

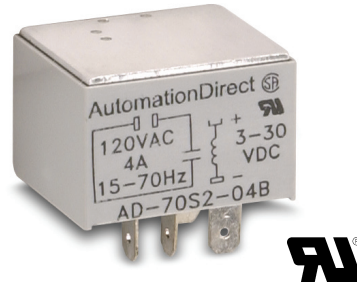
# AD Series Solid State Relays



**AD-SSR210-22-DCZ**

## Overview

A solid state relay is a relay with an isolated input and output, whose functions are achieved by using electronic components without the use of moving parts (vs. electromechanical relays).



**AD-70S2-04B**

## Operation

Solid state relays (SSR) are similar to electromechanical relays, in that both use a control circuit and a separate circuit for switching the load. When voltage is applied to the input of the SSR, the relay is energized by a light-emitting diode. The light from the diode is beamed into a light sensitive semiconductor which, in the case of zero voltage crossover relays, signals the control circuit to turn on the output of the solid state switch at the next zero voltage crossover.

## Features

Solid state relays have features which electromechanical relays do not, such as:

- Long life
- Shock and vibration resistant
- No generation of RFI, EMI
- No contact bounce
- Arcless switching
- No acoustic noise
- Zero crossing or random switching types
- IC compatibility
- Immunity to humidity, salt spray and dirt
- UL # E222847
- CSA # 2742910

## AD-SSR

- AC & DC input
- AC output
- 10 or 25 amp loads
- Photo isolated zero voltage switching
- 4000 Vrms isolation input to output
- Internal RC (snubber) network
- RFI suppression
- Integral safety cover and heatsink
- DIN-rail mounting or panel-mount

## AD-70S2

- DC input
- AC output
- Up to 4 amp loads
- Optically isolated
- Quick connect terminal, or panel mount when inserted into DIN-rail mountable socket

# AD Series Solid State Relay Selection Guide

| Solid State Relays                      |         |                            |                                                                                                                                                                            |                  |                 |          |
|-----------------------------------------|---------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|----------|
| Part Number                             | Price   | Drawing Links              | Description                                                                                                                                                                | Switching Type   | Derating Charts |          |
| <a href="#"><u>AD-SSR210-22-ACZ</u></a> | \$46.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 90-280 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open. | Zero Cross       | Figure 1        |          |
| <a href="#"><u>AD-SSR210-22-DCZ</u></a> | Retired | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 4-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR230-22-ACZ</u></a> | Retired | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 90-280 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open. |                  |                 |          |
| <a href="#"><u>AD-SSR230-22-DCZ</u></a> | \$69.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 4-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR610-22-ACZ</u></a> | Retired | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 90-280 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open. |                  |                 |          |
| <a href="#"><u>AD-SSR610-22-DCZ</u></a> | Retired | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 4-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR630-22-ACZ</u></a> | \$69.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 90-280 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open. |                  |                 |          |
| <a href="#"><u>AD-SSR630-22-DCZ</u></a> | \$62.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 4-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR210-22-ACR</u></a> | \$46.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 90-280 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open. | Random Switching |                 | Figure 1 |
| <a href="#"><u>AD-SSR210-22-DCR</u></a> | Retired | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 4-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR230-22-ACR</u></a> | \$52.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 90-280 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open. |                  |                 |          |
| <a href="#"><u>AD-SSR230-22-DCR</u></a> | Retired | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 4-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR610-22-ACR</u></a> | \$46.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 90-280 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open. |                  |                 |          |
| <a href="#"><u>AD-SSR610-22-DCR</u></a> | \$46.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 4-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR630-22-ACR</u></a> | \$57.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 90-280 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open. |                  |                 |          |
| <a href="#"><u>AD-SSR630-22-DCR</u></a> | \$57.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 4-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR245-45-ACZ</u></a> | \$87.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 45A contact rating. Coil voltage 90-140 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open. | Zero Cross       | Figure 2        |          |
| <a href="#"><u>AD-SSR245-45-DCZ</u></a> | \$86.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 45A contact rating. Coil voltage 3-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR645-45-ACZ</u></a> | \$88.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 45A contact rating. Coil voltage 90-140 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open. |                  |                 |          |
| <a href="#"><u>AD-SSR645-45-DCZ</u></a> | \$88.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 45A contact rating. Coil voltage 3-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-SSR665-45-ACZ</u></a> | \$77.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 65A contact rating. Coil voltage 90-140 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open. |                  |                 |          |
| <a href="#"><u>AD-SSR665-45-DCZ</u></a> | \$77.00 | <a href="#"><u>PDF</u></a> | Solid state DIN-rail mount relay with 65A contact rating. Coil voltage 3-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.   |                  |                 |          |
| <a href="#"><u>AD-70S2-04B*</u></a>     | \$23.50 | NA                         | Solid state plug-in relay with 4A contact rating. Coil voltage is 3-30 VDC. Load voltage is 24-140 VAC. SPST normally open.                                                |                  |                 |          |
| <a href="#"><u>AD-70S2-04C*</u></a>     | Retired | NA                         | Solid state plug-in relay with 4A contact rating. Coil voltage is 3-30 VDC. Load voltage is 24-280 VAC. SPST normally open.                                                |                  |                 |          |
| <a href="#"><u>AD-70S2-04D*</u></a>     | \$23.50 | NA                         | Solid state plug-in relay with 4A contact rating. Coil voltage is 3-30 VDC. Load voltage is 8-50 VAC. SPST normally open.                                                  |                  |                 |          |

\*NOTE: See 78 Series Relays Socket dimensions.

# AD Series Solid State Relay Specifications

| Specifications                                  |                                                                             |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
|-------------------------------------------------|-----------------------------------------------------------------------------|------------------|------------------|------------------|------------------------|------------------|------------------|------------------|---------------------------------------------------------|------------------|------------------|------------------|------------------------|------------------|------------------|------------------|---------------------------------------------------------|------------------|------------------------|------------------|------------------|------------------|-----|--|
| Part Number                                     | AD-SSR245-45-DCZ                                                            | AD-SSR210-22-DCZ | AD-SSR230-22-DCZ | AD-SSR210-22-DCR | AD-SSR230-22-DCR       | AD-SSR610-22-DCZ | AD-SSR630-22-DCZ | AD-SSR645-45-DCZ | AD-SSR665-45-DCZ                                        | AD-SSR610-22-DCR | AD-SSR630-22-DCR | AD-SSR210-22-ACZ | AD-SSR230-22-ACZ       | AD-SSR210-22-ACR | AD-SSR230-22-ACR | AD-SSR610-22-ACZ | AD-SSR630-22-ACZ                                        | AD-SSR645-45-ACZ | AD-SSR610-22-ACR       | AD-SSR630-22-ACR | AD-SSR245-45-ACZ | AD-SSR665-45-ACZ |     |  |
| Input Characteristics                           |                                                                             |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Control Voltage Range                           | 3-32 VDC                                                                    | 4-32 VDC         |                  |                  |                        |                  |                  | 90-280 VAC       |                                                         |                  |                  | 90-140 VAC       | 90-280 VAC             |                  | 90-140 VAC       |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Typical Input Current                           | 8-12 mA                                                                     |                  |                  |                  |                        |                  | 2-4 mA           |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Max. Turn-On Voltage                            | 4VDC                                                                        |                  |                  |                  |                        |                  | 90 Vrms          |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Min. Turn-Off Voltage                           | 1VDC                                                                        |                  |                  |                  |                        |                  | 10 Vrms          |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Output Characteristics                          |                                                                             |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Output Type                                     | SCR                                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Switching Type                                  | Zero Cross                                                                  |                  | Random Switching | Zero Cross       |                        | Random Switching | Zero Cross       | Random Switching | Zero Cross                                              |                  | Random Switching | Zero Cross       |                        | Random Switching | Zero Cross       |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Output Voltage                                  | 24-280 VAC                                                                  |                  |                  |                  | 48-660 VAC             |                  |                  |                  | 24-280 VAC                                              |                  |                  |                  | 48-660 VAC             |                  |                  |                  | 24-280 VAC                                              |                  | 48-660 VAC             |                  |                  |                  |     |  |
| Load Current Range                              | 10-45A                                                                      |                  |                  |                  | 65A                    | 10-45A           |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  | 65A |  |
| Transient Over-Voltage                          | 600Vpk                                                                      |                  |                  |                  | 1200Vpk                |                  |                  |                  | 600Vpk                                                  |                  |                  |                  | 1200Vpk                |                  |                  |                  | 600Vpk                                                  |                  | 1200Vpk                |                  |                  |                  |     |  |
| Max. Surge Current                              | 10A: 120Apk;<br>30/45A: 625Apk;<br>(at 16.6 ms)                             |                  |                  |                  | 625Apk<br>(at 16.6 ms) |                  |                  |                  | 10A: 120Apk;<br>30/45A: 625Apk;<br>(at 16.6 ms)         |                  |                  |                  | 625Apk<br>(at 16.6 ms) |                  |                  |                  | 10A:<br>120Apk;<br>30/45A:<br>625Apk;<br>(at 16.6 ms)   |                  | 625Apk<br>(at 16.6 ms) |                  |                  |                  |     |  |
| Max. On-State Voltage Drop at Rated Current     | 1.6 Vpk                                                                     |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Max. I²T for Fusing (8.3 ms)                    | 10A: 60 A2sec;<br>20A: 260 A2sec;<br>30/45A: 1620 A2sec                     |                  |                  |                  | 1620 A2sec             |                  |                  |                  | 10A: 60 A2sec;<br>20A: 260 A2sec;<br>30/45A: 1620 A2sec |                  |                  |                  | 1620 A2sec             |                  |                  |                  | 10A: 60 A2sec;<br>20A: 260 A2sec;<br>30/45A: 1620 A2sec |                  | 1620 A2sec             |                  |                  |                  |     |  |
| Max. Off-State Leakage Current at Rated Current | 10mA                                                                        |                  |                  |                  | 1mA                    |                  |                  |                  | 10mA                                                    |                  |                  |                  | 1mA                    |                  |                  |                  | 10mA                                                    |                  | 1mA                    |                  |                  |                  |     |  |
| Max. Rate of Rise Off State Voltage (dv/dt)     | 500 V/us                                                                    |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Max Response Time (On and Off)                  | 1/2 cycle                                                                   |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| General Characteristics                         |                                                                             |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Electrical Life                                 | N/A for solid state relays                                                  |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Operating Temperature Range                     | -40 to 80°C [-40 to 176°F] - derating applies                               |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Storage Temperature Range                       | -40 to 125°C [-40 to 257°F]                                                 |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Frequency                                       | Input: no frequency limitation / output: snubber 48-63 Hz                   |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Weight                                          | 10/20/30 A: 272g [9.6 oz]; 45A: 482g [17oz]                                 |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Input Indication                                | Green LED                                                                   |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Encapsulation                                   | Thermally conductive epoxy                                                  |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Input Terminal Screw Torque                     | 10/20/30 A: 5.0-6.0 in-lb [0.6-0.7 N·m]; 45A: 5.0-6.0 in-lb [0.6-0.7 N·m]   |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Output Terminal Screw Torque                    | 10/20/30 A: 5.0-6.0 in-lb [0.6-0.7 N·m]; 45A: 10.0-15.0 in-lb [1.1-1.7 N·m] |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Mount Type                                      | 35mm DIN rail and panel mount                                               |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Max. Wire Size                                  | 8AWG                                                                        |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |
| Agency Approvals *                              | E222847 UL Recognized, CE, CSA 2742910                                      |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                  |                  |                        |                  |                  |                  |                                                         |                  |                        |                  |                  |                  |     |  |

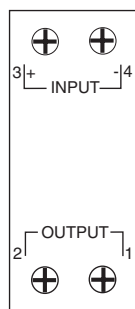
\* To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.

# AD Series Solid State Relay Specifications

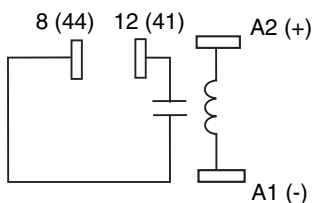
| Specifications                                 |                                  |              |             |
|------------------------------------------------|----------------------------------|--------------|-------------|
| Part Number                                    | AD-70S2-04B                      | AD-70S2-04C  | AD-70S2-04D |
| Input Characteristics                          |                                  |              |             |
| Input Voltage Range                            | 3 - 30 VDC                       |              |             |
| Must Release Voltage                           | 5VDC                             |              |             |
| Typical Input Current                          | 1 - 17 mA                        | 1 - 6 mA     | 1 - 17 mA   |
| Maximum Reverse Control Voltage                | 5VDC                             |              |             |
| Output Characteristics                         |                                  |              |             |
| Contact Rating                                 | 4A                               |              |             |
| Contact Configuration                          | SPST-N.O.                        |              |             |
| Output Voltage Range                           | 24 - 140 VAC                     | 24 - 280 VAC | 8 - 50 VAC  |
| Switching Type                                 | Zero Cross                       |              |             |
| Switching Device                               | Triac                            |              |             |
| Maximum Rate of Rise Off State Voltage (dv/dt) | 300 V/us                         |              |             |
| Min. Load Current to Maintain On               | 75mA                             |              |             |
| Non-Repetitive Surge Current (1 cycle)         | 60A                              |              |             |
| Max. Off Sate Leakage Current (rms)            | 6mA                              | 6mA          | 10mA        |
| Minimum Peak Blocking Voltage                  | 400VAC                           | 600VAC       | 200VAC      |
| Typical On State Voltage Drop (rms)            | 1.6 VAC                          |              |             |
| General Characteristics                        |                                  |              |             |
| Mounting Type                                  | Socket Mount                     |              |             |
| Thermal Resistance (Junction to Case)          | 4 °C/W                           |              |             |
| Dielectric Strength, Terminals to Chassis      | 3000 VAC                         |              |             |
| Ambient Air Temperature - Storage              | -40 to +125 °C                   |              |             |
| Ambient Air Temperature - Operation            | -40 to +100 °C                   |              |             |
| Agency Approvals                               | UL (E258297), CSA (040787), RoHs |              |             |

## Wiring Diagrams

**Figure 1**  
AD-SSRxxx-xx wiring diagram



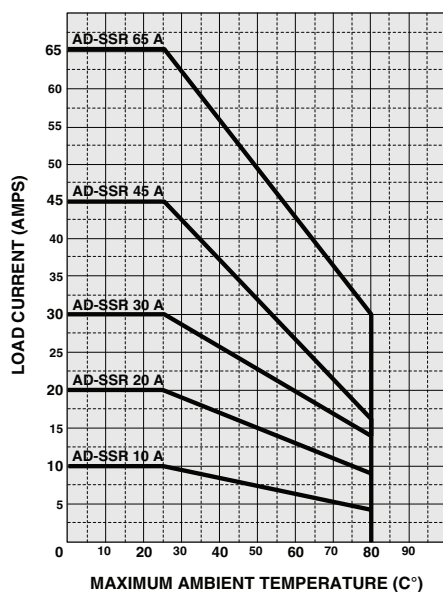
**Figure 2**  
AD-70S2-xx wiring diagram



# SSR Series Derating Charts

## Derating Charts

AD-SSR Series derating chart



AD-70S2 Series derating charts

Maximum Continuous Current  
vs. Ambient Temperature

