

# Low Signal Relay G6K

- Compact fourth generation design, offers excellent board space savings.
- Available in 2.54 and 3.2 mm coil-contact terminal spacing.
- “-Y” models meet 2.5 kV Bellcore surge requirements.
- Conforms to FCC Part 68.
- Terminal design based on Omron’s successful G6S relay.
- Available in PCB through-hole, SMT gullwing and SMT “inside-L” terminals.
- UL recognized / CSA certified.
- Available in single coil latching.
- RoHS Compliant.



## Ordering Information

To Order: Select the part number and add the desired coil voltage rating (e.g., G6K-2F-DC5).

Terminal	Contact form	Model		
		Non-latching 2.54 mm spacing	Non-latching 3.2 mm coil-contact terminal spacing	Single coil latching 3.2 mm coil-contact terminal spacing
Gullwing	DPDT	G6K-2F	G6K-2F-Y	G6KU-2F-Y
Inside “L”		G6K-2G	G6K-2G-Y	G6KU-2G-Y
PCB through-hole		G6K-2P	G6K-2P-Y	G6KU-2P-Y

When ordering tape packing (surface mount versions), add “-TR” to the model number (e.g., G6K-2G-TR-DC5)

## Specifications

### ■ Contact Data

<b>Load</b>	Resistive load (cosφ=1)
<b>Rated load</b>	0.3 A at 125 VAC 1 A at 30 VDC
<b>Contact material</b>	Ag (Au clad)
<b>Max. carry current</b>	1 A
<b>Max. operating voltage</b>	125 VAC, 60 VDC
<b>Max. operating current</b>	1 A
<b>Max. switching capacity</b>	37.5 VA, 30W
<b>Min. permissible load (See note)</b>	10 μA at 10 mVDC

**Note:** This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50 Ω. This value may vary depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.

## ■ Coil Data

G6K- 2.5 mm coil-contact terminal spacing, standard, non-latching (G6K-2F, G6K-2G, G6K-2P)

G6K- 3.2 mm coil-contact terminal spacing, non-latching (G6K-2F-Y, G6K-2G-Y, G6K-2P-Y)

Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Pick-up voltage	Dropout voltage	Maximum voltage	Power consumption (mW)
			% of rated value			
3	33.0	91	80% max.	10% min.	150% max. @ 23°C to 70°C	Approx. 100
4.5	23.2	194				
5	21.1	237				
6	17.6	341				
9	11.3	795				
12	9.1	1,315				
24	4.6	5,220				

G6KU- 3.2 mm spacing, single coil latching (G6KU-2F-Y, G6KU-2G-Y, G6KU-2P-Y)

Rated voltage (VDC)	Rated current (mA)	Coil resistance (Ω)	Set-up voltage	Reset voltage	Maximum voltage	Power consumption (mW)
			% of rated value			
3	33.0	91	75% max.	75% min.	150% max. @ 23°C to 70°C	Approx. 100
4.5	23.2	194				
5	21.1	237				
6	17.6	341				
9	11.3	795				
12	9.1	1,315				
24	4.6	5,220				

- Note:**
- The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ± 10%.
  - The operating characteristics are measured at a coil temperature of 23°C unless otherwise specified.
  - Pick-up voltage will vary with temperature
  - The maximum voltage is the highest voltage that can be imposed on the relay coil instantaneously.

## ■ Characteristics

<b>Contact resistance (See note 1)</b>		100 mΩ max.
<b>Operate (set) time (See note 2)</b>		3 ms max. (Approx. 1.4 ms - standard. Approx. 1.2 ms - latching)
<b>Release (set) time (See note 2)</b>		3 ms max. (Approx. 1.3 ms - standard. Approx. 1.2 ms - latching)
<b>Insulation resistance (See note 3)</b>		1,000 MΩ min. (at 500 VDC)
<b>Dielectric strength</b>		1,500 VAC for 1 minute between coil contacts 1,000 VAC for 1 minute between contacts of different poles 750 VAC for 1 minute between contacts of the same pole
<b>Surge withstand voltage</b>	<b>“-Y” versions</b>	2,500 V, (2 x 10 μs) between coil and contacts. (Conforms to Bellcore specifications)
	<b>Standard versions</b>	1,500 V, (10 x 160 μs) between coil and contacts / contacts of different and same polarity. (Conforms to FCC Part 68)
<b>Vibration</b>	<b>Mechanical durability</b>	10 to 55 Hz; 5.0 mm double amplitude
	<b>Malfunction durability</b>	10 to 55 Hz; 3.3 mm double amplitude
<b>Shock</b>	<b>Mechanical durability</b>	1,000 m/s <sup>2</sup> (approx. 100G)
	<b>Malfunction durability</b>	750 m/s <sup>2</sup> (approx. 75G)
<b>Ambient temperature</b>		-40°C to 70°C with no icing or condensation
<b>Humidity</b>		5 to 85% RH
<b>Service life</b>	<b>Mechanical</b>	50,000,000 operations min. (at 36,000 operations per hour)
	<b>Electrical</b>	100,000 operations min. at rated load (at 1,800 operations per hour)
<b>Weight</b>		Approx. 0.7 g

- Note:**
- The contact resistance was measured with 10 mA at 1 VDC with a voltage-drop method.
  - Values in parentheses are typical values unless otherwise stated.
  - The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those for checking the dielectric strength.
  - Data shown are of initial value.

# Characteristic data

## Maximum Switching Capacity



## Ambient Temperature vs. Maximum Coil Voltage



## Ambient Temperature vs. Switching Current



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

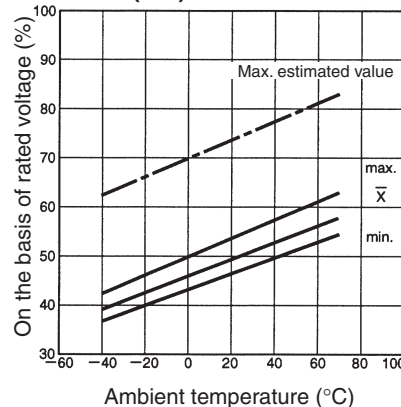
## Electrical Service Life



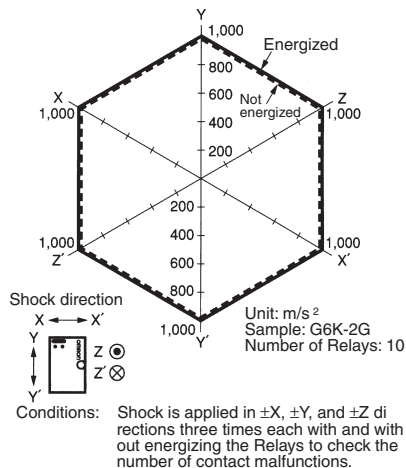
## Ambient Temperature vs. Must Operate or Must Release Voltage



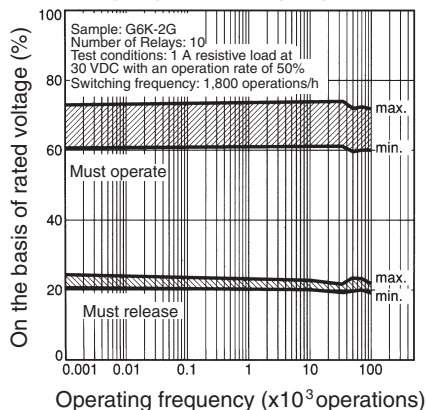
## Ambient Temperature vs. Must Set or Must Reset Voltage



## Shock Malfunction

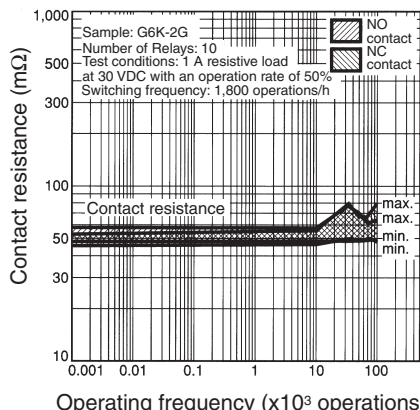


## Electrical Service Life (with Must Operate and Must Release Voltage)



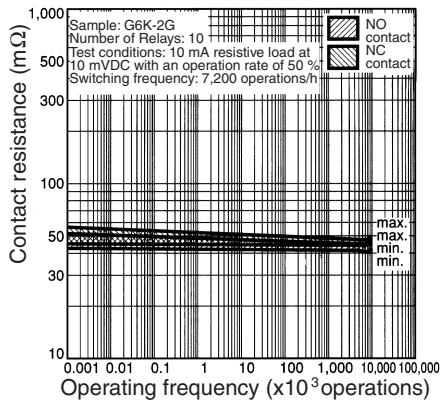
**Note:** The tests were conducted at an ambient temperature of 23°C.

## Electrical Service Life (Contact Resistance)



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

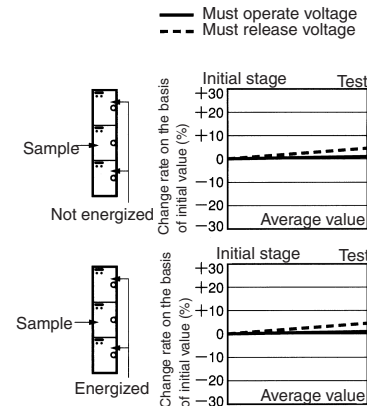
**Contact Reliability Test (See note.)**  
**G6K-2G (F/P), G6K-2G (F/P)-Y**



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



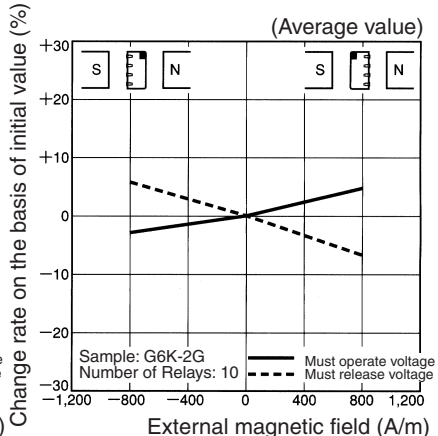
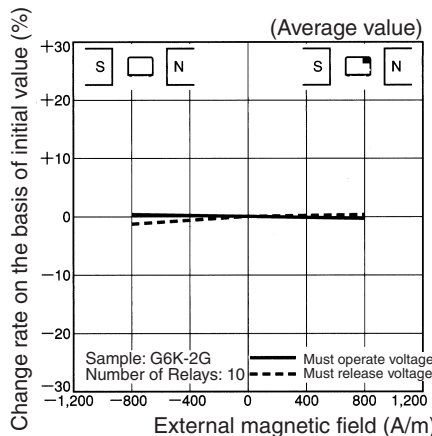
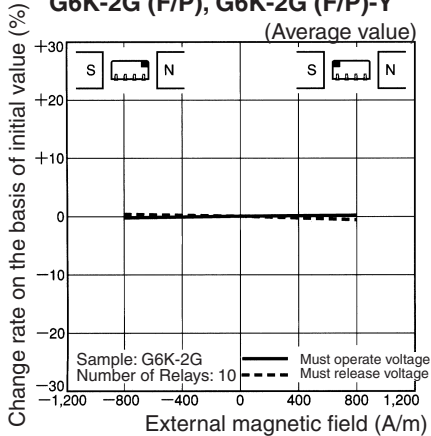
**Mutual Magnetic Interference**  
**G6K-2G (F/P), G6K-2G (F/P)-Y**



**Note 1:** The test was 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.

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



**High-frequency Characteristics (Isolation)**  
**G6K-2G (F/P), G6K-2G (F/P)-Y**



**High-frequency Characteristics (Insertion Loss)**  
**G6K-2G (F/P), G6K-2G (F/P)-Y**



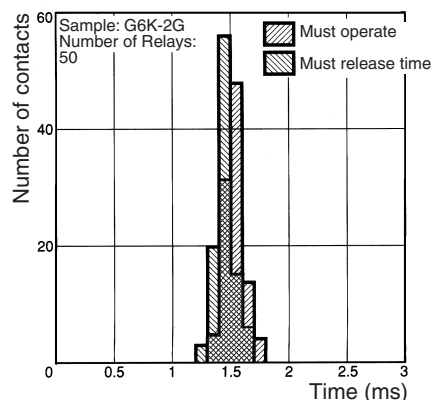
**High-frequency Characteristics (Return Loss)**  
**G6K-2G (F/P), G6K-2G (F/P)-Y**



**Note: 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.

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



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



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



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

**Approvals**

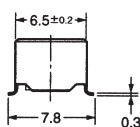
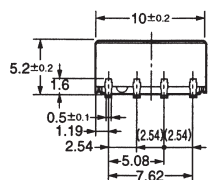
UL Recognized (File No. E41515) / CSA Certified (File No. LR31928) - - Ambient Temp. = 40°C

Contact form	Coil rating	Contact ratings	Number of test operations
DPDT	3 to 24 VDC	1 A at 30 VDC (Resistive) 0.5 A at 60 VDC (Resistive) 0.3 A at 125 VAC (General Use)	6,000

**Dimensions**

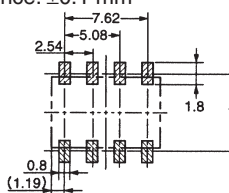
Note: All units are in millimeters unless otherwise indicated.

**G6K-2F**



**Mounting Dimensions (Top View)**

Tolerance: ±0.1 mm

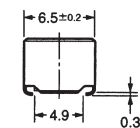
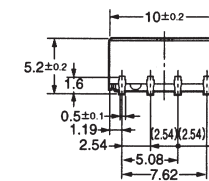
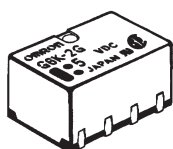


**Terminal Arrangement/  
Internal Connections  
(Top View)**



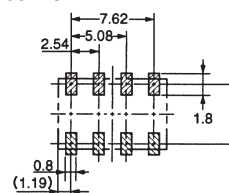
Note: Each value has a tolerance of ±0.3 mm.

**G6K-2G**

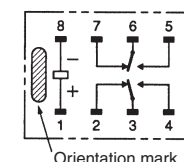


**Mounting Dimensions (Top View)**

Tolerance: ±0.1 mm

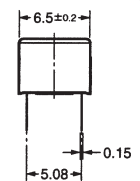
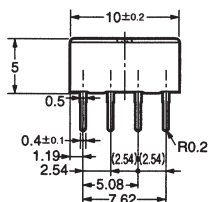
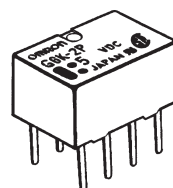


**Terminal Arrangement/  
Internal Connections  
(Top View)**



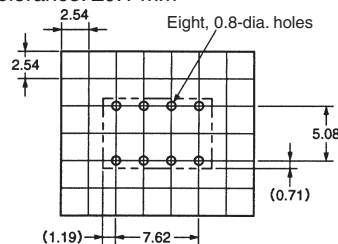
Note: Each value has a tolerance of ±0.3 mm.

**G6K-2P**

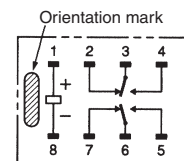


**Mounting Dimensions (Bottom View)**

Tolerance: ±0.1 mm

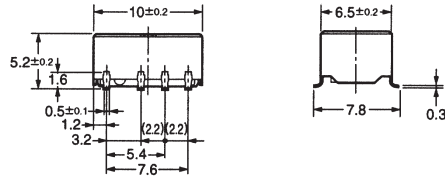
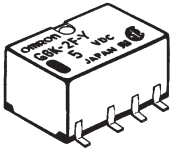


**Terminal Arrangement/  
Internal Connections  
(Bottom View)**



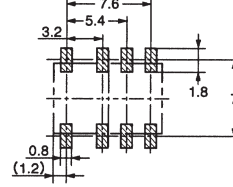
Note: Each value has a tolerance of ±0.3 mm.

**G6K-2F-Y**

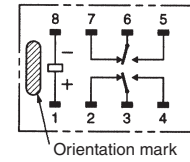


**Mounting Dimensions (Top View)**

Tolerance:  $\pm 0.1$  mm

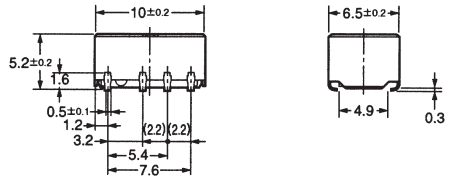
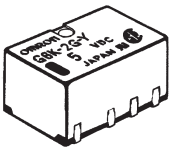


**Terminal Arrangement/  
Internal Connections  
(Top View)**



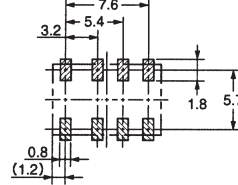
**Note:** Each value has a tolerance of  $\pm 0.3$  mm.

**G6K-2G-Y**

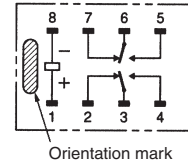


**Mounting Dimensions (Top View)**

Tolerance:  $\pm 0.1$  mm

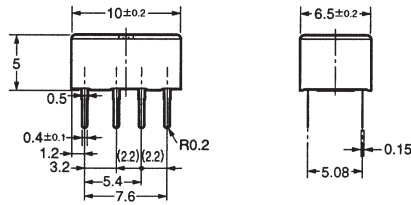
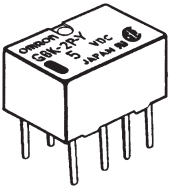


**Terminal Arrangement/  
Internal Connections  
(Top View)**



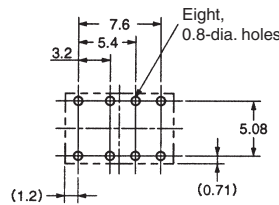
**Note:** Each value has a tolerance of  $\pm 0.3$  mm.

**G6K-2P-Y**

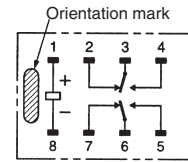


**Mounting Dimensions (Bottom View)**

Tolerance:  $\pm 0.1$  mm

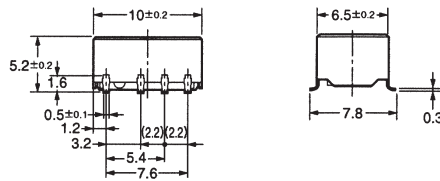
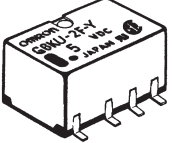


**Terminal Arrangement/  
Internal Connections  
(Bottom View)**



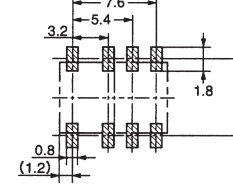
**Note:** Each value has a tolerance of  $\pm 0.3$  mm.

**G6KU-2F-Y**

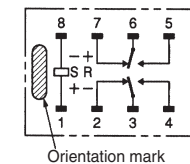


**Mounting Dimensions (Top View)**

Tolerance:  $\pm 0.1$  mm

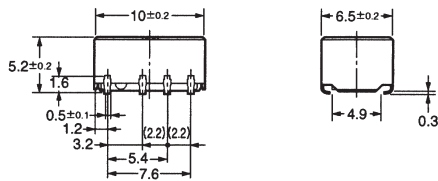
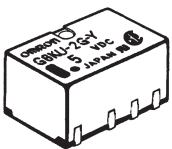


**Terminal Arrangement/  
Internal Connections  
(Top View)**



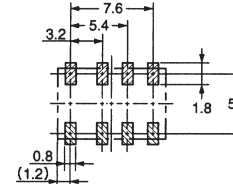
**Note:** Each value has a tolerance of  $\pm 0.3$  mm.

**G6KU-2G-Y**

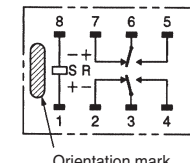


**Mounting Dimensions (Top View)**

Tolerance:  $\pm 0.1$  mm

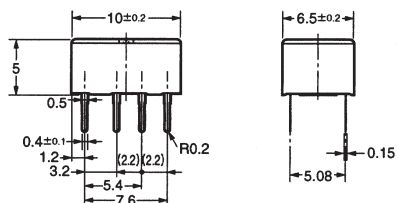
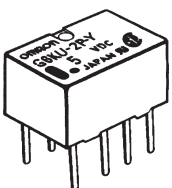


**Terminal Arrangement/  
Internal Connections  
(Top View)**



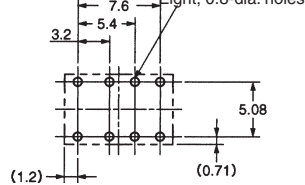
**Note:** Each value has a tolerance of  $\pm 0.3$  mm.

**G6KU-2P-Y**

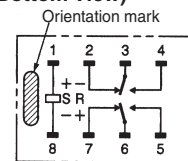


**Mounting Dimensions (Bottom View)**

Tolerance:  $\pm 0.1$  mm



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



**Note:** Each value has a tolerance of  $\pm 0.3$  mm.

## ■ Packaging Information

<b>Tube packing</b>	Standard nomenclature	50 pcs per anti-static tube
<b>Tape packing</b> (SMT versions, only)	When ordering, add "TR" before the rated coil voltage (e.g., G6K-2G-TR-DC5). Note: TR is not part of the relay model number and will not be marked on the relay.	900 pcs per reel 2 reels per box Order in box multiples (see details below)

Relays in tube packing are arranged so that the orientation mark of each Relay is on the left side.  
Be sure to reference Relay orientation when mounting the Relay to the PCB.

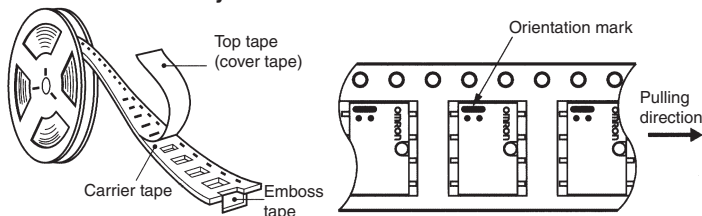


Tube length: 520 mm (stopper not included)  
No. of Relays per Tube: 50

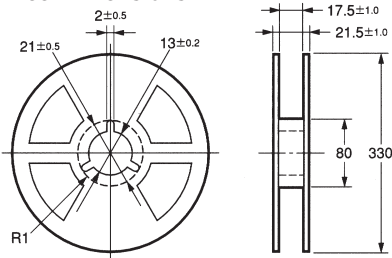
## ■ Tape and Reel Dimensions (Surface Mount Models)

- Tape type: ETX7200 (EIAJ - Electronic Industrial Association of Japan)
- Reel type: RPM-16D (EIAJ, 330 mm diameter)
- Relays per reel: 900

### 1. Direction of Relay Insertion

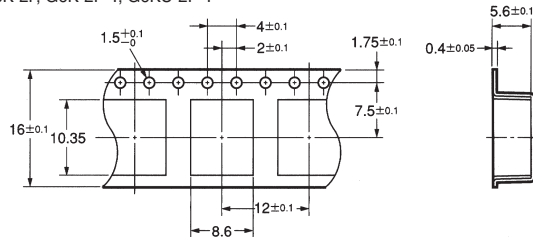


### 2. Reel Dimensions

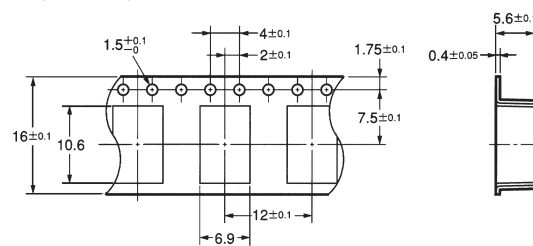


### 3. Carrier Tape Dimensions

G6K-2F, G6K-2F-Y, G6KU-2F-Y



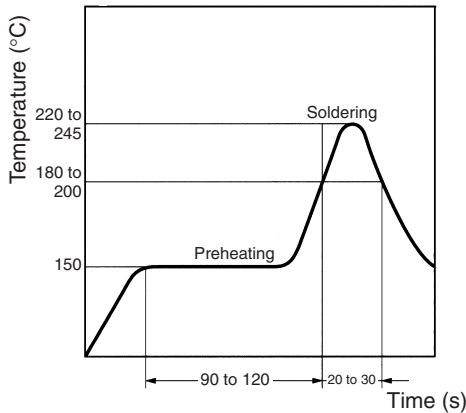
G6K-2G, G6K-2G-Y, G6KU-2G-Y



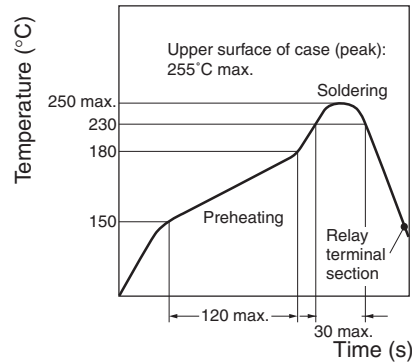
## Recommended Soldering Method

Temperature indicates the surface temperature of the PCBs.  
IRS Method (for surface mounting terminal models)

### (1) IRS Method (Mounting Solder: Lead)



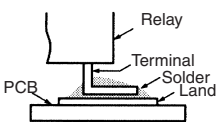
### (2) IRS Method (Mounting Solder: Lead-free)



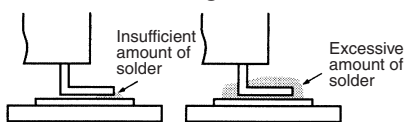
**Note:** The temperature profile indicates the temperature of the relay terminal section.

- The thickness of cream solder to be applied should be within a range between 150 and 200  $\mu\text{m}$  on OMRON's recommended PCB pattern.
- In order to perform correct soldering, it is recommended that the correct soldering conditions be maintained as shown below on the left side.

#### Correct Soldering



#### Incorrect Soldering



Visually check that the Relay is properly soldered.

## Precautions

### Correct Use

#### Handling

Do not unpack the relay until mounting it.

#### Soldering

Solder: JIS Z3282, H63A or equivalent

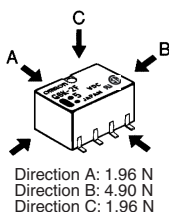
Soldering temperature: Approx. 250°C (260°C if the DWS method is used)

Soldering time: Approx. 5 s max. (approx. 2 s for the first time and approx. 3 s for the second time if the DWS method is used)

Be sure to make a molten solder level adjustment 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 securing force of each claw to the following so that the Relays characteristics will be maintained.



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

It is best to keep the relay in its packaging in a controlled environment until it is ready for mounting.

If the Relay is stored for a long time in an adverse environment with high temperature, high humidity, organic gases, or sulfide gases, sulfide or oxide films will form on the contact surfaces. These films may result in unstable contact, contact problems, or functional problems. Therefore, operate, store, or 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 or vice versa. The Latching Relay is reset before shipping. If excessive vibration or shock is imposed, however, 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 increase and the heat-resisting temperature of coil insulating sheath material. (Exceeding the heat-resisting temperature may result in burning or short-circuiting.) The maximum allowable voltage also involves important restrictions which include the following:



- Must not cause thermal changes in or deterioration of the insulating material.
- Must not cause damage to other control devices.
- Must not cause any harmful effect on people.
- Must not cause fire.

Therefore, be sure to use the maximum allowable voltage as specified in the catalog.

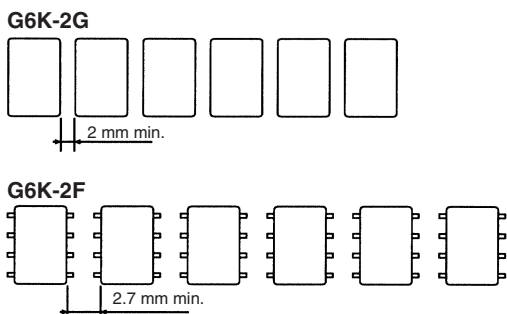
As a rule, the rated voltage must be applied to the coil. A voltage exceeding the rated value, however, can be applied to the coil provided that the voltage is less than or equal to the maximum allowable voltage. It must be noted that continuous voltage application to the coil will cause a coil temperature increase which may affect characteristics such as electrical life and coil insulation.

### Coating

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

### PCB Mounting

If two or more Relays are closely mounted with the long sides of the Relays facing each other and soldering is performed with infrared radiation, the solder may not be properly exposed to the infrared rays. Be sure to keep the proper distance between adjacent Relays as shown below to insure formation of good solder joints.



Two or more Relays may be mounted as closely as desired with the short sides of the Relays facing each other.

MEMO

A large grid of dashed lines for taking notes, consisting of 20 columns and 30 rows of small squares.

# Omron Electronic Components, LLC

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### I. GENERAL

- Definitions:** The words used herein are defined as follows.
  - Terms:** These terms and conditions
  - Seller:** Omron Electronic Components LLC and its subsidiaries
  - Buyer:** The buyer of Products, including any end user in section III through VI
  - Products:** Products and/or services of Seller
  - Including:** Including without limitation
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  - Delivery and shipping dates are estimates only; and
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- Suitability:** IT IS THE BUYER'S SOLE RESPONSIBILITY TO ENSURE THAT ANY OMRON PRODUCT IS FIT AND SUFFICIENT FOR USE IN A MOTORIZED VEHICLE APPLICATION. BUYER SHALL BE SOLELY RESPONSIBLE FOR DETERMINING APPROPRIATENESS OF THE PARTICULAR PRODUCT WITH RESPECT TO THE BUYER'S APPLICATION INCLUDING (A) ELECTRICAL OR ELECTRONIC COMPONENTS, (B) CIRCUITS, (C) SYSTEM ASSEMBLIES, (D) END PRODUCT, (E) SYSTEM, (F) MATERIALS OR SUBSTANCES OR (G) OPERATING ENVIRONMENT. Buyer acknowledges that it alone has determined that the Products will meet their requirements of the intended use in all cases. Buyer must know and observe all prohibitions of use applicable to the Product/s.
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To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

# OMRON®

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