

New



Compliance with RoHS Directive

FEATURES

1. Contact gap: 1 mm **.039 inch**
2. Wide lineup of 3 types available
 - 1) 10A, 1 mm contact gap type
 - 2) 16A, 1 mm contact gap type
 - 3) 16 A standard type
3. **High insulation resistance**
 - 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
4. **High noise immunity**

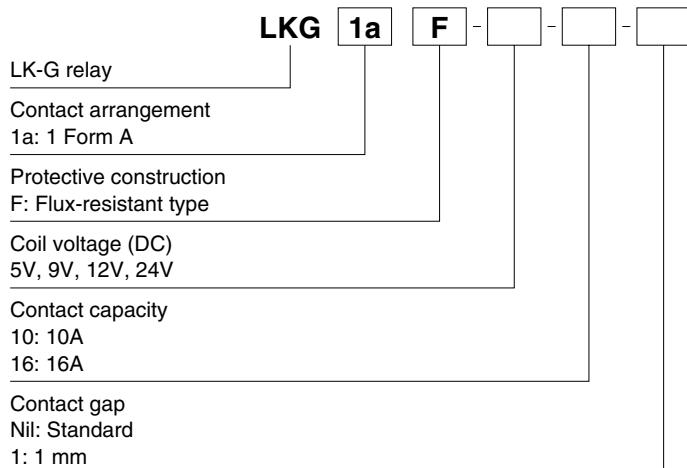
High noise immunity realized by the card separation structure between contact and coil
5. **Conforms to the various safety standards**

UL, C-UL and TÜV approved

TYPICAL APPLICATIONS

1. Audio visual equipment
2. HA equipment
3. Home appliances
4. Office equipment

ORDERING INFORMATION



LK-G

TYPES

Contact arrangement	Nominal coil voltage	Part No.		
		10A, 1 mm contact gap type	16A, 1 mm contact gap type	16 A standard type
1 Form A	5V DC	LKG1aF-5V-10-1	LKG1aF-5V-16-1	LKG1aF-5V-16
	9V DC	LKG1aF-9V-10-1	LKG1aF-9V-16-1	LKG1aF-9V-16
	12V DC	LKG1aF-12V-10-1	LKG1aF-12V-16-1	LKG1aF-12V-16
	24V DC	LKG1aF-24V-10-1	LKG1aF-24V-16-1	LKG1aF-24V-16

Standard packing: Carton: 100 pcs.; Case: 500 pcs.

RATING

1. Coil data

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power	Max. allowable voltage (at 20°C 68°F)
5V DC	75%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	106.4mA	47Ω	530mW	130%V of nominal voltage
9V DC			58.8mA	153Ω		
12V DC			44.2mA	272Ω		
24V DC			22.1mA	1,087Ω		

2. Specifications

Characteristics	Item	Specifications				
		10A, 1 mm contact gap type	16A, 1 mm contact gap type	16 A standard type		
Contact	Arrangement	1 Form A				
	Initial contact resistance, max.	Max. 100 mΩ (By voltage drop 6 V DC 1A)				
	Contact material	AgSnO ₂ type				
Rating	Nominal switching capacity (resistive load)	10A 277V AC	16A 277V AC			
	Max. switching power (resistive load)	2,770VA	4,432VA			
	Max. switching voltage	277V AC	277V AC			
	Max. switching current	10A (AC)	16A (AC)			
	Min. switching capacity*1	100mA 5V DC				
Electrical characteristics	Contact gap	Min. 1 mm .039 inch				
	Insulation resistance (Initial)	Min. 1,000MΩ (at 500V DC)				
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1 min. (Detection current: 10 mA)			
		Between contact and coil	4,000 Vrms for 1 min. (Detection current: 10 mA)			
	Temperature rise		Max. 45°C 113°F (By resistive method, nominal voltage applied to the coil; contact carrying current: 10A, at 70°C 158°F)	Max. 45°C 113°F (By resistive method, nominal voltage applied to the coil; contact carrying current: 16A, at 70°C 158°F)		
	Surge breakdown voltage*2 (Between contact and coil)		10,000 V (initial)			
	Operate time (at nominal voltage) (at 20°C 68°F)		Max. 15 ms (excluding contact bounce time.)			
	Release time (at nominal voltage) (at 20°C 68°F)		Max. 20 ms (excluding contact bounce time.) (with diode)			
Mechanical characteristics	Shock resistance	Functional	Min. 200 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)			
		Destructive	Min. 1,000 m/s ² (Half-wave pulse of sine wave: 6 ms.)			
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1.5 mm (Detection time: 10μs.)			
		Destructive	10 to 55 Hz at double amplitude of 1.5 mm			
Expected life	Mechanical	Min. 2×10 ⁶ (at 180 cpm)				
	Electrical	Min. 10×10 ⁴ (at 6 cpm) (with diode)	Min. 5×10 ⁴ (at 6 cpm) (with diode)			
Conditions	Conditions for operation, transport and storage*3		Ambient temperature: -40°C to +70°C -40°F to +158°F; Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature); Air pressure: 86 to 106 kPa			
	Max. operating speed		6 cpm (at rated load)			
Unit weight	Approx. 12 g .42 oz					

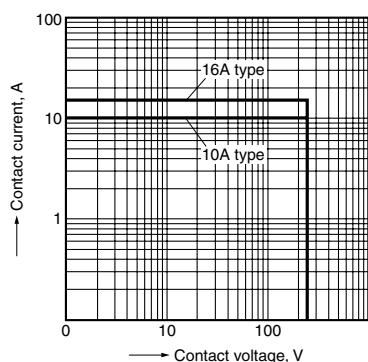
Notes: *1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

*2 Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

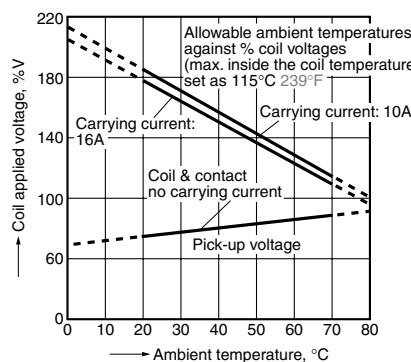
*3 The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to 1. Usage, transport and storage conditions in NOTES.

REFERENCE DATA

1. Max. switching power (AC resistive load)



2. Ambient temperature characteristics and coil applied voltage



3-(1). Electrical life test (10A type)

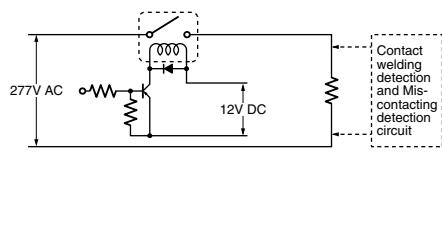
Sample: LKG1aF-12V-10-1, 6 pcs.

Operation frequency: 6 times/min.

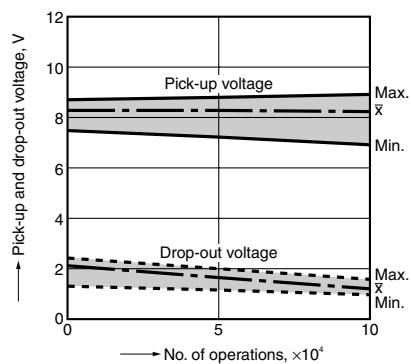
(ON/OFF = 1s: 9s)

Ambient temperature: 20°C 68°F

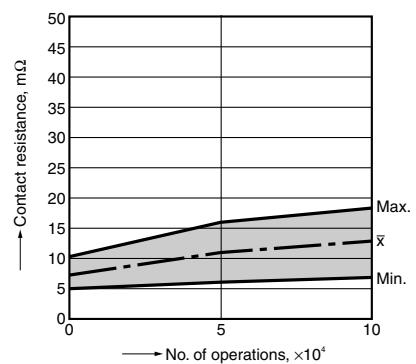
Circuit:



Change of pick-up and drop-out voltage



Change of contact resistance



3-(2). Electrical life test (16A type)

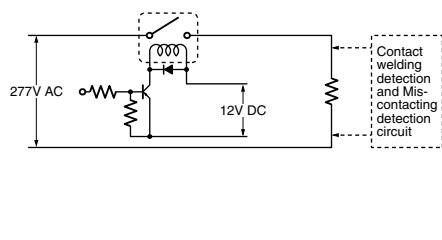
Sample: LKG1aF-12V-16-1, 6 pcs.

Operation frequency: 6 times/min.

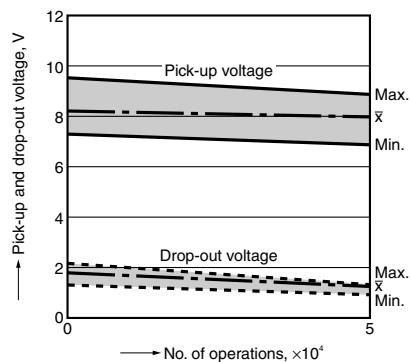
(ON/OFF = 1s: 9s)

Ambient temperature: 20°C 68°F

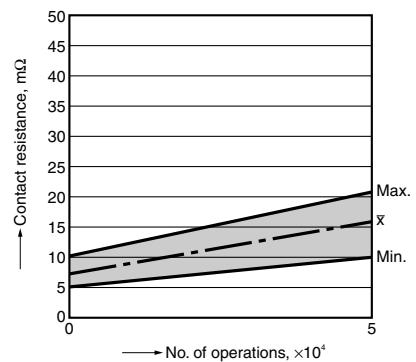
Circuit:

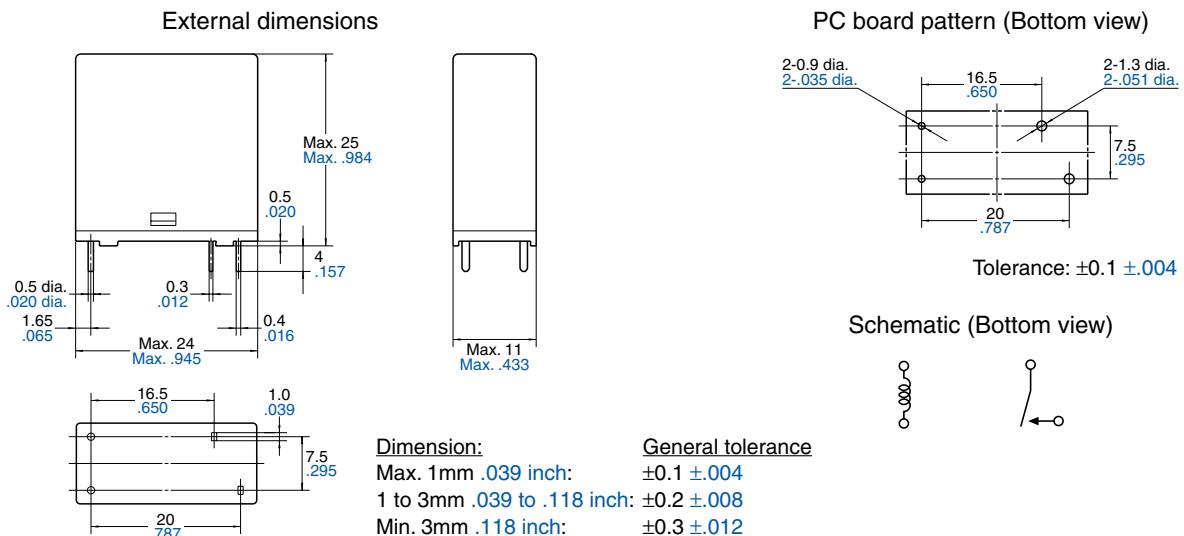


Change of pick-up and drop-out voltage



Change of contact resistance





NOTES

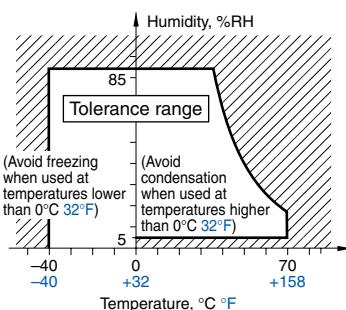
1. Usage, transport and storage conditions

1) Temperature:

-40 to +70°C **-40 to +158°F**

2) Humidity: 5 to 85% RH
(Avoid freezing and condensation.)
The humidity range varies with the temperature. Use within the range indicated in the graph below.

3) Atmospheric pressure: 86 to 106 kPa
Temperature and humidity range for usage, transport, and storage



4) Condensation

Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.

5) Freezing

Condensation or other moisture may freeze on the relay when the temperatures is lower than 0°C **32°F**. This causes problems such as sticking of movable parts or operational time lags.

6) Low temperature, low humidity environments

The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

2. Solder and cleaning conditions

1) Please obey the following conditions when soldering automatically.

(1) Preheating: Within 120°C **248°F** (solder surface terminal portion) and within 120 seconds

(2) Soldering iron: **260°C $\pm 5^\circ\text{C}$** **500°F $\pm 41^\circ\text{F}$** (solder temperature) and within 6 seconds (soldering time)

2) Since this is not a sealed type relay, do not clean it as is. Also, be careful not to allow flux to overflow above the PC board or enter the inside of the relay.

3. Certification

1) This relay is UL and C-UL certified.
2) This relay is certified by TÜV as an electromagnetic relay that complies with VDE0435.

The terminals of this relay can only be connected with solder.

4. Others

1) For precautions regarding use and explanations of technical terminology, please refer to "Relay Technical Data Book".

2) To ensure good operation, please keep the voltage on the coil ends to $\pm 5\%$ (at 20°C **68°F**) of the rated coil operation voltage. Also, please be aware that the pick-up voltage and drop-out voltage may change depending on the temperature and conditions of use.

3) Keep the ripple rate of the nominal coil voltage below 5%.

4) The cycle lifetime is defined under the standard test condition specified in the JIS C 5442 standard (temperature 15 to 35°C **59 to 95°F**, humidity 25 to 75%).

The cycle life time is based on the condition that a diode is connected in parallel with the coil. The cycle life time

may be different if no diode was connected to the coil.

Check this with the real device as it is affected by coil driving circuit, load type, activation frequency, activation phase, ambient conditions and other factors. Also, be especially careful of loads such as those listed below.

(1) When used for AC load-operating and the operating phase is synchronous. Rocking and fusing can easily occur due to contact shifting.

(2) Highly frequent load-operating

When highly frequent opening and closing of the relay is performed with a load that causes arcs at the contacts, nitrogen and oxygen in the air is fused by the arc energy and HNO_3 is formed. This can corrode metal materials.

Three countermeasures for these are listed here.

- Incorporate an arc-extinguishing circuit.
- Lower the operating frequency
- Lower the ambient humidity

5) Heat, smoke, and even a fire may occur if the relay is used in conditions outside of the allowable ranges for the coil ratings, contact ratings, operating cycle lifetime, and other specifications. Therefore, do not use the relay if these ratings are exceeded.

6) If the relay has been dropped, the appearance and characteristics should always be checked before use.

7) Incorrect wiring may cause unexpected events or the generation of heat or flames.