## Panasonic ideas for life



RoHS compliant

1a 10A TV-5 rated power relays

## LK-P RELAYS

## FEATURES

1. High switching capacity: 10 A 277V AC
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 IEC60065)
2) Surge withstand voltage between contact and coil: 10,000 V
3. Popular terminal pitch in AV equipment field
4. Space-saving slim type

Base area: Width $11 \times$ Length 24 mm
Width $.433 \times$ Length .945 inch
5. Conforms to the various safety standards
UL, CSA, VDE, TÜV and SEMKO approved

TYPICAL APPLICATIONS

- Audio visual equipment

TVs, VTRs

- Office equipment

LBP, CRT

- Home appliances

Refrigerator, Air conditioner

## ORDERING INFORMATION



Notes: Certified by UL, CSA, TÜV and SEMKO
VDE approved type is available. Please consult us for details.

## TYPES

| Contact arrangement | Nominal coil voltage | Part No. |
| :---: | :---: | :---: |
| 1 Form A | 5 V DC | LKP1aF-5V |
|  | 9 V DC | LKP1aF-9V |
|  | 12 V DC | LKP1aF-12V |
|  | 24 V DC | LKP1aF-24V |

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

## RATING

| Nominal coil voltage | Pick-up voltage (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) | Drop-out voltage (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) | $\begin{gathered} \text { Nominal operating } \\ \text { current } \\ {[ \pm 10 \%]\left(\text { at } 20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}\right)} \end{gathered}$ | $\begin{gathered} \text { Coil resistance } \\ {[ \pm 10 \%]\left(\text { at } 20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}\right)} \end{gathered}$ | Nominal operating power | Max. applied voltage (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5V DC | $70 \% \mathrm{~V}$ or less of nominal voltage (Initial) | $10 \% \mathrm{~V}$ or more of nominal voltage (Initial) | 106.4 mA | $47 \Omega$ | 530 mW | 6.5 V DC |
| 9V DC |  |  | 58.8 mA | $153 \Omega$ |  | 11.7V DC |
| 12 V D |  |  | 44.2 mA | $272 \Omega$ |  | 15.6V DC |
| 24V DC |  |  | 22.1 mA | 1,087 $\Omega$ |  | 31.2V DC |

## 2. Specifications

| Characteristics | Item |  | Specifications |
| :---: | :---: | :---: | :---: |
| Contact | Arrangement |  | 1 Form A |
|  | Contact resistance (Initial) |  | Max. $100 \mathrm{~m} \Omega$ (By voltage drop 6 V DC 1A) |
|  | Contact material |  | $\mathrm{AgSnO}_{2}$ type |
| Rating | Nominal switching capacity (resistive load) |  | 10A 277V AC, 5A 30V DC |
|  | Max. switching power (resistive load) |  | 2,770VA, 150W |
|  | Max. switching voltage |  | 277V AC, 30V DC |
|  | Max. switching current |  | 10A (AC), 5A (DC) |
|  | Min. switching capacity (reference value)*1 |  | $100 \mathrm{~mA}, 5 \mathrm{~V}$ DC |
| Electrical characteristics | Insulation resistance (Initial) |  | Min. 1,000M $\Omega$ (at 500V DC) Measurement at same location as "Breakdown voltage" section. |
|  | Breakdown voltage (Initial) | Between open contacts | $1,000 \mathrm{Vrms}$ for 1 min . (Detection current: 10 mA ) |
|  |  | Between contact and coil | $4,000 \mathrm{Vrms}$ for 1 min . (Detection current: 10 mA ) |
|  | Temperature rise (coil) |  | Max. $45^{\circ} \mathrm{C} 113^{\circ} \mathrm{F}$ (By resistive method, nominal coil voltage applied to the coil; contact carrying current: 10 A , at $70^{\circ} \mathrm{C} 158^{\circ} \mathrm{F}$ ) |
|  | Surge breakdown voltage*2 (Between contact and coil) (Initial) |  | 10,000 V |
|  | Operate time (at nominal voltage) (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) (Initial) |  | Max. 15 ms (excluding contact bounce time.) |
|  | Release time (at nominal voltage) (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) (Initial) |  | Max. 5 ms (excluding contact bounce time) (Without diode) |
| Mechanical characteristics | Shock resistance | Functional | $200 \mathrm{~m} / \mathrm{s}^{2}$ (Half-wave pulse of sine wave: 11 ms ; detection time: $10 \mu \mathrm{~s}$. ) |
|  |  | Destructive | $1,000 \mathrm{~m} / \mathrm{s}^{2}$ (Half-wave pulse of sine wave: 6 ms .) |
|  | Vibration resistance | Functional | 10 to 55 Hz at double amplitude of 1.5 mm (Detection time: $10 \mu \mathrm{~s}$.) |
|  |  | Destructive | 10 to 55 Hz at double amplitude of 1.5 mm |
| Expected life | Mechanical (at 180 times/min.) |  | Min. $2 \times 10^{6}$ |
|  | Electrical |  | Min. $10^{5}$ (ON/OFF $=1.5 \mathrm{~s}: 1.5 \mathrm{~s}$ at rated load) |
| Conditions | Conditions for operation, transport and storage ${ }^{* 3}$ |  | Ambient temperature: $-40^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}-40^{\circ} \mathrm{F}$ to $+158^{\circ} \mathrm{F}$, <br> Humidity: 5 to $85 \%$ R.H. (Not freezing and condensing at low temperature), <br> Air pressure: 86 to 106 kPa |
|  | Max. operating speed |  | 20 times/min. (at nominal switching capacity) |
| Unit weight |  |  | Approx. 12 g .42 oz |

* Specifications will vary with foreign standards certification ratings.

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 $\pm 1.2 \times 50 \mu \mathrm{~s}$ 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 Usage, transport and storage conditions in NOTES.

## REFERENCE DATA


2. Coil temperature rise

Sample: LKP1aF-12V, 6 pcs. Point measured: coil inside Contact current: $5 \mathrm{~A}, 10 \mathrm{~A}$

3. Ambient temperature characteristics and coil applied voltage
Contact current: 10 A

4. Life curve

Operation frequency: 20 times/min.
(ON/OFF = $1.5 \mathrm{~s}: 1.5 \mathrm{~s}$ )
Ambient temperature: room temperature

5. Electrical life test
(10 A 277 V AC, resistive load)
Sample: LKP1aF-12V, 6 pcs.
Operation frequency: 20 times $/ \mathrm{min}$.
(ON/OFF = $1.5 \mathrm{~s}: 1.5 \mathrm{~s}$ )
Ambient temperature: $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$
Circuit:


Change of pick-up and drop-out voltage


Change of contact resistance


DIMENSIONS (mm inch)
CAD Data
The CAD data of the products with
CAD Data
mark can be downloaded from: http://industrial.panasonic.com/ac/e/




Dimension:
Less than 1 mm .039inch:
Min. 1mm .039inch less than 3 mm .118 inch: $\pm 0.2+.008$
Min. 3mm . 118 inch:

PC board pattern (Bottom view)


Tolerance: $\pm 0.1 \pm .004$

Schematic (Bottom view)


General tolerance
$\pm 0.1 \pm .004$
$\pm 0.2 \pm .008$
$\pm 0.3 \pm .012$

## SAFETY STANDARDS

| UL/C-UL (Recognized) |  | CSA (Certified) |  | VDE (Certified) |  | TV rating (UL/CSA) |  | TÜV (Cerrified) |  | 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 | $\begin{aligned} & \text { 10A } 277 \mathrm{~V} \text { AC } \\ & 5 \mathrm{~A} 30 \mathrm{~V} \text { D } \end{aligned}$ | LR26550 etc. | $\begin{aligned} & \text { 10A } 277 \mathrm{~V} \text { AC } \\ & \text { 5A 30V DC } \end{aligned}$ | 40014390 | 10A 250V AC ( $\cos \phi=1.0)$ | UL E43149 CSA LR26550 | TV-5 | $\begin{aligned} & \text { B } 1105 \\ & 13461299 \end{aligned}$ | $\begin{aligned} & 10 \mathrm{~A} 250 \mathrm{~V} \text { AC }(\cos \phi=1.0) \\ & 5 \mathrm{~A} 30 \mathrm{~V} \text { DC (0ms) } \end{aligned}$ | 807779 | 3/100A 250V AC 5/40A 250V AC 10A 250V DC |

## For Cautions for Use.

