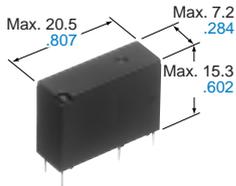


UL File No.: E43028  
CSA File No.: LR26550



mm inch

### FEATURES

- 1. Slim type: Width 7 mm .276 inch.**  
20.3(L) × 7.0(W) × 15.0(H) mm  
.799(L) × .276(W) × .591(H) inch
- 2. Perfect for small load switching of home appliances**  
2 × 10<sup>5</sup> switching operations possible with a 3A 125V AC resistive load.
- 3. Low operating power**  
Compact size, nominal operating power as low as 200mW.

- 4. High shock resistance**  
The relay withstands a functional shock resistance of 300m/s<sup>2</sup> [approx. 30 G more]
- 5. High insulation resistance**
  - Creepage distance and clearances between contact and coil: Min. 6 mm .236 inch (In compliance with IEC65)
  - Surge withstand voltage between contact and coil: 10,000 V or more.

### SPECIFICATIONS

#### Contact

Arrangement		1 Form A	
Initial contact resistance, max. (By voltage drop 6 V DC 1 A)		Max. 100 mΩ	
Contact material		Silver alloy	
Rating (resistive load)	Nominal switching capacity	3 A 125 V AC, 3 A 250 V AC, 3 A 30V DC	
	Max. switching power	831 V A (AC), 90W (DC)	
	Max. switching voltage	277 V AC, 30 V DC	
	Max. switching current	3 A	
Expected life (min. operations)	Mechanical (at 180 cpm)	5 × 10 <sup>6</sup>	
	Electrical (at 20 cpm) (at rated load)	3A 125V AC 3A 30VDC	2 × 10 <sup>5</sup>
		1A 250V AC	10 <sup>5</sup>

#### Coil

Nominal operating power	200 mW
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#### Remarks

- \*1 Measurement at same location as "Initial breakdown voltage" section.
- \*2 Detection current: 10mA
- \*3 Wave is standard shock voltage of ±1.2 × 50μs according to JEC-212-1981
- \*4 Excluding contact bounce time.
- \*5 Half-wave pulse of sine wave: 11 ms; detection time: 10 μs
- \*6 Half-wave pulse of sine wave: 6 ms
- \*7 Detection time: 10 μs
- \*8 Refer to 6. Usage, transport and storage conditions NOTES (Page 3)

#### Characteristics

Max. operating speed		20 cpm (at rated load)
Initial insulation resistance*1		Min. 1,000 MΩ (at 500 V DC)
Initial *2 breakdown voltage	Between open contacts	750 Vrms for 1 min.
	Between contact and coil	4,000 Vrms for 1 min.
Surge voltage between contact and coil*3		Min. 10,000 V (initial)
Operate time*4 (at nominal voltage)		Max. 10ms (at 20°C 68°F)
Release time (with diode)*4 (at nominal voltage)		Max. 10ms (at 20°C 68°F)
Temperature rise (at 70°C)		Max. 45°C with nominal coil voltage and at 3 A contact carrying current
Shock resistance	Functional*5	Min. 300 m/s <sup>2</sup> {approx. 30 G}
	Destructive*6	Min. 1,000 m/s <sup>2</sup> {approx. 100 G}
Vibration resistance	Functional*7	10 to 55Hz at double amplitude of 1.5mm
	Destructive	10 to 55Hz at double amplitude of 1.5mm
Conditions for operation, transport and storage*8 (Not freezing and condensing at low temperature)	Ambient temp.	-40°C to +70°C -40°F to +158°F
	Humidity	5 to 85% R.H.
Unit weight		Approx. 5 g .176 oz

### TYPICAL APPLICATIONS ORDERING INFORMATION

- Air conditioner
- Refrigerator
- Hot water units
- Microwave ovens
- Fan heaters

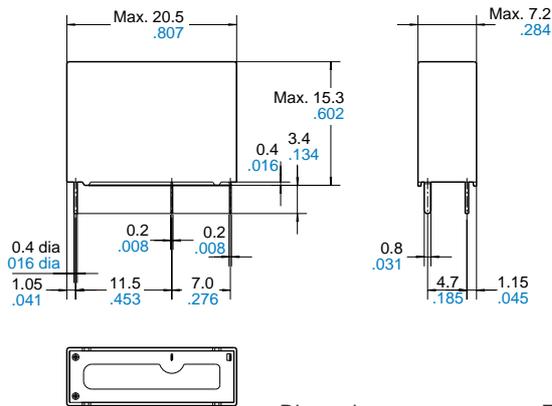
Ex.	A	LD	1	12
Product name	Contact arrangement		Coil voltage(V DC)	
LD	1: 1 Form A		4H: 4.5, 09: 9, 24: 24 05: 5, 12: 12 06: 6, 18: 18	

## TYPES AND COIL DATA (at 20°C 68°F)

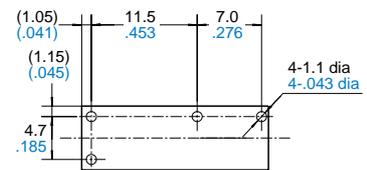
Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Coil resistance, $\Omega$ ( $\pm 10\%$ )	Nominal operating current, mA ( $\pm 10\%$ )	Nominal operating power, mW	Maximum allowable voltage, V DC
ALD14H	4.5	(Initial) 3.38	(Initial) 0.23	101	44.5	200	5.8
ALD105	5	(Initial) 3.75	(Initial) 0.25	125	40.0	200	6.5
ALD106	6	(Initial) 4.5	(Initial) 0.3	180	33.3	200	7.8
ALD109	9	(Initial) 6.75	(Initial) 0.45	405	22.2	200	11.7
ALD112	12	(Initial) 9	(Initial) 0.6	720	16.7	200	15.6
ALD118	18	(Initial) 13.5	(Initial) 0.9	1,620	11.1	200	23.4
ALD124	24	(Initial) 18	(Initial) 1.2	2,880	8.3	200	31.2

## DIMENSIONS

mm inch

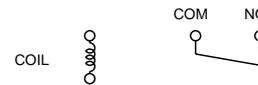


PC board pattern (Bottom view)



Tolerance :  $\pm 0.1 \pm .004$

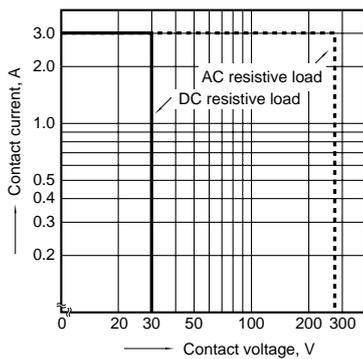
Schematic (Bottom view)



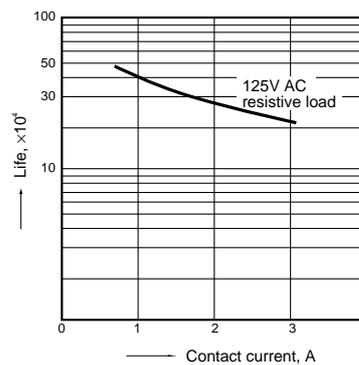
Dimension	Tolerance
Max. 1mm .039 inch:	$\pm 0.1 \pm .004$
1 to 3mm .039 to .118 inch:	$\pm 0.2 \pm .008$
Min. 3mm .118 inch:	$\pm 0.3 \pm .012$

## REFERENCE DATA

### 1. Max. switching power



### 2. Life curve



## NOTES

### 1. Coil operating power

Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%. However, check it with the actual circuit since the characteristics may be slightly different.

### 2. Voltage applied to coil

To ensure reliable operation, the voltage applied to both ends of the coil must be within  $\pm 5\%$  of the rated operating voltage (at 20°C 68°F) of the coil. Be aware that the pick-up voltage and dropout voltage vary depending on the ambient temperature and conditions.

### 3. Cleaning

Avoid using ultrasonic cleaning to clean the relay for it may have adverse effects on the relay characteristics. Use alcohol-based cleaning solutions to clean the relay.

### 4. Operating life

Operating life varies depending on the type and load of the coil drive circuit, as well as factors like the operating frequency, operating phase and ambient atmosphere, so please check with actual equipment.

### 5. Soldering

We recommend the following soldering conditions.

#### 1) Automatic soldering

- \* Preheating: 100°C 212°F, within 2 mins (PC board solder surface)
- \* Soldering: 260°C 500°F, within 5 s

#### 2) Hand soldering

- \* Iron tip temperature: 280 to 300°C 536 to 571°F

- \* Soldering iron: 30 to 60W

- \* Soldering time: Within 5 s

### 6. Usage, transport and storage conditions

1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:

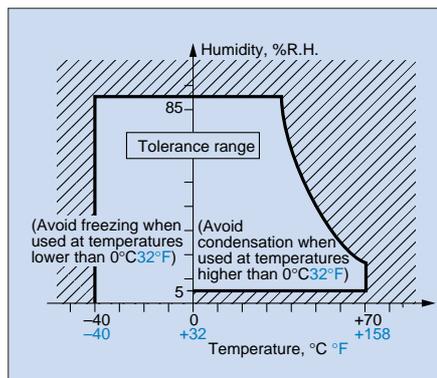
(1) Temperature:

-40 to +70°C -40 to +158°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:

#### 2) 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.

#### 3) 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.

#### 4) 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.

### 7. Others

- 1) If in error the relay has been dropped, the appearance and characteristics should be checked before use without fail.
- 2) Please do not use the coating material of organic system which contains solvents such as xylene and toluene for this product.