Panasonic
ideas for life

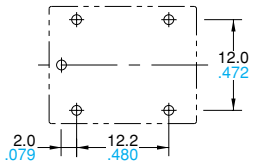
10A COMPACT CUBE TYPE POWER RELAY

LS RELAYS (ALS)



FEATURES

1. Universal terminal footprint
Same terminal pitch as our JS relay



2. Space-saving and Compact cube type
19.5 (L) × 15.5 (W) × 15.2 (H) mm
.768 (L) × .610 (W) × .598 (H) inch
Comparison with our JS relay:
• PCB mount area: 86%

3. Excellent heat resistance and tracking performance
• 85°C 185°F ambient operating temperature (UL Class B)
• Compatibility available for UL Class F
• Uses PTI250 material
• EN60335 GWT compliant

4. Supports all safety standards
• UL and C-UL certified
• VDE currently under application.

TYPICAL APPLICATIONS

1. Household appliances
Refrigerator, Heater, Washing machine, Dishwasher, Rice cooker, etc.
2. Office automation equipment, Home appliances, etc.
3. Game machines, etc.

RoHS Directive compatibility information
http://www.nais-e.com/

SPECIFICATIONS

Contact

Arrangement		1 Form A, 1 Form C
Initial contact resistance, max. (By voltage drop 6 V DC 1 A)		100 mΩ
Contact material		AgNi/$AgSnO_2$ type
Rating	Nominal switching capacity (resistive load)	10 A 277 V AC (N.O.) 6 A 277 V AC (N.C.)
	Max. switching power (resistive load)	2,770 VA
	Max. switching voltage	277 V AC
	Max. switching current	10 A (AC)
	Min. switching capacity#1	100 mA, 5 V DC
Expected life (min. ope.)	Mechanical (at 180 cpm)	10^7
	Electrical at 20°C 68°F (resistive load)	10 A 250 V AC: 5×10^4 (N.O.) 6 A 250 V AC: 10^5 (N.O.) 6 A 250 V AC: 5×10^4 (N.C.)

Coil

Nominal operating power	360 mW

#1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

Remarks
*1 Detection current: 10mA
*2 Excluding contact bounce time
*3 Half-wave pulse of sine wave: 11ms; detection time: 10μs
*4 Half-wave pulse of sine wave: 6ms
*5 Detection time: 10μs
*6 The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value.
*7 Pick-up and drop-out voltages increase approximately 0.4% for each 1°C 33.8°F where the standard temperature is 20°C 68°F. Therefore, when using the relay where the ambient temperature is high, please take into consideration the rise in pick-up voltage due to ambient temperature and determine a coil nominal voltage that is within the maximum allowable voltage range.

Characteristics

Max. operating speed		20 cpm
Initial insulation resistance		Min. 100 MΩ (at 500 V DC)
Initial breakdown voltage*1	Between open contacts	750 Vrms for 1 min.
	Between contacts and coil	1,500 Vrms for 1 min.
Operate time*2 (at nominal voltage)		Max. 10 ms
Release time(without diode)*2 (at nominal voltage)		Max. 10 ms
Temperature rise (at nominal voltage)		Max. 45°C, resistive, nominal voltage applied to coil. Contact carrying current: 10A, at 85°C 185°F
Shock resistance	Functional*3	Min. 98 m/s² {10 G}
	Destructive*4	Min. 980 m/s² {100 G}
Vibration resistance	Functional*5	10 to 55 Hz at double amplitude of 1.6 mm
	Destructive	10 to 55 Hz at double amplitude of 2 mm
Conditions for operation, transport and storage*6 (Not freezing and condensing at low temperature)	Ambient temp.*7	–40°C to +85°C –40°F to +185°F
	Humidity	5 to 85% R.H.
Unit weight		Approx.10 g .35 oz

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ORDERING INFORMATION

Ex. A LS ☐ ☐ ☐☐ T W

Product name	Contact arrangement and Protective construction	Coil insulation class	Coil nominal voltage (DC)	Packing style
LS	1: 1 Form C, Flux-resistant type 2: 1 Form C, Sealed type 3: 1 Form A, Flux-resistant type 4: 1 Form A, Sealed type	B: Class B insulation F: Class F insulation	05: 5 V 06: 6 V 09: 9 V 12: 12 V 18: 18 V 24: 24 V 48: 48 V	W: Carton packing

Note: UL, C-UL, VDE (under application) approved type is standard.

TYPES

Contact arrangement	Nominal voltage, V DC	Part No.	
		Sealed type	Flux-resistant type
1 Form A	5	ALS4❍05TW	ALS3❍05TW
	6	ALS4❍06TW	ALS3❍06TW
	9	ALS4❍09TW	ALS3❍09TW
	12	ALS4❍12TW	ALS3❍12TW
	18	ALS4❍18TW	ALS3❍18TW
	24	ALS4❍24TW	ALS3❍24TW
	48	ALS4❍48TW	ALS3❍48TW
1 Form C	5	ALS2❍05TW	ALS1❍05TW
	6	ALS2❍06TW	ALS1❍06TW
	9	ALS2❍09TW	ALS1❍09TW
	12	ALS2❍12TW	ALS1❍12TW
	18	ALS2❍18TW	ALS1❍18TW
	24	ALS2❍24TW	ALS1❍24TW
	48	ALS2❍48TW	ALS1❍48TW

Packing quantity: inner 100 pieces, outer 500 pieces

Notes: 1. ❍: Input the following letter. Class B insulation: B, Class F insulation: F
2. Carton packing symbol "W" is not marked on the relay.
3. Please consult with our sales office on a tube packing type.

COIL DATA

Nominal voltage, V DC	Pick-up voltage, V DC (max.) (at 20°C 68°F)	Drop-out voltage, V DC (min.) (at 20°C 68°F)	Nominal operating current, mA (±10%) (at 20°C 68°F)	Coil resistance, Ω (±10%) (at 20°C 68°F)	Nominal operating power, mW (at 20°C 68°F)	Maximum allowable voltage (at 85°C 185°F)
5	3.75	0.5	72	69.4	360	130%V of nominal voltage*1
6	4.5	0.6	60	100	360	
9	6.75	0.9	40	225	360	
12	9	1.2	30	400	360	
18	13.5	1.8	20	900	360	
24	18	2.4	15	1,600	360	
48	36	4.8	7.5	6,400	360	

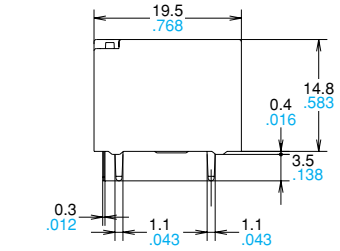
*1 Pick-up and drop-out voltages increase approximately 0.4% for each 1°C 33.8°F where the standard temperature is 20°C 68°F. Therefore, when using the relay where the ambient temperature is high, please take into consideration the rise in pick-up voltage due to ambient temperature and determine a coil nominal voltage that is within the maximum allowable voltage range.

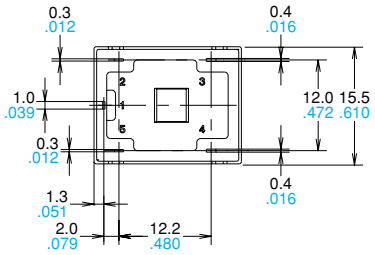
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DIMENSIONS

mm inch

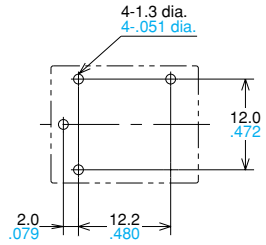




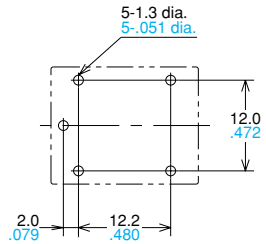


PC board pattern (Bottom view)

1 Form A



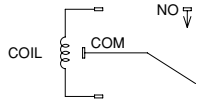
1 Form C



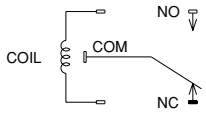
Tolerance: ±0.1 ±.004

Schematic (Bottom view)

1 Form A

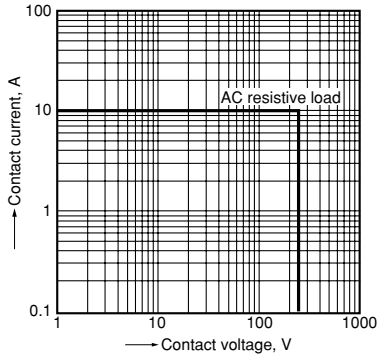


1 Form C



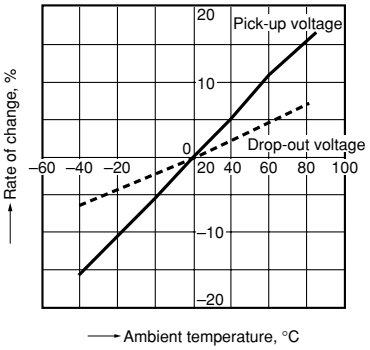
REFERENCE DATA

1. Maximum switching capacity



2. Ambient temperature characteristics

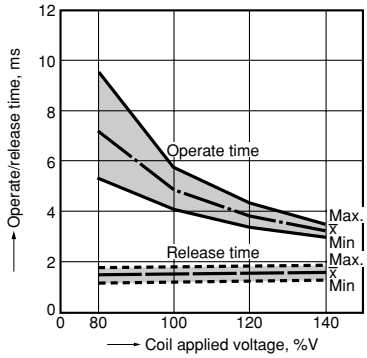
Sample: 6 pcs., ALS2B12TW



* Rate of change: for nominal voltage

3. Operate/release time

Sample: 25 pcs., ALS2B12TW

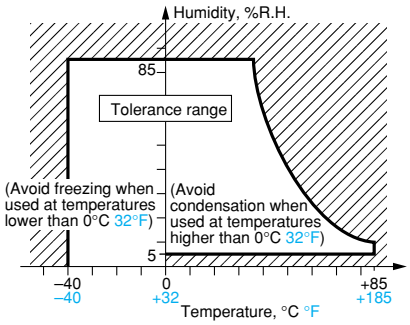


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NOTES

1. Usage, transport and storage conditions

1) Temperature:
–40 to +85°C –40 to +185°F
2) Humidity: 5 to 85% RH
(Avoid freezing and condensation.)
The humidity range varies with the temperature. Use within the range indicated in the graph below.
3) Atmospheric pressure: 86 to 106 kPa
Temperature and humidity range for usage, transport, and storage



4) Condensation
Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.
5) Freezing
Condensation or other moisture may freeze on the relay when the temperatures is lower than 0°C 32°F. This causes problems such as sticking of movable parts or operational time lags.
6) Low temperature, low humidity environments
The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

2. Solder and cleaning conditions

1) Please obey the following conditions when soldering automatically.
(1) Preheating: Within 120°C 248°F (solder surface terminal portion) and within 120 seconds
(2) Soldering iron: 265°C 541°F (solder temperature) and within 6 seconds (soldering time)

3. Precautions for use

1) For precautions regarding use and explanations of technical terminology, please refer to “Relay Technical Data Book”.
2) To ensure good operation, please keep the voltage on the coil ends to ±5% (at 20°C 68°F) of the rated coil operation voltage. Also, please be aware that the pick-up voltage and drop-out voltage may change depending on the temperature and conditions of use.
3) Keep the ripple rate of the nominal coil voltage below 5%.
4) The cycle lifetime is defined under the standard test condition specified in the JIS* C 5442 standard (temperature 15 to 35°C 59 to 95°F, humidity 25 to 75%). Check this with the real device as it is affected by coil driving circuit, load type, activation frequency, activation phase,ambient conditions and other factors.
Also, be especially careful of loads such as those listed below.
(1) When used for AC load-operating and the operating phase is synchronous.
Rocking and fusing can easily occur due to contact shifting.
(2) High-frequency load-operating
When high-frequency opening and closing of the relay is performed with a load that causes arcs at the contacts, nitrogen and oxygen in the air is fused by the arc energy and HNO_3 is formed. This can corrode metal materials.
Three countermeasures for these are listed here.
• Incorporate an arc-extinguishing circuit.
• Lower the operating frequency
• Lower the ambient humidity
5) Heat, smoke, and even a fire may occur if the relay is used in conditions outside of the allowable ranges for the coil ratings, contact ratings, operating cycle lifetime, and other specifications. Therefore, do not use the relay if these ratings are exceeded.
6) If the relay has been dropped, the appearance and characteristics should always be checked before use.
7) Incorrect wiring may cause unexpected events or the generation of heat or flames.

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