

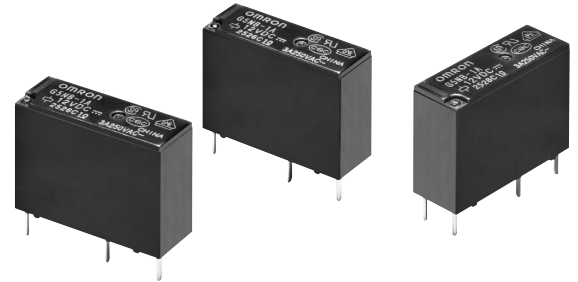
G5NB

PCB Power Relay

A Miniature Relay with 1-pole 3A/5A Switching Capability and 10 kV Impulse Withstand Voltage



- Highly efficient magnetic circuit for high sensitivity (200 mW).
- Small, yet provides 10-kV impulse withstand voltage (between coil and contacts).
- Standard model conforms to UL/CSA/VDE standards.
- Satisfies EN61010 reinforced insulation requirements.
- IEC/EN 60335-1 conformed. (-HA Model)
- IEC/EN 60079-15 conformed. (Only for G5NB-1A4, G5NB-1A4-E Model)



RoHS Compliant

Model Number Legend

G5NB-□□□-□□-□□-□□-□□
1 2 3 4 5 6 7 8

- | | | | |
|--|--|--|--|
| <p>1. Number of Poles 1 : 1-pole</p> <p>2. Contact Form A : SPST-NO (1a)</p> <p>3. Enclosure rating None : Flux protection 4 : Sealed</p> | <p>4. Classification None : Standard E : High-capacity</p> <p>5. Market Code None : General purpose HA : Home Appliance according to IEC/EN60335-1</p> | <p>6. Coil Insulation Class(UL1446) None : Class E CF : Class F</p> <p>7. Coil Holding Voltage None : Not supported PW : Supported</p> | <p>8. Packing None : Tray Packing SP : Tube Packing</p> |
|--|--|--|--|

Application Examples

- Water heaters
- Air conditioners
- Small electric appliances
- Refrigerators
- Home appliances

Ordering Information

| Terminal Shape | Market Code | Classification | Contact form | Enclosure rating | Model | Rated coil voltage | Minimum packing unit |
|----------------|-----------------|-----------------------|-----------------|------------------|---------------------------------|------------------------|-------------------------------|
| PCB terminals | General purpose | Standard | SPST-NO (1a) | Flux protection | G5NB-1A(-SP) | 5VDC 12VDC | 100 pcs/Tray (50 pcs/Tube) |
| | | | | Sealed | G5NB-1A4(-SP) | 18VDC 24VDC | |
| | | | | Flux protection | G5NB-1A-CF(-SP) | 5VDC 12VDC 24VDC | |
| | | G5NB-1A-CF-PW(-SP) | | | | | |
| | | G5NB-1A-PW(-SP) | | | | | |
| | | High-capacity | | G5NB-1A-E(-SP) | 5VDC 12VDC 18VDC 24VDC | | |
| | Sealed | | G5NB-1A4-E(-SP) | 18VDC 24VDC | | | |
| | Home Appliance | | Standard | Flux protection | G5NB-1A-HA(-SP) s | 5VDC 12VDC 24VDC | |
| | | G5NB-1A-HA-CF(-SP) | | | | | |
| | | G5NB-1A-HA-CF-PW(-SP) | | | | | |
| | | G5NB-1A-HA-PW | 12VDC 24VDC | | | | |
| | | High-capacity | | | G5NB-1A-E-HA(-SP) | | |

Note 1. When ordering, add the rated coil voltage to the model number.

Example: G5NB-1A DC5

Rated coil voltage

However, the notation of the coil voltage on the product case as well as on the packing will be marked as □□VDC.

Note 2. When ordering tape packing, add "-SP" to the model number.

Be sure since "-SP" is not part of the relay model number, it is not marked on the relay case.

■ Ratings

● Coil

| Item | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|---------------|--------------------|---------------------|--------------------------|--------------------------|---|----------------------------|
| | | | % of rated voltage | | | |
| Rated voltage | | | | | | |
| 5 VDC | 40 | 125 | 75% max. | 10% min. 10 to 31%* | Standard: 180% (at 23°C) High-capacity: 170% (at 23°C) | Approx. 200 Approx. 32* |
| 12 VDC | 16.7 | 720 | | | | |
| 18 VDC | 11.1 | 1,620 | | | | |
| 24 VDC | 8.3 | 2,880 | | | | |

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.

Note 2. The operating characteristics are measured at a coil temperature of 23°C.

Note 3. The "Max. voltage" is the maximum voltage that can be applied to the relay coil.

* These numbers are only for -PW type. Power consumption with Holding Voltage is 32mW. Please confirm the detail in page 6 Coil Voltage Reduction (Holding Voltage).

● Contacts

| Item | Load | Resistive load | |
|------------------------|------|--------------------|----------------|
| | | Standard | High-capacity |
| Contact Type | | Single | |
| Contact material | | Ag-alloy (Cd free) | |
| Rated load | | 3 A at 125 VAC | 5 A at 250 VAC |
| | | 3 A at 30 VDC | 3 A at 30 VDC |
| Rated carry current | | 3 A | 5 A |
| Max. switching voltage | | 250 VAC, 30 VDC | |
| Max. switching current | | 3 A | 5 A |

■ Characteristics

| | | |
|---|---|---|
| Contact resistance *1 | 100 mΩ max. | |
| Operate time | 10 ms max. | |
| Release time | 10 ms max. | |
| Insulation resistance *2 | 1,000 MΩ min. | |
| Dielectric strength | Between coil and contacts | 4,000 VAC, 50/60 Hz for 1 min |
| | Between contacts of the same polarity | 750 VAC, 50/60 Hz for 1 min |
| Impulse withstand voltage | Between coil and contacts | 10 kV (1.2 × 50 μs) |
| Vibration resistance | Destruction | 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) |
| | Malfunction | 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) |
| Shock resistance | Destruction | 1,000 m/s ² |
| | Malfunction | 100 m/s ² |
| Durability | Mechanical | 5,000,000 operations min. |
| | Electrical (resistive load) | Standard (G5NB-1A, -1A4) 200,000 operations at 125 VAC, 3A 200,000 operations at 30 VDC, 3A High-capacity (G5NB-1A-E, -1A4-E) 100,000 operations at 250 VAC, 5A 200,000 operations at 30 VDC, 3A (with a rated load at 1,800 operations/hour) |
| Failure rate (P level) (reference value) *3 | DC5V 10mA | |
| Ambient operating temperature *4 | -40°C to 85°C (with no icing or condensation) | |
| Ambient operating humidity | 5% to 85% | |
| Weight | Approx. 4 g | |

Note. Values in the above table are the initial values at 23°C.

*1. Measurement conditions: 5 VDC, 1 A, voltage drop method

*2. Measurement conditions: Measured at the same points as the dielectric strength using a 500 VDC ohmmeter.

*3. This value was measured at a switching frequency of 120 operations/min.

*4. Sealed (G5NB-1A4, -1A4-E): -40°C to 70°C

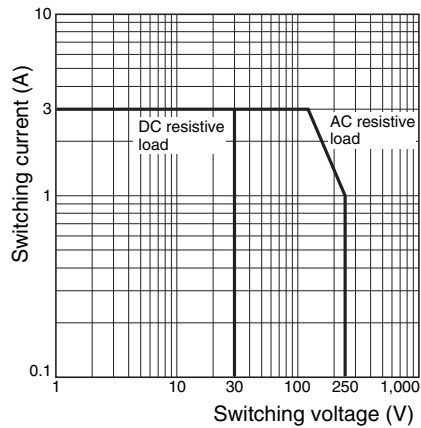
■ Actual Load Life (Reference Values)

- 120 VAC** motor and lamp load
2.5A surge and 0.5A normal:
250,000 operations min. (at 23°C)
- 160 VDC** valve load (with varistor)
0.24A:
250,000 operations min. (at 23°C)
- 140 VAC** pump load
Inrush: 5.4 A (o-p), Steady state: 1.6 A
200,000 operations min. (Ambient temperature: 23°C)
- 100 VAC** motor load
Inrush: 10.7 A (o-p), Steady state: 1.1 A
200,000 operations min. (Ambient temperature: 23°C)

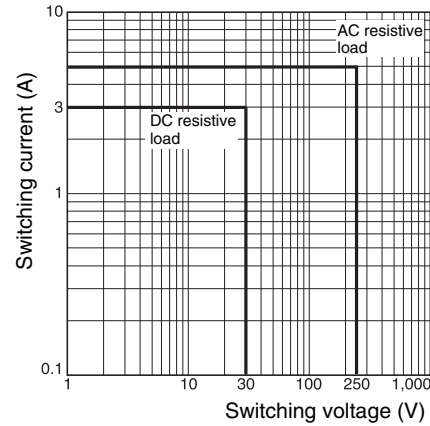
Engineering Data

Maximum Switching Capacity

Standard models

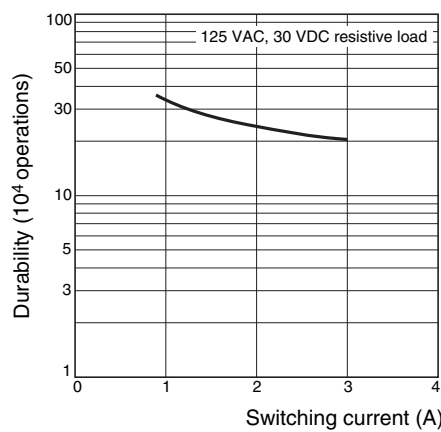


High-capacity models

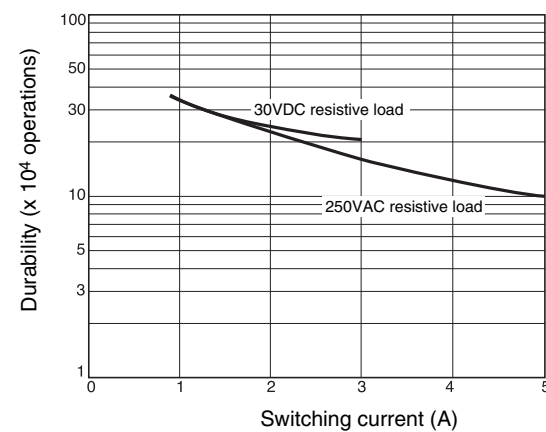


Durability

Standard models

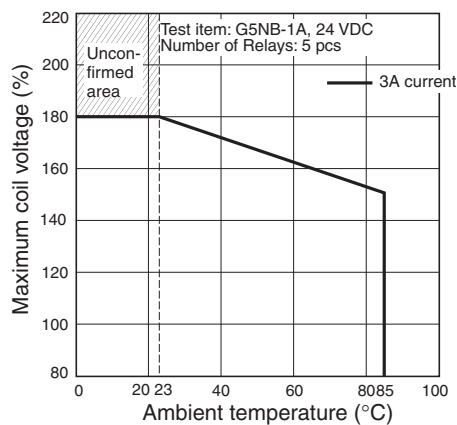


High-capacity models

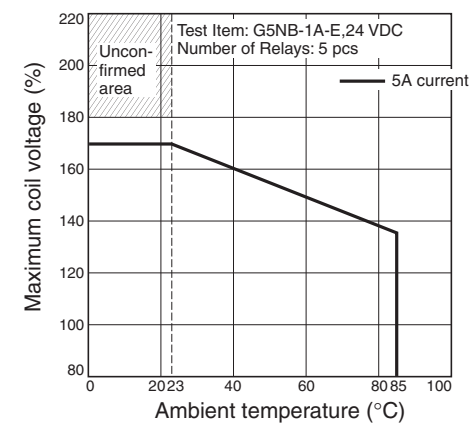


Ambient Temperature vs. Maximum Coil Voltage

Standard models



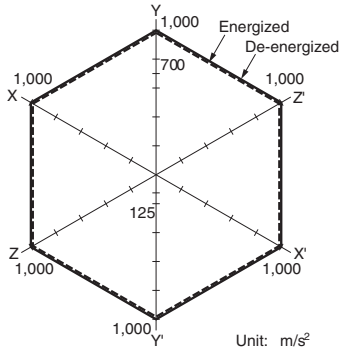
High-capacity models



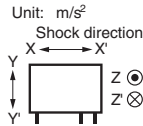
Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

● Shock malfunction

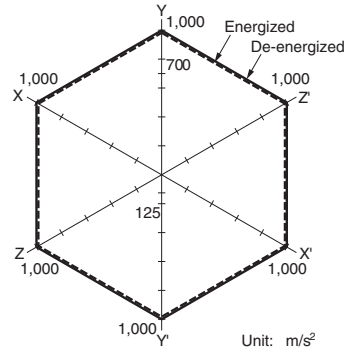
Standard models



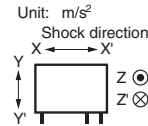
Test Item: G5NB-1A, 24VDC
 Number of Relays: 5 pcs
 Test Method: Shock is applied 3 times in 6 directions along 3 axes and the level at which shock caused malfunction is measured.
 The energized voltage is 100% of the rated voltage.
 Rating: 100 m/s²



High-capacity models



Test Item: G5NB-1A-E, 24VDC
 Number of Relays: 5 pcs
 Test Method: Shock is applied 3 times in 6 directions along 3 axes and the level at which shock caused malfunction is measured.
 The energized voltage is 100% of the rated voltage.
 Rating: 100 m/s²

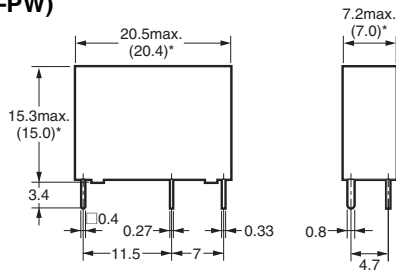
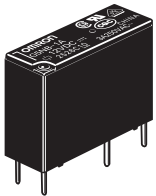


■ Dimensions

(Unit: mm)

G5NB

G5NB-1A(4)(-E)(-HA)(-CF)(-PW)

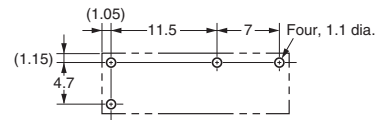


*Average value

PCB Mounting Holes

(Bottom View)

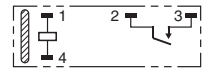
Tolerance: ±0.1 mm



Terminal Arrangement/

Internal Connections

(Bottom View)



(No coil polarity)

Approved Standards

The approval rating values for overseas standards are different from the performance values determined individually. Confirm the values before use.

●UL Recognized:  (File No. E41515)

CSA Certified:  (File No. LR31928)

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations |
|------------------------------|-----------------|--------------|---|---------------------------|
| G5NB-1A(4)(-HA)(-CF)(-PW) | SPST-NO (1a) | 5 to 24V DC | 3A 250V AC (Resistive) 85°C | 100,000 |
| | | | 3A 30V DC (Resistive) 70°C | 6,000 |
| G5NB-1A(4)-E G5NB-1A-E-HA | | | 5A 250 V AC (Resistive) 85°C 5A 30 V DC (Resistive) 70°C | 6,000 |

●EN/IEC, VDE Certified  (Certificate No. 137575)

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations |
|------------------------------|-----------------|-------------------|---|---------------------------|
| G5NB-1A(4)(-HA)(-CF)(-PW) | SPST-NO (1a) | 5, 12, 18, 24V DC | 3A 250V AC (Resistive) 85°C 3A 30V DC (Resistive) 85°C | 100,000 |
| G5NB-1A(4)-E G5NB-1A-E-HA | | | 5A 250 V AC (Resistive) 85°C 5A 30 V DC (Resistive) 85°C | 10,000 |
| | | | 3A 250V AC (Resistive) 85°C | 100,000 |

| | |
|---|---|
| Creepage distance | 6.0 mm min. |
| Clearance distance | 6.0 mm min. |
| Insulation material group | IIIa |
| Type of insulation coil-contact circuit open contact circuit | Pollution degree 2 / Reinforced (Sealed) Pollution degree 3 / Basic (Flux protection) / Reinforced (Sealed) Micro disconnection |
| Rated Insulation voltage | 250 V |
| Pollution degree | 3 |
| Rated voltage system | 250 V |
| Over voltage category | III |
| Category of protection according to IEC 61810-1 | RT II (Flux protection) / RT III (Sealed) |
| Glow wire according to IEC 60335-1 | <HA Models only> GWT 750°C min. (IEC 60695-2-11) / GWFI 850°C min. (IEC 60695-2-12) |
| Tracking resistance according to IEC 60112 | PTI 250 V min. (housing parts) |
| Flammability class according to UL94 | V-0 |

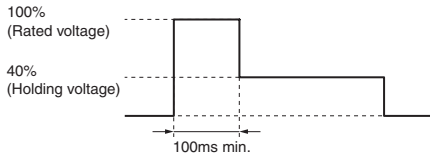
■Precautions

●Please refer to “PCB Relays Common Precautions” for correct use.

Correct Use

●Coil Voltage Reduction (Holding Voltage) after Relay Operation

- If the coil voltage is reduced to the holding voltage after Relay operation, first apply the rated voltage to the coil for at least 100 ms, as shown below.
- A voltage of at least 40% of the rated voltage is required for the coil holding voltage. Do not allow voltage fluctuations to cause the coil holding voltage to fall below this level.



| | Applied coil voltage | Coil resistance* | Power consumption |
|-----------------|----------------------|-------------------------------|-------------------|
| Rated voltage | 100% | 125Ω (5 VDC) 720Ω (12 VDC) | Approx. 200 mW |
| Holding voltage | 40% | 2880Ω (24 VDC) | Approx. 32 mW |

* The coil resistance were measured at a coil temperature of 23°C with tolerances of ± 10%.

Please check each region's Terms & Conditions by region website.

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