

Panasonic

ideas for life

Small size, controlled 7.5A inrush current possible

TX RELAYS TH types



RoHS compliant

FEATURES

- 1. Small size, controlled 7.5A inrush current possible**
- 2. 2,000 V breakdown voltage between contact and coil**
The body block construction of the coil that is sealed at formation offers a high breakdown voltage of 2,000 V between contact and coil, and 1,000 V between open contacts.

- 3. Outstanding surge resistance.**
Surge breakdown voltage between open contacts:
1,500 V $10 \times 160 \mu$ sec. (FCC part 68)
Surge breakdown voltage between contact and coil:
2,500 V $2 \times 10 \mu$ sec. (Bellcore)
- 4. Nominal operating power: High sensitivity of 140mW**
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.
- 5. High contact capacity: 2 A 30 V DC**
- 6. Compact size**
 $15.0(L) \times 7.4(W) \times 8.2(H)$.591(L) \times .291(W) \times .323(H)
- 7. Outstanding vibration and shock resistance.**
Functional shock resistance: 750 m/s²
Destructive shock resistance: 1,000 m/s²
Functional vibration resistance: 10 to 55 Hz (at double amplitude of 3.3 mm .130 inch)
Destructive vibration resistance: 10 to 55 Hz (at double amplitude of 5 mm .197 inch)

- 8. Sealed construction allows automatic washing.**
- 9. A range of surface-mount types is also available**
SA: Low-profile surface-mount terminal type
SS: Space saving surface-mount terminal type

TYPICAL APPLICATIONS

- 1. Air-conditioning control (solenoid load)**
- 2. Others, High-capacity control etc.**

ORDERING INFORMATION

TX **2** - [] - [] - [] - [] - TH - []

Contact arrangement
2: 2 Form C

Surface-mount availability
Nil: Standard PC board terminal type
SA: SA type
SS: SS type

Operating function
Nil: Single side stable
L: 1 coil latching
L2: 2 coil latching
LT: 2 coil latching

Terminal shape
Nil: Standard PC board terminal or surface-mount terminal

Nominal coil voltage (DC)*
1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V

Contact material
TH: Power type (Ag+Au clad/stationary, movable)

Packing style
Nil: Tube packing
X: Tape and reel (picked from 1/3/4/5-pin side)
Z: Tape and reel packing (picked from the 8/9/10/12-pin side)

Notes: 1. *48 V coil type: Single side stable only
2. In case of 5 V transistor 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 (L2) | 2 coil latching (LT) |
|---------------------|----------------------|--------------------|-----------------|----------------------|----------------------|
| | | Part No. | Part No. | Part No. | Part No. |
| 2 Form C | 1.5V DC | TX2-1.5V-TH | TX2-L-1.5V-TH | TX2-L2-1.5V-TH | TX2-LT-1.5V-TH |
| | 3V DC | TX2-3V-TH | TX2-L-3V-TH | TX2-L2-3V-TH | TX2-LT-3V-TH |
| | 4.5V DC | TX2-4.5V-TH | TX2-L-4.5V-TH | TX2-L2-4.5V-TH | TX2-LT-4.5V-TH |
| | 5V DC | TX2-5V-TH | TX2-L-5V-TH | TX2-L2-5V-TH | TX2-LT-5V-TH |
| | 6V DC | TX2-6V-TH | TX2-L-6V-TH | TX2-L2-6V-TH | TX2-LT-6V-TH |
| | 9V DC | TX2-9V-TH | TX2-L-9V-TH | TX2-L2-9V-TH | TX2-LT-9V-TH |
| | 12V DC | TX2-12V-TH | TX2-L-12V-TH | TX2-L2-12V-TH | TX2-LT-12V-TH |
| | 24V DC | TX2-24V-TH | TX2-L-24V-TH | TX2-L2-24V-TH | TX2-LT-24V-TH |
| | 48V DC | TX2-48V-TH | — | — | — |

Standard packing: Tube: 40 pcs.; Case: 1,000 pcs.

2. Surface-mount terminal

1) Tube packing

| Contact arrangement | Nominal coil voltage | Single side stable | 1 coil latching | 2 coil latching (L2) | 2 coil latching (LT) |
|---------------------|----------------------|--------------------|-----------------|----------------------|----------------------|
| | | Part No. | Part No. | Part No. | Part No. |
| 2c | 1.5V DC | TX2S□-1.5V-TH | TX2S□-L-1.5V-TH | TX2S□-L2-1.5V-TH | TX2S□-LT-1.5V-TH |
| | 3V DC | TX2S□-3V-TH | TX2S□-L-3V-TH | TX2S□-L2-3V-TH | TX2S□-LT-3V-TH |
| | 4.5V DC | TX2S□-4.5V-TH | TX2S□-L-4.5V-TH | TX2S□-L2-4.5V-TH | TX2S□-LT-4.5V-TH |
| | 5V DC | TX2S□-5V-TH | TX2S□-L-5V-TH | TX2S□-L2-5V-TH | TX2S□-LT-5V-TH |
| | 6V DC | TX2S□-6V-TH | TX2S□-L-6V-TH | TX2S□-L2-6V-TH | TX2S□-LT-6V-TH |
| | 9V DC | TX2S□-9V-TH | TX2S□-L-9V-TH | TX2S□-L2-9V-TH | TX2S□-LT-9V-TH |
| | 12V DC | TX2S□-12V-TH | TX2S□-L-12V-TH | TX2S□-L2-12V-TH | TX2S□-LT-12V-TH |
| | 24V DC | TX2S□-24V-TH | TX2S□-L-24V-TH | TX2S□-L2-24V-TH | TX2S□-LT-24V-TH |
| | 48V DC | TX2S□-48V-TH | — | — | — |

□: For each surface-mounted terminal identification, input the following letter. SA type: A, SS type: S

Standard packing: Tube: 40 pcs.; Case: 1,000 pcs.

2) Tape and reel packing

| Contact arrangement | Nominal coil voltage | Single side stable | 1 coil latching | 2 coil latching (L2) | 2 coil latching (LT) |
|---------------------|----------------------|--------------------|-------------------|----------------------|----------------------|
| | | Part No. | Part No. | Part No. | Part No. |
| 2 Form C | 1.5V DC | TX2S□-1.5V-TH-Z | TX2S□-L-1.5V-TH-Z | TX2S□-L2-1.5V-TH-Z | TX2S□-LT-1.5V-TH-Z |
| | 3V DC | TX2S□-3V-TH-Z | TX2S□-L-3V-TH-Z | TX2S□-L2-3V-TH-Z | TX2S□-LT-3V-TH-Z |
| | 4.5V DC | TX2S□-4.5V-TH-Z | TX2S□-L-4.5V-TH-Z | TX2S□-L2-4.5V-TH-Z | TX2S□-LT-4.5V-TH-Z |
| | 5V DC | TX2S□-5V-TH-Z | TX2S□-L-5V-TH-Z | TX2S□-L2-5V-TH-Z | TX2S□-LT-5V-TH-Z |
| | 6V DC | TX2S□-6V-TH-Z | TX2S□-L-6V-TH-Z | TX2S□-L2-6V-TH-Z | TX2S□-LT-6V-TH-Z |
| | 9V DC | TX2S□-9V-TH-Z | TX2S□-L-9V-TH-Z | TX2S□-L2-9V-TH-Z | TX2S□-LT-9V-TH-Z |
| | 12V DC | TX2S□-12V-TH-Z | TX2S□-L-12V-TH-Z | TX2S□-L2-12V-TH-Z | TX2S□-LT-12V-TH-Z |
| | 24V DC | TX2S□-24V-TH-Z | TX2S□-L-24V-TH-Z | TX2S□-L2-24V-TH-Z | TX2S□-LT-24V-TH-Z |
| | 48V DC | TX2S□-48V-TH-Z | — | — | — |

□: For each surface-mounted terminal identification, input the following letter. SA type: A, SS type: S

Standard packing: Tape and reel: 500 pcs.; Case: 1,000 pcs.

Note: Tape and reel packing symbol "Z" is not marked on the relay. "X" type tape and reel packing (picked from 1/2/3/4-pin side) is also available.

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) |
|----------------------|--|--|---|---------------------------------------|-------------------------|-------------------------------------|
| 1.5V DC | 75%V or less of nominal voltage* (Initial) | 10%V or more of nominal voltage* (Initial) | 93.8mA | 16Ω | 140mW | 150%V of nominal voltage |
| 3V DC | | | 46.7mA | 64.3Ω | | |
| 4.5V DC | | | 31mA | 145Ω | | |
| 5V DC | | | 28.1mA | 178Ω | | |
| 6V DC | | | 23.3mA | 257Ω | | |
| 9V DC | | | 15.5mA | 579Ω | | |
| 12V DC | | | 11.7mA | 1,028Ω | | |
| 24V DC | | | 5.8mA | 4,114Ω | | |
| 48V DC | | | 5.6mA | 8,533Ω | 270mW | 120%V of nominal voltage |

TX-TH

2) 1 coil latching

| Nominal coil voltage | Set voltage (at 20°C 68°F) | Reset voltage (at 20°C 68°F) | Nominal operating current [$\pm 10\%$] (at 20°C 68°F) | Coil resistance [$\pm 10\%$] (at 20°C 68°F) | Nominal operating power | Max. applied voltage (at 20°C 68°F) |
|----------------------|--|--|---|---|-------------------------|-------------------------------------|
| 1.5V DC | 75%V or less of nominal voltage* (Initial) | 75%V or less of nominal voltage* (Initial) | 66.7mA | 22.5 Ω | 100mW | 150%V of nominal voltage |
| 3V DC | | | 33.3mA | 90 Ω | | |
| 4.5V DC | | | 22.2mA | 202.5 Ω | | |
| 5V DC | | | 20mA | 250 Ω | | |
| 6V DC | | | 16.7mA | 360 Ω | | |
| 9V DC | | | 11.1mA | 810 Ω | | |
| 12V DC | | | 8.3mA | 1,440 Ω | | |
| 24V DC | | | 4.2mA | 5,760 Ω | | |

3) 2 coil latching (L2, LT)

| Nominal coil voltage | Set voltage (at 20°C 68°F) | Reset voltage (at 20°C 68°F) | Nominal operating current [$\pm 10\%$] (at 20°C 68°F) | | Coil resistance [$\pm 10\%$] (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 | 75%V or less of nominal voltage* (Initial) | 75%V or less of nominal voltage* (Initial) | 93.8mA | 93.8mA | 16 Ω | 16 Ω | 140mW | 140mW | 150%V of nominal voltage |
| 3V DC | | | 46.7mA | 46.7mA | 64.3 Ω | 64.3 Ω | | | |
| 4.5V DC | | | 31mA | 31mA | 145 Ω | 145 Ω | | | |
| 5V DC | | | 28.1mA | 28.1mA | 178 Ω | 178 Ω | | | |
| 6V DC | | | 23.3mA | 23.3mA | 257 Ω | 257 Ω | | | |
| 9V DC | | | 15.5mA | 15.5mA | 579 Ω | 579 Ω | | | |
| 12V DC | | | 11.7mA | 11.7mA | 1,028 Ω | 1,028 Ω | | | |
| 24V DC | | | 5.8mA | 5.8mA | 4,114 Ω | 4,114 Ω | | | |

*Pulse drive (JIS C 5442-1986)

2. Specifications

| Characteristics | Item | Specifications | |
|--|--|--|---|
| Contact | Arrangement | 2 Form C | |
| | Initial contact resistance, max. | Max. 100 m Ω (By voltage drop 6 V DC 1A) | |
| | Contact material | Ag+Au plating | |
| Rating | Nominal switching capacity | 2 A 30 V DC, 0.5 A 125 V AC (resistive load) | |
| | Max. switching power | 60 W, 60 VA (resistive load) | |
| | Max. switching voltage | 220V DC, 250V AC | |
| | Max. switching current | 7.5 A (When used at 7.5 A. Regarding connection method, you must follow the precaution, below*.) | |
| | Min. switching capacity (Reference value)* ¹ | 10 μ A 10mV DC | |
| | Nominal operating power | Single side stable | 140 mW (1.5 to 24 V DC), 270 mW (48 V DC) |
| 1 coil latching | | 100 mW (1.5 to 24 V DC) | |
| 2 coil latching | | 140 mW (1.5 to 24 V DC) | |
| Electrical characteristics | Insulation resistance (Initial) | Min. 1,000M Ω (at 500V DC) Measurement at same location as "Initial breakdown voltage" section. | |
| | Breakdown voltage (Initial) | Between open contacts | 1,000 Vrms for 1min. (Detection current: 10mA) |
| | | Between contact and coil | 2,000 Vrms for 1min. (Detection current: 10mA) |
| | | Between contact sets | 1,000 Vrms for 1min. (Detection current: 10mA) |
| | Temperature rise (at 20°C 68°F) | Max. 50°C (By resistive method, nominal coil voltage applied to the coil; contact carrying current: 2A.) | |
| | Surge breakdown voltage (Initial) | Between open contacts | 1,500 V (10 \times 160 μ s) (FCC Part 68) |
| | | Between contacts and coil | 2,500 V (2 \times 10 μ s) (Telcordia) |
| Operate time [Set time] (at 20°C 68°F) | Max. 4 ms [Max. 4 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) | | |
| Release time [Reset time] (at 20°C 68°F) | Max. 4 ms [Max. 4 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode) | | |
| Mechanical characteristics | Shock resistance | Functional | Min. 750 m/s ² (Half-wave pulse of sine wave: 6 ms; detection time: 10 μ s.) |
| | | Destructive | Min. 1,000 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: 10 μ s.) |
| | | Destructive | 10 to 55 Hz at double amplitude of 5 mm |
| Expected life | Mechanical | Min. 10 ⁸ (at 180 cpm) | |
| | Electrical | Min. 10 ⁵ (2 A 30 V DC resistive), 5 \times 10 ⁵ (1 A 30 V DC resistive), Min. 10 ⁵ (0.5 A 125 V AC resistive) (at 20 cpm) Min. 2 \times 10 ⁵ (7.5 A inrush (250 ms)/1.5 A normal 30 V AC (cos ϕ = 0.4)) (ON/OFF = 1s/9s) | |
| Conditions | Conditions for operation, transport and storage* ² | Ambient temperature: -40°C to +85°C (up to 24 V coil) -40°F to +185°F [-40°C to +70°C (48 V coil) -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. 2 g .071 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 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 24).

REFERENCE DATA

1. Electrical life (2×10^5 operation is possible)
 Tested sample: TX2SA-24V-TH, 6 pcs.
 Switching frequency: ON:OFF = 1s:9s
 Ambient temperature: 25°C 77°F
 Circuit



Condition: 30 V AC
 Inrush current 7.5 A (execution value),
 inrush time 250 ms
 Normal current 1.5 A (execution value),
 (inductive load $\cos\phi = 0.4$)

Inrush current wave form vs time



***Precaution**

When using at 7.5 A, connection of NO (pin #5 and #8) and COM (pin #4 and #9) in the circuit is required.

Pin layout and schematic (BOTTOM VIEW)



For general REFERENCE DATA, DIMENSIONS and NOTES, please refer to the “TX Relay”.

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