TYPES

1. PC board terminal type

Contact arrangement	Rated coil voltage	Part No.		Packing	
		Standard type	High heat-resistant type	Carton (tube)	Case
1 Form A	12V DC	ACNM3112	ACNM7112	50 pcs.	1,500 pcs.
1 Form C		ACNM1112	ACNM5112		

2. Surface-mount terminal type

Contact arrangement	Rated coil voltage	Part No.	Packing	
		High heat-resistant type	Carton (tube)	Case
1 Form A	12V DC	ACNM7112SAX	200 pcs.	600 pcs.
		ACNM7112SAZ		
1 Form C		ACNM5112SAX		
		ACNM5112SAZ		

Notes: *1. Surface-mount terminal type is available in high heat-resistant type only.
*2. An “X” at the end of the part number indicates, for tape and reel packing, reverse N.O. terminal direction in pull-out direction.
A “Z” at the end of the part number indicates, for tape and reel packing, normal N.O. terminal direction in pull-out direction.
Tape and reel packing symbol “z” or “x” are not marked on the relay.

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
12 V DC	Max. 7.2 V DC	Min. 1.0 V DC	53.3 mA	225Ω	640 mW	10 to 16 V DC

2. Specifications

Item		Specifications
Contact data	Contact arrangement	1 Form A, 1 Form C
	Contact resistance (initial)	Max. 30mΩ (Typ. 5mΩ) (By voltage drop 1A 6V DC)
	Contact material	Ag alloy
	Rated switching capacity (resistive)	N.O. side: 30A 14V DC, N.C. side: 15A 14V DC
	Max. carrying current*1	N.O. side 30A/1 hour, 40A/2 min. (Coil applied voltage 16V DC, at 20°C 68°F) 25A/1 hour, 35A/2 min. (Coil applied voltage 16V DC, at 85°C 185°F) 20A/1 hour, 30A/2 min. (Coil applied voltage 16V DC, at 110°C 230°F) (High heat-resistant type)
	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 bounce time)
	Release (Reset) time (at Rated voltage)	Max. 10ms (at 20°C 68°F, without 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. 44.1m/s² {approx. 4.5G} (Detection time: 10μs)
	Destructive	10 to 500 Hz, Min. 44.1m/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	<Resistive load> Min. 10^5 (At rated switching capacity, operating frequency: ON 1s, OFF 9s) <Motor load> Min. 2×10^5 (motor free): at 80 A (inrush), 16 A (steady), 14 V DC (Operating frequency: ON 2s, OFF 6s) <Lamp load> Min. 10^5: at 84 A (inrush), 12 A (steady), 14 V DC (Operating frequency: ON 1s, OFF 14s)
Conditions	Conditions for usage, transport and storage*3	Standard type; Ambient temperature: –40 to +85°C –40 to +185°F, Humidity: 5 to 85% R.H. High heat-resistant type; Ambient temperature: –40 to +110°C –40 to +230°F, Humidity: 2 to 85% R.H. (Please avoid icing or condensation)
Weight		Approx. 5.5 g .19 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).

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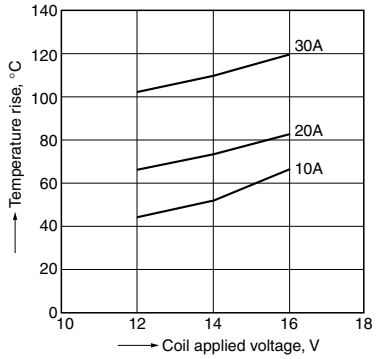
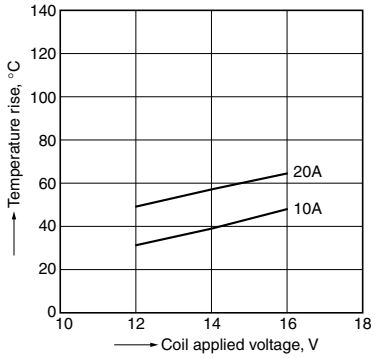
REFERENCE DATA

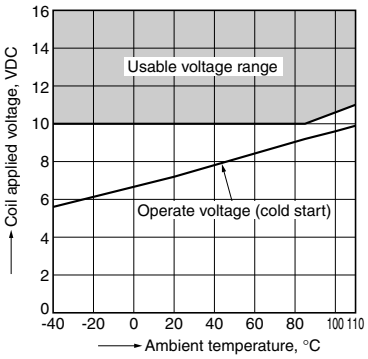
1-(1). Coil temperature rise (at room temperature)
Sample: ACNM1112, 3pcs
Measured portion: Inside the coil
Carrying current: 10A, 20A, 30A
Ambient temperature: 26°C 78.8°F



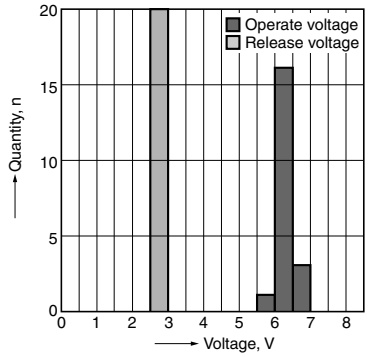
1-(2). Coil temperature rise (at 110°C 230°F)
Sample: ACNM7112, 3pcs
Measured portion: Inside the coil
Carrying current: 10A, 20A
Ambient temperature: 110°C 230°F



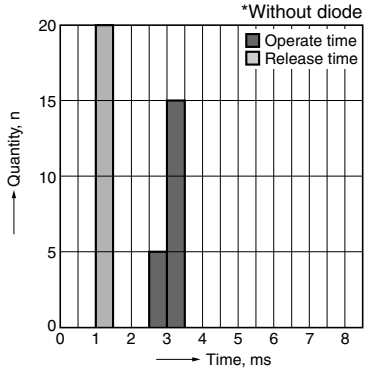
2. Ambient temperature and usable voltage range



3. Distribution of operate (set) and release (reset) voltage
Sample: ACNM1112, 20pcs.

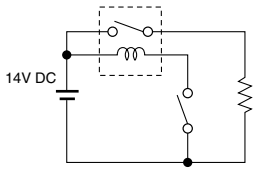


4. Distribution of operate (set) and release (reset) time
Sample: ACNM1112, 20pcs.

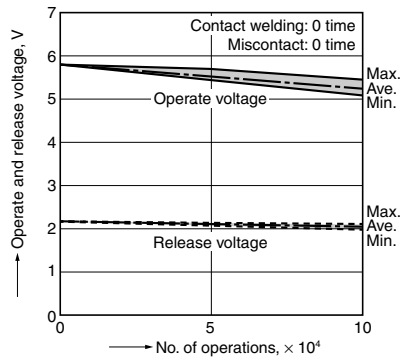


5-(1). Electrical life test (Resistive load)
Sample: ACNM1112, 3pcs.
Load: Resistive load (N.O. side: 30A 14V DC)
Operating frequency: ON 1s, OFF 9s
Ambient temperature: Room temperature

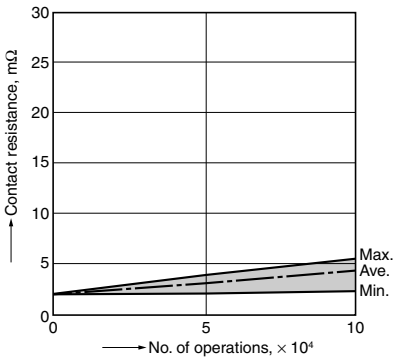
Circuit:



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

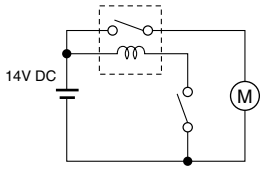


Change of contact resistance

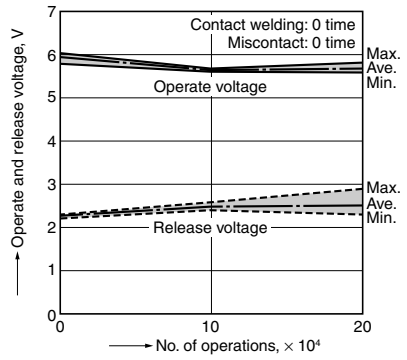


5-(2). Electrical life test (Motor load)
Sample: ACNM7112, 3pcs.
Load: inrush: 80A/steady: 16A (motor free)
Operating frequency: ON 2s, OFF 6s
Ambient temperature: 110°C 230°F

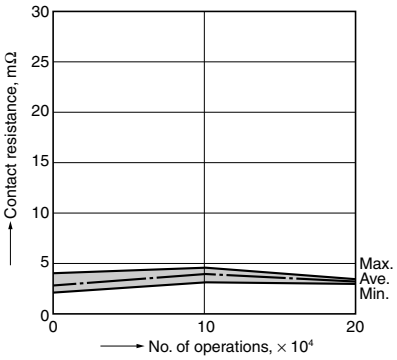
Circuit:



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



Change of contact resistance



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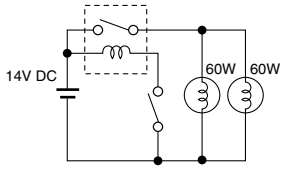
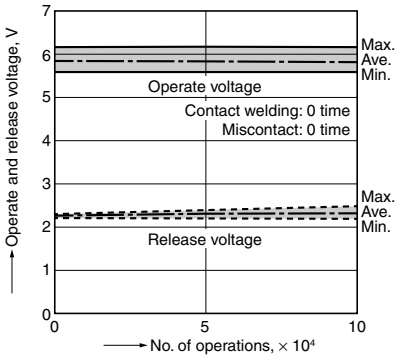
5-(3). Electrical life test (Lamp load)
Sample: ACNM3112, 3pcs.
Load: inrush: 84A/steady: 12A
Operating frequency: ON 1s, OFF 14s
Ambient temperature: Room temperature

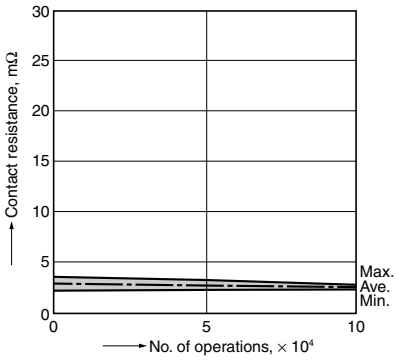
Circuit:



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



Change of contact resistance



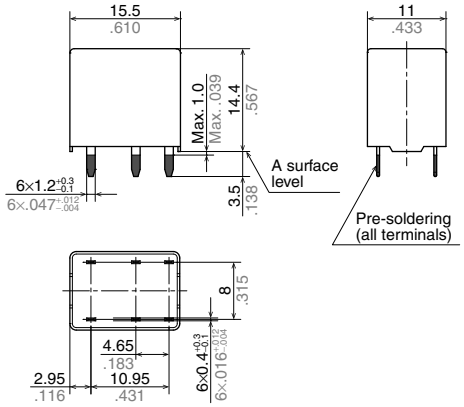
DIMENSIONS (mm inch)

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

1. PC board terminal type

CAD

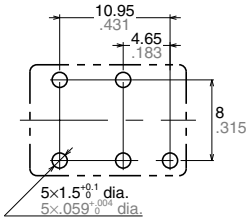
External dimensions



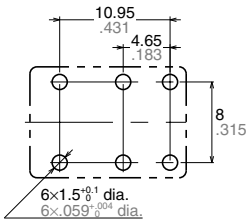
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)

1 Form A

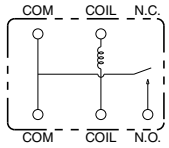


1 Form C

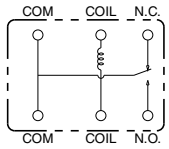


Schematic (Bottom view)

1 Form A



1 Form C



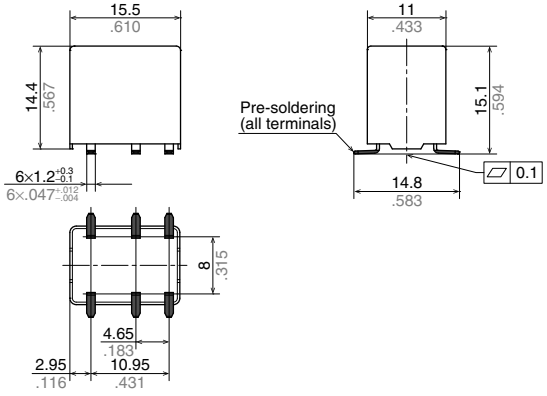
Tolerance: ±0.1 ±.004

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

2. Surface-mount terminal type

CAD

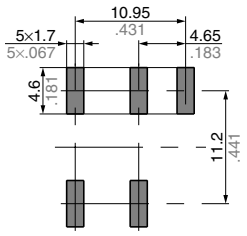
External dimensions



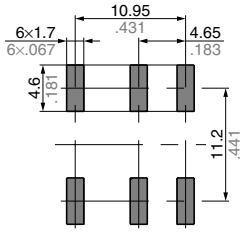
Dimension:	Tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

Recommended mounting pad (Top view)

1 Form A

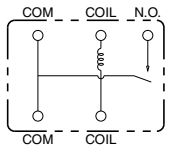


1 Form C

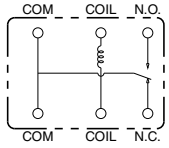


Schematic (Top view)

1 Form A



1 Form C



Tolerance: ±0.1 ±.004

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NOTES

1. Usage, transport and storage conditions

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

(1) Temperature:

–40 to +85°C –40 to +185°F

(Standard type)

–40 to +110°C –40 to +230°F

(High heat-resistant type)

(2) Humidity:

5 to 85% RH (Standard type)

2 to 85% RH (High heat-resistant type)

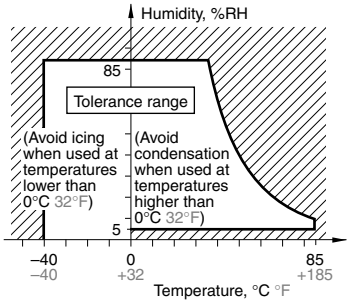
(Avoid icing and condensation.)

(3) Air pressure: 86 to 106 kPa

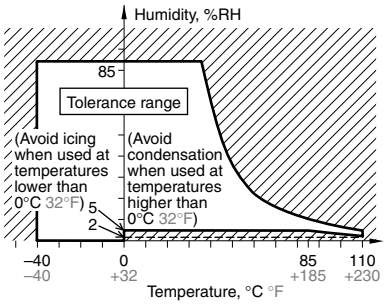
The humidity range varies with the temperature. Use within the range indicated in the graph below.

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

Standard type



High heat-resistant type



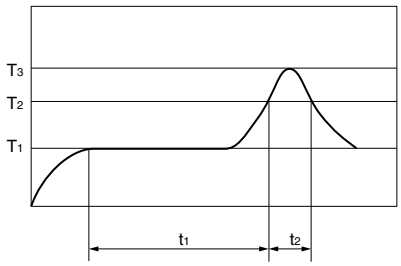
2. Storage condition after opening a moisture-prevention package

(1) After opening a moisture-prevention package, use the item as soon as possible (within 3 days under an environment of Max. 30°C 86°F, Max. 70% RH).

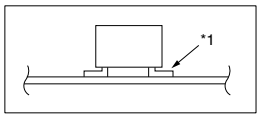
(2) If products are not used within 3 days after opening a moisture-prevention package, store them in a humidity-controlled desiccator or in a storage bag with silica gel.

3. 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 302 to 356°F
T_2 = 230°C 446°F or more
T_3 = Less than 250°C 482°F
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 the PC board, however, for other areas such as the surface of relay case, make a setting so that you do not exceed the recommended conditions.

*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.

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".

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