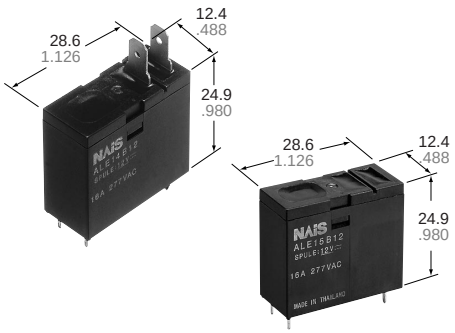
NAiS

16A Power Relay For Micro wave oven

LE RELAYS



mm inch

FEATURES

1. Ideal for magnetron and heater loads

2. Excellent heat resistance

- This satisfies UL coil insulation class B/ class F available

3. High insulation resistance

- Creepage distance and clearances between contact and coil: Min. 8 mm .315 inch
- Surge withstand voltage: Min. 10,000V

4. Low operating power

- Nominal operating power: 400mW/ 200mW (High sensitive type)

5. A wide variety of types

- Product line consists of 4 types with different shapes and pins

6. Conforms to the various safety standards:

- UL/CSA, TÜV, VDE approved and SEMKO available

SPECIFICATIONS

Contact

Arrangement		1 Form A
Initial contact resistance, max. (By voltage drop 6 V DC 1 A)		100 mΩ
Contact material		Silver alloy
Rating (resistive load)	Nominal switching capacity	16 A 277 V AC
	Max. switching power	4,432 V A
	Max. switching voltage	277 V AC
	Max. switching current	16 A
Expected life (min. operations)	Mechanical (at 180 cpm)	2×10^6
	Electrical (at 20 cpm) (Resistive load)	10^5

Coil

Type	Standard	High sensitive
Nominal operating power	400 mW	200 mW

Remarks

∗ Specifications will vary with foreign standards certification ratings.
*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 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 24).

Characteristics

Max. operating speed (at rated load)		20 cpm
Initial insulation resistance*1		Min. 1,000 MΩ (at 500 V DC)
Initial breakdown voltage*2	Between open contacts	1,000 Vrms for 1 min.
	Between contacts and coil	4,000 Vrms for 1 min.
Initial surge voltage between contact and coil*3		Min. 10,000 V
Operate time*4 (at nominal voltage) (at 20°C 68°F)		Max. 20ms
Release time (with diode)*4 (at nominal voltage) (at 20°C 68°F)		Max. 20ms Max. 25ms (200 mW type)
Temperature rise (at nominal voltage) (resistance method, contact current 16 A, 20°C 68°F)		Max. 55°C Max. 45°C (200 mW type)
Shock resistance	Functional*5	Min. 200 m/s²{20 G}
	Destructive*6	Min. 1,000 m/s²{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 +85°C –40°F to +185°F
	Humidity	5 to 85% R.H.
Unit weight		Approx. 17 g .60 oz

TYPICAL APPLICATIONS

- **Microwave ovens**
- **Refrigerators**
- **OA equipment**

ORDERING INFORMATION

Ex. A | LE | 1 | 2 | B | 12

Product name	Contact arrangement	Terminal shape	Coil insulation class	Coil voltage, V DC
LE	1: 1 Form A 7: 1 Form A (200 mW)	2: TMP type/PCB side three terminals (includes one dummy terminal) 3: TMP type/PCB side three terminals 4: TMP type/PCB side four terminals 5: PCB type (No tab terminals)	B: Class B insulation F: Class F insulation	05: 5 18: 18 06: 6 24: 24 09: 9 48: 48 12: 12

UL/CSA, TÜV, VDE approved type is standard.
Note: Standard packing; Carton: 100 pcs. Case 500 pcs.

TYPES

1. Standard type

Contact arrangement	Coil voltage, V DC	TMP type/PCB side three terminals (includes one dummy terminal)	TMP type/PCB side three terminals	TMP type/PCB side four terminals	PCB type (No tab terminals)
		Part No.	Part No.	Part No.	Part No.
1 Form A	5	ALE12❍05	ALE13❍05	ALE14❍05	ALE15❍05
	6	ALE12❍06	ALE13❍06	ALE14❍06	ALE15❍06
	9	ALE12❍09	ALE13❍09	ALE14❍09	ALE15❍09
	12	ALE12❍12	ALE13❍12	ALE14❍12	ALE15❍12
	18	ALE12❍18	ALE13❍18	ALE14❍18	ALE15❍18
	24	ALE12❍24	ALE13❍24	ALE14❍24	ALE15❍24
	48	ALE12❍48	ALE13❍48	ALE14❍48	ALE15❍48

❍: Input the following letter. Class B: B, Class F: F

2. High sensitive type

Contact arrangement	Coil voltage, V DC	TMP type/PCB side three terminals (includes one dummy terminal)	TMP type/PCB side three terminals	TMP type/PCB side four terminals	PCB type (No tab terminals)
		Part No.	Part No.	Part No.	Part No.
1 Form A (High sensitivity: 200mW)	5	ALE72❍05	ALE73❍05	ALE74❍05	ALE75❍05
	6	ALE72❍06	ALE73❍06	ALE74❍06	ALE75❍06
	9	ALE72❍09	ALE73❍09	ALE74❍09	ALE75❍09
	12	ALE72❍12	ALE73❍12	ALE74❍12	ALE75❍12
	18	ALE72❍18	ALE73❍18	ALE74❍18	ALE75❍18
	24	ALE72❍24	ALE73❍24	ALE74❍24	ALE75❍24
	48	ALE72❍48	ALE73❍48	ALE74❍48	ALE75❍48

❍: Input the following letter. Class B: B, Class F: F

COIL DATA (at 20°C 68°F)

1. Standard type

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)	Coil resistance, Ω (±10%) (at 20°C 68°F)	Nominal operating current, mA (±10%) (at 20°C 68°F)	Nominal operating power, mW (at 20°C 68°F)	Maximum allowable voltage, V DC (at 20°C 68°F)
5	3.75	0.25	63	80	400	7.25
6	4.5	0.3	90	66.7		8.7
9	6.75	0.45	203	44.4		13.05
12	9	0.6	360	33.3		17.4
18	13.5	0.9	810	22.2		26.1
24	18	1.2	1,440	16.7		34.8
48	36	2.4	5,760	8.3		69.6

2. High sensitive type

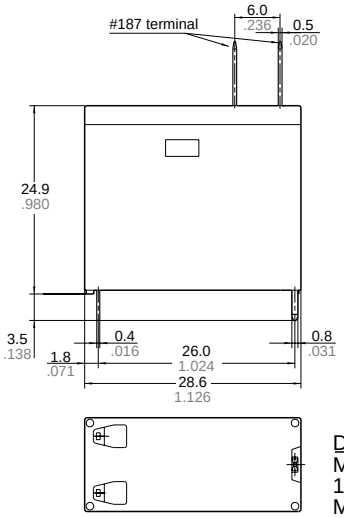
Nominal voltage, V DC	Pick-up voltage, V DC (max.) (at 20°C 68°F)	Drop-out voltage, V DC (min.) (at 20°C 68°F)	Coil resistance, Ω (±10%) (at 20°C 68°F)	Nominal operating current, mA (±10%) (at 20°C 68°F)	Nominal operating power, mW (at 20°C 68°F)	Maximum allowable voltage, V DC (at 20°C 68°F)
5	3.75	0.25	125	40	200	7.25
6	4.5	0.3	180	33.3		8.7
9	6.75	0.45	405	22.2		13.05
12	9	0.6	720	16.7		17.4
18	13.5	0.9	1,620	11.1		26.1
24	18	1.2	2,880	8.3		34.8
48	36	2.4	11,520	4.2		69.6

DIMENSIONS

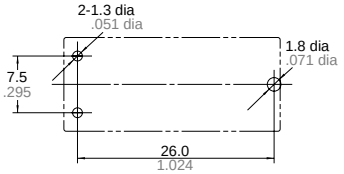
mm inch

1. TMP type

PCB side three terminals
(includes one dummy terminal)

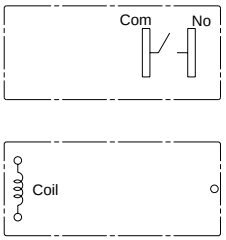


PC board pattern (Bottom view)



Tolerance : ±0.1 ±.004

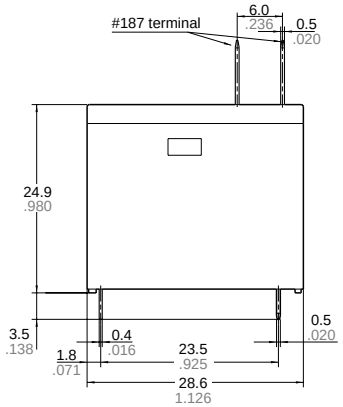
Schematic (Bottom view)



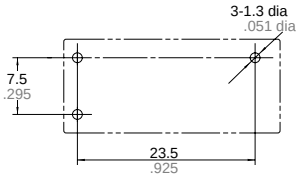
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PCB side three terminals

mm inch

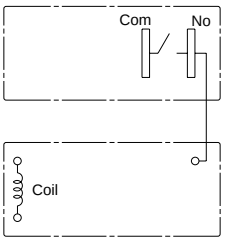


PC board pattern (Bottom view)



Tolerance : ±0.1 ±.004

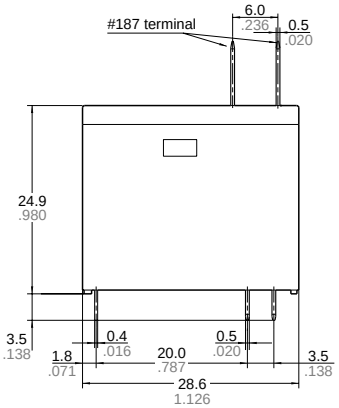
Schematic (Bottom view)



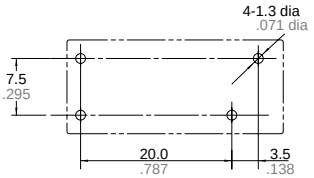
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PCB side four terminals

mm inch

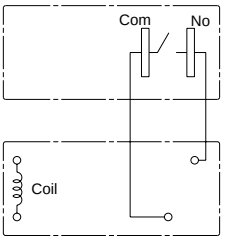


PC board pattern (Bottom view)



Tolerance : ±0.1 ±.004

Schematic (Bottom view)

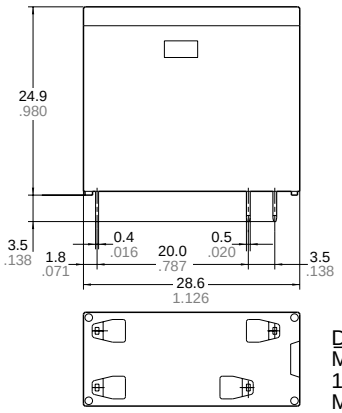


Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

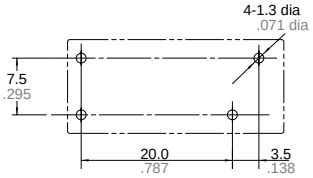
2. PCB type

PCB side four terminals
(No tab terminals)

mm inch



PC board pattern (Bottom view)



Tolerance : ±0.1 ±.004

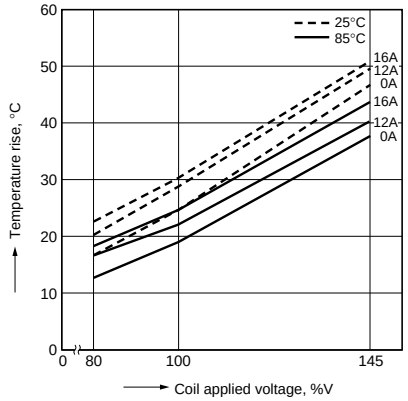
Schematic (Bottom view)

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

REFERENCE DATA

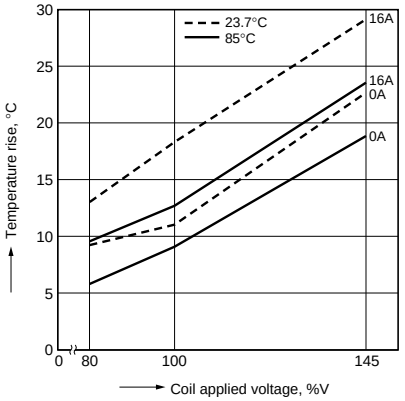
1-1. Coil temperature rise (400mW type)

Sample: ALE15B12, 6 pcs.
Point measured: coil inside
Ambient temperature: 25°C 77°F, 85°C 185°F

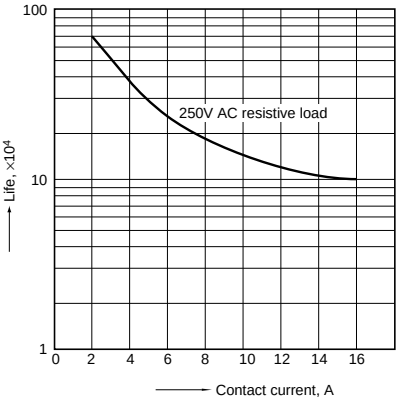


1-2. Coil temperature rise (200mW type)

Sample: ALE75B12, 6 pcs.
Point measured: coil inside
Ambient temperature: 23.7°C 74.66°F, 85°C 185°F

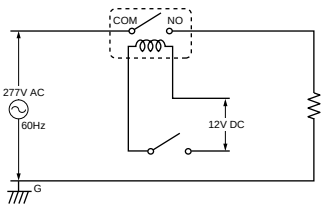


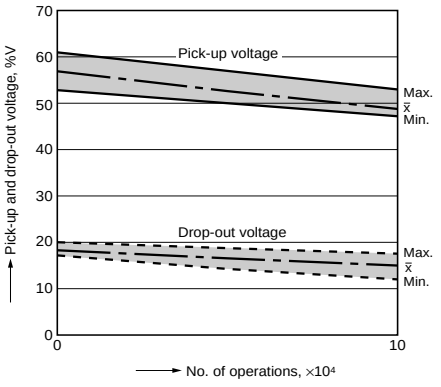
2. Life curve



3. Electrical life test (16 A 277 V AC, resistive load)

Sample: ALE15B12, 6 pcs.
Operation frequency: 20 times/min.
(ON/OFF = 1.5s: 1.5s)
Ambient temperature: Room temperature
Circuit:





For Cautions for Use, see Relay Technical Information (Page 11 to 39).