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

<table>
<thead>
<tr>
<th>Contact arrangement</th>
<th>Nominal coil voltage</th>
<th>Part No.</th>
<th>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>
<td></td>
</tr>
<tr>
<td>1 Form C</td>
<td>12V DC</td>
<td>ACNM1112</td>
<td>ACNM5112</td>
<td></td>
</tr>
</tbody>
</table>

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

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

2. Surface-mount terminal type

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.
## 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>

### 2. Specifications

#### Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact</strong></td>
<td></td>
</tr>
<tr>
<td>Contact arrangement</td>
<td>1 Form A, 1 Form C</td>
</tr>
<tr>
<td>Contact resistance (Initial)</td>
<td>Typical 5mΩ (By voltage drop 6 V DC 1 A)</td>
</tr>
<tr>
<td>Contact material</td>
<td>Ag alloy (Cadmium free)</td>
</tr>
<tr>
<td><strong>Rating</strong></td>
<td></td>
</tr>
<tr>
<td>Nominal switching capacity (resistive load) N.O.:</td>
<td>30A 14V DC, N.C.: 15A 14V DC</td>
</tr>
<tr>
<td>Max. carrying current (at 14V DC)</td>
<td>N.O. 30A/1 h, 40A/2 min. at 20°C 68°F</td>
</tr>
<tr>
<td></td>
<td>25A/1 h, 35A/2 min. at 85°C 185°F</td>
</tr>
<tr>
<td></td>
<td>20A/1 h, 30A/2 min. at 110°C 230°F (High heat-resistant type)</td>
</tr>
<tr>
<td></td>
<td>N.C. 25A/1 h, 30A/2 min. at 20°C 68°F</td>
</tr>
<tr>
<td></td>
<td>20A/1 h, 25A/2 min. at 85°C 185°F</td>
</tr>
<tr>
<td></td>
<td>15A/1 h, 20A/2 min. at 110°C 230°F (High heat-resistant type)</td>
</tr>
<tr>
<td>Nominal operating power</td>
<td>640 mW</td>
</tr>
<tr>
<td>Min. switching capacity (resistive load)*</td>
<td>1A 12V DC</td>
</tr>
</tbody>
</table>

#### Electrical characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation resistance (Initial)</td>
<td>Min. 100 MΩ (at 500 V DC)</td>
</tr>
<tr>
<td>Breakdown voltage (Initial)</td>
<td>Between open contacts: 500 Vrms for 1 min. (Detection current: 10mA)</td>
</tr>
<tr>
<td></td>
<td>Between contacts and coil: 500 Vrms for 1 min. (Detection current: 10mA)</td>
</tr>
<tr>
<td>Operate time (at nominal voltage)</td>
<td>Max. 10ms (at 20°C 68°F, excluding contact bounce time) (Initial)</td>
</tr>
<tr>
<td>Release time (at nominal voltage)</td>
<td>Max. 10ms (at 20°C 68°F, excluding contact bounce time) (Initial) (without diode)</td>
</tr>
</tbody>
</table>

#### Mechanical characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock resistance Functional</td>
<td>Min. 100 m/s² (10G) (Half-wave pulse of sine wave: 11ms; detection time: 10μs)</td>
</tr>
<tr>
<td>Destructive</td>
<td>Min. 1,000 m/s² (100G) (Half-wave pulse of sine wave: 5ms)</td>
</tr>
<tr>
<td>Vibration resistance Functional</td>
<td>10 Hz to 100 Hz, Min. 44.1 m/s² (4.5G) (Detection time: 10μs)</td>
</tr>
<tr>
<td>Destructive</td>
<td>10 Hz to 500 Hz, Min. 44.1 m/s² (4.5G)</td>
</tr>
</tbody>
</table>

#### Expected life

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Min. 10⁷ (at 120 cpm)</td>
<td></td>
</tr>
</tbody>
</table>

#### Electrical

- **<Resistive load>**
  - Min. 10⁷ (At nominal switching capacity, operating frequency: 1s ON, 2s OFF)
- **<Motor load>**
  - Min. 2×10⁷ at 80 A (inrush), 16 A (steady), 14 V DC (Operating frequency: 2s ON, 6s OFF)
- **<Lamp load>**
  - Min. 10⁻⁸ 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.

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# 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

### 2. Ambient temperature and operating voltage range

![Operating voltage range](image)

**Pick-up voltage (cold start)**

![Pick-up voltage](image)

**Ambient temperature, °C**

![Ambient temperature](image)
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:
**CN-M (ACNM)**

**DIMENSIONS (mm inch)**

1. **PC board terminal type**

   **External dimensions**

   **PC board pattern**
   
   **Schematic**
   
   **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 |

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

2. **Surface-mount terminal type**

   **External dimensions**

   **Recommended mounting pad**
   
   **Schematic**
   
   **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 |

   Tolerance: ±0.1 ±0.004

Download [CAD Data](#) from our Web site.
NOTES
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)
   • Cautions for mounting operations
      Temperature profile indicates the temperature of the soldered part (*1) of terminals on the surface of a circuit board. The exterior temperature of a relay may be extremely high depending on the component density on the board or the heating method of the reflow oven or circuit board type. Sufficient verification under actual processing conditions is required.
      2) Avoid cleaning (ultrasonic cleaning, boiling cleaning, etc.) and coating in order to prevent negative impacts on relay characteristics.

For Cautions for Use, see Relay Technical Information.