



**1 Form C / 2 Form C, 2 A,
200 mW Nominal operating
power relays**

DS RELAYS



RoHS compliant

FEATURES

1. 1 Form C / 2 Form C contact
2. Available 2 coil latching type
3. DIL terminal array enables use of IC sockets

TYPICAL APPLICATIONS

1. Telecommunications and measuring devices
2. Office equipment
3. Computers and related equipment
4. Industrial equipment

ORDERING INFORMATION

DS E - -

Contact arrangement

- 1: 1 Form C
- 2: 2 Form C

M: Standard type

S: High sensitivity type

Operating function

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

Nominal coil voltage

DC 1.5, 3, 5, 6, 9, 12, 24, 48 V

Note: * Nominal coil voltage 1.5V type are 1 Form C only.

TYPES

| Contact arrangement | Nominal coil voltage | High sensitivity type | | Standard type | |
|---------------------|----------------------|-------------------------|----------------------|-------------------------|----------------------|
| | | Single side stable type | 2 coil latching type | Single side stable type | 2 coil latching type |
| | | Part No. | Part No. | Part No. | Part No. |
| 1 Form C | 1.5 V DC | DS1E-S-DC1.5V | DS1E-SL2-DC1.5V | DS1E-M-DC1.5V | DS1E-ML2-DC1.5V |
| | 3 V DC | DS1E-S-DC3V | DS1E-SL2-DC3V | DS1E-M-DC3V | DS1E-ML2-DC3V |
| | 5 V DC | DS1E-S-DC5V | DS1E-SL2-DC5V | DS1E-M-DC5V | DS1E-ML2-DC5V |
| | 6 V DC | DS1E-S-DC6V | DS1E-SL2-DC6V | DS1E-M-DC6V | DS1E-ML2-DC6V |
| | 9 V DC | DS1E-S-DC9V | DS1E-SL2-DC9V | DS1E-M-DC9V | DS1E-ML2-DC9V |
| | 12 V DC | DS1E-S-DC12V | DS1E-SL2-DC12V | DS1E-M-DC12V | DS1E-ML2-DC12V |
| | 24 V DC | DS1E-S-DC24V | DS1E-SL2-DC24V | DS1E-M-DC24V | DS1E-ML2-DC24V |
| | 48 V DC | DS1E-S-DC48V | DS1E-SL2-DC48V | DS1E-M-DC48V | DS1E-ML2-DC48V |
| 2 Form C | 3 V DC | DS2E-S-DC3V | DS2E-SL2-DC3V | — | — |
| | 5 V DC | DS2E-S-DC5V | DS2E-SL2-DC5V | — | — |
| | 6 V DC | DS2E-S-DC6V | DS2E-SL2-DC6V | — | — |
| | 9 V DC | DS2E-S-DC9V | DS2E-SL2-DC9V | — | — |
| | 12 V DC | DS2E-S-DC12V | DS2E-SL2-DC12V | — | — |
| | 24 V DC | DS2E-S-DC24V | DS2E-SL2-DC24V | — | — |
| | 48 V DC | DS2E-S-DC48V | DS2E-SL2-DC48V | — | — |

Standard packing: Carton: 50 pcs.; Case: 500 pcs.

RATING

1. Coil data

1) Single side stable type

| 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 50°C 122°F) |
|---------------------------|----------------------|--|---|---|---------------------------------------|-------------------------|--|
| Standard (M) type | 1.5 V DC | 70%V or less of nominal voltage (Initial) | 10%V or more of nominal voltage (Initial) | 266.7 mA | 5.63 Ω | 400 mW | 1 Form C: 120%V of nominal voltage |
| | 3 V DC | | | 133.3 mA | 22.5 Ω | | |
| | 5 V DC | | | 80.0 mA | 62.5 Ω | | |
| | 6 V DC | | | 66.7 mA | 90 Ω | | |
| | 9 V DC | | | 44.4 mA | 203 Ω | | |
| | 12 V DC | | | 33.3 mA | 360 Ω | | |
| | 24 V DC | | | 16.7 mA | 1,440 Ω | | |
| High sensitivity (S) type | 1.5 V DC | 1 Form C: 80%V or less of nominal voltage | 10%V or more of nominal voltage (Initial) | 133.3 mA | 11.3 Ω | 200 mW | 1 Form C: 160%V of nominal voltage 2 Form C: 220%V of nominal voltage |
| | 3 V DC | | | 66.7 mA | 45 Ω | | |
| | 5 V DC | | | 40.0 mA | 125 Ω | | |
| | 6 V DC | 2 Form C: 70%V or less of nominal voltage (Initial) | | 33.3 mA | 180 Ω | | |
| | 9 V DC | | | 22.2 mA | 405 Ω | | |
| | 12 V DC | | | 16.7 mA | 720 Ω | | |
| | 24 V DC | 8.3 mA | | 2,880 Ω | | | |
| 48 V DC | 4.2 mA | 11,520 Ω | | | | | |

2) 2 coil latching type

| 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 50°C 122°F) |
|---------------------------|----------------------|--|--|---|------------|---------------------------------------|------------|-------------------------|------------|--|
| | | | | Set coil | Reset coil | Set coil | Reset coil | Set coil | Reset coil | |
| Standard (M) type | 1.5 V DC | 70%V or less of nominal voltage (Initial) | 70%V or less of nominal voltage (Initial) | 240 mA | 240 mA | 6.25 Ω | 6.25 Ω | 360 mW | 360 mW | 1 Form C: 120%V of nominal voltage |
| | 3 V DC | | | 120 mA | 120 mA | 25 Ω | 25 Ω | | | |
| | 5 V DC | | | 72 mA | 72 mA | 69.4 Ω | 69.4 Ω | | | |
| | 6 V DC | | | 60 mA | 60 mA | 100 Ω | 100 Ω | | | |
| | 9 V DC | | | 40 mA | 40 mA | 225 Ω | 225 Ω | | | |
| | 12 V DC | | | 30 mA | 30 mA | 400 Ω | 400 Ω | | | |
| | 24 V DC | | | 15 mA | 15 mA | 1,600 Ω | 1,600 Ω | | | |
| High sensitivity (S) type | 1.5 V DC | 1 Form C: 80%V or less of nominal voltage | 1 Form C: 80%V or less of nominal voltage | 120 mA | 120 mA | 12.5 Ω | 12.5 Ω | 180 mW | 180 mW | 1 Form C: 160%V of nominal voltage 2 Form C: 220%V of nominal voltage |
| | 3 V DC | | | 60 mA | 60 mA | 50 Ω | 50 Ω | | | |
| | 5 V DC | | | 36 mA | 36 mA | 139 Ω | 139 Ω | | | |
| | 6 V DC | 2 Form C: 70%V or less of nominal voltage (Initial) | | 30 mA | 30 mA | 200 Ω | 200 Ω | | | |
| | 9 V DC | | | 20 mA | 20 mA | 450 Ω | 450 Ω | | | |
| | 12 V DC | | | 15 mA | 15 mA | 800 Ω | 800 Ω | | | |
| | 24 V DC | 7.5 mA | | 7.5 mA | 3,200 Ω | 3,200 Ω | | | | |
| 48 V DC | 3.75 mA | 3.75 mA | 12,800 Ω | 12,800 Ω | | | | | | |

2. Specifications

| Characteristics | Item | | Specifications | |
|----------------------------|---|--------------------------|---|---------------------------|
| Contact | Arrangement | | 1 Form C | 2 Form C |
| | Initial contact resistance, max. | | Max. 50 mΩ (By voltage drop 6 V DC 1A) | |
| | Contact material | | Ag+Au clad | |
| Rating | Nominal switching capacity | | 2 A 30 V DC (resistive load) | |
| | Max. switching power | | 60 W, 125 VA (resistive load) | |
| | Max. switching voltage | | 220 V DC, 250 V AC | |
| | Max. carrying current | | 3 A | |
| | Min. switching capacity (Reference value)*1 | | 10μA 10m V DC | |
| | Nominal operating power | | Single side stable (M type: 400 mW, S type: 200 mW); latching (M type: 360 mW, S type: 180 mW) | |
| Electrical characteristics | Insulation resistance (Initial) | | Min. 100MΩ (at 500V DC) Measurement at same location as "Initial breakdown voltage" section. | |
| | Breakdown voltage (Initial) | Between open contacts | 1,000 Vrms for 1min. (500 Vrms for 1min: 1 Form C type) (Detection current: 10mA.) | |
| | | Between contact and coil | 1,500 Vrms for 1min. (1,000 Vrms for 1min: 1 Form C type) (Detection current: 10mA.) | |
| | Temperature rise | | Max. 65°C (By resistive method, nominal coil voltage applied to the coil, contact carrying current: 2A.) | |
| | Operate time [Set time] (at 20°C 68°F) | | Max. 10 ms [10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) | |
| | Release time [Reset time] (at 20°C 68°F) | | Max. 5 ms [10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode) | |
| Mechanical characteristics | Shock resistance | Functional*2 | Min. 490 m/s ² | Min. 490 m/s ² |
| | | 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 3.3 mm (Detection time: 10μs.) | |
| | | Destructive | 10 to 55 Hz at double amplitude of 5 mm | |
| Expected life | Mechanical | | Min. 10 ⁸ (10 ⁷ : 1 Form C latching type) (at 600 cpm) | |
| | Electrical | | Min. 5×10 ⁵ rated load (at 60 cpm) | |
| 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 (at rated load) | | 60 cpm | |
| Unit weight | | | Approx. 3 g .11 oz | Approx. 4g .14oz |

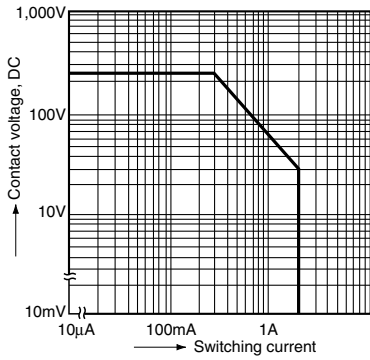
Notes: *1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load. TX/TX-S/TX-D relay AgPd contact type are available for low level load switching (10V DC, 10mA max. level).

*2 Half-wave pulse of sine wave: 1 ms; detection time: 10μs

*3 Refer to "AMBIENT ENVIRONMENT" in GENERAL APPLICATION GUIDELINES.

REFERENCE DATA

1. Maximum switching capacity



2. Life curve (Resistive load)



3. Contact reliability for AC loads

Tested sample: DS2E-S-DC24V 10 pcs.
 Operating speed: 20 cpm.
 Detection level: 200 mΩ

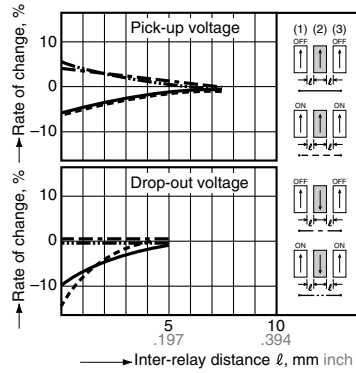


4. Operate and release time characteristics (2 Form C single side stable type)

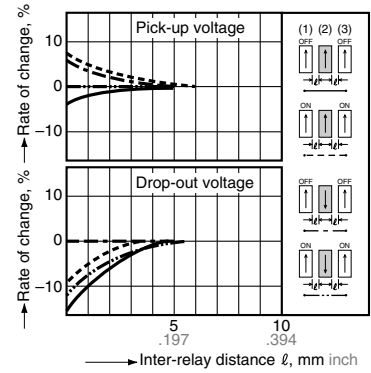
Test condition: Without diode connected to coil in parallel



5-(1). Influence of adjacent mounting (1 Form C)



5-(2). Influence of adjacent mounting (2 Form C)



DIMENSIONS (mm inch)

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

DS (1 Form C)

Single side stable, 2 coil latching

CAD Data

External dimensions



General tolerance: $\pm 0.3 \pm 0.012$

PC board pattern (Bottom view)

Single side stable

2 coil latching



Schematic (Bottom view)

Single side stable

2 coil latching



(Deenergized condition)



(Reset condition)

Tolerance: $\pm 0.1 \pm 0.004$

DS (2 Form C)
Single side stable

CAD Data

External dimensions



General tolerance: $\pm 0.3 \pm 0.12$

PC board pattern (Bottom view)



Schematic (Bottom view)



(Deenergized condition)

Tolerance: $\pm 0.1 \pm 0.04$

DS (2 Form C)
2 coil latching

CAD Data

External dimensions



General tolerance: $\pm 0.3 \pm 0.12$

PC board pattern (Bottom view)



Schematic (Bottom view)



(Reset condition)

Tolerance: $\pm 0.1 \pm 0.04$

NOTES

1. Coil connection

When connecting coils, refer to the wiring diagram to prevent mis-operation or malfunction.

For general cautions for use, please refer to the "Cautions for use of Signal Relays" or "General Application Guidelines".

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