

Panasonic



Compliant with European standards 1a1b 16A/10A/8A polarized power relays

DE RELAYS

FEATURES

- 1. Conforms to European safety standards (VDE0700 and VDE0631)**
 Insulating distance between coil and contacts:
 Clearance Min. 8mm .315 inch
 Creepage distance Min. 8mm .315 inch
- 2. Extensive product line-up**
- 3. Surge voltage between contact and coil 12 kV**
- **Low operating power**
 Nominal operating power at 200 mW (Single side stable, 2 coil latching)
- 4. Compact body saves space**
 Size: 12.5(W) × 25.0(L) × 12.5(H) mm
 .492(W) × .984(L) × .492(H) inch
- 5. UL/CSA, VDE approved**
 16A contact rating possible for 1 Form A and 1 Form A 1 Form B.

TYPICAL APPLICATIONS

- Temperature controller
- Automatic meter reading
- OA equipment
- FA equipment

ORDERING INFORMATION

DE - - V

Contact arrangement

- 1a: 1 Form A
- 2a: 2 Form A
- 1a1b: 1 Form A 1 Form B

Operating function

- Nil: Single side stable
- L: 1 coil latching
- L2: 2 coil latching

Coil voltage (V DC)

- 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48* (*single side stable only)

Note: UL/CSA, VDE approved type is standard.

DE (ADE)

TYPES

| Contact arrangement | Nominal coil voltage | Single side stable type | 1 coil latching type | 2 coil latching type |
|---------------------|----------------------|-------------------------|----------------------|----------------------|
| | | Part No. | Part No. | Part No. |
| 1 Form A | 1.5V DC | DE1A-1,5V | DE1A-L-1,5V | DE1A-L2-1,5V |
| | 3V DC | DE1A-3V | DE1A-L-3V | DE1A-L2-3V |
| | 4.5V DC | DE1A-4,5V | DE1A-L-4,5V | DE1A-L2-4,5V |
| | 5V DC | DE1A-5V | DE1A-L-5V | DE1A-L2-5V |
| | 6V DC | DE1A-6V | DE1A-L-6V | DE1A-L2-6V |
| | 9V DC | DE1A-9V | DE1A-L-9V | DE1A-L2-9V |
| | 12V DC | DE1A-12V | DE1A-L-12V | DE1A-L2-12V |
| | 24V DC | DE1A-24V | DE1A-L-24V | DE1A-L2-24V |
| 1 Form A 1 Form B | 48V DC | DE1A-48V | — | — |
| | 1.5V DC | DE1A1B-1,5V | DE1A1B-L-1,5V | DE1A1B-L2-1,5V |
| | 3V DC | DE1A1B-3V | DE1A1B-L-3V | DE1A1B-L2-3V |
| | 4.5V DC | DE1A1B-4,5V | DE1A1B-L-4,5V | DE1A1B-L2-4,5V |
| | 5V DC | DE1A1B-5V | DE1A1B-L-5V | DE1A1B-L2-5V |
| | 6V DC | DE1A1B-6V | DE1A1B-L-6V | DE1A1B-L2-6V |
| | 9V DC | DE1A1B-9V | DE1A1B-L-9V | DE1A1B-L2-9V |
| | 12V DC | DE1A1B-12V | DE1A1B-L-12V | DE1A1B-L2-12V |
| 2 Form A | 24V DC | DE1A1B-24V | DE1A1B-L-24V | DE1A1B-L2-24V |
| | 48V DC | DE1A1B-48V | — | — |
| | 1.5V DC | DE2A-1,5V | DE2A-L-1,5V | DE2A-L2-1,5V |
| | 3V DC | DE2A-3V | DE2A-L-3V | DE2A-L2-3V |
| | 4.5V DC | DE2A-4,5V | DE2A-L-4,5V | DE2A-L2-4,5V |
| | 5V DC | DE2A-5V | DE2A-L-5V | DE2A-L2-5V |
| | 6V DC | DE2A-6V | DE2A-L-6V | DE2A-L2-6V |
| | 9V DC | DE2A-9V | DE2A-L-9V | DE2A-L2-9V |
| 2 Form A | 12V DC | DE2A-12V | DE2A-L-12V | DE2A-L2-12V |
| | 24V DC | DE2A-24V | DE2A-L-24V | DE2A-L2-24V |
| | 48V DC | DE2A-48V | — | — |

Standard packing: Tube package: 20 pcs.; Case: 500 pcs.

RATING

1. Coil data

1) Single side stable 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 | Max. applied voltage (at 20°C 68°F) |
|----------------------|---|---|---|---------------------------------------|-------------------------|-------------------------------------|
| 1.5V DC | 70%V or less of nominal voltage (Initial) | 10%V or more of nominal voltage (Initial) | 132.7mA | 11.3Ω | 200mW | 130%V of nominal voltage |
| 3V DC | | | 66.6mA | 45Ω | | |
| 4.5V DC | | | 44.5mA | 101Ω | | |
| 5V DC | | | 40mA | 125Ω | | |
| 6V DC | | | 33.3mA | 180Ω | | |
| 9V DC | | | 22.2mA | 405Ω | | |
| 12V DC | | | 16.6mA | 720Ω | | |
| 24V DC | | | 8.3mA | 2,880Ω | | |
| 48V DC | | | 4.2mA | 11,520Ω | | |

2) 1 coil latching type

| Nominal coil voltage | Set voltage (at 20°C 68°F) | Reset 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 | Max. applied voltage (at 20°C 68°F) |
|----------------------|---|---|---|---------------------------------------|-------------------------|-------------------------------------|
| 1.5V DC | 70%V or less of nominal voltage (Initial) | 70%V or less of nominal voltage (Initial) | 66.6mA | 22.5Ω | 100mW | 130%V of nominal voltage |
| 3V DC | | | 33.3mA | 90Ω | | |
| 4.5V DC | | | 22.3mA | 202Ω | | |
| 5V DC | | | 20mA | 250Ω | | |
| 6V DC | | | 16.7mA | 360Ω | | |
| 9V DC | | | 11.1mA | 812Ω | | |
| 12V DC | | | 8.3mA | 1,440Ω | | |
| 24V DC | | | 4.2mA | 5,760Ω | | |

3) 2 coil latching type

| Nominal coil voltage | Set voltage (at 20°C 68°F) | Reset 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 | | Max. applied voltage (at 20°C 68°F) |
|----------------------|--|--|--|------------|--|------------|-------------------------|------------|--|
| | | | Set coil | Reset coil | Set coil | Reset coil | Set coil | Reset coil | |
| 1.5V DC | 70%V or less of nominal voltage (Initial) | 70%V or less of nominal voltage (Initial) | 132.7mA | 132.7mA | 11.3Ω | 11.3Ω | 200mW | 200mW | 130%V of nominal voltage |
| 3V DC | | | 66.6mA | 66.6mA | 45Ω | 45Ω | | | |
| 4.5V DC | | | 44.5mA | 44.5mA | 101Ω | 101Ω | | | |
| 5V DC | | | 40mA | 40mA | 125Ω | 125Ω | | | |
| 6V DC | | | 33.3mA | 33.3mA | 180Ω | 180Ω | | | |
| 9V DC | | | 22.2mA | 22.2mA | 405Ω | 405Ω | | | |
| 12V DC | | | 16.6mA | 16.6mA | 720Ω | 720Ω | | | |
| 24V DC | | | 8.3mA | 8.3mA | 2,880Ω | 2,880Ω | | | |

2. Specifications

| Characteristics | Item | Specifications | |
|--|---|--|--|
| Contact | Arrangement | 1 Form A 1 Form A 1 Form B 2 Form A | |
| | Contact resistance (Initial) | Max. 30 mΩ (By voltage drop 6 V DC 1A) | |
| | Contact material | AgSnO ₂ type | |
| Rating | Nominal switching capacity (resistive load) | 10A 250V AC, 10A 30V DC 8A 250V AC, 8A 30V DC | |
| | Max. switching power (resistive load) | 2,500VA*4, 300W 2,000VA*4, 240W | |
| | Max. switching voltage | 440V AC, 230V DC 440V AC, 230V DC | |
| | Max. switching current | 10A (16A)*4 8A (16A)*4 | |
| | Nominal operating power | Single side stable, 2 coil latching: 200mW; 1 coil latching: 100mW | |
| | 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 open contacts | 1,000 Vrms for 1 min. (Detection current: 10 mA) |
| | | Between contact sets | — 4,000 Vrms for 1 min. (Detection current: 10 mA) |
| | | Between contact and coil | 5,000 Vrms for 1 min. (Detection current: 10 mA) |
| | Surge breakdown voltage*2 (Between contact and coil) (Initial) | 12,000 V | |
| | Temperature rise (coil) (at 70°C 158°F) | Max. 50°C 122°F (By resistive method) | |
| | Operate time [Set time] (at 20°C 68°F) | Max. 10 ms (typ. 5ms) Max. 10 ms (typ. 4ms) (Nominal coil voltage applied to the coil, excluding contact bounce time.) | |
| Release time [Reset time] (at 20°C 68°F) | Max. 5 ms (typ. 2ms) Max. 10 ms (typ. 4ms) (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode) | | |
| Mechanical characteristics | Shock resistance | Functional | Min. 196 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.) |
| | | Destructive | Min. 980 m/s ² (Half-wave pulse of sine wave: 6 ms.) |
| | Vibration resistance | Functional | 10 to 55 Hz at double amplitude of 2 mm (Detection time: 10μs.) |
| | | Destructive | 10 to 55 Hz at double amplitude of 3 mm |
| Expected life | Mechanical | Min. 10 ⁷ (at 300 times/min.) | |
| | Electrical | Min. 10 ⁵ (resistive load, at 20 times/min., at nominal switching capacity) | |
| | Electrical (16A/230V AC resistive)*4 | 25000 20000 | |
| Conditions | Conditions for operation, transport and storage*3 | Ambient temperature: -40°C to +70°C -40°F to +158°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. 7 g .25 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

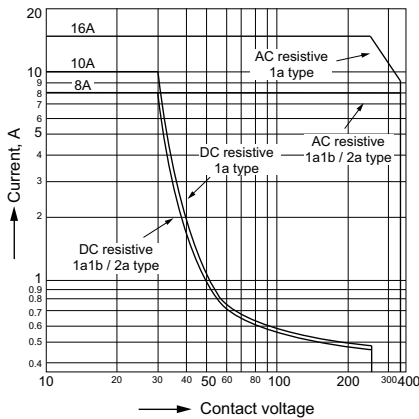
*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to "6. Usage, Storage and Transport Conditions" in [AMBIENT ENVIRONMENT](#) section in [Relay Technical Information](#).

*4. 16A possible for one contact set only with max. 4000VA switching power.

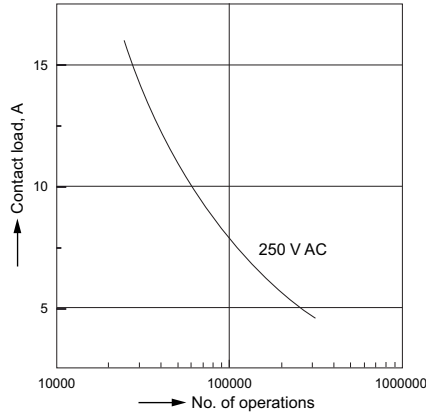
DE (ADE)

REFERENCE DATA

1. Max. switching power

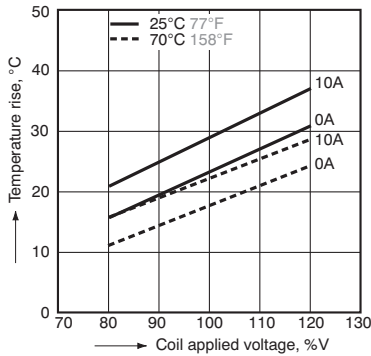


2. Life curve



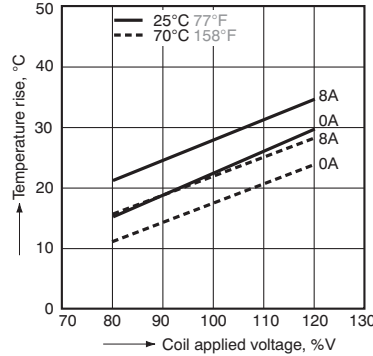
3.1 Coil temperature rise (1 Form A) Tested sample: ADE109

Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F



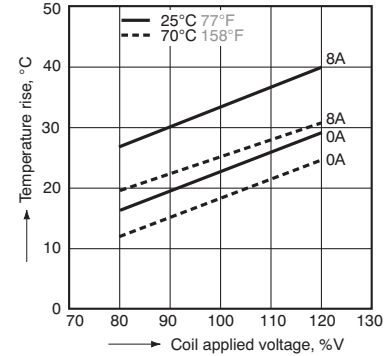
3.2 Coil temperature rise (1 Form A 1 Form B) Tested sample: ADE309

Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F



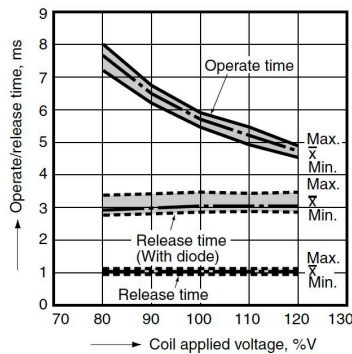
3.3 Coil temperature rise (2 Form A) Tested sample: ADE209

Quantity: n=6
Ambient temperature: 25°C to 70°C 77°F to 158°F

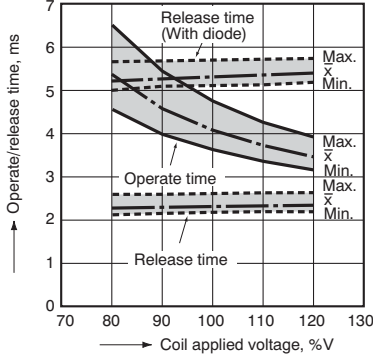


4.1 Operate/release time (1 Form A) Tested sample: DE1a-5V

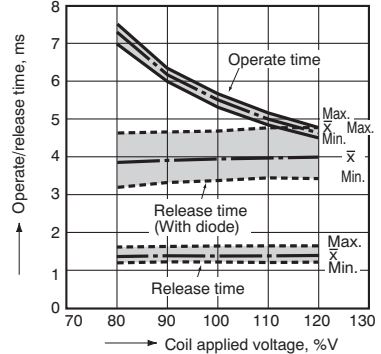
Quantity: n=5



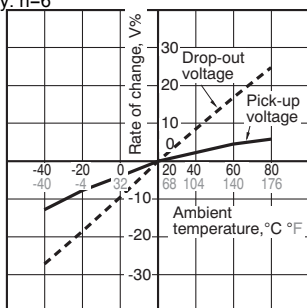
4.2 Operate/release time (1 Form A 1 Form B) Tested sample: DE1a1b-5V, Quantity: n=5



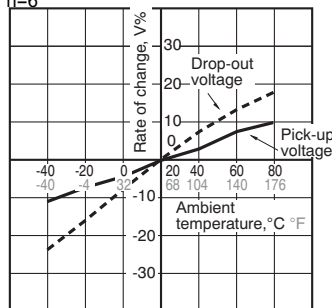
4.3 Operate/release time (2 Form A) Tested sample: DE2a-5V, Quantity: n=5



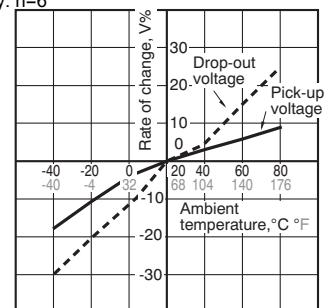
5.1 Ambient temperature characteristics (1 Form A) Tested sample: DE1a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



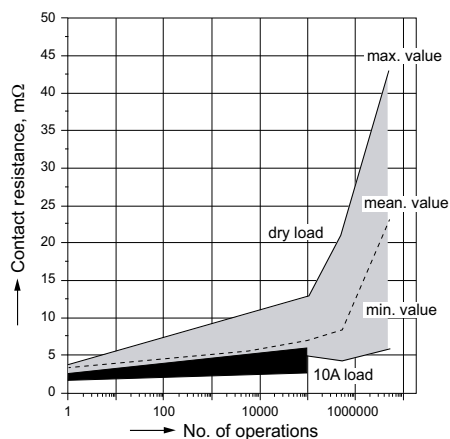
5.2 Ambient temperature characteristics (1 Form A 1 Form B) Tested sample: DE1a1b-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



5.3 Ambient temperature characteristics (2 Form A) Tested sample: DE2a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



6. Change of contact resistance



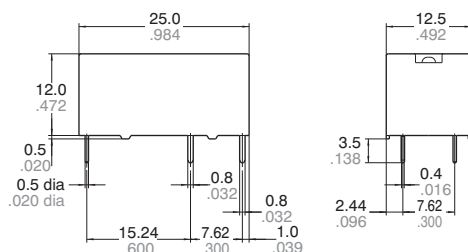
DIMENSIONS (mm inch)

Download [CAD Data](#) from our Web site.

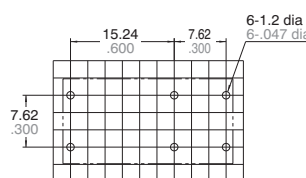
CAD Data



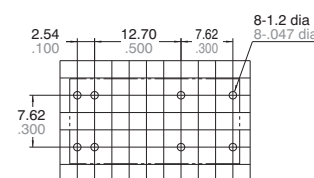
Single side stable
1 coil latching type



Single side stable
1 coil latching type

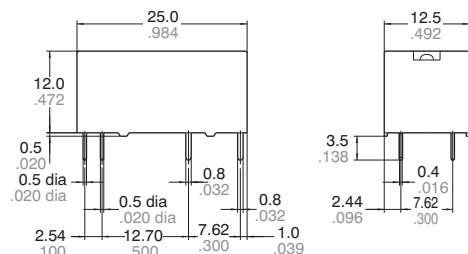


2 coil latching type



Tolerance : $\pm 0.1 \pm .004$

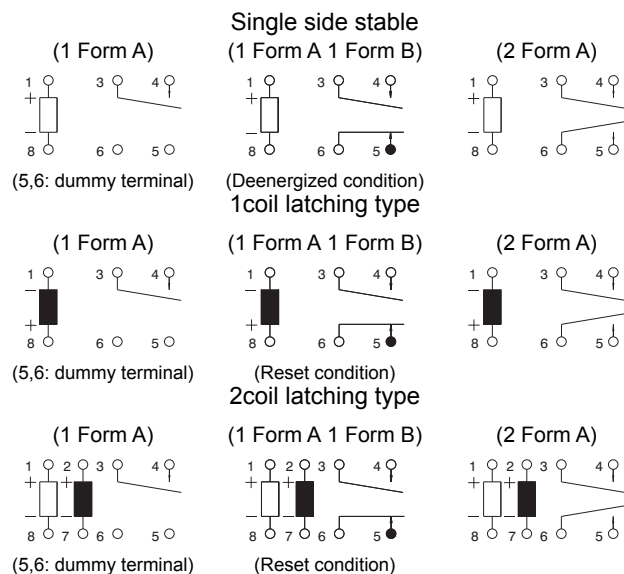
2 coil latching type



Tolerance: $\pm 0.3 \pm .012$

PC board pattern (Bottom view)

Schematic (Bottom view)



SAFETY STANDARDS

| Item | UL/C-UL (Recognized) | | CSA (Certified) | | VDE (Certified) | |
|----------------------|----------------------|-------------------------|-----------------|-------------------------|-----------------|---|
| | File No. | Contact rating | File No. | Contact rating | File No. | Contact rating |
| 1 Form A | E120782 | PILOT DUTY B300 R300 | LR85932 | PILOT DUTY B300 R300 | 115944 | 8A 250V AC (cosφ=1.0) 16A 250V AC (cosφ=1.0) |
| 1 Form A 1 Form B | E120782 | PILOT DUTY B300 R300 | LR85932 | PILOT DUTY B300 R300 | 115944 | 8A 250V AC (cosφ=1.0) 16A 250V AC (cosφ=1.0) |
| 2 Form A | E120782 | PILOT DUTY B300 R300 | LR85932 | PILOT DUTY B300 R300 | 115944 | 8A 250V AC (cosφ=1.0) |

For Cautions for Use, see [Relay Technical Information](#).