FEATURES
• Best space savings in its class.
• Compact and high-capacity 30A load switching.
• Full line up (High heat-resistant type and SMD type)
• Terminals for PC board pattern designs are easily allocated.

TYPICAL APPLICATIONS
Defogger, Seat heater, Head lamp, Fog lamp, Fan motor, etc.

ORDERING INFORMATION

ACNM [ ] [ ] [ ] [ ]

Contact arrangement**1
1: 1 Form C
3: 1 Form A
5: 1 Form C high heat-resistant type
7: 1 Form A high heat-resistant type

Pick-up voltage
1: Max. 7.2V DC

Coil voltage (DC)
12: 12V

Terminal shape
Nil: PC board terminal
SA: Surface-mount terminal

Packing style**2
Nil: Tube packing
X: Tape and reel packing
(Reverse NO terminal direction in pull-out direction)
Z: Tape and reel packing
(Normal NO terminal direction in pull-out direction)

Notes:
*1. Surface-mount terminal type is available in high heat-resistant type only.
*2. Tube packing: PC board terminal type only
      Tape and reel packing: Surface-mount type only

TYPES

1. PC board terminal type

<table>
<thead>
<tr>
<th>Contact arrangement</th>
<th>Nominal coil voltage</th>
<th>Part No. Standard type</th>
<th>High heat-resistant type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Form A</td>
<td>12V DC</td>
<td>ACNM3112</td>
<td>ACNM7112</td>
</tr>
<tr>
<td>1 Form C</td>
<td></td>
<td>ACNM1112</td>
<td>ACNM5112</td>
</tr>
</tbody>
</table>

Standard packing: Carton (tube): 50 pcs.; Case: 1,500 pcs.

2. Surface-mount terminal type

<table>
<thead>
<tr>
<th>Contact arrangement</th>
<th>Nominal coil voltage</th>
<th>Part No. High heat-resistant type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Form A</td>
<td>12V DC</td>
<td>ACNM7112SAX</td>
</tr>
<tr>
<td>1 Form C</td>
<td></td>
<td>ACNM5112SAX</td>
</tr>
</tbody>
</table>

Standard packing: Carton (tape and reel): 200 pcs.; Case: 800 pcs.

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 NO terminal direction in pull-out direction.
      A “Z” at the end of the part number indicates, for tape and reel packing, normal NO terminal direction in pull-out direction.
**CN-M (ACNM) RATING**

### 1. Coil data

<table>
<thead>
<tr>
<th>Nominal coil voltage</th>
<th>Pick-up voltage (at 20°C 68°F)</th>
<th>Drop-out voltage (at 20°C 68°F)</th>
<th>Nominal operating current [±10%] (at 20°C 68°F)</th>
<th>Coil resistance [±10%] (at 20°C 68°F)</th>
<th>Nominal operating power (at 20°C 68°F)</th>
<th>Usable voltage range</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 V DC</td>
<td>Max. 7.2 V DC (Initial)</td>
<td>Min. 1.0 V DC (Initial)</td>
<td>53.3 mA</td>
<td>225Ω</td>
<td>640 mW</td>
<td>10 to 16 V DC</td>
</tr>
</tbody>
</table>

**Note:** *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. Specifications

#### Characteristics

- **Contact**
  - Arrangement: 1 Form A, 1 Form C
  - Contact resistance (Initial): Typical 5mΩ (By voltage drop 6 V DC 1 A)
  - Contact material: Ag alloy (Cadmium free)

- **Nominal switching capacity (resistive load):**
  - N.O.: 30A 14V DC, N.C.: 15A 14V DC

- **Max. carrying current (at 14 DC):**
  - N.O.: 30A/1 h, 40A/2 min. at 20°C 68°F
  - 25A/1 h, 35A/2 min. at 85°C 185°F
  - 20A/1 h, 30A/2 min. at 110°C 230°F (High heat-resistant type)
  - N.C.: 25A/1 h, 30A/2 min. at 20°C 68°F
  - 20A/1 h, 25A/2 min. at 85°C 185°F
  - 15A/1 h, 20A/2 min. at 110°C 230°F (High heat-resistant type)

- **Nominal operating power:**
  - 640 mW

- **Min. switching capacity (resistive load):** 1A 12V DC

#### Electrical characteristics

- **Insulation resistance (Initial):** Min. 100 MΩ (at 500 V DC)
- **Breakdown voltage (Initial):** Between open contacts 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 diode)

- **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: 5ms)

- **Vibration resistance:**
  - Functional: 10 Hz to 100 Hz, Min. 44.1m/s² (4.5G) (Detection time: 10μs)
  - Destructive: 10 Hz to 500 Hz, Min. 44.1m/s² (4.5G)
  - Time of vibration for each direction: X, Y direction: 2 hours, Z direction: 4 hours

#### Mechanical characteristics

- **Expected life**
  - Mechanical: Min. 10⁷ (at 120 cpm)
  - Electrical: <Resistive load>
    - Min. 10⁴ (At nominal switching capacity, operating frequency: 1s ON, 2s OFF)
    - <Motor load>
      - Min. 2-10⁴: at 80 A (inrush), 16 A (steady), 14 V DC (Operating frequency: 2s ON, 6s OFF)
      - <Lamp load>
        - Min. 10⁴: at 84 A (inrush), 12 A (steady), 14 V DC (Operating frequency: 1s ON, 14s OFF)

#### Conditions

- **Conditions for operation, transport and storage**
  - Standard type: Ambient temp: −40°C to +85°C; −40°F to +185°F, Humidity: 5 to 85% R.H.
  - High-heat-resistant type: Ambient temp: −40°C to +110°C; −40°F to +230°F, Humidity: 2 to 85% R.H.
  - (Not freezing and condensing at low temperature)

- **Unit weight:** Approx. 5.5 g .19 oz

**Note:** *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.*

### REFERENCE DATA

#### 1-(1). Coil temperature rise

- **Sample:** ACNM1112, 3pcs
- **Measured portion:** Inside the coil
- **Contact carrying current:** 10A, 20A, 30A
- **Ambient temperature:** 26°C 78.8°F

#### 1-(2). Coil temperature rise

- **Sample:** ACNM7112, 3pcs
- **Measured portion:** Inside the coil
- **Contact carrying current:** 10A, 20A
- **Ambient temperature:** 110°C 230°F

#### 2. Ambient temperature and operating voltage range

- **Ambient temperature:** 10 to 16 V DC

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**ds_61220_en_cnm: 010113J**
3. Distribution of pick-up and drop-out voltage
Sample: ACNM1112, 20pcs.

4. Distribution of operate and release time
Sample: ACNM1112, 20pcs.

5-(1). Electrical life test (Resistive load)
Sample: ACNM1112, 3pcs.
Load: Resistive load (NO side: 30A 14V DC)
Operating frequency: (ON:OFF = 1s:1s)
Ambient temperature: Room temperature

Circuit:

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

Circuit:

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

Circuit:
1. PC board terminal type

External dimensions

PC board pattern (Bottom view)

Dimension: General tolerance
Max. 1mm .039 inch: ±0.1 ±0.004
1 to 3mm .039 to .118 inch: ±0.2 ±0.008
Min. 3mm .118 inch: ±0.3 ±0.012

Schematic (Bottom view)

Recommended mounting pad (Top view)

Recommended mounting pad (Top 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.

Tolerance: ±0.1 ±0.004

2. Surface-mount terminal type

External dimensions

Schematic (Top view)

Recommended mounting pad (Top view)

Recommended mounting pad (Top view)

Tolerance: ±0.1 ±0.004

* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering.

Intervals between terminals is measured at A surface level.

Tolerance: ±0.1 ±0.004
1. Usage, transport and storage conditions
   1) Ambient temperature, humidity, and atmospheric 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: 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)

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
   1) Recommended reflow condition is:
      • Reflow-soldering temperature profile condition (IRS method)

2) Avoid cleaning (ultrasonic cleaning, boiling cleaning, etc.) and coating to prevent negative impacts on relay characteristics.

For Cautions for Use, see Relay Technical Information.