

### FEATURES

#### 1. High contact reliability over a long life has been made possible for low level loads.

Using a low level load (1 mV 10 $\mu$ A to 10 V 10 mA) 10<sup>7</sup> operations were achieved with a static contact resistance of Max. 100 m $\Omega$  (voltage drop of 20 mV, 1 mA, 1 kHz) and a dynamic contact resistance of Max. 1  $\Omega$  (Measurement delay 10 ms, voltage drop of 20 mV, 1 mA, 1 kHz).

#### 2. High sensibility of 50 mW

By using the highly efficient polar magnetic circuit "seesaw balance armature mechanism", a rated power consumption of 50 mW (for single side stable type) has been achieved.

#### 3. Low thermal electromotive force

Reducing the heat from the coil enables a thermal electromotive force of 3  $\mu$ V or less.

### TYPICAL APPLICATIONS

This relay will be used for the low level load for measuring instruments or others where a stable contact resistance is required.

Compliance with RoHS Directive

### ORDERING INFORMATION

| ASX                                                                                                                                                        | 2 |  | 0 |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--|---|--|--|--|--|
| Contact arrangement<br>2: 2 Form C                                                                                                                         |   |  |   |  |  |  |  |
| Operating function<br>0: Single side stable<br>1: 1 coil latching<br>2: 2 coil latching                                                                    |   |  |   |  |  |  |  |
| Type of operation<br>0: Standard type (B.B.M.)                                                                                                             |   |  |   |  |  |  |  |
| Terminal shape<br>Nil: Standard PC board terminal<br>A: Surface-mount terminal (A type)                                                                    |   |  |   |  |  |  |  |
| Nominal coil voltage (DC)<br>1H: 1.5V 03: 3V 4H: 4.5V 06: 6V 09: 9V<br>12: 12V 24: 24V                                                                     |   |  |   |  |  |  |  |
| Packing style<br>Nil: Tube packing<br>X: Tape and reel packing (picked from 1/3/4/5 pin side)<br>Z: Tape and reel packing (picked from 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              | ASX2001H           | ASX2101H        | ASX2201H        |
|                     | 3V DC                | ASX20003           | ASX21003        | ASX22003        |
|                     | 4.5V DC              | ASX2004H           | ASX2104H        | ASX2204H        |
|                     | 6V DC                | ASX20006           | ASX21006        | ASX22006        |
|                     | 9V DC                | ASX20009           | ASX21009        | ASX22009        |
|                     | 12V DC               | ASX20012           | ASX21012        | ASX22012        |
|                     | 24V DC               | ASX20024           | ASX21024        | ASX22024        |

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

# SX (ASX)

## 2. 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              | ASX200A1H          | ASX210A1H       | ASX220A1H       |
|                     | 3V DC                | ASX200A03          | ASX210A03       | ASX220A03       |
|                     | 4.5V DC              | ASX200A4H          | ASX210A4H       | ASX220A4H       |
|                     | 6V DC                | ASX200A06          | ASX210A06       | ASX220A06       |
|                     | 9V DC                | ASX200A09          | ASX210A09       | ASX220A09       |
|                     | 12V DC               | ASX200A12          | ASX210A12       | ASX220A12       |
|                     | 24V DC               | ASX200A24          | ASX210A24       | ASX220A24       |

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 |
|---------------------|----------------------|--------------------|-----------------|-----------------|
|                     |                      | Part No.           | Part No.        | Part No.        |
| 2 Form C            | 1.5V DC              | ASX200A1HZ         | ASX210A1HZ      | ASX220A1HZ      |
|                     | 3V DC                | ASX200A03Z         | ASX210A03Z      | ASX220A03Z      |
|                     | 4.5V DC              | ASX200A4HZ         | ASX210A4HZ      | ASX220A4HZ      |
|                     | 6V DC                | ASX200A06Z         | ASX210A06Z      | ASX220A06Z      |
|                     | 9V DC                | ASX200A09Z         | ASX210A09Z      | ASX220A09Z      |
|                     | 12V DC               | ASX200A12Z         | ASX210A12Z      | ASX220A12Z      |
|                     | 24V DC               | ASX200A24Z         | ASX210A24Z      | ASX220A24Z      |

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 1/3/4/5-pin side) is also available.

# RATING

## 1. Coil data

### 1) Single side stable type

| 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              | 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 type

| 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              | 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 type

| 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              | 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 5442-1996)

## 2. Specifications

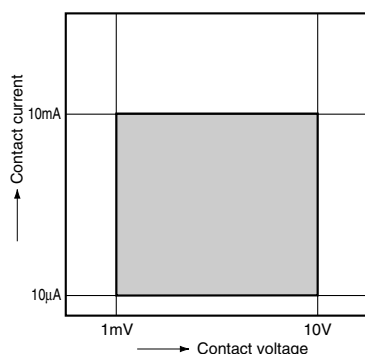
| Characteristics             | Item                                                                   |                           | Specifications                                                                                                                                                                     |
|-----------------------------|------------------------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contact                     | Arrangement                                                            |                           | 2 Form C                                                                                                                                                                           |
|                             | Static contact resistance<br>(During initial and electric life tests)  |                           | Max. 100 mΩ (By voltage drop of 20 mV 1 mA [1kHz])<br>(By nominal switching capacity: No. of operations: 10 <sup>7</sup> )                                                         |
|                             | Dynamic contact resistance<br>(During initial and electric life tests) |                           | Max. 1 Ω (By voltage drop of 20 mV 1 mA [1 kHz], Measurement delay 10 ms after applying nominal coil voltage) (By nominal switching capacity: No. of operations: 10 <sup>7</sup> ) |
|                             | Contact material                                                       |                           | Stationary contact: AgPd+Au clad Movable contact: AgPd                                                                                                                             |
| Rating                      | Nominal switching capacity                                             |                           | 10 mA 10 V DC (resistive load)                                                                                                                                                     |
|                             | Max. switching power                                                   |                           | 0.1 W (resistive load)                                                                                                                                                             |
|                             | Max. switching voltage                                                 |                           | 10 V DC                                                                                                                                                                            |
|                             | Max. switching current                                                 |                           | 10 mA DC                                                                                                                                                                           |
|                             | Min. switching capacity (Reference value)*1                            |                           | 10 μA 1 mV DC                                                                                                                                                                      |
|                             | Nominal operating power                                                | Single side stable        | 50mW (1.5 to 12 V DC), 70mW (24 V DC)                                                                                                                                              |
|                             |                                                                        | 1 coil latching           | 35mW (1.5 to 12 V DC), 50mW (24 V DC)                                                                                                                                              |
|                             |                                                                        | 2 coil latching           | 70mW (1.5 to 12 V DC), 150mW (24 V DC)                                                                                                                                             |
| Electrical characteristics  | Insulation resistance (Initial)                                        |                           | Min. 10,000MΩ (at 500V DC)<br>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  | 1,000 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<br>(By resistive method, nominal coil voltage applied to the coil; contact carrying current: 10mA.)                                                                      |
|                             | Operate time [Set time] (at 20°C 68°F)                                 |                           | Max. 5 ms [Max. 5 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.)                                                                                   |
| Mechanical characteristics  | Shock resistance                                                       | Functional                | Min. 750 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms; detection time: 10μs.)                                                                                              |
|                             |                                                                        | 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. 5 × 10 <sup>7</sup> (at 750 cpm)                                                                                                                                              |
|                             | Electrical                                                             |                           | Min. 10 <sup>7</sup> (10 mA 10 V DC resistive load) (at 750 cpm)                                                                                                                   |
| Thermal electromotive force |                                                                        |                           | Max. 3μV (at nominal voltage applied to the coil)                                                                                                                                  |
| Conditions                  | Conditions for operation, transport and storage*2                      |                           | Ambient temperature: -40°C to +70°C -40°F to +158°F<br>Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)                                                    |
|                             | Max. operating speed (at rated load)                                   |                           | 750 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. Switching capacity range



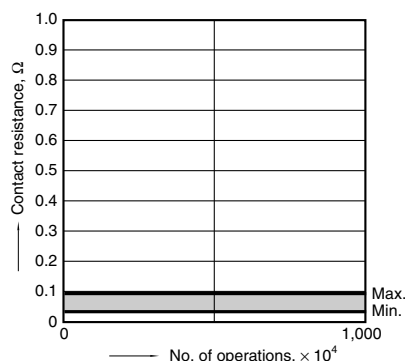
### 2-(1). Change in dynamic contact resistance

(10 mA 10 V DC resistive load)

Tested sample: ASX20012, 10 pcs.

Operating speed: 750 cpm

Measured condition: 10 ms after applying nominal coil voltage, using voltage drop of 20 mV, 1 mA, 1 kHz.



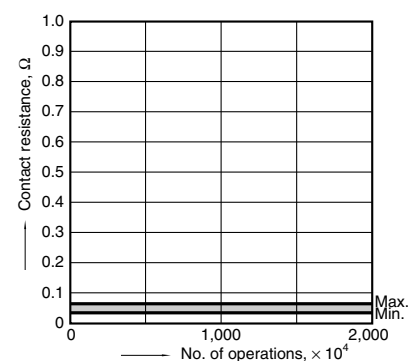
### 2-(2). Change in dynamic contact resistance

(10 μA 1 mV DC resistive load)

Tested sample: ASX20012, 10 pcs.

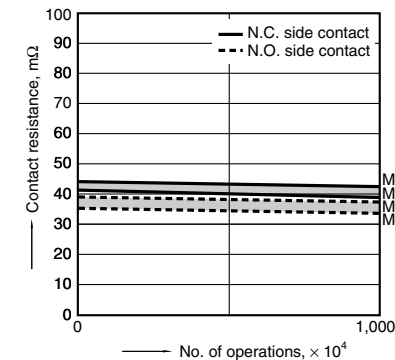
Operating speed: 750 cpm

Measured condition: 10 ms after applying nominal coil voltage, using voltage drop of 20 mV, 1 mA, 1 kHz.

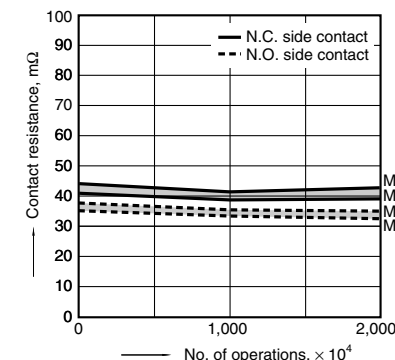


SX (ASX)

3-(1). Change in static contact resistance  
(10 mA 10 V DC resistive load)  
Tested sample: ASX20012, 10 pcs.  
Operating speed: 750 cpm



3-(2). Change in static contact resistance  
(10 μA 1 mV DC resistive load)  
Tested sample: ASX20012, 10 pcs.  
Operating speed: 750 cpm

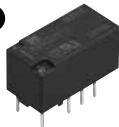


DIMENSIONS (mm inch)

The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://panasonic-electric-works.net/ac>

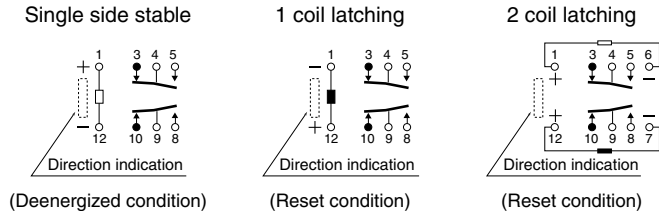
1. Standard PC board terminal

CAD Data



| External dimensions (General tolerance: $\pm 0.3 \pm .012$ ) |                 | PC board pattern (Tolerance: $\pm 0.1 \pm .004$ ) |                 |
|--------------------------------------------------------------|-----------------|---------------------------------------------------|-----------------|
| Single side stable/1 coil latching                           | 2 coil latching | Single side stable/1 coil latching                | 2 coil latching |
|                                                              |                 |                                                   |                 |

Schematic (Bottom view)



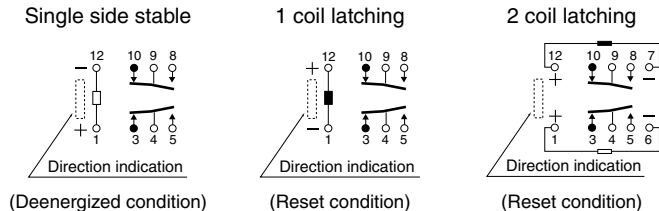
2. Surface-mount terminal

CAD Data



| Type   | External dimensions (General tolerance: $\pm 0.3 \pm .012$ ) |                 | Suggested mounting pad (Tolerance: $\pm 0.1 \pm .004$ ) |                 |
|--------|--------------------------------------------------------------|-----------------|---------------------------------------------------------|-----------------|
|        | Single side stable/1 coil latching                           | 2 coil latching | Single side stable/1 coil latching                      | 2 coil latching |
| A type |                                                              |                 |                                                         |                 |

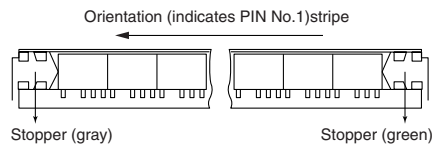
Schematic (Top view)



NOTES

1. Packing style

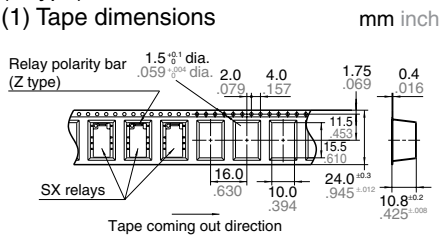
1) The relay is packed in a tube with the relay orientation mark on the left side, as shown in the figure below.



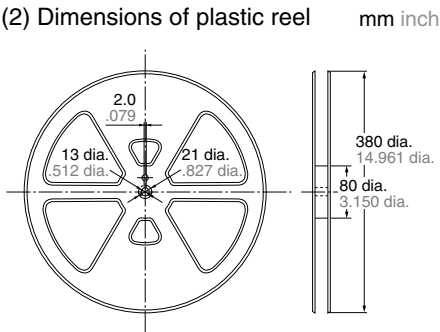
2) Tape and reel packing

(A type)

(1) Tape dimensions



(2) Dimensions of plastic reel



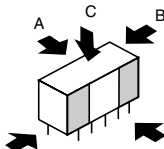
2. Automatic insertion

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 general cautions for use,  
please refer to the “Cautions for  
use of Signal Relays” or “General  
Application Guidelines”.

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