

Panasonic
ideas for life

Space reduction down to footprint of
5.6 mm × 14 mm² realized

TN RELAYS



⚠ Product to be discontinued.

FEATURES

1. 2 Form C Slim type

14.0(L) × 9.0(W) × 5.0(H) .551(L) × .354(W) × .197(H)

Small header area makes higher density mounting possible

2. Nominal operating power:

High sensitivity of 140 mW (Single side stable type)

By using the highly efficient polar magnetic circuit "seesaw balance mechanism", a nominal operating power of 140 mW (minimum operating power of 79 mW) has been achieved.

3. Surge breakdown voltage:

1500 V FCC Part 68

4. Outstanding vibration and shock resistance

Functional shock resistance: 490 m/s²

Destructive shock resistance: 980 m/s²

Functional vibration resistance:

10 to 55 Hz (at double amplitude of 3 mm .118 inch)

Destructive vibration resistance:

10 to 55 Hz (at double amplitude of 5 mm .197 inch)

5. High density mounting possible

High-efficiency magnetic circuits ensure low magnetic flux leakage.

Because characteristics are little changed by proximity mounting, high-density mounting is possible.

6. The use of gold-clad twin crossbar contacts ensures high contact reliability.

*We also offer TX-series relays with AgPd contacts, suitable for use in low level load analog circuits.

7. Low thermal electromotive force

As well as low power consumption of 140 mW, use of a structure with separate coil and contact sections has reduced thermal electromotive force to the low level of approximately 5 μV.

8. Latching types also available.

9. Self-clinching terminal also available.

10. Sealed construction allows automatic washing.

TYPICAL APPLICATIONS

- Communications
- Measurement equipment
- OA equipment
- Industrial machines

ORDERING INFORMATION

TN 2 - - -

Contact arrangement

2: 2 Form C

Operating function

Nil: Single side stable

L: 1 coil latching

L2: 2 coil latching

Terminal shape

Nil: Standard PC board terminal

H: Self-clinching terminal

Nominal coil voltage (DC)*

3, 4.5, 5, 6, 9, 12, 24, 48V

Notes: 1. *48 V coil type: Single side stable only

2. In case of 5 V drive circuit, it is recommended to use 4.5 V type relay.

TYPES

1. Standard PC board terminal

| Contact arrangement | Nominal coil voltage | Single side stable | 1 coil latching | 2 coil latching |
|---------------------|----------------------|--------------------|-----------------|-----------------|
| | | Part No. | Part No. | Part No. |
| 2 Form C | 3V DC | TN2-3V | TN2-L-3V | TN2-L2-3V |
| | 4.5V DC | TN2-4.5V | TN2-L-4.5V | TN2-L2-4.5V |
| | 5V DC | TN2-5V | TN2-L-5V | TN2-L2-5V |
| | 6V DC | TN2-6V | TN2-L-6V | TN2-L2-6V |
| | 9V DC | TN2-9V | TN2-L-9V | TN2-L2-9V |
| | 12V DC | TN2-12V | TN2-L-12V | TN2-L2-12V |
| | 24V DC | TN2-24V | TN2-L-24V | TN2-L2-24V |
| | 48V DC | TN2-48V | — | — |

Standard packing: Tube: 50 pcs.; Case: 1,000 pcs.

2. Self-clinching terminal

| Contact arrangement | Nominal coil voltage | Single side stable | 1 coil latching | 2 coil latching |
|---------------------|----------------------|--------------------|-----------------|-----------------|
| | | Part No. | Part No. | Part No. |
| 2 Form C | 3V DC | TN2-H-3V | TN2-L-H-3V | TN2-L2-H-3V |
| | 4.5V DC | TN2-H-4.5V | TN2-L-H-4.5V | TN2-L2-H-4.5V |
| | 5V DC | TN2-H-5V | TN2-L-H-5V | TN2-L2-H-5V |
| | 6V DC | TN2-H-6V | TN2-L-H-6V | TN2-L2-H-6V |
| | 9V DC | TN2-H-9V | TN2-L-H-9V | TN2-L2-H-9V |
| | 12V DC | TN2-H-12V | TN2-L-H-12V | TN2-L2-H-12V |
| | 24V DC | TN2-H-24V | TN2-L-H-24V | TN2-L2-H-24V |
| | 48V DC | TN2-H-48V | — | — |

Standard packing: Tube: 50 pcs.; Case: 1,000 pcs.

Note: Types ("3" to the end of part No.) designed to withstand strong vibration caused, for example, by the use of terminal cutters, can also be ordered.

However, please contact us if you need parts for use in low level load and low thermal power.

RATING

1. Coil data

1) Single side stable

| 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) |
|----------------------|--|--|---|---------------------------------------|-------------------------|-------------------------------------|
| 3V DC | 75%V or less of nominal voltage* (Initial) | 10%V or more of nominal voltage* (Initial) | 46.7mA | 64.3Ω | 140mW | 150%V of nominal voltage |
| 4.5V DC | | | 31.1mA | 145Ω | | |
| 5V DC | | | 28.1mA | 178Ω | | |
| 6V DC | | | 23.3mA | 257Ω | | |
| 9V DC | | | 15.5mA | 579Ω | | |
| 12V DC | | | 11.7mA | 1,028Ω | | |
| 24V DC | | | 8.3mA | 2,880Ω | 200mW | |
| 48V DC | | | 6.25mA | 7,680Ω | 300mW | 120%V of nominal voltage |

2) 1 coil latching

| 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) |
|----------------------|--|--|---|---------------------------------------|-------------------------|-------------------------------------|
| 3V DC | 75%V or less of nominal voltage* (Initial) | 75%V or less of nominal voltage* (Initial) | 33.3mA | 90Ω | 100mW | 150%V of nominal voltage |
| 4.5V DC | | | 22.2mA | 202.5Ω | | |
| 5V DC | | | 20mA | 250Ω | | |
| 6V DC | | | 16.7mA | 360Ω | | |
| 9V DC | | | 11.1mA | 810Ω | | |
| 12V DC | | | 8.3mA | 1,440Ω | | |
| 24V DC | | | 6.3mA | 3,840Ω | 150mW | |

3) 2 coil latching

| 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 | |
| 3V DC | 75%V or less of nominal voltage* (Initial) | 75%V or less of nominal voltage* (Initial) | 66.7mA | 66.7mA | 45Ω | 45Ω | 200mW | 200mW | 150%V of nominal voltage |
| 4.5V DC | | | 44.4mA | 44.4mA | 101.2Ω | 101.2Ω | | | |
| 5V DC | | | 40mA | 40mA | 125Ω | 125Ω | | | |
| 6V DC | | | 33.3mA | 33.3mA | 180Ω | 180Ω | | | |
| 9V DC | | | 22.2mA | 22.2mA | 405Ω | 405Ω | | | |
| 12V DC | | | 16.7mA | 16.7mA | 720Ω | 720Ω | | | |
| 24V DC | | | 12.5mA | 12.5mA | 1,920Ω | 1,920Ω | 300mW | 300mW | 120%V of nominal voltage |

*Pulse drive (JIS C 5442-1986)

2. Specifications

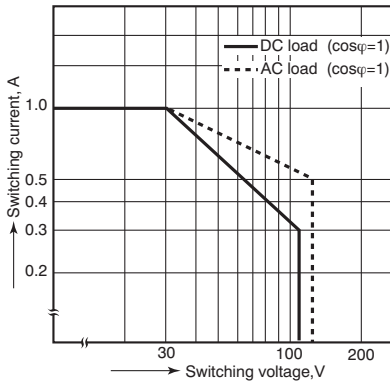
| Characteristics | Item | | Specifications |
|----------------------------|---|--------------------------|--|
| Contact | Arrangement | | 2 Form C |
| | Initial contact resistance, max. | | Max. 60 mΩ (By voltage drop 6 V DC 1A) |
| | Contact material | | Ag+Au clad |
| Rating | Nominal switching capacity | | 1 A 30 V DC, 0.5 A 125 V AC (resistive load) |
| | Max. switching power | | 30 W (DC), 62.5 VA (AC) (resistive load) |
| | Max. switching voltage | | 110 V DC, 125 V AC |
| | Max. switching current | | 1 A |
| | Min. switching capacity (Reference value) ^{*1} | | 10μA 10mV DC |
| | Nominal operating power | Single side stable | 140 mW (3 to 12 V DC), 200 mW (24 V DC), 300 mW (48 V DC) |
| | | 1 coil latching | 100 mW (3 to 12 V DC), 150 mW (24 V DC) |
| | | 2 coil latching | 200 mW (3 to 12 V DC), 300 mW (24 V DC) |
| Electrical characteristics | Insulation resistance (Initial) | | Min. 1,000MΩ (at 500V DC) Measurement at same location as "Initial breakdown voltage" section. |
| | Breakdown voltage (Initial) | Between open contacts | 750 Vrms for 1 min. (Detection current: 10 mA) |
| | | Between contact and coil | 1,000 Vrms for 1 min. (Detection current: 10 mA) |
| | | Between contact sets | 1,000 Vrms for 1 min. (Detection current: 10 mA) |
| | Surge breakdown voltage (Initial) | Between open contacts | 1,500 V (10×160μs) (FCC Part 68) |
| | Temperature rise (at 20°C 68°F) | | Max. 50°C (By resistive method, nominal coil voltage applied to the coil; contact carrying current: 1A.) |
| | Operate time [Set time] (at 20°C 68°F) | | Max. 3 ms [Max. 3 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) |
| Mechanical characteristics | Release time [Reset time] (at 20°C 68°F) | | Max. 3 ms [Max. 3 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode) |
| | Shock resistance | Functional | Min. 490 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 3 mm (Detection time: 10μs.) |
| | | Destructive | 10 to 55 Hz at double amplitude of 5 mm |
| Expected life | Mechanical | | Min. 10 ⁸ (at 180 cpm) |
| | Electrical | | Min. 2×10 ⁵ (1 A 30 V DC resistive), Min. 10 ⁵ (0.5 A 125 V AC resistive) (at 20 cpm) |
| Conditions | Conditions for operation, transport and storage ^{*2} | | 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) | | 20 cpm |
| Unit weight | | | Approx. 1.5 g .053 oz |

*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-series relay AgPd contact types are available for low level load switching.)

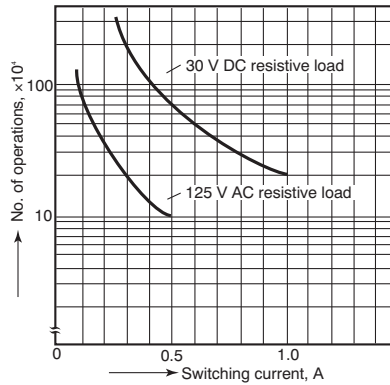
*2 Refer to "6. Usage, Storage and Transport Conditions" in [AMBIENT ENVIRONMENT](#) section in [Relay Technical Information](#).

REFERENCE DATA

1. Maximum switching capacity

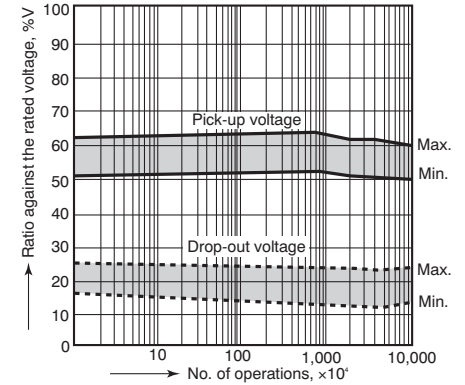


2. Life curve



3. Mechanical life

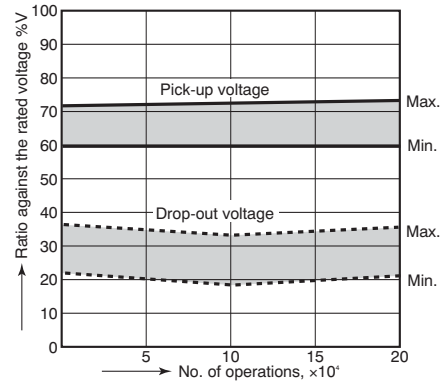
Tested sample: TN2-12V, 10 pcs.



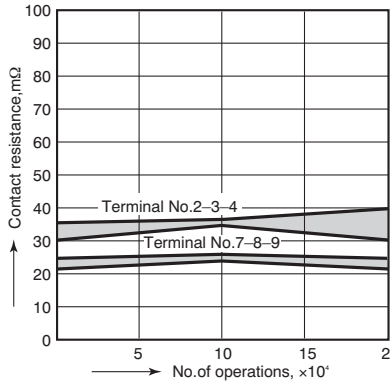
4. Electrical life (DC load)

Tested sample: TN2-12V, 10 pcs.
Condition: 1 A 30 V DC resistive load, 20 cpm

Change of pick-up and drop-out voltage

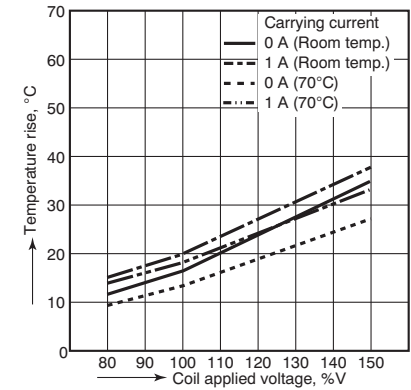


Change of contact resistance



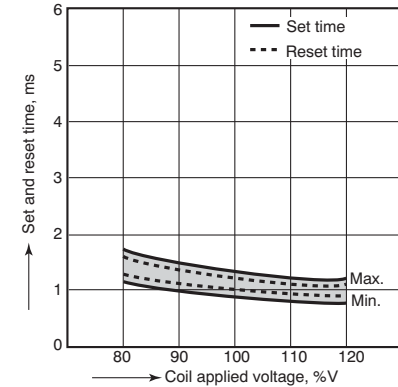
5. Coil temperature rise

Tested sample: TN2-12V
Point measured: Inside the coil
Ambient temperature: Room temperature (25° to 26°C), 70°C (77° to 79°F), 158°F



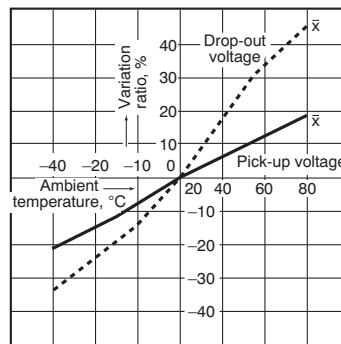
6. Set/reset time characteristics

Tested sample: TN2-L2-12V, 5 pcs.



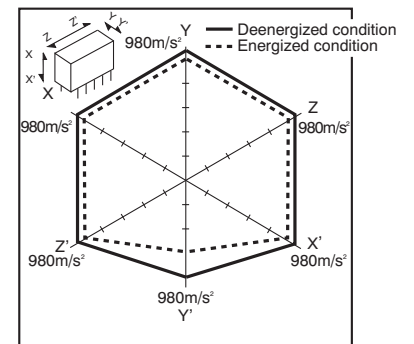
7. Ambient temperature characteristics

Tested sample: TN2-12V, 5 pcs.



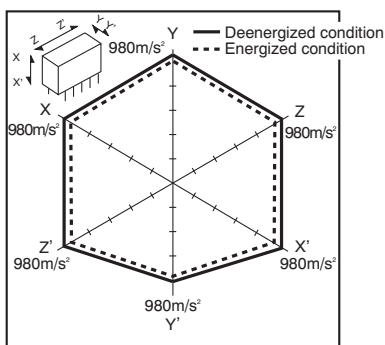
8-(1). Malfunctional shock (single side stable)

Tested sample: TN2-12V, 6 pcs.

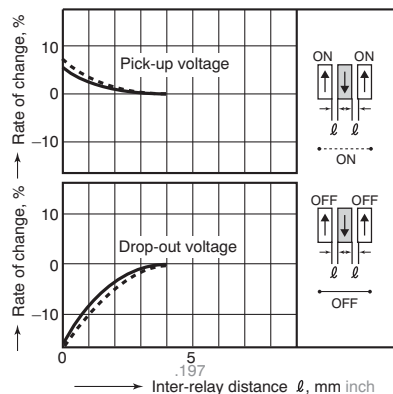


8-(2). Malfunctional shock (latching)

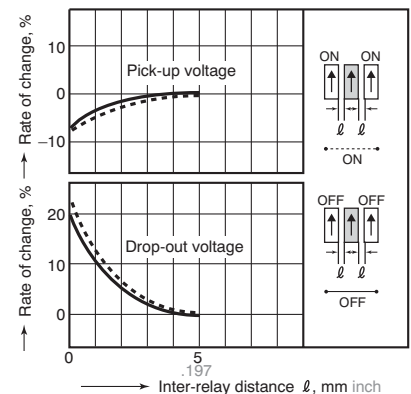
Tested sample: TN2-L2-12V, 6 pcs.



9-(1). Influence of adjacent mounting



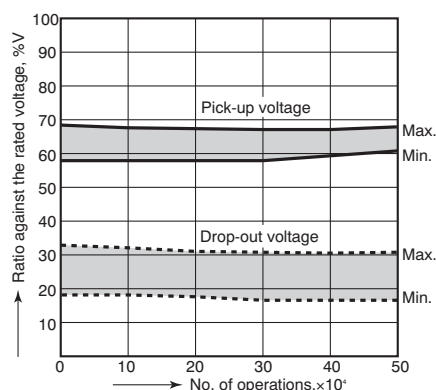
9-(2). Influence of adjacent mounting



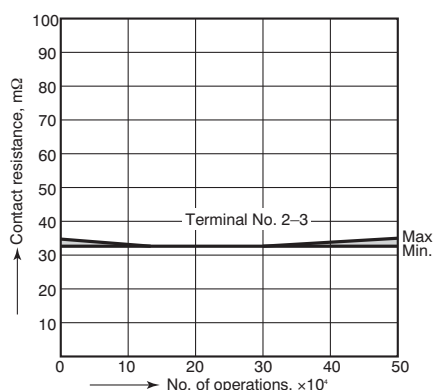
10. Actual load test (35 mA 48 V DC wire spring relay load)

Tested sample: TN2-12V, 5 pcs.

Change of pick-up and drop-out voltage



Change of contact resistance



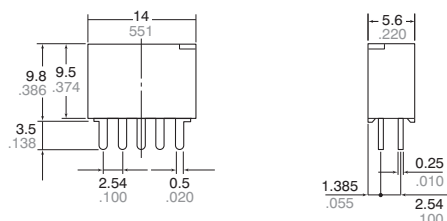
DIMENSIONS (mm inch)

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

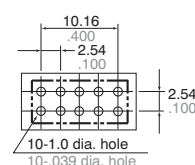
CAD Data



External dimensions Standard PC board terminal

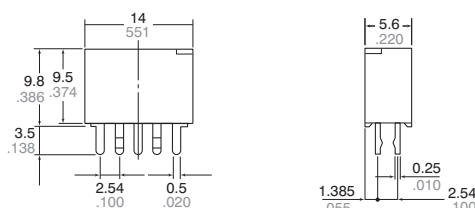


PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm .004$

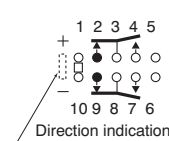
Self-clinching terminal



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

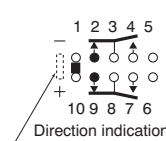
Schematic (Bottom view)

Single side stable



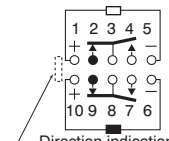
(Deenergized condition)

1-coil latching



(Reset condition)

2-coil latching

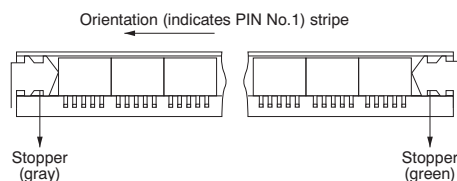


(Reset condition)

NOTES

1. Packing style

The relay is packed in a tube with the relay orientation mark on the left side, as shown in the figure below.



2. Automatic insertion

To maintain the internal function of the relay, the chucking pressure should not exceed the values below.

Chucking pressure in the direction A:

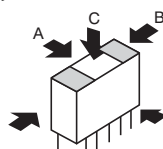
9.8 N {1 kgf} or less

Chucking pressure in the direction B:

9.8 N {1 kgf} or less

Chucking pressure in the direction C:

4.9 N {500gf} or less



Please chuck the portion.

Avoid chucking the center of the relay. In addition, excessive chucking pressure to the pinpoint of the relay should be avoided.

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