substrate.

AC- or DC-controlled versions are available. Built-in LED status indication for applied control voltage and over-temperature alarm (optional). A version that can be controlled with 5 VDC @ 15 mA (max) is also available (LD).

The series covers a range of load currents up to 75 AACrms.

## Ordering Key

**RZ 3 A 60 D 75 P**

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

## Type Selection

| Switching mode    | Rated operational voltage                          | Rated operational current                                   | Control voltage                                     | Option                                                                                |
|-------------------|----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|
| A: Zero Switching | 40: 400 VACrms<br>48: 480 VACrms<br>60: 600 VACrms | 25: 3 x 25 AACrms<br>55: 3 x 55 AACrms<br>75: 3 x 75 AACrms | LD: 5 VDC<br>D: 4-32 VDC<br>A: 24-275 VAC/24-50 VDC | P: Over-temperature protection and alarm output<br>(available only for A and D input) |

## Selection Guide

| Rated operational voltage | Control voltage      | Rated operational current |                   |                   |
|---------------------------|----------------------|---------------------------|-------------------|-------------------|
|                           |                      | 3 x 25 A                  | 3 x 55 A          | 3 x 75 A          |
| 400 VACrms                | 5 VDC                | <b>RZ3A40LD25</b>         | <b>RZ3A40LD55</b> | <b>RZ3A40LD75</b> |
|                           | 4-32 VDC             | <b>RZ3A40D25</b>          | <b>RZ3A40D55</b>  | <b>RZ3A40D75</b>  |
|                           | 24-275 VAC/24-50 VDC | <b>RZ3A40A25</b>          | <b>RZ3A40A55</b>  | <b>RZ3A40A75</b>  |
| 480 VACrms                | 5 VDC                | <b>RZ3A48LD25</b>         | <b>RZ3A48LD55</b> | <b>RZ3A48LD75</b> |
|                           | 4-32 VDC             | <b>RZ3A48D25</b>          | <b>RZ3A48D55</b>  | <b>RZ3A48D75</b>  |
|                           | 24-275 VAC/24-50 VDC | <b>RZ3A48A25</b>          | <b>RZ3A48A55</b>  | <b>RZ3A48A75</b>  |
| 600 VACrms                | 5 VDC                | <b>RZ3A60LD25</b>         | <b>RZ3A60LD55</b> | <b>RZ3A60LD75</b> |
|                           | 4-32 VDC             | <b>RZ3A60D25</b>          | <b>RZ3A60D55</b>  | <b>RZ3A60D75</b>  |
|                           | 24-275 VAC/24-50 VDC | <b>RZ3A60A25</b>          | <b>RZ3A60A55</b>  | <b>RZ3A60A75</b>  |

### Notes

Over-temperature protection and alarm output: add suffix P to include over-temperature protection and alarm output.  
Example: RZ3A60D75P. Not available with "LD" type control.

## Isolation

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

## Thermal Specifications

|                       |                                  |
|-----------------------|----------------------------------|
| Operating temperature | -30° to +80°C (-22° to +158° F)  |
| Storage temperature   | -40° to +100°C (-40° to +212° F) |
| Junction temperature  | ≤ +125°C (+ 257°F)               |

## General Specifications

|                             | RZ3A40..           | RZ3A48..            | RZ3A60..            |
|-----------------------------|--------------------|---------------------|---------------------|
| Operational voltage range   | 24-440 VAC         | 42-530 VAC          | 42-660 VAC          |
| Blocking voltage            | 850 V <sub>p</sub> | 1200 V <sub>p</sub> | 1600 V <sub>p</sub> |
| Operational frequency range | 45 to 65 Hz        | 45 to 65 Hz         | 45 to 65 Hz         |
| Overvoltage category        | III                | III                 | III                 |
| Pollution degree            | 3                  | 3                   | 3                   |
| Approvals                   | UL, cUL, CSA       | UL, cUL, CSA        | UL, cUL, CSA        |
| CE-marking                  | Yes                | Yes                 | Yes                 |

## Input Specifications

|                                                | RZ3A..LD.. | RZ3A..D.. | RZ3A..A..            |
|------------------------------------------------|------------|-----------|----------------------|
| Control voltage range                          | 5 VDC      | 4-32 VDC  | 24-275 VAC/24-50 VDC |
| Pick-up voltage                                | 4.5 VDC    | 3.8 VDC   | 18 VAC/20 VDC        |
| Drop-out voltage                               | 1.2 VDC    | 1.2 VDC   | 9 VAC/DC             |
| Input current                                  | ≤ 15 mA    | ≤ 23 mA   | ≤ 15 mA              |
| Response time pick-up<br>Power output = 50 Hz  | 10 ms      | 10 ms     | 20 ms                |
| Response time drop-out<br>Power output = 50 Hz | 10 ms      | 10 ms     | 30 ms                |

All data specified at Ta=25°C

## Output Specifications

|                                                                | RZ3A..25..           | RZ3A..55..            | RZ3A..75..            |
|----------------------------------------------------------------|----------------------|-----------------------|-----------------------|
| Rated operational current<br>AC51 @ Ta=25°C<br>AC53a @ Ta=25°C | 25 Arms<br>5 Arms    | 55 Arms<br>15 Arms    | 75 Arms<br>20 Arms    |
| Minimum operational current                                    | 150 mArms            | 250 mArms             | 400 mArms             |
| Rep. overload current t=1 s                                    | 37 Arms              | < 125 Arms            | < 150 Arms            |
| Non-rep. surge current t = 10 ms                               | 300 A <sub>p</sub>   | 600 A <sub>p</sub>    | 1150 A <sub>p</sub>   |
| Off-state leakage current                                      | < 3 mArms            | < 3 mArms             | < 3 mArms             |
| I <sup>2</sup> t for fusing t = 10 ms                          | 450 A <sup>2</sup> s | 1800 A <sup>2</sup> s | 6600 A <sup>2</sup> s |
| On-state voltage drop                                          | ≤ 1.6 Vrms           | ≤ 1.6 Vrms            | ≤ 1.6 Vrms            |
| Critical dV/dt off-state                                       | ≥ 500 V/μs           | ≥ 500 V/μs            | ≥ 500 V/μs            |

## Over-temperature Protection (Option: ...P)

|                          |  |                                                          |  |        |  |
|--------------------------|--|----------------------------------------------------------|--|--------|--|
| SSR Input*               |  |                                                          |  | ≥ 20ms |  |
| Green LED                |  |                                                          |  |        |  |
| SSR Output               |  |                                                          |  |        |  |
| Over-temperature sensing |  | Over-temperature detection                               |  |        |  |
| Red LED                  |  | Over-temperature protection is ON<br>SSR output disabled |  |        |  |
| Closed Alarm status      |  |                                                          |  |        |  |
| Open                     |  |                                                          |  |        |  |

\*After over-temperature condition is removed, SSR can be reset by switching OFF the control input for more than 20 ms and switching back ON: this will switch ON the SSR output

## Heatsink Dimensions (load current versus ambient temperature)

### RZ3..25

| Load current [A] | Thermal resistance [K/W] |       |      |      |      |      | Power dissipation [W] |
|------------------|--------------------------|-------|------|------|------|------|-----------------------|
|                  | 20                       | 30    | 40   | 50   | 60   | 70   | 80                    |
| 25.0             | 0.44                     | 0.34  | 0.23 | 0.12 | 0.01 | --   | --                    |
| 22.5             | 0.62                     | 0.49  | 0.37 | 0.24 | 0.12 | --   | --                    |
| 20.0             | 0.84                     | 0.69  | 0.54 | 0.40 | 0.25 | 0.10 | --                    |
| 17.5             | 1.12                     | 0.95  | 0.78 | 0.60 | 0.43 | 0.25 | 0.08                  |
| 15.0             | 1.51                     | 1.30  | 1.09 | 0.88 | 0.67 | 0.46 | 0.25                  |
| 12.5             | 2.06                     | 1.80  | 1.54 | 1.27 | 1.01 | 0.75 | 0.48                  |
| 10.0             | 2.75                     | 2.40  | 2.06 | 1.72 | 1.37 | 1.03 | 0.69                  |
| 7.5              | 3.83                     | 3.35  | 2.87 | 2.39 | 1.91 | 1.43 | 0.96                  |
| 5.0              | 6.01                     | 5.26  | 4.51 | 3.76 | 3.01 | 2.25 | 1.50                  |
| 2.5              | 12.62                    | 11.04 | 9.46 | 7.89 | 6.31 | 4.73 | 3.15                  |

T<sub>A</sub>  
Ambient temp [°C]

### RZ3 ..55

| Load current [A] | Thermal resistance [K/W] |      |      |      |      |      | Power dissipation [W] |
|------------------|--------------------------|------|------|------|------|------|-----------------------|
|                  | 20                       | 30   | 40   | 50   | 60   | 70   | 80                    |
| 55.0             | 0.29                     | 0.23 | 0.17 | 0.11 | 0.05 | --   | --                    |
| 50.0             | 0.36                     | 0.29 | 0.22 | 0.16 | 0.09 | 0.02 | --                    |
| 45.0             | 0.44                     | 0.36 | 0.29 | 0.21 | 0.14 | 0.06 | --                    |
| 40.0             | 0.54                     | 0.46 | 0.37 | 0.29 | 0.20 | 0.12 | 0.03                  |
| 35.0             | 0.67                     | 0.58 | 0.48 | 0.38 | 0.28 | 0.19 | 0.09                  |
| 30.0             | 0.85                     | 0.74 | 0.62 | 0.51 | 0.39 | 0.28 | 0.16                  |
| 25.0             | 1.10                     | 0.96 | 0.82 | 0.68 | 0.55 | 0.41 | 0.27                  |
| 20.0             | 1.38                     | 1.21 | 1.04 | 0.87 | 0.69 | 0.52 | 0.35                  |
| 15.0             | 1.85                     | 1.62 | 1.39 | 1.16 | 0.93 | 0.70 | 0.46                  |
| 10.0             | 2.80                     | 2.45 | 2.10 | 1.75 | 1.40 | 1.05 | 0.70                  |
| 5.0              | 5.62                     | 4.92 | 4.21 | 3.51 | 2.81 | 2.11 | 1.40                  |
| 2.5              | 11.26                    | 9.85 | 8.45 | 7.04 | 5.63 | 4.22 | 2.82                  |

T<sub>A</sub>  
Ambient temp [°C]

### RZ3 ..75

| Load current [A] | Thermal resistance [K/W] |      |      |      |      |      | Power dissipation [W] |
|------------------|--------------------------|------|------|------|------|------|-----------------------|
|                  | 20                       | 30   | 40   | 50   | 60   | 70   | 80                    |
| 75.0             | 0.27                     | 0.22 | 0.17 | 0.12 | 0.07 | 0.02 | --                    |
| 70.0             | 0.32                     | 0.27 | 0.21 | 0.16 | 0.10 | 0.05 | --                    |
| 65.0             | 0.38                     | 0.32 | 0.26 | 0.20 | 0.14 | 0.08 | 0.02                  |
| 60.0             | 0.44                     | 0.38 | 0.31 | 0.25 | 0.18 | 0.11 | 0.05                  |
| 55.0             | 0.52                     | 0.45 | 0.38 | 0.30 | 0.23 | 0.16 | 0.08                  |
| 50.0             | 0.62                     | 0.54 | 0.45 | 0.37 | 0.29 | 0.21 | 0.12                  |
| 45.0             | 0.74                     | 0.64 | 0.55 | 0.46 | 0.36 | 0.27 | 0.17                  |
| 40.0             | 0.87                     | 0.76 | 0.65 | 0.54 | 0.43 | 0.32 | 0.22                  |
| 35.0             | 1.01                     | 0.89 | 0.76 | 0.63 | 0.51 | 0.38 | 0.25                  |
| 30.0             | 1.21                     | 1.06 | 0.91 | 0.76 | 0.60 | 0.45 | 0.30                  |
| 25.0             | 1.49                     | 1.30 | 1.11 | 0.93 | 0.74 | 0.56 | 0.37                  |
| 20.0             | 1.90                     | 1.67 | 1.43 | 1.19 | 0.95 | 0.71 | 0.48                  |
| 15.0             | 2.60                     | 2.28 | 1.95 | 1.63 | 1.30 | 0.98 | 0.65                  |
| 10.0             | 4.01                     | 3.51 | 3.01 | 2.51 | 2.01 | 1.50 | 1.00                  |
| 5.0              | 8.24                     | 7.21 | 6.18 | 5.15 | 4.12 | 3.09 | 2.06                  |

T<sub>A</sub>  
Ambient temp [°C]

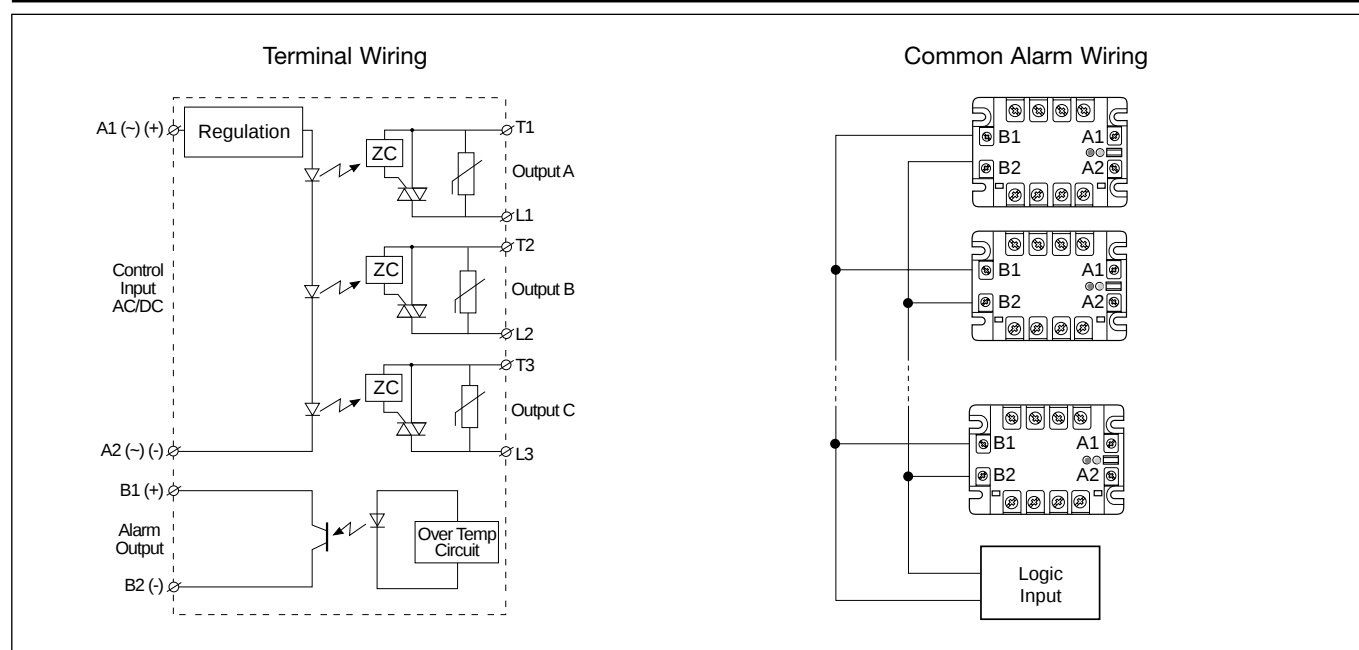
## Heatsink Selection

| Carlo Gavazzi Heatsink<br>(see Accessories) | Thermal resistance            |
|---------------------------------------------|-------------------------------|
| No heatsink required                        | R <sub>th s-a</sub> > 8.0 K/W |
| RHS 300 Assy or backplate                   | 5.0 K/W                       |
| RHS 112A Assy                               | 1.1 K/W                       |
| RHS 301 Assy                                | 0.8 K/W                       |
| RHS 112A F Assy                             | 0.4 K/W                       |
| RHS 301 F Assy                              | 0.25 K/W                      |
| Consult your distributor                    | < 0.25 K/W                    |

## Alarm Output Specifications

|                             |        |
|-----------------------------|--------|
| Collector - emitter voltage | 35 Vdc |
| Emitter - collector voltage | 6 Vdc  |
| Collector current           | 50 mA  |
| Delay time on reset         | 20 ms  |

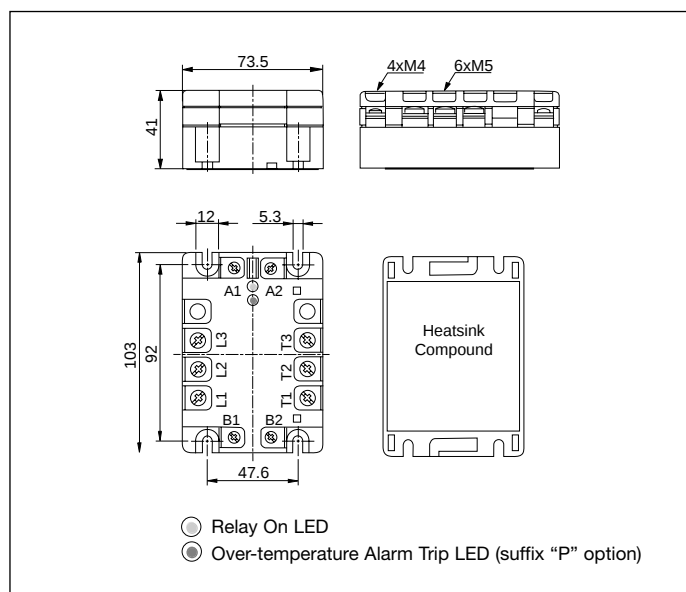
## Connection Diagrams



## Housing Specifications

|                  |                                      |
|------------------|--------------------------------------|
| Weight           | Approx. 380 g                        |
| Material         | Noryl                                |
| Base plate       |                                      |
| 25, 55A          | Aluminum, nickel-plated              |
| 75A              | Copper, nickel-plated                |
| Potting compound | Polyurethane                         |
| Relay            |                                      |
| Mounting screws  | M5                                   |
| Mounting torque  | ≤ 1.5 Nm                             |
| Control terminal |                                      |
| Mounting screws  | M4                                   |
| Mounting torque  | ≤ 0.5 Nm                             |
| Wire size        | Max. 2 x 2.5 mm <sup>2</sup> (AWG14) |
|                  | Min. 2 x 1 mm <sup>2</sup>           |
| Power terminal   |                                      |
| Mounting screws  | M5                                   |
| Mounting torque  | ≤ 2.5 Nm                             |
| Wire size        | Max. 2 x 6 mm <sup>2</sup> (AWG8)    |
|                  | Min. 2 x 1 mm <sup>2</sup>           |

## Dimensions



## Alarm Output Connection

