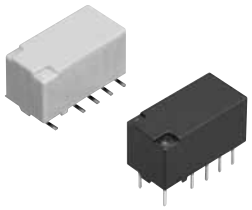
THE DATASHEET OF

TX2-12V

Panasonic
ideas for life

Small size, controlled 7.5A inrush current possible

TX RELAYS TH types



Compliance with RoHS Directive

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 10×160μ sec. (FCC part 68)
   Surge breakdown voltage between contact and coil:
   2,500 V 2×10μ 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) × 7.4(W) × 8.2(H) .591(L) × .291(W) × .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
   SL: High connection reliability 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 or self-clinching terminal type
SA: SA type
SL: SL 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
H: Self-clinching 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. self-clinching 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 Fom C	1.5V DC	TX2-H-1.5V-TH	TX2-L-H-1.5V-TH	TX2-L2-H-1.5V-TH	TX2-LT-H-1.5V-TH
	3V DC	TX2-H-3V-TH	TX2-L-H-3V-TH	TX2-L2-H-3V-TH	TX2-LT-H-3V-TH
	4.5V DC	TX2-H-4.5V-TH	TX2-L-H-4.5V-TH	TX2-L2-H-4.5V-TH	TX2-LT-H-4.5V-TH
	5V DC	TX2-H-5V-TH	TX2-L-H-5V-TH	TX2-L2-H-5V-TH	TX2-LT-H-5V-TH
	6V DC	TX2-H-6V-TH	TX2-L-H-6V-TH	TX2-L2-H-6V-TH	TX2-LT-H-6V-TH
	9V DC	TX2-H-9V-TH	TX2-L-H-9V-TH	TX2-L2-H-9V-TH	TX2-LT-H-9V-TH
	12V DC	TX2-H-12V-TH	TX2-L-H-12V-TH	TX2-L2-H-12V-TH	TX2-LT-H-12V-TH
	24V DC	TX2-H-24V-TH	TX2-L-H-24V-TH	TX2-L2-H-24V-TH	TX2-LT-H-24V-TH
	48V DC	TX2-H-48V-TH	—	—	—

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

3. 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, SL type: L, 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	—	—	—

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

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)
1.5V DC	75%V or less of nominal voltage* (Initial)	75%V or less of nominal voltage* (Initial)	66.7mA	22.5Ω	100mW	150%V of nominal voltage
3V DC			33.3mA	90Ω		
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			4.2mA	5,760Ω		

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 [±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	
1.5V DC	75%V or less of nominal voltage* (Initial)	75%V or less of nominal voltage* (Initial)	93.8mA	93.8mA	16Ω	16Ω	140mW	140mW	150%V of nominal voltage
3V DC			46.7mA	46.7mA	64.3Ω	64.3Ω			
4.5V DC			31mA	31mA	145Ω	145Ω			
5V DC			28.1mA	28.1mA	178Ω	178Ω			
6V DC			23.3mA	23.3mA	257Ω	257Ω			
9V DC			15.5mA	15.5mA	579Ω	579Ω			
12V DC			11.7mA	11.7mA	1,028Ω	1,028Ω			
24V DC			5.8mA	5.8mA	4,114Ω	4,114Ω			

*Pulse drive (JIS C 5442-1986)

2. Specifications

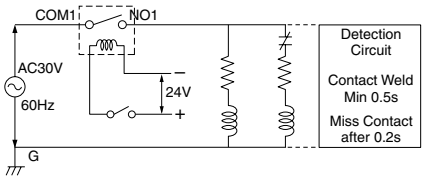
Characteristics	Item		Specifications
Contact	Arrangement		2 Form C
	Initial contact resistance, max.		Max. 100 mΩ (By voltage drop 6 V DC 1A)
	Contact material		Ag+Au plating
Rating	Nominal switching capacity		2 A 30 V DC, 0.5 A 125 V AC (resistive load)
	Max. switching power		60 W, 60 VA (resistive 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		10μA 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. 1,000MΩ (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 (10×160μs) (FCC Part 68)
		Between contacts and coil	2,500 V (2×10μs) (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/s² (Half-wave pulse of sine wave: 6 ms; detection time: 10μs.)
		Destructive	Min. 1,000 m/s² (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 (at 180 cpm)
	Electrical		Min. 10^5 (2 A 30 V DC resistive), 5×10^5 (1 A 30 V DC resistive), Min. 10^5 (0.5 A 125 V AC resistive) (at 20 cpm) Min. 2×10^5 (7.5 A inrush (250 ms)/1.5 A normal 30 V AC ($\cos\phi$ = 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.

REFERENCE DATA

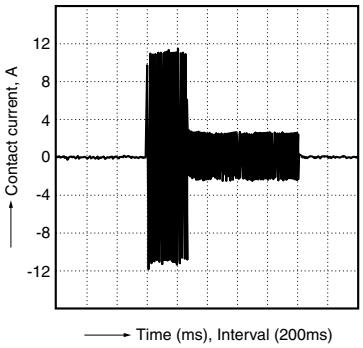
1. Electrical life (2×10^5 operation is possible)

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)

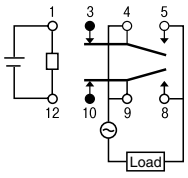
Inrush current wave form vs time



***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)
1 coil latching



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

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