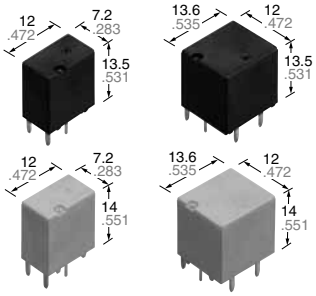
Miniature PC Board, Twin Type, 1 Form C Automotive Relay

TE RELAYS

<Protective construction>
High heat-resistant type: Sealed
Pin in Paste compliant type: Flux tight



(Unit: mm inch)

RoHS compliant

FEATURES

- **Compact and high-capacity 25 A load switching**
- **Pin in Paste compliant model added**

TYPICAL APPLICATIONS

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

ORDERING INFORMATION

ACTE □ □ □ □

Contact arrangement
2: 1 Form C
3: 1 Form C × 2 (8 pins)
5: 1 Form C × 2 (10 pins)

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

Heat resistance/Protective construction
H: High heat-resistant type/Sealed
R: Pin in Paste compliant type/Flux tight

Coil resistance
1: 110Ω
2: 160Ω
3: 220Ω

TYPES

Contact arrangement	Contact type	Rated coil voltage	Coil resistance	Part No.		Packing	
				Heat resistance			
				High heat-resistant type	Pin in Paste compliant type	Carton (tube)	Case
1 Form C	Standard type	12V DC	110Ω	ACTE2H1	ACTE2R1	50 pcs.	2,000 pcs.
			160Ω	ACTE2H2	ACTE2R2		
			220Ω	ACTE2H3	ACTE2R3		
	Standard type (Ag alloy / Cu clad)		110Ω	ACTE2CH1	ACTE2CR1		
			160Ω	ACTE2CH2	ACTE2CR2		
			220Ω	ACTE2CH3	ACTE2CR3		
1 Form C × 2 (8 pins)	Standard type		110Ω	ACTE3H1	ACTE3R1	40 pcs.	
			160Ω	ACTE3H2	ACTE3R2		
			220Ω	ACTE3H3	ACTE3R3		
	Standard type (Ag alloy / Cu clad)		110Ω	ACTE3CH1	ACTE3CR1		
			160Ω	ACTE3CH2	ACTE3CR2		
			220Ω	ACTE3CH3	ACTE3CR3		
1 Form C × 2 (10 pins)	Standard type		110Ω	ACTE5H1	ACTE5R1		
			160Ω	ACTE5H2	ACTE5R2		
			220Ω	ACTE5H3	ACTE5R3		
	Standard type (Ag alloy / Cu clad)		110Ω	ACTE5CH1	ACTE5CR1		
			160Ω	ACTE5CH2	ACTE5CR2		
			220Ω	ACTE5CH3	ACTE5CR3		

RATING

1. Coil data

Rated coil voltage	Operate (Set) voltage (at 20°C 68°F) (Initial)	Release (Reset) voltage (at 20°C 68°F) (Initial)	Rated operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Rated operating power (at 20°C 68°F)	Usable voltage range
12V DC	Max. 5.5V DC	Min. 0.6V DC	109 mA	110Ω	1,309 mW	10 to 16V DC
	Max. 6.5V DC	Min. 0.8V DC	75 mA	160Ω	900 mW	
	Max. 7.7V DC		54.5 mA	220Ω	655 mW	

2. Specifications

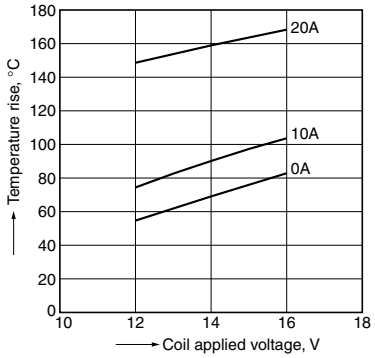
Item		Specifications
Contact data	Contact arrangement	1 Form C, 1 Form C × 2
	Contact resistance (initial)	Max. 50mΩ (N.O. side: typ. 4mΩ, N.C. side: typ. 5mΩ) (By voltage drop 1A 6V DC)
	Contact material	Ag alloy
	Rated switching capacity (resistive)	N.O. side: 20A 14V DC, N.C. side: 10A 14V DC
	Max. carrying current (initial)*1	25A for 2 minutes (Coil applied voltage 12V DC, at 20°C 68°F)
	Min. switching load (resistive)*2	1A 14V DC (at 20°C 68°F)
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 68°F, without contact bounce time)
	Release (Reset) time (at rated voltage)	Max. 10ms (at 20°C 68°F, 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 –40 to +230°F, Humidity: 2 to 85% R.H. (Please avoid icing or condensation)
Weight		Single type: approx. 3.5 g .12 oz, Twin type: approx. 6.5 g .23 oz

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 230°F).
*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.

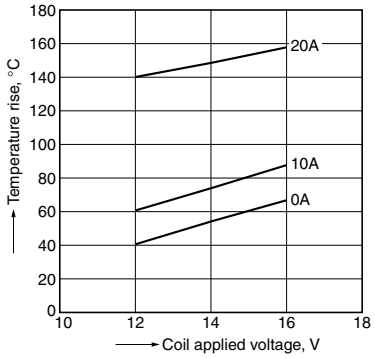
*If the relay is used continuously for long periods of time with coils on both sides in an energized condition, breakdown might occur due to abnormal heating depending on the carrying condition. Therefore, please inquire our sales representative when using with a circuit that causes an energized condition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

REFERENCE DATA

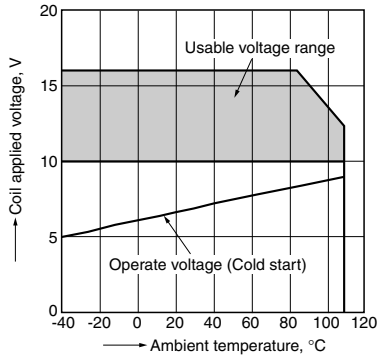
1.-(1) Coil temperature rise (at room temperature)
Sample: ACTE3H2, 3pcs.
Carrying current: 0A, 10A, 20A
Ambient temperature: Room temperature



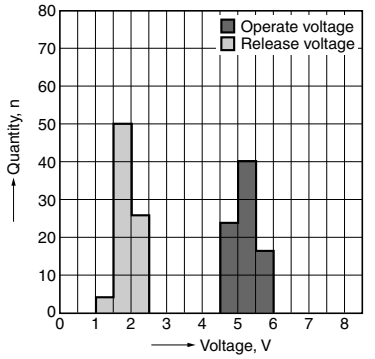
1.-(2) Coil temperature rise (at 110°C 230°F)
Sample: ACTE3H2, 3pcs.
Carrying current: 0A, 10A, 20A
Ambient temperature: 110°C 230°F



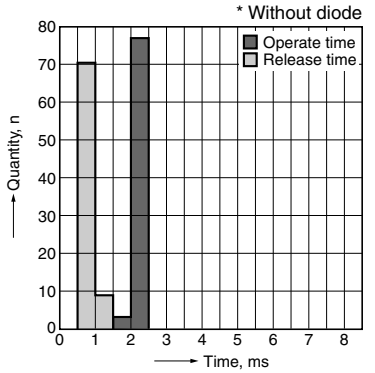
2. Ambient temperature and usable voltage range
Sample: ACTE3H2



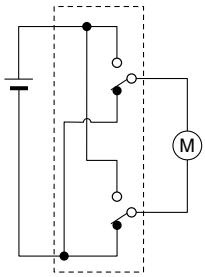
3. Distribution of operate (set) and release (reset) voltage
Sample: ACTE3H2, 40 × 2pcs.



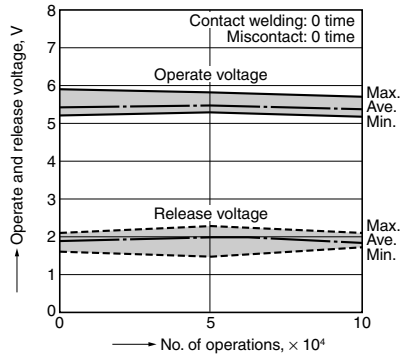
4. Distribution of operate (set) and release (reset) time
Sample: ACTE3H2, 40 × 2pcs.



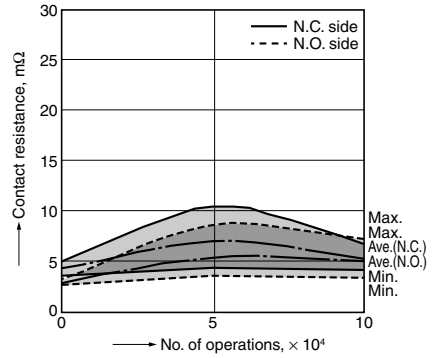
5.-(1) Electrical life test (Motor lock)
Sample: ACTE3H2, 3pcs.
Load: 25A 14V DC
Power window motor actual load (lock condition)
Operating frequency: ON 0.5s, OFF 9.5s
Ambient temperature: Room temperature
Circuit:



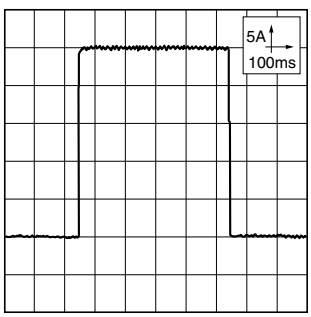
Change of operate (set) and release (reset) voltage



Change of contact resistance



Load current waveform
Current value: 25A



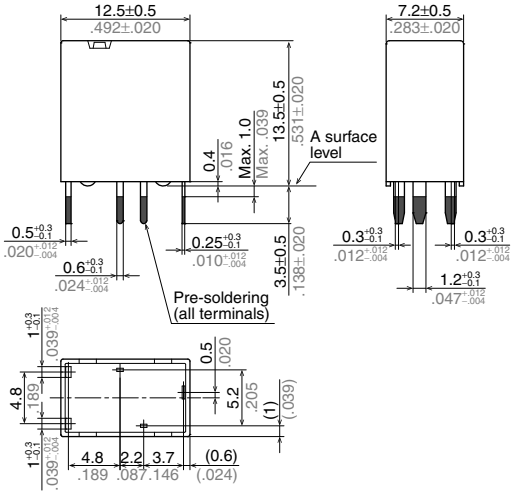
DIMENSIONS (mm inch)

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

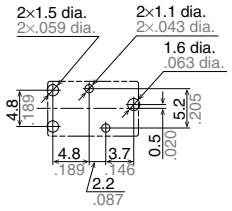
1 Form C type

CAD

External dimensions

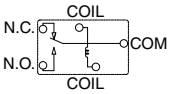


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



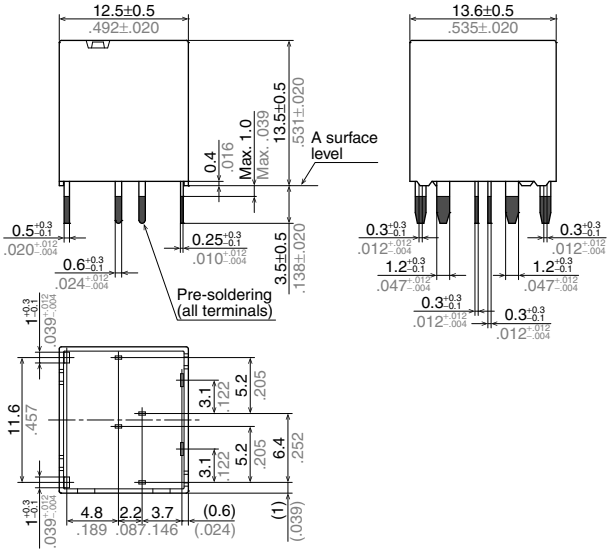
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

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

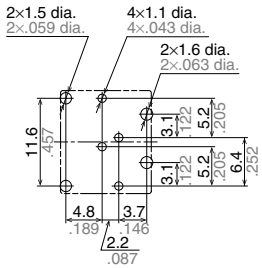
Twin type (8 pins)

CAD

External dimensions

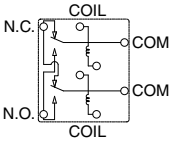


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



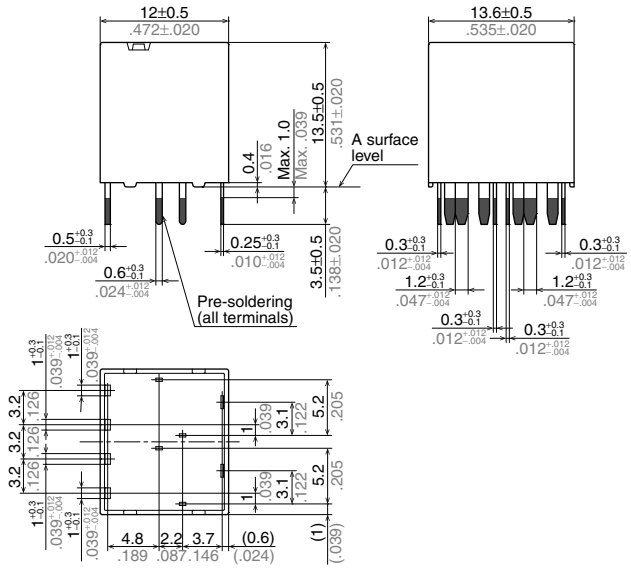
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

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

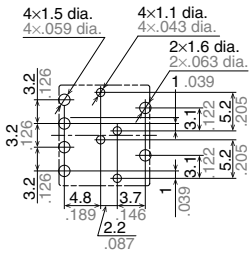
Twin type (10 pins)

CAD

External dimensions

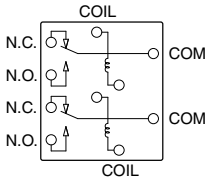


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



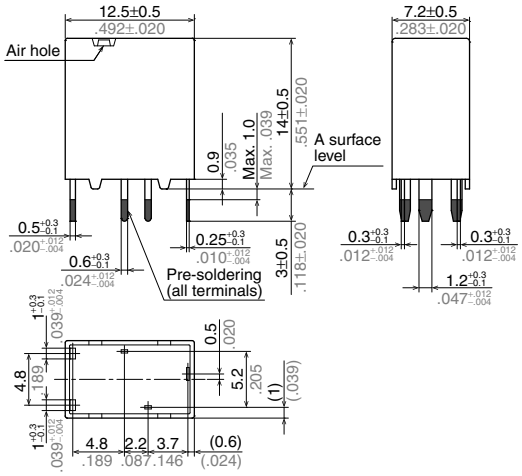
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

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

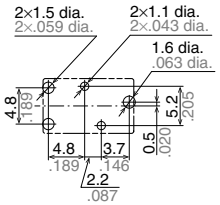
1 Form C type
Pin in Paste compliant type

CAD

External dimensions

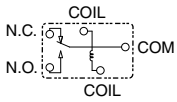


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



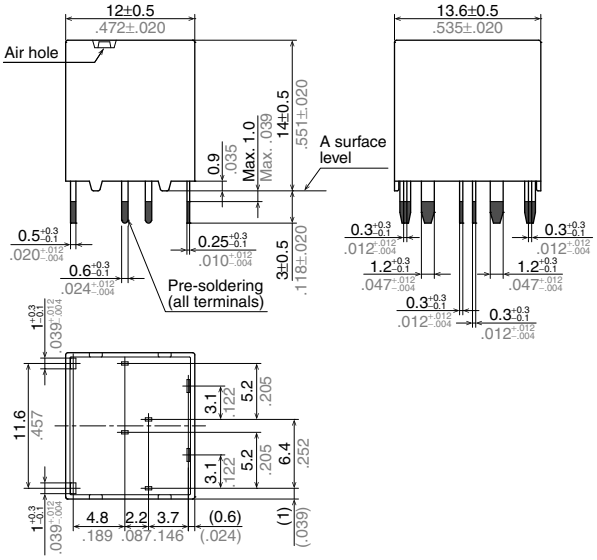
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

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

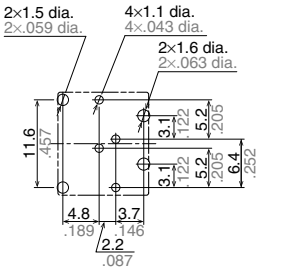
Twin type (8 pins)
Pin in Paste compliant type

CAD

External dimensions

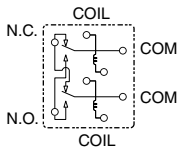


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



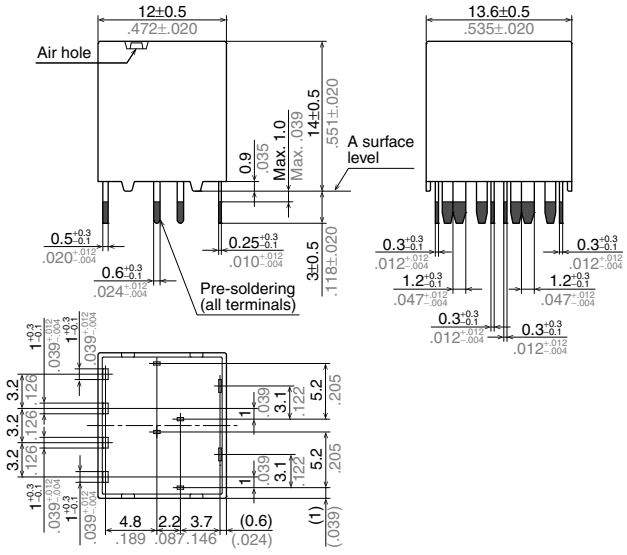
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

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

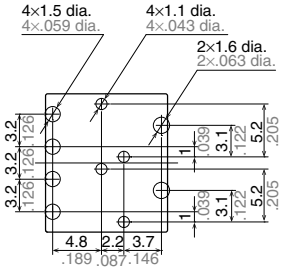
Twin type (10 pins)
Pin in Paste compliant type

CAD

External dimensions

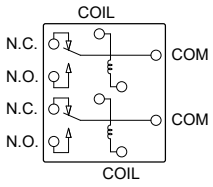


PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

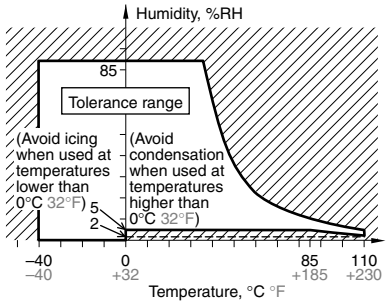
* Dimensions (thickness and width) of terminal is measured after pre-soldering.
Intervals between terminals is measured at A surface level.

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 –40 to +230°F (High heat-resistant type/Pin in Paste compliant type)
(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.

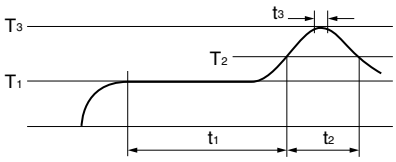
[Temperature and humidity range for usage, transport, and storage]



Mounting and cleaning conditions for Pin in Paste compliant type

When soldering this relay, please observe the following conditions.
[I.R.S. method (recommended)]
(Recommended number of reflows: 1)

t_1 = 60 to 120 sec.
t_2 = Less than 30 sec.
t_3 = Less than 5 sec.
T_1 = 150 to 180°C 302 to 356°F
T_2 = 230°C 446°F or more
T_3 = Less than 250°C 482°F



• Cautions for mounting

1. The temperature profile shows the temperature at the soldering portion on the PCB surface.
2. Depending on the mounting density condition, reflow heating method, and PCB type (metal etc.), the relay's exterior and interior temperature may become extremely high.
   Therefore, please confirm well under the actual use condition before use.

The other cautions of reflow soldering:

1. When soldering condition is out of recommendation, the relay performance may be adversely affected.
   If soldering conditions are out of our recommendation, please contact us before operation.
2. Please check the effect at the actual soldering because heat stress to relay is changed by PCB type and manufacturing process condition.
3. Solder creepage, wettability or soldering strength will be affected by the mounting condition or soldering material. Please check the actual production condition in detail.
4. Do not wash the relay as failures may occur.
5. This product is not plastic sealed type. Please perform coating with sufficient attention to avoid infiltration of the solvent to the inside. Also, please pay careful attention to use and store them with no contamination of foreign material.

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®

ASCTB97E-1 201709-T