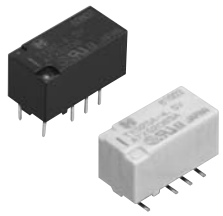
Panasonic
ideas for life

SMALL POLARIZED RELAY WITH HIGH SENSITIVITY 50mW

TX-S RELAYS



FEATURES

1. Nominal operating power: High sensitivity of 50mW
By using the highly efficient polar magnetic circuit "seesaw balance mechanism", a nominal operating power of 50 mW (minimum operating power of 32 mW) has been achieved.

2. Compact size
15.0(L) × 7.4(W) × 8.2(H) .591(L) × .291(W) × .323(H)

3. High contact reliability
High contact reliability is achieved by the use of gold-clad twin crossbar contacts, low-gas formation materials, mold sealing the coil section, and by controlling organic gas in the coil.
***We also offer a range of products with AgPd contacts suitable for use in low level load analog circuits (Max. 10V DC 10 mA).**
***SX relays designed for low level loads are also available.**

4. Outstanding surge resistance.
Surge breakdown voltage between open contacts:
1,500 V 10×160 μsec. (FCC part 68)
Surge breakdown voltage between contact and coil:
2,500 V 2×10 μsec. (Telcordia)

5. Low thermal electromotive force (approx. 0.3 μV)
The structure of the mold-sealed body block of the coil section achieves nominal operating power of 50 mW and high sensitivity, along with low thermal electromotive force, reduced to approximately 0.3 μV.

6. 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

7. Sealed construction allows automatic washing.

TYPICAL APPLICATIONS

1. **Communications (XDSL, Transmission)**
2. **Measurement**
3. **Security**
4. **Home appliances, and audio/visual equipment**
5. **Automotive equipment**
6. **Medical equipment**

ORDERING INFORMATION

TXS **2** □ - □ - □ - □ - □ - □

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

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

Coil voltage (DC)
1.5, 3, 4.5, 6, 9, 12, 24V

Contact material
Nil: Standard contact (Ag+Au clad)
1: AgPd contact (low level load); AgPd+Au clad (stationary), AgPd (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)

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	1.5V DC	TXS2-1.5V	TXS2-L-1.5V	TXS2-L2-1.5V
	3V DC	TXS2-3V	TXS2-L-3V	TXS2-L2-3V
	4.5V DC	TXS2-4.5V	TXS2-L-4.5V	TXS2-L2-4.5V
	6V DC	TXS2-6V	TXS2-L-6V	TXS2-L2-6V
	9V DC	TXS2-9V	TXS2-L-9V	TXS2-L2-9V
	12V DC	TXS2-12V	TXS2-L-12V	TXS2-L2-12V
	24V DC	TXS2-24V	TXS2-L-24V	TXS2-L2-24V

Standard packing: Tube: 40 pcs.; Case: 1,000 pcs.
Note: Please add “-1” to the end of the part number for AgPd contacts (low level load).

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	1.5V DC	TXS2-H-1.5V	TXS2-L-H-1.5V	TXS2-L2-H-1.5V
	3V DC	TXS2-H-3V	TXS2-L-H-3V	TXS2-L2-H-3V
	4.5V DC	TXS2-H-4.5V	TXS2-L-H-4.5V	TXS2-L2-H-4.5V
	6V DC	TXS2-H-6V	TXS2-L-H-6V	TXS2-L2-H-6V
	9V DC	TXS2-H-9V	TXS2-L-H-9V	TXS2-L2-H-9V
	12V DC	TXS2-H-12V	TXS2-L-H-12V	TXS2-L2-H-12V
	24V DC	TXS2-H-24V	TXS2-L-H-24V	TXS2-L2-H-24V

Standard packing: Tube: 40 pcs.; Case: 1,000 pcs.
Note: Please add “-1” to the end of the part number for AgPd contacts (low level load).

3. Surface-mount terminal

1) Tube packing

Contact arrangement	Nominal coil voltage	Single side stable	1 coil latching	2 coil latching
		Part No.	Part No.	Part No.
2 Form C	1.5V DC	TXS2SM-1.5V	TXS2S□-L-1.5V	TXS2S□-L2-1.5V
	3V DC	TXS2SM-3V	TXS2S□-L-3V	TXS2S□-L2-3V
	4.5V DC	TXS2SM-4.5V	TXS2S□-L-4.5V	TXS2S□-L2-4.5V
	6V DC	TXS2SM-6V	TXS2S□-L-6V	TXS2S□-L2-6V
	9V DC	TXS2SM-9V	TXS2S□-L-9V	TXS2S□-L2-9V
	12V DC	TXS2SM-12V	TXS2S□-L-12V	TXS2S□-L2-12V
	24V DC	TXS2SM-24V	TXS2S□-L-24V	TXS2S□-L2-24V

□: 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.
Note: Please add “-1” to the end of the part number for AgPd contacts (low level load).

2) Tape and reel packing

Contact arrangement	Nominal coil voltage	Single side stable	1 coil latching	2 coil latching
		Part No.	Part No.	Part No.
2 Form C	1.5V DC	TXS2S□-1.5V-Z	TXS2S□-L-1.5V-Z	TXS2S□-L2-1.5V-Z
	3V DC	TXS2S□-3V-Z	TXS2S□-L-3V-Z	TXS2S□-L2-3V-Z
	4.5V DC	TXS2S□-4.5V-Z	TXS2S□-L-4.5V-Z	TXS2S□-L2-4.5V-Z
	6V DC	TXS2S□-6V-Z	TXS2S□-L-6V-Z	TXS2S□-L2-6V-Z
	9V DC	TXS2S□-9V-Z	TXS2S□-L-9V-Z	TXS2S□-L2-9V-Z
	12V DC	TXS2S□-12V-Z	TXS2S□-L-12V-Z	TXS2S□-L2-12V-Z
	24V DC	TXS2S□-24V-Z	TXS2S□-L-24V-Z	TXS2S□-L2-24V-Z

□: For each surface-mounted terminal identification, input the following letter. SA type: A, SL type: L, SS type: S
Standard packing: Tape and reel: 500 pcs.; Case: 1,000 pcs.
Notes: 1. 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.
2. Please add “-1” to the end of the part number for AgPd contacts (low level load). (Ex. TXS2SA-1.5V-1-Z)

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. allowable voltage (at 20°C 68°F)
1.5V DC	80%V or less of nominal voltage* (Initial)	10%V or more of nominal voltage* (Initial)	33.3mA	45Ω	50mW	150%V of nominal voltage
3V DC			16.7mA	180Ω		
4.5V DC			11.1mA	405Ω		
6V DC			8.3mA	720Ω		
9V DC			5.6mA	1,620Ω		
12V DC			4.2mA	2,880Ω		
24V DC			2.9mA	8,229Ω	70mW	

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. allowable voltage (at 20°C 68°F)
1.5V DC	80%V or less of nominal voltage* (Initial)	80%V or less of nominal voltage* (Initial)	23.3mA	64.3Ω	35mW	150%V of nominal voltage
3V DC			11.7mA	257Ω		
4.5V DC			7.8mA	579Ω		
6V DC			5.8mA	1,029Ω		
9V DC			3.9mA	2,314Ω		
12V DC			2.9mA	4,114Ω		
24V DC			2.1mA	11,520Ω	50mW	

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. allowable voltage (at 20°C 68°F)
			Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
1.5V DC	80%V or less of nominal voltage* (Initial)	80%V or less of nominal voltage* (Initial)	46.7mA	46.7mA	32.1Ω	32.1Ω	70mW	70mW	150%V of nominal voltage
3V DC			23.3mA	23.3mA	129Ω	129Ω			
4.5V DC			15.6mA	15.6mA	289Ω	289Ω			
6V DC			11.7mA	11.7mA	514Ω	514Ω			
9V DC			7.8mA	7.8mA	1,157Ω	1,157Ω			
12V DC			5.8mA	5.8mA	2,057Ω	2,057Ω			
24V DC			6.3mA	6.3mA	3,840Ω	3,840Ω	150mW	150mW	

*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		Standard contact: Ag+Au clad, AgPd contact (low level load): AgPd+Au clad (stationary), AgPd (movable)
Rating	Nominal switching capacity (resistive load)		1 A 30 V DC
	Max. switching power (resistive load)		30 W (DC)
	Max. switching voltage		110V DC
	Max. switching current		1 A
	Min. switching capacity (Reference value)*1		10μA 10mV DC
	Nominal operating power	Single side stable	50 mW (1.5 to 12 V DC), 70 mW (24 V DC)
		1 coil latching	35 mW (1.5 to 12 V DC), 50 mW (24 V DC)
		2 coil latching	70 mW (1.5 to 12 V DC), 150 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 1min. (Detection current: 10mA)
		Between contact and coil	1,800 Vrms for 1min. (Detection current: 10mA)
		Between contact sets	1,000 Vrms for 1min. (Detection current: 10mA)
	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)
	Temperature rise (at 20°C 68°F)		Max. 50°C (By resistive method, nominal voltage applied to the coil; contact carrying current: 1A.)
	Operate time [Set time] (at 20°C 68°F)		Max. 5 ms [Max. 5 ms] (Nominal voltage applied to the coil, excluding contact bounce time.)
	Release time [Reset time] (at 20°C 68°F)		Max. 5 ms [Max. 5 ms] (Nominal 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. 5×10^7 (at 180 cpm)
	Electrical		Min. 2×10^5 (1 A 30 V DC 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. 2 g .071 oz

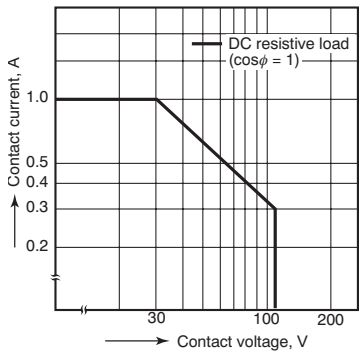
Notes:

*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. (AgPd contact type or SX relays are available for low level load switching [10V DC, 10mA max. level])

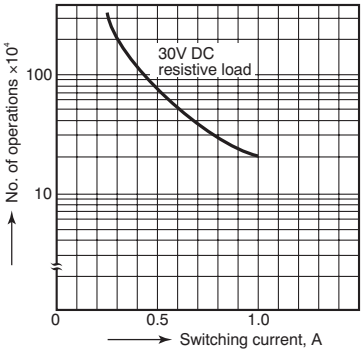
*2 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (p. 19, Relay Technical Information).

REFERENCE DATA

1. Maximum switching capacity

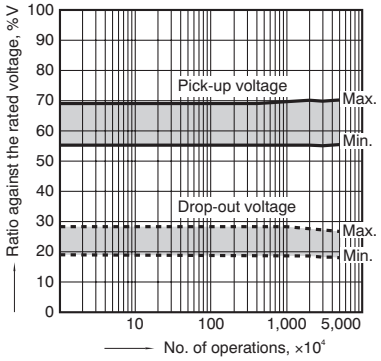


2. Life curve



3. Mechanical life

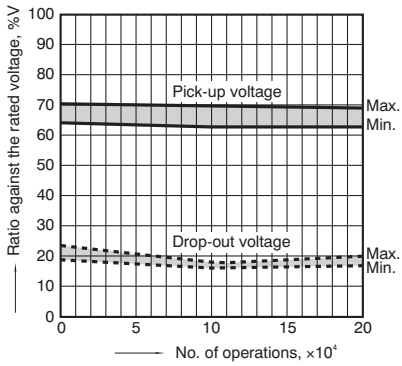
Tested sample: TXS2-4.5V, 10 pcs.
Operating speed: 180 cpm



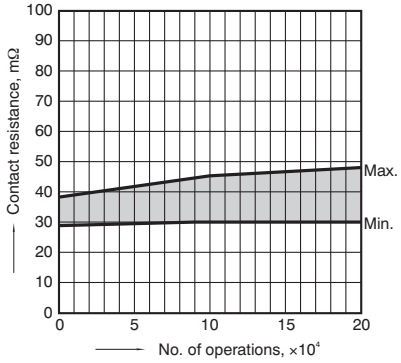
4. Electrical life (1 A 30 V DC resistive load)

Tested sample: TXS2-4.5V, 6 pcs.
Operating speed: 20 cpm

Change of pick-up and drop-out voltage

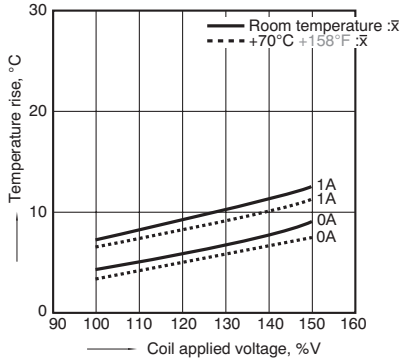


Change of contact resistance



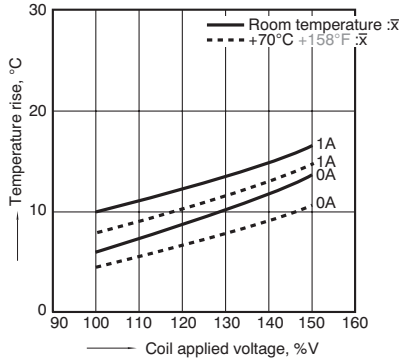
5-(1). Coil temperature rise

Tested sample: TXS2-4.5V, 6 pcs.
Point measured: Inside the coil
Ambient temperature: 25°C 77°F, 70°C 158°F



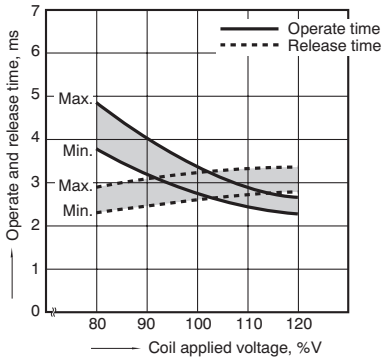
5-(2). Coil temperature rise

Tested sample: TXS2-24V, 6 pcs.
Point measured: Inside the coil
Ambient temperature: 25°C 77°F, 70°C 158°F



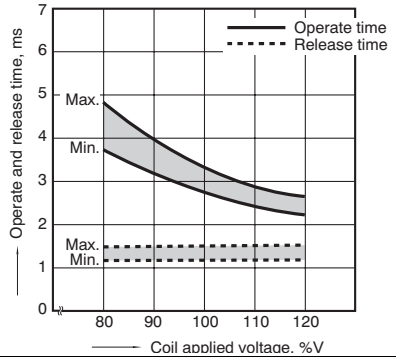
6-(1). Operate and release time (with diode)

Tested sample: TXS2-4.5V, 10 pcs.



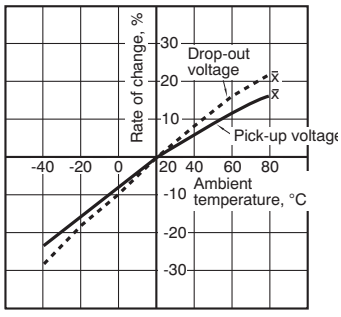
6-(2). Operate and release time (without diode)

Tested sample: TXS2-4.5V, 10 pcs.



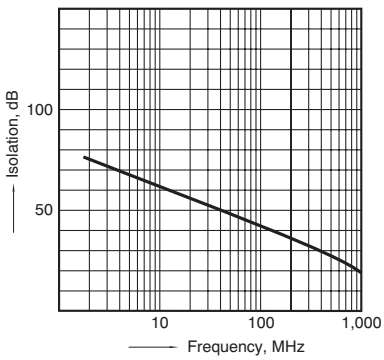
7. Ambient temperature characteristics

Tested sample: TXS2-4.5V, 5 pcs.



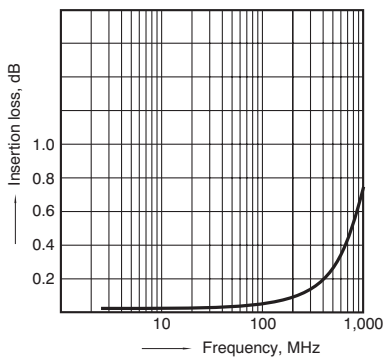
8-(1). High frequency characteristics (Isolation)

Tested sample: TXS2-4.5V, 2 pcs.

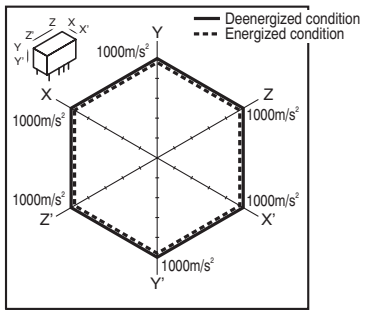


8-(2). High frequency characteristics (Insertion loss)

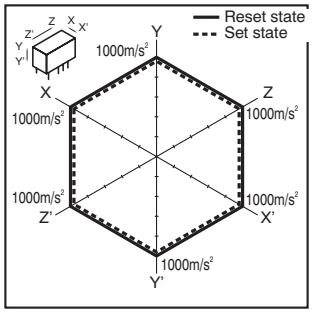
Tested sample: TXS2-4.5V, 2 pcs.



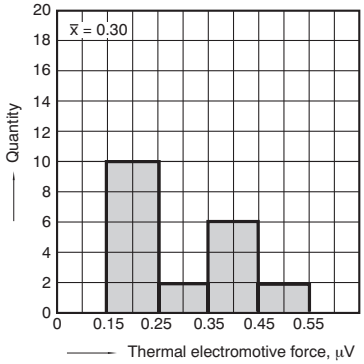
9-(1). Malfunctional shock (single side stable)
Tested sample: TXS2-4.5V, 6 pcs.



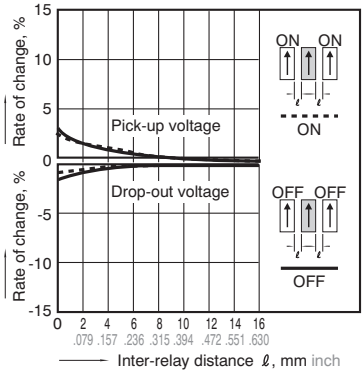
9-(2). Malfunctional shock (latching)
Tested sample: TXS2-L2-4.5V, 6 pcs.



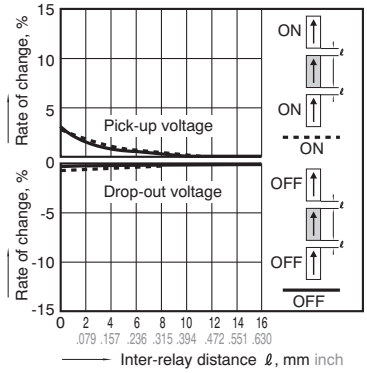
10. Thermal electromotive force
Tested sample: TXS2-4.5V, 6 pcs.



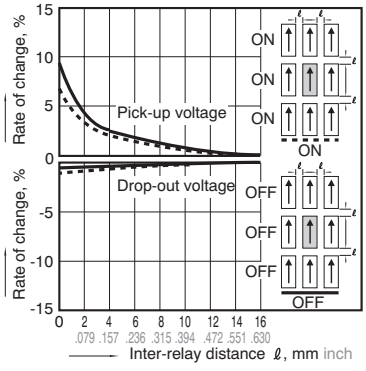
11-(1). Influence of adjacent mounting
Tested sample: TXS2-4.5V, 6 pcs.



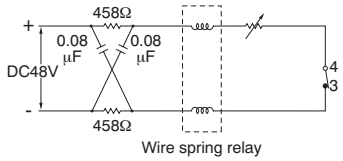
11-(2). Influence of adjacent mounting
Tested sample: TXS2-4.5V, 6 pcs.



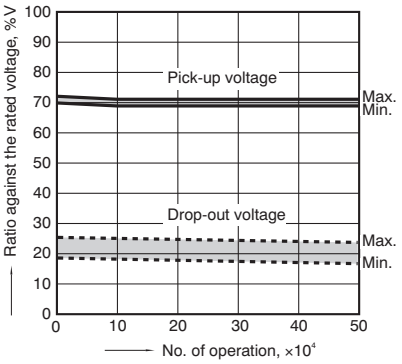
11-(3). Influence of adjacent mounting
Tested sample: TXS2-4.5V, 6 pcs.



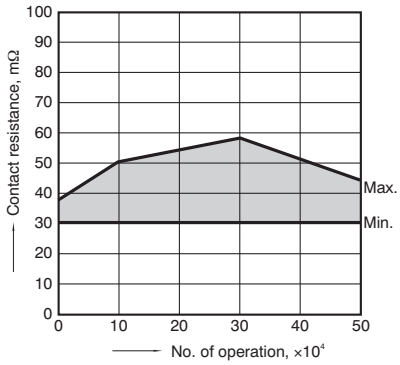
12. Pulse dialing test
(35 mA 48V DC wire spring relay load)
Tested sample: TXS2-4.5V, 6 pcs.



Change of pick-up and drop-out voltage



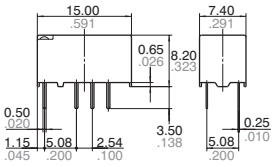
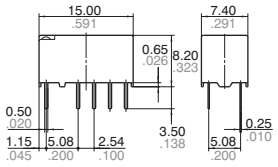
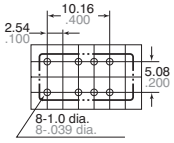
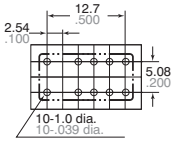
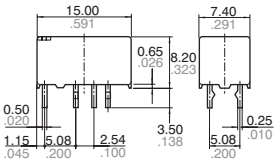
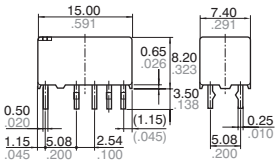
Change of contact resistance



Note: Data of surface-mount type are the same as those of PC board terminal type.

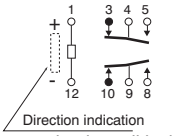
DIMENSIONS (Unit: mm inch)

1. Standard PC board terminal and Self clinching terminal

Type	External dimensions (General tolerance: ±0.3 ±.012)		PC board pattern (Bottom view) (Tolerance: ±0.1 ±.004)	
	Single side stable and 1 coil latching type	2 coil latching type	Single side stable and 1 coil latching type	2 coil latching type
Standard PC board terminal				
Self clinching terminal				

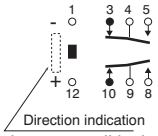
Schematic (Bottom view)

Single side stable



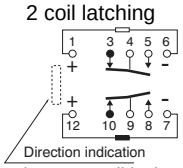
(Deenergized condition)

1 coil latching



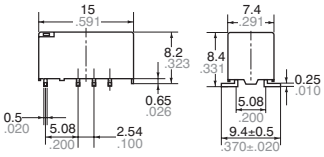
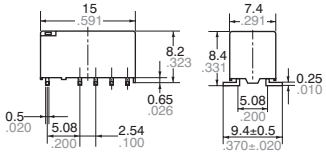
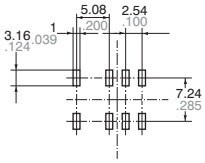
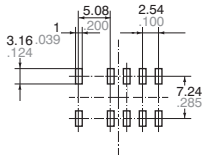
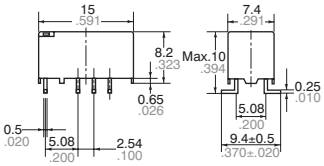
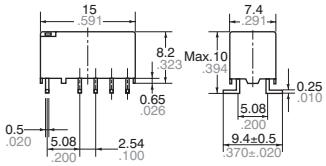
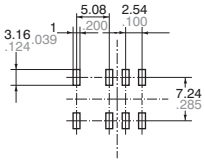
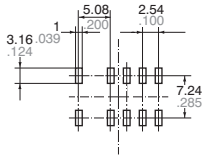
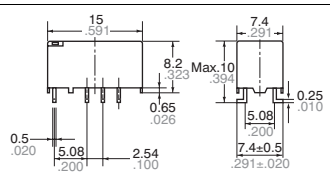
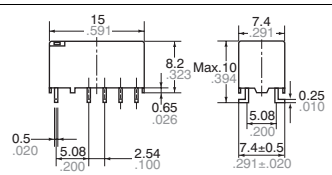
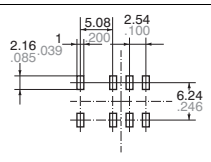
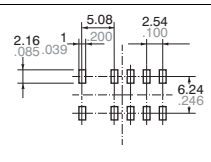
(Reset condition)

2 coil latching



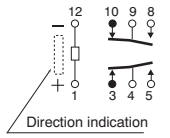
(Reset condition)

2. Surface-mount terminal

Type	External dimensions (General tolerance: ±0.3 ±.012)		Suggested mounting pad (Top view) (Tolerance: ±0.1 ±.004)	
	Single side stable and 1 coil latching type	2 coil latching type	Single side stable and 1 coil latching type	2 coil latching type
SA type				
SL type				
SS type				

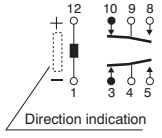
Schematic (Top view)

Single side stable



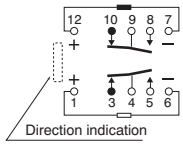
(Deenergized condition)

1 coil latching



(Reset condition)

2 coil latching



(Reset condition)

NOTES

1. Coil operating power

Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%.
However, check it with the actual circuit since the characteristics may be slightly different. The nominal operating voltage should be applied to the coil for more than 10 ms to set/reset the latching type relay.

2. Coil connection

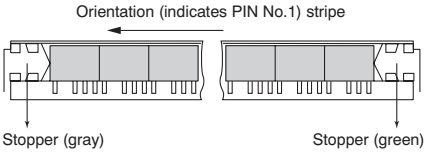
When connecting coils, refer to the wiring diagram to prevent mis-operation or malfunction.

3. External magnetic field

Since T series relays are highly sensitive polarized relays, their characteristics will be affected by a strong external magnetic field. Avoid using the relay under that condition.

4. Packing style

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

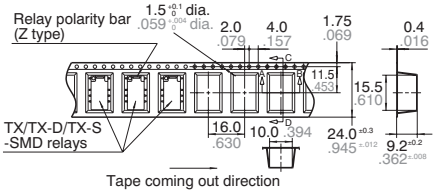


2) Tape and reel packing (surface-mount terminal type)

(1) Tape dimensions

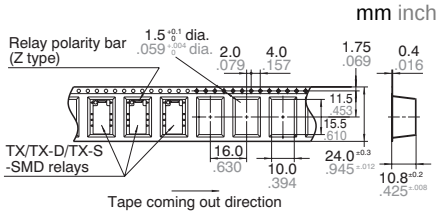
(i) SA type

mm inch



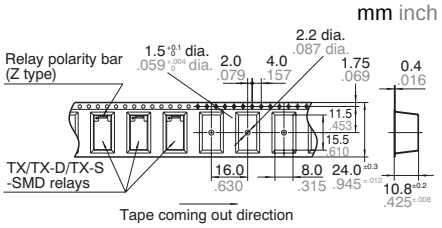
(ii) SL type

mm inch



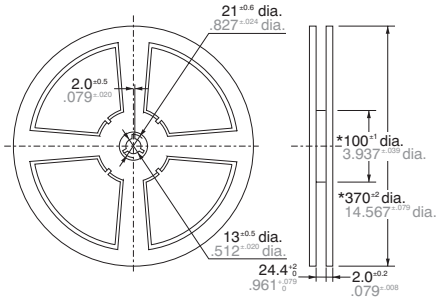
(iii) SS type

mm inch



(2) Dimensions of plastic reel

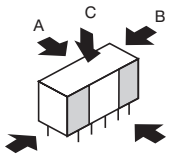
mm inch



Note: Dimensions of items produced after December 2006 have changed as shown below.
100 dia. 3.937 dia. → 80 dia. 3.150 dia.;
370 dia. 14.567 dia. → 380 dia. 14.961 dia.

5. 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: 4.9 N {500gf} or less
Chucking pressure in the direction B: 9.8 N {1 kgf} or less
Chucking pressure in the direction C: 9.8 N {1 kgf} 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.

6. Others

1) If in error the relay has been dropped, the appearance and characteristics should be checked before use without fail.

2) The cycle lifetime is defined under the standard test condition specified in the JIS* C 5442-1986 standard (temperature 15°C to 35°C 59°F to 95°F, humidity 25% to 85%). Check this with the real device as it is affected by coil driving circuit, load type, activation frequency, activation phase, ambient conditions, and other factors.

For Cautions for Use, see Relay Technical Information.