

Panasonic
ideas for life

THE SLIM POWER RELAY

PE RELAYS (APE)



Compliance with RoHS Directive

FEATURES

1. 5 mm .197 inch width allows high density mounting.

Space saved with 5 mm .197 inch slim type with 28 mm 1.102 inch length. Allows high density mounting and enables making of compact devices.

2. Satisfies insulation distance standard (VDE0700: household devices).

Maintains clearance and creepage distance of 8 mm. Complies with EN60335 and VDE0700.

3. High capacity of 6A.

Supports 6A 250 V AC nominal switching capacity (resistive load) and high capacity loads.

4. 1 Form A and 1 Form C contact arrangements available.

1 Form A and 1 Form C contact arrangements and a rich variation let you select the number of poles needed for your application.

(Please inquire regarding 1 Form B.)

5. 4,000 V high breakdown voltage and 6,000 V high surge breakdown voltage.

Controller malfunction due to surges and noise is prevented thanks to breakdown voltage of 4,000 Vrms for 1 min. between contacts and coil, and 6,000 V surge breakdown voltage between contacts and coil.

6. Sealed construction allows automatic washing.

7. Complies with all safety standards.

Complies with Electrical Appliance and Material Safety Law. UL, C-UL, VDE, SEMKO and SEV certified.

TYPICAL APPLICATIONS

1. Interface relays for programmable controllers
2. Output relays for measuring equipment, timers, counters and temperature controllers
3. Industrial equipment, office equipment
4. House-hold appliances for Europe

ORDERING INFORMATION

APE 0

Contact arrangement

- 1: 1 Form A
- 3: 1 Form C

Contact type

- 0: Single contact

Contact material

- 0: Standard contact
- 1: Standard contact/Au-plated

Coil voltage (DC)

- 4H: 4.5 V 06: 6 V 12: 12 V 18: 18 V 24: 24 V 48: 48 V

Note: UL/C-UL/VDE/SEMKO approved type is standard.

TYPES

Contact arrangement	Nominal coil voltage	Part No.
1 Form A (without Au-plated)	4.5V DC	APE1004H
	6V DC	APE10006
	12V DC	APE10012
	18V DC	APE10018
	24V DC	APE10024
	48V DC	APE10048
1 Form A (with Au-plated)	4.5V DC	APE1014H
	6V DC	APE10106
	12V DC	APE10112
	18V DC	APE10118
	24V DC	APE10124
	48V DC	APE10148
1 Form C (without Au-plated)	4.5V DC	APE3004H
	6V DC	APE30006
	12V DC	APE30012
	18V DC	APE30018
	24V DC	APE30024
	48V DC	APE30048
1 Form C (with Au-plated)	4.5V DC	APE3014H
	6V DC	APE30106
	12V DC	APE30112
	18V DC	APE30118
	24V DC	APE30124
	48V DC	APE30148

Standard packing: Carton: 20 pcs.; Case: 1,000 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)
4.5V DC	66%V or less of nominal voltage (Initial)	5%V or more of nominal voltage (Initial)	38mA	119Ω	170mW	120%V of nominal voltage
6V DC			28mA	212Ω		
12V DC			14mA	847Ω		
18V DC			9mA	1,906Ω		
24V DC			7mA	3,388Ω		
48V DC			5mA	10,618Ω	217mW	

PE (APE)

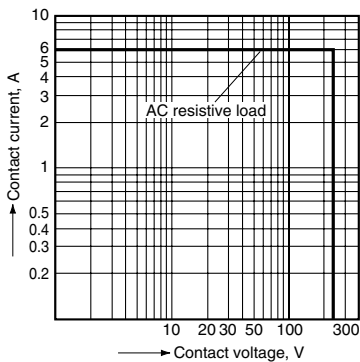
2. Specifications

Characteristics	Item	Specifications	
Contact	Arrangement	1 Form A, 1 Form C	
	Initial contact resistance, max.	Max. 100 mΩ (By voltage drop 6 V DC 1A) Max. 30 mΩ (By voltage drop 6 V DC 1A)	
Rating	Contact material	AgSnO ₂ type Au-plated AgSnO ₂ type	
	Nominal switching capacity (resistive load)	6 A 250 V AC	
	Max. switching power (resistive load)	1,500 VA	
	Max. switching voltage	250V AC	
	Max. switching current	6 A (AC)	
	Nominal operating power	170 mW (5 to 24 V DC), 217 mW (48 V DC)	
Electrical characteristics	Min. switching capacity (Reference value)*1	100 mA 5 V DC (without Au-plated), 1 mA 1 V DC (with Au-plated)	
	Insulation resistance (Initial)	Min. 1,000MΩ (at 500V DC) Measurement at same location as "Initial breakdown voltage" section.	
	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)
	Surge breakdown voltage*2	Between contact and coil	6,000 V (initial)
	Temperature rise (at 20°C 68°F)		Max. 30°C (By resistive method, nominal voltage applied to the coil; contact carrying current: 6A.)
	Operate time (at 20°C 68°F)		Max. 8 ms (approx. 5 ms) (Nominal voltage applied to the coil, excluding contact bounce time.)
	Release time (at 20°C 68°F)		Max. 4 ms (approx. 2.5 ms) (Nominal voltage applied to the coil, excluding contact bounce time.) (without diode)
Mechanical characteristics	Shock resistance	Functional	1 Form C: Min. 49 m/s ² ; 1 Form A: Min. 98 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)
		Destructive	Min. 980 m/s ² (Half-wave pulse of sine wave: 6 ms.)
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1 mm (Detection time: 10μs.)
		Destructive	10 to 55 Hz at double amplitude of 1.5 mm
Expected life	Mechanical	Min. 5×10 ⁶ (at 180 cpm)	
	Electrical	N.O.: Min. 5×10 ⁴ , N.C.: Min. 3×10 ⁴ (at 6 cpm) (at rated load)	
Conditions	Conditions for operation, transport and storage*3	Ambient temperature: -40°C to +85°C -40°F to +185°F; Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)	
	Max. operating speed (at rated load)	6 cpm	
Unit weight		Approx. 4 g .14 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 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT.

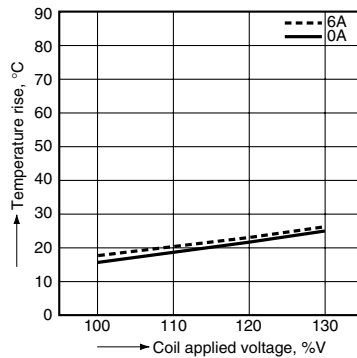
REFERENCE DATA

1. Max. switching capacity



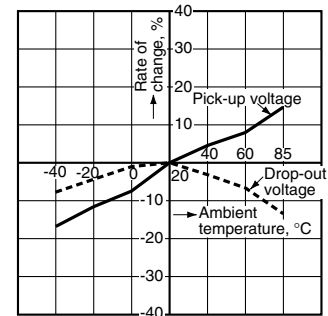
2. Coil temperature rise

Tested sample: APE30012
 Measured portion: Inside the coil
 Ambient temperature: 28°C 82°F



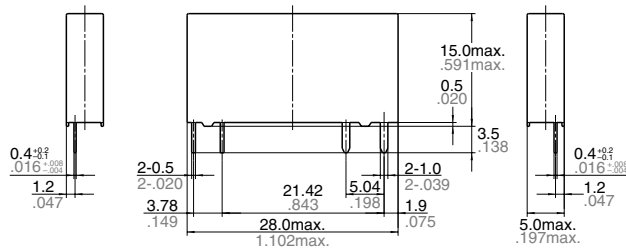
3. Ambient temperature characteristics

Tested sample: APE30012, 6 pcs.



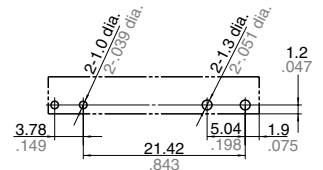
DIMENSIONS (Unit: mm inch)

1. 1 Form A type



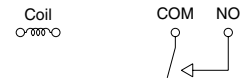
General tolerance: $\pm 0.3 \pm 0.012$

PC board pattern (Bottom view)

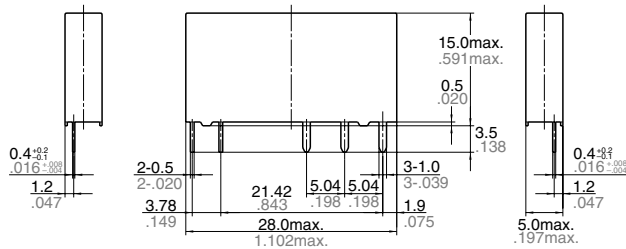


Tolerance: $\pm 0.1 \pm 0.004$

Schematic (Bottom view)

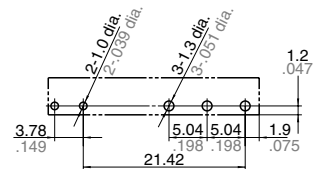


2. 1 Form C type



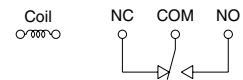
General tolerance: $\pm 0.3 \pm 0.012$

PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm 0.004$

Schematic (Bottom view)



NOTES

1. Cleaning

For automatic cleaning, the boiling method is recommended. Avoid ultrasonic cleaning which subjects the relays to high frequency vibrations, which may cause the contacts to stick. It is recommended that a fluorinated hydrocarbon or other alcoholic solvents be used.

2. Soldering

The automatic soldering shall be performed under following condition.

1) Preheating

Temperature: Max. 120°C 248°F

Time: Max. 120s

2) Soldering

Temperature: 260°C±5°C 500°F±41°F

Time: Max. 6s

3. Coil operating power

Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%. However, check it with the actual circuit since the characteristics may be slightly different.

4. Relay mounting

If, after mounting on PC boards, the relays are to be subjected to vibration during operation, use other means besides soldering to secure the relays to the PC board.

For Cautions for Use, see Relay Technical Information.