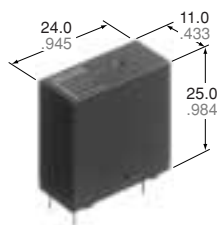


# NAIS

## 250 mW Slim Power Relay

# LK-S RELAYS



mm inch

### FEATURES

#### 1. High sensitivity: 250mW

The power-saving relay is highly sensitive at the nominal operating power of 250 mW (530 mW power consumption on LK relays).

#### 2. High insulation resistance between contact and coil

- 1) Creepage distance and clearances between contact and coil: Min. 6 mm .236 inch (In compliance with IEC65)
- 2) Surge withstand voltage between contact and coil: 10,000 V or more

#### 3. High noise immunity realized by the card separation structure between contact and coil

#### 4. Popular terminal pitch in AV equipment field

#### 5. Space-saving slim type

Base area: Width 11 × Length 24 mm  
Width .433 × Length .945 inch

#### 6. Conforms to the various safety standards

UL/CSA, VDE, TÜV and SEMKO SEV approved

### SPECIFICATIONS

#### Contact

|  |   |                 |
|--|---|-----------------|
| Arrangement  |   | 1 Form A        |
| Initial contact resistance, max.<br>(By voltage drop 6 V DC 1 A) |   | Max. 100 mΩ     |
| Contact material   |   | Silver alloy    |
| Rating<br>(resistive load)                                       | Nominal switching capacity                | 5 A 277 V AC    |
|  | Max. switching power                      | 1,385 V A       |
|  | Max. switching voltage                    | 277 V AC        |
|  | Max. switching current                    | 5 A (AC)        |
| Expected life<br>(min. operations)                               | Mechanical (at 180 cpm)                   | 10 <sup>6</sup> |
|  | Electrical (at 20 cpm)<br>(at rated load) | 10 <sup>5</sup> |

#### Coil

|                         |        |
|-------------------------|--------|
| Nominal operating power | 250 mW |
|-------------------------|--------|

#### Remarks

- \* Specifications will vary with foreign standards certification ratings.  
 \*<sub>1</sub> Measurement at same location as "Initial breakdown voltage" section.  
 \*<sub>2</sub> Detection current: 10mA  
 \*<sub>3</sub> Wave is standard shock voltage of  $\pm 1.2 \times 50\mu s$  according to JEC-212-1981  
 \*<sub>4</sub> Excluding contact bounce time.  
 \*<sub>5</sub> Half-wave pulse of sine wave: 11 ms; detection time: 10  $\mu s$   
 \*<sub>6</sub> Half-wave pulse of sine wave: 6 ms  
 \*<sub>7</sub> Detection time: 10  $\mu s$   
 \*<sub>8</sub> Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT.

#### Characteristics

|  |                             |  |
|--|-----------------------------|--|
| Max. operating speed   |                             | 20 cpm (at rated load)   |
| Initial insulation resistance* <sub>1</sub>  |                             | Min. 1,000 MΩ (at 500 V DC)  |
| Initial * <sub>2</sub><br>breakdown<br>voltage   | Between open<br>contacts    | 1,000 Vrms for 1 min.  |
|  | Between contact and<br>coil | 4,000 Vrms for 1 min.  |
| Initial surge voltage between contact<br>and coil* <sub>3</sub>  |                             | Min. 10,000 V  |
| Operate time* <sub>4</sub> (at nominal voltage)  |                             | Approx. 7 ms (at 20°C 68°F)  |
| Release time (without diode)* <sub>4</sub><br>(at nominal voltage)   |                             | Approx. 2 ms (at 20°C 68°F)  |
| Temperature rise (at 70°C)   |                             | Max. 35°C with nominal coil<br>voltage and at 5 A contact<br>carrying current<br>(resistance method) |
| Shock resistance   | Functional* <sub>5</sub>    | Min. 200 m/s <sup>2</sup> {approx. 20 G}   |
|  | Destructive* <sub>6</sub>   | Min. 1,000 m/s <sup>2</sup> {approx. 100 G}  |
| Vibration resistance   | Functional* <sub>7</sub>    | 10 to 55Hz<br>at double amplitude of 1.5mm   |
|  | Destructive                 | 10 to 55Hz<br>at double amplitude of 1.5mm   |
| Conditions for operation,<br>transport and storage* <sub>8</sub><br>(Not freezing and con-<br>densing at low tempera-<br>ture) | Ambient<br>temp.            | -40°C to +70°C<br>-40°F to +158°F  |
|  | Humidity                    | 5 to 85% R.H.  |
|  | Air<br>pressure             | 86 to 106 kPa  |
| Unit weight  |                             | Approx. 12 g .42 oz  |

### TYPICAL APPLICATIONS

- Audio visual equipment
- Office equipment
- Home appliances

### ORDERING INFORMATION

Ex. LKS 1a F - 12V

| Contact arrangement | Protective construction | Coil voltage(DC)     |
|---------------------|-------------------------|----------------------|
| 1a: 1 Form A        | F: Flux-resistant type  | 5, 6, 9, 12, 18, 24V |

UL/CSA, TÜV, SEMKO, TV-5 approved type is standard.

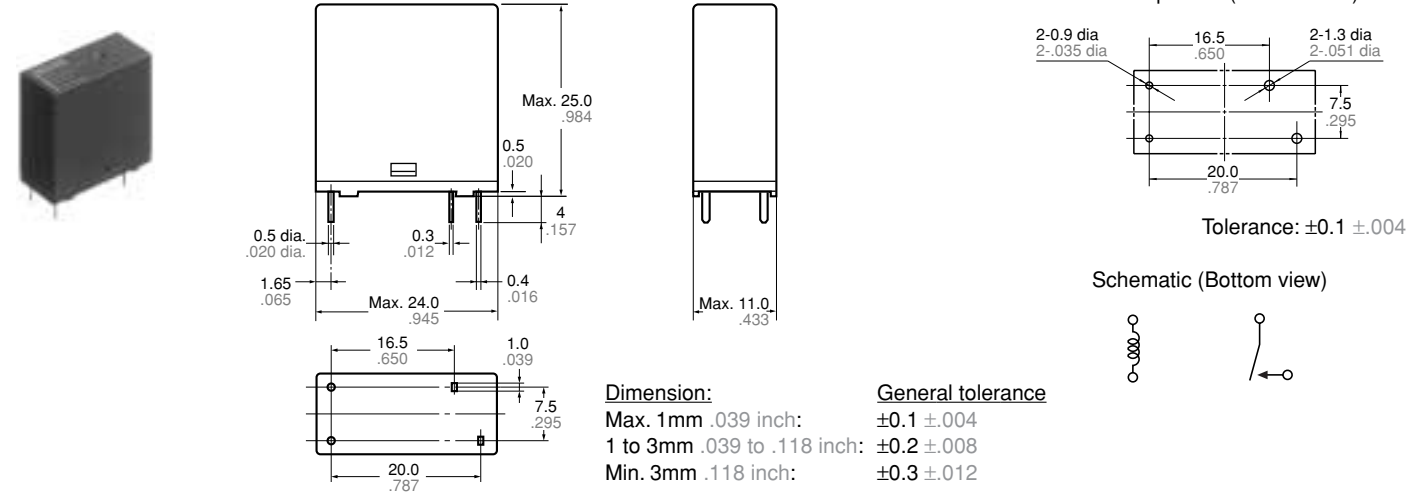
- Notes 1. Standard packing Carton: 100 pcs. Case: 500 pcs.  
 2. 6 V, 18 V DC types are also available. Please consult us for details.

LK-S

TYPES AND COIL DATA (at 20°C 68°F)

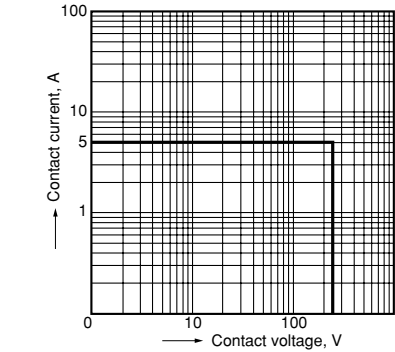
| Part No.   | Nominal voltage, V DC | Pick-up voltage, V DC (max.) (Initial) | Drop-out voltage, V DC (min.) (Initial) | Coil resistance, Ω (±10%) | Nominal operating current, mA (±10%) | Nominal operating power, mW | Maximum allowable voltage, V DC (at 20°C 68°F) |
|------------|-----------------------|--|---|---------------------------|--------------------------------------|-----------------------------|--|
| LKS1aF-5V  | 5                     | 3.5                                    | 0.5                                     | 100                       | 50                                   | 250                         | 6.5  |
| LKS1aF-6V  | 6                     | 4.2                                    | 0.6                                     | 144                       | 41.7                                 | 250                         | 7.8  |
| LKS1aF-9V  | 9                     | 6.3                                    | 0.9                                     | 324                       | 27.8                                 | 250                         | 11.7   |
| LKS1aF-12V | 12                    | 8.4                                    | 1.2                                     | 576                       | 20.8                                 | 250                         | 15.6   |
| LKS1aF-18V | 18                    | 12.6                                   | 1.8                                     | 1,296                     | 13.9                                 | 250                         | 23.4   |
| LKS1aF-24V | 24                    | 16.8                                   | 2.4                                     | 2,304                     | 10.4                                 | 250                         | 31.2   |

DIMENSIONS



REFERENCE DATA

1. Max. switching power (AC resistive load)

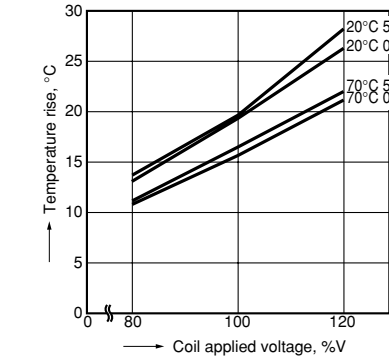


2. Coil temperature rise

Sample: LKS1aF-12V, 6 pcs.

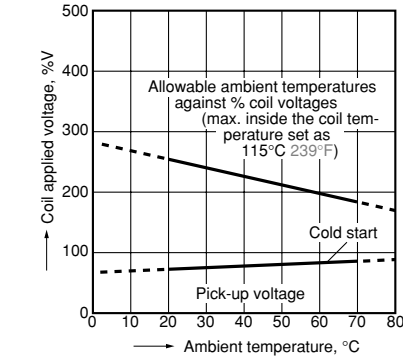
Point measured: coil inside

Contact current: 0 A, 5 A



3. Ambient temperature characteristics and coil applied voltage

Contact current: 5 A

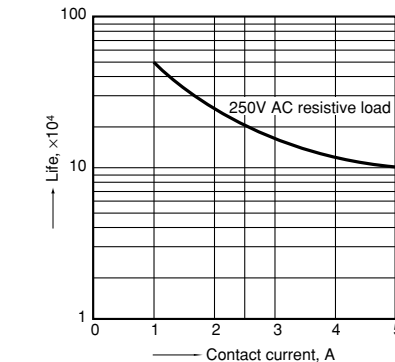


4. Life curve

Operation frequency: 20 times/min.

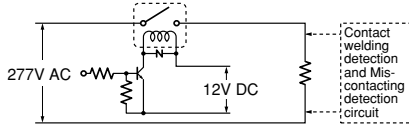
(ON/OFF = 1.5s: 1.5s)

Ambient temperature: Room temperature

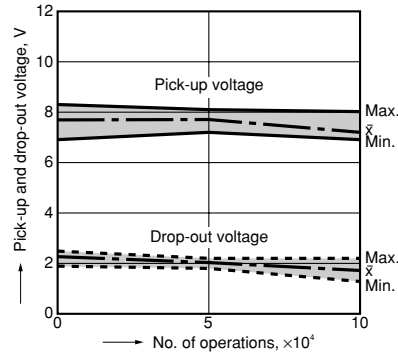


5-(1). Electrical life test  
(5 A 277 V AC, resistive load)  
Sample: LKS1aF-12V, 6 pcs.  
Operation frequency: 20 times/min.  
(ON/OFF = 1.5s: 1.5s)  
Ambient temperature: 20°C 68°F

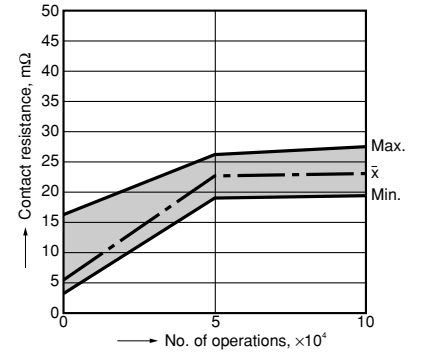
Circuit:



Change of pick-up and drop-out voltage



Change of contact resistance

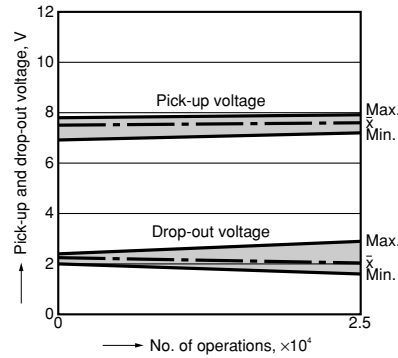


5-(2). Electrical life test (UL lamp load test TV-5)

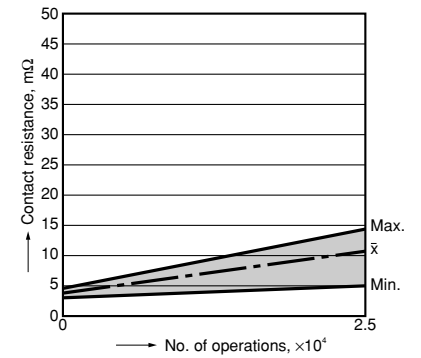
Tested sample: LKS1aF-12V, 6 pcs.

- Overload test  
Load: 7.5 A 120 V AC (60 Hz),  
Inrush: 111 A  
Operation frequency: 10 times/min  
(ON: OFF = 1 s: 5 s)  
No. of operations: 50 ope.
- Endurance test  
Load: 5A 120 V AC (60 Hz),  
Inrush: 78 A  
Operation frequency: 10 times/min  
(ON: OFF = 1 s: 5 s)  
No. of operations: 25,000 ope.

Change of pick-up and drop-out voltage



Change of contact resistance



**For Cautions for Use, see Relay Technical Information.**