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)

Note 1. When ordering, add the rated coil voltage to the model number.
Example: G5V-1 3 VDC

2. A special series of bifurcated crossbar contacts models are also available.

■ Model Number Legend

G5V-□ 1

1. Number of Poles/Contact Form

1: 1-pole/SPDT (1c)

■ Ordering Information

<table>
<thead>
<tr>
<th>Classification</th>
<th>Enclosure rating</th>
<th>Contact form</th>
<th>Terminal Shape</th>
<th>Model</th>
<th>Rated coil voltage</th>
<th>Minimum packing unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>Fully sealed</td>
<td>SPDT (1c)</td>
<td>PCB terminals</td>
<td>G5V-1</td>
<td></td>
<td>25 pcs/tube</td>
</tr>
</tbody>
</table>

Note 1. The rated coil voltage is 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.

■ Ratings

■ Coil

<table>
<thead>
<tr>
<th>Rated coil voltage</th>
<th>Rated current (mA)</th>
<th>Coil resistance (Ω)</th>
<th>Must operate voltage (V)</th>
<th>Must release voltage (V)</th>
<th>Max. voltage at 23°C (V)</th>
<th>Power consumption (mW)</th>
<th>% of rated voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 VDC</td>
<td>50</td>
<td>60</td>
<td>80% max.</td>
<td>10% min.</td>
<td>200%</td>
<td>Approx. 150</td>
<td>100%</td>
</tr>
<tr>
<td>5 VDC</td>
<td>30</td>
<td>167</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 VDC</td>
<td>25</td>
<td>240</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 VDC</td>
<td>16.7</td>
<td>540</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 VDC</td>
<td>12.5</td>
<td>990</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 VDC</td>
<td>2.25</td>
<td>3,840</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1. The contact resistance 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.

■ Characteristics

- Contact resistance *1
  - 100 mΩ 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: 300 VAC, 50/60 Hz for 1 min
- Vibration resistance
  - Destruction: 10 to 55 to 10 Hz, 1.85 mm single amplitude (3.3 mm double amplitude)
  - Malfunction: 10 to 55 to 10 Hz, 1.85 mm single amplitude (3.3 mm double amplitude)
- Shock resistance
  - Destruction: 1,000 m/s²
  - Malfunction: 100 m/s²
- 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 (*1 level): 1 mA at 5 VDC
- Ambient operating temperature
  - -40°C to 70°C (with no icing or condensation)
- Ambient operating humidity
  - 95% 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 may vary depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.
Engineering Data

Maximum Switching Capacity

Ambient Temperature vs. Must Operate or Must Release Voltage

Shock Malfunction

Contact Reliability Test *1, *2

High-frequency Characteristics

Test Conditions

Note: The tests were conducted at an ambient temperature of 23°C.

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

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.
G5V-1
Low Signal Relay

- **Higher frequency characteristics** (isolation) *1, *2
  - **High return loss, VSWR** *1, *2

- **Must operate and must release**
- **Time distribution** *1

- **Distribution of bounce time** *1

- **Dimensions**

- **Approved standards**
  - UL recognized: [File No. E41515]
  - CSA certified: [File No. LR31928]

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

**Correct use**

- **Long-term Continuously ON Contacts**
  - When 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.

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**Table: Model Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Contact form</th>
<th>Coil ratings</th>
<th>Contact ratings</th>
<th>Number of test operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5V-1</td>
<td>SPDT (1c)</td>
<td>3 to 24 VDC</td>
<td>1 A, 30 VDC at 40°C, 0.3 A, 110 VDC at 40°C, 0.5 A, 125 VDC at 40°C</td>
<td>6,000, 100,000</td>
</tr>
</tbody>
</table>

*Note: Each value has a tolerance of ±0.3 mm.*
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.