AZSR190

90/100 AMP POWER RELAY

FEATURES

- Up to 100 Amp switching capability
- Wide contact gap of ≥ 3.6 mm
- Clearance and creepage of ≥ 10 mm
- 5 kV dielectric strength, 10 kV surge withstand voltage
- UL Class F insulation (155°C)
- UL E365652
- TÜV B0887930008
- CQC 17002178200

CONTACTS

Arrangement	SPST-N.O. (1 Form A)
Ratings (max.) standard version switched power switched current high current version switched power switched current switched voltage	(resistive load) 44000 VA 90 A 69000VA 100 A 800 VAC
Approved ratings high current version high current version	**UL/CUR** 55A at 480 VAC, resistive, 85°C, 30k cycles [1] 55A at 690 VAC, resistive, 85°C, 20k cycles [1] 55A at 800 VAC, resistive, 85°C, 1k cycles [1][2] 55A at 690 VAC, resistive, 85°C, 30k cycles [2] 80A at 277 VAC, resistive, 85°C, 10k cycles [2] 100A at 480 VAC, resistive, 85°C, 1k cycles [1] 100A at 690 VAC, resistive, 85°C, 1k cycles [2] **TUV/CQC** 30A at 480 VAC, resistive, 85°C, 50k cycles [1] 55A at 480 VAC, resistive, 85°C, 30k cycles [1] 55A at 690 VAC, resistive, 85°C, 20k cycles [1] 55A at 690 VAC, resistive, 85°C, 30k cycles [2] 55A at 800 VAC, resistive, 85°C, 1k cycles [1][2] 80A at 277 VAC, resistive, 85°C, 10k cycles [2] 90A at 480 VAC, resistive, 85°C, 1k cycles [1] 100A at 480 VAC, resistive, 85°C, 1k cycles [1] 100A at 690 VAC, resistive, 85°C, 1k cycles [2]
Contact material	AgNi - silver nickel [1] $AgSnO_2$ - silver tin oxide [2]
Contact gap	≥ 3.6 mm
Initial contact resistance	≤ 100 mΩ (at 6V, 1A, voltage drop method) < 3 mΩ (typical) ≤ 10 mΩ (at 10A, voltage drop method)

COIL

Nominal coil DC voltages	6, 9, 12, 24,
Dropout voltage	≥ 5% of nominal coil voltage
Holding voltage	≥ 40% of nominal coil voltage
Coil power nominal holding power at pickup voltage	(at 23 °C) 1.9 W 310mW 1.1 W
Temperature Rise	70 K at nom. coil voltage, 85°C
Max. temperature	Class F insulation - 155°C (311°F)

GENERAL DATA

Life Expectancy mechanical electrical	(minimum operations) 1 x 10^6 see approved ratings
Operate Time	40 ms (max.) at nominal coil voltage
Release Time	10 ms (max.) at nominal coil voltage, without coil suppression
Dielectric Strength coil to load contacts open load contacts	(at sea level for 1 min.) 5000 V_{RMS} 2500 V_{RMS}
Surge Voltage coil to contacts	10kV (at 1.2 x 50µs)
Insulation Resistance	1000 MΩ (min.) at 23°C, 500 VDC, 50% RH
Creepage coil to contact	≥ 10.0 mm
Clearance coil to contact	≥ 10.0 mm
Temperature Range operating	(at nominal coil voltage) -40°C (-40°F) to 85°C (185°F)
Vibration resistance	0.062" (1.5 mm) DA at 10–55 Hz
Shock	10 g
Enclosure protection category material group flammability	PBT(Case) and PA46(Base) RT II, flux proof IIIa UL94 V-0
Terminals	Tinned copper alloy, P. C.
Soldering max. temperature max. time	 270 °C (518°F) 5 seconds
Dimensions length width height standard version low profile version	 38.0 mm (1.50") 33.0 mm (1.30") 43.0 mm (1.69") 41.5 mm (1.63")
Weight	85 grams (approx.)
Compliance	UL 508, IEC 61810-1, RoHS, REACH
Packing unit in pcs	10per plastic tube / 150 per carton box

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COIL VOLTAGE SPECIFICATIONS

Nominal Coil VDC	Must Operate VDC	Min. Holding VDC	Max. Cont. VDC	Resistance Ohm ± 10%
6	4.5	2.4	6.6	18.8
9	6.75	3.6	9.9	42.2
12	9	4.8	13.2	75
24	18	9.6	26.4	300

Note: All values at 23°C (73°F), upright position, terminals downward.

ORDERING DATA

AZSR190□-1A□-□□D□

Height
nil: standard height (43.0mm)
L: low profile (41.5mm)

Nominal coil voltage
See coil voltage specifications table

Contact material
nil: silver nickel
E: silver tin oxide

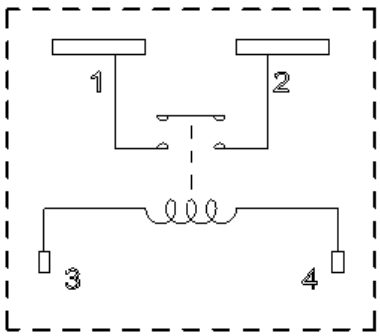
Switching capacity
nil: standard version
T: high current version

Example ordering data

AZSR190-1A-12DL	Standard version, contact material: silver nickel, 12 VDC nominal coil voltage, low profile
AZSR190T-1A-12D	High current version, contact material: silver nickel, 12 VDC nominal coil voltage, standard height
AZSR190-1AE-9DL	Standard version, contact material: silver tin oxide, 9 VDC nominal coil voltage, low profile

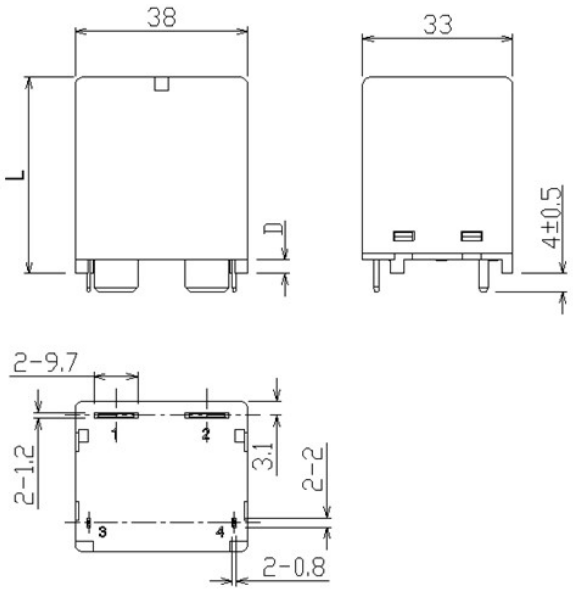
WIRING DIAGRAMS

Viewed towards terminals.
Note: Provide sufficient PCB cross section on load terminals. Recommended cross section according to IEC 61810-1 at 90A is 35 mm²



MECHANICAL DATA

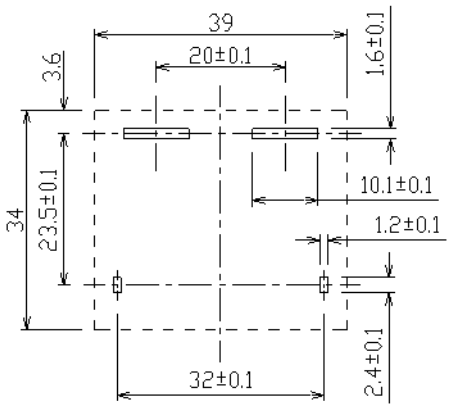
Dimensions in mm. Tolerance: ±0.5mm



Version	L	D
Standard	43.0	3.0
Low profile	41.5	1.5

PC BOARD LAYOUT

Dimensions in mm. Tolerance: ±0.1mm unless otherwise stated
Viewed towards terminals.



NOTES

General

1. All values in this datasheet are at reference temperature of 23°C (73°F) unless stated otherwise.
2. Evaluate the component's performance and operating conditions under the worst-case conditions of the actual application.
3. The datasheet and the component's specifications are subject to change without notice.

Storage, handling, and environmental guidelines

4. Relays are electromechanical components that are sensitive to shock. The relay's adjustment can be affected if the relay is subjected to excessive shock or excessive pressure is applied to the relay case. Relays which have been dropped must no longer be used.
5. Substances containing silicone or phosphorus must be avoided in the vicinity to the relay. Outgassing from these substances can penetrate the relay and adhere on the contacts. Deposits of these substances may act as insulators and adversely affect the contact resistance. Silicone can be found e.g. in gaskets, lubricants or filling materials, phosphorus can be found e.g. as a flame retardant in plastics.
6. Protect relays from atmospheres containing corrosive gases, liquids, or solids such as water vapor, H2S, SO2, NO2, Cl, P, dust, and other harmful substances and elements. Corrosion of internal structures and contacts leads to malfunction and shortens the component's service life.
7. Prevent non-sealed relays and relays with opened vent hole from atmospheres subject to dust. Dust particles may enter the case and get stuck between the contacts, causing the contact circuits to fail. Do not use these relays in environments with explosive or flammable gases. Electrical arcing at the contacts could ignite these gases and cause fire.
8. For automated dual wave soldering process we recommend preheating with 120°C (248°F) for max. 120 seconds and a soldering temperature of 260 ±5°C (500 ±9°F) for max. 10 seconds soldering time (max. 5 seconds per wave). For manual soldering we recommend 350°C (662°F) max. temperature for max. 5 seconds. During the soldering process, no force may be exerted on the relay terminals.
9. Non-sealed relays must not be washed, immersion cleaned or conformal coated as substances may enter the case and cause corrosion or seizure of mechanical parts.
10. Avoid high frequency or ultrasonic vibrations on the relays as these can cause contact welding and misalignment or destruction of internal structures.
11. During operation, storage and transport, ambient temperature should be within the specified operating temperature range. Humidity should be in the range of 5% to 85% RH. Icing and condensation must be avoided. Relays stored for an extended period of time may show initially increased contact resistance values due to chemical effects such as oxidation.
12. With sealed versions of this relay type, the vent hole must be cut open after washing or conformal coating to achieve the specified performance and service life. Care must be taken to ensure no particles get into the relay as a result of the cutting process.

Design guidelines

13. The relay may pull in and operate with less than the specified *must operate* voltage value.
14. The coil's *must operate* and *min. holding* voltages, the coil's *ohmic resistance* and the relay's *operate time* depend on the temperature of the coil. The specified values are given for a coil temperature of 23°C and increase by approx. 0.39% per Kelvin of temperature rise. This circumstance must be considered, especially during operation with high load currents and elevated ambient temperature.
15. Coil suppression circuits such as diodes, etc. in parallel to the coil will lengthen the release time. We recommend using suppression circuits with a breakdown voltage of approx. 2 times the nominal coil voltage in order to achieve a quick release time.
16. For short-circuit performance according IEC62955, IEC61008-1 or IEC62752(if datasheet has this parameter), coil suppression circuits with a breakdown voltage of ≥ 2 times the nominal coil voltage must be used. Using rectifier diodes or similar in parallel to the coil is not appropriate.
17. When using PWM coil control, use a fast-switching recirculation diode in parallel with the coil to keep the coil current during pulse pauses. To achieve the IEC62955, IEC61008-1 or IEC 62752(if datasheet has this parameter) required short-circuit performance, when de-energizing the coil, the recirculation diode must be eliminated from the circuit to get a fast decay of coil current and a short release time. As PWM frequency we recommend ≥ 15 kHz in order to avoid audible noise from magnetostriction. To reduce EMI effects, we recommend to apply the PWM to the coil's inner layer terminal and have the outer layer terminal connected to ground or the supply rail.
18. Contact resistance is a function of load current, dwell time and wear level of the contacts. Immediately after closing the contacts, or if tested with low current only, the contact resistance will show a relatively high value. A low level steady state contact resistance is reached at higher current after a certain time in thermal equilibrium.
19. The relay dissipates heat form power losses through its load terminals. Provide sufficient cross section and area of the PCB traces so that they can act as heat spreader.
20. For PCBs with multiple relays, do not place the components directly next to each other. We suggest providing a mounting distance of minimum 10 mm to allow for better cooling.
21. A minimum load of 10 mA / 5 V / 50 mW is recommended for the gold plated monitor contact (if it has) to ensure a reliable and stable electrical connection.
22. As with any contact mechanism, the relay's NC monitor contact (if it has) bounces when switching. For evaluation of its signal, suitable debouncing measures must be taken to get a reliable signal.
23. At elevated ambient temperatures, after applying the rated nominal coil voltage for ≥ 10 times of operate time, the coil energization must be reduced to a holding level in order to reduce thermal stress and prevent the coil from overheating.

DISCLAIMER

This product specification is to be used in conjunction with the application notes which can be downloaded from the regional ZETTLER relay websites. The specification provides an overview of the most significant part features. Any individual applications and operating conditions are not taken into consideration. It is recommended to test the product under application conditions. Responsibility for the application remains with the customer. Proper operation and service life cannot be guaranteed if the part is operated outside the specified limits.

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