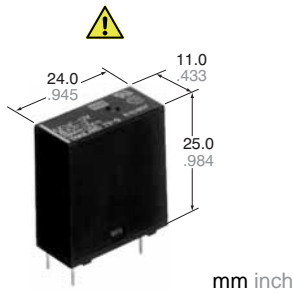


## SLIM POWER RELAY WITH HIGH INRUSH CURRENT CAPABILITY

# LK RELAYS



⚠ Product is discontinued.

### FEATURES

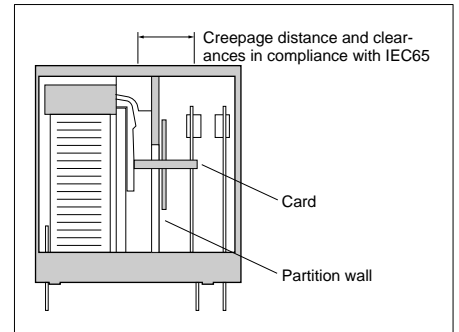
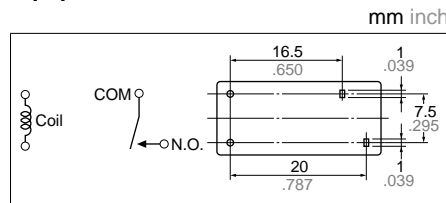
- High inrush current capability**
  - Operating load capability: inrush 100 A, steady 5 A
  - UL/CSA, TV-5

#### 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, SEMKO, SEV, BSI 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, 5 A 30 V DC
	Max. switching power	1,385 VA, 150 W
	Max. switching voltage	277 V AC, 30 V DC
	Max. switching current	5A (AC), 5 A (DC)
Expected life (min. ope.)	Min. switching capacity <sup>#1</sup>	100 mA, 5 V DC
	Mechanical (at 180 cpm)	2 × 10 <sup>6</sup>
	Electrical (at 20 cpm) (at rated load)	10 <sup>5</sup>

#### Coil

Nominal operating power	530 mW
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#1 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.
- \*1 Measurement at same location as "Initial breakdown voltage" section.
- \*2 Detection current: 10mA
- \*3 Wave is standard shock voltage of  $\pm 1.2 \times 50\mu\text{s}$  according to JEC-212-1981
- \*4 Excluding contact bounce time.
- \*5 Half-wave pulse of sine wave: 11 ms; detection time: 10  $\mu\text{s}$
- \*6 Half-wave pulse of sine wave: 6 ms
- \*7 Detection time: 10  $\mu\text{s}$
- \*8 Refer to "6. Usage, Storage and Transport Conditions" in **AMBIENT ENVIRONMENT** section in Relay Technical Information.

#### Characteristics

Max. operating speed	20 cpm	
Initial insulation resistance <sup>*1</sup>	Min. 1,000 MΩ (at 500 V DC)	
Initial breakdown voltage <sup>*2</sup>	Between open contacts	1,000 Vrms for 1 min
	Between contacts 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 at 5A contact carrying current (resistance method)	
Shock resistance	Functional <sup>*5</sup>	Min. 200 m/s <sup>2</sup>
	Destructive <sup>*6</sup>	Min. 1,000 m/s <sup>2</sup>
Vibration resistance	Functional <sup>*7</sup>	10 to 55 Hz at double amplitude of 1.5 mm
	Destructive	10 to 55 Hz at double amplitude of 1.5 mm
Conditions for operation, transport and storage <sup>*8</sup> (Not freezing and condensing at low temperature)	Ambient temp.	-40 to +70°C -40 to +158°F
	Humidity	5 to 85%R.H.
	Air pressure	86 to 106 kPa
Unit weight	Approx. 12 g .42 oz	

### TYPICAL APPLICATIONS

- AV equipment: TV's, VTR's, etc.
- OA equipment
- HA equipment

### ORDERING INFORMATION

Ex. LK 1a F — 24V

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

UL/CSA, TÜV, SEMKO, TV-5 approved type is standard.  
(Note) Standard packing Carton: 100 pcs. Case: 500 pcs.

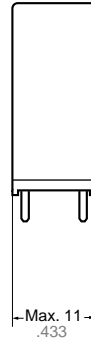
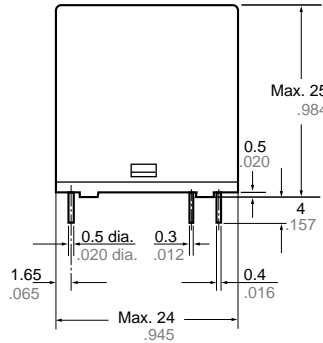
## TYPES AND COIL DATA (at 20°C 68°F)

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	Max. allowable voltage, V DC (at 20°C 68°F)
LK1aF-5V	5	3.5	0.5	47	106.4	530	6.5
LK1aF-6V	6	4.2	0.6	68	88.3	530	7.8
LK1aF-9V	9	6.3	0.9	153	58.8	530	11.7
LK1aF-12V	12	8.4	1.2	272	44.2	530	15.6
LK1aF-18V	18	12.6	1.8	611	29.5	530	23.4
LK1aF-24V	24	16.8	2.4	1,087	22.1	530	31.2

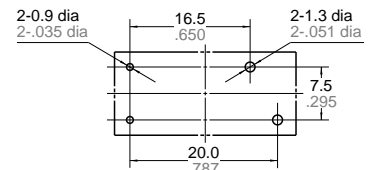
## DIMENSIONS (mm inch)

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

[CAD Data](#)



PC board pattern (Bottom view)



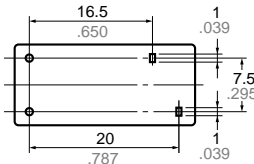
Tolerance:  $\pm 0.1 \pm 0.04$

Schematic (Bottom view)



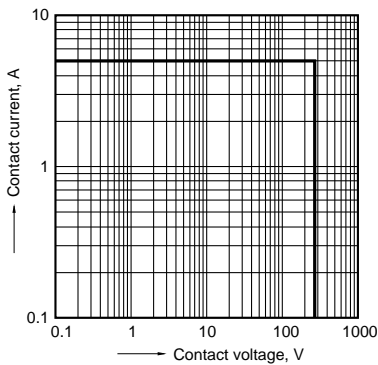
**Dimension :**  
 Max. 1mm .039 inch:  
 1 to 3mm .039 to .118 inch:  
 Min. 3mm .118 inch:

**General tolerance**  
 $\pm 0.1 \pm 0.04$   
 $\pm 0.2 \pm 0.08$   
 $\pm 0.3 \pm 0.12$

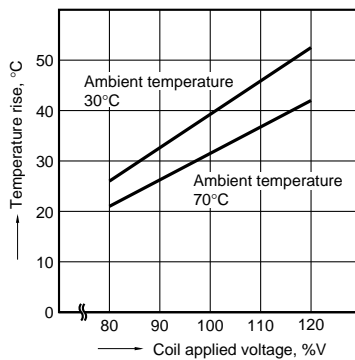


## REFERENCE DATA

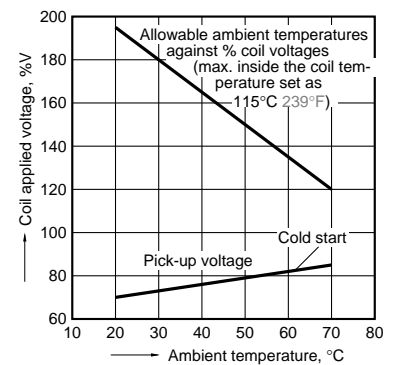
1. Max. switching power (AC resistive load)



2. Coil temperature rise  
 Sample: LK1aF-12V, 6 pcs.  
 Point measured: coil inside  
 Contact current: 5 A

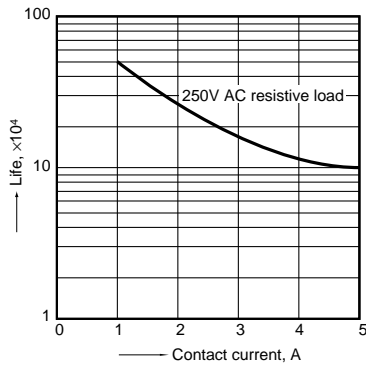


3. Ambient temperature characteristics  
 Contact current: 5 A



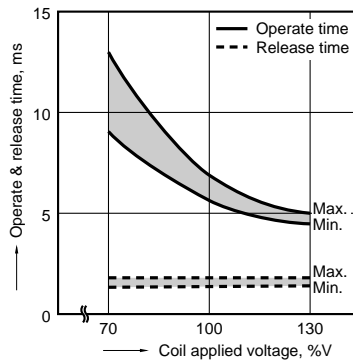
**4. Life curve**

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



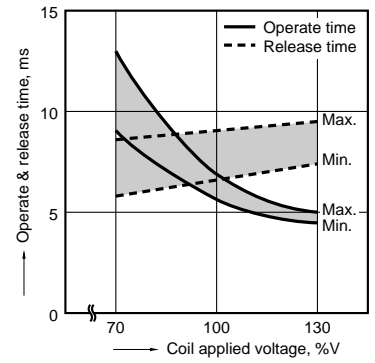
**5-1. Operate & release time (without diode)**

Sample: LK1aF-12V, 20 pcs.



**5-2. Operate & release time (with diode)**

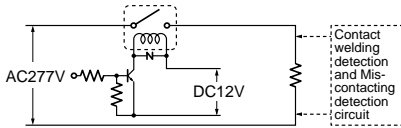
Sample: LK1aF-12V, 20 pcs.



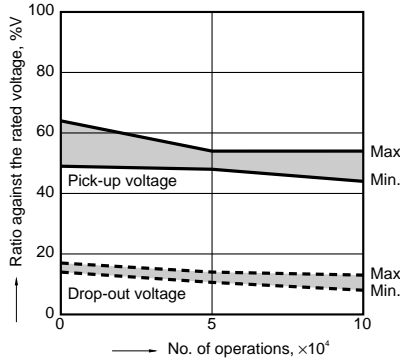
**6-1. Electrical life test**

(5 A 277 V AC, resistive load)  
Sample: LK1aF-12V, 6 pcs.  
Operation frequency: 20 times/min.  
(ON/OFF = 1.5s: 1.5s)  
Ambient temperature: 26°C 79°F

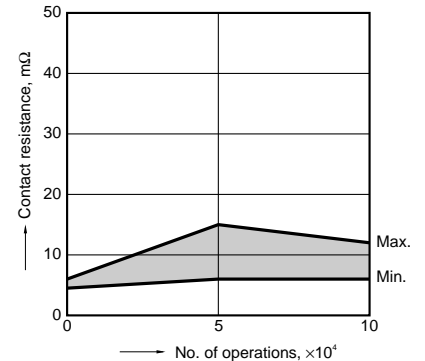
Circuit:



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



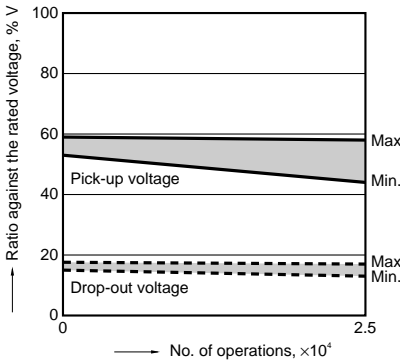
**Change of contact resistance**



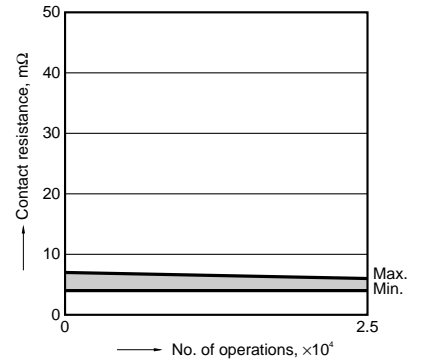
**6-2. Electrical life test**

(UL lamp load test TV-5)  
Tested sample: LK1aF-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**



**NOTES**

**1. Cleaning**

This relay is not the sealed type, so it cannot be immersion cleaned. Be careful that flux does not overflow onto the PC board or penetrate inside the relay.

**2. Soldering**

We recommend the following soldering conditions.

- 1) Automatic soldering
  - \* Preheating: 100°C 212°F, within 2 mins (PC board solder surface)
  - \* Soldering: 260°C 500°F, within 5 s

**2) Hand soldering**

- \* Iron tip temperature: 280 to 300°C 536 to 571°F
- \* Soldering iron: 30 to 60W
- \* Soldering time: Within 3 s

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

单击下面可查看定价，库存，交付和生命周期等信息

[>>Panasonic\(松下\)](#)