## 1 Form A 5A slim power relay complies with IEC61010 <br> PA-N RELAYS reinforced insulation

## FEATURES

1. High density mounting
$5 \mathrm{~mm}(\mathrm{~W}) \times 20 \mathrm{~mm}(\mathrm{~L}) \times 12.5 \mathrm{~mm}(\mathrm{H})$
.197 inch $(\mathrm{W}) \times .787$ inch $(\mathrm{L}) \times$
492inch(H)
2. Low operating power

Nominal operating power: 110 mW
3. Complies with IEC61010 reinforced insulation standards
4. Long Insulation distance

- Clearance: 5.29 mm .208 inch Creepage distance: 5.35 mm .211inch (Between contact and coil)
-3,000 V breakdown voltage and
$6,000 \mathrm{~V}$ surge breakdown voltage

5. Complies with Standard for Hazardous Location (ANSI/ISA 12.12.01)

## TYPICAL APPLICATIONS

1. Output relays for programmable controllers and temperature controllers
2. Industrial equipment, office equipment
3. Measuring devices and test equipment

## ORDERING INFORMATION



## TYPES

| Contact arrangement | Nominal coil voltage | Part No. |
| :---: | :---: | :---: |
| 1 Form A | 3 V DC | APAN3103 |
|  | 4.5 V DC | APAN314H |
|  | 5 V DC | APAN3105 |
|  | 6 V DC | APAN3106 |
|  | 9 V DC | APAN3109 |
|  | 12 V DC | APAN3112 |
|  | 18 V DC | APAN3118 |
|  | 24 V DC | APAN3124 |

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## RATING

## 1. Coil data

| Nominal coil voltage | Pick-up voltage (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) | Drop-out voltage (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) | $\begin{gathered} \text { Nominal operating } \\ \text { current } \\ {[ \pm 10 \%]\left(\text { at } 20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}\right. \text { ) }} \end{gathered}$ | Coil resistance $[ \pm 10 \%]\left(\text { at } 20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}\right)$ | Nominal operating power | Max. applied voltage (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 3 V DC | $70 \% \mathrm{~V}$ or less of nominal voltage* (Initial) | $5 \% \mathrm{~V}$ or more of nominal voltage* (Initial) | 36.7 mA | $82 \Omega$ | 110 mW | $120 \% \mathrm{~V}$ of nominal voltage |
| 4.5 V DC |  |  | 24.4 mA | $184 \Omega$ |  |  |
| 5 V DC |  |  | 22.0 mA | $227 \Omega$ |  |  |
| 6 V DC |  |  | 18.3 mA | $327 \Omega$ |  |  |
| 9 V DC |  |  | 12.2 mA | $736 \Omega$ |  |  |
| 12 V DC |  |  | 9.2 mA | 1,309 $\Omega$ |  |  |
| 18 V DC |  |  | 6.1 mA | 2,945 $\Omega$ |  |  |
| 24 V DC |  |  | 4.6 mA | 5,236 $\Omega$ |  |  |

Note: *Pulse drive (JIS C 5442)

## 2. Specifications

| Characteristics | Item |  | Specifications |
| :---: | :---: | :---: | :---: |
| Contact | Arrangement |  | 1 Form A (Bifurcated) |
|  | Contact resistance (Initial) |  | Max. $30 \mathrm{~m} \Omega$ (By voltage drop 6 V DC 1A) |
|  | Contact material |  | AgNi type + Au |
| Rating | Nominal switching capacity (resistive load) |  | 5 A 250 V AC, 5 A 30 V DC |
|  | Max. switching power (resistive load) |  | 1,250 VA, 150 W |
|  | Max. switching voltage |  | 250 V (AC), 110 V (DC) (0.4 A) |
|  | Max. switching current |  | 5 A (AC, DC) |
|  | Nominal operating power |  | 110 mW |
|  | Min. switching capacity (Reference value)* |  | 1 mA 5 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 | $3,000 \mathrm{Vrms}$ for 1 min . (Detection current: 10mA.) |
|  | Surge breakdown voltage (Initial) (Between contacts and coil)*2 |  | 6,000 V |
|  | Operate time (at nominal voltage) (at $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ ) (Initial) |  | Max. 10 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 and without diode) |
| Mechanical characteristics | Shock resistance | Functional | Min. $147 \mathrm{~m} / \mathrm{s}^{2}$ (Half-wave pulse of sine wave: 11 ms ; detection time: $10 \mu \mathrm{~s}$.) |
|  |  | Destructive | Min. $980 \mathrm{~m} / \mathrm{s}^{2}$ (Half-wave pulse of sine wave: 6 ms .) |
|  | Vibration resistance | Functional | 10 to 55 Hz at double amplitude of 2.5 mm (Detection time: $10 \mu \mathrm{~s}$.) |
|  |  | Destructive | 10 to 55 Hz at double amplitude of 3.5 mm |
| Expected life | Mechanical |  | Min. $2 \times 10^{7}$ (at 180 times/min.) |
|  | Electrical |  | Min. $10^{5}$ (3 A $250 \mathrm{~V} \mathrm{AC}, 30 \mathrm{~V} \mathrm{DC} ,\mathrm{resistive} \mathrm{load)}$ Min. $5 \times 10^{4}$ (5 A $250 \mathrm{~V} \mathrm{AC}, 30 \mathrm{~V}$ DC, resistive load) (at 20 times $/ \mathrm{min}$.) ${ }^{* 4}$ |
| Conditions | Conditions for operation, transport and storage ${ }^{* 3}$ |  | Ambient temperature: $-40^{\circ} \mathrm{C}$ to $90^{\circ} \mathrm{C}-40^{\circ} \mathrm{F}$ to $194^{\circ} \mathrm{F}$; <br> Humidity: 5 to $85 \%$ R.H. (Not freezing and condensing at low temperature) |
|  | Max. operating speed |  | 20 times/min. (at nominal switching capacity)*4 |
|  | Unit weight |  | Approx. 3 g .15 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 $\pm 1.2 \times 50 \mu$ 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.
*4. Operating frequency of 5 A 250 V AC is 6 times $/ \mathrm{min}$. ( $\mathrm{ON}: \mathrm{OFF}=1 \mathrm{~s}: 9 \mathrm{~s}$ )

## REFERENCE DATA

1. Max. switching capacity

2. Operate \& release time

Tested sample: APAN3124, 20 pcs.
Measured direction: Upright


5. Ambient temperature characteristics Tested sample: APAN3124, 6 pcs.

3. Coil temperature rise

Tested sample: APAN3124, 6 pcs.
Measured portion: Inside the coil
Ambient temperature: $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}, 90^{\circ} \mathrm{C} 194^{\circ} \mathrm{F}$ (No contact current)

6. Malfunctional shock

Tested sample: APAN3124, 6 pcs.


DIMENSIONS (mm inch)
The CAD data of the products with

## External dimensions




General tolerance: $\pm 0.3 \pm .012$

PC board pattern (Bottom view)


Tolerance: $\pm 0.1 \pm .004$
Schematic (Bottom view)


## SAFETY STANDARDS

| UL/C-UL (Recognized) |  |  |  | TÜV (Certified) |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| File No. | Contact ratings | Temp. | Cycles | File No. | Contact ratings | Temp. | Cycles |
| E43149 | 5 A 250 V AC Resistive <br> 5 A 250 V AC Resistive <br> 5 A 30 V DC General use <br> 5 A 30V DC, 3 A 250 V AC General use <br> 3 A 250 V AC Resistive <br> 3 A 30 V DC General use <br> B300, R300 Pilot duty | $40^{\circ} \mathrm{C} 104^{\circ} \mathrm{F}$ $90^{\circ} \mathrm{C} 194^{\circ} \mathrm{F}$ $40^{\circ} \mathrm{C} 104^{\circ} \mathrm{F}$ $90^{\circ} \mathrm{C} 194^{\circ} \mathrm{F}$ $40^{\circ} \mathrm{C} 104^{\circ} \mathrm{F}$ $40^{\circ} \mathrm{C} 104^{\circ} \mathrm{F}$ $40^{\circ} \mathrm{C} 104^{\circ} \mathrm{F}$ | $5 \times 10^{4}$ $10^{4}$ $5 \times 10^{4}$ $10^{4}$ $10^{5}$ $10^{5}$ - | B16 0113461348 | $\begin{aligned} & \text { 5 A } 250 \vee \mathrm{VC}(\cos \phi=1.0) \\ & 5 \mathrm{~A} 250 \mathrm{VAC}(\cos \phi=1.0) \\ & 5 \mathrm{~A} 30 \vee \mathrm{DC}(0 \mathrm{~ms}) \\ & 5 \mathrm{~A} 30 \vee \mathrm{DC}(0 \mathrm{~ms}) \\ & 3 \text { A } 250 \vee \mathrm{VC}(\cos \phi=1.0) \\ & 3 \text { A } 30 \vee \mathrm{DC}(0 \mathrm{~ms}) \end{aligned}$ | $\begin{aligned} & 40^{\circ} \mathrm{C} 104^{\circ} \mathrm{F} \\ & 90^{\circ} \mathrm{C} 194^{\circ} \mathrm{F} \\ & 40^{\circ} \mathrm{C} 104^{\circ} \mathrm{F} \\ & 90^{\circ} \mathrm{C} 194^{\circ} \mathrm{F} \\ & 40^{\circ} \mathrm{C} 104^{\circ} \mathrm{F} \\ & 40^{\circ} \mathrm{F} \end{aligned}$ | $\begin{gathered} 5 \times 10^{4} \\ 10^{4} \\ 5 \times 10^{4} \\ 10^{4} \\ 10^{5} \\ 10^{5} \end{gathered}$ |
| E479891 | Class I, Division 2, Groups A, B, C, D Hazardous Location (ANSI/ISA 12.12.01-2015, CAN/CSA C22.2 No.213-15) |  |  |  |  |  |  |

Insulation distance (between contact and coil)

- UL/C-UL: Clearance distance: 5.29 mm .208 inch, Creepage distance: 5.35 mm .211 inch
- TÜV: Clearance distance: 5.29 mm .208 inch, Creepage distance: 5.35 mm .211 inch


## NOTES

1. For cautions for use, please read "GENERAL APPLICATION GUIDELINES".
2. If it includes ripple, the ripple factor should be less than $5 \%$.
3. Specification values for pick-up and drop-out voltages are for the relay mounting with its terminals below.
Tested sample: APAN3124, 6 pcs.
Ambient temperature: $20^{\circ} \mathrm{C} 68^{\circ} \mathrm{F}$ Measured direction: 6 direction

4. When mounting the relays within 1 mm .039 inch, please notice the condition below.
1) Mount the relays in the same direction.

2) Coil terminals (Terminal No. 1 \& 2) polarity should be arranged in the same direction.


[^0]:    Standard packing: Tube: 25 pcs.; Case: 1,000 pcs.

    * Terminal sockets available.

