

# G6DN

PCB Power Relay

## SPST Slim Power Relay for 5 A switching

- Slim 5-mm width and miniature size. (20 × 5.08 × 12.5 mm)
- High switching capability 5 A (250 VAC and 30 VDC), and high contact reliability by crossbar-twin contact.
- Low power consumption 110 mW.
- Meets application standards EN61010-1 and EN61010-2-201 for reinforced insulation (CTI 600 V min. and Rated insulation voltage 300 V). (Except G6DN-1A-CF Models)
- Actualize electrical durability 100 Kops (-L type)
- Lineup of high temperature types with an ambient temperature of 105°C (-CF type)



### Model Number Legend

G6DN-□□□-□□  
1 2 3 4 5

**1. Number of Poles**

1: 1-pole

**2. Contact Form**

A: SPST-NO (1a)

**3. Enclosure Rating**

None: Fully sealed

**4. Classification**

None: Standard (E-LIFE 80 Kops)  
L: High durability type (E-LIFE 100 Kops)  
SL: General purpose

**5. Coil Insulation Class**

None: Class B  
CF: Class F (High temperature)

### Application Examples

- Programmable Controller output
- Temperature Controller
- Building Automation
- Output of control system

### Ordering Information

| Classification   | Contact form | Enclosure rating | Terminal shapes | Model      | Minimum packing unit |
|------------------|--------------|------------------|-----------------|------------|----------------------|
| Standard         | SPST-NO (1a) | Fully sealed     | PCB terminal    | G6DN-1A    | 25 pcs/ tube         |
| High durability  |              |                  |                 | G6DN-1A-L  |                      |
| General purpose  |              |                  |                 | G6DN-1A-SL | 100pcs/tray          |
| High temperature |              |                  |                 | G6DN-1A-CF |                      |

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

Example: G6DN-1A DC5

Rated coil voltage

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

Example: G6DN-1A 5VDC

Note 2. When placing an order, please specify the number in package multiples.

## ■ Ratings

### ● Coil

| Classification   | Rated voltage | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|------------------|---------------|--------------------|---------------------|--------------------------|--------------------------|------------------|------------------------|
|                  |               |                    |                     | % of rated voltage       |                          |                  |                        |
| Standard         | 4.5 VDC       | 24.4               | 184                 | 70% max. *               | 5% min.                  | 160%             | Approx. 110            |
|                  | 5 VDC         | 22.0               | 227                 |                          |                          |                  |                        |
|                  | 12 VDC        | 9.2                | 1,309               |                          |                          |                  |                        |
|                  | 24 VDC        | 4.6                | 5,236               |                          |                          |                  |                        |
| High durability  | 5 VDC         | 36.0               | 139                 |                          |                          |                  | Approx. 180            |
|                  | 12 VDC        | 15.0               | 800                 |                          |                          |                  |                        |
|                  | 24 VDC        | 7.5                | 3,200               |                          |                          |                  |                        |
| General purpose  | 5 VDC         | 22.0               | 227                 |                          |                          |                  | Approx. 110            |
|                  | 12 VDC        | 9.2                | 1,309               |                          |                          |                  |                        |
|                  | 24 VDC        | 4.6                | 5,236               |                          |                          |                  |                        |
| High temperature | 4.5 VDC       | 24.4               | 184                 |                          |                          |                  |                        |
|                  | 5 VDC         | 22.0               | 227                 |                          |                          |                  |                        |
|                  | 12 VDC        | 9.2                | 1,309               |                          |                          |                  |                        |
|                  | 24 VDC        | 4.6                | 5,236               |                          |                          |                  |                        |

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

\* Operating voltage is less than 72% when the relay is sideways and the marking is right way.

### ● Contacts

| Item                   | Classification | Standard                        |   | High temperature                |   |
|------------------------|----------------|---------------------------------|---|---------------------------------|---|
|                        |                | High durability                 | General purpose                             | High durability                 | General purpose                             |
| Load                   |                | Resistive load                  | Inductive load<br>(cos φ = 0.4)(L/R = 7 ms) | Resistive load                  | Inductive load<br>(cos φ = 0.4)(L/R = 7 ms) |
| Contact Type           |                | Cross bar twin                  |   |                                 |   |
| Contact material       |                | Ag-Alloy and Au plating *       |   |                                 |   |
| Rated load             |                | 5 A at 250 VAC<br>5 A at 30 VDC | 2 A at 250 VAC<br>2 A at 30 VDC             | 5 A at 250 VAC<br>5 A at 30 VDC | 1 A at 250 VAC<br>2 A at 30 VDC             |
| Rated carry current    |                | 5 A                             |   |                                 |   |
| Max. switching voltage |                | 277 VAC, 125 VDC                |   |                                 |   |
| Max. switching current |                | 5 A                             |   |                                 |   |

\* Au plating is applied to stationary contact.

## ■ Characteristics

|  |                                       | Standard  | High durability  | General purpose  | High temperature  |
|--|---------------------------------------|---|--|--|---|
| Contact resistance *1                          |                                       | 100 mΩ max.   |  |  |   |
| Operate time                                   |                                       | 10 ms max.  |  |  |   |
| Release time                                   |                                       | 5 ms max.   |  |  |   |
| Insulation resistance *2                       |                                       | 1,000 MΩ min. (at 500 VDC)  |  |  |   |
| Dielectric strength                            | Between coil and contacts             | 3,000 VAC, 50/60 Hz for 1 min   |  |  |   |
|  | Between contacts of the same polarity | 750 VAC, 50/60 Hz for 1 min   |  |  |   |
| Surge withstand voltage                        | Between coil and contacts             | 6 kV (1.2 × 50 μs)  |  |  |   |
| Vibration resistance                           | Destruction                           | 10 to 55 to 10 Hz, 2.5 mm single amplitude (5.0 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 <sup>2</sup>  |  |  |   |
|  | Malfunction                           | 100 m/s <sup>2</sup>  |  |  |   |
| Durability                                     | Mechanical                            | 20,000,000 operations min. (at 18,000 operations/hr)  |  |  |   |
|  | Electrical                            | 100,000 operations min.<br>(3 A at 250 VAC,<br>3 A at 30 VDC Resistive load)<br>80,000 operations min.<br>(5 A at 250 VAC,<br>5 A at 30 VDC Resistive load)<br>100,000 operations min.<br>(2 A at 250 VAC,<br>2 A at 30 VDC Inductive load) | 100,000 operations min.<br>(5 A at 250 VAC, Resistive load)<br>100,000 operations min.<br>(5 A at 30 VDC, Resistive load)<br>200,000 operations min.<br>(2 A at 250 VAC, Inductive load)<br>200,000 operations min.<br>(2 A at 30 VDC, Inductive load) | 50,000 operations min.<br>(5 A at 250 VAC, Resistive load)<br>50,000 operations min.<br>(5 A at 30 VDC, Resistive load)<br>100,000 operations min.<br>(2 A at 250 VAC, Inductive load)<br>100,000 operations min.<br>(2 A at 30 VDC, Inductive load) | 10,000 operations min.<br>(5 A at 250 VAC Resistive load 105°C)<br>100,000 operations min.<br>(3 A at 250 VAC Resistive load 105°C)<br>10,000 operations min.<br>(5 A at 30 VDC Inductive load 105°C)<br>100,000 operations min.<br>(3 A at 30 VDC Resistive load 105°C)<br>100,000 operations min.<br>(1 A at 250 VAC Inductive load 105°C)<br>100,000 operations min.<br>(2 A at 30 VDC Inductive load 105°C) |
| Failure rate (P level)<br>(reference value *3) |                                       | 0.1 mA at 0.1 VDC   |  |  |   |
| Ambient temperature                            | Operating                             | -40°C to +90°C (with no icing or condensation)  |  |  | -40°C to +105°C *4<br>(with no icing or condensation)   |
| Humidity                                       |                                       | 5% RH to 85% RH   |  |  |   |
| Weight   |                                       | Approx. 3 g   |  |  |   |

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

\*1. Values in the above table are initial values.

\*2. The contact resistance is measured with 1 A applied at 5 VDC using a fall-of-potential method.

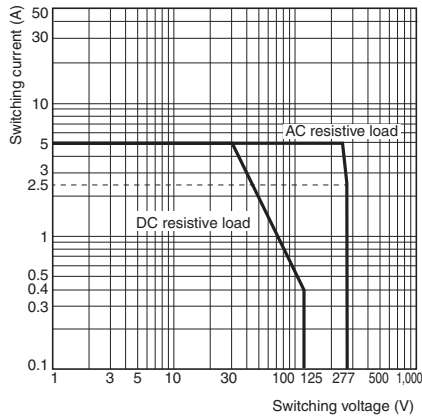
\*3. The insulation resistance is measured between coil and contacts and between contacts of the same polarity at 500 VDC.

\*4. For installation, please see "● Mounting" on page 6.

## Engineering Data

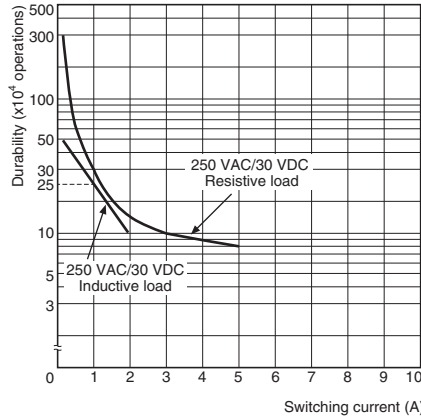
### Maximum Switching Capacity

#### G6DN-1A, G6DN-1A-L, G6DN-1A-CF



### Durability

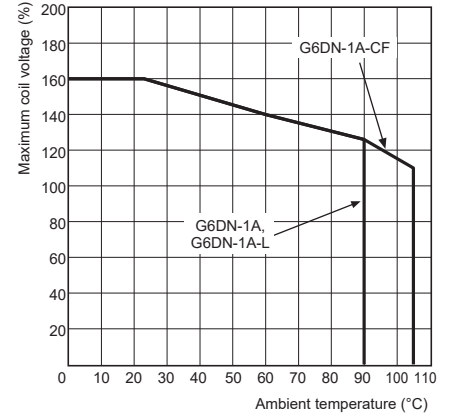
#### G6DN-1A, G6DN-1A-CF



Note. The durability curve is based on room temperature data.

### Ambient Temperature vs. Maximum Coil Voltage

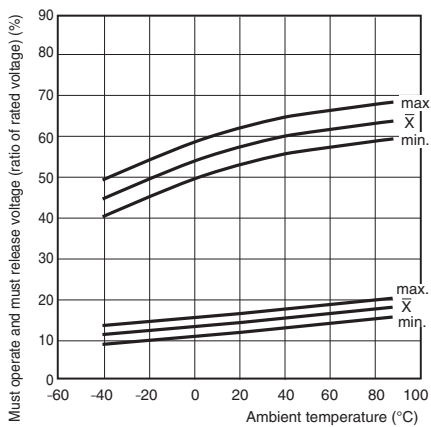
#### G6DN-1A, G6DN-1A-L, G6DN-1A-CF



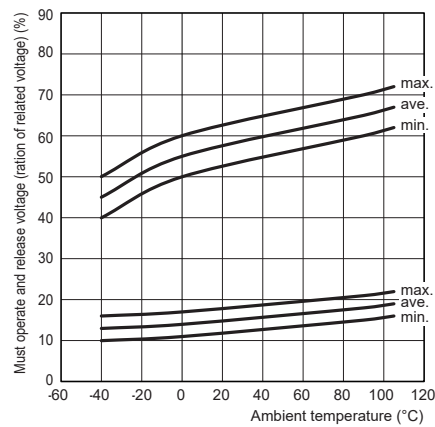
Note. The maximum coil voltage refers to the maximum voltage in a varying range of operating power voltage, not a continuous voltage.

### Ambient Temperature vs. Must Operate and Must Release Voltages

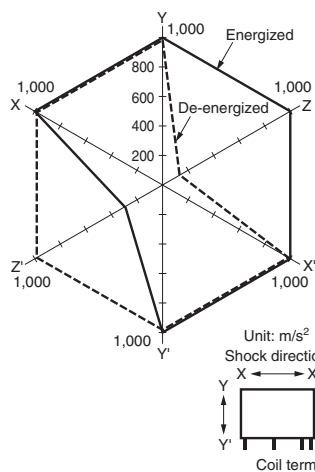
#### G6DN-1A, G6DN-1A-L



#### G6DN-1A-CF



### Shock Malfunction

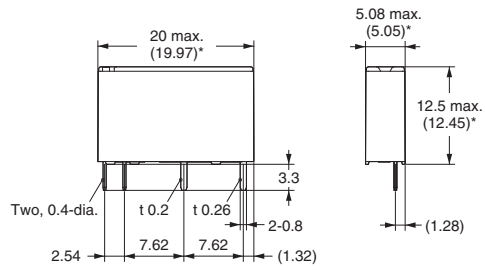


Sample: G6DN-1A  
 Number of Relays: 5 pcs  
 Test conditions: Impose a shock in the  $\pm X$ ,  $\pm Y$ , and  $\pm Z$  directions three times each with the Relay energized to check the shock values that cause the Relay to malfunction.  
 Standard: 100 m/s<sup>2</sup>

## ■ Dimensions

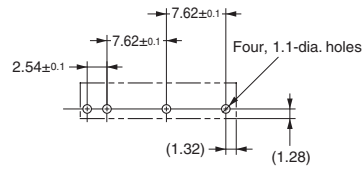
**CAD Data** Please visit our website, which is noted on the last page.

### G6DN-1A(-L)

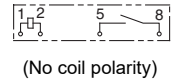


\* Average value

### PCB Mounting Holes (Bottom View)

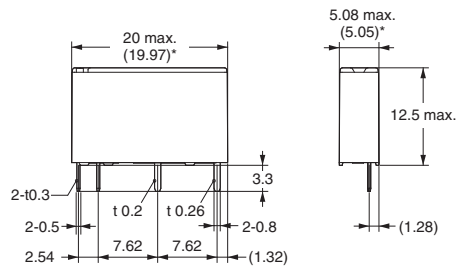


### Terminal Arrangement/ Internal Connections (Bottom View)



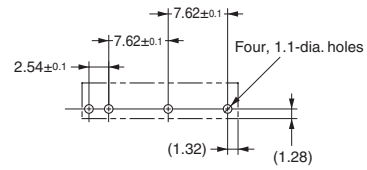
**CAD Data**

### G6DN-1A(-SL)(-CF)

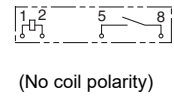


\* Average value

### PCB Mounting Holes (Bottom View)



### Terminal Arrangement/ Internal Connections (Bottom View)



**CAD Data**


## Approved Standards

● The rated values approved by each of the safety standards may be different from the performance characteristics individually defined in this datasheet.

**UL/C-UL-approved models**  (File No. E41515)

| Model             | Contact form | Coil ratings  | Contact ratings                 | Operations |
|-------------------|--------------|---------------|---------------------------------|------------|
| G6DN-1A(-SL)(-CF) | SPST-NO      | 4.5 to 24 VDC | 5 A at 277 VAC (Resistive) 95°C | 6,000      |
|                   |              |               | 5 A at 30 VDC (Resistive) 90°C  | 6,000      |
|                   |              |               | 3A, 250V ac, Resistive 85°C     | 100,000    |
|                   |              |               | 1/10 hp 125 VAC 95°C            | 1,000      |
|                   |              |               | 1/10 hp 277 VAC 95°C            | 1,000      |
|                   |              |               | D300 120 VAC/240 VAC 95°C       | 6,000      |
|                   |              |               | C300 120 VAC/240 VAC 95°C       | 6,000      |
|                   |              |               | R300 125 VDC/250 VDC 95°C       | 6,000      |
|                   |              |               | 5 A 250 VAC (Resistive) 105°C   | 10,000     |
|                   |              |               | 5 A 30 VDC (Resistive) 105°C    | 10,000     |
| G6DN-1A-L         | SPST-NO      | 5 to 24 VDC   | 5 A 250 VAC (Resistive) 95°C    | 100,000    |
|                   |              |               | 2 A 250 VAC (General Use) 95°C  | 100,000    |
|                   |              |               | 2 A 30 VDC (General Use) 95°C   | 100,000    |
|                   |              |               | 1/10 hp 120 VAC 40°C            | 6,000      |
|                   |              |               | C300 120 VAC/240 VAC 95°C       | 6,000      |
|                   |              |               | D150 120 VAC 95°C               | 6,000      |
|                   |              |               | R150 125 VDC 95°C               | 6,000      |

Note. CSA certification CSA 22.2 No.14 can be recognized by C-UL.

**VDE (EN61810-1)**  (Certificate No. 40042696)

| Model     | Contact form | Coil ratings       | Contact ratings                 | Operations |
|-----------|--------------|--------------------|---------------------------------|------------|
| G6DN-1A   | SPST-NO      | 4.5, 5, 12, 24 VDC | 5 A at 250 VAC (cosφ= 1.0) 90°C | 10,000     |
|           |              |                    | 5 A at 30 VDC (L/R = 0 ms) 90°C | 10,000     |
| G6DN-1A-L | SPST-NO      | 5, 12, 24 VDC      | 5 A 250 VAC (cosφ= 1.0) 90°C    | 100,000    |
|           |              |                    | 2 A 250 VAC (cosφ= 0.4) 90°C    | 100,000    |
|           |              |                    | 2 A 250 VAC (cosφ= 0.6) 90°C    | 100,000    |
|           |              |                    | 5 A 30 VDC (L/R = 0 ms) 90°C    | 100,000    |
|           |              |                    | 2 A 30 VDC (L/R = 7 ms) 90°C    | 100,000    |

**TÜV (EN61810-1)**  (Registration No. R 50396359)

| Model             | Contact form | Coil ratings  | Contact ratings                  | Operations |
|-------------------|--------------|---------------|----------------------------------|------------|
| G6DN-1A(-SL)(-CF) | SPST-NO      | 5, 12, 24 VDC | 5 A at 250 VAC (cosφ= 1.0) 90°C  | 10,000     |
|                   |              |               | 5 A at 30 VDC (L/R = 0 ms) 90°C  | 10,000     |
|                   |              |               | 5 A at 250 VAC (cosφ= 1.0) 105°C | 10,000     |
|                   |              |               | 5 A at 30 VDC (cosφ= 1.0) 105°C  | 10,000     |

|   |   |
|---|---|
| Clearance distance                              | 3.5 mm min.   |
| Creepage distance                               | 3.6 mm min.   |
| Type of insulation coil-contact circuit         | Basic (PD.2)  |
| open contact circuit                            | Micro disconnection   |
| Rated Insulation voltage                        | 300 V   |
| Pollution degree                                | 2   |
| Rated voltage system                            | 250 V   |
| Over voltage category                           | II  |
| Category of protection according to IEC 61810-1 | RT III (Sealed)   |
| Insulation material group                       | I   |
| Tracking resistance according to IEC 60112      | CTI 600 V min.  |
| Flammability class according to UL94            | V-0   |
| Coil insulation system according to UL          | Class B (Standard/High durability/General purpose)/Class F (High temperature) |

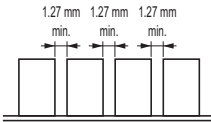
## ■Precautions

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

### Correct Use

#### ●Mounting

When mounting a number of relays on a PCB in 90°C to 105°C, be sure to provide a minimum mounting space of 1.27 mm min. as shown below.



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