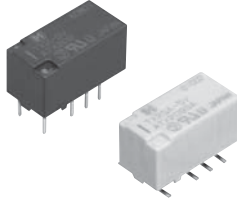


**Best seller with broad lineup and AC 2000 V breakdown voltage.**

## TX RELAYS



### FEATURES

- 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.
- 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)

- 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.
- High contact capacity: 2 A 30 V DC**
- Compact size**  
15.0(L) × 7.4(W) × 8.2(H) .  
591(L) × .291(W) × .323(H)
- The use of gold-clad twin crossbar contacts ensures high contact reliability.**  
*\*We also offer a range of products with AgPd contacts suitable for use in low level load analog circuits (max. 10V DC 10 mA).*
- Outstanding vibration and shock resistance**  
Functional shock resistance: 750 m/s<sup>2</sup>  
Destructive shock resistance: 1,000 m/s<sup>2</sup>  
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)

- Sealed construction allows automatic washing.**
- 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

- Communications (xDSL, Transmission)
- Measurement
- Security
- Home appliances, and audio/visual equipment
- Automotive equipment
- Medical equipment

### ORDERING INFORMATION

TX **2** - - - - -

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  
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)

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	TX2-L-1.5V	TX2-L2-1.5V	TX2-LT-1.5V
	3V DC	TX2-3V	TX2-L-3V	TX2-L2-3V	TX2-LT-3V
	4.5V DC	TX2-4.5V	TX2-L-4.5V	TX2-L2-4.5V	TX2-LT-4.5V
	5V DC	TX2-5V	TX2-L-5V	TX2-L2-5V	TX2-LT-5V
	6V DC	TX2-6V	TX2-L-6V	TX2-L2-6V	TX2-LT-6V
	9V DC	TX2-9V	TX2-L-9V	TX2-L2-9V	TX2-LT-9V
	12V DC	TX2-12V	TX2-L-12V	TX2-L2-12V	TX2-LT-12V
	24V DC	TX2-24V	TX2-L-24V	TX2-L2-24V	TX2-LT-24V
	48V DC	TX2-48V	—	—	—

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. 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	TX2S□-L-1.5V	TX2S□-L2-1.5V	TX2S□-LT-1.5V
	3V DC	TX2S□-3V	TX2S□-L-3V	TX2S□-L2-3V	TX2S□-LT-3V
	4.5V DC	TX2S□-4.5V	TX2S□-L-4.5V	TX2S□-L2-4.5V	TX2S□-LT-4.5V
	5V DC	TX2S□-5V	TX2S□-L-5V	TX2S□-L2-5V	TX2S□-LT-5V
	6V DC	TX2S□-6V	TX2S□-L-6V	TX2S□-L2-6V	TX2S□-LT-6V
	9V DC	TX2S□-9V	TX2S□-L-9V	TX2S□-L2-9V	TX2S□-LT-9V
	12V DC	TX2S□-12V	TX2S□-L-12V	TX2S□-L2-12V	TX2S□-LT-12V
	24V DC	TX2S□-24V	TX2S□-L-24V	TX2S□-L2-24V	TX2S□-LT-24V
	48V DC	TX2S□-48V	—	—	—

□: 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.

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 (L2)	2 coil latching (LT)
		Part No.	Part No.	Part No.	Part No.
2 Form C	1.5V DC	TX2S□-1.5V-Z	TX2S□-L-1.5V-Z	TX2S□-L2-1.5V-Z	TX2S□-LT-1.5V-Z
	3V DC	TX2S□-3V-Z	TX2S□-L-3V-Z	TX2S□-L2-3V-Z	TX2S□-LT-3V-Z
	4.5V DC	TX2S□-4.5V-Z	TX2S□-L-4.5V-Z	TX2S□-L2-4.5V-Z	TX2S□-LT-4.5V-Z
	5V DC	TX2S□-5V-Z	TX2S□-L-5V-Z	TX2S□-L2-5V-Z	TX2S□-LT-5V-Z
	6V DC	TX2S□-6V-Z	TX2S□-L-6V-Z	TX2S□-L2-6V-Z	TX2S□-LT-6V-Z
	9V DC	TX2S□-9V-Z	TX2S□-L-9V-Z	TX2S□-L2-9V-Z	TX2S□-LT-9V-Z
	12V DC	TX2S□-12V-Z	TX2S□-L-12V-Z	TX2S□-L2-12V-Z	TX2S□-LT-12V-Z
	24V DC	TX2S□-24V-Z	TX2S□-L-24V-Z	TX2S□-L2-24V-Z	TX2S□-LT-24V-Z
	48V DC	TX2S□-48V-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.

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).

# 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 [ $\pm 10\%$ ] (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)	10%V or more of nominal voltage* (Initial)	93.8mA	16 $\Omega$	140mW	150%V of nominal voltage
3V DC			46.7mA	64.3 $\Omega$		
4.5V DC			31mA	145 $\Omega$		
5V DC			28.1mA	178 $\Omega$		
6V DC			23.3mA	257 $\Omega$		
9V DC			15.5mA	579 $\Omega$		
12V DC			11.7mA	1,028 $\Omega$		
24V DC			5.8mA	4,114 $\Omega$		
48V DC			5.6mA	8,533 $\Omega$	270mW	

### 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 $\Omega$	100mW	150%V of nominal voltage
3V DC			33.3mA	90 $\Omega$		
4.5V DC			22.2mA	202.5 $\Omega$		
5V DC			20mA	250 $\Omega$		
6V DC			16.7mA	360 $\Omega$		
9V DC			11.1mA	810 $\Omega$		
12V DC			8.3mA	1,440 $\Omega$		
24V DC			4.2mA	5,760 $\Omega$		

### 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)	133.9mA	133.9mA	11.2 $\Omega$	11.2 $\Omega$	200mW	200mW	150%V of nominal voltage
3V DC			66.7mA	66.7mA	45 $\Omega$	45 $\Omega$			
4.5V DC			44.5mA	44.5mA	101.2 $\Omega$	101.2 $\Omega$			
5V DC			40mA	40mA	125 $\Omega$	125 $\Omega$			
6V DC			33.3mA	33.3mA	180 $\Omega$	180 $\Omega$			
9V DC			22.2mA	22.2mA	405 $\Omega$	405 $\Omega$			
12V DC			16.7mA	16.7mA	720 $\Omega$	720 $\Omega$			
24V DC			8.3mA	8.3mA	2,880 $\Omega$	2,880 $\Omega$			

\*Pulse drive (JIS C 5442-1986)

## 2. Specifications

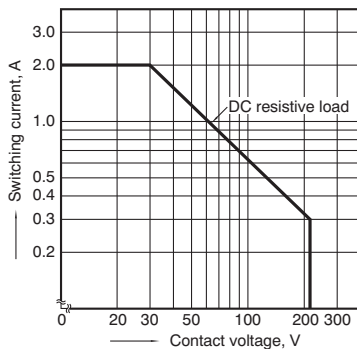
Characteristics	Item	Specifications	
Contact	Arrangement	2 Form C	
	Initial contact resistance, max.	Max. 100 mΩ (By voltage drop 6 V DC 1A)	
	Contact material	Standard contact: Ag+Au clad, AgPd contact (low level load): AgPd+Au clad (stationary), AgPd (movable)	
Rating	Nominal switching capacity	Standard contact: 2 A 30 V DC, AgPd contact: 1 A 30 V DC (resistive load)	
	Max. switching power	Standard contact: 60 W (DC), AgPd contact: 30 W (DC) (resistive load)	
	Max. switching voltage	220V DC	
	Max. switching current	Standard contact: 2 A, AgPd contact: 1 A	
	Min. switching capacity (Reference value) <sup>1*</sup>	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		200 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)
	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 coil voltage applied to the coil; contact carrying current: 2A.)	
	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
Destructive			Min. 1,000 m/s <sup>2</sup> (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 <sup>8</sup> (at 180 cpm)	
	Electrical	Min. 10 <sup>5</sup> (2 A 30 V DC resistive), 5×10 <sup>5</sup> (1 A 30 V DC resistive) (at 20 cpm)	
Conditions	Conditions for operation, transport and storage <sup>2*</sup>	Ambient temperature: -40°C to +85°C (up to 24 V coil) -40°F to +185°F (up to 24 V coil) [-40°C to +70°C (48 V coil) -40°F to +158°F (48 V coil)]; 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	

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 is available for low level load switching [10V DC, 10mA max. level].)

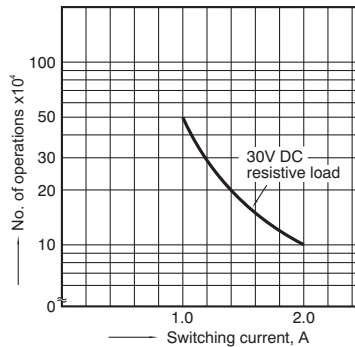
2\* Refer to "6. Usage, Storage and Transport Conditions" in [AMBIENT ENVIRONMENT](#) section in [Relay Technical Information](#).

## REFERENCE DATA

### 1. Maximum switching capacity

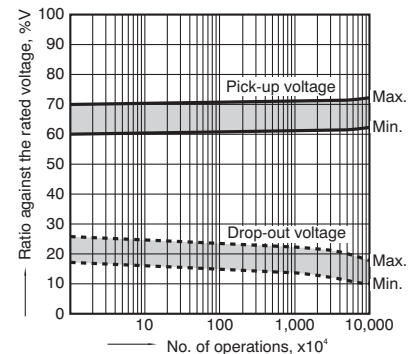


### 2. Life curve



### 3. Mechanical life

Tested sample: TX2-5V, 10 pcs.  
Operating speed: 180 cpm

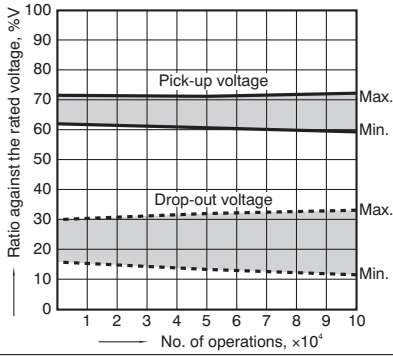


4. Electrical life (2A 30V DC resistive load)

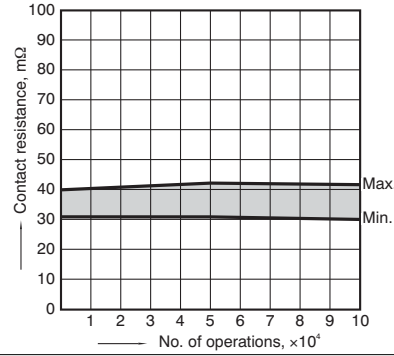
Tested sample: TX2-5V, 6 pcs.

Operating speed: 20 cpm

Change of pick-up and drop-out voltage



Change of contact resistance

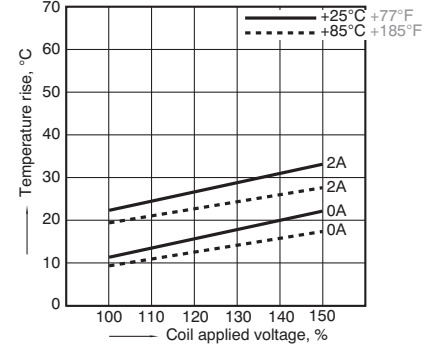


5-(1). Coil temperature rise

Tested sample: TX2-5V, 6 pcs.

Point measured: Inside the coil

Ambient temperature: 25°C 77°F, 85°C 185°F

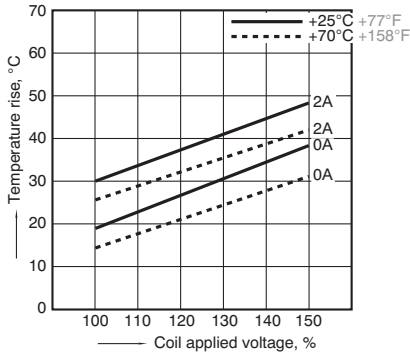


5-(2). Coil temperature rise

Tested sample: TX2-48V, 6 pcs.

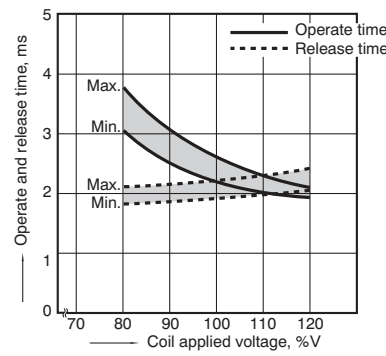
Point measured: Inside the coil

Ambient temperature: 25°C 77°F, 70°C 158°F



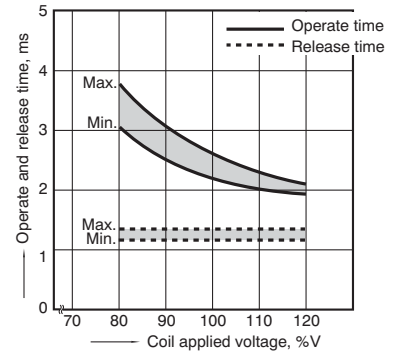
6-(1). Operate and release time (with diode)

Tested sample: TX2-5V, 10 pcs.



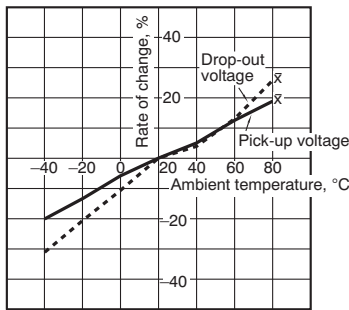
6-(2). Operate and release time (without diode)

Tested sample: TX2-5V, 10 pcs.



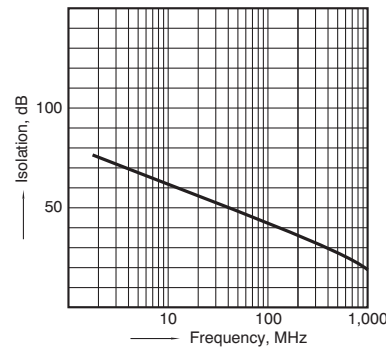
7. Ambient temperature characteristics

Tested sample: TX2-5V, 5 pcs.



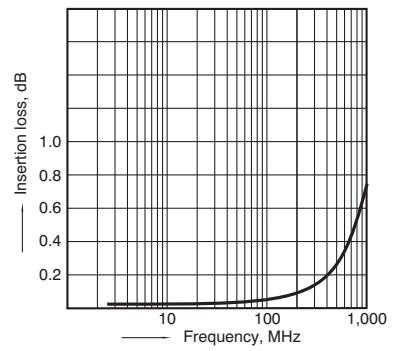
8-(1). High frequency characteristics (Isolation)

Tested sample: TX2-12V, 2 pcs.



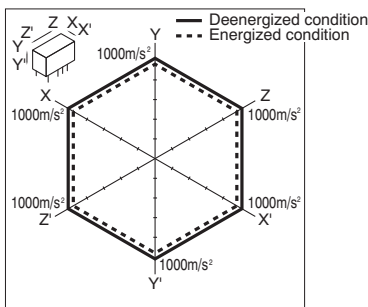
8-(2). High frequency characteristics (Insertion loss)

Tested sample: TX2-12V, 2 pcs.



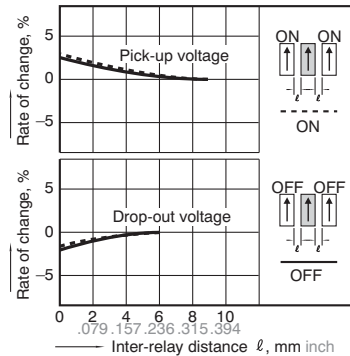
9 Malfunctional shock (single side stable)

Tested sample: TX2-5V, 6 pcs.



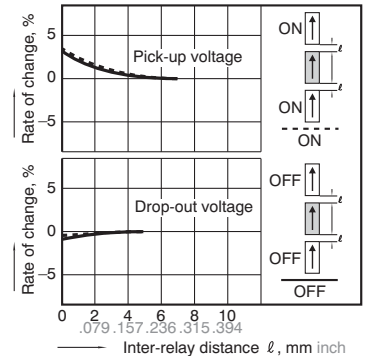
10-(1). Influence of adjacent mounting

Tested sample: TX2-12V, 6 pcs.



10-(2). Influence of adjacent mounting

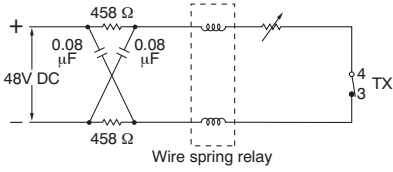
Tested sample: TX2-12V, 6 pcs.



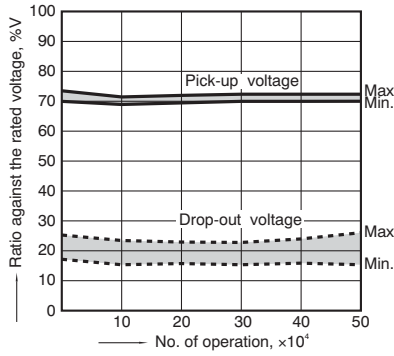
## 11. Pulse dialing test

Tested sample: TX2-5V, 6 pcs.  
(35 mA 48 V DC wire spring relay load)

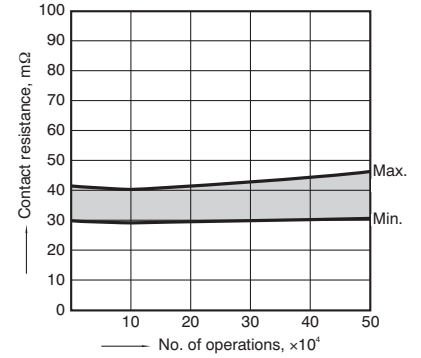
### Circuit



### Change of pick-up and drop-out voltage



### Change of contact resistance



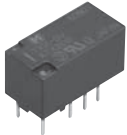
Note: Data of surface-mount type are the same as those of PC board terminal type.

## DIMENSIONS (mm inch)

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

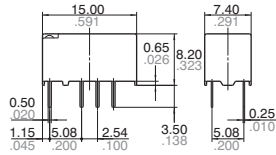
### 1. Standard PC board terminal

[CAD Data](#)



#### Single side stable and 1 coil latching type

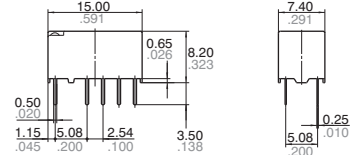
External dimensions  
Standard PC board terminal



General tolerance:  $\pm 0.3 \pm 0.12$

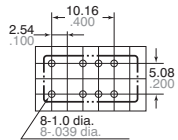
#### 2 coil latching type (L2, LT)

External dimensions  
Standard PC board terminal



General tolerance:  $\pm 0.3 \pm 0.12$

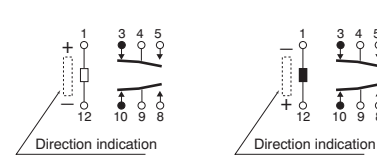
#### PC board pattern (Bottom view)



Tolerance:  $\pm 0.1 \pm 0.004$

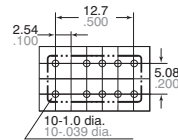
#### Schematic (Bottom view)

Single side stable      1 coil latching



(Deenergized condition)      (Reset condition)

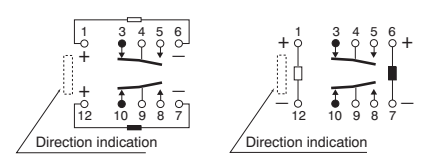
#### PC board pattern (Bottom view)



Tolerance:  $\pm 0.1 \pm 0.004$

#### Schematic (Bottom view)

2 coil latching (L2)      2 coil latching (LT)



(Reset condition)      (Reset condition)

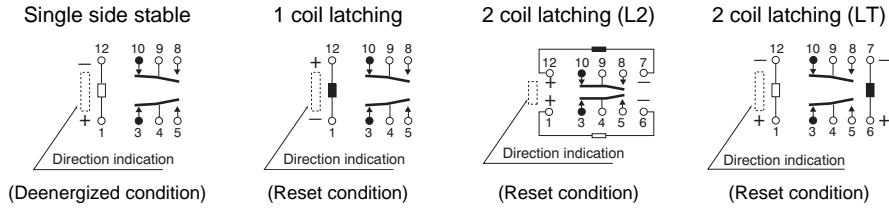
### 2. Surface-mount terminal

[CAD Data](#)



Type	External dimensions (General tolerance: $\pm 0.3 \pm 0.12$ )		Suggested mounting pad (Top view) (Tolerance: $\pm 0.1 \pm 0.004$ )	
	Single side stable and 1 coil latching type	2 coil latching type (L2, LT)	Single side stable and 1 coil latching type	2 coil latching type (L2, LT)
SA type				
SS type				

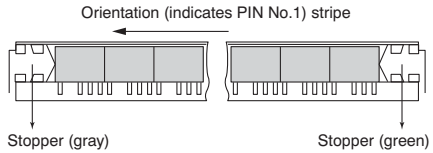
**Schematic (Top view)**



**NOTES**

**1. Packing style**

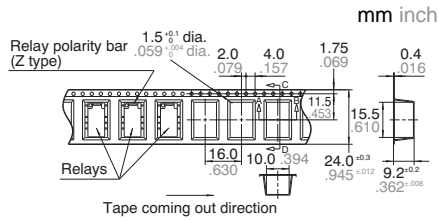
1) The relay is packed in a tube with the relay orientation mark on the left side, as shown in the figure below.



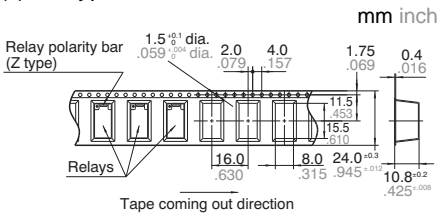
2) Tape and reel packing (surface-mount terminal type)

(1) Tape dimensions

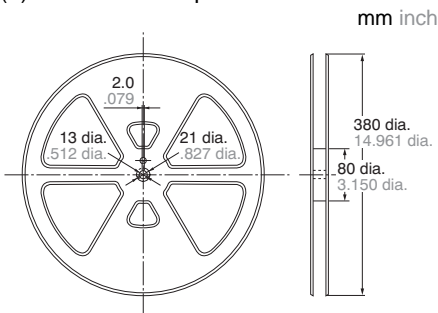
(i) SA type



(ii) SS type



(2) Dimensions of plastic reel



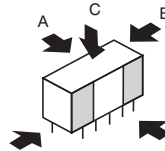
**2. Automatic insertion**


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

Chucking pressure in the direction A: 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.

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