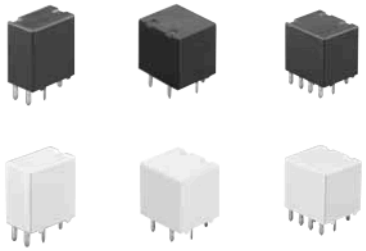
Panasonic
ideas for life

SUPER MINIATURE PC BOARD TYPE AUTOMOTIVE RELAY

CJ RELAYS (ACJ)



RoHS compliant

FEATURES

• 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, both the 1 Form C and 10-pin and 8-pin twin types take up approx. two-thirds the space and volume. This makes them ideal for relay unit miniaturization.

• Compact and high-capacity 25 A load switching
High capacity control is possible while being compact and capable of motor lock load switching at 25 A, 14 V DC.

• Pin in Paste* compatible model added
Models compatible with the recently increasing Pin in Paste technique (reflow solder mounting) have been added.
Pin in Paste compatible models are the flux tight type.
* The Pin in Paste method may sometimes be referred to as THR (Through-hole Reflow).

• 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 J/B related products, etc.**

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.6.5 V DC (Initial)	ACJ5112	ACJ5112P
		Max.7.2 V DC (Initial)	ACJ5212	ACJ5212P

Standard packing; Carton (tube): 70 pcs.; Case: 2,800 pcs. (1 Form C), Carton (tube): 40 pcs.; Case: 1,000 pcs. (8 terminal), Carton (tube): 35 pcs.; Case: 1,400 pcs. (10 terminal)

RATING

1. 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)	Usable voltage range*
12 V DC	Max. 7.2 V DC (Initial)	Min. 1.0 V DC (Initial)	53.3 mA	225Ω	640 mW	10 to 16 V DC
	Max. 6.5 V DC (Initial)	Min. 0.8 V DC (Initial)	66.7 mA	180Ω	800 mW	9 to 16 V DC

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

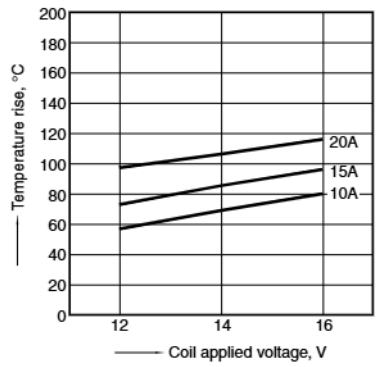
2. Specifications

Characteristics	Item		Specifications
Contact	Arrangement		1 Form C, 1 Form C×2
	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 (resistive load)		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) (when coil powered on one side)
	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 (resistive load)*1		1A 12V DC
Electrical characteristics	Initial insulation resistance		Min. 100 MΩ (at 500 V DC)
	Breakdown voltage (Initial)	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 time: 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 temperature: –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)
Mass			1 Form C type: approx. 3.5 g .12 oz, Twin type: approx. 6.5 g .23 oz

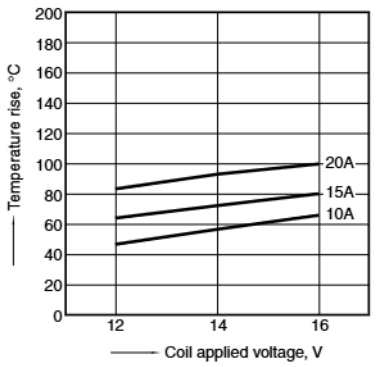
Notes: *1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.
*2. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Please refer to "Usage ambient condition" in CAUTIONS FOR USE OF AUTOMOTIVE RELAYS.
Please inquire if you will be using the relay in a high temperature atmosphere (110°C 230°F).
*3. Depends on connection conditions. Also, this does not guarantee repeated switching. We recommend that you confirm operation under actual conditions.
* If the relay is used continuously for long periods of time with coils on both sides in an energized condition, breakdown might occur due to abnormal heating depending on the carrying condition. Therefore, please inquire when using with a circuit that causes an energized condition on both sides simultaneously.

REFERENCE DATA

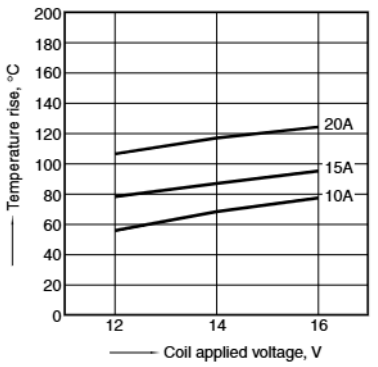
1-(1). Coil temperature rise (at room temperature)
Sample: ACJ1212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 25°C 77°F



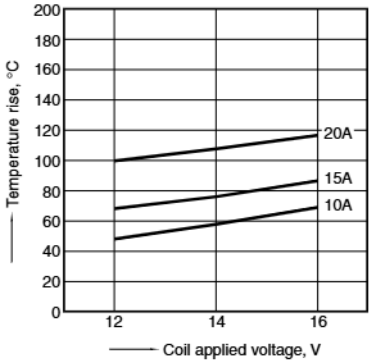
1-(2). Coil temperature rise (at 85°C 185°F)
Sample: ACJ1212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 85°C 185°F



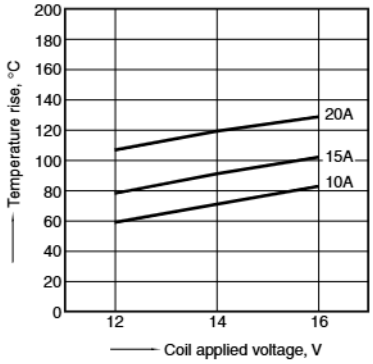
1-(3). Coil temperature rise (at room temperature)
Sample: ACJ2212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 25°C 77°F



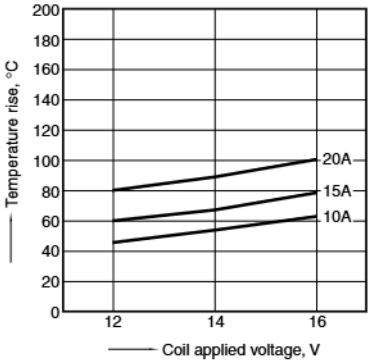
1-(4). Coil temperature rise (at 85°C 185°F)
Sample: ACJ2212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 85°C 185°F



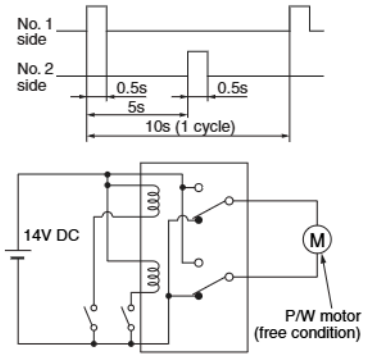
1-(5). Coil temperature rise (at room temperature)
Sample: ACJ5212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 25°C 77°F



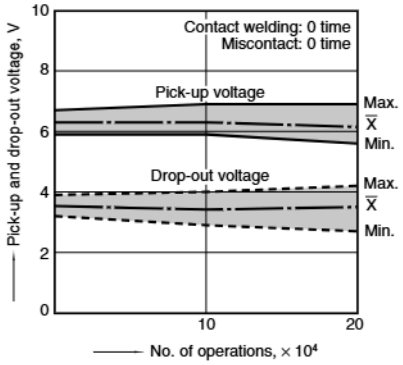
1-(6). Coil temperature rise (at 85°C 185°F)
Sample: ACJ5212, 3pcs
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 85°C 185°F



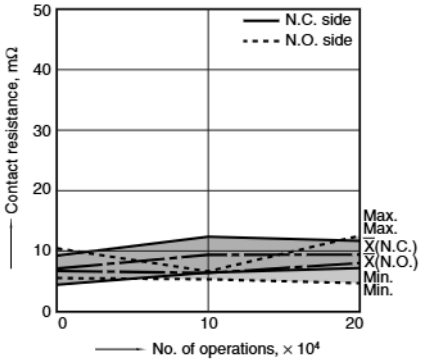
2-(1). Electrical life test (Motor free)
Sample: ACJ2212, 3pcs
Load: Inrush current: 25A/Steady current: 5A,
Power window motor actual load (free condition)
Tested voltage: 14V DC
Switching frequency: ON 0.5s, OFF 9.5s
Switching cycle: 2×10^5
Ambient temperature: Room temperature
Circuit



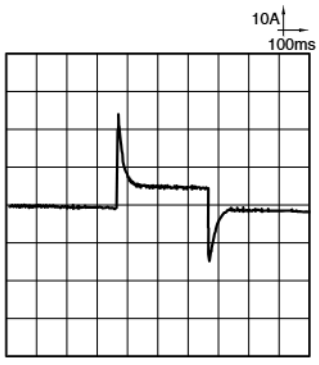
Change of pick-up and drop-out voltage



Change of contact resistance



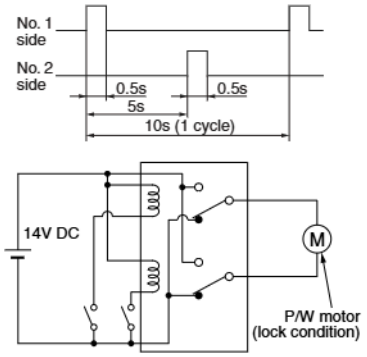
Load current waveform
Inrush current: 25A, Steady current: 6A,
Brake current: 13A



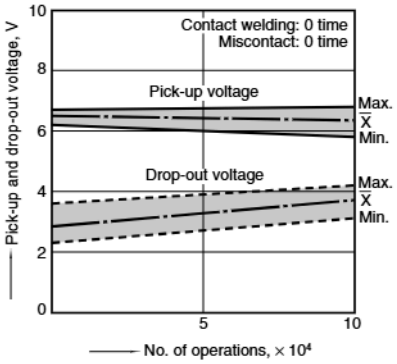
2-(2). Electrical life test (Motor lock)

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

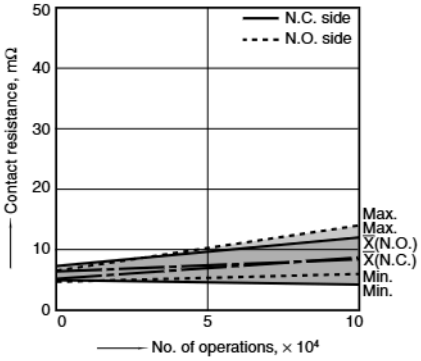
Circuit



Change of pick-up and drop-out voltage

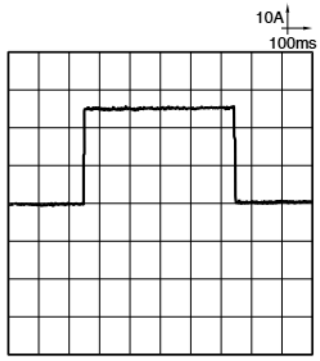


Change of contact resistance



Load current waveform

Current value: 25A



DIMENSIONS (mm inch)

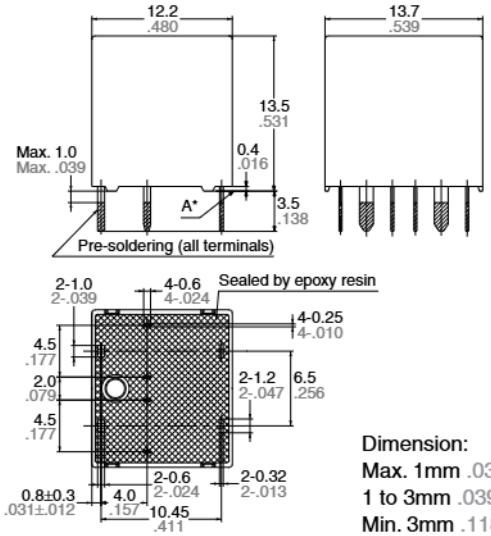
The CAD data of the products with a **CAD Data** mark can be downloaded from: http://industrial.panasonic.com/ac/e

1. Twin type (8-pin)

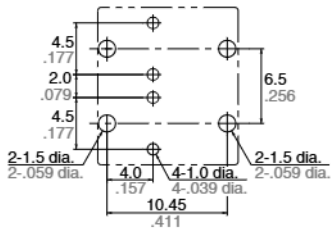
CAD Data



External dimensions

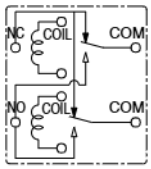


PC board pattern (Bottom view)



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

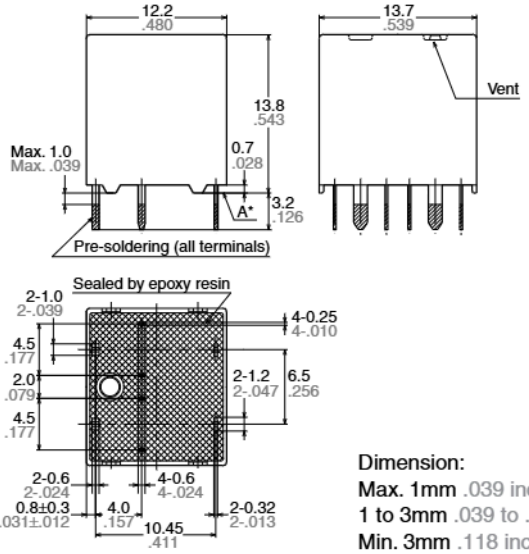
* Dimensions (thickness and width) of terminal is measured before pre-soldering.
Intervals between terminals is measured at A surface level.

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

CAD Data

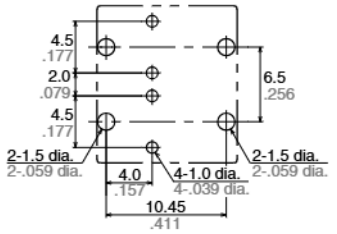


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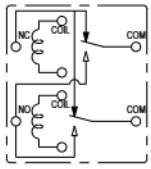
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



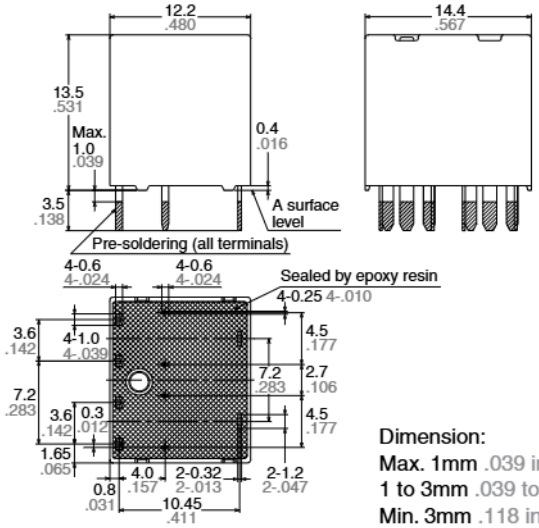
* Dimensions (thickness and width) of terminal is measured before pre-soldering.
Intervals between terminals is measured at A surface level.

3. Twin type (10-pin)
Standard type

CAD Data

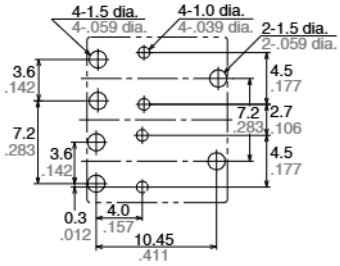


External dimensions



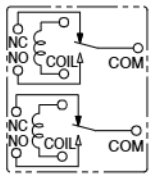
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

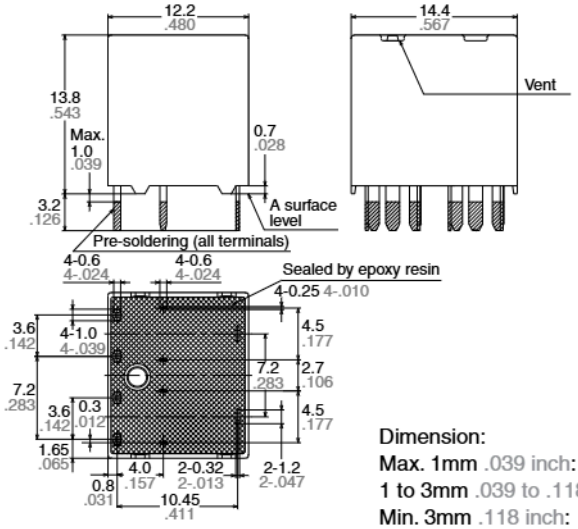


4. Twin type (10-pin)
Pin in Paste type

CAD Data

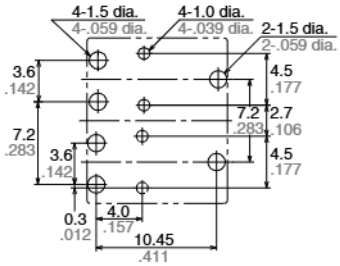


External dimensions



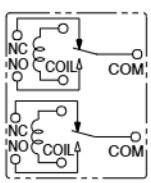
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

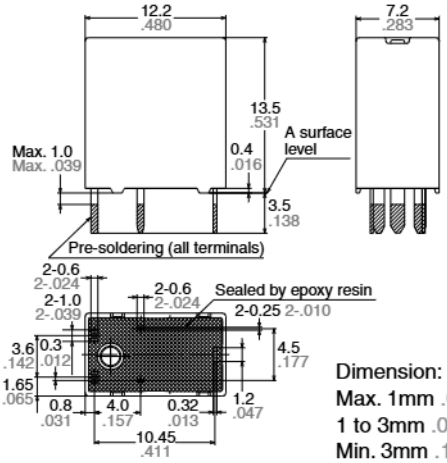


5. Slim 1 Form C
Standard type

CAD Data

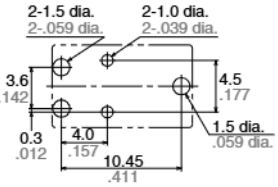


External dimensions



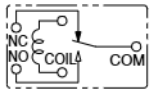
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

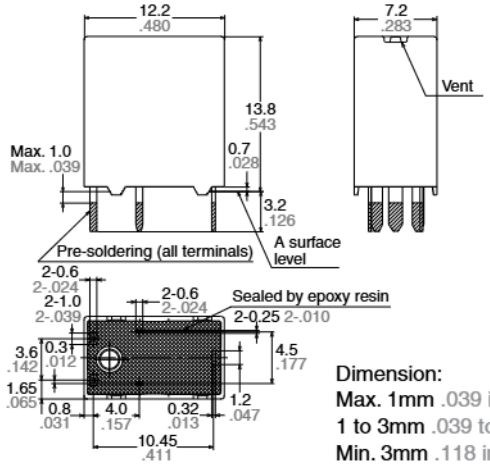


6. Slim 1 Form C
Pin in Paste type

CAD Data

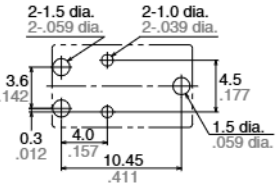


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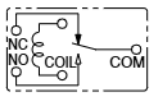
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



For Cautions for Use.