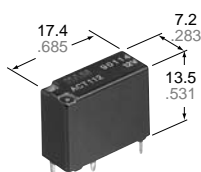


Twin type (8 terminals)



Slim 1c type

mm inch

## FEATURES

### • Small & slim size

Twin type: 17.4(L)×14.0(W)×13.5(H)mm  
.685(L)×.551(W)×.531(H)inch

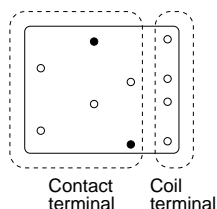
Slim 1c type: 17.4(L)×7.2(W)×13.5(H)mm  
.685(L)×.283(W)×.531(H)inch

### • Twin (1 Form C × 2)

Forward/reverse motor control is possible with a single relay.

### • Simple footprint enables ease of PC board layout

※ 10 terminals layout



○ = 8 terminals

## TYPICAL APPLICATIONS

- Power windows
- Auto door lock
- Power sunroof
- Electrically powered mirrors
- Powered seats
- Lift gates
- Slide door closers, etc.  
(for DC motor forward/reverse control circuits)

## SPECIFICATIONS

### Contact

Arrangement			1 Form C×2, 1 Form C
Contact material			Silver alloy
Initial contact resistance (By voltage drop 6 V DC 1 A)			Max. 100mΩ
Initial contact voltage drop			Max. 0.2 V (at 10 A)
Rating	Nominal switching capacity		N.O.: 20 A 14 V DC N.C.: 10 A 14 V DC
	Max. carrying current		35 A for 2 minutes, 25 A for 1 hour (14 V, at 20°C 68°F) 30 A for 2 minutes, 20 A for 1 hour (14 V, at 85°C 185°F)
	Min. switching capacity#1		1 A 12 V DC
	Mechanical (at 120 cpm)		Min. 10 <sup>7</sup>
Expected life (min. operation)	Electrical	Resistive load	Min. 10 <sup>5*1</sup>
		Motor load	Min. 2×10 <sup>5*2</sup> (free)
			Min. 10 <sup>5*3</sup> (lock)

### Coil

Nominal operating power	800 mW
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#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.

### Remarks

- \*1 At nominal switching capacity, operating frequency: 1s ON, 9s OFF  
 \*2 N.O.: at 5 A (steady), 25 A (inrush)/N.C.: at 20 A (brake) 14 V DC, operating frequency: 0.5s ON, 9.5s OFF  
 \*3 At 25A 14 V DC (Motor lock), operating frequency: 0.5s ON, 9.5s OFF  
 \*4 Measurement at same location as "Initial breakdown voltage" section  
 \*5 Detection current: 10mA  
 \*6 Excluding contact bounce time  
 \*7 Half-wave pulse of sine wave: 11ms; detection: 10μs  
 \*8 Half-wave pulse of sine wave: 6ms

### Characteristics

Max. operating speed (at nominal switching capacity)		6 cpm
Initial insulation resistance*4		Min. 100 MΩ (at 500 V DC)
Initial breakdown voltage*5	Between open contacts	500 Vrms for 1 min.
	Between contacts and coil	500 Vrms for 1 min.
Operate time*6 (at nominal voltage) (at 20°C 68°F)		Max. 10ms (Initial)
Release time*6 (at nominal voltage) (at 20°C 68°F)		Max. 10ms (Initial)
Shock resistance	Functional*7	Min. 100 m/s <sup>2</sup> {10G}
	Destructive*8	Min. 1,000 m/s <sup>2</sup> {100G}
Vibration resistance	Functional*9	10 Hz to 100 Hz, Min. 44.1m/s <sup>2</sup> {4.5G}
	Destructive*10	10 Hz to 500 Hz, Min. 44.1m/s <sup>2</sup> {4.5G}
Conditions for operation, transport and storage*11 (Not freezing and condensing at low temperature)		Ambient temp -40°C to +85°C -40°F to +185°F
		Humidity 5% R.H. to 85% R.H.
Mass		Approx. 8.0g .28oz (Twin type) Approx. 4.0g .14oz (Slim 1c type)

\*9 Detection time: 10μs

\*10 Time of vibration for each direction;  
X, Y, direction: 2 hours  
Z direction: 4 hours



\*11 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (see catalog).

## ORDERING INFORMATION

Ex. 

A
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CT
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1
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12
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Product name	Contact arrangement	Coil voltage (V DC)
CT	1: 1 Form C 2: 1 Form C × 2 (8 terminals type) 5: 1 Form C × 2 (10 terminals type)	12: 12

Standard packing; 1 Form C: Carton(tube package) 30pcs. Case 1,500pcs.  
1 Form C × 2: Carton(tube package) 30pcs. Case 900pcs.

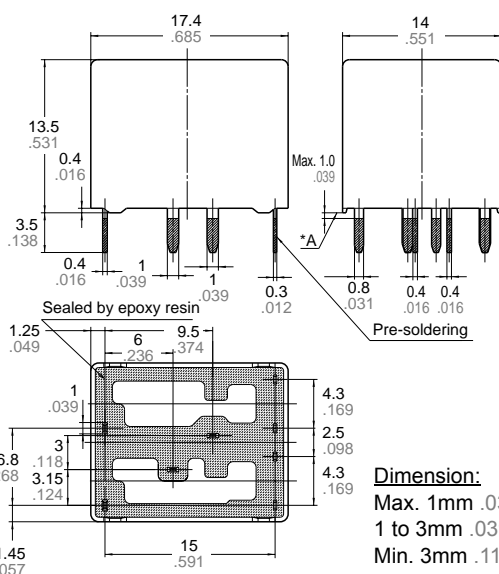
## TYPES AND COIL DATA (at 20°C 68°F)

Contact arrangement	Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (Initial)	Drop-out voltage, V DC (Initial)	Coil resistance, $\Omega$	Nominal operating current, mA	Nominal operating power, mW	Usable voltage range, V DC
1c	ACT112	12	Max. 7.2	Min. 1.0	180 $\pm$ 10%	66.7 $\pm$ 10%	800	10 to 16
1c $\times$ 2 (8 terminals type)	ACT212	12	Max. 7.2	Min. 1.0	180 $\pm$ 10%	66.7 $\pm$ 10%	800	10 to 16
1c $\times$ 2 (10 terminals type)	ACT512	12	Max. 7.2	Min. 1.0	180 $\pm$ 10%	66.7 $\pm$ 10%	800	10 to 16

\* Other pick-up voltage types are also available. Please contact us for details.

## DIMENSIONS

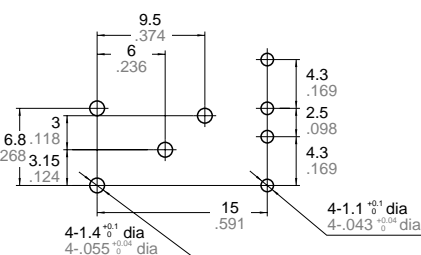
### 1. Twin type (8 terminals)



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

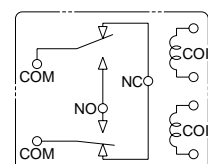


PC board pattern (Bottom view)

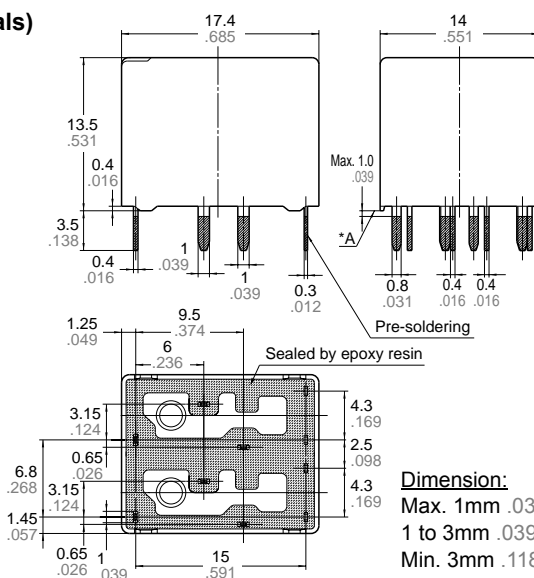


Tolerance:  $\pm 0.1 \pm .004$

Schematic (Bottom view)

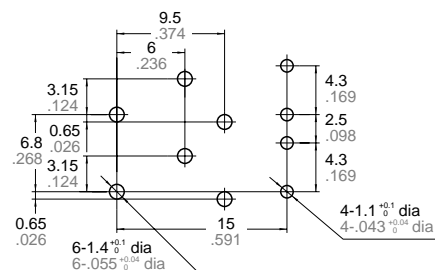


## 2. Twin type (10 terminals)



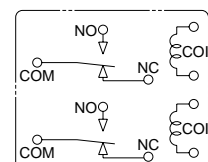
\* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering.  
Intervals between terminals is measured at A surface level.

PC board pattern (Bottom view)

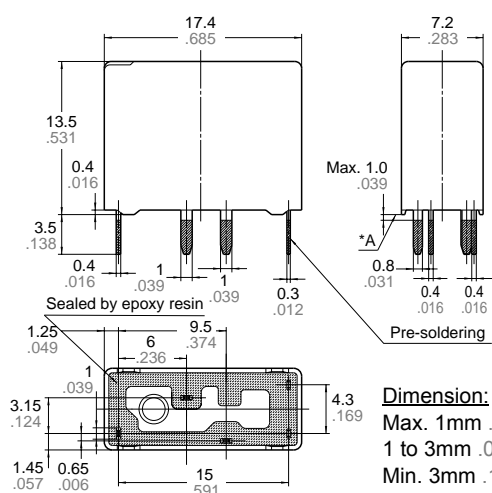


Tolerance:  $\pm 0.1 \pm .004$

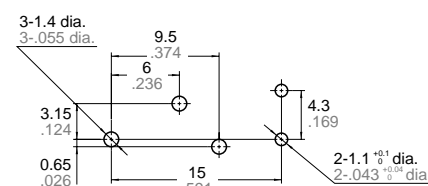
Schematic (Bottom view)



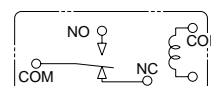
## 3. Slim 1c type



PC board pattern (Bottom view)

Tolerance:  $\pm 0.1 \pm .004$ 

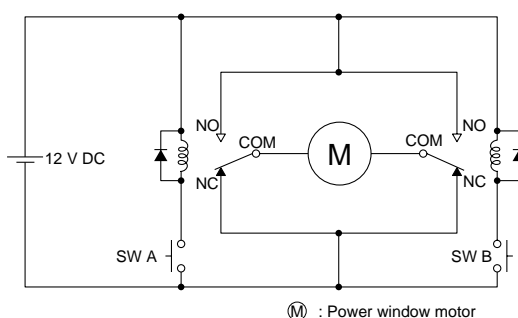
Schematic (Bottom view)



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

## EXAMPLE OF CIRCUIT

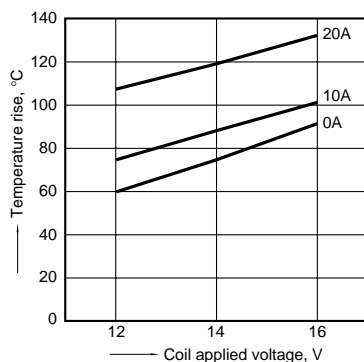
Forward/reverse control circuits of DC motor for power windows



## REFERENCE DATA

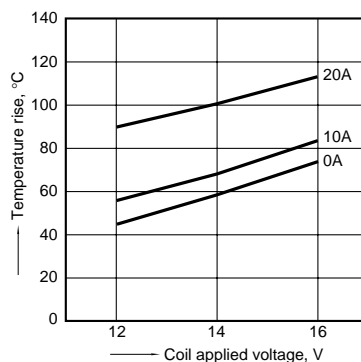
1-(1). Coil temperature rise (at room temperature)

Sample: ACT212, 3pcs.  
Contact carrying current: 0A, 10A, 20A

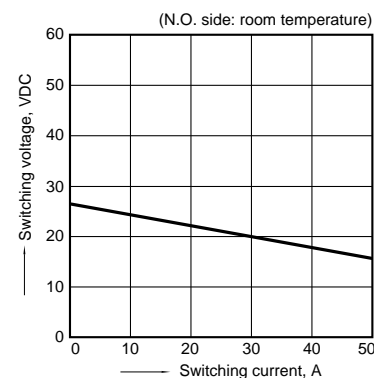


1-(2). Coil temperature rise (at 85°C 185°F)

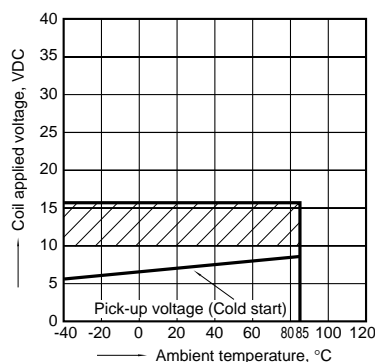
Sample: ACT212, 3pcs.  
Contact carrying current: 0A, 10A, 20A



2. Max. switching capability (Resistive load)

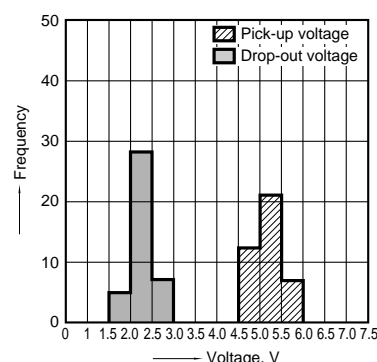


3. Ambient temperature and operating voltage range



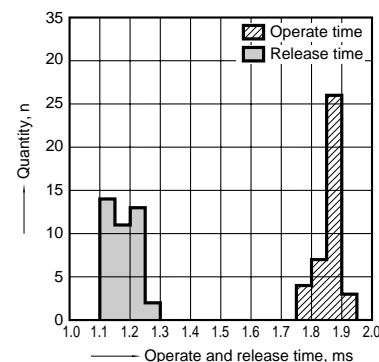
4. Distribution of pick-up and drop-out voltage

Sample: ACT212, 40pcs.



5. Distribution of operate and release time

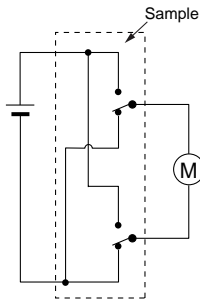
Sample: ACT212, 40pcs.  
\* Without diode



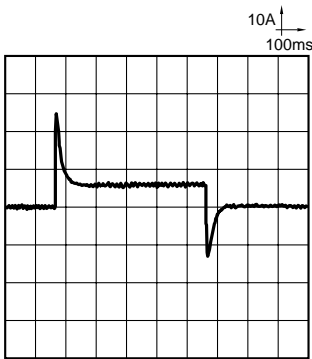
# CT (ACT)

6-(1). Electrical life test (Motor free)  
Sample: ACT212, 3pcs.  
Load: 5A steady, Inrush 25A, 14V DC  
Brake current: 13A 14V DC,  
Power window motor actual load (free condition)  
Operating frequency: (ON : OFF = 0.5s : 9.5s)  
Ambient temperature: Room temperature

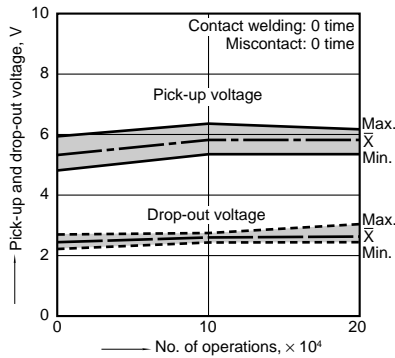
Circuit:



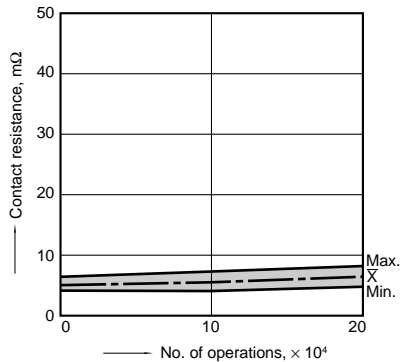
Load current waveform  
Inrush current: 25A, Steady current: 6A  
Brake current: 13A



Change of pick-up and drop-out voltage

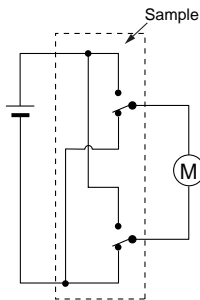


Change of contact resistance

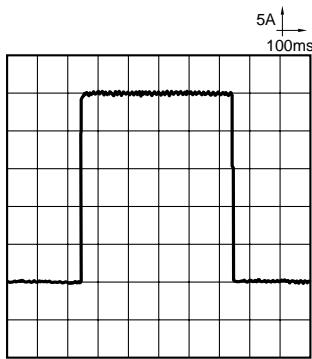


6-(2). Electrical life test (Motor lock)  
Sample: ACT212, 3pcs.  
Load: 25A 14V DC  
Switching frequency: (ON : OFF = 0.5s : 9.5s)  
Ambient temperature: Room temperature

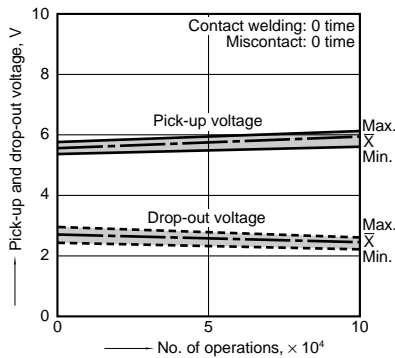
Circuit:



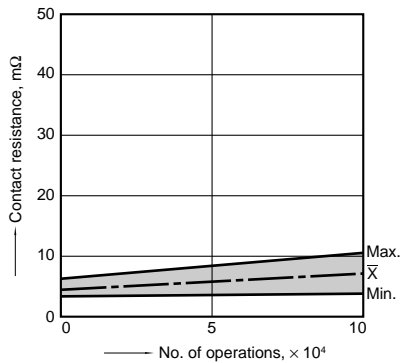
Load current waveform



Change of pick-up and drop-out voltage



Change of contact resistance



## 6-(3). Electrical life test (Motor lock)

Sample: ACT212, 3pcs.

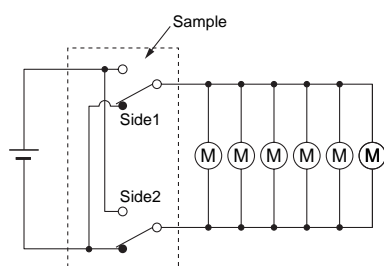
Load: 20A 14V DC,

door lock motor actual load (Lock condition)

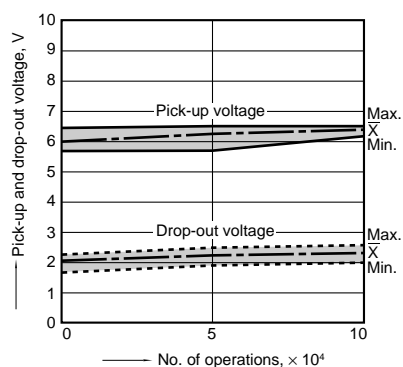
Switching frequency: (ON : OFF = 0.3s : 19.7s)

Ambient temperature: Room temperature

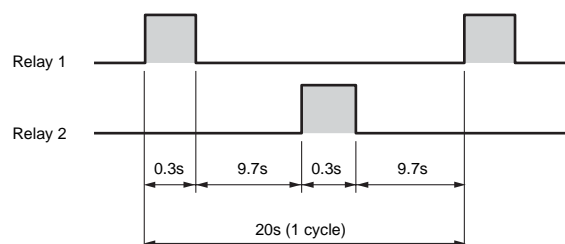
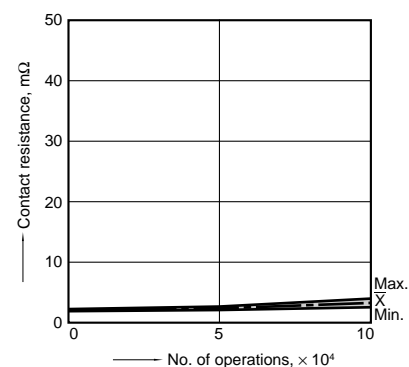
Circuit:



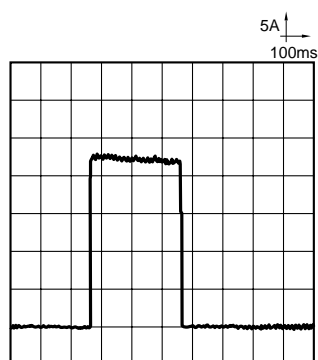
## Change of pick-up and drop-out voltage



## Change of contact resistance



## Load current waveform



**For Cautions for Use, see Relay Technical Information (see catalog).**