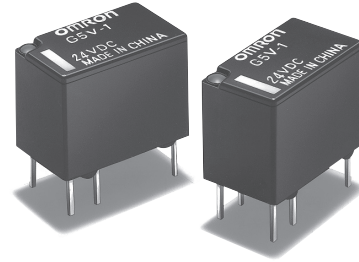


# G5V-1

Low Signal Relay

## Ultra-miniature, Highly Sensitive SPDT Relay for Signal Circuits



- Ultra-miniature at 12.5 × 7.5 × 10 mm (L × W × H).
- Wide switching power of 1 mA to 1 A.
- High sensitivity: 150 mW nominal coil power consumption.
- Fully-sealed construction offering environment resistance.
- Conforms to FCC Part 68 requirements for coil to contacts.  
(1,500 V, 10 × 160 μs)
- Models for ambient temperatures up to 90°C added to series.

**RoHS Compliant**

### Model Number Legend

G5V-□-□  
1 2

#### 1. Number of Poles/Contact Form

1: 1-pole/SPDT (1c)

#### 2. Classification

None: Standard (Ambient operating temperature 70°C max.)

T90: Ambient operating temperature 90°C max.

### Application Examples

- Telecommunication equipment
- Audio-visual products
- Security equipment
- Building automation equipment

### Ordering Information

| Classification | Enclosure rating | Contact form | Terminal Shape | Model     | Rated coil voltage | Minimum packing unit |
|----------------|------------------|--------------|----------------|-----------|--------------------|----------------------|
| Standard       | Fully sealed     | SPDT (1c)    | PCB terminals  | G5V-1     | 3 VDC              | 25 pcs/tube          |
|                |                  |              |                |           | 5 VDC              |                      |
|                |                  |              |                |           | 6 VDC              |                      |
|                |                  |              |                |           | 9 VDC              |                      |
|                |                  |              |                |           | 12 VDC             |                      |
| G5V-1-T90      |                  |              |                | G5V-1-T90 | 5 VDC              |                      |
|                |                  |              |                |           | 12 VDC             |                      |
|                |                  |              |                |           | 24 VDC             |                      |

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

Example: G5V-1 DC3

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.

### Ratings

#### Coil

G5V-1 (Standard)

| Rated voltage | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|---------------|--------------------|---------------------|--------------------------|--------------------------|------------------|------------------------|
|               |                    |                     |                          |                          |                  |                        |
| 3 VDC         | 50                 | 60                  | 80% max.                 | 10% min.                 | 200% at 23°C     | Approx. 150            |
| 5 VDC         | 30                 | 167                 |                          |                          |                  |                        |
| 6 VDC         | 25                 | 240                 |                          |                          |                  |                        |
| 9 VDC         | 16.7               | 540                 |                          |                          |                  |                        |
| 12 VDC        | 12.5               | 960                 |                          |                          |                  |                        |
| 24 VDC        | 6.25               | 3,840               |                          |                          |                  |                        |

G5V-1-T90

| Rated voltage | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|---------------|--------------------|---------------------|--------------------------|--------------------------|------------------|------------------------|
|               |                    |                     |                          |                          |                  |                        |
| 5 VDC         | 30                 | 167                 | 70% max.                 | 10% min.                 | 200% at 23°C     | Approx. 150            |
| 12 VDC        | 12.5               | 960                 |                          |                          |                  |                        |
| 24 VDC        | 6.25               | 3,840               |                          |                          |                  |                        |

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

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

3. The maximum voltage is the highest voltage that can be imposed on the relay coil.

4. G5V-1-2 types with a must operate voltage of 70% max. are available as special series products.

### Standard Model Specifications

Contact type: Single crossbar (Au-alloy + Ag)

Enclosure rating: Plastic sealed

Terminal shape: PCB terminals

#### Contacts

| Item                   | Load | Resistive load                     |
|------------------------|------|------------------------------------|
| Contact type           |      | Single crossbar                    |
| Contact material       |      | Au-alloy + Ag                      |
| Rated load             |      | 0.5 A at 125 VAC;<br>1 A at 24 VDC |
| Rated carry current    |      | 2 A                                |
| Max. switching voltage |      | 125 VAC, 60 VDC                    |
| Max. switching current |      | 1 A                                |

G5V-1

## ■Characteristics

|   |                                       |   |
|---|---------------------------------------|---|
| Contact resistance *1                       |                                       | 100 mΩ max.   |
| Operate time                                |                                       | 5 ms max.   |
| Release time                                |                                       | 5 ms max.   |
| Insulation resistance *2                    |                                       | 1,000 MΩ min. (at 500 VDC between coil and contacts, at 250 VDC between contacts of same polarity.) |
| Dielectric strength                         | Between coil and contacts             | 1,000 VAC, 50/60 Hz for 1 min   |
|   | Between contacts of the same polarity | 400 VAC, 50/60 Hz for 1 min   |
| Vibration resistance                        | Destruction                           | 10 to 55 to 10 Hz, 1.65 mm single amplitude (3.3 mm double amplitude)                               |
|   | Malfunction                           | 10 to 55 to 10 Hz, 1.65 mm single amplitude (3.3 mm double amplitude)                               |
| Shock resistance                            | Destruction                           | 1,000 m/s <sup>2</sup>  |
|   | Malfunction                           | 100 m/s <sup>2</sup>  |
| Durability                                  | Mechanical                            | 5,000,000 operations min. (at 36,000 operations/hr)   |
|   | Electrical                            | 100,000 operations min. (under rated load, at 1,800 operations/hr)                                  |
| Failure rate (P level) (reference value) *3 |                                       | 1 mA at 5 VDC   |
| Ambient operating temperature               |                                       | -40°C to 70°C (Standard), -40°C to 90°C (G5V-1-T90) (with no icing or condensation)                 |
| Ambient operating humidity                  |                                       | 5% to 85%   |
| Weight                                      |                                       | Approx. 2 g   |

Note: The values here are initial values.

\*1. Measured with 10 mA at 1 VDC with a voltage drop method.

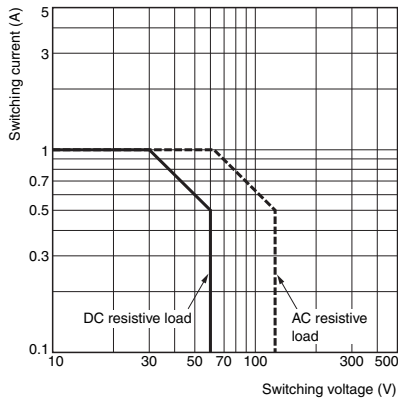
\*2. Measured with a 500 VDC megohmmeter between coil and contacts and a 250 VDC megohmmeter between contacts with the same polarity applied to the same parts as those used for checking the dielectric strength.

\*3. This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 100 Ω.

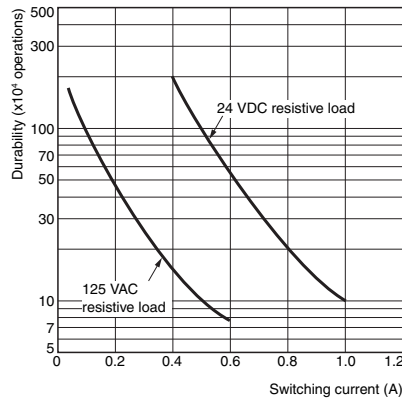
This value may vary depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.

## Engineering Data

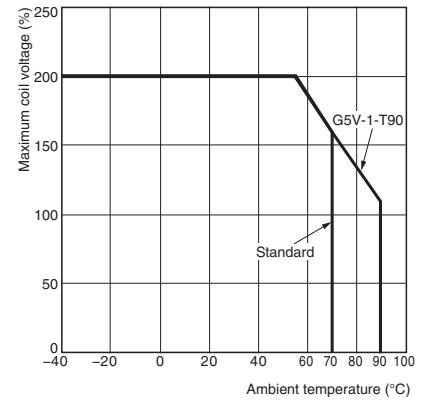
### Maximum Switching Capacity



### Durability

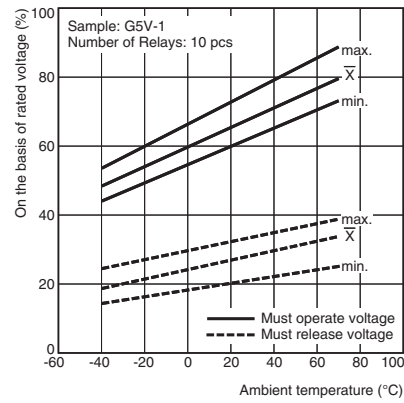


### Ambient Temperature vs. Maximum Coil Voltage

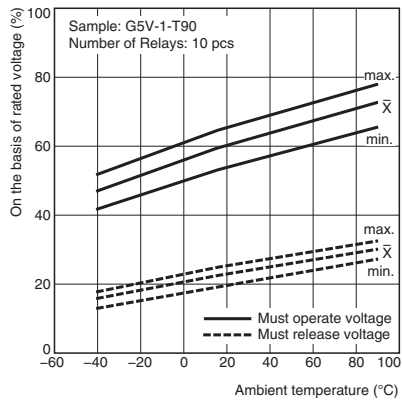


Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

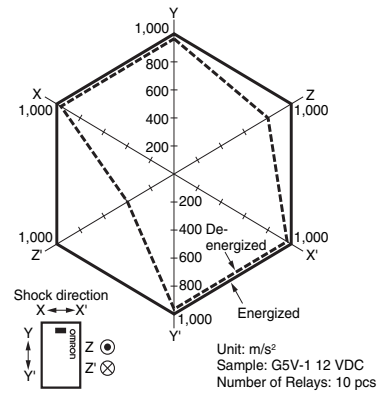
### Ambient Temperature vs. Must Operate or Must Release Voltage



### G5V-1-T90

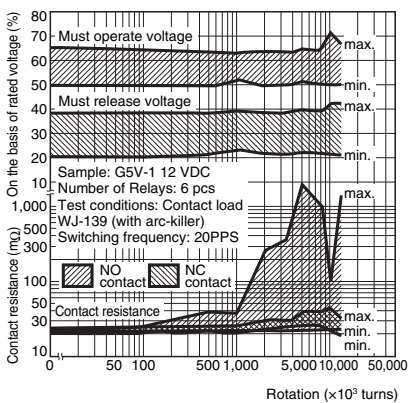


### Shock Malfunction

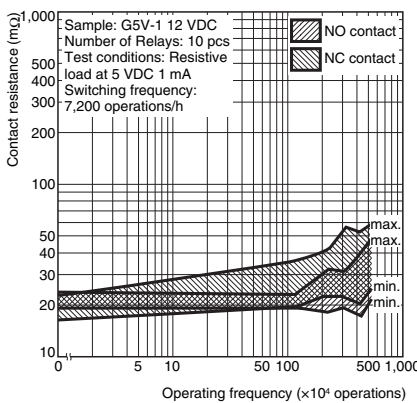


Test conditions: Shock is applied in  $\pm X$ ,  $\pm Y$ , and  $\pm Z$  directions three times each with and without energizing the Relays to check the number of contact malfunctions.

### Dial Pulse Test \*1



### Contact Reliability Test \*1, \*2

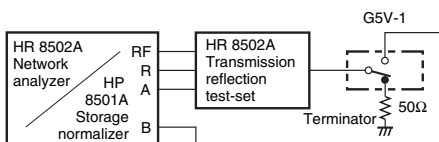


\*1. The tests were conducted at an ambient temperature of 23°C.

\*2. The contact resistance data are periodically measured reference values and are not values from each monitoring operation. Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use.

### High-frequency Characteristics

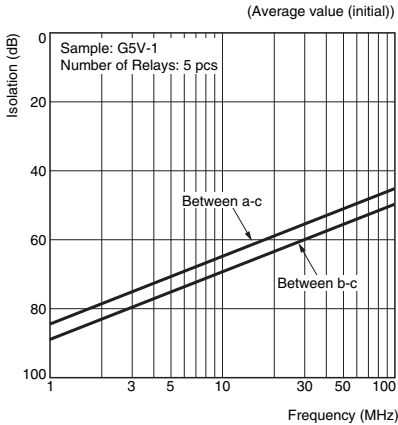
#### Test Conditions



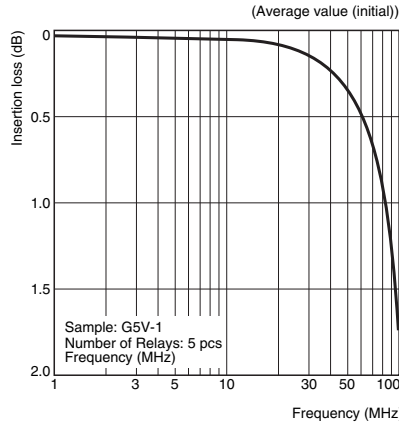
Terminals which were not being measured were terminated with 50  $\Omega$ .  
Measuring impedance: 50  $\Omega$

Note: The high-frequency characteristics data were measured using a dedicated circuit board and actual values will vary depending on the usage conditions. Check the characteristics of the actual equipment being used.

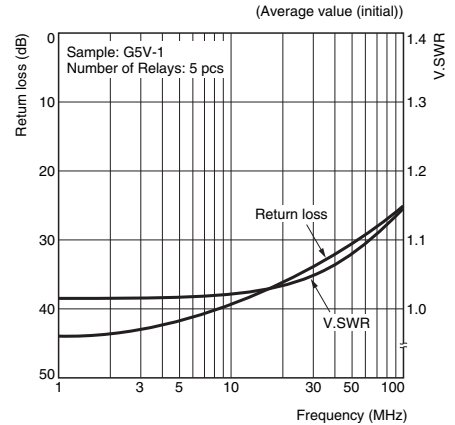
## ●High-frequency Characteristics (Isolation) \*1, \*2



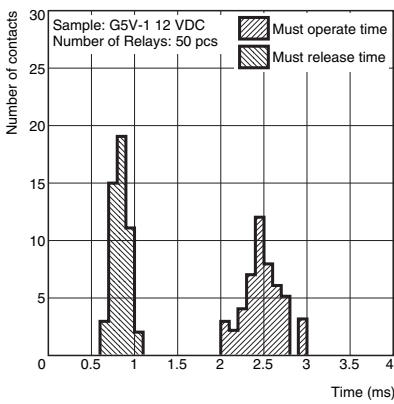
## ●High-frequency Characteristics (Insertion Loss) \*1, \*2



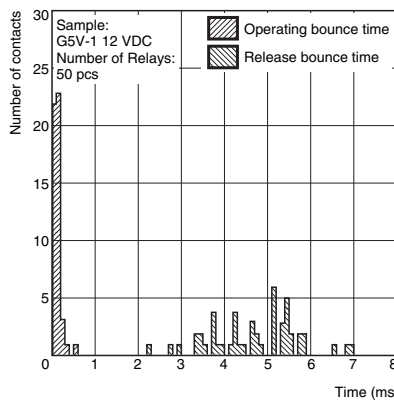
## ●High-frequency Characteristics (Return Loss, V.SWR) \*1, \*2



## ●Must Operate and Must Release Time Distribution \*1



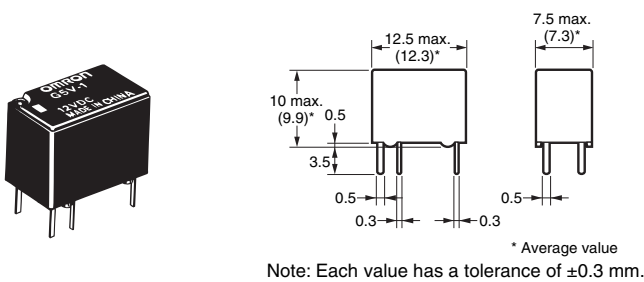
## ●Distribution of Bounce Time \*1



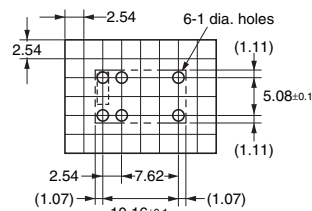
- \*1. The tests were conducted at an ambient temperature of 23°C.
- \*2. High-frequency characteristics depend on the PCB to which the Relay is mounted. Always check these characteristics, including endurance, in the actual machine before use.

## ■Dimensions

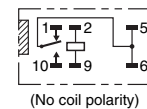
### G5V-1



### PCB Mounting Holes (Bottom View)



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



## ■Approved Standards

UL recognized: (File No. E41515)

CSA certified: (File No. LR31928)

| Model     | Contact form | Coil ratings | Contact ratings        | Number of test operations |
|-----------|--------------|--------------|------------------------|---------------------------|
| G5V-1     | SPDT (1c)    | 3 to 24 VDC  | 1 A, 30 VDC at 40°C    | 6,000                     |
|           |              |              | 0.3 A, 110 VDC at 40°C |                           |
|           |              |              | 0.5 A, 125 VAC at 40°C |                           |
| G5V-1-T90 | SPDT (1c)    | 5 to 24 VDC  | 1 A, 30 VDC at 90°C    | 100,000                   |
|           |              |              | 0.5 A, 125 VAC at 90°C |                           |

## ■Precautions

- Please refer to "PCB Relays Common Precautions" for correct use.

### Correct Use

#### • Long-term Continuously ON Contacts

Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts, because the heat generated by the coil itself will affect the insulation, causing a film to develop on the contact surfaces. Be sure to use a fail-safe circuit design that provides protection against contact failure or coil burnout.

#### • Relay Handling

When washing the product after soldering the Relay to a PCB, use a water-based solvent or alcohol-based solvent, and keep the solvent temperature to less than 40°C. Do not put the Relay in a cold cleaning bath immediately after soldering.

- Application examples provided in this document are for reference only. In actual applications, confirm equipment functions and safety before using the product.
- Consult your OMRON representative before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems or equipment that may have a serious influence on lives and property if used improperly. Make sure that the ratings and performance characteristics of the product provide a margin of safety for the system or equipment, and be sure to provide the system or equipment with double safety mechanisms.

**Note: Do not use this document to operate the Unit.**

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