Surface-Mounting Signal Relay – G6K-Y

Precautions

Contact Use

Long Term Current Carrying

Under a long-term current carrying without switching, the insulation resistance of the coil gives down gradually due to the heat generated from the coil. The insulation resistance of the Relay will gradually become unmeasurable due to the generation of film on the contact surfaces. A Latching Relay can be used to prevent these problems. When using a single-side stable relay, the design of the fail-safe circuit provides protection against contact failure and open coils.

Handling of Surface-mounting Relays

Use the Relay as soon as possible after opening the moisture-proof package. If the Relay is left for a long time after opening the moisture-proof package, the appearance may suffer and seal failure may occur after the solder mounting process. To store the Relay after opening the moisture-proof package, place it into the original package and seal the package with adhesive tape. If the Relay is left for a long time after opening the moisture-proof package, place it into a moisture-proof container (humidity 20% or below and temperature 28°C or below) and keep the ambient temperature to less than 40°C. Do not put the relay in a cold cleaning bath immediately after soldering.

Soldering

Solder: JIS Z3030: H3A
Soldering temperature: Approx. 250°C (468°F) if the G6K method is used.
Soldering time: Approx. 2 sec. (Approx. 2x for the first time and approx. 4x for the second time if the G6K method is used.)
Be sure to adjust the level of the rosin solder so that the solder will not overflow onto the PCB.

Claw-Securing Force During Automatic Mounting

During automatic insertion of Relays, make sure to set the securing force of the claws to the following values so that the Relay characteristics will be maintained.

Direction A: 4.00 N max. 
Direction B: 6.00 N min. 
Direction C: 3.00 N min.

Secure the claws to the area indicated by shading. Do not attach them to the center area or to only part of the Relay.

Environmental Conditions During Operation, Storage, and Transportation

Protect the Relays from direct sunlight and keep the Relays under normal temperature, humidity, and pressure.

Mounting Latching Relays

Make sure that the vibration or shock that is generated from other devices, such as Relays in operation, on the same panel and imposed on the Latching Relays does not exceed the rated value, as specified in the catalog. Excessive vibration or shock applied to the Latching Relays may lead to incorrect operation of the Latching Relays. Be sure to apply a reset signal before use.

Surface-Mounting Signal Relay – G6K

Surface-Mounting Relay with the World's Smallest Mounting Area and a Height of Only 5.2 mm

■Nov.-Y models offer an impulse withstand voltage of 2,500 V for 2 x 10 µs (conforms to Bellcore specifications) by optimizing the distance between coil and contacts.

■Conforms to UL (File No. E41515)/CSA (File No. C22.2 No. 0, No. 14, No. 950 (File no. LP51180))

The above specifications are ensured as of August 1999.

■Complies with the ROHS directive.

■Conforms to UL and CSA.

Ordering Information

Classification

Single-side stable

Single-winding latching

Single-side stable Bellcore

5.00 V for 2x10 µs

G6K-Y

G6KU-Y

G6KU-Y

G6K-Y

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

Example: G6K-Y-12 VDC

2. When ordering tape packing, add "TR" to the model number.

Example: G6K-Y TR-12 VDC

Be sure to mark as "TR" in part as the relay model number, it is not marked on the relay case.

Model Number Legend

1. Relay function

None: Single-side stable model
U: Single-winding latching model

2. Contact Form

P: DPDT

3. Terminal shape

F: Outside-L, surface-mounting terminal
G: Inside-L, surface-mounting terminal
H: PCB terminal

4. Approval standards

Note: UL, CSA

Does not conform to Bellcore specifications

Conforms to Bellcore specifications: 2,500 V for 2 x 10 µs

5. Rated Coil Voltage

3, 4, 5, 10, 24 VDC
Surface-Mounting Signal Relay – G6K

Application Examples

Telephones, communication equipment, measurement devices, office automation machines, and audio–visual products.

Specifications

Contact mechanism: Bi-wound crossbar Ay (Au–alloy contact) Enclosure rating: Fully sealed

■ Coil Ratings


<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>1 VDC</th>
<th>4.5 VDC</th>
<th>5 VDC</th>
<th>12 VDC</th>
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</thead>
<tbody>
<tr>
<td>rated current</td>
<td>0.05 mA</td>
<td>0.2 mA</td>
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</tr>
<tr>
<td>Coil resistance</td>
<td>51 Ω</td>
<td>454 Ω</td>
<td>376 Ω</td>
<td>1,315 Ω</td>
</tr>
<tr>
<td>Must set voltage</td>
<td>75% max. of rated voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Must release voltage</td>
<td>15% min. of rated voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. voltage</td>
<td>150% of rated voltage at 22°C to 70°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>Approx. 100 mW</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note: 1. The rated current and coil resistance are measured at a coil temperature of 22°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 instantaneously.


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■ Characteristics

Contact resistance (see note 1)

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Operating (set) time (see note 2)

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<tr>
<th>Single-side stable models (double-pole)</th>
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<td>3 ms max. (approx. 1.4 ms)</td>
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■ Contact Ratings

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<tbody>
<tr>
<td>Resistor load</td>
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</table>

Rated load 0.2 A at 30 VDC; 1 A at 60 VDC

Rated carry current 1 A

Rated voltage

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■ Characteristics

Contact resistance (see note 1)

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Rated load 0.2 A at 30 VDC; 1 A at 60 VDC

Contact material Ag (Au–alloy)

Rated carry current 1 A

Rated voltage

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■ Characteristics

Contact resistance (see note 1)

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**Contact Ratings**


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<th>Max. voltage</th>
<th>Power consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>G6K-2F</td>
<td>6 V DC, 4 V DC</td>
<td>6 V to 12 V DC</td>
<td>Approx. 100 mW</td>
</tr>
<tr>
<td>G6K-2G</td>
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<tr>
<td>G6K-2P</td>
<td>6 V DC, 4 V DC</td>
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</table>

**Contact Resistance**

<table>
<thead>
<tr>
<th>Contact resistance</th>
<th>Contacts of same polarity</th>
<th>Contacts of different polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mΩ max.</td>
<td>3.00 V DC, 5.00 V DC for 1 min</td>
<td>1.000 V DC, 2.500 V DC for 1 min</td>
</tr>
</tbody>
</table>

### Characteristics

**Contact Ratings**


- **Rated current**: 1 A
- **Rated load**: 125 V AC, 60 V DC


- **Rated current**: 1 A
- **Rated load**: 125 V AC, 60 V DC

**Insulation Resistance**

- **Contact resistance**: 1,000 MΩ max.

**Vibration Resistance**

- **Operating time**: 3 ms max. (approx. 1.3 mA)
- **Release time**: 3 ms max. (approx. 1.2 mA)

**Shock Resistance**

- **Operating time**: 3 ms max. (approx. 1.4 mA)
- **Release time**: 3 ms max. (approx. 1.2 mA)

**Rms Operating Voltage**

- **Rms operating voltage**: 3.90V DC, 2.25V DC, 2.05V DC, 1.90V DC, 1.70V DC

**Rms Release Voltage**

- **Rms release voltage**: 1.90V DC, 1.75V DC, 1.65V DC, 1.55V DC, 1.45V DC

**Rms Contact Resistance**

- **Rms contact resistance**: 3.00 V DC, 5.00 V DC for 1 min

**Rms Contact Voltage**

- **Rms contact voltage**: 3.00 V DC, 5.00 V DC for 1 min

Note: The above values are nominal values.

### Application Examples

Surface-Mounting Signal Relay – G6K

**Application Examples**

- Telephones, communications equipment, measurement devices, office automation machines, and audio-visual products.

**Surface-Mounting Signal Relay – G6K**

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</tr>
<tr>
<td>G6K-2P</td>
<td>6 V DC, 4 V DC</td>
<td>6 V to 12 V DC</td>
<td>Approx. 100 mW</td>
</tr>
</tbody>
</table>

**Contact Resistance**

- **Contact resistance**: 100 mΩ max.

**Vibration Resistance**

- **Operating time**: 3 ms max. (approx. 1.3 mA)
- **Release time**: 3 ms max. (approx. 1.2 mA)

**Shock Resistance**

- **Operating time**: 3 ms max. (approx. 1.4 mA)
- **Release time**: 3 ms max. (approx. 1.2 mA)

**Rms Operating Voltage**

- **Rms operating voltage**: 3.90V DC, 2.25V DC, 2.05V DC, 1.90V DC, 1.70V DC

**Rms Release Voltage**

- **Rms release voltage**: 1.90V DC, 1.75V DC, 1.65V DC, 1.55V DC, 1.45V DC

**Rms Contact Resistance**

- **Rms contact resistance**: 3.00 V DC, 5.00 V DC for 1 min

**Rms Contact Voltage**

- **Rms contact voltage**: 3.00 V DC, 5.00 V DC for 1 min

Note: The above values are nominal values.
Surface-Mounting Signal Relay – G6K

Engineering Data

Maximum Switching Power

Ambient Temperature vs. Maximum Coil Voltage

Switching current (A)

Note: The maximum coil voltage relates to the peak value for a single range of operating power voltage, not a continuous voltage.

Endurance

Ambient Temperature vs. Must Operate or Must Release Voltage G6K-2G (F/P), G6K-2G (F/P)-Y

Ambient Temperature vs. Must Set or Must Reset Voltage G6KU-2G (F/P)-Y

External Magnetic Interference

Mutual Magnetic Interference G6K-2G (F/P), G6K-2G (F/P)-Y

Sample: G6K-2G (F/P), G6K-2G (F/P)-Y

Note: 1. These 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.
Surface-Mounting Signal Relay – G6K

Engineering Data

Maximum Switching Power

Endurance

External Magnetic Interference

High-frequency Characteristics

Contact Reliability Test (see note)

G6K-2G (F/P), G6K-2G (F/P)-Y

Mutual Magnetic Interference

G6K-2G (F/P), G6K-2G (F/P)-Y

Surface-Mounting Signal Relay – G6K

Mutual Magnetic Interference

G6K-2G (F/P), G6K-2G (F/P)-Y

G6KU-2G (F/P)-Y

Switching current (A) vs. Switching voltage (V)

Ambient Temperature vs. Maximum Coil Voltage

Ambient Temperature vs. Switching Current

Endurance

Flux Protection/Plug-in Relays

GJR-1, GJR-1A, GJR-1-T, GJR-1A-T

GJR-1Z, GJR-1AZ

GJR-1-E, GJR-1A-E

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

Note: 1. The test was conducted at an ambient temperature of 23°C.

Note: 2. The contact resistance data are periodically measured from the time of shipment to the time of delivery. Contact resistance values vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use.
Surface-Mounting Signal Relay – G6K

**Must Operate and Must Release**

- **Time Distribution** (see note)
  - G6K-2G (F/P), G6K-2G (F/P)-Y

- **Vibration Resistance**
  - G6K-2G (F/P), G6K-2G (F/P)-Y

**Dimensions**

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

**Mounting Dimensions (Top View)**

- **Terminal Arrangement/ Internal Connections**

**Mounting Dimensions (Bottom View)**

- **Terminal Arrangement/ Internal Connections**

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

**DPDT**

- **G6K-2F**
  
  - **Note:** Each value has a tolerance of ±0.3 mm.

- **G6K-2G**
  
  - **Note:** Each value has a tolerance of ±0.3 mm.

- **G6K-2P**
  
  - **Note:** Each value has a tolerance of ±0.3 mm.

**Signal Relays**

- **Must Operate and Must Release**
  
  - **Time Distribution** (see note)
    - G6K-2G (F/P), G6K-2G (F/P)-Y

- **Vibration Resistance**
  
  - G6K-2G (F/P), G6K-2G (F/P)-Y
Dimensions

Note: All units are in millimetres unless otherwise indicated.

DPDT

G6K-2F

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

G6K-2G

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

G6K-2P

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

Relays for stick packing are arranged so that the orientation mark of each Relay is on the left side. Fifty Relays are packed on one stick.

To avoid mistakes in Relay orientation when mounting the Relay to the PCB, the Relays are shipped in stick packing with the orientation mark of each Relay on the left side.

Stick length: 520 mm (stopper not included)
No. of Relays per stick: 50

Tape Packing (Surface-Mounting Terminal Models)

When ordering Relays in tape packing, add the prefix “-TR” to the model number; otherwise the Relays in stick packing will be provided.

Tape Type: ETX7200
Reel type: RPM-16D (EIAJ)
Relays per Reel: 900

Recommended Soldering Method

Temperatures indicate the surface temperatures of the PCB.

1. IRS Method (Mounting solder: Lead)
2. IRS Method (Mounting solder: Lead-free)

Surface-Mounting Signal Relay – G6K

- The thickness of cream solder to be applied should be within a range between 150 and 200 µm on OMRON’s recommended PCB pattern.
- To perform correct soldering, it is recommended that the correct soldering conditions be maintained as shown below on the left side.

Visually check that the Relay is properly soldered.

Approved Standards

UL approval: UL (File No. E41515)
CSA approval: C22.2 No. 0, No. 14, No. 950 (File No. LR1646)

Model Coil ratings Contact ratings Number of test operations

Standard G6K-2G: 3 to 12 VDC 1 A at 30 VDC 6,000
G6K-2G-Y: 3 to 24 VDC 0.5 A at 60 VDC
0.3 A at 125 VAC

G6K-2G-Y: 3 to 30 VDC
G6K-2G-Y: 3 to 24 VDC
G6K-2G-Y: 3 to 24 VDC
Surface-Mounting Signal Relay – G6K

Stick Packing and Tape Packing

Stick Packing
Relays in stick packing are arranged so that the orientation mark of each Relay is on the left side. Fifty Relays are packed on one stick.

Be sure not to make mistakes in Relay orientation when mounting the Relay to the PCB.

Tape Packing (Surface-Mounting Terminal Models)
When ordering Relays in tape packing, add the prefix “TR” to the model number, otherwise the Relays in stick packing will be provided.

Tape Type: ETX7200
(EIAJ (Electronic Industrial Association of Japan)
Relay type: RPM-18D (EIAJ)
Relays per Reel: 300

1. Direction of Relay Insertion
2. Reel Dimensions
3. Carrier Tape Dimensions

Recommended Soldering Method

Temperatures indicate the surface temperatures of the PCB.

1. IRS Method (Mounting solder: Lead)
2. IRS Method (Mounting solder: Lead-free)

The thickness of cream solder to be applied should be within a range between 150 and 200 µm on OMRON’s recommended PCB pattern.

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Visualy check that the Relay is properly soldered.

Approved Standards

UL approval: UL (File No. E41515)
CSA approval: C22.2 No. 0, No. 14, No. 950 (File No. LR01834)

Model
Coil ratings
Contact ratings
Number of test operations
G6K-2G
3 to 12 VDC
1 A at 30 VDC
6,000
G6K-2G-Y
3 to 24 VDC
0.5 A at 60 VDC
0.3 A at 125 VAC

Stick Packing and Tape Packing

Stick length: 500 min (stopper not included)

No. of Relays per stick: 50

Relays in stick packing are arranged so that the orientation mark of each Relay is on the left side. Fifty Relays are packed on one stick.

Be sure not to make mistakes in Relay orientation when mounting the Relay to the PCB.

Tape Packing (Surface-Mounting Terminal Models)
When ordering Relays in tape packing, add the prefix “TR” to the model number, otherwise the Relays in stick packing will be provided.

Tape Type: ETX7200
(EIAJ (Electronic Industrial Association of Japan)
Relay type: RPM-18D (EIAJ)
Relays per Reel: 300

1. Direction of Relay Insertion
2. Reel Dimensions
3. Carrier Tape Dimensions

Recommended Soldering Method

Temperatures indicate the surface temperatures of the PCB.

1. IRS Method (Mounting solder: Lead)
2. IRS Method (Mounting solder: Lead-free)

The thickness of cream solder to be applied should be within a range between 150 and 200 µm on OMRON’s recommended PCB pattern.

For correct soldering, it is recommended that the correct soldering conditions be maintained as shown below on the left side.

Visualy check that the Relay is properly soldered.

Approved Standards

UL approval: UL (File No. E41515)
CSA approval: C22.2 No. 0, No. 14, No. 950 (File No. LR01834)

Model
Coil ratings
Contact ratings
Number of test operations
G6K-2G
3 to 12 VDC
1 A at 30 VDC
6,000
G6K-2G-Y
3 to 24 VDC
0.5 A at 60 VDC
0.3 A at 125 VAC

Surface-Mounting Signal Relay – G6K
Surface-Mounting Signal Relay – G6K

**Precautions**

**CORRECT USE**

**Handling**

Leaves the Relay unpacked until mounting it.

**Soldering**

- JIS Z3230; H63A
- Soldering temperature: Approx. 250°C (500°F) if the DWS method is used.
- Soldering time: Approx. 3 sec (approx. 2 sec for the first time and approx. 2.5 sec for the second time) if the DWS method is used.
- Be sure to apply the proper amount of solder so that the solder will not overflow on the PCB.

**Claw Securing Force During Automatic Mounting**

During automatic insertion of Relays, make sure to set the positioning so that the following are maintained:

1. The Relay characteristics are maintained.
2. The maximum allowable voltage of the coil can be obtained from the coil temperature increases and the heat-resisting temperature of coil insulating sheath material. (Exceeding the heat-resisting temperature may result in burning or short-circuiting.)
3. The maximum allowable voltage also involve important restrictions which include the following:
   - Must not cause thermal changes in or deterioration of the insulating materials.
   - Must not cause damage to other control devices.
   - Must not cause any harmful effect on people.
4. Therefore, be sure to use the maximum allowable voltage beyond the value specified in the catalog.

As a rule, the rated voltage must be applied to the coil. A voltage exceeding the rated value, however, can be applied to the coil provided that the voltage is less than the maximum allowable voltage. It must be noted that continuous voltage application to coils with higher rated voltage values may cause ratings to exceed the maximum allowable voltage beyond the value specified in the catalog due to characteristics such as electrical life and resulting in the deterioration of coil insulation.

**Coating**

The Relay mounted on the PCB may be coated or washed but do not apply alloy coating or detergent containing silicone, otherwise the silicone coating or detergent may remain on the surface of the Relay.

**Environmental Conditions During Operation, Storage, and Transportation**

- Protect the Relay from direct sunlight and keep the Relay under normal temperature, humidity, and pressure.
- If the Relay is stored for a long time in an adverse environment with high temperature, high humidity, organic gases, or sulphide gases, sulphide or oxide films will form on the contact surfaces. These films may result in variable contact contact problems, or unstable switching. Be sure to transport the product under specified environmental conditions.

**Latching Relay Mounting**

Make sure that the vibration or shock that is generated from other devices, such as relays in operation, on the same panel and imposed on the Latching Relay does not exceed the rated value, otherwise the Latching Relay that has been set may be reset by vibrations or shock if imposed. The Latching Relay may be set accidentally. Be sure to apply a reset signal before use.

**Maximum Allowable Voltage**

- The maximum allowable voltage of the coil can be obtained from the coil temperature increases and the heat-resisting temperature of coil sheath material.
- Be sure to apply the proper amount of solder so that the solder will not overflow on the PCB.

**Ordering Information**

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<thead>
<tr>
<th>G6K</th>
<th>G6S</th>
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<tbody>
<tr>
<td>Inside-L</td>
<td>Surface mounting terminal</td>
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<tr>
<td>Through-hole terminal</td>
<td>Fully sealed terminal</td>
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<tr>
<td>Single-side stable</td>
<td>Single-winding latching</td>
</tr>
<tr>
<td>Double-winding latching</td>
<td>Double-winding latching</td>
</tr>
<tr>
<td>EN60950</td>
<td>EN60950</td>
</tr>
</tbody>
</table>

**Model Number Legend**

1. **Relay Function**
   - None: Single-side stable
   - U: Single-winding latching
   - K: Double-winding latching

2. **Contact Form**
   - G: Inside-L surface mounting terminal
   - F: Outside-L surface mounting terminal

3. **Rated Coil Voltage**
   - Y: EN60950
   - None: UL/CSA

4. **Approved Standards**
   - None: UL/CSA
   - EN60950

5. **Dimensions**
   - Width: 3.2 mm
   - Height: 6.9 mm

**Surface-Mounting Signal Relay – G6S**

**RoHS compliant.**

- Long terminals ideal for soldering and mounting reliability.
- Space-saving inside-L terminal.
- High dielectric strength between coil and contacts (2,000 VAC), and between contacts of different polarity (1,500 VAC).
- High impulse withstand voltage between coil and contacts, and between contacts of different polarity (2,500 V, 2 10 µs: Bellcore requirements).
- Low power consumption (140 mW).
- Bipolarized crossbar contact (Au-clad) and Fully sealed construction for high reliability.
- Applicable to IRS.
- High sealability after IRS.