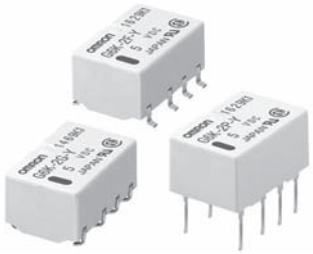
G6K
Surface Mounting Relay

Surface Mounting Relay with the World's Smallest Mounting Area



- Subminiature model as small as 5.2 (H) × 6.5 (W) × 10 (L) mm is ideal for high-density mounting (G6K(U)-2F(-Y)).
- Low profile of 5.2 mm improves mounting efficiency (G6K(U)-2F(-Y)).
- Light weight of 0.7 g contributes to higher speed mounting.
- Surface mounting terminal models incorporate a unique terminal structure with high infrared irradiation efficiency which allows the terminal temperature to rise easily when mounting the IRS, thus ensuring excellent soldering.
- Ensures a dielectric strength of 1,500 VAC and conforms to FCC Part 68 (i.e., withstanding an impulse withstand voltage of 1,500 V for 10 × 160 μs).
- -Y models offer an impulse withstand voltage of 2,500 V for 2 × 10 μs (conforms to Telcordia specifications) by optimizing the distance between coil and contacts.
- Standard model conforms to UL/CSA standards, certified by BSI (EN62368-1).
- Models available with a 2.54-mm terminal pitch.
- Rated carry current: 2A.

RoHS Compliant

■Model Number Legend

G6K□-□□-□
1 2 3 4

1. Relay function
None : Single-side stable model
U : Single-winding latching model

2. Number of contact poles/Contact form
2 : 2-pole/DPDT (2c)

3. Terminal Shape
F : Outside-L surface mounting terminals
G : Inside-L surface mounting terminals
P : PCB terminals

4. Terminal Arrangement - Impulse withstand voltage

None	:Terminal Arrangement	2.54 mm pitch
	Impulse withstand voltage	Between coil and contacts (1.5 kV for 10 × 160 μs)
Y	:Terminal Arrangement	Between Coil-Contact Terminal 3.2 mm Between Contact Terminal 2.2 mm pitch
	Impulse withstand voltage	Between coil and contacts (Conforms to Telcordia specifications: 2.5 kV for 2 × 10 μs, 1.5kV for 10 × 160 μs)

■Application Examples

- Telecommunication equipment
- Office automation machines
- Test and measurement equipment
- Building automation equipment
- Security equipment
- Industrial equipment
- Amusement equipment
- Home appliances

■Ordering Information

●Surface Mounting Terminal Standard Models

Enclosure rating	Relay Function	Contact form	Packing	Tube Packing			Tape Packing			
				Model	Rated coil voltage	Minimum packing unit	Model	Rated coil voltage	Minimum packing unit	Minimum ordering unit (tape packing)
Fully sealed	Single-side stable	DPDT (2c)		**G6K-2F**	3 VDC	50 pcs/tube	**G6K-2F-TR**	3 VDC	900 pcs/reel	1,800 pcs/2 reels
					4.5 VDC			4.5 VDC		
					5 VDC			5 VDC		
					12 VDC			12 VDC		
					24 VDC			24 VDC		
				Highly insulated **G6K-2F-Y**	3 VDC		Highly insulated **G6K-2F-Y-TR**	3 VDC		
					4.5 VDC			4.5 VDC		
					5 VDC			5 VDC		
					12 VDC			12 VDC		
					24 VDC			24 VDC		
				G6K-2G	3 VDC		**G6K-2G-TR**	3 VDC		
					4.5 VDC			4.5 VDC		
					5 VDC			5 VDC		
					12 VDC			12 VDC		
					24 VDC			24 VDC		
				Highly insulated **G6K-2G-Y**	3 VDC		Highly insulated **G6K-2G-Y-TR**	3 VDC		
					4.5 VDC			4.5 VDC		
					5 VDC			5 VDC		
					12 VDC			12 VDC		
					24 VDC			24 VDC		
	Single-winding latching			Highly insulated **G6KU-2F-Y**	3 VDC		Highly insulated **G6KU-2F-Y-TR**	3 VDC		
					4.5 VDC			4.5 VDC		
					5 VDC			5 VDC		
					12 VDC			12 VDC		
					24 VDC			24 VDC		
				Highly insulated **G6KU-2G-Y**	3 VDC		Highly insulated **G6KU-2G-Y-TR**	3 VDC		
					4.5 VDC			4.5 VDC		
					5 VDC			5 VDC		
					12 VDC			12 VDC		
					24 VDC			24 VDC		

●PCB Terminal Standard Models

Enclosure rating	Relay Function	Contact form	Model	Rated coil voltage	Minimum packing unit
Fully sealed	Single-side stable	DPDT (2c)	**G6K-2P**	3 VDC	50 pcs/tube
				4.5 VDC	
				5 VDC	
				12 VDC	
				24 VDC	
			Highly insulated **G6K-2P-Y**	3 VDC	
				4.5 VDC	
				5 VDC	
				12 VDC	
				24 VDC	
	Single-winding latching		Highly insulated **G6KU-2P-Y**	3 VDC	
				4.5 VDC	
				5 VDC	
				12 VDC	
				24 VDC	

Note 1. When ordering, add the rated coil voltage to the model number.
Example: G6K-2F 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.
Note 2. When ordering tape packing, add -TR" to the model number.
Be sure since -TR" is not part of the relay model number, it is not marked on the relay case.
When ordering tape packing, minimum order unit is 2 reels (900 pcs × 2 = 1,800 pcs).
Note 3. Surface mounting terminal (SMT) standard models are shipped in moisture-proof package.
PCB terminal standard types do not require moisture proof packaging and therefore shipped in non-moisture-proof package.

■Ratings

Coil: Single-side Stable Models

Item / 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			
3 VDC	33.0	91	80% max.	10% min.	150%	Approx. 100
4.5 VDC	23.2	194				
5 VDC	21.1	237				
12 VDC	9.1	1,315				
24 VDC	4.6	5,220				

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
Note 2. The operating characteristics are measured at a coil temperature of 23°C.
Note 3. The maximum voltage is the highest voltage that can be imposed on the relay coil instantaneously.

Coil: Single-winding Latching Models (G6KU-2F-Y, G6KU-2G-Y, G6KU-2P-Y)

Item / 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			
3 VDC	33.0	91	75% max.	75% max.	150%	Approx. 100
4.5 VDC	23.2	194				
5 VDC	21.1	237				
12 VDC	9.1	1,315				
24 VDC	4.6	5,220				

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
Note 2. The operating characteristics are measured at a coil temperature of 23°C.
Note 3. The maximum voltage is the highest voltage that can be imposed on the relay coil instantaneously.

Contacts

Item / Load	Resistive load
Contact type	Bifurcated crossbar
Contact material	Ag (Au-Alloy contact)
Rated load	0.3 A at 125 VAC, 1 A at 30 VDC
Rated carry current	2 A
Max. switching voltage	125 VAC, 60 VDC
Max. switching current	1 A

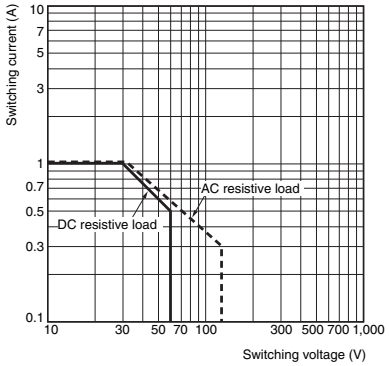
■Characteristics

Item / Relay Function		Single-side stable models		Single-winding latching models
		G6K-2F, G6K-2G, G6K-2P	G6K-2F-Y, G6K-2G-Y, G6K-2P-Y	G6KU-2F-Y, G6KU-2G-Y, G6KU-2P-Y
Contact resistance *1		100 mΩ max.		
Operating (set) time		3 ms max.		
Release (reset) time		3 ms max.		
Minimum set/reset signal width		–		10 ms
Insulation resistance *2		1,000 MΩ min. (at 500 VDC)		
Dielectric strength	Between coil and contacts	1,500 VAC, 50/60 Hz for 1 min		
	Between contacts of different polarity	1,000 VAC, 50/60 Hz for 1 min		
	Between contacts of the same polarity	750 VAC, 50/60 Hz for 1 min		
Impulse withstand voltage	Between coil and contacts	1,500 V (10 × 160 μs)	2,500 V (2 × 10 μs), 1,500 V (10 × 160 μs)	
	Between contacts of different polarity	1,500 V (10 × 160 μs)		
	Between contacts of the same polarity			
Vibration resistance	Destruction	10-55-10 Hz, 2.5 mm single amplitude (5 mm double amplitude) and 55 to 500 Hz, 300 m/s²		
	Malfunction	10-55-10 Hz, 1.65 mm single amplitude (3.3 mm double amplitude) and 55 to 500 Hz, 200 m/s²		
Shock resistance	Destruction	1,000 m/s²		
	Malfunction	750 m/s²		
Durability	Mechanical	50,000,000 operations min. (at 36,000 operations/hour)		
	Electrical	100,000 operations min. (with a rated load at 1,800 operations/hour)		
Failure rate (P level) *3		10 μA at 10 mVDC		
Ambient operating temperature		-40 to 70°C (with no icing or condensation)		
Ambient operating humidity		5% to 85%		
Weight		Approx. 0.7 g		

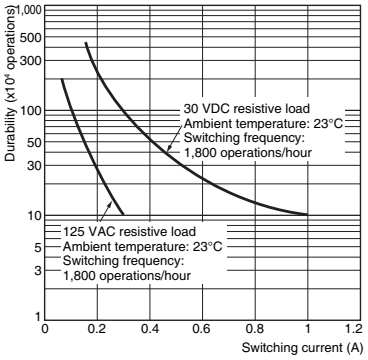
Note: The above values are initial values.
*1. The contact resistance was measured with 10 mA at 1 VDC with a voltage-drop method.
*2. The insulation resistance was measured with a 500 VDC megohmmeter applied to the same parts as those used for checking the dielectric strength.
*3. This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50 Ω. This value may vary depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.

■Engineering Data

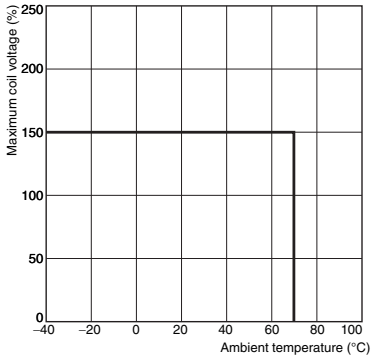
●Maximum Switching Capacity



●Durability

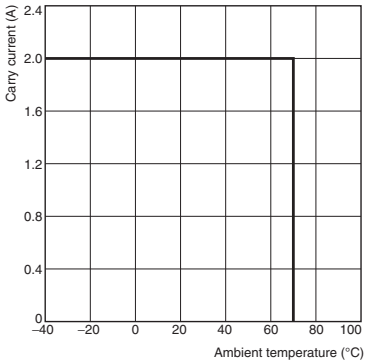


●Ambient Temperature vs. Maximum Coil Voltage

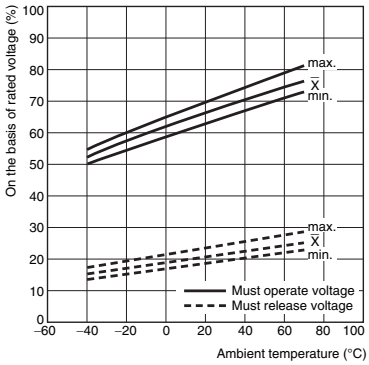


Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

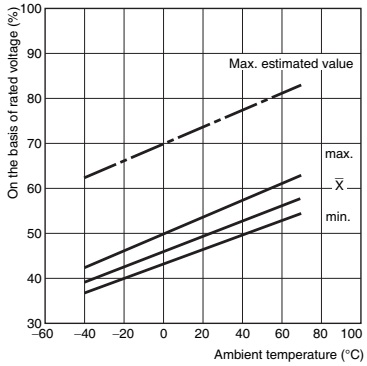
●Ambient Temperature vs. Carry Current



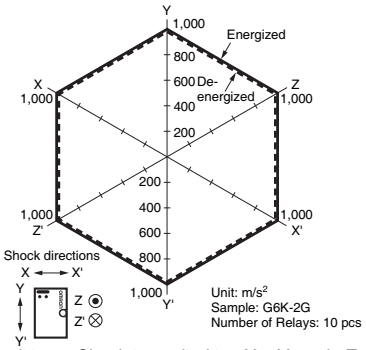
●Ambient Temperature vs. Must Operate or Must Release Voltage G6K-2G (F/P), G6K-2G (F/P)-Y



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

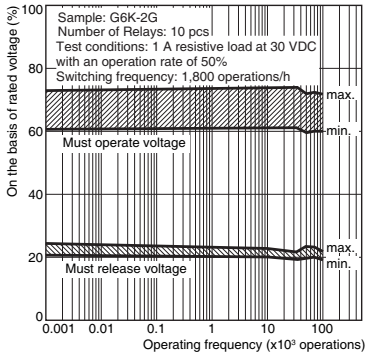


●Shock Malfunction

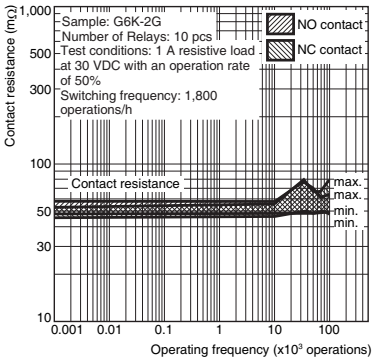


Conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with and without energizing the Relays to check the number of contact malfunctions.

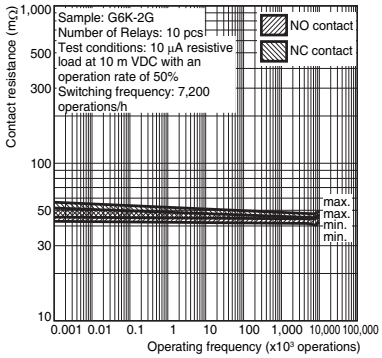
●Electrical Durability (with Must Operate and Must Release Voltage) *1 G6K-2G (F/P), G6K-2G (F/P)-Y



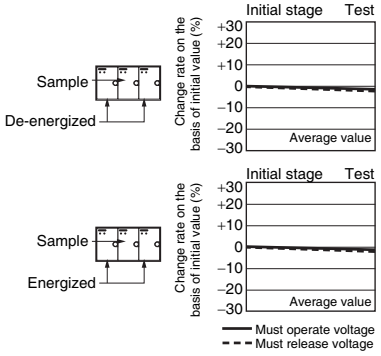
●Electrical Durability (Contact Resistance) *1 G6K-2G (F/P), G6K-2G (F/P)-Y



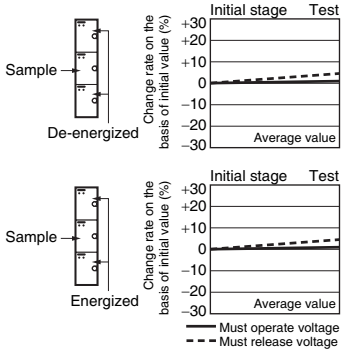
●Contact Reliability Test *1, *2 G6K-2G (F/P), G6K-2G (F/P)-Y



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



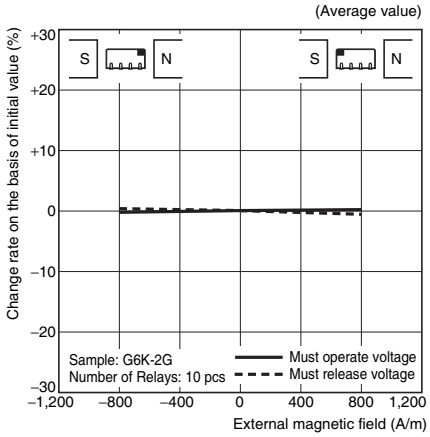
●Mutual Magnetic Interference G6K-2G (F/P), G6K-2G (F/P)-Y

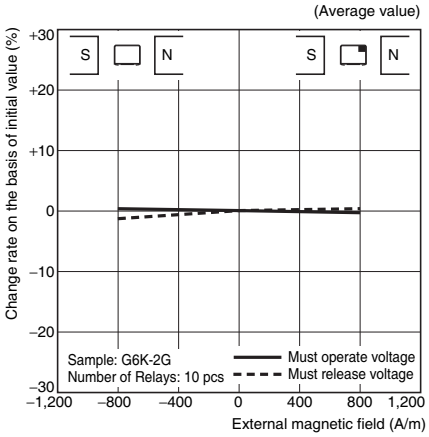


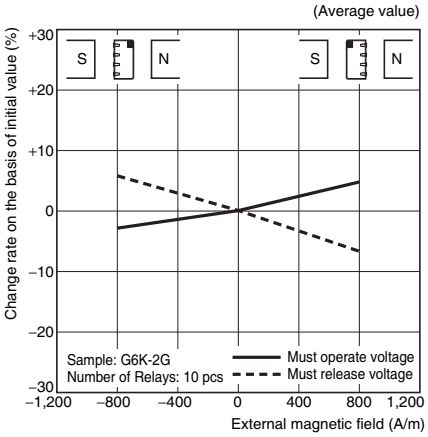
*1. The test was conducted at an ambient temperature of 23°C.

*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.

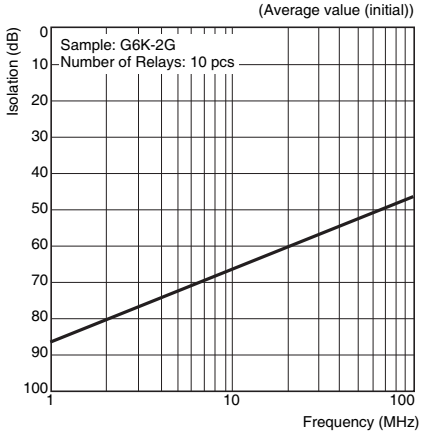
●External Magnetic Interference
G6K-2G (F/P), G6K-2G (F/P)-Y



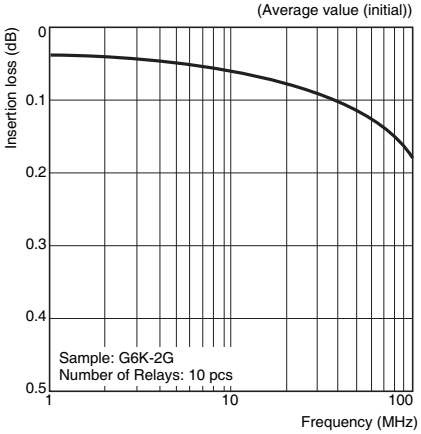




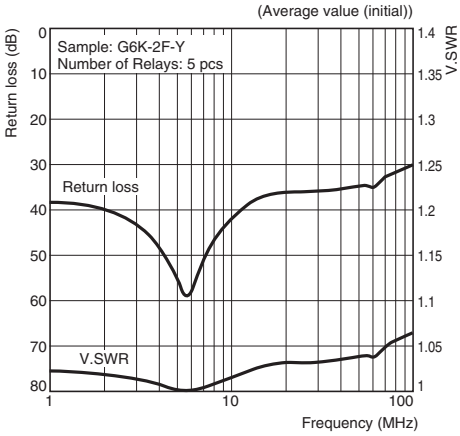
●High-frequency Characteristics (Isolation) *1, *2
G6K-2G (F/P), G6K-2G (F/P)-Y



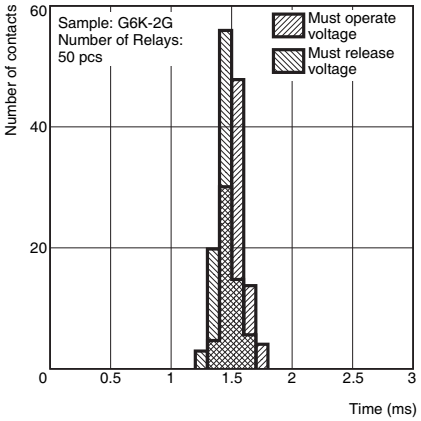
●High-frequency Characteristics (Insertion Loss)) *1, *2
G6K-2G (F/P), G6K-2G (F/P)-Y



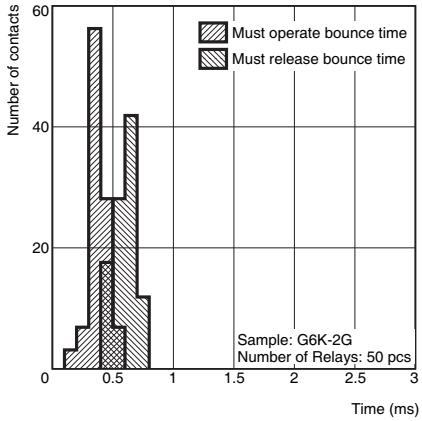
●High-frequency Characteristics (Return Loss) *1, *2
G6K-2G (F/P),G6K-2G (F/P)-Y



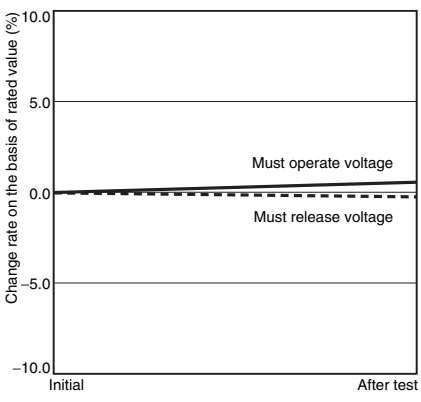
●Must Operate and Must Release Time Distribution *1
G6K-2G (F/P), G6K-2G (F/P)-Y



●Must Operate and Must Release Bounce Time Distribution *1
G6K-2G (F/P) , G6K-2G (F/P)-Y



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

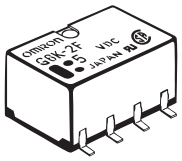


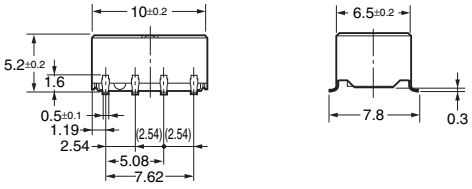
*1. The tests were conducted at an ambient temperature of 23°C.
*2. High-frequency characteristics depend on the PCB to which the Relay is mounted. Always check these characteristics including endurance in the actual machine before use.

■Dimensions (Unit: mm)

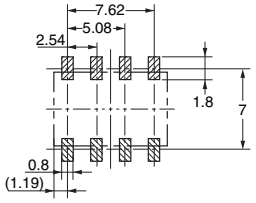
●Single-side Stable

G6K-2F



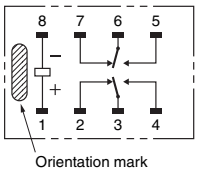


Mounting Dimensions (TOP VIEW)
Tolerance: ±0.1 mm



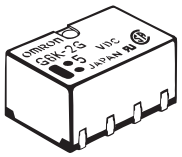
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2. The coplanarity of the terminals is 0.1 mm max.

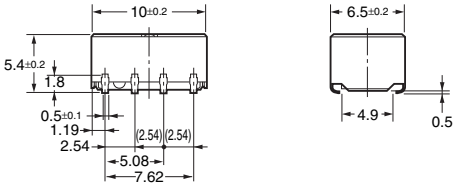
Terminal Arrangement/ Internal Connections (TOP VIEW)



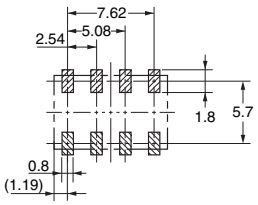
Note: Check carefully the coil polarity of the Relay.

G6K-2G



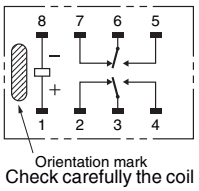


Mounting Dimensions (TOP VIEW)
Tolerance: ±0.1 mm



Note 1. Each value has a tolerance of ±0.3 mm.
Note 2. The coplanarity of the terminals is 0.1 mm max.

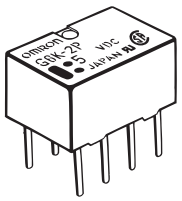
Terminal Arrangement/ Internal Connections (TOP VIEW)

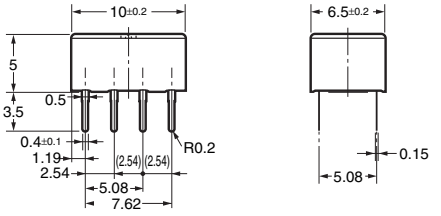


Note: Check carefully the coil polarity of the Relay.

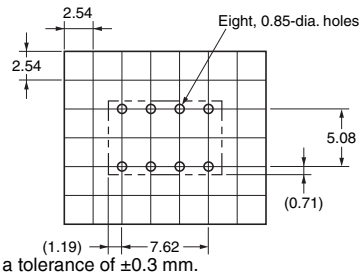
G
6
K

G6K-2P



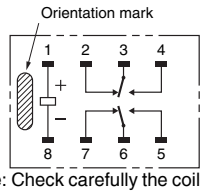


PCB Mounting Holes (Bottom VIEW)
Tolerance: ±0.1 mm



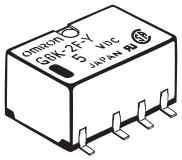
Note: Each value has a tolerance of ±0.3 mm.

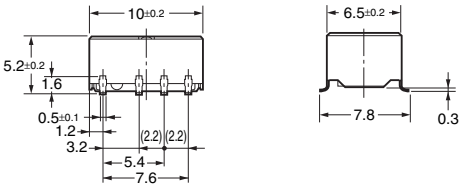
Terminal Arrangement/ Internal Connections (Bottom VIEW)



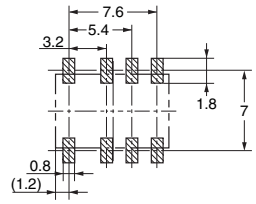
Note: Check carefully the coil polarity of the Relay.

G6K-2F-Y



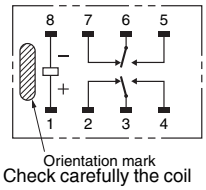


Mounting Dimensions (TOP VIEW)
Tolerance: ±0.1 mm



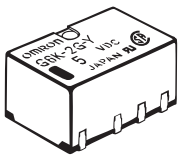
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2. The coplanarity of the terminals is 0.1 mm max.

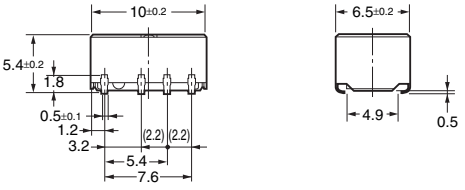
Terminal Arrangement/ Internal Connections (TOP VIEW)



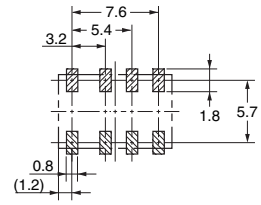
Note: Check carefully the coil polarity of the Relay.

G6K-2G-Y



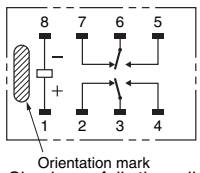


Mounting Dimensions (TOP VIEW)
Tolerance: ±0.1 mm



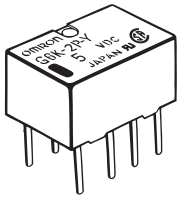
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2. The coplanarity of the terminals is 0.1 mm max.

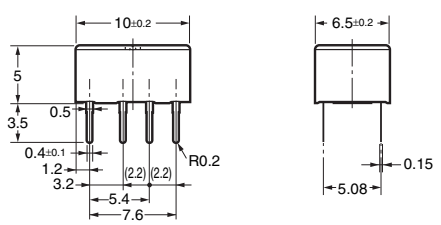
Terminal Arrangement/ Internal Connections (TOP VIEW)



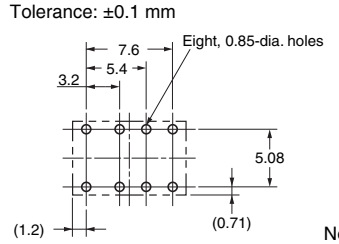
Note: Check carefully the coil polarity of the Relay.

G6K-2P-Y



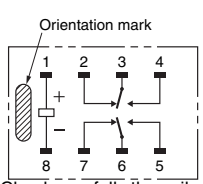


PCB Mounting Holes (BOTTOM VIEW)
Tolerance: ±0.1 mm



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

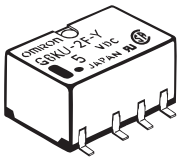
Terminal Arrangement/ Internal Connections (BOTTOM VIEW)

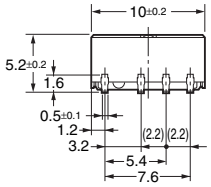


Note: Check carefully the coil polarity of the Relay.

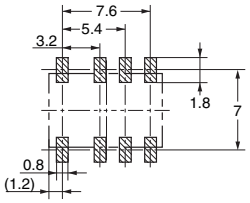
●Single-winding Latching

G6KU-2F-Y

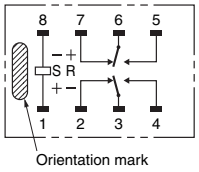




Mounting Dimensions (TOP VIEW)
Tolerance: ±0.1 mm



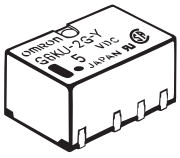
Terminal Arrangement/ Internal Connections (TOP VIEW)

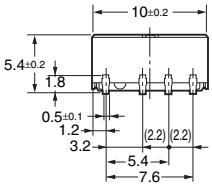


Note 1. Each value has a tolerance of ±0.3 mm.
Note 2. The coplanarity of the terminals is 0.1 mm max.

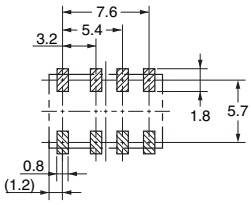
Note: Check carefully the coil polarity of the Relay.

G6KU-2G-Y

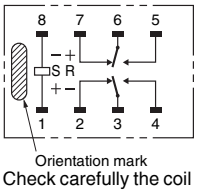




Mounting Dimensions (TOP VIEW)
Tolerance: ±0.1 mm



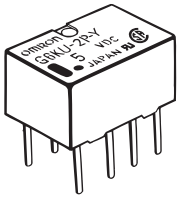
Terminal Arrangement/ Internal Connections (TOP VIEW)

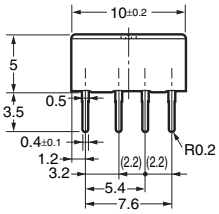


Note 1. Each value has a tolerance of ±0.3 mm.
Note 2. The coplanarity of the terminals is 0.1 mm max.

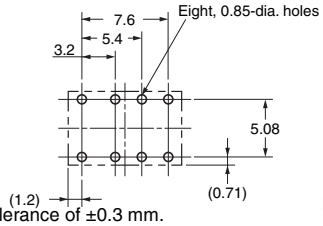
Note: Check carefully the coil polarity of the Relay.

G6KU-2P-Y

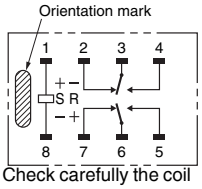




PCB Mounting Holes (BOTTOM VIEW)
Tolerance: ±0.1 mm



Terminal Arrangement/ Internal Connections (BOTTOM VIEW)



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

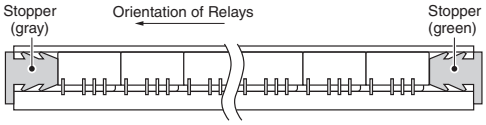
Note: Check carefully the coil polarity of the Relay.

■Tube Packing and Tape Packing

Surface mounting terminal (SMT) standard models are shipped in moisture-proof package, and PCB terminal standard types do not require moisture proof packaging and therefore shipped in non-moisture-proof package.
Please refer to "Correct Use" for handling after opening moisture-proof packaging for Surface mounting terminal (SMT) models.

(1) Tube Packing

- Relays in tube packing are arranged so that the orientation mark of each Relay in on the left side. Fifty Relays are packed on one tube.
  Be sure not to make mistakes in Relay orientation when mounting the Relay to the PCB.

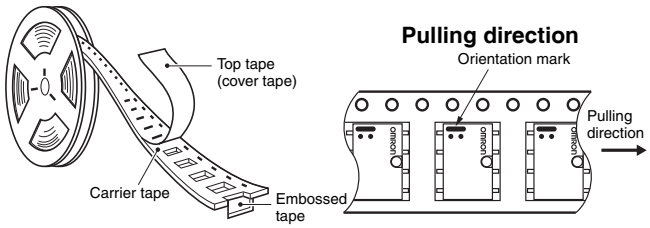


Tube length: 520 mm (stopper not included)
No. of Relays per tube: 50 pcs

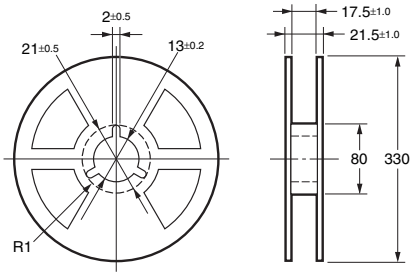
(2) Tape Packing (Surface Mounting Terminal Models)

- When ordering Relays in tape packing, add the prefix “-TR” to the model number, otherwise the Relays in tube packing will be provided.
  Relays per Reel: 900 pcs
  Minimum packing unit: 2 reels (1,800 pcs)

1. Direction of Relay Insertion

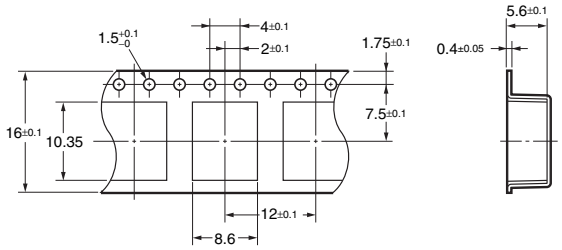


2. Reel Dimensions

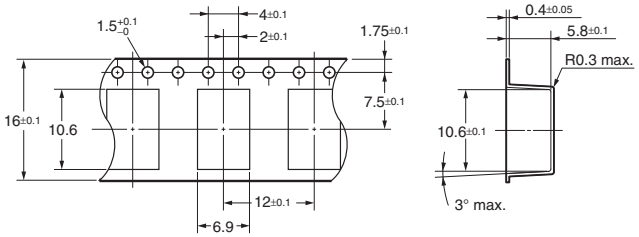


3. Carrier Tape Dimensions

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



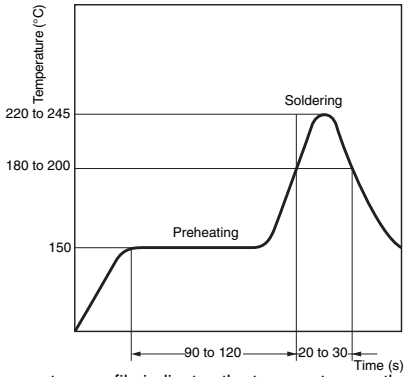
G6K-2G, G6K-2G-Y, G6KU-2G-Y



■Recommended Soldering Method

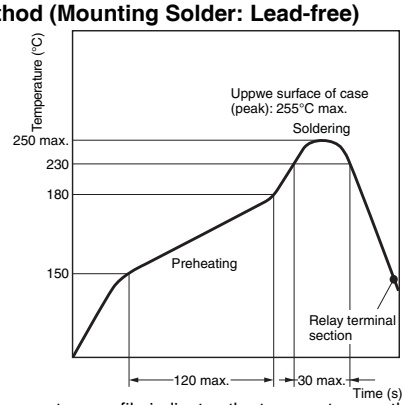
●IRS Method (for Surface-mounting Terminal Relays)

(1) IRS Method (Mounting Solder: Lead)



(The temperature profile indicates the temperature on the circuit board.)

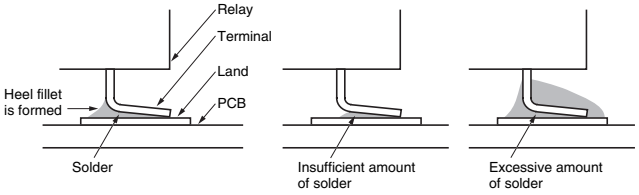
(2) IRS Method (Mounting Solder: Lead-free)



(The temperature profile indicates the temperature on the PCB.)

- The thickness of cream solder to be applied should be within a range between 150 and 200 μm 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.

■Approved Standards

UL recognized: UL1950 (File No. E41515)
CSA certified: C22.2 No. 950 (File No. LR31928)

Contact form	Coil rating	Contact rating	Number of test operations
DPDT (2c)	G6K-2G(F/P): 3 to 24 VDC G6K(U)-2G(F/P)-Y: 3 to 24 VDC	2 A, 30 VDC at 40°C 0.5 A, 60 VDC at 40°C 0.3 A, 125 VAC at 40°C	6,000

BSI (EN62368-1) (File No.VC689955)

Contact form	Isolation category	Voltage
DPDT (2c)	Basic Insulation	125 VAC

■Precautions

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

Correct Use

●Long-term Continuously ON Contacts

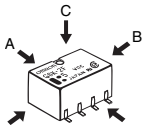
- Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts because the heat generated by the coil itself will affect the insulation, causing a film to develop on the contact surfaces. We recommend using a latching relay (magnetic-holding relay) in this kind of circuit. If a single-side stable model must be used in this kind of circuit, we recommend using a fail-safe circuit design that provides protection against contact failure or coil burnout.

●Relay Handling

- Use the Relay as soon as possible after opening the moistureproof package. (As a guideline, use the Relay within one week at 30°C or less and 60% RH or less.) 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 sealed the package with adhesive tape.
- 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.

●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.



Direction A: 1.96 N max.
Direction B: 4.90 N max.
Direction C: 1.96 N max.

●Environmental Conditions During Operation, Storage, and Transportation

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

●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 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 the coil will cause a coil temperature increase thus affecting characteristics such as electrical life and resulting in the deterioration of coil insulation.

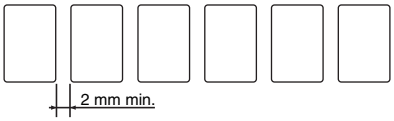
●Coating

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

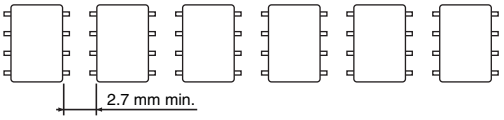
●PCB Mounting

- 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.

G6K-2G



G6K-2F



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

• 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.

OMRON Corporation
Electronic and Mechanical Components Company
Contact: www.omron.com/ecb
Cat. No. K106-E1-11
0118(0207)(O)