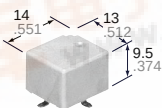
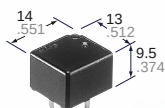


NAIS

ULTRA-MINIATURE,  
LOW PROFILE  
AUTOMOTIVE RELAY

CP-RELAYS

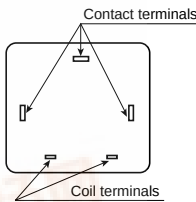


mm inch

FEATURES

- **Low profile**  
<Height>  
PC board terminal type: 9.5 mm .374 inch  
Surface-mount terminal type: 10.5mm .413inch
- **High capacity**  
CP Relay provides low profile spacesaving advantages while offering high continuous current of 25 A(1 hour).
- **Sealed construction suitable for harsh environments**

- **Simple footprint pattern enables ease of PC board layout**



- **"PC board terminal" and "Surface mount terminal" types available**

\*Surface mount terminal type is coming soon.

SPECIFICATIONS

Contact

|                                                                |                            |                                                                                                                               |
|----------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Arrangement                                                    | 1 Form A                   | 1 Form C                                                                                                                      |
| Contact material                                               | Silver alloy               |                                                                                                                               |
| Initial contact resistance, max.<br>(By voltage drop 6V DC 1A) | 100 mΩ                     |                                                                                                                               |
| Rating                                                         | Nominal switching capacity | 20 A 14 V DC<br>20 A 14 V DC (N.O.)<br>10 A 14 V DC (N.C.)                                                                    |
|                                                                | Max. switching voltage     | 16 V DC                                                                                                                       |
|                                                                | Max. carrying current      | 40 A for 2 minutes<br>30 A for 1 hour<br>(12 V at 20°C 68°F)<br>35 A for 2 minutes<br>25 A for 1 hour<br>(12 V at 85°C 185°F) |
| Expected life (min. operations)                                | Mechanical (at 120cpm)     | 10 <sup>7</sup>                                                                                                               |
|                                                                | Electrical (at 6cpm)       | Resistive load                                                                                                                |
|                                                                |                            | Min. 10 <sup>5*1</sup>                                                                                                        |
|                                                                |                            | Motor load                                                                                                                    |
|                                                                |                            | Min. 2×10 <sup>5*2</sup>                                                                                                      |
|                                                                |                            | Lamp load                                                                                                                     |
|                                                                |                            | Min. 10 <sup>5*4</sup>                                                                                                        |

Coil

|                         |        |
|-------------------------|--------|
| Nominal operating power | 640 mW |
|-------------------------|--------|

Remarks

- \* Specifications will vary with foreign standards certification ratings.
- \*1 At nominal switching capacity, operating frequency: 1s ON, 9s OFF
- \*2 N.O.: at 5A (steady), 25A (inrush)/N.C.: at 20A (brake) 14V DC, operating frequency: 0.5s ON, 9.5s OFF
- \*3 At 20A 14V DC (Motor lock), operating frequency: 0.5s ON, 9.5s OFF
- \*4 N.O.: at 5A (steady), 40A (inrush)14V DC, operating frequency: 1s ON, 14s OFF
- \*5 Measurement at same location as "Initial breakdown voltage" section

Characteristics

|                                                                                                               |                          |                                                    |
|---------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------------------|
| Max. operating speed (at rated load)                                                                          | 6cpm                     |                                                    |
| Initial insulation resistance*5                                                                               | Min. 100MΩ (at 500 V DC) |                                                    |
| Initial breakdown voltage*6                                                                                   | Between open contacts    | 500 Vrms for 1min.                                 |
|                                                                                                               | Between contact and coil | 500 Vrms for 1min.                                 |
| Operate time*7                                                                                                | Max. 10ms (at 20°C 68°F) |                                                    |
| Release time (without diode)*7<br>(at nominal voltage)                                                        | Max. 10ms (at 20°C 68°F) |                                                    |
| Shock resistance                                                                                              | Functional*8             | Min. 100 m/s <sup>2</sup> {10 G}                   |
|                                                                                                               | Destructive*9            | Min. 1,000 m/s <sup>2</sup> {100 G}                |
| Vibration resistance                                                                                          | Functional*10            | 10 to 100 Hz,<br>Min.44.1 m/s <sup>2</sup> {4.5 G} |
|                                                                                                               | Destructive              | 10 to 500 Hz,<br>Min.44.1 m/s <sup>2</sup> {4.5 G} |
| Conditions in case of operation, transport and storage*11<br>(Not freezing and condensing at low temperature) | Ambient temp             | −40 to +85°C<br>−40 to +185°F                      |
|                                                                                                               | Humidity                 | 5 to 85% R.H.                                      |
| Unit weight                                                                                                   | Approx. 4g .14 oz        |                                                    |

- \*6 Detection current: 10mA
- \*7 Excluding contact bounce time
- \*8 Half-wave pulse of sine wave: 11ms; detection time: 10μs
- \*9 Half-wave pulse of sine wave: 6ms
- \*10 Detection time: 10μs
- \*11 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61)

TYPICAL APPLICATIONS

- Power windows
- Auto door lock
- Power sunroof
- Hazard flasher
- Flasher
- Defogger
- Power steering
- Power seat

ORDERING INFORMATION

|                             |                                                       |                   |                                                                                                                                                   |   |
|-----------------------------|-------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Ex. CP                      | 1a                                                    | SA                | 12V                                                                                                                                               | X |
| Contact arrangement         | Mounting classification                               | Coil voltage (DC) | Packing style                                                                                                                                     |   |
| 1a: 1 Form A<br>1: 1 Form C | Nil: PC board terminal<br>SA: Surface-mount terminal* | 12 V              | Nil: Tube packing<br>X: Tape and reel packing (picked from the NC terminal side)<br>Z: Tape and reel packing (picked from the coil terminal side) |   |

- Notes: 1. Standard packing: Carton (Tube): 40 pcs.; Case: 1,000 pcs.  
2. Tape and reel packing: Carton (Tape and reel): 300 pcs.; Case: 900 pcs.  
3. Surface-mount terminal type are available only for tape and reel packing.  
4. 24 V DC type is also available. Please consult us for details.
- \*Only for 1 Form C type

## TYPES

## 1. PC board terminal type

| Contact arrangement | Coil voltage | Part No. |
|---------------------|--------------|----------|
| 1 Form A            | 12 V DC      | CP1a-12V |
| 1 Form C            | 12 V DC      | CP1-12V  |

## 2. Surface mount terminal type

| Contact arrangement | Coil voltage | Part No.    |
|---------------------|--------------|-------------|
| 1 Form C            | 12 V DC      | CP1SA-12V-Z |

## Notes:

1. Tape and reel (picked from N.C. terminal side) is also available by request.  
Part No. suffix "-x" is needed when ordering. (ex) CP1SA-12V-X
2. Tape and reel packing symbol "-z" or "-x" are not marked on the relay.
3. 24 V DC type is also available. Please consult us for details.

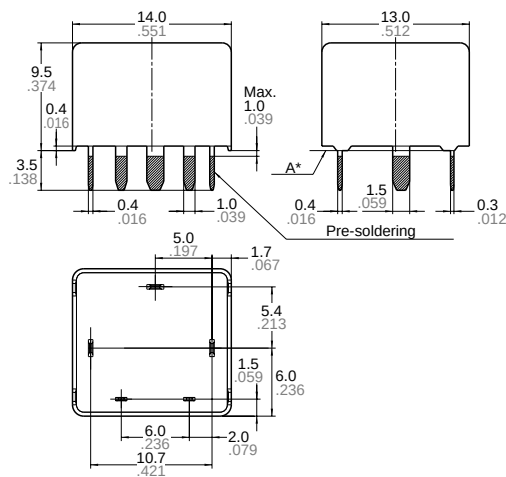
## COIL DATA (at 20°C 68°F)

| Nominal voltage,<br>V DC | Pick-up voltage,<br>V DC (max.) | Drop-out voltage,<br>V DC (min.) | Coil resistance<br>$\Omega$ ( $\pm 10\%$ ) | Nominal operating<br>current<br>mA ( $\pm 10\%$ ) | Nominal operating<br>power<br>mW | Usable voltage<br>range,<br>V DC |
|--------------------------|---------------------------------|----------------------------------|--------------------------------------------|---------------------------------------------------|----------------------------------|----------------------------------|
| 12                       | (initial) 7.2                   | (initial) 1.0                    | 225                                        | 53.3                                              | 640                              | 10 to 16                         |

## DIMENSIONS

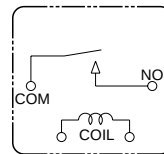
mm inch

## 1. PC board terminal type

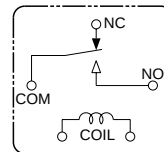


Schematic (Bottom view)

1a

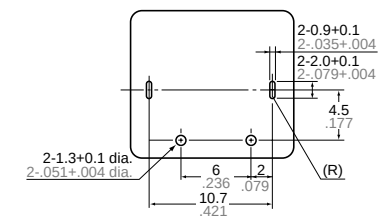


1c

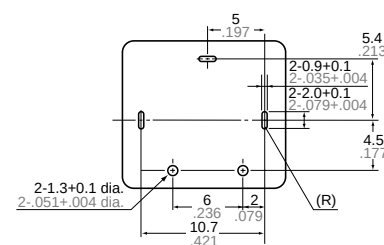


PC board pattern (Bottom view)

1a



1c



## Dimension:

Max. 1mm .039 inch:

1 to 3mm .039 to .118 inch:

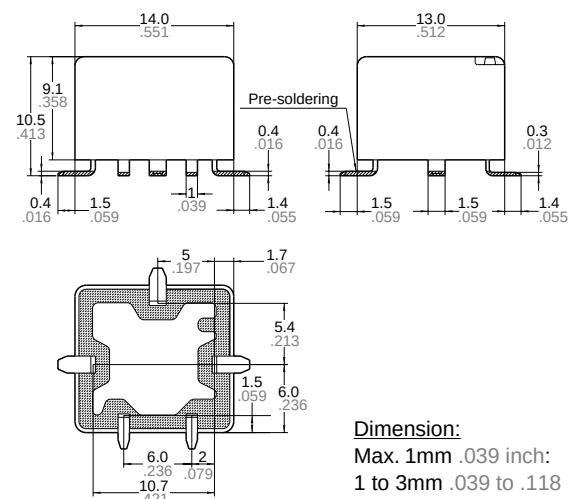
Min. 3mm .118 inch:

## General tolerance

 $\pm 0.1 \pm .004$  $\pm 0.2 \pm .008$  $\pm 0.3 \pm .012$ 

\* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering.  
Intervals between terminals is measured at A surface level.

## 2. Surface mount terminal type



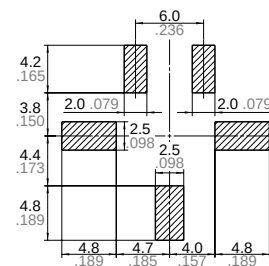
## Dimension:

Max. 1mm .039 inch:

1 to 3mm .039 to .118 inch:

Min. 3mm .118 inch:

## General tolerance

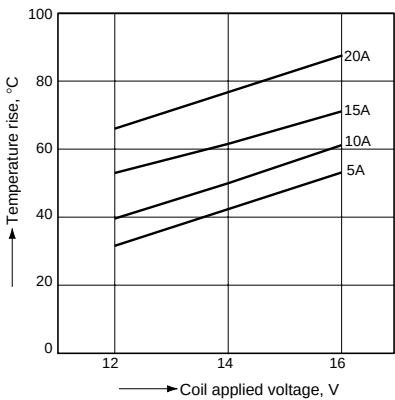
 $\pm 0.1 \pm .004$  $\pm 0.2 \pm .008$  $\pm 0.3 \pm .012$ Recommendable mounting pad  
(Top view)

CP

REFERENCE DATA

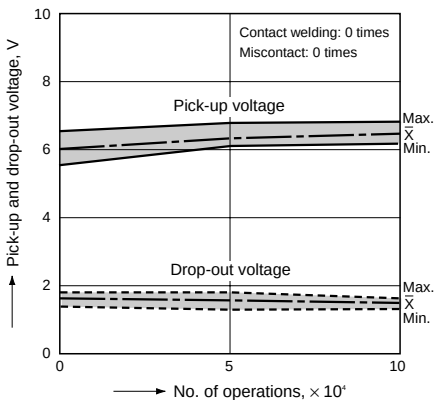
1. Coil temperature rise

Tested sample : CP1-12V, 6pcs  
Point measured : Inside the coil  
Contact carrying current, 5A, 10A, 15A, 20A  
Resistance method, ambient temperature 85°C 185°F



2-(1). Electrical life test (at rated load)

Tested Sample : CP1-12V  
Quantity : n = 4 (NC = 2, NO = 2)  
Load : Resistive load (NC side : 10A 14 V DC, NO side : 20 A 14 V DC)  
Operating frequency : ON 1s, OFF 9s

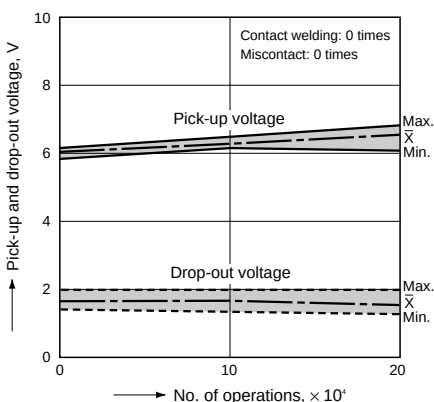
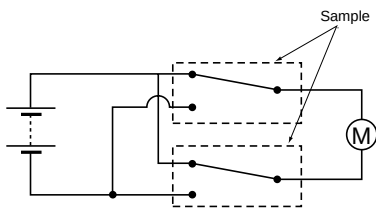


Contact welding : 0 time  
Miscontact : 0 time

2-(2). Electrical life test (Motor free)

Tested Sample : CP1-12V, 3pcs.  
Load : 5A, Inrush 25A, Brake current 15A, Power window motor load (Free condition).  
Operating frequency : ON 0.5s, OFF 9.5s

Circuit :

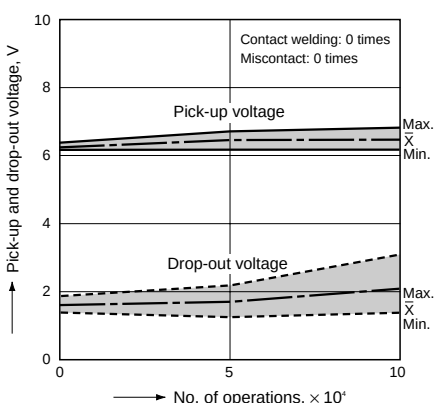
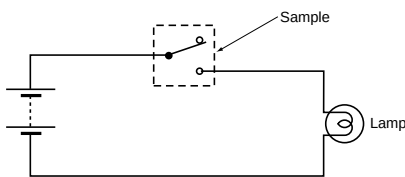


Contact welding : 0 time  
Miscontact : 0 time

2-(3). Electrical life test (Lamp load)

Tested sample : CP1-12V, 3pcs.  
Load : 5A, Inrush 40A, 14VDC lamp load  
Operating frequency : ON 1s, OFF 14s

Circuit :



Contact welding : 0 time  
Miscontact : 0 time

For Cautions for use, see Relay Technical Information (Page 48 to 76).