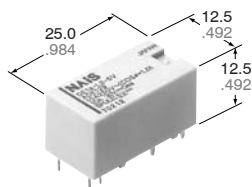


**Panasonic**  
ideas for life

## COMPACT HIGH-INSULATION POLARIZED POWER RELAY

# DE RELAYS (ADE)



mm inch

## FEATURES

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

## SPECIFICATIONS

### Contact

| Arrangement                                                 |                                         | 1 Form A                   | 1 Form A<br>1 Form B                             | 2 Form A                 |
|-------------------------------------------------------------|-----------------------------------------|----------------------------|--------------------------------------------------|--------------------------|
| Contact material                                            |                                         | Silver alloy               |                                                  |                          |
| Initial contact resistance, max. (By voltage drop 6V DC 1A) |                                         | 30mΩ                       |                                                  |                          |
| Rating<br>(resistive load)                                  | Nominal switching capacity              | 10A 250V AC,<br>10A 30V DC | 8A 250V AC,<br>8A 30V DC                         | 8A 250V AC,<br>8A 30V DC |
|                                                             | Max. switching power                    | 2,500 VA*,<br>300W         | 2,000 VA*,<br>240W                               | 2,000 VA*,<br>240W       |
|                                                             | Max. switching voltage                  | 440V AC,<br>230V DC        | 440V AC,<br>230V DC                              | 440V AC,<br>230V DC      |
|                                                             | Max. switching current                  | 10A (16A)*                 | 8A (16A)*                                        | 8A (16A)*                |
|                                                             | Min. switching capacity <sup>#1</sup>   | 100 mA, 5 V DC             |                                                  |                          |
| Expected life (min. operations)                             | Mechanical (at 300cpm)                  | 10 <sup>7</sup>            |                                                  |                          |
|                                                             | Electrical (at 20 cpm) (resistive load) | 10 <sup>5</sup>            | 10 <sup>5</sup> (AC)<br>5 × 10 <sup>4</sup> (DC) |                          |
|                                                             | Electrical (16A / 230 V AC resistive)*  | 25000                      | 20000                                            |                          |

### Coil (at 20°C, 68°F)

|                    | Nominal operating power |
|--------------------|-------------------------|
| Single side stable | 200 mW                  |
| 1 coil latching    | 100 mW                  |
| 2 coil latching    | 200 mW                  |

<sup>#1</sup> 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.

### Remarks

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

### Characteristics

|                                                                                                                   |                           |                                                                  |
|-------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------------------------|
| Max. operating speed                                                                                              |                           | 20 cpm (at rated load)                                           |
| Initial insulation resistance* <sup>1</sup>                                                                       |                           | Min. 1,000 MΩ<br>(at 500 V DC)                                   |
| Initial breakdown voltage* <sup>2</sup>                                                                           | Between open contacts     | 1,000 Vrms                                                       |
|                                                                                                                   | Between contact sets      | 4,000 Vrms (2 Form A,<br>1 Form A 1 Form B)                      |
|                                                                                                                   | Between contact and coil  | 5,000 Vrms                                                       |
| Surge voltage between contact and coil* <sup>3</sup>                                                              |                           | Min. 12,000 V (initial)                                          |
| Operate time [Set time]* <sup>4</sup>                                                                             |                           | Max. 10ms (typ. 5ms)<br>[Max. 10ms (typ. 4ms)]<br>(at 20°C 68°F) |
| Release time (without diode) [Reset time]* <sup>4</sup>                                                           |                           | Max. 5ms (typ. 2ms)<br>[Max. 10ms (typ. 4ms)]<br>(at 20°C 68°F)  |
| Temperature rise (at 70°C)* <sup>5</sup>                                                                          |                           | Max. 50°C                                                        |
| Shock resistance                                                                                                  | Functional* <sup>6</sup>  | Min. 196 m/s <sup>2</sup> {20 G}                                 |
|                                                                                                                   | Destructive* <sup>7</sup> | Min. 980 m/s <sup>2</sup> {100 G}                                |
| Vibration resistance                                                                                              | Functional* <sup>8</sup>  | 10 to 55 Hz at double<br>amplitude of 2 mm                       |
|                                                                                                                   | Destructive               | 10 to 55 Hz at double<br>amplitude of 3 mm                       |
| Conditions for operation, transport and storage* <sup>9</sup><br>(Not freezing and condensing at low temperature) | Ambient temp.             | −40°C to 70°C<br>−40°F to 158°F                                  |
|                                                                                                                   | Humidity                  | 5 to 85% R.H.                                                    |
| Unit weight                                                                                                       |                           | Approx. 7 g .25 oz                                               |

\*<sup>1</sup> Measurement at same location as "Initial breakdown voltage" section.

\*<sup>2</sup> Detection current: 10mA

\*<sup>3</sup> Wave is standard shock voltage of ±1.2 × 50μs according to JEC-212-1981

\*<sup>4</sup> Nominal operating voltage applied to the coil, excluding contact bounce time.

\*<sup>5</sup> By resistive method

\*<sup>6</sup> Half-wave pulse of sine wave: 11ms, detection time: 10ms.

\*<sup>7</sup> Half-wave pulse of sine wave: 6ms

\*<sup>8</sup> Detection time: 10ms

\*<sup>9</sup> Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (see catalog)

TYPICAL APPLICATIONS

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

ORDERING INFORMATION

Ex. 

|    |    |   |   |
|----|----|---|---|
| DE | 1a | L | 3 |
|----|----|---|---|

 V

| Product name | Contact arrangement                                     | Operating function                                                   | Coil voltage, V DC                    |
|--------------|---------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------|
| DE           | 1a: 1 Form A<br>1a1b: 1 Form A 1 Form B<br>2a: 2 Form A | Nil: Single side stable<br>L: 1 coil latching<br>L2: 2 coil latching | 1.5, 3, 4.5, 5,<br>6, 9, 12, 24, 48** |

Notes: 1) Standard packing: Carton (tube package)  
20 pcs. Case 500 pcs.

\*\*just for single side stable

2) UL/CSA, VDE approved type is standard.

TYPES AND COIL DATA (at 20°C 68°F)

- Single side stable type
- 1 Form A, 1 Form A 1 Form B, 2 Form A

| Part No. | Nominal voltage, V DC | Pick-up voltage, V DC (max.) (initial) | Drop-out voltage, V DC (min.) (initial) | Coil resistance, Ω (±10%) | Nominal operating current, mA (±10%) | Nominal operating power, mW | Max. allowable voltage, V DC |
|----------|-----------------------|----------------------------------------|-----------------------------------------|---------------------------|--------------------------------------|-----------------------------|------------------------------|
| DE□-1.5V | 1.5                   | 1.05                                   | 0.15                                    | 11.3                      | 132.7                                | 200                         | 1.95                         |
| DE□-3V   | 3                     | 2.1                                    | 0.3                                     | 45                        | 66.6                                 | 200                         | 3.9                          |
| DE□-4.5V | 4.5                   | 3.15                                   | 0.45                                    | 101                       | 44.5                                 | 200                         | 5.85                         |
| DE□-5V   | 5                     | 3.5                                    | 0.5                                     | 125                       | 40                                   | 200                         | 6.5                          |
| DE□-6V   | 6                     | 4.2                                    | 0.6                                     | 180                       | 33.3                                 | 200                         | 7.8                          |
| DE□-9V   | 9                     | 6.3                                    | 0.9                                     | 405                       | 22.2                                 | 200                         | 11.7                         |
| DE□-12V  | 12                    | 8.4                                    | 1.2                                     | 720                       | 16.6                                 | 200                         | 15.6                         |
| DE□-24V  | 24                    | 16.8                                   | 2.4                                     | 2,880                     | 8.3                                  | 200                         | 31.2                         |
| DE□-48V  | 48                    | 33.6                                   | 4.8                                     | 11,520                    | 4.2                                  | 200                         | 62.4                         |

- 1 coil latching type
- 1 Form A

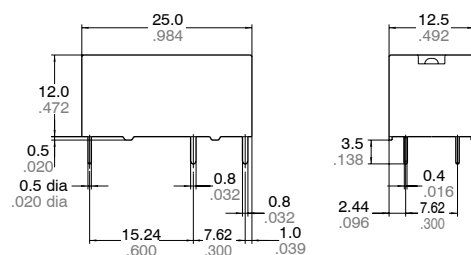
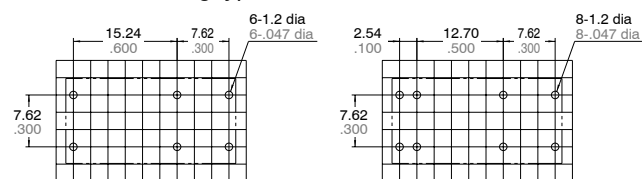
| Part No.   | Nominal voltage, V DC | Set voltage, V DC (max.) (initial) | Reset voltage, V DC (min.) (initial) | Coil resistance, Ω (±10%) | Nominal operating current, mA (±10%) | Nominal operating power, mW | Max. allowable voltage, V DC |
|------------|-----------------------|------------------------------------|--------------------------------------|---------------------------|--------------------------------------|-----------------------------|------------------------------|
| DE□-L-1.5V | 1.5                   | 1.05                               | 1.05                                 | 22.5                      | 66.6                                 | 100                         | 1.95                         |
| DE□-L-3V   | 3                     | 2.1                                | 2.1                                  | 90                        | 33.3                                 | 100                         | 3.9                          |
| DE□-L-4.5V | 4.5                   | 3.15                               | 3.15                                 | 202                       | 22.3                                 | 100                         | 5.85                         |
| DE□-L-5V   | 5                     | 3.5                                | 3.5                                  | 250                       | 20                                   | 100                         | 6.5                          |
| DE□-L-6V   | 6                     | 4.2                                | 4.2                                  | 360                       | 16.7                                 | 100                         | 7.8                          |
| DE□-L-9V   | 9                     | 6.3                                | 6.3                                  | 812                       | 11.1                                 | 100                         | 11.7                         |
| DE□-L-12V  | 12                    | 8.4                                | 8.4                                  | 1,440                     | 8.3                                  | 100                         | 15.6                         |
| DE□-L-24V  | 24                    | 16.8                               | 16.8                                 | 5,760                     | 4.2                                  | 100                         | 31.2                         |

- 2 coil latching type
- 1 Form A

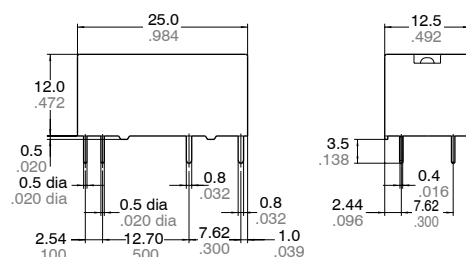
| Part No.    | Nominal voltage, V DC | Set voltage, V DC (max.) (initial) | Reset voltage, V DC (min.) (initial) | Coil resistance, Ω (±10%) |            | Nominal operating current, mA (±10%) |            | Nominal operating power, mW |            | Max. allowable voltage, V DC |
|-------------|-----------------------|------------------------------------|--------------------------------------|---------------------------|------------|--------------------------------------|------------|-----------------------------|------------|------------------------------|
|             |                       |                                    |                                      | Set coil                  | Reset coil | Set coil                             | Reset coil | Set coil                    | Reset coil |                              |
| DE□-L-1.5V  | 1.5                   | 1.05                               | 1.05                                 | 11.3                      | 11.3       | 66.6                                 | 66.6       | 200                         | 200        | 1.95                         |
| DE□-L2-3V   | 3                     | 2.1                                | 2.1                                  | 45                        | 45         | 66.6                                 | 66.6       | 200                         | 200        | 3.9                          |
| DE□-L2-4.5V | 4.5                   | 3.15                               | 3.15                                 | 101                       | 101        | 44.5                                 | 44.5       | 200                         | 200        | 5.85                         |
| DE□-L2-5V   | 5                     | 3.5                                | 3.5                                  | 125                       | 125        | 40                                   | 40         | 200                         | 200        | 6.5                          |
| DE□-L2-6V   | 6                     | 4.2                                | 4.2                                  | 180                       | 180        | 33.3                                 | 33.3       | 200                         | 200        | 7.8                          |
| DE□-L2-9V   | 9                     | 6.3                                | 6.3                                  | 405                       | 405        | 22.2                                 | 22.2       | 200                         | 200        | 11.7                         |
| DE□-L2-12V  | 12                    | 8.4                                | 8.4                                  | 720                       | 720        | 16.6                                 | 16.6       | 200                         | 200        | 15.6                         |
| DE□-L2-24V  | 24                    | 16.8                               | 16.8                                 | 2,880                     | 2,880      | 8.3                                  | 8.3        | 200                         | 200        | 31.2                         |

Note: Insert contact arrangement, e.g.1a, 1a1b, 2a, in □ for contact form required.

## DIMENSIONS

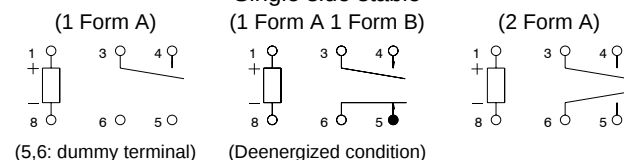
Single side stable  
1 coil latching typePC board pattern (Bottom view)  
Single side stable  
1 coil latching typeTolerance :  $\pm 0.1 \pm .004$ 

2 coil latching type

Tolerance:  $\pm 0.3 \pm .012$ 

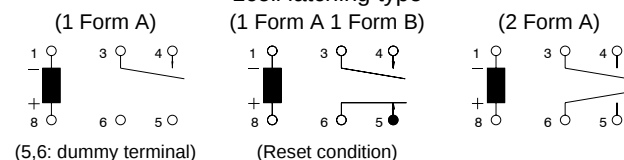
Schematic (Bottom view)

Single side stable



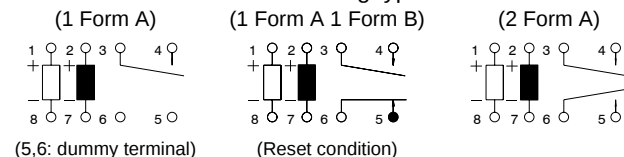
(Deenergized condition)

1coil latching type



(Reset condition)

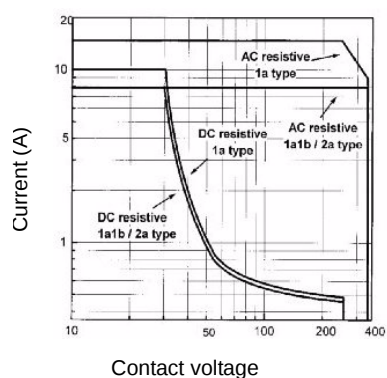
2coil latching type



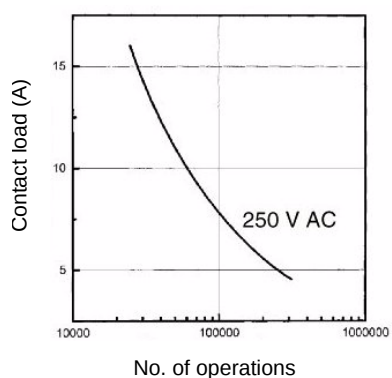
(Reset condition)

## REFERENCE DATA

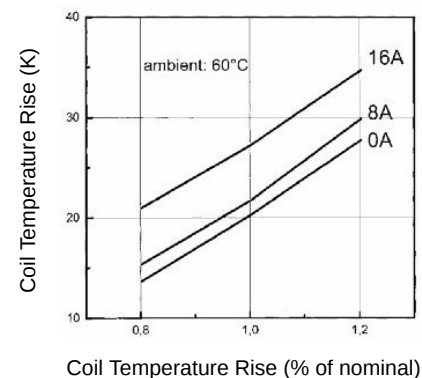
1. Max. switching power



2. Life curve



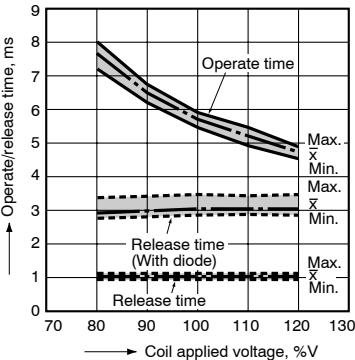
3. Coil Temperature Rise



DE (ADE)

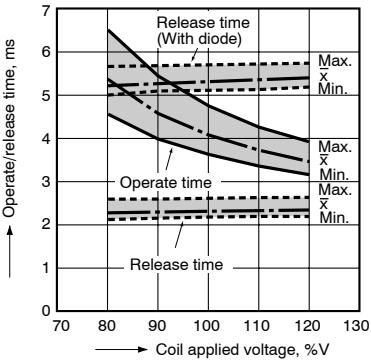
4-1. Operate/release time (1 Form A)

Tested sample: DE1a-5V  
Quantity: n=5



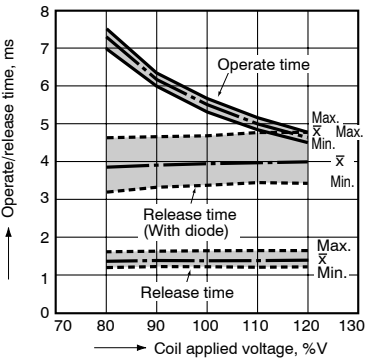
4-2. Operate/release time (1 Form A 1 Form B)

Tested sample: DE1a1b-5V, Quantity: n=5



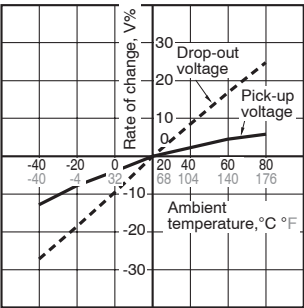
4-3. Operate/release time (2 Form A)

Tested sample: DE2a-5V, Quantity: n=5



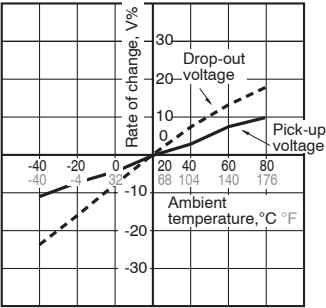
5-1. Ambient temperature characteristics (1 Form A)

Tested sample: DE1a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



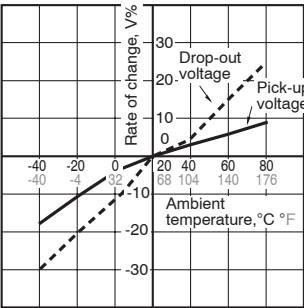
5-2. Ambient temperature characteristics (1 Form A 1 Form B)

Tested sample: DE1a1b-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6

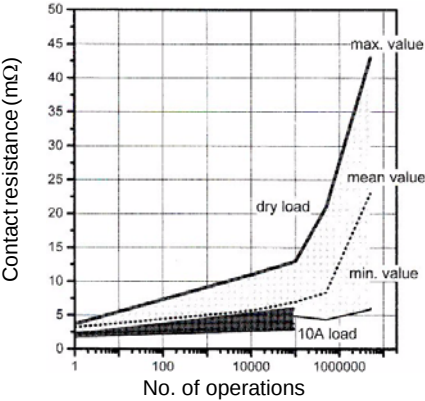


5-3. Ambient temperature characteristics (2 Form A)

Tested sample: DE2a-5V, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



6. Change of contact resistance



For Cautions for Use, see Relay Technical Information (see catalog).