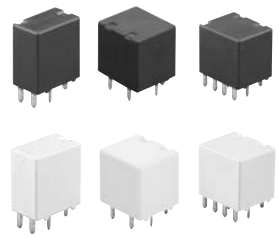
Panasonic
ideas for life

SUPER MINIATURE TWIN TYPE AUTOMOTIVE RELAY

CJ RELAYS (ACJ)



FEATURES

1. Smallest in its class, it is extremely compact at approx. 2/3 the size of previous products.
Compared to our previous miniature type CT relay, the 1 Form C as well as the 10-pin and 8-pin twin types take up approx. two-thirds the space and volume.

2. High-capacity 25 A load switching
High capacity control capable of motor lock load switching at 25 A, 14 V DC is possible despite compact size.

3. Pin in Paste (PiP) compatible model added
Models compatible with the recently increasing popular PiP technology (reflow solder mounting) have been added.
PiP compatible models are the flux tight type.
The PiP method is also known as the Through-Hole Reflow (THR) method.

4. Environmental protection specifications
Cadmium-free contacts and use of lead-free solder are standard. Environmental pollutants are not used.

TYPICAL APPLICATIONS

- **Powered windows**
- **Automatic door locks**
- **Electrically powered mirrors**
- **Powered sunroofs**
- **Powered seats**
- **Lift gates**
- **Smart junction box related products, etc.**

SPECIFICATIONS

Characteristics	Item		Specifications
Contact	Arrangement		1 Form C, 1 Form C×2
	Initial contact resistance (Initial)		N.O.: Typ7mΩ, N.C.: Typ10mΩ (By voltage drop 6 V DC 1 A)
	Contact material		Ag alloy (Cadmium free)
Protective construction			Standard type: Sealed type Pin in Paste type: Flux tight type
Rating	Nominal switching capacity		N.O.: 20A 14V DC, N.C.: 10A 14V DC
	Max. carrying current (14V DC)		N.O.: 20 A for 1 hour, 30 A for 2 minutes (at 20°C 68°F)
	Nominal operating power		640 mW (for pick-up voltage max. 7.2 V DC), 800 mW (for pick-up voltage max. 6.5 V DC)
	Min. switching capacity*1		1A 12V DC
Electrical characteristics	Initial insulation resistance		Min. 100 MΩ (at 500 V DC)
	Initial breakdown voltage	Between open contacts	500 Vrms for 1 min. (Detection current: 10mA)
		Between contacts and coil	500 Vrms for 1 min. (Detection current: 10mA)
	Operate time (at nominal voltage)		Max. 10ms (at 20°C 68° F, excluding contact bounce time) (Initial)
	Release time (at nominal voltage)		Max. 10ms (at 20°C 68° F, excluding contact bounce time) (Initial)
Mechanical characteristics	Shock resistance	Functional	Min. 100 m/s² {10G} (Half-wave pulse of sine wave: 11ms; detection: 10μs)
		Destructive	Min. 1,000 m/s² {100G} (Half-wave pulse of sine wave: 6ms)
	Vibration resistance	Functional	10 Hz to 100 Hz, Min. 44.1m/s² {4.5G} (Detection time: 10μs)
		Destructive	10 Hz to 500 Hz, Min. 44.1m/s² {4.5G} Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours
Expected life	Mechanical		Min. 10^7 (at 120 cpm)
	Electrical		**[Standard type]** <Resistive load> Min. 10^5 (At nominal switching capacity, operating frequency: 1s ON, 9s OFF) <Motor load> N.O. side: Min. 2×10^5: at 25 A (inrush), 5 A (steady), 14 V DC; Min. 10^5: at 25 A 14 V DC (Motor lock) N.C. side: Min. 2×10^5: at 20 A 14 V DC (brake) (Operating frequency: 0.5s ON, 9.5s OFF) **[Pin in Paste type]** <Resistive load> Min. 10^5 (At nominal switching capacity, operating frequency: 1s ON, 9s OFF) <Motor load> N.O. side: Min. 10^5: at 25 A (inrush), 5 A (steady), 14 V DC; Min. 5×10^4: at 25 A 14 V DC (Motor lock) N.C. side: Min. 10^5: at 20 A 14 V DC (brake) (Operating frequency: 0.5s ON, 9.5s OFF)
Conditions	Conditions for operation, transport and storage*2		Ambient temp: –40°C to +85°C –40°F to +185°F Humidity: 5% R.H. to 85% R.H. (Not freezing and condensing at low temperature)
	Max. operating speed		6 cpm (At nominal switching capacity)
Unit weight			1 Form C type: approx. 3.5 g .12 oz Twin type: approx. 6.5 g .23 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 (p. 19, Relay Technical Information).
Please inquire if you will be using the relay in a high temperature atmosphere (110°C 230°F).

ORDERING INFORMATION

Ex. A CJ 1 1 12 P

Product name	Contact arrangement	Pick-up voltage (V DC)	Coil voltage (V DC)	Coil voltage (V DC)
CJ	1: 1 Form C 2: 1 Form C × 2 (8 terminals type) 5: 1 Form C × 2 (10 terminals type)	1: Max. 6.5 V DC 2: Max. 7.2 V DC	12: 12	Nil: Standard type P : Pin in Paste type

Standard packing: 1 Form C: Tube: 70 pcs.; Outer carton: 2,800 pcs.
1 Form C × 2, 8 terminals: Tube: 40 pcs.; Outer carton: 1,000 pcs.
1 Form C × 2, 10 terminals: Tube: 35 pcs.; Outer carton: 1,400 pcs.

TYPES

Contact arrangement	Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Part No.	
			Standard type	Pin in Paste type
1 Form C	12 V DC	Max.6.5 V DC (Initial)	ACJ1112	ACJ1112P
		Max.7.2 V DC (Initial)	ACJ1212	ACJ1212P
1 Form C × 2 (8 terminal)		Max.6.5 V DC (Initial)	ACJ2112	ACJ2112P
		Max.7.2 V DC (Initial)	ACJ2212	ACJ2212P
1 Form C × 2 (10 terminal)		Max.6.5V DC (Initial)	ACJ5112	ACJ5112P
		Max.7.2 V DC (Initial)	ACJ5212	ACJ5212P

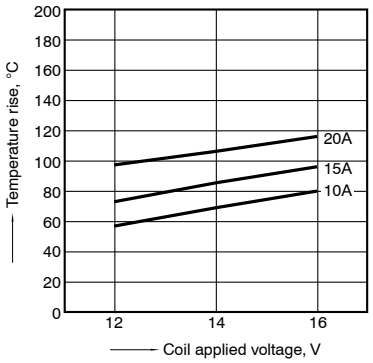
COIL DATA

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 (at 20°C 68°F)	Max. continuous voltage*
12 V DC	Max. 7.2 V DC (Initial)	Min. 1.0 V DC (Initial)	53.3 mA	225¾	640 mW	10 to 16 V DC
	Max. 6.5 V DC (Initial)	Min. 0.8 V DC (Initial)	66.7 mA	180¾	800 mW	9 to 16 V DC

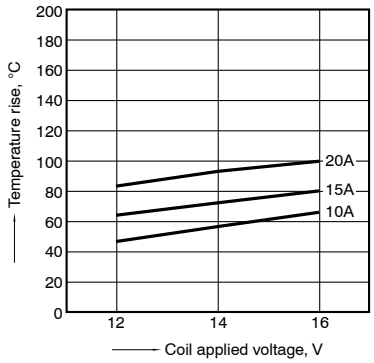
* Other usable voltage range types are also available. Please contact us for details.

REFERENCE DATA

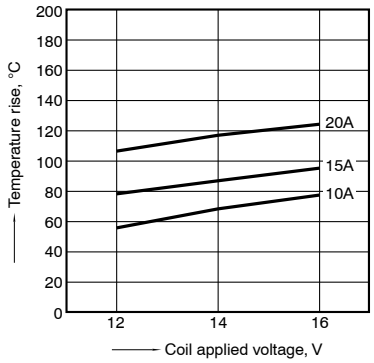
1-(1). Coil temperature rise (at room temperature)
Sample: ACJ1212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 25°C 77°F



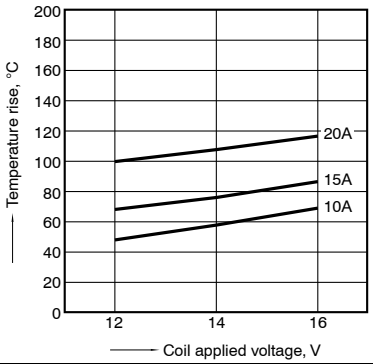
1-(2). Coil temperature rise (at 85°C 185°F)
Sample: ACJ1212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 85°C 185°F



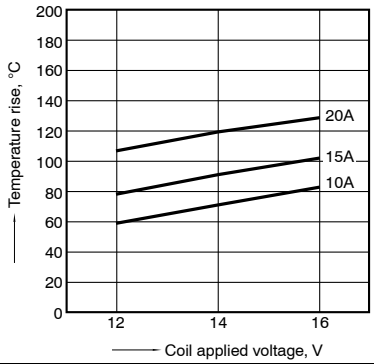
1-(3). Coil temperature rise (at room temperature)
Sample: ACJ2212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 25°C 77°F



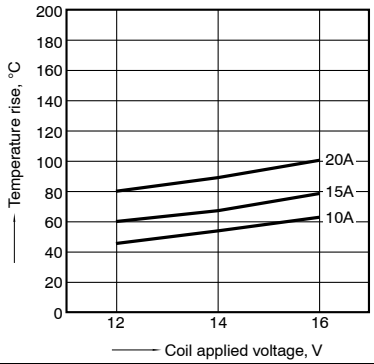
1-(4). Coil temperature rise (at 85°C 185°F)
Sample: ACJ2212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 85°C 185°F



1-(5). Coil temperature rise (at room temperature)
Sample: ACJ5212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 25°C 77°F



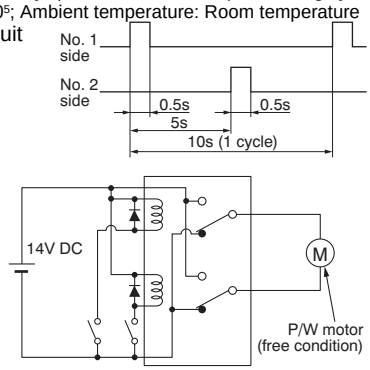
1-(6). Coil temperature rise (at 85°C 185°F)
Sample: ACJ5212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 85°C 185°F



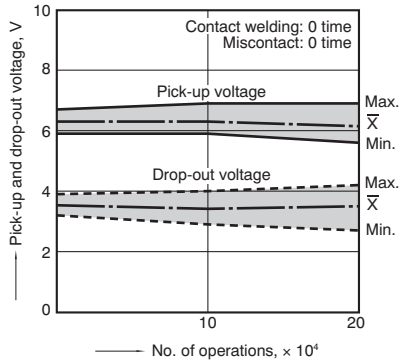
2-(1). Electrical life test (Motor free)

Sample: ACJ2212, 3pcs; Load: Inrush current: 25A/ Steady current: 5A, Power window motor actual load (free condition); Tested voltage: 14V DC; Switching frequency: (ON:OFF = 0.5s:9.5s); Switching cycle: 2×10^5; Ambient temperature: Room temperature

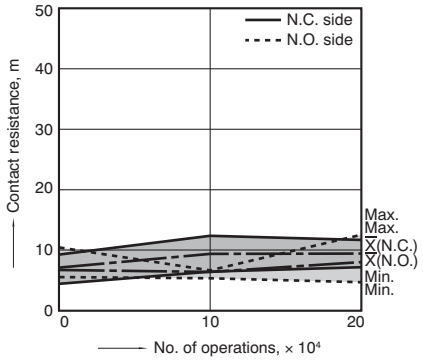
Circuit



Change of pick-up and drop-out voltage

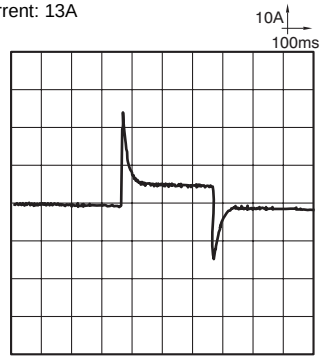


Change of contact resistance



Load current waveform

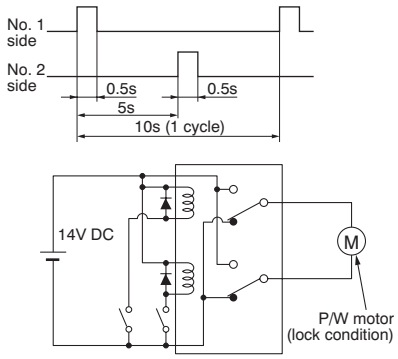
Inrush current: 25A, Steady current: 6A, Brake current: 13A



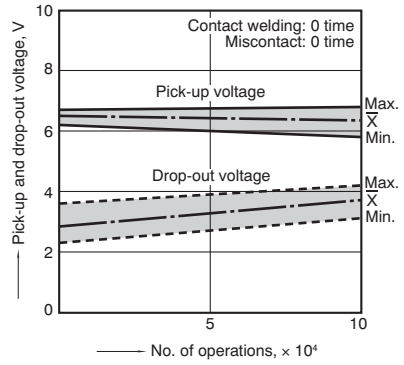
2-(2). Electrical life test (Motor lock)

Sample: ACJ2212, 3pcs; Load: Steady current: 25A, Power window motor actual load (lock condition); Tested voltage: 14V DC; Switching frequency: (ON:OFF = 0.5s:9.5s); Switching cycle: 10^5; Ambient temperature: Room temperature

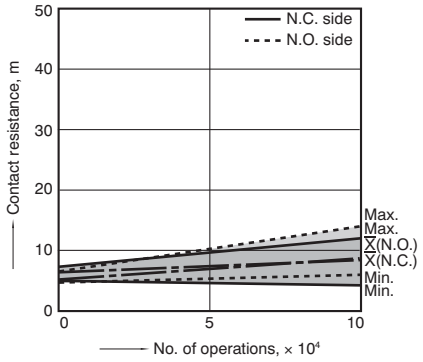
Circuit



Change of pick-up and drop-out voltage

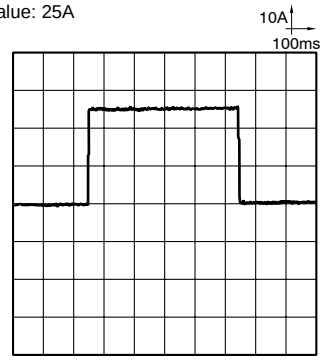


Change of contact resistance



Load current waveform

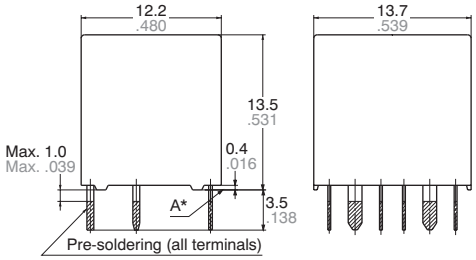
Current value: 25A

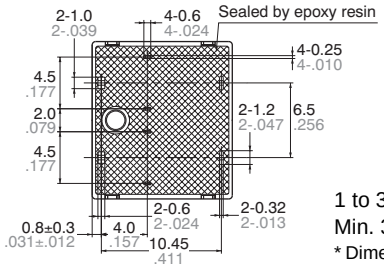


DIMENSIONS (Unit: mm inch)

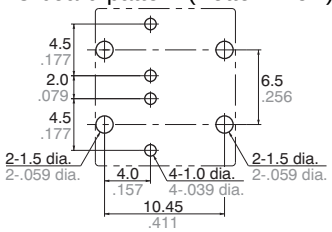
1. Twin type (8-pin)
Standard type

External dimensions



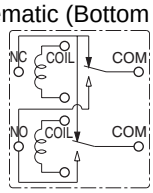


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



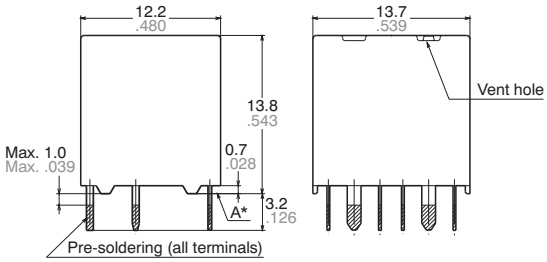
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

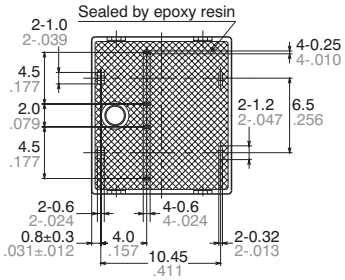
* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering.

Intervals between terminals is measured at A surface level.

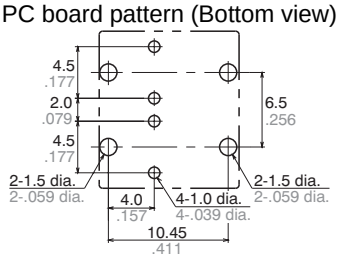
2. Twin type (8-pin)
Pin in Paste type

External dimensions



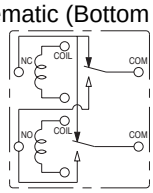


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

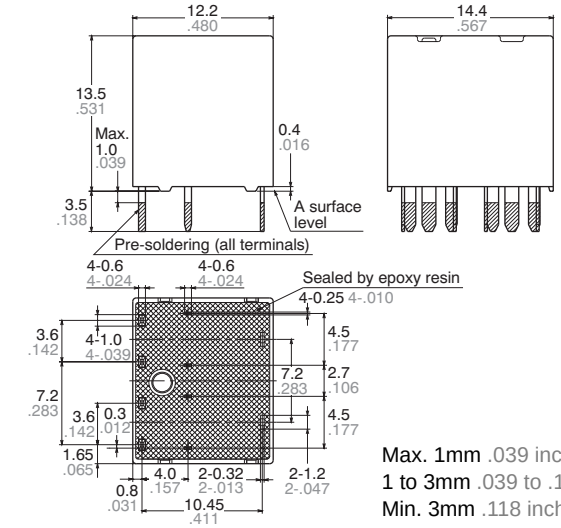


Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

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

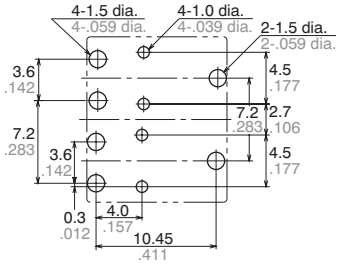
3. Twin type (10-pin)
Standard type

External dimensions



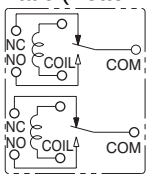
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



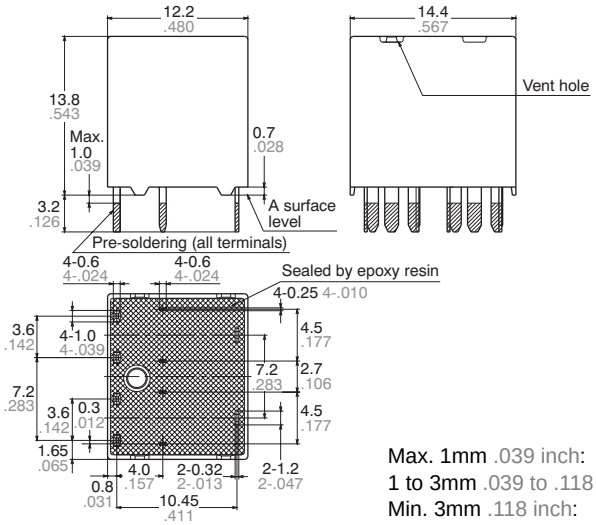
Tolerance: ±0.1 ±.004

Schematic (Bottom view)



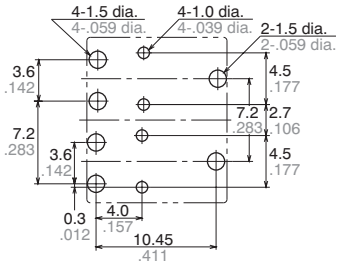
4. Twin type (10-pin)
Pin in Paste type

External dimensions



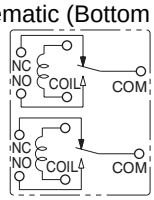
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



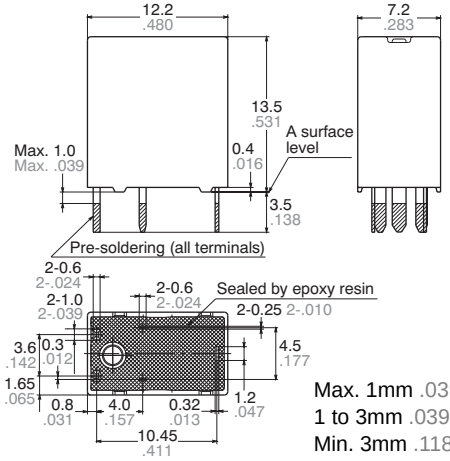
Tolerance: ±0.1 ±.004

Schematic (Bottom view)



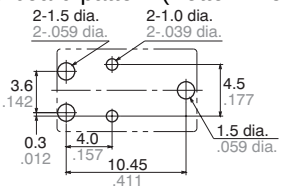
5. Slim 1 Form C
Standard type

External dimensions



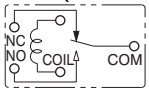
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



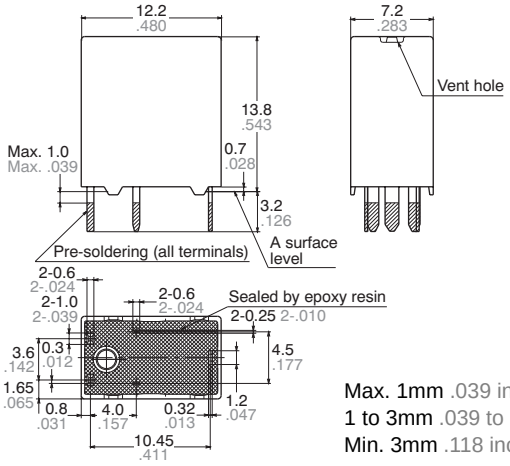
Tolerance: ±0.1 ±.004

Schematic (Bottom view)



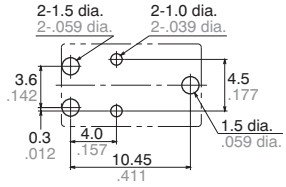
6. Slim 1 Form C
Pin in Paste type

External dimensions



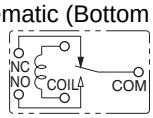
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



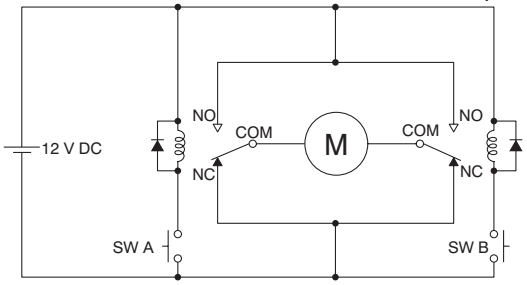
Tolerance: ±0.1 ±.004

Schematic (Bottom view)



EXAMPLE OF CIRCUIT

Forward/reverse control circuits of DC motor (for 1 Form C × 2 (8 terminal) type)



Ⓜ : Power window motor

For Cautions for Use, see Relay Technical Information.