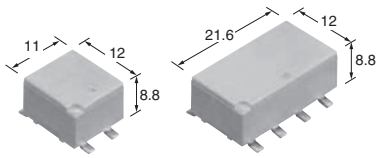
Miniature PC Board, Twin, 1 Form C, Surface-mount Type Automotive Relay

TH RELAYS

<Protective construction>
Sealed/Flux tight



(Unit: mm)

FEATURES

- **Compact flat type**
  <Height> Surface-mount type: 8.8 mm
- **Compact and high-capacity 25 A load switching**

TYPICAL APPLICATIONS

- **Powered windows, Automatic door locks, Powered mirrors, Powered sunroof, Powered seats, Lift gates and Slide door closers, etc.**

RoHS compliant

ORDERING INFORMATION

ACTH □ □ □ □

Contact arrangement/Terminal shape
5: 1 Form C/Surface-mount terminal type
6: 1 Form C × 2 (10 pins) Surface-mount terminal type

Contact type
Nil: Standard type
C: Standard type (Ag alloy / Cu clad)

Heat resistance/Protective construction
B: Reflow type/Sealed
R: Reflow type/Flux tight

Coil resistance
2: 160Ω
3: 220Ω

TYPES

Contact arrangement	Contact type	Rated coil voltage	Coil resistance	Part No.		Packing	
				Protective construction			
				Sealed type	Flux tight type	Carton (tape and reel)	Case
1 Form C	Standard type	12V DC	160Ω	ACTH5B2	ACTH5R2	500 pcs.	2,000 pcs.
			220Ω	ACTH5B3	ACTH5R3		
	Standard type (Ag alloy / Cu clad)		160Ω	ACTH5CB2	ACTH5CR2		
			220Ω	ACTH5CB3	ACTH5CR3		
1 Form C × 2 (10 pins)	Standard type		160Ω	ACTH6B2	ACTH6R2	400 pcs.	
			220Ω	ACTH6B3	ACTH6R3		
	Standard type (Ag alloy / Cu clad)		160Ω	ACTH6CB2	ACTH6CR2		
			220Ω	ACTH6CB3	ACTH6CR3		

RATING

1. Coil data

Rated coil voltage	Operate (Set) voltage (at 20°C) (Initial)	Release (Reset) voltage (at 20°C) (Initial)	Rated operating current [±10%] (at 20°C)	Coil resistance [±10%] (at 20°C)	Rated operating power (at 20°C)	Usable voltage range
12V DC	Max. 6.5V DC	Min. 0.6V DC	75 mA	160Ω	900 mW	10 to 16V DC
	Max. 7.7V DC		54.5 mA	220Ω	655 mW	

2. Specifications

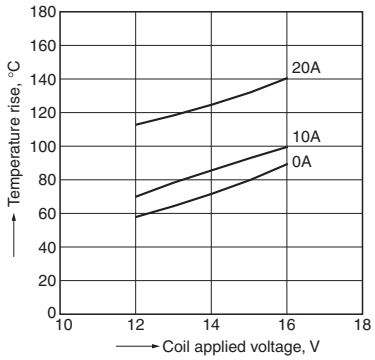
Item		Specifications
Contact data	Contact arrangement	1 Form C, 1 Form C × 2
	Contact resistance (initial)	Max. 50mΩ (N.O. side: typ. 4.5mΩ, N.C. side: typ. 5.5mΩ) (By voltage drop 1A 6V DC)
	Contact material	Ag alloy
	Rated switching capacity (resistive)	N.O. side: 20A 14V DC, N.C. side: 10A 14V DC
	Max. carrying current (initial)*1	25A for 10 minutes (Coil applied voltage 12V DC, at 20°C)
	Min. switching load (resistive)*2	1A 14V DC (at 20°C)
Insulated resistance (initial)		Min. 100 MΩ (at 500V DC, Measurement at same location as “Dielectric strength” section.)
Dielectric strength (initial)	Between open contacts	500 Vrms for 1 min. (Detection current: 10mA)
	Between contacts and coil	500 Vrms for 1 min. (Detection current: 10mA)
Time characteristics (initial)	Operate (Set) time (at rated voltage)	Max. 10ms (at 20°C, without contact bounce time)
	Release (Reset) time (at rated voltage)	Max. 10ms (at 20°C, without contact bounce time) (Without diode)
Shock resistance	Functional	Min. 100 m/s² {approx. 10G} (Half-wave pulse of sine wave: 11ms; detection time: 10μs)
	Destructive	Min. 1,000 m/s² {approx. 100G} (Half-wave pulse of sine wave: 6ms)
Vibration resistance	Functional	10 to 100 Hz, Min. 44.1 m/s² {approx. 4.5G} (Detection time: 10μs)
	Destructive	10 to 500 Hz, Min. 44.1 m/s² {approx. 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*4	<Resistive load> Min. 10^5 at rated switching capacity, operating frequency: 1s ON, 9s OFF <Motor load> Min. 10^5 25 A 14V DC at motor lock condition, operating frequency: 0.5s ON, 9.5s OFF
Conditions	Conditions for usage, transport and storage*3	Ambient temperature: –40 to +110°C, Humidity: 2 to 85% R.H. (Please avoid icing or condensation)
Weight		Single type: approx. 3 g, Twin type: approx. 6 g

Notes: *1. Depends on connection conditions. Also, this does not guarantee repeated switching. We recommend that you confirm operation under actual conditions.
*2. 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.
*3. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. For details, please refer to the “Automotive Relay Users Guide”.
Please inquire our sales representative if you will be using the relay in a high temperature atmosphere (110°C).
*4. Do not use for lamp loads, electric discharge lamp loads, any other lamp loads and capacitor loads. Please inquire our sales representative for details.

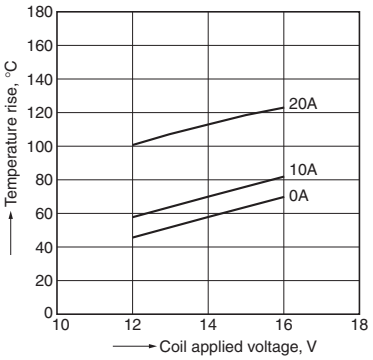
*If the relay is used continuously for long periods of time with coils on both sides in an energized condition, breakdown might occur due to abnormal heating depending on the carrying condition. Therefore, please inquire our sales representative when using with a circuit that causes an energized condition on both sides simultaneously.

REFERENCE DATA

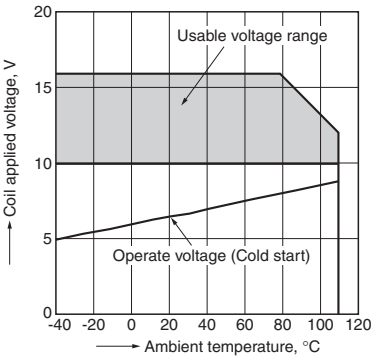
1.-(1) Coil temperature rise (at room temperature)
Sample: ACTH6B2, 3pcs.
Carrying current: 0A, 10A, 20A
Ambient temperature: Room temperature



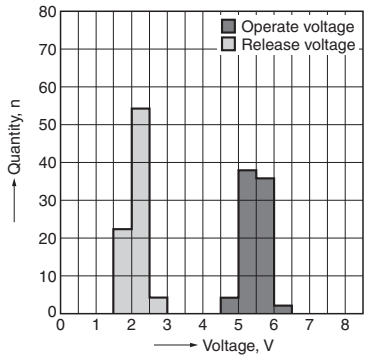
1.-(2) Coil temperature rise (at 110°C)
Sample: ACTH6B2, 3pcs.
Carrying current: 0A, 10A, 20A
Ambient temperature: 110°C



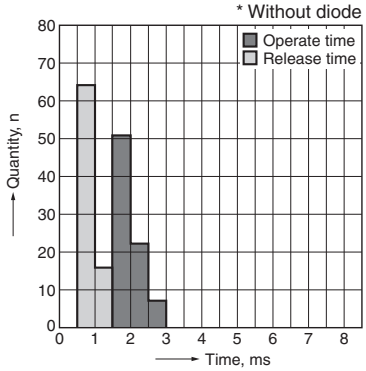
2. Ambient temperature and usable voltage range
Sample: ACTH6B2



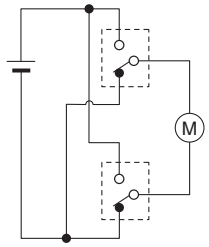
3. Distribution of operate (set) and release (reset) voltage
Sample: ACTH6B2, 40 × 2pcs.



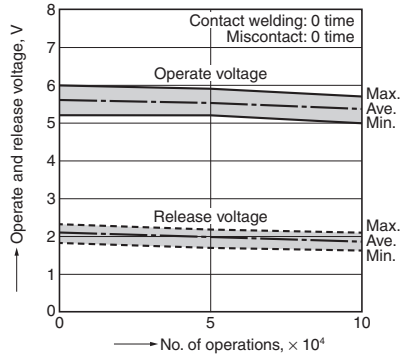
4. Distribution of operate (set) and release (reset) time
Sample: ACTH6B2, 40 × 2pcs.



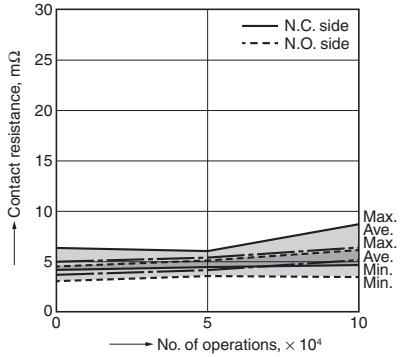
5. Electrical life test (Motor lock)
Sample: ACTH6B2, 3pcs.
Load: 25A 14V DC
Power window motor actual load (lock condition)
Operating frequency: ON 0.5s, OFF 9.5s
Ambient temperature: Room temperature
Circuit:



Change of operate (set) and release (reset) voltage

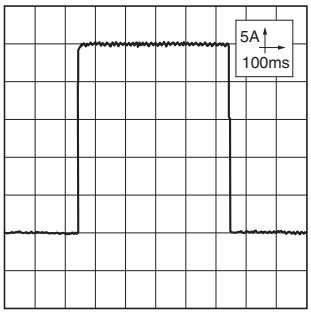


Change of contact resistance



Load current waveform

Current value: 25A



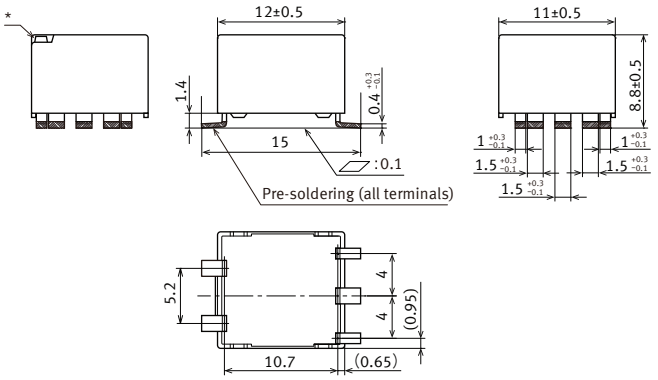
DIMENSIONS (mm)

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

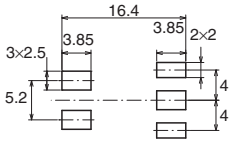
1 Form C type

CAD

External dimensions

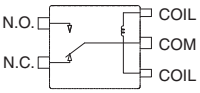


Recommendable mounting pad (Top view)



Tolerance: ±0.1

Schematic (Top view)



Tolerance

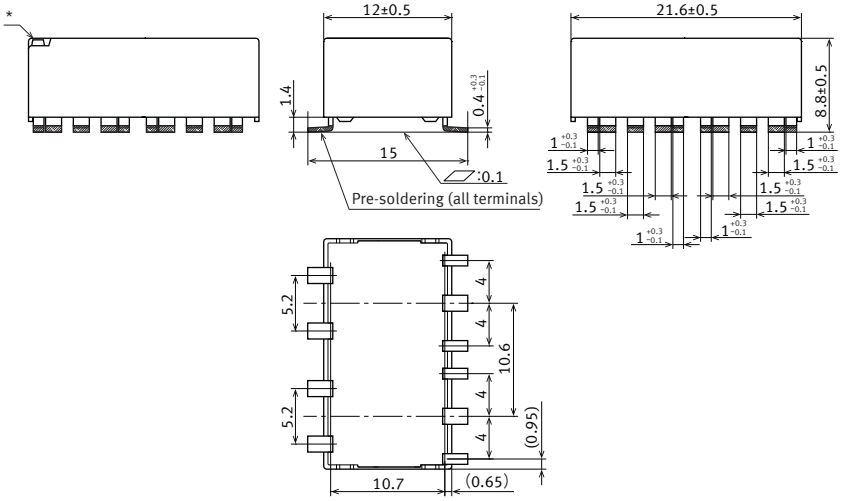
Less than 1mm	:±0.1
Min.1 less than 3mm	:±0.2
Min. 3mm	:±0.3

Note: * Flux tight type has air hole.

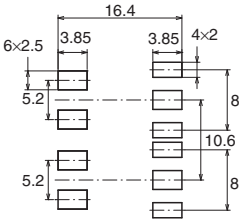
Twin type (10 pins)

CAD

External dimensions

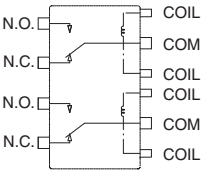


Recommendable mounting pad (Top view)



Tolerance: ±0.1

Schematic (Top view)



Tolerance

Less than 1mm	:±0.1
Min.1 less than 3mm	:±0.2
Min. 3mm	:±0.3

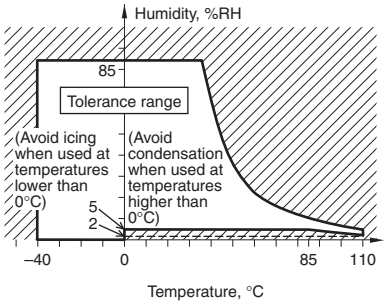
Note: * Flux tight type has air hole.

NOTES

Usage, transport and storage conditions

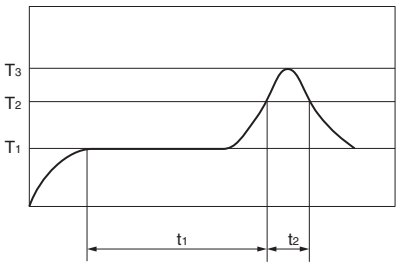
1) Ambient temperature, humidity, and air pressure during usage, transport, and storage of the relay:
(1) Temperature: –40 to +110°C
(2) Humidity: 2 to 85% RH (Avoid icing and condensation.)
(3) Air pressure: 86 to 106 kPa
The humidity range varies with the temperature. Use within the range indicated in the graph below.

[Temperature and humidity range for usage, transport, and storage]

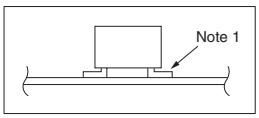


Mounting and cleaning conditions for Surface-mount terminal type relays

When soldering this relay, please observe the following conditions.
(Recommended conditions: Number of reflows: 1, Measurement location: terminal temperature)



T_1 = 150 to 180°C
T_2 = 230°C or more
T_3 = Less than 250°C
t_1 = 60 to 120 sec.
t_2 = Less than 30 sec.



Temperature profile indicates the temperature of the soldered part (Note 1) of terminals on the surface of a circuit board.
*The temperature of the relay exterior and interior may be extremely high depending on the component density on the board, the heating method of the reflow oven or circuit board type. Sufficient verification under actual processing conditions is required.

Other cautions during reflow soldering
(1) Reflow performance may be affected if you carry out soldering in a way that exceeds the recommended conditions. If you need to exceed the recommended conditions when soldering, please inquire our sales representative before using in an application.
(2) Please confirm the heat stress of relay by using actual board because it may be changed by board condition or manufacturing process condition.
(3) Solder creepage, wettability, or soldering strength will be affected by the changing of soldering condition or used solder type. Please check them under the actual production condition in detail.
(4) Avoid cleaning (ultrasonic cleaning, boiling cleaning, etc.) and coating in order to prevent negative impacts on relay characteristics.

For general cautions for use, please refer to the "Automotive Relay Users Guide".

Please contact .....

Panasonic Corporation
Electromechanical Control Business Division
■ 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan
industrial.panasonic.com/ac/e/

Panasonic®

ASCTB99E 201908