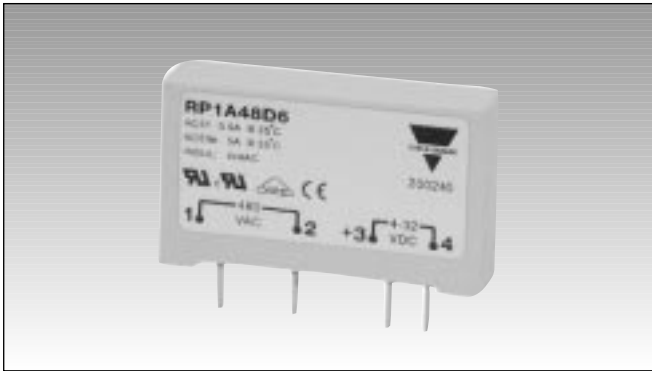




# Solid State Relays PCB, 1-Phase ZS/IO Type RP1A, RP1B



- AC Solid State Relay for PCB mounting
- Zero switching or instant-on
- Rated operational current: 3, 5 or 5.5 A
- Rated operational voltage: Up to 480 V
- Surface mount technology
- Flexible encapsulation for extended life
- Control voltage: 3 to 32 VDC\* / 16 to 32 VAC\*\*
- Opto-isolation: > 4000 VACrms
- Non-repetitive peak voltage: 1000 Vp
- Non-repetitive surge current up to 300 A

## Product Description

The RP1 is an SSR series for socket- or PCB-mounting, providing an ideal interface between logic controls and AC loads. The RP1 is designed for resistive and inductive loads up to 480V. Two regulated control voltages cover most standard input requirements in an economic package. These features allow a direct substitution of existing PCB mounted relays with RP1. Internally this new series enjoys an improved technical design with the introduction of stress-free flexible encapsulation and automated

assembly of components. Opto-isolation and load switching are performed by individual components, providing higher reliability than monolithic designs. Additionally RP1..6 is a special version with high current surge capability that reduces fusing requirements. This relay can also drive higher AC3 loads up to 5 A. The Solid State technology used can withstand peak voltages of 1000V, making the RP1 series suitable to drive AC loads such as valve solenoids and small induction motors.

## Ordering Key

**RP 1 A 23 D 3**

- Solid State Relay (PCB)
- 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 V                 | 3: 3 A                    | D: 3 to 32 VDC*                   |
| B: Instant-On switching | 40: 400 V                 | 5: 5 A                    | A: 16 to 32 VAC**                 |
|                         | 48: 480 V                 | 6: 5.5 A                  | * 4 to 32 VDC for 480 VAC types   |
|                         |                           |                           | ** Only available for 230V, 5.5 A |

## Selection Guide

| Rated operational voltage | Non-rep. voltage | Control voltage | Rated operational current |          |            |
|---------------------------|------------------|-----------------|---------------------------|----------|------------|
|                           |                  |                 | 3 AACrms                  | 5 AACrms | 5.5 AACrms |
| 230 VACrms                | 650 Vp           | 3 to 32 VDC     | RP1A23D3                  | RP1A23D5 | RP1A23D6   |
|                           |                  | 16 to 32 VAC    | RP1B23D3                  | RP1B23D5 | RP1B23D6   |
| 400 VACrms                | 850 Vp           | 3 to 32 VDC     | RP1A40D3                  | RP1A40D5 | RP1A40D6   |
|                           |                  |                 | RP1B40D3                  | RP1B40D5 | RP1B40D6   |
| 480 VACrms                | 1000 Vp          | 4 to 32 VDC     | RP1A48D3                  | RP1A48D5 | RP1A48D6   |
|                           |                  |                 | RP1B48D3                  | RP1B48D5 | RP1B48D6   |

## Selection Guide (mounted on DIN EN adaptor)

| Rated operational voltage | Non-rep. voltage | Control voltage | Rated operational current |            |            |
|---------------------------|------------------|-----------------|---------------------------|------------|------------|
|                           |                  |                 | 3 AACrms                  | 5 AACrms   | 5.5 AACrms |
| 230 VACrms                | 650 Vp           | 4 to 32 VDC     | RP1A23D3M1                | RP1A23D5M1 | RP1A23D6M1 |
|                           |                  | 16 to 32 VAC    | RP1B23D3M1                | RP1B23D5M1 | RP1B23D6M1 |
|                           |                  |                 |                           |            | RP1A23A6M1 |

## General Specifications

|                                                 | RP1.23..           | RP1.40..           | RP1.48..            |
|-------------------------------------------------|--------------------|--------------------|---------------------|
| Operational voltage range                       | 12 - 265 VACrms    | 12 - 440 VACrms    | 12 - 530 VACrms     |
| Non-rep. peak voltage                           | 650 V <sub>p</sub> | 850 V <sub>p</sub> | 1000 V <sub>p</sub> |
| Rated insulated input to output out to heatsink | 4 kVACrms          | 4 kVACrms          | 4 kVACrms           |
| Operational frequency range                     | 45 - 65 Hz         | 45 - 65 Hz         | 45 - 65 Hz          |
| Power factor                                    | > 0.5              | > 0.5              | > 0.5               |
| Zero voltage turn-on                            | < 10 V             | < 10 V             | < 10 V              |
| Approvals                                       | UL, cUL, VDE*      | UL, cUL, VDE*      | UL, cUL, VDE*       |
| CE-marking                                      | Yes                | Yes                | Yes                 |

\* VDE 0700, VDE 0805

## Input Specifications

|                        | RP1..23D..<br>RP1..40D.. | RP1..48D.. | RP1..23A6.. |
|------------------------|--------------------------|------------|-------------|
| Control voltage        | 3 - 32 VDC               | 4 - 32 VDC | 16 - 32 VAC |
| Pick-up voltage        | 2.5 VDC                  | 3.5 VDC    | 10 VAC      |
| Drop-out voltage       | 1.2 VDC                  | 1.2 VDC    | 5 VAC       |
| Input current max.     | 10 mADC                  | 10 mADC    | 13 mAAC     |
| Max. reverse voltage   | 32 VDC                   | 32 VDC     | -           |
| Response time pick-up  |                          |            |             |
| RP1A                   | < 10 ms                  | < 10 ms    | < 20 ms     |
| RP1B                   |                          |            |             |
| 12 VDC/50 Hz           | < 160 µs                 | < 160 µs   | -           |
| 5 VDC/50 Hz            | < 320 µs                 | < 320 µs   | -           |
| Response time drop-out |                          |            |             |
| RP1A                   | < 10 ms                  | < 10 ms    | < 20 ms     |
| RP1B                   | < 10 ms                  | < 10 ms    | -           |

## Output Specifications

|                                       | RP1....3            | RP1....5            | RP1....6             |
|---------------------------------------|---------------------|---------------------|----------------------|
| Rated operational current             |                     |                     |                      |
| AC 51 @ T <sub>a</sub> = 25°C         | 3 A                 | 5 A                 | 5.5 A                |
| AC 53a @ T <sub>a</sub> = 25°C        | 2 A                 | 3 A                 | 5 A                  |
| Min. operational load current         | 20 mA               | 20 mA               | 20 mA                |
| Rep. overload current t=1 s           | 10 A <sub>p</sub>   | 12 A <sub>p</sub>   | 16 A <sub>p</sub>    |
| Non-rep. surge current t=20 ms        | 65 A <sub>p</sub>   | 80 A <sub>p</sub>   | 300 A <sub>p</sub>   |
| Off-state leakage current             | < 1 mA              | < 1 mA              | < 1 mA               |
| I <sup>2</sup> t for fusing t=10 ms   | 20 A <sup>2</sup> s | 50 A <sup>2</sup> s | 400 A <sup>2</sup> s |
| Critical di/dt @ 50 Hz                | 50 A/µs             | 20 A/µs             | 20 A/µs              |
| Critical dV/dt off state min.         | 250 V/µs            | 500 V/µs            | 500 V/µs             |
| On-state voltage drop @ rated current | < 1.2 Vrms          | < 1.2 Vrms          | < 1.2 Vrms           |

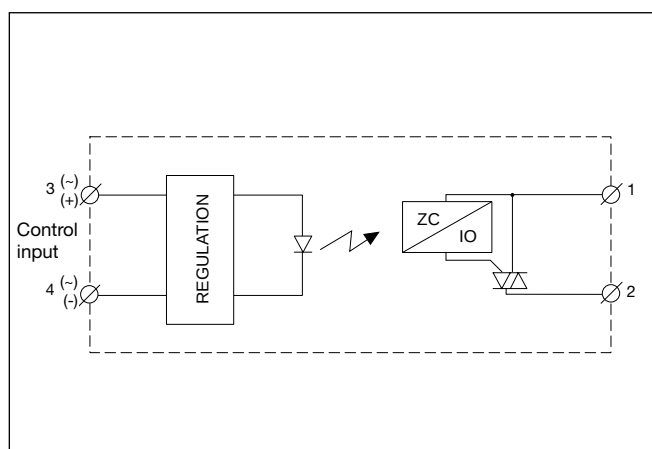
## Thermal Specifications

|                       |                                 |
|-----------------------|---------------------------------|
| Operating temperature | -20° to +70°C (-4° to +158°F)   |
| Storage temperature   | -40° to +100°C (-40° to +212°F) |

## Insulation Input - Output

|                        |                      |
|------------------------|----------------------|
| Insulation resistance  | ≥ 10 <sup>10</sup> Ω |
| Insulation capacitance | ≤ 8 pF               |

## Functional Diagram



## Applications

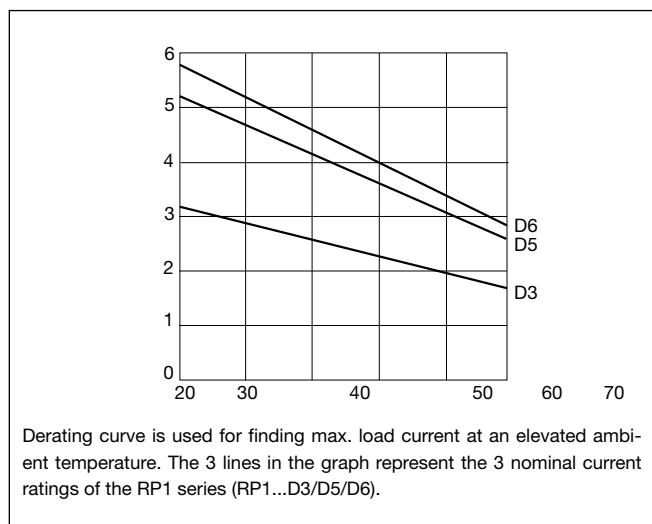
These relays can be used to switch heaters, motors, lights, valves or solenoids.

When used at full load current, the relays must be placed vertically. If more than one relay is mounted, please allow a minimum distance of 20 mm in between for sufficient air cooling.

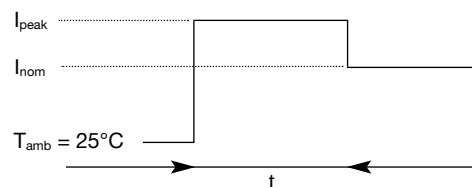
## Housing Specifications

|                  |                                          |
|------------------|------------------------------------------|
| Weight           | Approx. 20 g                             |
| Housing material | PBT, grey                                |
| Terminals        | Copper alloy, tin-plated                 |
| Potting compound | Flame-retardant flexible silicone rubber |

## Derating Curve



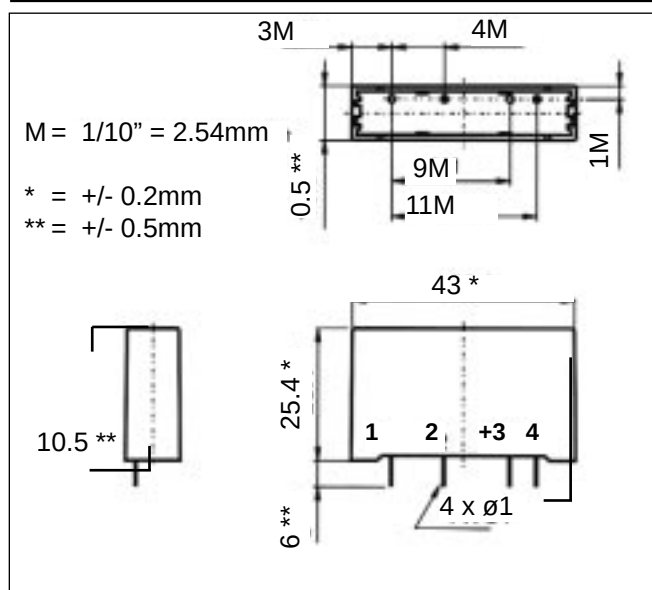
## Increased Current Options



|                  |    |   |    |
|------------------|----|---|----|
| I peak (Amps)    | 6  | 8 | 10 |
| D5 : t (minutes) | 15 | 5 | 3  |
| D6 : t (minutes) | 15 | 5 | 3  |

Note: Even though the D3 can withstand a slight increase in current for a limited time, it is not recommended for this purpose.

## Dimensions



## Accessories



M1 DIN-rail adaptor (photo)

Varistors

Fuses

For further information refer to "General Accessories".