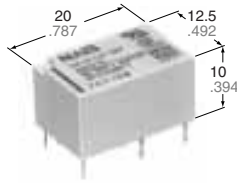


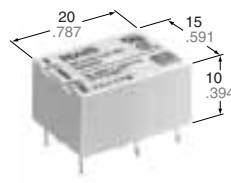
Panasonic
ideas for life

**10 A MINIATURE
POWER RELAY**

DK RELAYS



1a



1a1b

mm inch

FEATURES

- **Large capacity in small size: 10 A 250 V AC (1a)**
- **High sensitivity: 200 mW nominal operating power**
- **High breakdown voltage 4,000 Vrms between contacts and coil 1,000 Vrms between open contacts Meeting FCC Part 68**
- **Sealed construction**
- **Latching types available**

SPECIFICATIONS

Contact

| | | |
|---|------------------------------|---|
| Arrangement | 1 Form A | 2 Form A, 1 Form A 1 Form B |
| Initial contact resistance, max. (By voltage drop 6 V DC 1A) | 30 mΩ | |
| Contact material | Gold flash over silver alloy | |
| Rating (resistive) | Nominal switching capacity | 10 A 250 V AC 10 A 30 V DC |
| | Max. switching power | 300 W, 2,500 VA |
| | Max. switching voltage | 250 V AC, 30 V DC |
| | Max. switching current | 10 A |
| | Min. switching capacity*1 | 10 mA, 5 V DC |
| Expected life (min. operations) | Mechanical | 5×10 ⁷ |
| | Electrical (resistive) | 10 ⁵ (10 A 250 V AC, 10 A 30 V DC) |

Coil

| | |
|-------------------------|--------|
| Nominal operating power | 200 mW |
|-------------------------|--------|

#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.

Remarks

- * Specifications will vary with foreign standards certification ratings.
- *1 Measurement at same location as "Initial breakdown voltage" section
- *2 Detection current: 10 mA
- *3 Wave is standard shock voltage of $\pm 1.2 \times 50\mu\text{s}$ according to JEC-212-1981
- *4 Excluding contact bounce time
- *5 Half-wave pulse of sine wave: 11ms; detection time: 10μs
- *6 Half-wave pulse of sine wave: 6ms
- *7 Detection time: 10μs
- *8 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT

Characteristics

| | | |
|---|---|--|
| Max. operating speed | 20 cpm (at rated load) | |
| Initial insulation resistance*1 | Min. 1,000 mΩ (at 500 V DC) | |
| Initial breakdown voltage*2 | Between open contacts | 1,000 Vrms |
| | Between contacts and coil | 4,000 Vrms |
| Surge voltage between coil and contact*3 | Min. 10,000 V | |
| Operate time*4 (at nominal voltage) | Max. 10 ms (Approx. 5 ms) | |
| Release time (without diode)*4 (at nominal voltage) | Max. 8 ms (Approx. 3 ms) | |
| Temperature rise (at nominal voltage) | Max. 40°C with nominal coil voltage and at 10 A switching current | |
| Shock resistance | Functional*5 | Min. 98 m/s ² {10 G} |
| | Destructive*6 | Min. 980 m/s ² {100 G} |
| Vibration resistance | Functional*7 | 88.2 m/s ² {9 G}, 10 to 55 Hz at double amplitude of 1.5 mm |
| | Destructive | 176.4 m/s ² {18 G}, 10 to 55 Hz at double amplitude of 3.0 mm |
| Conditions for operation, transport and storage*8 (Not freezing and condensing at low temperature) | Ambient temp. | -40°C to +65°C -40°F to +149°F |
| | Humidity | 5 to 85% R.H. |
| Unit weight | 1 Form A | Approx. 5.6 g .20 oz |
| | 1 Form A 1 Form B, 2 Form A | Approx. 6 g .21 oz |

TYPICAL APPLICATIONS

- Switching power supply
- Power switching for various OA equipment
- Control or driving relays for industrial machines (robotics, numerical control machines, etc.)
- Output relays for programmable logic controllers, temperature controllers, timers and so on.
- Home appliances

ORDERING INFORMATION

Ex. DK 1a — L2 — 12V — F

| Contact arrangement | Operating function | Coil voltage | Environmental support |
|---|--|------------------------|--|
| 1a: 1 Form A 2a: 2 Form A 1a1b: 1 Form A 1 Form B | Nil: Single side stable L2: 2 coil latching | 3, 5, 6, 9, 12, 24V | <ul style="list-style-type: none"> • RoHS Directive conforming type (AgSnO₂ type) F: 1a Nil: 2a, 1a1b • RoHS Directive non-conforming type (AgCdO type) Nil: 1a |

Notes: 1. Standard packing Carton: 50 pcs.; Case: 500 pcs.
UL/CSA, TÜV approved type is standard.
2. 1 coil latching type available.

TYPES AND COIL DATA (at 20°C 68°F)

Single side stable

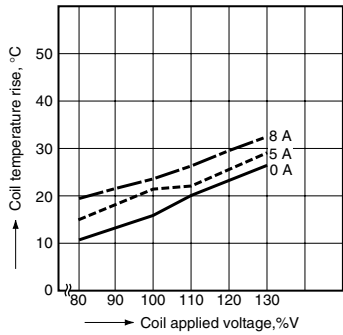
| | Part No. | Nominal voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Nominal operating current, mA ($\pm 10\%$) | | Coil resistance, Ω ($\pm 10\%$) | | Nominal operating power, mW | | Maximum allowable voltage, V DC (at 65°C 149°F) |
|----------------------|---------------|-----------------------|------------------------------|-------------------------------|--|--|--|--|-----------------------------|--|---|
| | | | | | | | | | | | |
| 1 Form A | DK1a-3V (-F) | 3 | 2.1 | 0.3 | 66.6 | | 45 | | 200 | | 3.9 |
| | DK1a-5V (-F) | 5 | 3.5 | 0.5 | 40 | | 125 | | 200 | | 6.5 |
| | DK1a-6V (-F) | 6 | 4.2 | 0.6 | 33.3 | | 180 | | 200 | | 7.8 |
| | DK1a-9V (-F) | 9 | 6.3 | 0.9 | 22.2 | | 405 | | 200 | | 11.7 |
| | DK1a-12V (-F) | 12 | 8.4 | 1.2 | 16.6 | | 720 | | 200 | | 15.6 |
| | DK1a-24V (-F) | 24 | 16.8 | 2.4 | 8.3 | | 2,880 | | 200 | | 31.2 |
| 1 Form A 1 Form B | DK1a1b-3V | 3 | 2.1 | 0.3 | 66.6 | | 45 | | 200 | | 3.9 |
| | DK1a1b-5V | 5 | 3.5 | 0.5 | 40 | | 125 | | 200 | | 6.5 |
| | DK1a1b-6V | 6 | 4.2 | 0.6 | 33.3 | | 180 | | 200 | | 7.8 |
| | DK1a1b-9V | 9 | 6.3 | 0.9 | 22.2 | | 405 | | 200 | | 11.7 |
| | DK1a1b-12V | 12 | 8.4 | 1.2 | 16.6 | | 720 | | 200 | | 15.6 |
| | DK1a1b-24V | 24 | 16.8 | 2.4 | 8.3 | | 2,880 | | 200 | | 31.2 |
| 2 Form A | DK2a-3V | 3 | 2.1 | 0.3 | 66.6 | | 45 | | 200 | | 3.9 |
| | DK2a-5V | 5 | 3.5 | 0.5 | 40 | | 125 | | 200 | | 6.5 |
| | DK2a-6V | 6 | 4.2 | 0.6 | 33.3 | | 180 | | 200 | | 7.8 |
| | DK2a-9V | 9 | 6.3 | 0.9 | 22.2 | | 405 | | 200 | | 11.7 |
| | DK2a-12V | 12 | 8.4 | 1.2 | 16.6 | | 720 | | 200 | | 15.6 |
| | DK2a-24V | 24 | 16.8 | 2.4 | 8.3 | | 2,880 | | 200 | | 31.2 |

2 coil latching

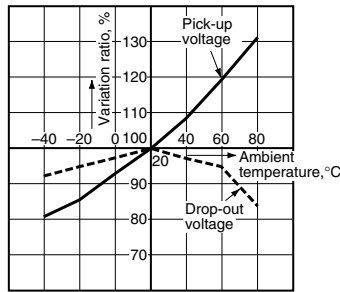
| | Part No. | Nominal voltage, V DC | Set voltage, V DC (max.) | Reset voltage, V DC (max.) | Nominal operating current, mA ($\pm 10\%$) | | Coil resistance, Ω ($\pm 10\%$) | | Nominal operating power, mW | | Maximum allowable voltage, V DC (at 65°C 149°F) |
|----------------------|------------------|-----------------------|--------------------------|----------------------------|--|-------|--|-------|-----------------------------|-------|---|
| | | | | | Set | Reset | Set | Reset | Set | Reset | |
| | | | | | | | | | | | |
| 1 Form A | DK1a-L2-3V (-F) | 3 | 2.1 | 2.1 | 66.6 | 66.6 | 45 | 45 | 200 | 200 | 3.9 |
| | DK1a-L2-5V (-F) | 5 | 3.5 | 3.5 | 40 | 40 | 125 | 125 | 200 | 200 | 6.5 |
| | DK1a-L2-6V (-F) | 6 | 4.2 | 4.2 | 33.3 | 33.3 | 180 | 180 | 200 | 200 | 7.8 |
| | DK1a-L2-9V (-F) | 9 | 6.3 | 6.3 | 22.2 | 22.2 | 405 | 405 | 200 | 200 | 11.7 |
| | DK1a-L2-12V (-F) | 12 | 8.4 | 8.4 | 16.6 | 16.6 | 720 | 720 | 200 | 200 | 15.6 |
| | DK1a-L2-24V (-F) | 24 | 16.8 | 16.8 | 8.3 | 8.3 | 2,880 | 2,880 | 200 | 200 | 31.2 |
| 1 Form A 1 Form B | DK1a1b-L2-3V | 3 | 2.1 | 2.1 | 66.6 | 66.6 | 45 | 45 | 200 | 200 | 3.9 |
| | DK1a1b-L2-5V | 5 | 3.5 | 3.5 | 40 | 40 | 125 | 125 | 200 | 200 | 6.5 |
| | DK1a1b-L2-6V | 6 | 4.2 | 4.2 | 33.3 | 33.3 | 180 | 180 | 200 | 200 | 7.8 |
| | DK1a1b-L2-9V | 9 | 6.3 | 6.3 | 22.2 | 22.2 | 405 | 405 | 200 | 200 | 11.7 |
| | DK1a1b-L2-12V | 12 | 8.4 | 8.4 | 16.6 | 16.6 | 720 | 720 | 200 | 200 | 15.6 |
| | DK1a1b-L2-24V | 24 | 16.8 | 16.8 | 8.3 | 8.3 | 2,880 | 2,880 | 200 | 200 | 31.2 |
| 2 Form A | DK2a-L2-3V | 3 | 2.1 | 2.1 | 66.6 | 66.6 | 45 | 45 | 200 | 200 | 3.9 |
| | DK2a-L2-5V | 5 | 3.5 | 3.5 | 40 | 40 | 125 | 125 | 200 | 200 | 6.5 |
| | DK2a-L2-6V | 6 | 4.2 | 4.2 | 33.3 | 33.3 | 180 | 180 | 200 | 200 | 7.8 |
| | DK2a-L2-9V | 9 | 6.3 | 6.3 | 22.2 | 22.2 | 405 | 405 | 200 | 200 | 11.7 |
| | DK2a-L2-12V | 12 | 8.4 | 8.4 | 16.6 | 16.6 | 720 | 720 | 200 | 200 | 15.6 |
| | DK2a-L2-24V | 24 | 16.8 | 16.8 | 8.3 | 8.3 | 2,880 | 2,880 | 200 | 200 | 31.2 |

4. Coil temperature rise

Sample: DK1a1b-12V, 5 pcs.
Ambient temperature: 20°C 68°F



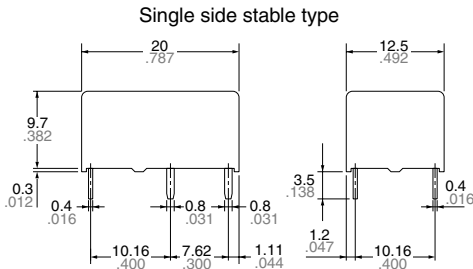
5. Ambient temperature characteristics



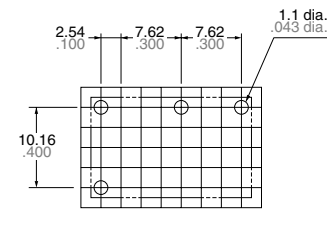
DIMENSIONS

mm inch

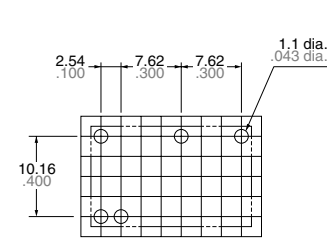
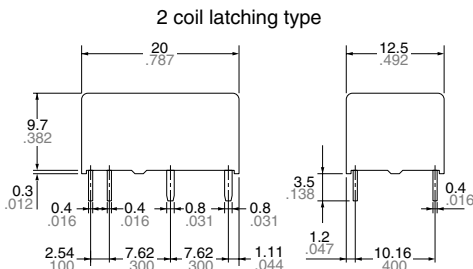
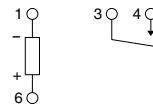
1.1 Form A type



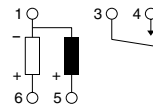
PC board pattern (Copper-side view)



Schematic (Bottom view) Single side stable (Deenergized condition)



2 coil latching (Reset condition)



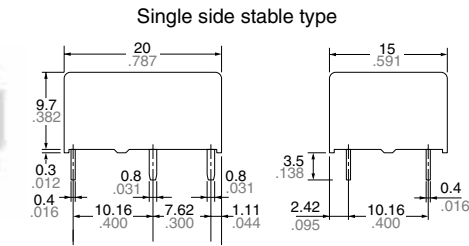
The above shows 2 coil latching type. No.5 terminal is eliminated on single side stable type.

Since this is a polarized relay, the connection to the coil should be done according to the above schematic.

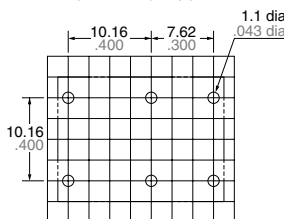
General tolerance: $\pm 0.3 \pm 0.012$

Tolerance: $\pm 0.1 \pm 0.004$

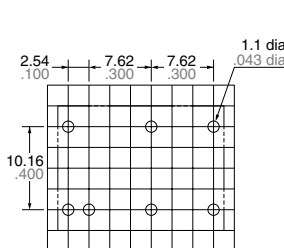
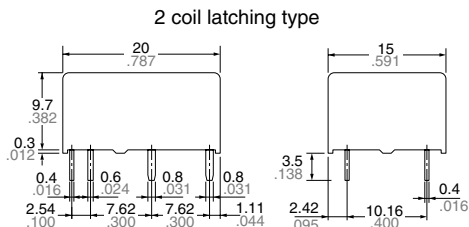
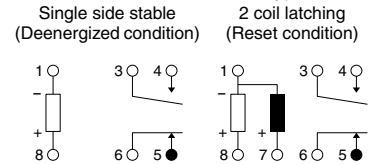
2.1 Form A 1 Form B type, 2 Form A type



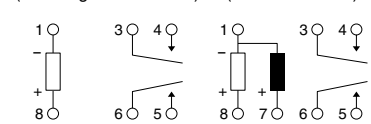
PC board pattern (Copper-side view)



Schematic (Bottom view) <1 Form A 1 Form B type>



<2 Form A>



Since this is a polarized relay, the connection to the coil should be done according to the above schematic.

Note:
Relay out-line and PC board pattern are common for both 1 Form A 1 Form B type and 2 Form A type.

General tolerance: $\pm 0.3 \pm 0.012$

Tolerance: $\pm 0.1 \pm 0.004$

DK relay socket



TYPES AND RELAY COMPATIBILITY

| Relay | | Socket | | 1 Form A | | 1 Form A 1 Form B, 2 Form A | |
|-------------------------------|-------------------------|-------------------------|----------------------|-------------------------|----------------------|-----------------------------|----------------------|
| | | Single side stable type | 2 coil latching type | Single side stable type | 2 coil latching type | Single side stable type | 2 coil latching type |
| 1 Form A | Single side stable type | DK1a-PS | DK1a-PSL2 | — | — | — | — |
| | 2 coil latching type | — | DK1a-PSL2 | — | — | — | — |
| 1 Form A 1 Form B 2 Form A | Single side stable type | — | — | DK2a-PS | DK2a-PSL2 | — | — |
| | 2 coil latching type | — | — | — | — | — | DK2a-PSL2 |

SPECIFICATIONS

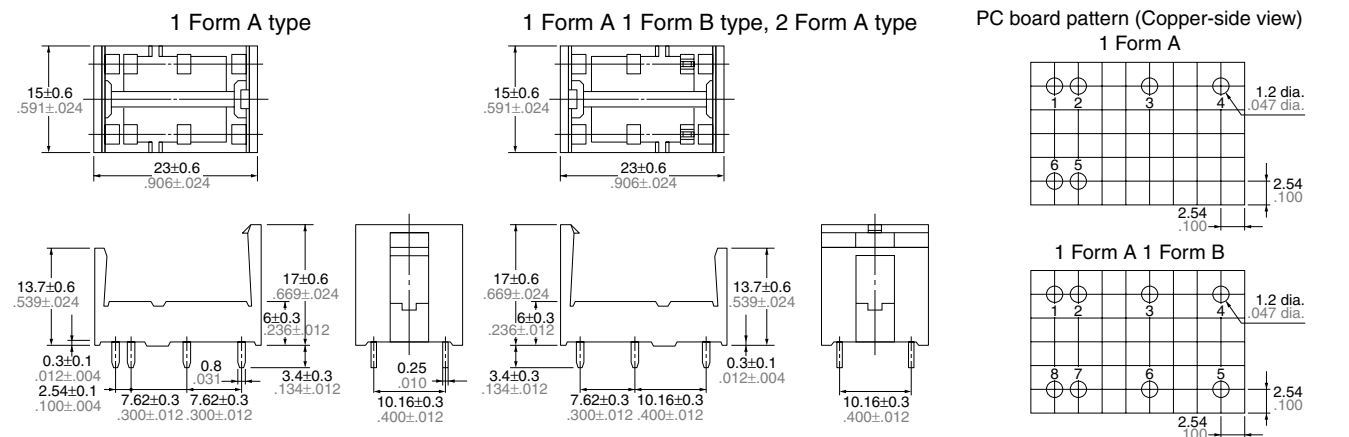
| | |
|-------------------------|--|
| Breakdown voltage*1 | 4,000 Vrms (Except the portion between coil terminals) |
| Insulation resistance | Min. 1,000 mΩ (at 500 V DC) |
| Heat resistance | 150°C (for 1 hour) |
| Max. continuous current | 10 A (DK1a-PS, DK1a-PSL2), 8 A (DK2a-PS, DK2a-PSL2) |

Remarks

*1 Detection current: 10 mA

DIMENSIONS

mm inch



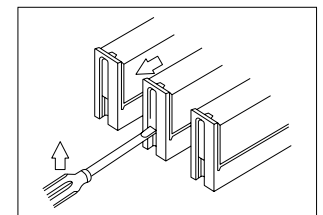
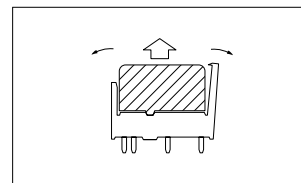
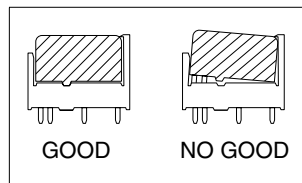
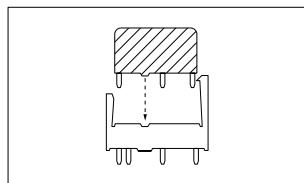
The above shows 2 coil latching type. No.2 and 5 terminal are eliminated on single side stable type.

General tolerance: $\pm 0.3 \pm .012$

Tolerance: $\pm 0.1 \pm .004$

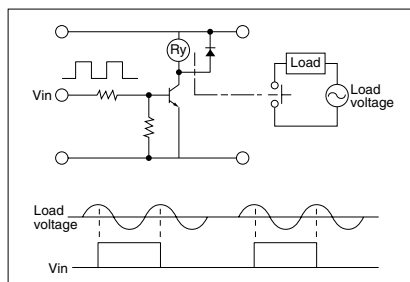
FIXING AND REMOVAL METHOD

- Match the direction of relay and socket.
- Both ends of the relay are to be secured firmly so that the socket hooks on the top surface of the relay.
- Remove the relay, applying force in the direction shown below.
- In case there is not enough space to grasp relay with fingers, use screwdrivers in the way shown below.



NOTES

- Phase synchronization of AC-load switching
In case of switching the contact synchronized with phase of load voltage, the life of contact might be shorter or contact failure might be caused. Please confirm this matter in the actual system in this case. If necessary, the phase control would be recommended.



- Soldering should be done under the following conditions:
250°C 482°F within 10s
300°C 572°F within 5s
350°C 662°F within 3s

For Cautions for Use, see Relay Technical Information