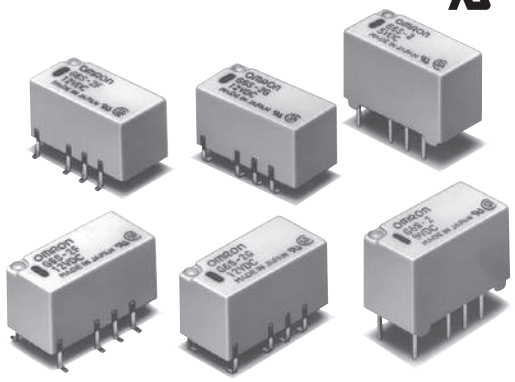
G6S

Surface-mounting Relay

Surface-mounting, double-pole signal switching Relay, with terminals jutting out from both sides of the case



- Long terminals for ideal for soldering and mounting reliability. (Surface mounting terminal models)
- Space-saving inside-L terminal. (Surface mounting terminal models)
- Unique terminal construction allowing the terminal temperature to rise easily, ideal for soldering reliability. (Surface mounting terminal models)
- High dielectric strength (2,000 VAC) and impulse withstand voltage between coil and contacts (2,500 V, 2 × 10 μs: Telcordia requirements).
- High sensitivity with 140 mW rated power consumption.
- Ultra-miniature at 9.4 mm (H) × 7.5 mm (W) × 15 mm (L).
- Applicable to IRS using heat-resistant material.
- Standard model conforms to UL/CSA standards.
- Model with PCB terminals (G6S□-2) is added to this series.
- EN60950 certified type is available. (-Y type)

RoHS Compliant

G6S

■Model Number Legend

G6S□-□□-□
1 2 3 4

1. Relay Function

None : Single-side stable
U : Single-winding latching
K : Double-winding latching

2. Number of poles/ Contact form

2: 2-pole/DPDT (2c)

3. Terminal Shape

None : PCB terminals
F : Outside-L surface mounting terminals
G : Inside-L surface mounting terminals

4. Approved Standards

None : UL/CSA
Y : EN60950 certified

■Application Examples

- Telecommunication equipment
- Measurement devices
- Office automation machines
- Audio-visual products.

■Ordering Information

●Surface mounting terminal standard models (UL, CSA certified)

Enclosure rating	Relay Function	Single-side stable		Single-winding latching		Double-winding latching		Minimum packing unit	Minimum ordering unit (tape packing)
	Contact form	Model	Rated coil voltage	Model	Rated coil voltage	Model	Rated coil voltage		
Fully sealed	DPDT (2c)	**G6S-2F G6S-2G**	3 VDC	**G6SU-2F G6SU-2G**	3 VDC	**G6SK-2F G6SK-2G**	3 VDC	50 pcs/tube (400 pcs/reel)	800 pcs/ 2 reels
			4.5 VDC		4.5 VDC		4.5 VDC		
			5 VDC		5 VDC		5 VDC		
			12 VDC		12 VDC		12 VDC		
			24 VDC		24 VDC		24 VDC		

●Surface mounting terminal standard models (EN60950 certified)

Enclosure rating	Relay Function	Single-side stable		Minimum packing unit	Minimum ordering unit (tape packing)
	Contact form	Model	Rated coil voltage		
Fully sealed	DPDT (2c)	**G6S-2F-Y G6S-2G-Y**	5 VDC	50 pcs/tube (400 pcs/reel)	800 pcs/ 2 reels
			12 VDC		
			24 VDC		

Note 1. When ordering, add the rated coil voltage to the model number.
Example: G6S-2F 3 VDC
Rated coil voltage

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.

●PCB Terminal Standard Models (UL, CSA certified)

Enclosure rating	Relay Function	Single-side stable		Single-winding latching		Double-winding latching		Minimum packing unit
	Contact form	Model	Rated coil voltage	Model	Rated coil voltage	Model	Rated coil voltage	
Fully sealed	DPDT (2c)	**G6S-2**	3 VDC	**G6SU-2**	3 VDC	**G6SK-2**	3 VDC	50 pcs/tube
			4.5 VDC		4.5 VDC		4.5 VDC	
			5 VDC		5 VDC		5 VDC	
			12 VDC		12 VDC		12 VDC	
			24 VDC		24 VDC		24 VDC	

●PCB Terminal Standard Models (EN60950 certified)

Enclosure rating	Relay Function	Single-side stable		Minimum packing unit
	Contact form	Model	Rated coil voltage	
Fully sealed	DPDT (2c)	**G6S-2-Y**	5 VDC	50 pcs/tube
			12 VDC	
			24 VDC	

Note: When ordering, add the rated coil voltage to the model number.
Example: G6S-2 3 VDC
Rated coil voltage

■Ratings

●Single-side Stable Model (G6S-2, G6S-2F, G6S-2G)

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	46.7	64.3	75% max.	10% min.	200% (at 23°C)	Approx. 140
4.5 VDC	31.0	145				
5 VDC	28.1	178				
12 VDC	11.7	1,028				
24 VDC	8.3	2,880			170% (at 23°C)	Approx. 200

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
2. 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.

●Contacts

Item / Load	Resistive load
Contact type	Bifurcated crossbar
Contact material	Ag (Au-Alloy)
Rated load	0.5 A at 125 VAC; 2 A at 30 VDC
Rated carry current	2 A
Max. switching voltage	250 VAC, 220 VDC
Max. switching current	2 A

●Single-winding Latching Model (G6SU-2, G6SU-2F, G6SU-2G)

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Must set voltage (V)	Must reset voltage (V)	Max. voltage (V)	Power consumption (mW)
			% of rated voltage			
3 VDC	33.3	90	75% max.	75% max.	180% (at 23°C)	Approx. 100
4.5 VDC	22.2	203				
5 VDC	20	250				
12 VDC	8.3	1,440				
24 VDC	6.3	1,152				Approx. 150

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
2. 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.

●Double-winding Latching Model (G6SK-2, G6SK-2F, G6SK-2G)

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Must set voltage (V)	Must reset voltage (V)	Max. voltage (V)	Power consumption (mW)
			% of rated voltage			
3 VDC	66.6	45	75% max.	75% max.	170% (at 23°C)	Approx. 200
4.5 VDC	44.4	101				
5 VDC	40	125				
12 VDC	16.7	720				
24 VDC	12.5	1,920			140% (at 23°C)	Approx. 300

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
2. 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.

●EN60950 certified Model (G6S-2F-Y, G6S-2G-Y, G6S-2-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			
5 VDC	40	125	75% max.	10% min.	170% (at 23°C)	Approx. 200
12 VDC	16.7	720				
24 VDC	9.6	2,504				Approx. 230

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
2. 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

Item	Relay Function	Single-side Stable G6S-2, G6S-2F, G6S-2G	Single-winding Latching G6SU-2, G6SU-2F, G6SU-2G	Double-winding Latching G6SK-2, G6SK-2F, G6SK-2G	EN60950 certified G6S-2F-Y, G6S-2G-Y, G6S-2-Y
Contact resistance *1		75 mΩ max.			
Operate (set) time		4 ms max.			
Release (reset) time		4 ms max.			
Min. set/reset pulse width		–	10 ms		–
Insulation resistance *2		1,000 MΩ min. (at 500 VDC)			
Dielectric strength	Between coil and contacts	2,000 VAC, 50/60 Hz for 1 min		1,000 VAC, 50/60 Hz for 1 min	2,000 VAC, 50/60 Hz for 1 min
	Between contacts of different polarity	1,500 VAC, 50/60 Hz for 1 min			
	Between contacts of the same polarity	1,500 VAC, 50/60 Hz for 1 min			
	Between set and reset coil	–		500 VAC, 50/60 Hz for 1 min	–
Impulse withstand voltage	Between coil and contacts	2,500 V (2 × 10 μs); 1,500 V (10 × 160 μs)		1,500 V (10 × 160 μs)	2,500 V (2 × 10 μs); 1,500 V (10 × 160 μs)
	Between contacts of different polarity	2,500 V (2 × 10 μs); 1,500 V (10 × 160 μs)			
	Between contacts of the same polarity	1,500 V (10 × 160 μs)			
Vibration resistance	Destruction	10 to 55 to 10 Hz, 2.5 mm single amplitude (5 mm double amplitude)			
	Malfunction	10 to 55 to 10 Hz, 1.65 mm single amplitude (3.3 mm double amplitude)			
Shock resistance	Destruction	1,000 m/s²			
	Malfunction	750 m/s²			
Durability	Mechanical	100,000,000 operations min. (at 36,000 operations/hr)			
	Electrical	100,000 operations min. for AC (at 1,800 operations/h with rated load) 100,000 operations min. for DC (at 1,200 operations/h with rated load)			
Failure rate (P level) (reference value) *3		10 μA at 10 m VDC			
Ambient operating temperature		-40°C to 85°C (with no icing or condensation), and -40°C to 70°C (with no icing or condensation) only for double-winding latching 24 VDC type and EN60950 standard approved 24 VDC type			
Ambient operating humidity		5% to 85%			
Weight		Approx. 2 g			

Note: The above values are initial values.

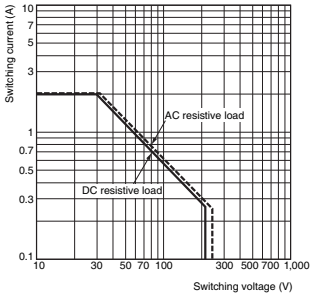
*1. The contact resistance was measured with 10 mA at 1 VDC with a voltage drop method.

*2. The insulation resistance was measured with a 500 VDC megohmmeter applied to the same parts as those used for checking the dielectric strength (except between the set and reset coil).

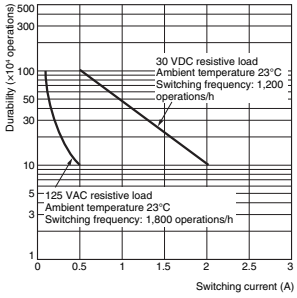
*3. This value was measured at a switching frequency of 120 operations/min. This value may vary, depending on switching frequency, operating conditions, expected reliability level of the relay, etc. It is always recommended to double-check relay suitability under actual load conditions.

■Engineering Data

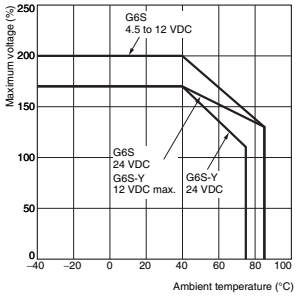
●Maximum Switching Capacity



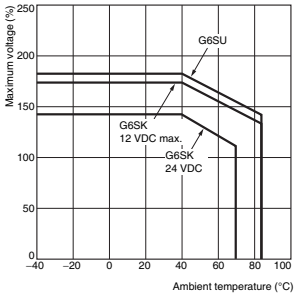
●Durability G6S-2F(G)



●Ambient Temperature vs. Maximum Voltage (Single-side Stable)

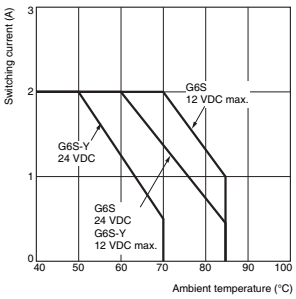


●Ambient Temperature vs. Maximum Voltage (Latching)

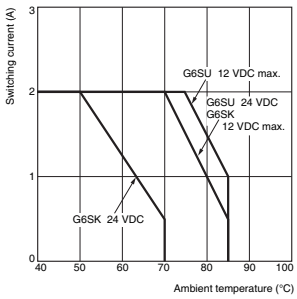


Note: "Maximum voltage" is the maximum voltage that can be applied to the Relay coil.

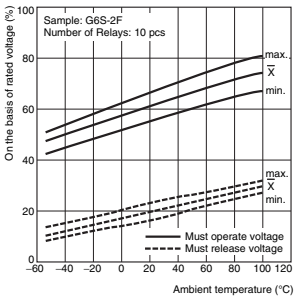
●Ambient Temperature vs. Switching Current (Single-side Stable)



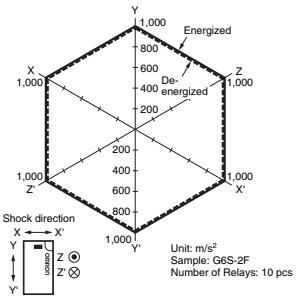
●Ambient Temperature vs. Switching Current (Latching)



●Ambient Temperature vs. Must Operate or Must Release Voltage G6S-2F(G)

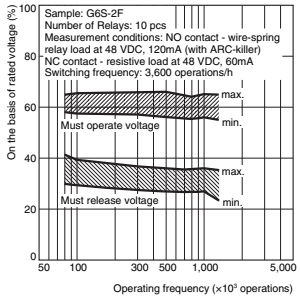


●Shock Malfunction G6S-2F(G)

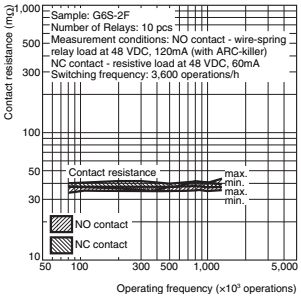


Conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with and without energizing the Relays to check the number of contact malfunctions.

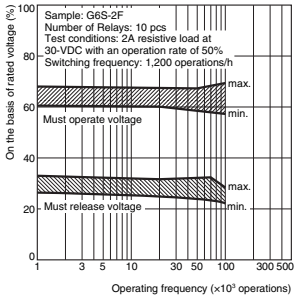
●Electrical Endurance (with Must Operate and Must Release Voltage) *1 G6S-2F(G)



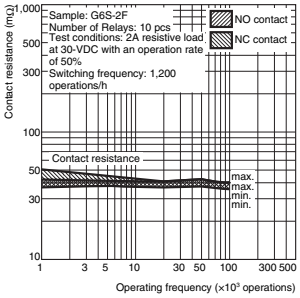
●Electrical Endurance (Contact Resistance) *1 G6S-2F(G)



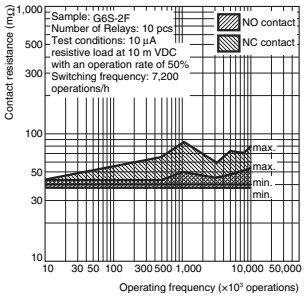
●Electrical Endurance (with Must Operate and Must Release Voltage) *1 G6S-2F(G)



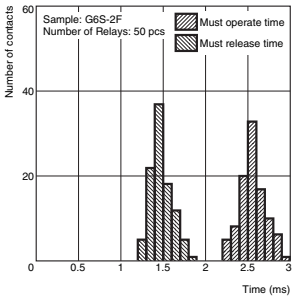
●Electrical Endurance (Contact Resistance) *1 G6S-2F(G)



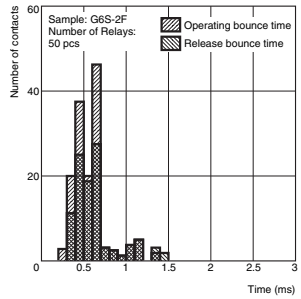
●Contact Reliability Test (Contact Resistance) *1, *2 G6S-2F(G)



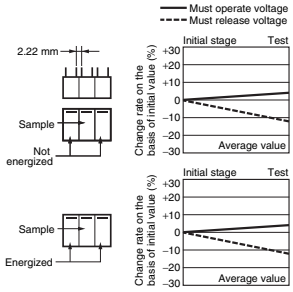
●Must Operate and Must Release Time Distribution *1 G6S-2F(G)



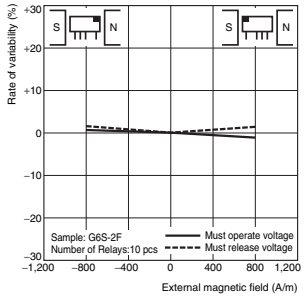
●Distribution of Bounce Time *1 G6S-2F(G)



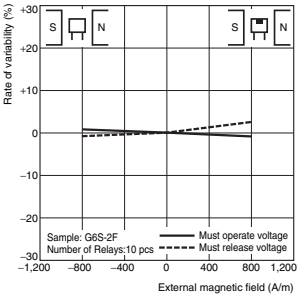
●Mutual Magnetic Interference G6S-2F(G)



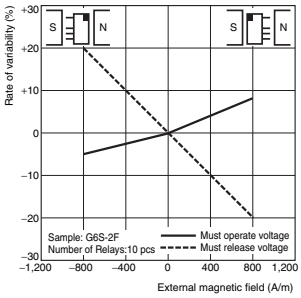
●External Magnetic Interference G6S-2F(G) (Average value)



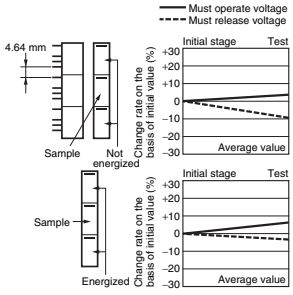
(Average value)



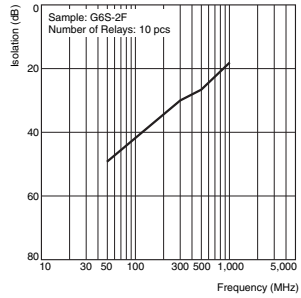
(Average value)



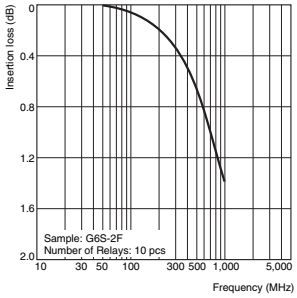
●Mutual Magnetic Interference G6S-2F(G)



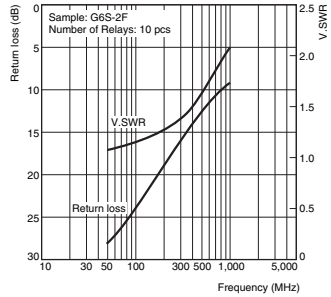
●High-frequency Characteristics (Isolation) *1, *2 G6S-2F(G) (Average value (initial))



●High-frequency Characteristics (Insertion Loss) *1, *3 G6S-2F(G) (Average value (initial))



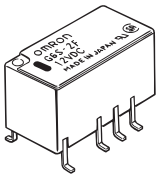
●High-frequency Characteristics (Return Loss, V.SWR) *1, *3 G6S-2F(G) (Average value (initial))

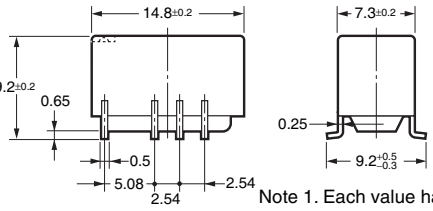


*1. The tests were conducted at an ambient temperature of 23°C.
*2. The contact resistance data are periodically measured reference values and are not values from each monitoring operation. Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use.
*3. High-frequency characteristics depend on the PCB to which the Relay is mounted. Always check these characteristics, including durability, in the actual machine before use.

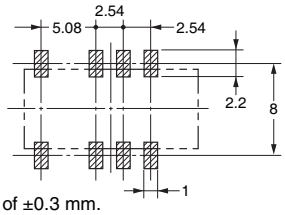
■Dimensions

Single-side Stable
G6S-2F
G6S-2F-Y

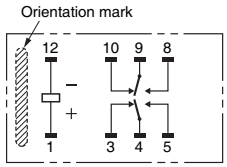




Mounting Dimensions (Top View)
Tolerance: ±0.1 mm

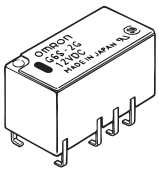


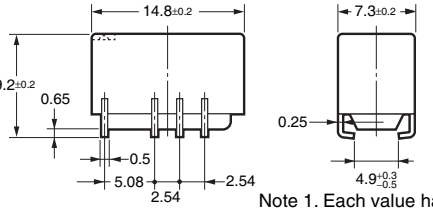
Terminal Arrangement/ Internal Connections (Top View)



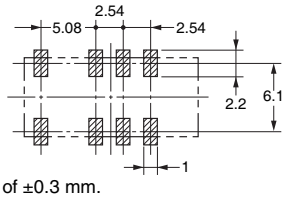
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2.The coplanarity of the terminals is 0.1 mm max.

G6S-2G
G6S-2G-Y

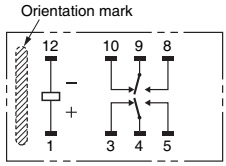




Mounting Dimensions (Top View)
Tolerance: ±0.1 mm

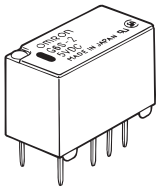


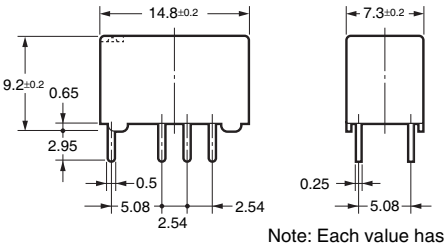
Terminal Arrangement/ Internal Connections (Top View)



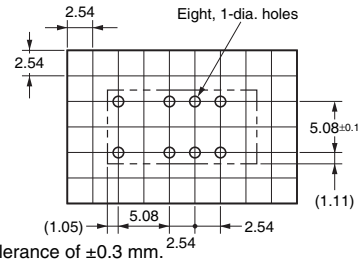
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2.The coplanarity of the terminals is 0.1 mm max.

G6S-2
G6S-2-Y

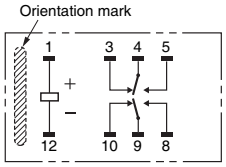




PCB Mounting Holes (Bottom View)

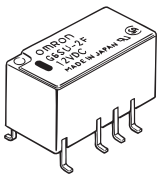


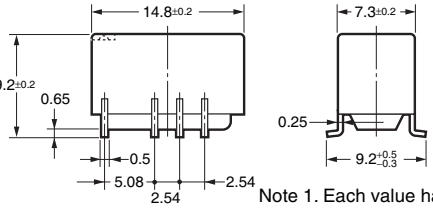
Terminal Arrangement/ Internal Connections (Bottom View)



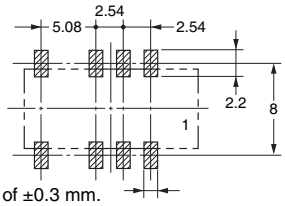
Note: Each value has a tolerance of ±0.3 mm.

Single-winding Latching
G6SU-2F

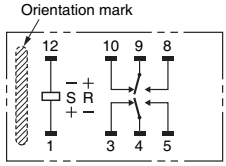




Mounting Dimensions (Top View)
Tolerance: ±0.1 mm

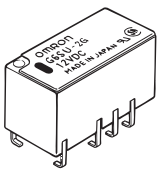


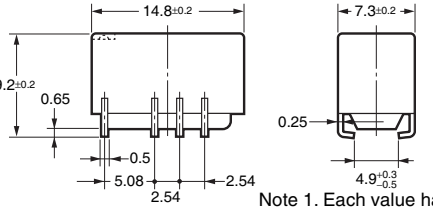
Terminal Arrangement/ Internal Connections (Top View)



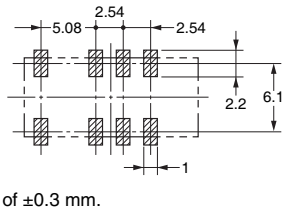
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2.The coplanarity of the terminals is 0.1 mm max.

G6SU-2G

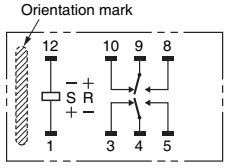




Mounting Dimensions (Top View)
Tolerance: ±0.1 mm

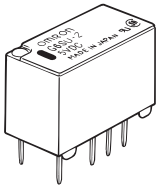


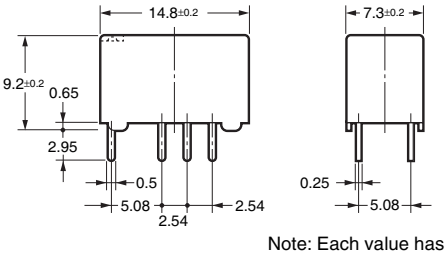
Terminal Arrangement/ Internal Connections (Top View)



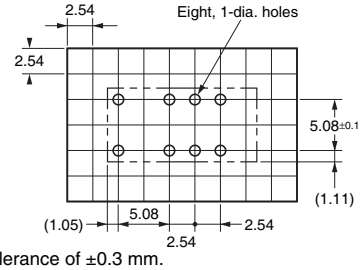
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2.The coplanarity of the terminals is 0.1 mm max.

G6SU-2

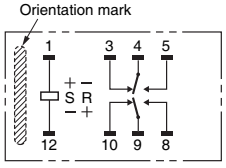




PCB Mounting Holes (Bottom View)

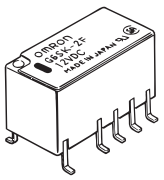


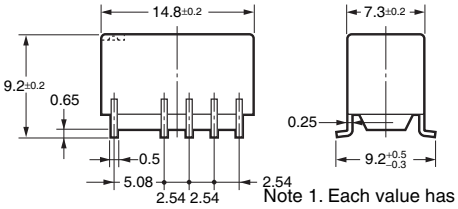
Terminal Arrangement/ Internal Connections (Bottom View)



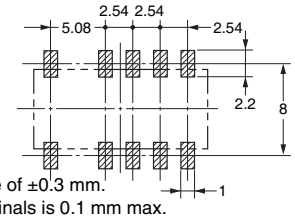
Note: Each value has a tolerance of ±0.3 mm.

Double-winding Latching
G6SK-2F

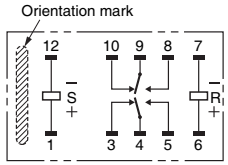




Mounting Dimensions (Top View)
Tolerance: ±0.1 mm

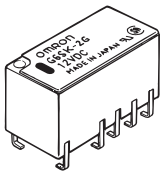


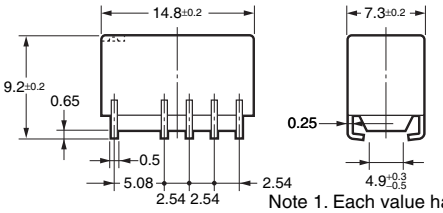
Terminal Arrangement/ Internal Connections (Top View)



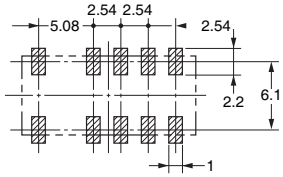
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2.The coplanarity of the terminals is 0.1 mm max.

G6SK-2G

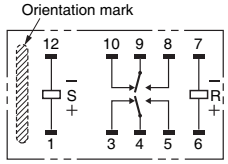




Mounting Dimensions (Top View)
Tolerance: ±0.1 mm

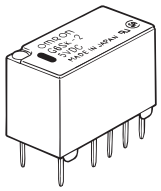


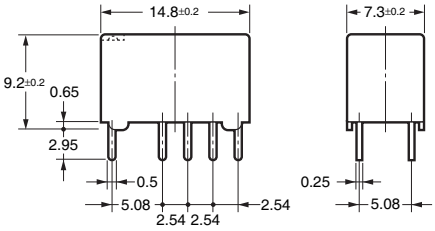
Terminal Arrangement/ Internal Connections (Top View)



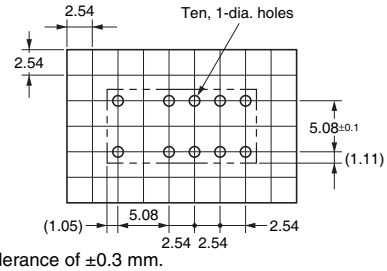
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2.The coplanarity of the terminals is 0.1 mm max.

G6SK-2

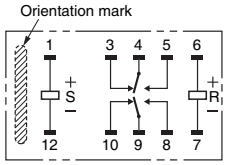




PCB Mounting Holes (Bottom View)



Terminal Arrangement/ Internal Connections (Bottom View)

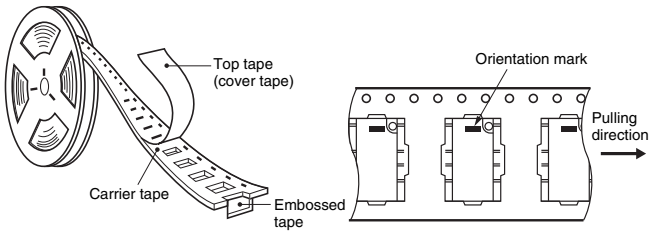


Note: Each value has a tolerance of ±0.3 mm.

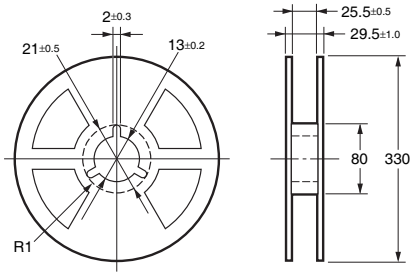
■Tape Packing (Surface Mounting Terminal Models)

- 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: 400 pcs
  Minimum ordering unit: 2 reels (800 pcs)

(1) Direction of Relay Insertion

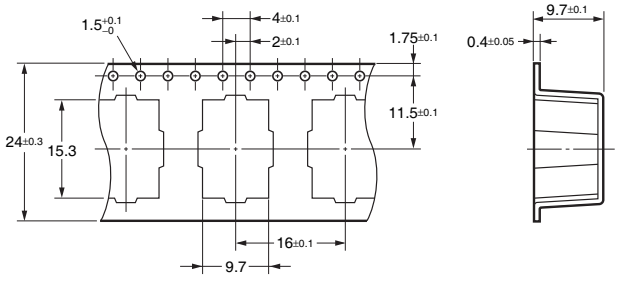


(2) Reel Dimensions

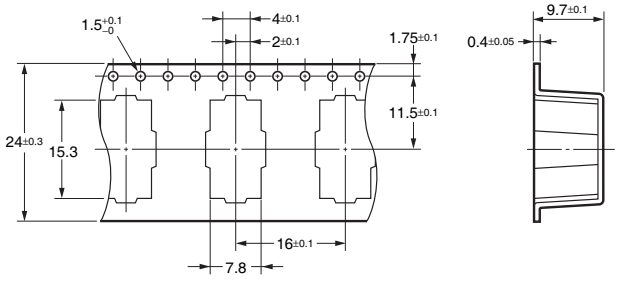


(3) Carrie Tape Dimensions

G6S-2F(-Y), G6SU-2F, G6SK-2F

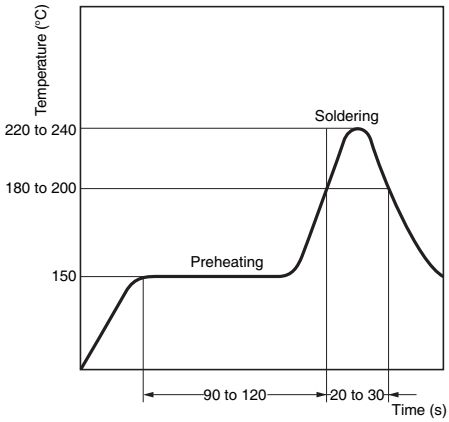


G6S-2G(-Y), G6SU-2G, G6SK-2G



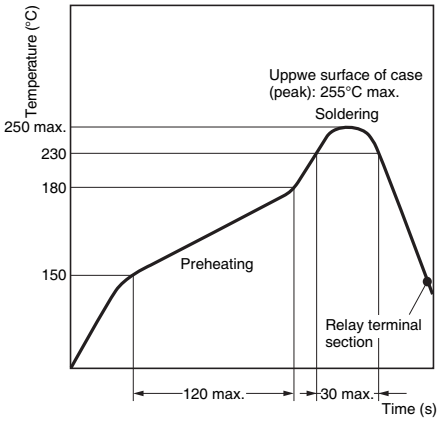
■Recommended Soldering Method

(1) IRS Method (Mounting Solder: Lead)



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

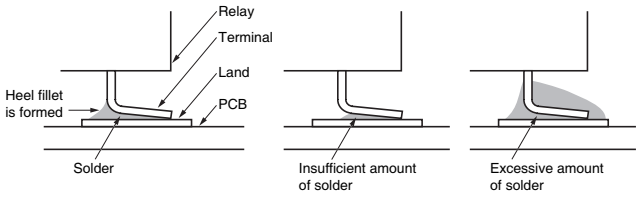
(2) IRS Method (Mounting Solder: Lead-free)



(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: (File No. E41515)
CSA certified: (File No. LR31928)

Contact form	Coil ratings	Contact ratings	Number of test operations
DPDT (2c)	2 to 48 VDC	3 A, 30 VDC at 40°C 0.3 A, 110 VDC at 40°C 0.5 A, 125 VAC at 40°C	6,000

EN/IEC (File No. 8064)

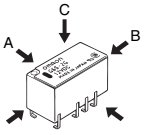
Contact form	Isolation category	Voltage
DPDT (2c)	Supplementary Isolation	250 VAC

■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. 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, be sure to set the securing force of each claw to the following so that the Relay's characteristics will be maintained.



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

• 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. K093-E1-05
0812(0207)(O)