

### 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

- Creepage distance and clearances between contact and coil: Min. 6 mm .236 inch (In compliance with IEC65)
- 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. (By voltage drop 6 V DC 1 A) | Max. 100 mΩ                            |                 |
| Contact material  | AgSnO <sub>2</sub> type                |                 |
| Rating (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 (min. operations)                               | Min. switching capacity <sup>#1</sup>  | 100 mA, 5 V DC  |
|   | Mechanical (at 180 cpm)                | 10 <sup>6</sup> |
|   | Electrical (at 20 cpm) (at rated load) | 10 <sup>5</sup> |

### Coil

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

<sup>#1</sup> 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.

### Remarks

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

### Characteristics

|  |   |   |
|--|---|---|
| Max. operating speed   | 20 cpm (at rated load)  |   |
| Initial insulation resistance <sup>*1</sup>  | Min. 1,000 MΩ (at 500 V DC)   |   |
| Initial <sup>*2</sup> breakdown voltage  | Between open contacts   | 1,000 Vrms for 1 min.                       |
|  | Between contact and coil  | 4,000 Vrms for 1 min.                       |
| Initial surge voltage between contact and coil <sup>*3</sup>   | Min. 10,000 V   |   |
| Operate time <sup>*4</sup> (at nominal voltage)  | Max. 15 ms (at 20°C 68°F)   |   |
| Release time (without diode) <sup>*4</sup> (at nominal voltage)  | Max. 5 ms (at 20°C 68°F)  |   |
| Temperature rise (at 70°C)   | Max. 35°C with nominal coil voltage and at 5 A contact carrying current (resistance method) |   |
| Shock resistance   | Functional <sup>*5</sup>  | Min. 200 m/s <sup>2</sup> {approx. 20 G}    |
|  | Destructive <sup>*6</sup>   | Min. 1,000 m/s <sup>2</sup> {approx. 100 G} |
| Vibration resistance   | Functional <sup>*7</sup>  | 10 to 55Hz at double amplitude of 1.5mm     |
|  | Destructive   | 10 to 55Hz at double amplitude of 1.5mm     |
| Conditions for operation, transport and storage <sup>*8</sup> (Not freezing and condensing at low temperature) | Ambient temp.   | -40°C to +70°C<br>-40°F to +158°F           |
|  | Humidity  | 5 to 85% R.H.                               |
|  | Air 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
- Standard packing Carton: 100 pcs. Case: 500 pcs.
  - 6 V, 18 V DC types are also available. Please consult us for details.

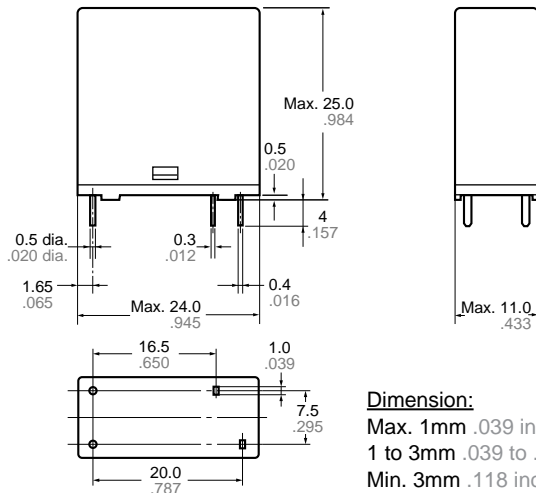
**TYPES AND COIL DATA (at 20°C 68°F)**

| 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   |

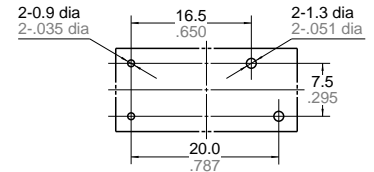
**DIMENSIONS**(mm inch)

Download [CAD Data](#) from our Web site.

[CAD Data](#)



PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

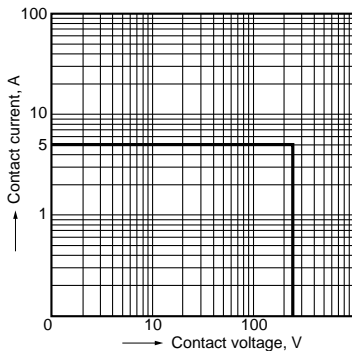


**General tolerance**

±0.1 ±.004  
±0.2 ±.008  
±0.3 ±.012

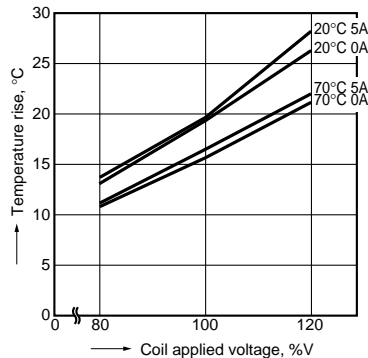
**REFERENCE DATA**

1. Max. switching power (AC resistive load)



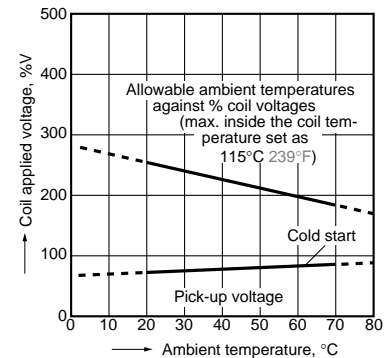
2. Coil temperature rise

Sample: LKS1aF-12V, 6 pcs.  
Point measured: coil inside  
Contact current: 0 A, 5A



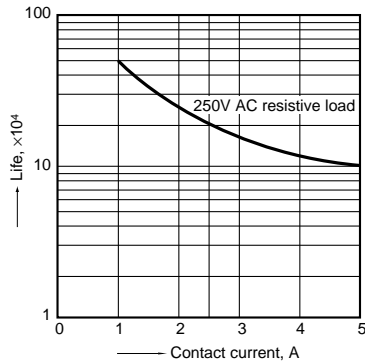
3. Ambient temperature characteristics and coil applied voltage

Contact current: 5 A



**4. Life curve**

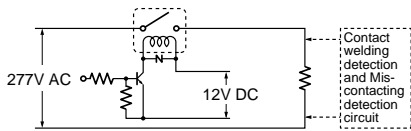
Operation frequency: 20 times/min.  
 (ON/OFF = 1.5s: 1.5s)  
 Ambient temperature: Room temperature



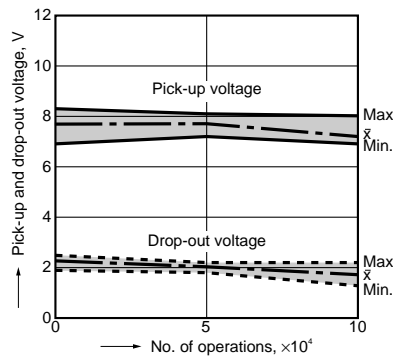
**5-(1). Electrical life test**

(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

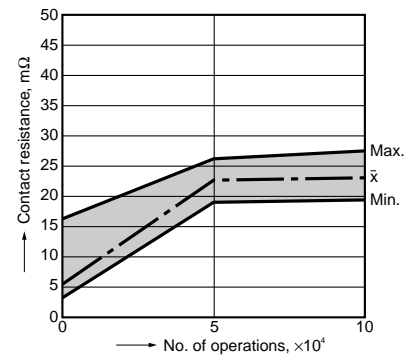
Circuit:



**Change of pick-up and drop-out voltage**



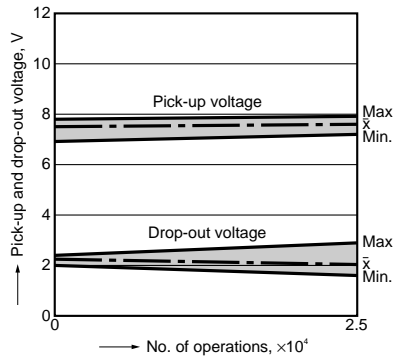
**Change of contact resistance**



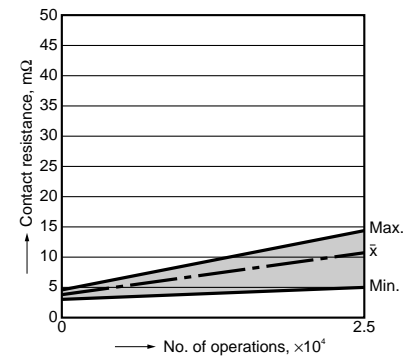
**5-(2). Electrical life test**

(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**



**SAFETY STANDARDS**

| UL/C-UL (Recognized) |  | CSA (Certified) |  | VDE (Certified) |   | TV rating (UL/CSA)             |        | TÜV (Certified)         |                       | SEMKO (Certified) |                                 |
|----------------------|--|-----------------|--|-----------------|---|--------------------------------|--------|-------------------------|-----------------------|-------------------|---------------------------------|
| File No.             | Contact rating                         | File No.        | Contact rating                         | File No.        | Contact rating                                  | File No.                       | Rating | File No.                | Rating                | File No.          | Contact rating                  |
| E43149               | 5A 277V AC<br>5A 30V DC<br>10A 277V AC | LR26550<br>etc. | 5A 277V AC<br>5A 30V DC<br>10A 277V AC | 4001439<br>0    | 5A 250V AC (cosφ=1.0)<br>10A 250V AC (cosφ=1.0) | UL<br>E43149<br>CSA<br>LR26550 | TV-5   | B 10 01<br>13461<br>270 | 5A 250V AC (cosφ=1.0) | 807779            | 3/100A 250V AC<br>5/40A 250V AC |

**For Cautions for Use, see [Relay Technical Information](#).**