1 Form A 16A power relay for micro wave oven

LE RELAYS (ALE)

TMP type

PCB type

RoHS compliant

Protective construction: Flux-resistant type

FEATURES

1. Supports magnetron and heater loads
Capable for switching magnetron and heater loads found in microwave ovens.

2. Excellent heat resistance
Ambient temperature: up to 85°C 185°F
Certified UL coil insulation class B and class F

3. High insulation resistance
• Creepage distance and clearances between contact and coil:
Clearance Min. 8 mm .315 inch
Creepage Min. 9.5 mm .374 inch
• Surge withstand voltage: 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 and VDE approved
UL, CSA and VDE approved (PCB type)

TYPICAL APPLICATIONS

1. Microwave ovens
2. Refrigerators
3. OA equipment

ORDERING INFORMATION

ALE □ □ □ □ □

LE relay

Contact arrangement
1: 1 Form A (400 mW)
7: 1 Form A (200 mW)

Terminal shape
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
P: PCB type (No tab terminals)

Coil insulation class
B: Class B insulation
F: Class F insulation

Nominal coil voltage, V DC
05: 5, 06: 6, 09: 9, 12: 12, 18: 18, 24: 24, 48: 48

Notes: • Certified by UL, CSA, TÜV and VDE (TMP type).
• Certified by UL, CSA and VDE (PCB type).

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TYPES

1. Standard type

Contact arrangement	Nominal coil voltage	TMP type			PCB type (No tab terminals)
		PCB side three terminals (includes one dummy terminal)	PCB side three terminals	PCB side four terminals	
		Part No.	Part No.	Part No.	Part No.
1 Form A	5V DC	ALE12❍05	ALE13❍05	ALE14❍05	ALE1P❍05
	6V DC	ALE12❍06	ALE13❍06	ALE14❍06	ALE1P❍06
	9V DC	ALE12❍09	ALE13❍09	ALE14❍09	ALE1P❍09
	12V DC	ALE12❍12	ALE13❍12	ALE14❍12	ALE1P❍12
	18V DC	ALE12❍18	ALE13❍18	ALE14❍18	ALE1P❍18
	24V DC	ALE12❍24	ALE13❍24	ALE14❍24	ALE1P❍24
	48V DC	ALE12❍48	ALE13❍48	ALE14❍48	ALE1P❍48

Standard packing; Carton: 100 pcs. Case 500 pcs.
❍: Input the following letter. Class B: B, Class F: F

2. High sensitive type

Contact arrangement	Nominal coil voltage	TMP type			PCB type (No tab terminals)
		PCB side three terminals (includes one dummy terminal)	PCB side three terminals	PCB side four terminals	
		Part No.	Part No.	Part No.	Part No.
1 Form A (High sensitivity: 200mW)	5V DC	ALE72❍05	ALE73❍05	ALE74❍05	ALE7P❍05
	6V DC	ALE72❍06	ALE73❍06	ALE74❍06	ALE7P❍06
	9V DC	ALE72❍09	ALE73❍09	ALE74❍09	ALE7P❍09
	12V DC	ALE72❍12	ALE73❍12	ALE74❍12	ALE7P❍12
	18V DC	ALE72❍18	ALE73❍18	ALE74❍18	ALE7P❍18
	24V DC	ALE72❍24	ALE73❍24	ALE74❍24	ALE7P❍24
	48V DC	ALE72❍48	ALE73❍48	ALE74❍48	ALE7P❍48

Standard packing; Carton: 100 pcs. Case 500 pcs.
❍: Input the following letter. Class B: B, Class F: F

RATING

1. Coil data

1) Standard type

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power (at 20°C 68°F)	Max. applied voltage (at 20°C 68°F)
5V DC	75%V or less of nominal voltage (Initial)	5%V or more of nominal voltage (Initial)	80 mA	63Ω	400mW	7.25V DC
6V DC			66.7mA	90Ω		8.7 V DC
9V DC			44.4mA	203Ω		13.05V DC
12V DC			33.3mA	360Ω		17.4 V DC
18V DC			22.2mA	810Ω		26.1 V DC
24V DC			16.7mA	1,440Ω		34.8 V DC
48V DC			8.3mA	5,760Ω		69.6 V DC

2) High sensitive type

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power (at 20°C 68°F)	Max. applied voltage (at 20°C 68°F)
5V DC	75%V or less of nominal voltage (Initial)	5%V or more of nominal voltage (Initial)	40 mA	125Ω	200mW	7.25V DC
6V DC			33.3mA	180Ω		8.7 V DC
9V DC			22.2mA	405Ω		13.05V DC
12V DC			16.7mA	720Ω		17.4 V DC
18V DC			11.1mA	1,620Ω		26.1 V DC
24V DC			8.3mA	2,880Ω		34.8 V DC
48V DC			4.2mA	11,520Ω		69.6 V DC

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2. Specifications

Characteristics	Item		Specifications
Contact	Arrangement		1 Form A
	Contact resistance (Initial)		Max. 100 mΩ (By voltage drop 6 V DC 1A)
	Contact material		$AgSnO_2$ type
Rating	Nominal switching capacity (resistive load)		16A 277V AC
	Max. switching power (resistive load)		4,432VA
	Max. switching voltage		277V AC
	Max. switching current		16A
	Nominal operating power		400mW (Standard type), 200mW (High sensitive type)
	Min. switching capacity (reference value)*1		100mA, 5V DC
Electrical characteristics	Insulation resistance (Initial)		Min. 1,000MΩ (at 500V DC) Measurement at same location as “Breakdown voltage” section.
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1 min. (Detection current: 10 mA)
		Between contact and coil	4,000 Vrms for 1 min. (Detection current: 10 mA)
	Temperature rise (coil)		Max. 55°C 131°F, Max. 45°C 113°F (200mW type) (By resistive method, nominal coil voltage applied to the coil; contact carrying current: 16A, at 20°C 68°F)
	Surge breakdown voltage*2 (Between contact and coil) (Initial)		10,000 V
	Operate time (at nominal voltage) (at 20°C 68°F)		Max. 20 ms (excluding contact bounce time.)
	Release time (at nominal voltage) (at 20°C 68°F)		Max. 20 ms, Max. 25 ms (200mW type) (excluding contact bounce time) (With diode)
Mechanical characteristics	Shock resistance	Functional	200 m/s² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)
		Destructive	1,000 m/s² (Half-wave pulse of sine wave: 6 ms.)
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1.5 mm (Detection time: 10μs.)
		Destructive	10 to 55 Hz at double amplitude of 1.5 mm
Expected life	Mechanical (at 180 times/min.)		Min. 2×10^6
	Electrical (at 20 times/min.)		Min. 10^5 (at resistive load)
Conditions	Conditions for operation, transport and storage*3		Ambient temperature: –40°C to +85°C –40°F to +185°F; Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)
	Max. operating speed		20 times/min. (at nominal switching capacity)
Unit weight			Approx. 17 g .60 oz, Approx. 15 g .53 oz (PCB type)

* Specifications will vary with foreign standards certification ratings.

Notes: *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.

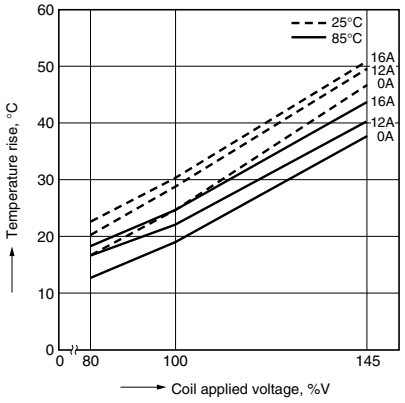
*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

REFERENCE DATA

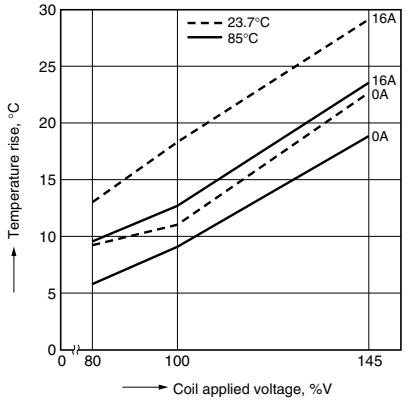
1.-(1) Coil temperature rise (400mW type)

Sample: ALE14B12, 6 pcs.
Point measured: coil inside
Ambient temperature: 25°C 77°F, 85°C 185°F

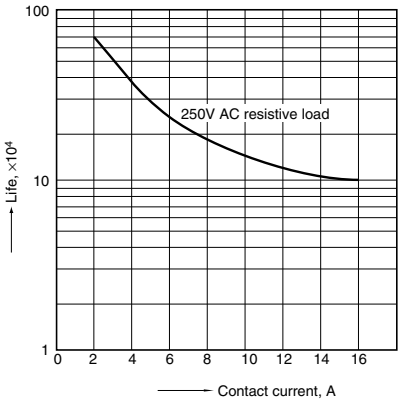


1.-(2) Coil temperature rise (200mW type)

Sample: ALE74B12, 6 pcs.
Point measured: coil inside
Ambient temperature: 23.7°C 74.66°F, 85°C 185°F



2. Life curve



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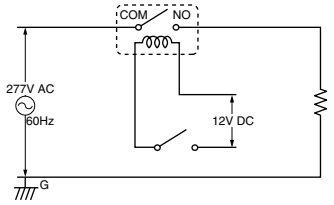
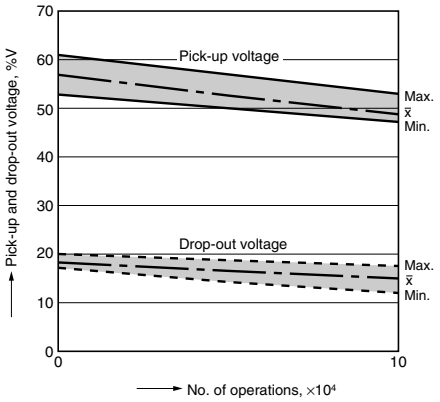
3. Electrical life test (16 A 277 V AC, resistive load)
Sample: ALE14B12, 6 pcs.
Operation frequency: 20 times/min.
(ON/OFF = 1.5s: 1.5s)
Ambient temperature: Room temperature
Circuit:





DIMENSIONS (mm inch)

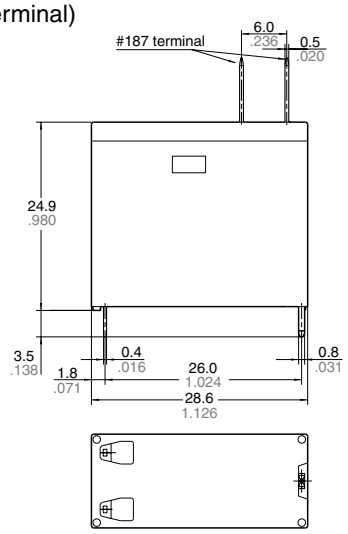
The CAD data of the products with a **CAD Data** mark can be downloaded from: http://industrial.panasonic.com/ac/e/

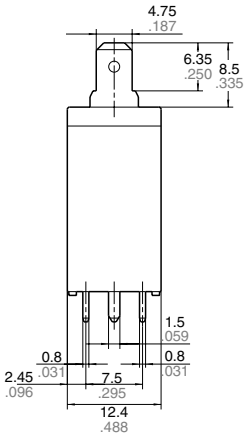
1. TMP type

1) PCB side three terminals
(includes one dummy terminal)

CAD Data

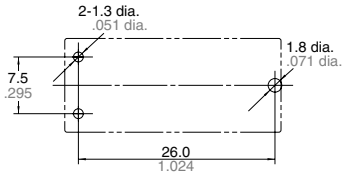
External dimensions





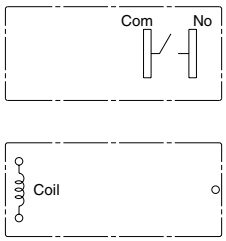
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

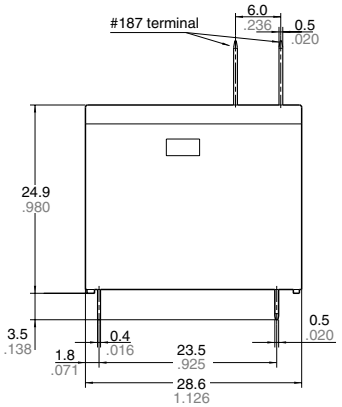
Schematic (Bottom view)

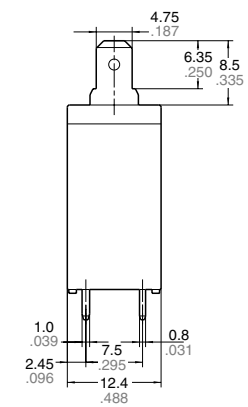


2) PCB side three terminals

CAD Data

External dimensions





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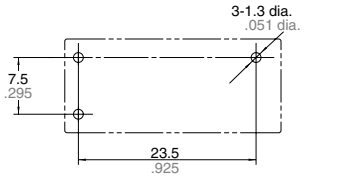
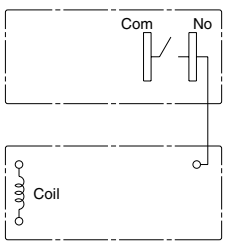


Tolerance: ±0.1 ±.004

Schematic (Bottom view)



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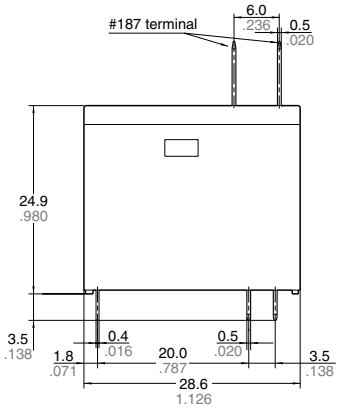
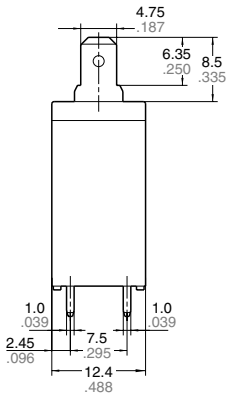
3) PCB side four terminals

CAD Data

External dimensions





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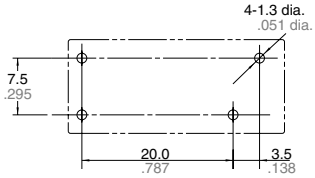
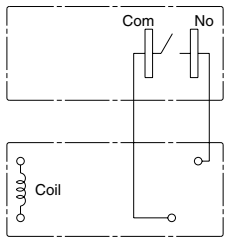
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

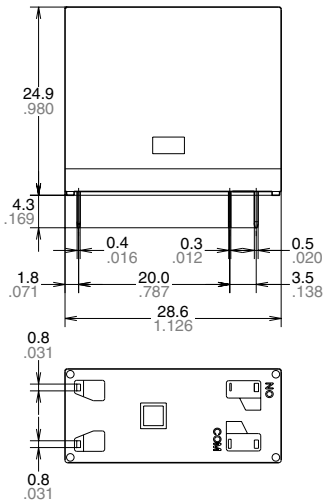
Schematic (Bottom view)

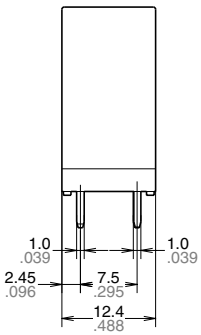


2. PCB type
(No tab terminals)

CAD Data

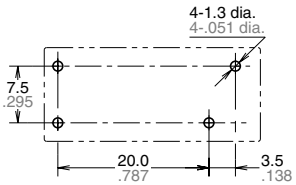
External dimensions





Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

SAFETY STANDARDS

UL/C-UL (Recognized)		CSA (Certified)		VDE (Certified)		TV rating (UL/CSA)		TÜV (Certified)	
File No.	Contact rating	File No.	Contact rating	File No.	Contact rating	File No.	Rating	File No.	Rating
E43149	16A 277V AC 16A 30V DC 18A 125V AC	LR26550	16A 277V AC 16A 30V DC 18A 125V AC	40009159	16A 250V AC (cosϕ=1.0) 16A 30V DC (0ms)	UL E43149 CSA LR26550	TV-5	B 12 06 13461 325	16A 250V AC (cosϕ=1.0) 16A 30V DC (0ms)

NOTES

1. For cautions for use, please read "GENERAL APPLICATION GUIDELINES" on page B-1.

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ALE75B05 ALE75B06 ALE75B09 ALE75B12 ALE75B18 ALE75B24 ALE75B48 ALE75F05 ALE75F06 ALE75F09 ALE75F12 ALE75F18 ALE75F24 ALE75F48 ALE14B05 ALE14B06 ALE14B09 ALE14B12 ALE14B24 ALE14B48 ALE15B12 ALE15B24 ALE12B05 ALE12B06 ALE12B09 ALE12B12 ALE12B18 ALE12B24 ALE12B48 ALE12F05 ALE12F06 ALE12F09 ALE12F12 ALE12F18 ALE12F24 ALE12F48 ALE13B05 ALE13B06 ALE13B09 ALE13B12 ALE13B18 ALE13B24 ALE13B48 ALE13F05 ALE13F06 ALE13F09 ALE13F12 ALE13F18 ALE13F24 ALE13F48 ALE14B18 ALE14F05 ALE14F06 ALE14F09 ALE14F12 ALE14F18 ALE14F24 ALE14F48 ALE72B05 ALE72B06 ALE72B09 ALE72B12 ALE72B18 ALE72B24 ALE72B48 ALE72F05 ALE72F06 ALE72F09 ALE72F12 ALE72F18 ALE72F24 ALE72F48 ALE73B05 ALE73B06 ALE73B09 ALE73B12 ALE73B18 ALE73B24 ALE73B48 ALE73F05 ALE73F06 ALE73F09 ALE73F12 ALE73F18 ALE73F24 ALE73F48 ALE74B05 ALE74B06 ALE74B09 ALE74B12 ALE74B18 ALE74B24 ALE74B48 ALE74F05 ALE74F06 ALE74F09 ALE74F12 ALE74F18 ALE74F24 ALE74F48

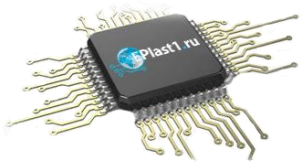
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.