

## FEATURES

- Compact flat type
- <Height> Surface-mount terminal type: 8.8 mm .346 inch
- Compact and high-capacity 25 A load switching

## TYPICAL APPLICATIONS

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

RoHS compliant

## ORDERING INFORMATION

	ACTH			
Contact arrangement/Terminal shape				
5: 1 Form C/Surface-mount terminal type				
6: 1 Form C × 2 (10 terminals type)/				
Surface-mount terminal type				
Heat resistance/Protective construction				
B: Reflow type/Sealed type				
R: Reflow type/Flux tight type				
Coil resistance				
2: 160Ω				
3: 220Ω				

## TYPES

### Surface-mount terminal type

Contact arrangement	Nominal coil voltage	Coil resistance	Part No.	
			Protective construction	
			Sealed type	Flux tight type
1 Form C	12V DC	160Ω	ACTH5B2	ACTH5R2
		220Ω	ACTH5B3	ACTH5R3
1 Form C × 2 (10 terminals type)		160Ω	ACTH6B2	ACTH6R2
		220Ω	ACTH6B3	ACTH6R3

Standard packing; 1 Form C Carton (tape and reel): 500 pcs.; Case: 2,000 pcs.  
1 Form C × 2 Carton (tape and reel): 400 pcs.; Case: 2,000 pcs.

## 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
12V DC	Max. 6.5V DC (Initial)	Min. 0.6V DC (Initial)	75 mA	160Ω	900 mW	10 to 16V DC
	Max. 7.7V DC (Initial)	Min. 0.6V DC (Initial)	54.5 mA	220Ω	655 mW	

### 2. Specifications

Characteristics	Item		Specifications
Contact	Arrangement		1 Form C, 1 Form C × 2
	Contact resistance (Initial)		N.O.: Typ4.5mΩ, N.C.: Typ5.5mΩ (By voltage drop 6V DC 1A)
	Contact material		Ag alloy (Cadmium free)
Rating	Nominal switching capacity (resistive load)		N.O.: 20A 14V DC, N.C.: 10A 14V DC
	Max. carrying current (12V DC initial)*3		25A for 10 minutes (at 20°C 68°F)
	Nominal operating power		900 mW (Pick-up voltage 6.5V DC type)
			655 mW (Pick-up voltage 7.7V DC type)
	Min. switching capacity (resistive load)*1		1A 14V DC
Electrical characteristics	Insulation resistance (Initial)		Min. 100 MΩ (at 500V DC, Measurement at same location as “Breakdown voltage” section.)
	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) (without protective element)
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. 44.1 m/s² {4.5G} (Detection time: 10μs)
		Destructive	10 Hz to 500 Hz, Min. 44.1 m/s² {4.5G}, Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours
	Expected life	Mechanical	
Electrical*4		<Resistive load> Min. 10 <sup>5</sup> (at nominal switching capacity, operating frequency: 1s ON, 9s OFF)	
		<Motor load> Min. 10 <sup>5</sup> (25 A 14V DC at motor lock condition), operating frequency: 0.5s ON, 9.5s OFF	
Conditions	Conditions for operation, transport and storage*2		Reflow type Ambient temperature: -40°C to +110°C -40°F to +230°F, Humidity: 2% R.H. to 85% R.H. (Not freezing and condensing at low temperature)
Mass			Single type: approx. 3 g .106 oz, Twin type: approx. 6 g .21 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.

\*4. Do not use for lamp loads, electric discharge lamp loads, any other lamp loads and capacitor loads. Please contact us for details.

\*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.

# TH (ACTH)

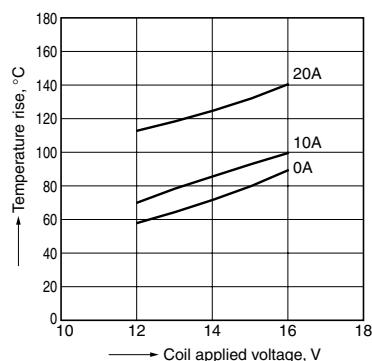
## REFERENCE DATA

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

Sample: ACTH6B2, 3pcs.

Contact carrying current: 0A, 10A, 20A

Ambient temperature: Room temperature

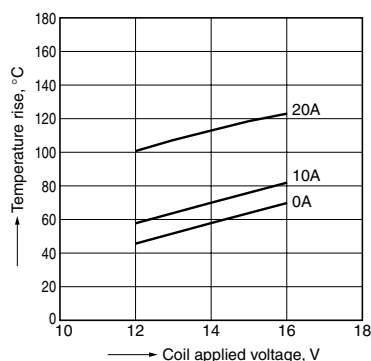


1.-(2) Coil temperature rise (at 110°C 230°F)

Sample: ACTH6B2, 3pcs.

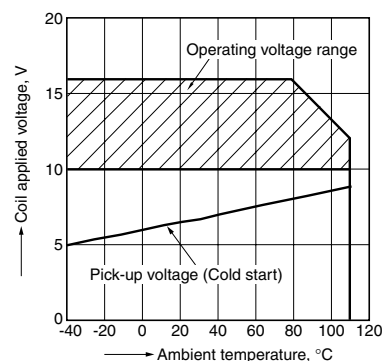
Contact carrying current: 0A, 10A, 20A

Ambient temperature: 110°C 230°F



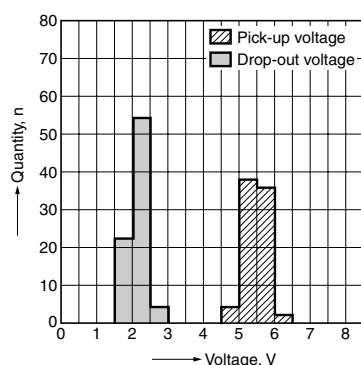
2. Ambient temperature and operating voltage range

Sample: ACTH6B2



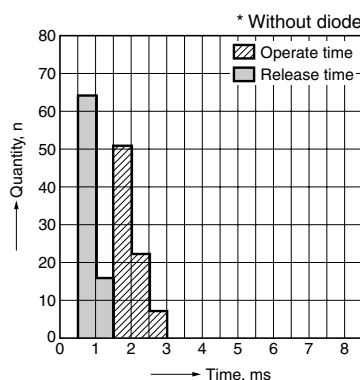
3. Distribution of pick-up and drop-out voltage

Sample: ACTH6B2, 40 × 2pcs.



4. Distribution of operate and release time

Sample: ACTH6B2, 40 × 2pcs.



5. Electrical life test (Motor lock)

Sample: ACTH6B2, 3pcs.

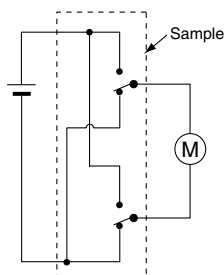
Load: 25A 14V DC

Power window motor actual load (lock condition)

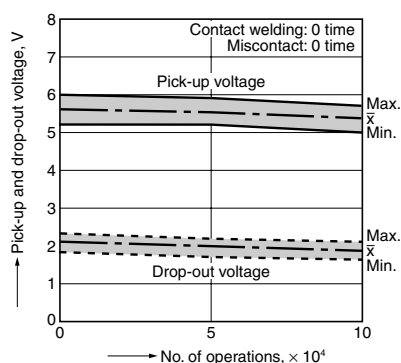
Operating frequency: ON 0.5s, OFF 9.5s

Ambient temperature: Room temperature

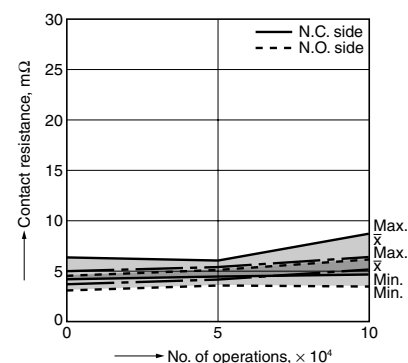
Circuit:



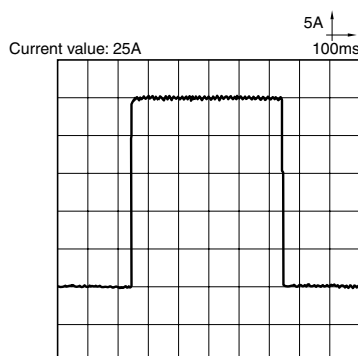
Change of pick-up and drop-out voltage



Change of contact resistance

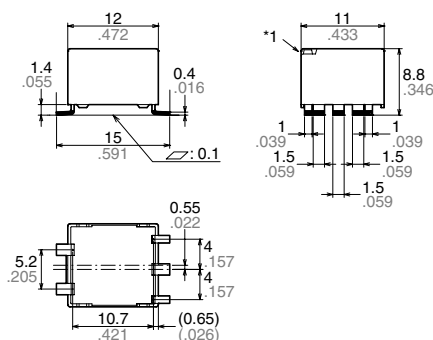


Load current waveform



**DIMENSIONS** (mm inch)**1 Form C type**

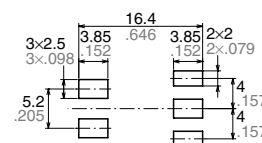
External dimensions

Dimension:

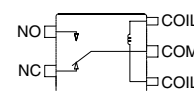
Less than 1mm .039inch:

Min. 1mm .039inch less than 3mm .118 inch:  $\pm 0.2 \pm .008$ 

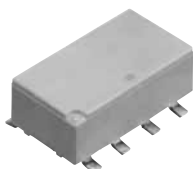
Min. 3mm .118 inch:

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

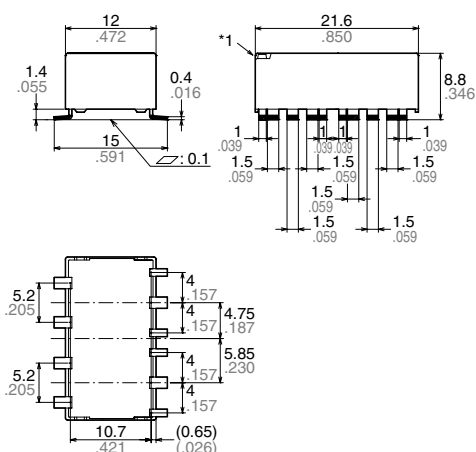
Schematic (Top view)



Note: \*1. Flux tight type has air hole.

**Twin type (10 terminals type)**

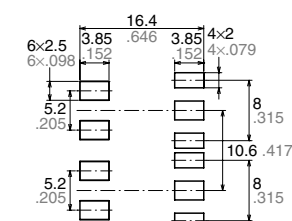
External dimensions

Dimension:

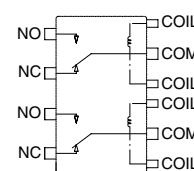
Less than 1mm .039inch:

Min. 1mm .039inch less than 3mm .118 inch:  $\pm 0.2 \pm .008$ 

Min. 3mm .118 inch:

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

Schematic (Top view)



Note: \*1. Flux tight type has air hole.

**NOTES****Usage, transport and storage conditions**

1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:

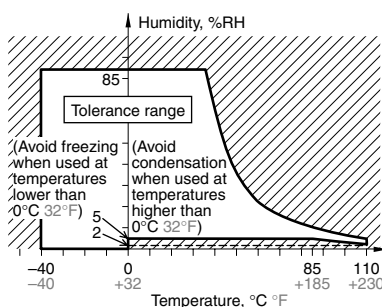
(1) Temperature:  $-40$  to  $+110^{\circ}\text{C}$   $-40$  to  $+230^{\circ}\text{F}$  (Reflow type)

(2) Humidity: 2 to 85% RH (Avoid freezing and condensation.)

(3) Atmospheric pressure: 86 to 106 kPa

The humidity range varies with the temperature. Use within the range indicated in the graph below.

(Temperature and humidity range for usage, transport, and storage)



**For general cautions for use, please refer to the “CAUTIONS FOR USE OF AUTOMOTIVE RELAYS”**