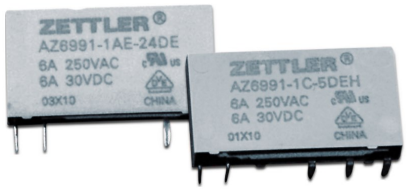
AZ6991

SMALL WIDTH SUBMINIATURE RELAY

FEATURES

- 8 A switching capability
- Small footprint, extremely small width of only 5 mm
- High coil sensitivity with only 95 mW pickup power
- Dielectric strength of 4000 V_{RMS} between coil and contacts
- Isolation spacing greater than 8 mm
- Horizontal and vertical versions available
- Epoxy sealed version available
- Reinforced insulation acc. EN 60730-1, EN 60335-1
- VDE and UL / CUR approvals



CONTACTS

Arrangement	SPST-NO (1 Form A), SPDT (1 Form C)
Ratings (max.) switched power switched current switched voltage	(resistive load) 180 W or 2216 VA 8 A 30 VDC or 277 VAC
Approved ratings UL, CUR	**1 Form A** 8 A at 277 VAC, resistive, 85°C, 10k cycles [1][2] 6 A at 277 VAC, resistive, 85°C, 60k cycles [1][2] 6 A at 277 VAC, general use, 85°C, 30k cycles [1] 6 A at 277 VAC, general use, 85°C, 20k cycles [2] B300, R300 pilot duty, 85°C [1][2] C300, R300 pilot duty, 28°C, 30k cycles [1][2] 6 A at 30 VDC, 85°C, 6k cycles [1][2] **1 Form C** 8 A at 277 VAC, res., 85°C, 10k cycles (N.O.) [1][2] 6 A at 277 VAC, res., 85°C, 30k cycles (N.O.) [1][2] 6 A at 277 VAC, res., 85°C, 10k cycles (N.C.) [1][2] 6 A at 277 VAC, gen.use, 85°C, 30k cycles (N.O.) [1] 6 A at 277 VAC, gen.use, 85°C, 20k cycles (N.O.) [2] 6 A at 277 VAC, gen.use, 85°C, 20k cyc. (N.C.) [1][2] C300, R300 pilot duty, 28°C, 30k cycles (N.O.) [1][2] 6 A at 30 VDC, 85°C, 6k cycles [1][2] B300, R300 pilot duty, 85°C [1][2]
VDE	**1 Form A** 6 A at 250 VAC, 85°C, 50k cycles [1][2] 6 A at 30 VDC, 85°C, 60k cycles [1][2] **1 Form C** 6 A at 250 VAC, 85°C, 10k cycles [1][2] 6 A at 30 VDC, 85°C, 60k cycles [1][2] [1] denotes AgNi (silver nickel) contact material [2] denotes $AgSnO_2$ (silver tin oxide) contact material
Contact material	AgNi / AgNi+Au (silver nickel / Au plating) $AgSnO_2$ / $AgSnO_2$+Au (silver tin oxide / Au plating)
Contact resistance	≤ 100 mΩ initial max. < 7 mΩ typ. (at 1 A)

COIL

Nominal coil voltages	5, 6, 9, 12, 18, 24, 48, 60 (DC)
Dropout voltage	≥ 5% of nominal coil voltage
Coil power 5 to 24 VDC coils 48 to 60 VDC coils	(nominal, at 23°C) 170 mW 217 mW
Temperature rise	20 K (typ., at nominal coil voltage)
Insulation system	class F, max. temperature 155°C

GENERAL DATA

Life Expectancy mechanical electrical	(minimum operations) 1 x 10^7 1 x 10^5 at 5 A, 250 VAC
Operate Time	≤ 8 ms at nominal coil voltage
Release Time	≤ 4 ms (nom. coil voltage, w/o suppression)
Dielectric Strength coil to load contact open load contact	(at sea level for 1 min.) 4000 V_{RMS} 1000 V_{RMS}
Surge voltage coil to contact	(1.2/50 µs pulses) 6 kV
Insulation Distances coil to load contact	(clearance / creepage) ≥ 8.0 mm / ≥ 8.0 mm
Insulation Resistance	≥ 1000 MΩ (at 23°C, 500 VDC, 50% RH)
Temperature Range operating	(at nominal coil voltage) -40°C (-40°F) to 85°C (185°F)
Vibration resistance	1 mm DA at 10–55 Hz
Shock	5 g (operating)
Enclosure material protection category material group flammability	 PBT RT II, flux proof / RTIII, wash tight) IIIa UL94 V-0
Terminals	Tinned copper alloy, THT PCB mounting
Soldering preheating soldering	(referring IEC 61760-1 wave soldering) 120°C (248°F) / ≤ 120 s 260 ±5°C (500 ±9°F) / ≤ 2 x 5 s
Cleaning max. solvent temp. max. immersion time	(RT III wash tight types only) 80°C (176°F) 30 seconds
Dimensions and Weight	28.0 mm x 5.0 mm x 15 mm, 5 grams
Compliance	UL 508, IEC 61810-1, RoHS, REACH
Agency Approvals VDE UL/CUR	 40020561 E43203
Packing (pcs.) horizontal version vertical version	 20 per plastic tube 2000 per carton box 100 per plastic tube 2000 per carton box

AZ6991

COIL VOLTAGE SPECIFICATIONS

Voltage [VDC]			Resistance [Ω]	Power (ref.) [mW]
nominal	must operate	max.		nominal
5	3.75	7.5	147 ±10%	170
6	4.5	9.0	212 ±10%	
9	6.75	13.5	476 ±10%	
12	9.0	18.0	848 ±10%	
18	13.5	27.0	1906 ±15%	
24	18.0	36.0	3390 ±15%	
48	36.0	72.0	10600 ±15%	217
60	45.0	90.0	16600 ±15%	

Notes:
1. All values at 23°C, upright position, terminals downward.
2. Voltage max. is the voltage the coil can endure for a short period of time.
3. Preferred coil voltages in bold face numbers.
4. Values for coil power for reference only.

ORDERING DATA

AZ6991-□□□-□□D□□□

Orientation
nil: vertical version
H: horizontal version

Plating option
nil: non plated
A: gold plated contacts

Sealing option
nil: RTII - flux proof - non sealed
E: RTIII - wash tight - sealed

Nominal coil voltage
see coil voltage specifications table

Contact material
nil: silver nickel
E: silver tin oxide

Contact arrangement
1A: 1 Form A (SPST-NO)
1C: 1 Form C (SPDT)

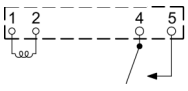
Example ordering data

AZ6991-1A-12D	1 Form A (SPST-NO), silver nickel, 12 VDC nominal coil voltage, flux proof, non gold plated, vertical version
AZ6991-1C-9DEA	1 Form C (SPDT), silver nickel, 9 VDC nominal coil voltage, wash tight, gold plated, vertical version
AZ6963-1AE-24DH	1 Form A (SPST-NO), silver tin oxide, 24 VDC nominal coil voltage, flux proof, non gold plated, horizontal version

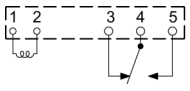
WIRING DIAGRAMS

Viewed towards terminals

Vertical Mount

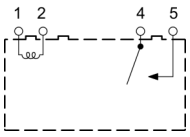


1 Form A

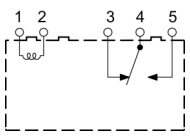


1 Form C

Horizontal Mount



1 Form A



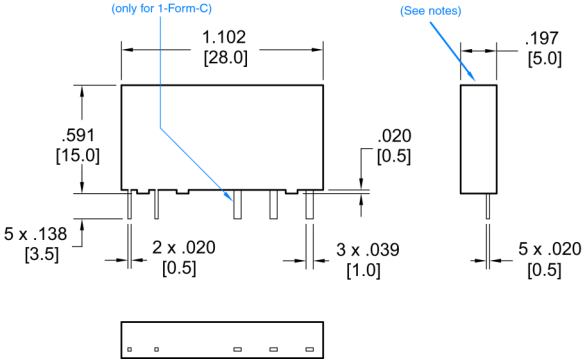
1 Form C

MECHANICAL DATA

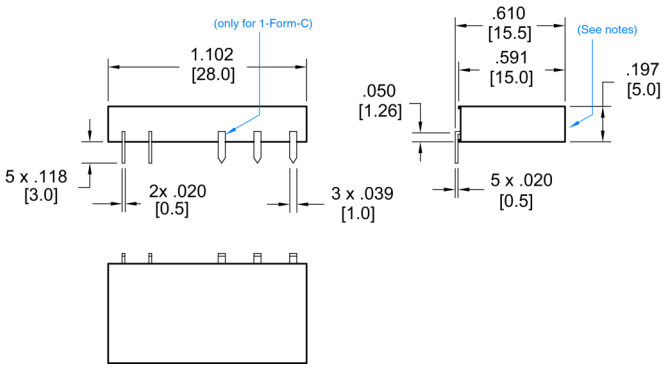
Dimensions in inches with metric equivalents in parentheses. Tolerance: ± .010"

Notes: 1) Pin dimensions for reference only and given without tin coating.
2) Do not mount SPDT (1 Form C) types in a way that the indicated side is facing downwards.

Vertical Mount



Horizontal Mount

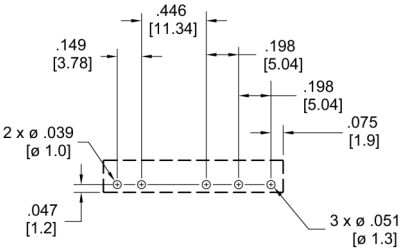


PCB FOOTPRINT

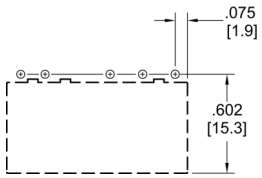
Layout recommendation. Dimensions in inches with metric equivalents in parentheses.
Viewed towards terminals.

Note: Mounting hole diameters and center to center dimensions are the same for vertical and horizontal mounting versions.

Vertical Mount



Horizontal Mount



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. Prevent relays from atmospheres containing corrosive gases. 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.
8. Do not use these relays in environments with explosive or flammable gases. Electrical arcing at the contacts could ignite these gases and cause fire.
9. 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.
10. 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.
11. Avoid high frequency or ultrasonic vibrations on the relays as these can cause contact welding and misalignment or destruction of internal structures.
12. 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.

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* voltage, 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. 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.

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.

ZETTLER GROUP

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