

TV-4 rated.  
2a 3A/5A power relays

## LA RELAYS (ALA)



RoHS compliant

### FEATURES

#### 1. 2 Form A slim type

24(L) × 12(W) × 25(H) mm  
.945(L) × .472(W) × .984(H) inch

#### 2. 3A type and 5A TV type

3A type: Contact reliability and break performance best suited for protecting and switching speakers.  
5A TV type: Tough against inrush current and optimal for turning on and off the power supply. Rated TV-4 (UL, CSA).

#### 3. 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

4. High noise immunity realized by the card separation structure between contact and coil

5. Conforms to the various safety standards

- UL, CSA, VDE, TÜV, SEMKO approved

### TYPICAL APPLICATIONS

- Audio devices
- Monitor
- Automatic vending machine

### ORDERING INFORMATION

|                                                   |     |   |  |   |  |  |
|---------------------------------------------------|-----|---|--|---|--|--|
|                                                   | ALA | 2 |  | F |  |  |
| LA relay                                          |     |   |  |   |  |  |
| Contact arrangement<br>2: 2 Form A                |     |   |  |   |  |  |
| Contact capacity<br>Nil: 3A<br>P: 5A TV-4         |     |   |  |   |  |  |
| Protective construction<br>F: Flux-resistant type |     |   |  |   |  |  |
| Nominal coil voltage (DC)<br>12: 12V, 24: 24V     |     |   |  |   |  |  |

Note: Certified by UL, CSA, VDE, TÜV, SEMKO and TV-4

### TYPES

| Contact arrangement | Coil voltage | Part No. |                   |
|---------------------|--------------|----------|-------------------|
|                     |              | 3A type  | 5A TV type (TV-4) |
| 2 Form A            | 12V DC       | ALA2F12  | ALA2PF12          |
|                     | 24V DC       | ALA2F24  | ALA2PF24          |

Standard packing Carton: 100 pcs. Case: 500 pcs.

Note: 4.5V, 5V, 9V and 18V DC types are also available. Please consult us for details.

### RATING

#### 1. Coil data

| Nominal coil voltage | Pick-up voltage<br>(at 20°C 68°F)         | Drop-out voltage<br>(at 20°C 68°F)       | Nominal operating current<br>[±10%] (at 20°C 68°F) | Coil resistance<br>[±10%] (at 20°C 68°F) | Nominal operating power | Max. applied voltage<br>(at 20°C 68°F) |
|----------------------|-------------------------------------------|------------------------------------------|----------------------------------------------------|------------------------------------------|-------------------------|----------------------------------------|
| 12V DC               | 75%V or less of nominal voltage (Initial) | 5%V or more of nominal voltage (Initial) | 44.2mA                                             | 272Ω                                     | 530mW                   | 15.6V DC                               |
| 24V DC               |                                           |                                          | 22.1mA                                             | 1,087Ω                                   |                         | 31.2V DC                               |

## 2. Specifications

| Characteristics            | Item                                                              | Specifications                                                                                                                                                  |                                                                                                   |
|----------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
|                            |                                                                   | 3A type                                                                                                                                                         | 5A TV type (TV-4)                                                                                 |
| Contact                    | Arrangement                                                       | 2 Form A                                                                                                                                                        |                                                                                                   |
|                            | Contact resistance (Initial)                                      | Max. 50 mΩ (By voltage drop 6V DC 1A)                                                                                                                           | Max. 100 mΩ (By voltage drop 6V DC 1A)                                                            |
|                            | Contact material                                                  | Gold-clad, AgNi type                                                                                                                                            | AgSnO <sub>2</sub> type                                                                           |
| Rating                     | Nominal switching capacity (resistive load)                       | 3A 125V AC                                                                                                                                                      | 5A 277V AC                                                                                        |
|                            | Max. switching power (resistive load)                             | 625VA                                                                                                                                                           | 1,385VA                                                                                           |
|                            | Max. switching voltage                                            | 125V AC                                                                                                                                                         | 277V AC                                                                                           |
|                            | Max. switching current                                            | 5A (AC)                                                                                                                                                         |                                                                                                   |
|                            | Min. switching capacity*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 contact sets                                                                                                                                            | 1,000 Vrms for 1 min. (Detection current: 10 mA)                                                  |
|                            |                                                                   | 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. 45°C 113°F<br>(with nominal coil voltage and at 3 A contact carrying current, at 70°C 158°F)                                                               | Max. 45°C 113°F<br>(with nominal coil voltage and at 5 A contact carrying current, at 70°C 158°F) |
|                            | Surge breakdown voltage*2<br>(Between contact and coil) (Initial) | 10,000 V                                                                                                                                                        |                                                                                                   |
|                            | Operate time (at nominal voltage) (at 20°C 68°F)                  | Max. 15 ms (excluding contact bounce time.)                                                                                                                     |                                                                                                   |
|                            | Release time (at nominal voltage) (at 20°C 68°F)                  | Max. 15 ms (excluding contact bounce time) (With diode)                                                                                                         |                                                                                                   |
| Mechanical characteristics | Shock resistance                                                  | Functional                                                                                                                                                      | 200 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)                 |
|                            |                                                                   | Destructive                                                                                                                                                     | 1,000 m/s <sup>2</sup> (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                                                        | Min. 10 <sup>6</sup> (at 180 times/min.)                                                                                                                        |                                                                                                   |
|                            | Electrical (at 20 times/min.)                                     | Min. 5×10 <sup>4</sup> (ON: OFF=1.5s: 1.5s) (at nominal switching capacity)                                                                                     |                                                                                                   |
| Conditions                 | Conditions for operation, transport and storage*3                 | Ambient temperature: -40°C to +70°C -40°F to +158°F,<br>Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature),<br>Air pressure: 86 to 106kPa |                                                                                                   |
|                            | Max. operating speed                                              | 20 times/min. (at nominal switching capacity)                                                                                                                   |                                                                                                   |
| Unit weight                |                                                                   | Approx. 13 g .46 oz                                                                                                                                             |                                                                                                   |

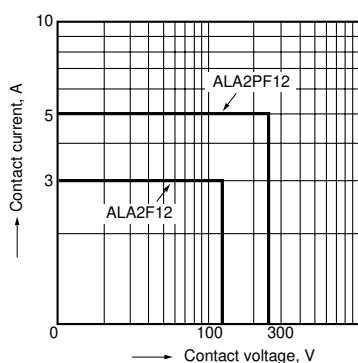
Notes: \*1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

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

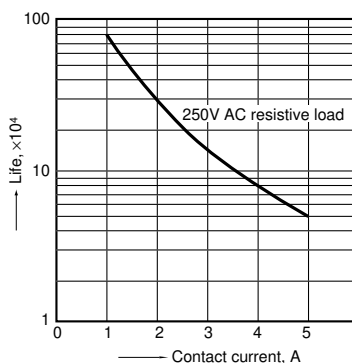
\*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

## REFERENCE DATA

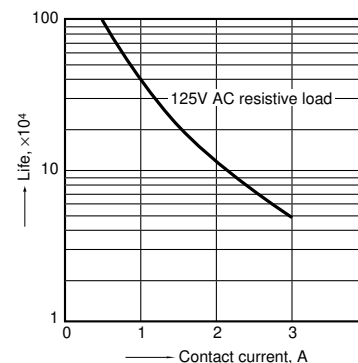
1. Max. switching power (AC resistive load)



2-(1). Life curve (250 V AC resistive load)

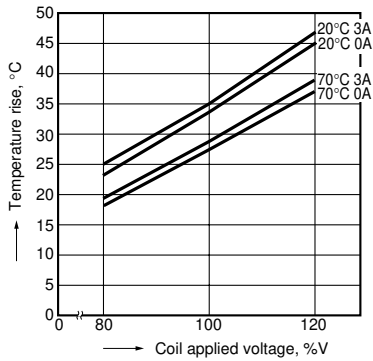


2-(2). Life curve (125 V AC resistive load)

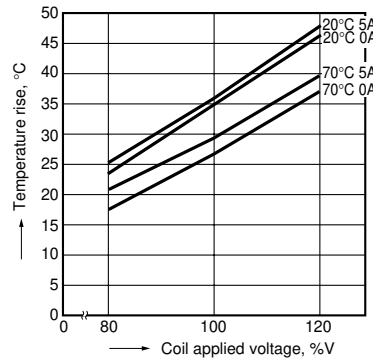


# LA (ALA)

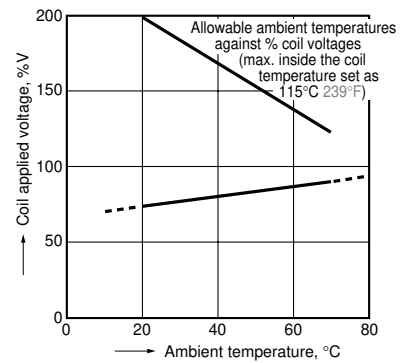
3-(1). Coil temperature rise  
Sample: ALA2F12, 6 pcs.  
Measured portion: coil inside  
Contact current: 0 A, 3A



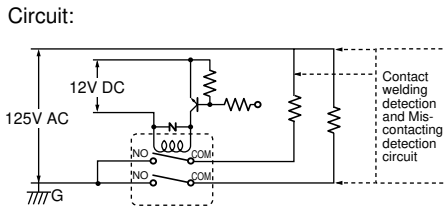
3-(2). Coil temperature rise  
Sample: ALA2PF12, 6 pcs.  
Measured portion: coil inside  
Contact current: 0 A, 5A



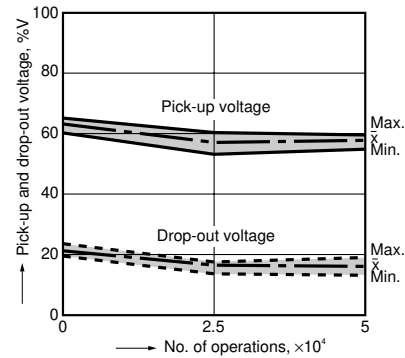
4. Ambient temperature characteristics and coil applied voltage  
Contact current: ALA2F=3A  
ALA2PF=5A



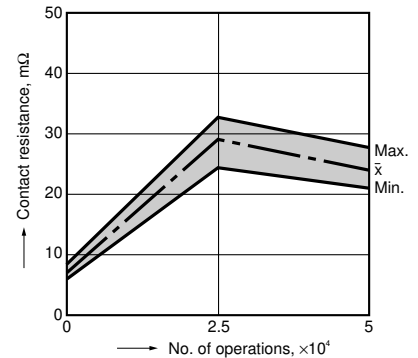
5-(1). Electrical life test  
(3 A 125 V AC, resistive load)  
Sample: ALA2F12, 6 pcs.  
Operation frequency: 20 times/min.  
(ON/OFF = 1.5s: 1.5s)  
Ambient temperature: 20°C 68°F



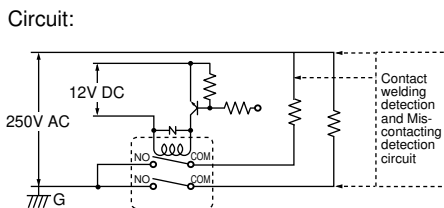
Change of pick-up and drop-out voltage



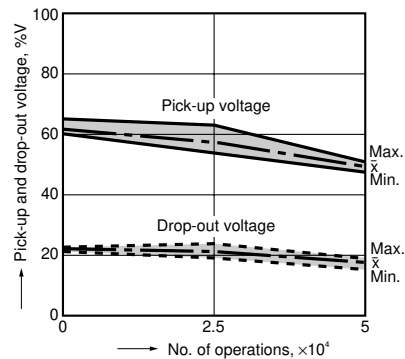
Change of contact resistance



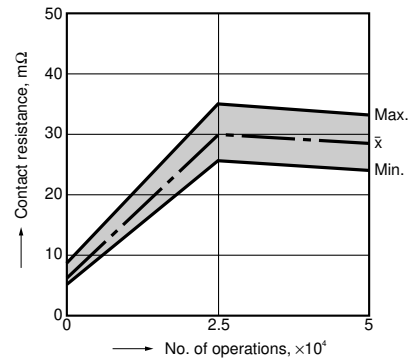
5-(2). Electrical life test  
(5 A 250 V AC, resistive load)  
Sample: ALA2PF12, 6 pcs.  
Operation frequency: 20 times/min.  
(ON/OFF = 1.5s: 1.5s)  
Ambient temperature: 20°C 68°F



Change of pick-up and drop-out voltage

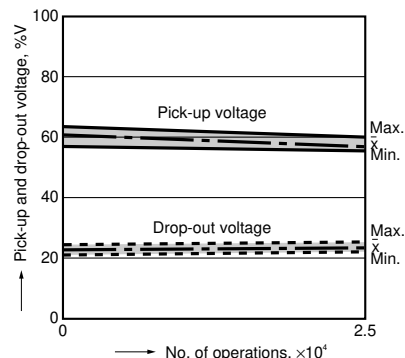


Change of contact resistance

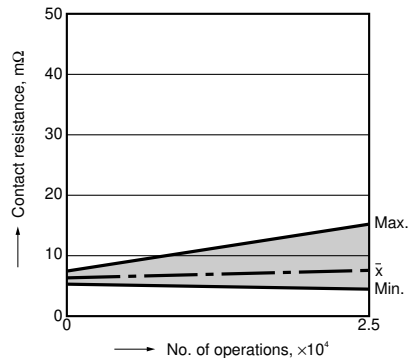


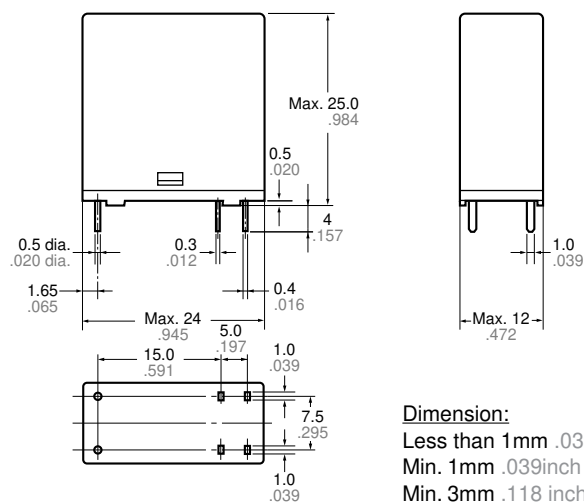
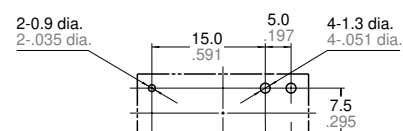
5-(3). Electrical life test  
(UL lamp load test TV-4)  
Tested sample: ALA2PF12, 6 pcs.  
• Overload test  
Load: 6.0 A 120 V AC (60 Hz),  
Inrush: 91 A  
Operation frequency: 10 times/min  
(ON: OFF = 1 s: 5 s)  
No. of operations: 50 ope.  
• Endurance test  
Load: 4A 120 V AC (60 Hz),  
Inrush: 65 A  
Operation frequency: 10 times/min  
(ON: OFF = 1 s: 5 s)  
No. of operations: 25,000 ope.

Change of pick-up and drop-out voltage



Change of contact resistance



**DIMENSIONS** (mm inch)The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>**CAD Data****External dimensions****PC board pattern (Bottom view)**Tolerance :  $\pm 0.1 \pm 0.004$ **Schematic (Bottom view)****Dimension:**

Less than 1mm .039inch:

Min. 1mm .039inch less than 3mm .118 inch:

Min. 3mm .118 inch:

**General tolerance** $\pm 0.1 \pm 0.004$  $\pm 0.2 \pm 0.008$  $\pm 0.3 \pm 0.012$ **SAFETY STANDARDS**

| Item          | UL/C-UL (Recognized) |                                      | CSA (Certified) |                                      | VDE (Certified) |                                                  | TV rating (UL/CSA)             |        | TÜV (Certified)      |                                                  | SEMKO (Certified) |                         |
|---------------|----------------------|--------------------------------------|-----------------|--------------------------------------|-----------------|--------------------------------------------------|--------------------------------|--------|----------------------|--------------------------------------------------|-------------------|-------------------------|
|               | File No.             | Contact rating                       | File No.        | Contact rating                       | File No.        | Contact rating                                   | File No.                       | Rating | File No.             | Rating                                           | File No.          | Contact rating          |
| Standard      | E43149               | 3A 125V AC<br>3A 30V DC<br>5A 50V DC | LR26550<br>etc. | 3A 125V AC<br>3A 30V DC<br>5A 50V DC | 40012000        | 3A 125V AC ( $\cos\phi=1.0$ )<br>3A 30V DC (0ms) | —                              | —      | B 11 05<br>13461 298 | 3A 125V AC ( $\cos\phi=1.0$ )<br>3A 30V DC (0ms) | 817139            | 3A 125V AC<br>3A 30V DC |
| High capacity | E43149               | 5A 277V AC<br>5A 30V DC              | LR26550<br>etc. | 5A 277V AC<br>5A 30V DC              | 40012000        | 5A 250V AC ( $\cos\phi=1.0$ )<br>5A 30V DC (0ms) | UL<br>E43149<br>CSA<br>LR26550 | TV-4   | B 11 05<br>13461 298 | 5A 250V AC ( $\cos\phi=1.0$ )<br>5A 30V DC (0ms) | 817139            | 4/65A 250V AC           |

**For Cautions for Use.**