AZ7709

SPST MINIATURE POWER RELAY

FEATURES

- 4 kV dielectric strength
- Proof tracking index (PTI/CTI) 250
- 5 Amp switching capability (version “T” 10 Amp)
- Epoxy sealed version available
- Class F insulation available
- UL, CUR file E365652
- TUV B0887930007
- CQC 14002105344

CONTACTS

Arrangement	SPST-NO. (1 Form A)
Ratings (max.) switched power switched current continuous current switched voltage	(resistive load) 150W or 1250 VA (Version “T”：300W or 2500VA） 5 A (Version “T”： 10A） 5 A (Version “T”： 10A） 30VDC* or 250VAC
Rated Loads **UL/CUR**	Standard Coil 5A at 250VAC, resistive, 100k cycles 85°C 5A at 30VDC, resistive, 100k cycles 85°C 1/6HP at 125/250 VAC, 100k cycles 85°C Sensitive Coil 3A at 250VAC, Res. 100k cycles 85°C 3A at 30VDC, Res. 100k cycles 85°C High capacity version “T” Standard Coil 10A at 250VAC, Res. 100k cycles 85°C 10A at 30VDC, Res. 100k cycles 85°C 1/6HP at 125/250 VAC, 100k cycles 85°C TV5 at 120VAC, 25k cycles 25°C Silver tin contacts only Sensitive Coil 8A at 250VAC, 85°C, 100k cycles 8A at 30VDC, Res. 100k cycles 85°C
TÜV/CQC	Standard Coil 5A at 250VAC/ 30VDC, Res., 100k cycles 85°C 10A at 250VAC/ 30VDC, Res., 100k cycles 85°C("T Ver.) Sensitive Coil 3A at 250VAC/ 30VDC, Res. 100k cycles 85°C 8A at 250VAC/ 30VDC, Res., 100k cycles 85°C("T Ver.) (All TUV ratings 105°C Class F only)
Contact material	Silver cadmium oxide, Silver alloy (UL only), Silver tin oxide, gold plating available (UL/TUV only)
Contact resistance	(load contact)
Initial	≤ 100 mΩ
typical	< 3 mΩ

COIL

Nominal coil DC voltages	3,5,6, 9, 12, 18, 24
Dropout voltage	> 5% of nominal coil voltage
Coil power Nominal	(at 20 °C) 0.45 W (standard coil) 0.2W (sensitive coil)
at pickup voltage	220mW (standard coil) 113 mW (sensitive coil)
Temperature Rise	standard 41°C (74°F) at nominal coil voltage, 85℃ sensitive 22°C (40°F) at nominal coil voltage, 85℃
Max. temperature	Max. 105°C (221°F) Standard Max. 155°C (311°F) available

AZ7709

GENERAL DATA

Life Expectancy	(minimum operations)
mechanical	1×10^7
electrical	see UL/CUR/TÜV/CQC ratings
Operate Time	8 ms (max.) at nominal coil voltage
Release Time	4 ms (max.) at nominal coil voltage, （without coil suppression）
Dielectric Strength	(at sea level for 1 min.)
coil to load contacts	4000 V_{RMS}
open load contacts	1000 V_{RMS}
Insulation Resistance	1000 MΩ (min.) at 20°C, 500 VDC, 50% RH
Temperature Range operating	(at nominal coil voltage) -40°C (-40°F) to 85°C (185°F) -40°C (-40°F) to 105°C (221°F) Class F only
Vibration resistance	0.062" (1.5 mm) DA at 10–55 Hz
Shock	10 g
Enclosure	P.B.T. polyester
protection category	RT II, flux proof
material group	IIIa
flammability	UL94 V-0
Terminals	Tinned copper alloy, P. C.
Soldering	
max. temperature	270 °C
max. time	5 s
Dimensions	
length	18.4 mm (0.724")
width	10.2 mm (0.401")
height	15.5 mm (0.610")
Weight	6 grams (approx.)
Compliance	UL 508, IEC 61810-1, RoHS, REACH
Packing unit in pcs	100 per plastic tray / 1000 per carton box

COIL VOLTAGE SPECIFICATIONS

STANDARD COIL

Nominal Coil VDC	Must Operate VDC	Max. Cont. VDC	Resistance Ohm ± 10%
3	2.1	3.9	20
5	3.5	6.5	55
6	4.2	7.8	80
9	6.3	11.7	180
12	8.4	15.6	320
18	12.6	23.4	720
24	16.8	31.2	1280
48	33.6	62.4	5120

SENSITIVE COIL

Nominal Coil VDC	Must Operate VDC	Max. Cont. VDC	Resistance Ohm ± 10%
3	2.25	3.9	45
5	3.75	6.5	125
6	4.5	7.8	180
9	6.75	11.7	400
12	9.0	15.6	720
18	13.5	23.4	1620
24	18.0	31.2	2800

Note: All values at 20°C (73°F), upright position, terminals downward.

ORDERING DATA

AZ7709 - 1A E -12DS E F G (XXX)

I II III IV V VI VII VIII

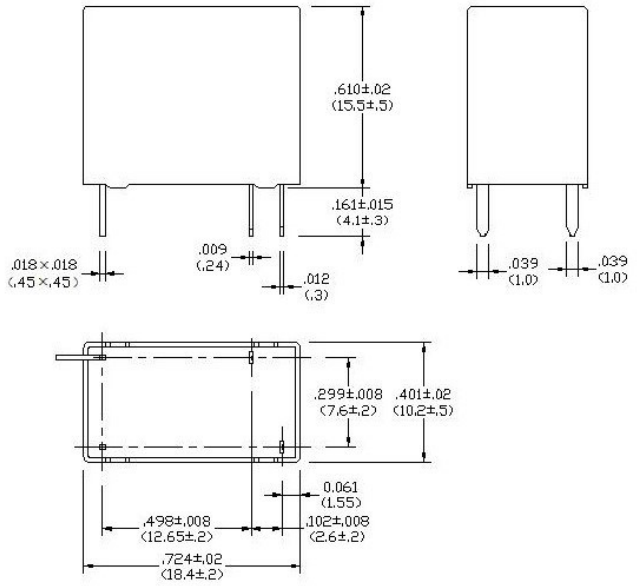
I. Basic Series	AZ7709 : standard contacts AZ7709T : High capacity version
II. Contact Form	1A: 1 form A
III. Contact Material	Blank: Silver cadmium oxide E: Silver tin oxide B: Silver alloy (UL only)
IV. Coil Voltage	D（standard coil）3,5,6, 9, 12, 18,24,48VDC. DS (sensitive coil) 3,5,6,9,12,18,24VDC.
V. Construction	Blank: no epoxy seal E: epoxy seal
VI. Insulation System	Blank: standard version F: Class F 155°C Version
VII. Gold plated contacts	Blank: no gold plated contacts G:gold plated contacts. (UL/TUV only)
VIII. Special code	Additional numbers or letters, which does not Designate construction features or ratings

Example ordering data

AZ7709-1AE-12DF	With
	AZ7709 standard series
	$AgSnO_2$ Contact Material
	12 VDC standard coil
	No epoxy seal
	Class F Insulation System
	No gold plated contacts

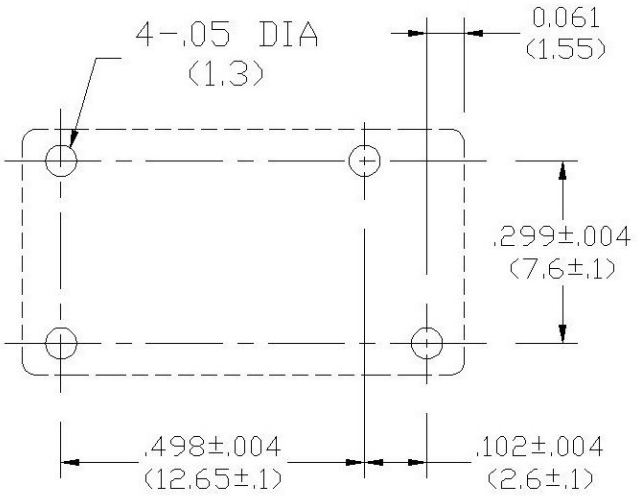
MECHANICAL DATA

Dimensions in mm. Tolerance: ±0.3mm



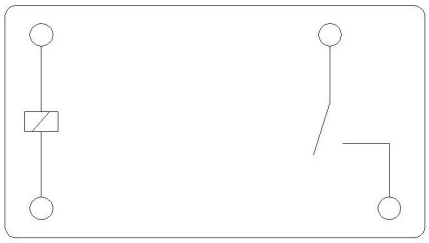
PC BOARD LAYOUT

Viewed towards terminals. Dimensions in mm. Tolerance: ±0.3mm



WIRING DIAGRAMS

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. Prevent relays from atmospheres containing corrosive gases or liquid or solid. Corrosion of structures and contacts leads to malfunction and shortens the component's service life.
7. Prevent non-sealed relays 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 (RTII) 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* 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. At elevated ambient temperatures, after applying the rated nominal coil voltage for ≥ 200 milliseconds, the coil energization must be reduced to a suitable holding level in order to reduce thermal stress and to prevent the coil from overheating.
16. 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.
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 a quick release time when de-energizing the coil, the recirculation diode must be eliminated from the circuit to get a fast decay of coil current. As PWM frequency we recommend ≥ 15 kHz in order to avoid audible noise from magnetostriction. To reduce negative EMI effects, we recommend to apply the PWM to the coil's inner/center 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 NC signal contact to ensure a reliable and stable electrical connection.
22. As with any contact mechanism, the relay's NC signal contact bounces when switching. For evaluation of its signal, suitable debouncing measures must be taken to get a reliable signal.

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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