

## Surface-Mounting Signal Relay – G6K

### Precautions

#### CORRECT USE

##### Handling

Leave the Relay unpacked until mounting it.

##### Soldering

Solder: JIS Z3282, H63A

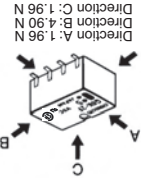
Soldering temperature: Approx. 250°C (260°C if the DWS method is used)

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 are maintained.



##### Environmental Conditions During Operation, Storage, and PCB Mounting

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

If the Relay is stored for a long time in an adverse environment with high temperature, high humidity, organic gases, or sulphide gases, sulphide or oxide films will form on the contact surfaces. These films may result in 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 beyond the value specified in the catalog.

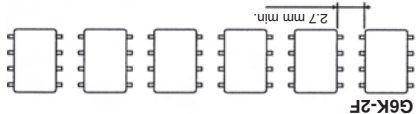
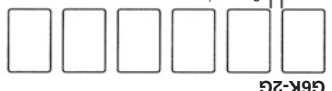
As a rule, the rated voltage must be applied to the coil. A voltage exceeding the rated value, however, can be applied to the coil provided that the voltage is less than the maximum allowable voltage. It must be noted that continuous voltage application to the coil will cause a coil temperature increase 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 adjacent Relays as shown below.



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

## Surface-Mounting Signal Relay – G6S

### Surface-Mounting DPDT Relay

■ ROHS compliant.

■ Long terminals ideal for soldering and mounting reliability.

■ Space-saving inside-L terminal.

■ High dielectric strength between coil and contacts (2,000 VAC), and between contacts of different polarity (1,500 VAC).

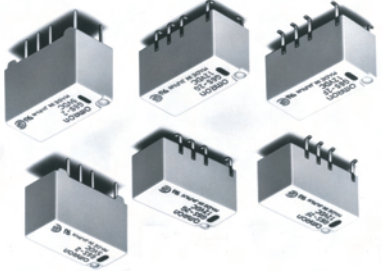
■ High impulse withstand voltages between coil and contacts, and between contacts of different polarity (2,500 V, 2 10 μs: Bellcore requirements).

■ Low power consumption (140 mW).

■ Bifurcated crossbar contact (Au-clad) and Fully sealed construction for high reliability.

■ Applicable to IFS.

■ High sealability after IFS.



■ Ultra-miniature at 15 x 7.5 x 9.4 mm (L x W x H).

■ Through-hole terminal is available

■ EN60950 Supplementary Insulation-certified type is available.

### Ordering Information

Classification	Single-side		Single-winding latching		Double-winding latching		Single-side stable	
	Stable	G6S-2	G6SU-2	G6SK-2	G6S-2-Y	EN60950/EN41003	Single-side stable	EN60950/EN41003
DPDT	Fully sealed	Through-hole terminal	G6S-2G	G6SU-2G	G6SK-2G	G6S-2G-Y	Through-hole terminal	G6S-2F-Y
		Surface mounting	G6S-2F	G6SU-2F	G6SK-2F	G6S-2F-Y	Surface mounting	G6S-2F-Y

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

Example: G6S-2F 12 VDC

Rated coil voltage

2. When ordering tape packing, add -TR\* to the model number.

Example: G6S-2F-TR 12 VDC

Tape packing

Be sure since -TR\* is not part of the relay model number, it is not marked on the relay case.

#### Model Number Legend



#### 1. Relay Function

None: Single-side stable

U: Single-winding latching

K: Double-winding latching

#### 2. Contact Form

2: DPDT

4, 5, 12, 24 VDC

#### 3. Terminal Shape

None: Through-hole terminal

G: Inside-L surface mounting terminal

F: Outside-L surface mounting terminal

#### 4. Approved Standards

None: UL/CSA

Y: EN60950

#### 5. Rated Coil Voltage

**Surface-Mounting Signal Relay – G65**

**Specifications**

**■ Coil Ratings**

Single-side Stable Type (G6S-2, G6S-2F, G6S-2G)

Rated voltage	4.5 VDC	5 VDC	12 VDC	24 VDC
Rated current	31.0 mA	28.1 mA	11.7 mA	8.3 mA
Coil resistance	145 Ω	178 Ω	1,028 Ω	2,880 Ω
Must operate voltage	75% max. of rated voltage			
Must release voltage	10% min. of rated voltage			
Max. voltage	200% of rated voltage at 23°C			
Power consumption	Approx. 140 mW			

Single-winding Latching Type (G6SU-2, G6SU-2F, G6SU-2G)

Rated voltage	4.5 VDC	5 VDC	12 VDC	24 VDC
Rated current	22.2 mA	20 mA	8.3 mA	6.3 mA
Coil resistance	203 Ω	250 Ω	1,440 Ω	3,840 Ω
Coil inductance	0.27	0.36	2.12	5.80
(H) (ref. value)	Armature ON	0.14	0.18	1.14
	Armature OFF	0.18	1.14	3.79
Must set voltage	75% max. of rated voltage			
Must reset voltage	75% min. of rated voltage			
Max. voltage	180% of rated voltage at 23°C			
Power consumption	Approx. 100 mW			

Double-winding Latching Type (G6SK-2, G6SK-2F, G6SK-2G)

Rated voltage	4.5 VDC	5 VDC	12 VDC	24 VDC
Rated current	44.4 mA	40 mA	16.7 mA	12.5 mA
Coil resistance	101 Ω	125 Ω	720 Ω	1,920 Ω
Coil inductance	0.12	0.14	0.60	1.98
(H) (ref. value)	Set	Armature OFF	0.074	0.088
	Reset	Armature ON	0.082	0.098
Must set voltage	75% max. of rated voltage			
Must reset voltage	75% min. of rated voltage			
Max. voltage	170% of rated voltage at 23°C			
Power consumption	Approx. 200 mW			

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.

**Surface-Mounting Signal Relay – G6S**

Single-side Stable EN60950 Approved Type (G6S-2-Y, G6S-2F-Y, G6S-2G-Y)

Rated voltage	5 VDC	12 VDC
Rated current	40 mA	16.7 mA
Coil resistance	125 Ω	720 Ω
Must operate voltage	75% max. of rated voltage	
Must release voltage	10% min. of rated voltage	
Max. voltage	170% of rated voltage at 23°C	
Power consumption	Approx. 200 mW	

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.

**■ Contact Ratings**

Load	Resistive load (cosφ = 1)
Rated Load	0.5 A at 125 VAC; 2 A at 30 VDC
Contact material	Ag (Au-alloy)
Rated Carry Current	2 A
Max. switching voltage	250 VAC, 220 VDC
Max. switching current	2 A
Max. switching power	62.5 VA, 60 W
Failure rate (reference value)	10 μA at 10 mVDC

Note: P level: λ<sub>60</sub> = 0.1 x 10<sup>-6</sup>/operation. This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50Ω. This value may vary depending on the operating environment. Always double-check relay suitability under actual operating conditions.

**Surface-Mounting Signal Relay – G65**

**Specifications**

**■ Coil Ratings**

Single-side Stable Type (G6S-2, G6S-2F, G6S-2G)

Rated voltage	4.5 VDC	5 VDC	12 VDC	24 VDC
Rated current	31.0 mA	28.1 mA	11.7 mA	8.3 mA
Coil resistance	145 Ω	178 Ω	1,028 Ω	2,880 Ω
Must operate voltage	75% max. of rated voltage			
Must release voltage	10% min. of rated voltage			
Max. voltage	200% of rated voltage at 23°C			
Power consumption	Approx. 140 mW			

Single-winding Latching Type (G6SU-2, G6SU-2F, G6SU-2G)

Rated voltage	4.5 VDC	5 VDC	12 VDC	24 VDC
Rated current	22.2 mA	20 mA	8.3 mA	6.3 mA
Coil resistance	203 Ω	250 Ω	1,440 Ω	3,840 Ω
Coil inductance	0.27	0.36	2.12	5.80
(H) (ref. value)	Armature ON	0.14	0.18	1.14
	Armature OFF	0.18	1.14	3.79
Must set voltage	75% max. of rated voltage			
Must reset voltage	75% min. of rated voltage			
Max. voltage	180% of rated voltage at 23°C			
Power consumption	Approx. 100 mW			

Double-winding Latching Type (G6SK-2, G6SK-2F, G6SK-2G)

Rated voltage	4.5 VDC	5 VDC	12 VDC	24 VDC
Rated current	44.4 mA	40 mA	16.7 mA	12.5 mA
Coil resistance	101 Ω	125 Ω	720 Ω	1,920 Ω
Coil inductance	0.12	0.14	0.60	1.98
(H) (ref. value)	Set	Armature OFF	0.074	0.088
	Reset	Armature ON	0.082	0.098
Must set voltage	75% max. of rated voltage			
Must reset voltage	75% min. of rated voltage			
Max. voltage	170% of rated voltage at 23°C			
Power consumption	Approx. 200 mW			

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.

**Surface-Mounting Signal Relay – G6S**

Single-side Stable EN60950 Approved Type (G6S-2-Y, G6S-2F-Y, G6S-2G-Y)

Rated voltage	5 VDC	12 VDC
Rated current	40 mA	16.7 mA
Coil resistance	125 Ω	720 Ω
Must operate voltage	75% max. of rated voltage	
Must release voltage	10% min. of rated voltage	
Max. voltage	170% of rated voltage at 23°C	
Power consumption	Approx. 200 mW	

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.

**■ Contact Ratings**

Load	Resistive load (cosφ = 1)
Rated Load	0.5 A at 125 VAC; 2 A at 30 VDC
Contact material	Ag (Au-alloy)
Rated Carry Current	2 A
Max. switching voltage	250 VAC, 220 VDC
Max. switching current	2 A
Max. switching power	62.5 VA, 60 W
Failure rate (reference value)	10 µA at 10 mVDC

Note: P level: λ<sub>60</sub> = 0.1 x 10<sup>-6</sup>/operation. This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50Ω. This value may vary depending on the operating environment. Always double-check relay suitability under actual operating conditions.

Surface-Mounting Signal Relay – G6S

■ Characteristics

Contact resistance (Note)	75 mΩ max.
Operate (set) time (Note 2)	4 ms max. (mean value: approx. 2.5 ms; latching type: approx. 2 ms)
Release (reset) time (Note 2)	4 ms max. (mean value: approx. 1.5 ms; latching type: approx. 2 ms)
Max. operating frequency	Mechanical: 36,000 operations/hr Electrical: 1,800 operations/hr (under rated load)
Insulation resistance (Note 3)	1,000 MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min between coil and contacts 1,000 VAC, 50/60 Hz for 1 min between contacts of different polarity 1,500 VAC, 50/60 Hz for 1 min between contacts of same polarity 500 VAC, 50/60 Hz for 1 min between set and reset coil (double-winding latching)
Impulse withstand voltage	2,500 V (2 × 10 μs) between coil and contacts 2,500 V (2 × 10 μs) between contacts of different polarity 1,500 V (10 × 160 μs) between contacts of same polarity (conforms to FCC Part 68)
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 2.5mm single amplitude (5mm double amplitude) Malfunction: 10 to 55 to 10 Hz, 1.65mm single amplitude (3.3mm double amplitude)
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> (approx. 100g) Malfunction: 750 m/s <sup>2</sup> (approx. 175g)
Endurance	Mechanical: 100,000,000 operations min. (at 36,000 operations/hr) Electrical: 100,000 operations min. (2 A at 30 VDC, resistive load; 1,200 operations/hr) 100,000 operations min. (0.5 A at 125 VAC, resistive load)
Ambient temperature	Operating: -40°C to 85°C (with no icing), -40°C to 70°C (double-winding latching, 24 VDC) Operating: 5% to 85%
Ambient humidity	Approx. 2 g
Weight	Approx. 2 g

Note: The above values are initial values.  
 Note: 1. The contact resistance was measured with 10mA at 1 VDC with a voltage drop method.  
 Note: 2. Values in parentheses are actual values.  
 Note: 3. 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).

■ Approved Standards  
 UL (File No. E41515)/CSA C22.2 (File No. LR24825)

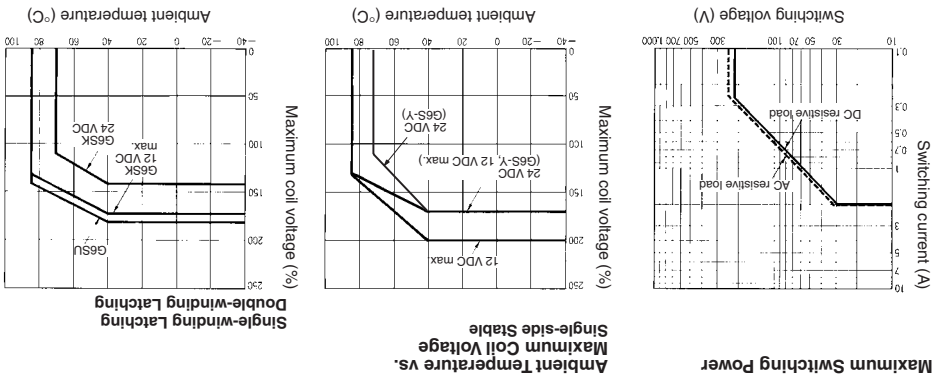
Model	Contact form	Coil ratings	Contact ratings
G6S-2, G6S-2F, G6S-2G	DPDT	1.5 to 48 VDC	2 A, 30 VDC 0.3 A, 110 VDC 0.5 A, 125 VAC
G6SU2G, G6SK-2F, G6SU-2F		1.5 to 24 VDC	

Model	Contact form	Isolation category	Voltage
G6S-2-Y, G6S-2G-Y, G6S-2F-Y	DPDT	Supplementary isolation	250 VAC

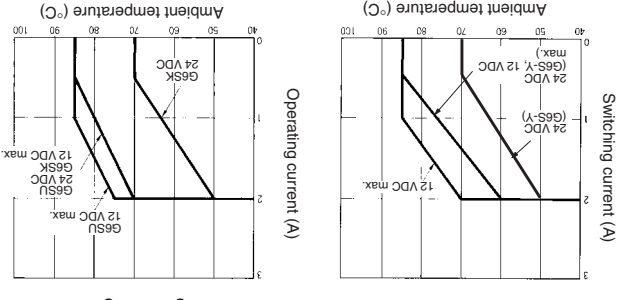
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Surface-Mounting Signal Relay – G6S

■ Engineering Data

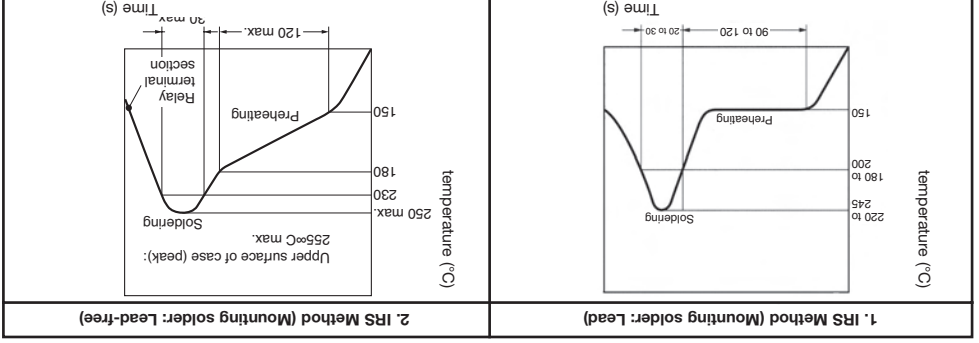


Reference Data



Recommended Soldering Method

Temperatures indicate the surface temperatures of 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.

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Surface-Mounting Signal Relay – G6S

■ Characteristics

Contact resistance (Note)	75 mΩ max.
Operate (set) time (Note 2)	4 ms max. (mean value: approx. 2.5 ms; latching type: approx. 2 ms)
Release (reset) time (Note 2)	4 ms max. (mean value: approx. 1.5 ms; latching type: approx. 2 ms)
Max. operating frequency	Mechanical: 36,000 operations/hr Electrical: 1,800 operations/hr (under rated load)
Insulation resistance (Note 3)	1,000 MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min between coil and contacts
	1,000 VAC, 50/60 Hz for 1 min between contacts of different polarity 1,500 VAC, 50/60 Hz for 1 min between contacts of same polarity 500 VAC, 50/60 Hz for 1 min between set and reset coil (double-winding latching)
Impulse withstand voltage	2,500 V (2 × 10 μs) between coil and contacts
	2,500 V (2 × 10 μs) between contacts of different polarity 1,500 V (10 × 160 μs) between contacts of same polarity (conforms to FCC Part 68)
Vibration resistance	Malfunction: 10 to 55 to 10 Hz, 2.5mm single amplitude (5mm double amplitude)
	Destruction: 10 to 55 to 10 Hz, 1.65mm single amplitude (3.3mm double amplitude)
Shock resistance	Malfunction: 750 m/s <sup>2</sup> (approx. 175g)
	Destruction: 1,000 m/s <sup>2</sup> (approx. 100g)
Endurance	Mechanical: 100,000,000 operations min. (at 36,000 operations/hr)
	Electrical: 100,000 operations min. (2 A at 30 VDC, resistive load; 1,200 operations/hr) 100,000 operations min. (0.5 A at 125 VAC, resistive load)
Ambient temperature	Operating: -40°C to 85°C (with no icing), -40°C to 70°C (double-winding latching, 24 VDC) Operating: 5% to 85%
Ambient humidity	Approx. 2 g
Weight	Approx. 2 g

Note: The above values are initial values.  
 Note: 1. The contact resistance was measured with 10mA at 1 VDC with a voltage drop method.  
 Note: 2. Values in parentheses are actual values.  
 Note: 3. 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).

■ Approved Standards  
 UL (File No. E41515)/CSA C22.2 (File No. LR24825)

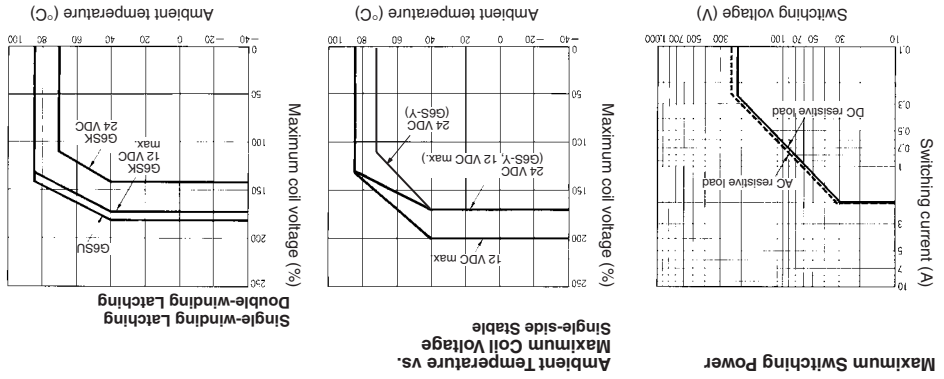
Model	Contact form	Coil ratings	Contact ratings
G6S-2, G6S-2F, G6S-2G	DPDT	1.5 to 48 VDC	2 A, 30 VDC 0.3 A, 110 VDC 0.5 A, 125 VAC
G6SU2G, G6SK-2F, G6SU-2F		1.5 to 24 VDC	

EN60950

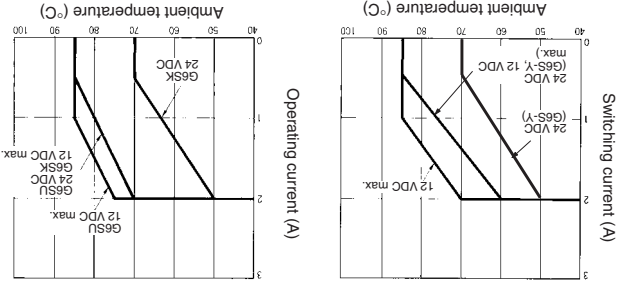
Model	Contact form	Isolation category	Voltage
G6S-2-Y, G6S-2G-Y, G6S-2F-Y	DPDT	Supplementary isolation	250 VAC

Surface-Mounting Signal Relay – G6S

■ Engineering Data

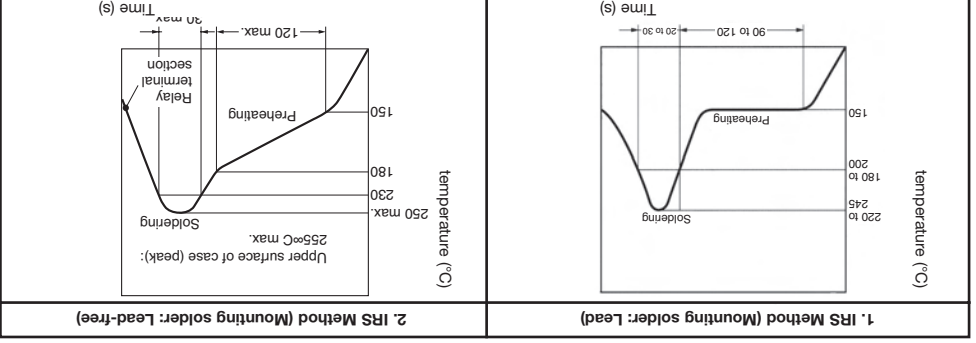


Reference Data



Recommended Soldering Method

Temperatures indicate the surface temperatures of 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.



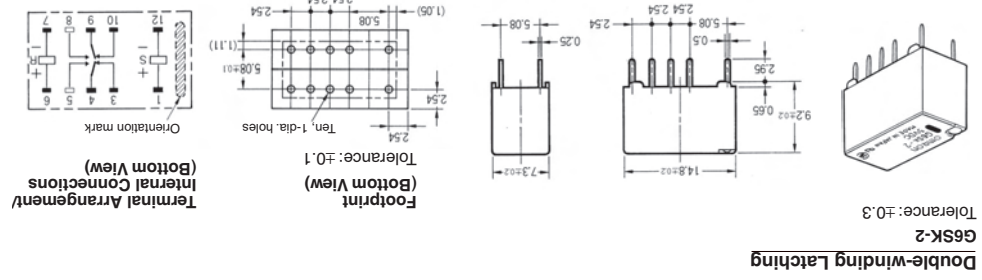




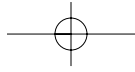
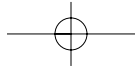
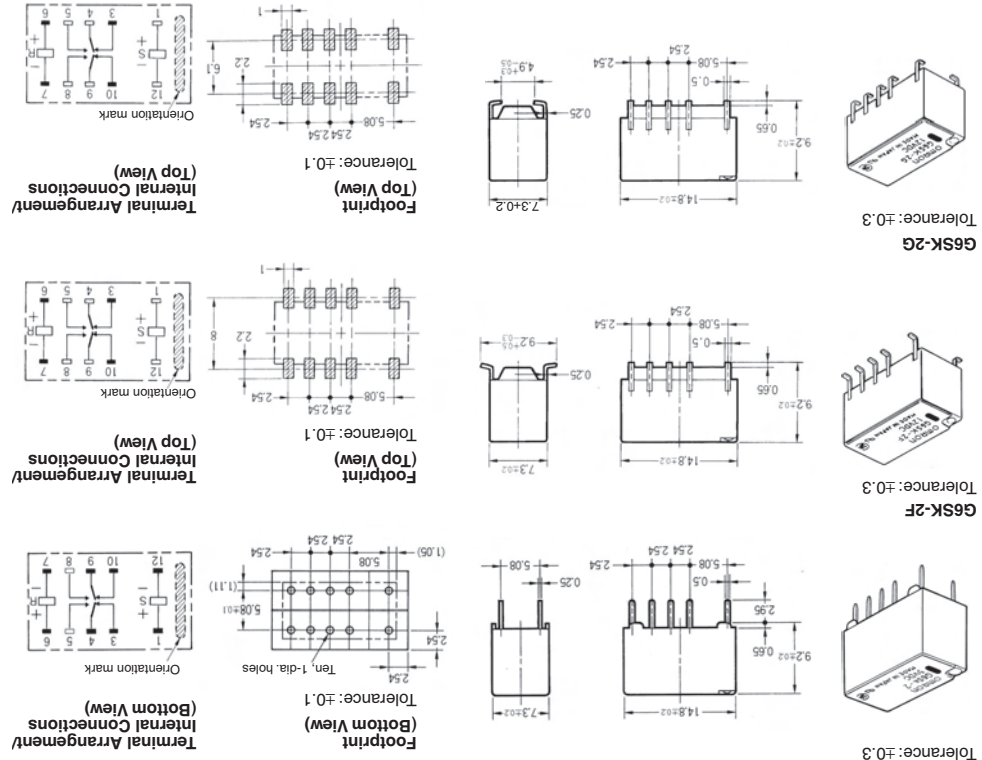




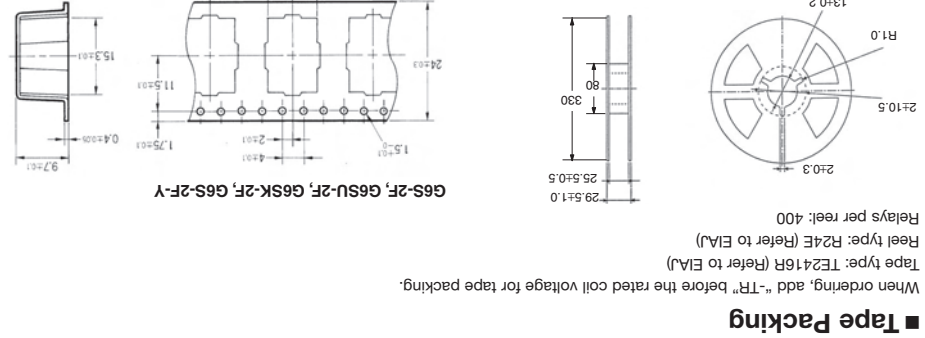
Surface-Mounting Signal Relay – G6S



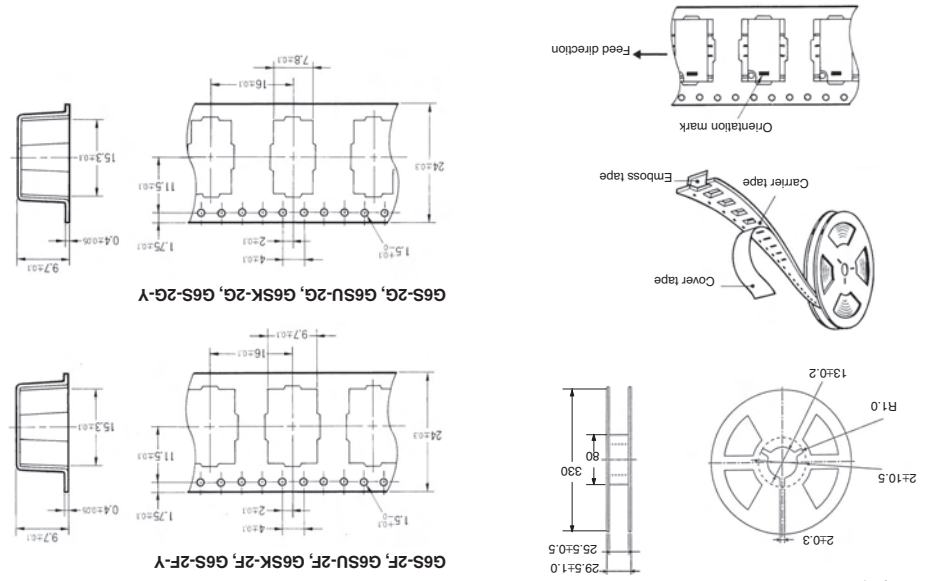
Surface-Mounting Signal Relay – G6S



Surface-Mounting Signal Relay – G6S



Surface-Mounting Signal Relay – G6S



Precautions

Use a DC power supply with 5% or less ripple factor to operate the coil.

Do not use the G6S where subject to strong external magnetic fields.

Do not use the G6S where subject to magnetic particles or excessive amounts of dust.

Latching types are delivered in the reset position. We recommend that a reset voltage be applied in advance to start operation.

Do not drop the G6S or otherwise subject it to excessive shock.

Remove the relay from the packing immediately prior to usage.

**Precautions**

**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 moisture-proof package. If the Relay is left for a long time after opening the moisture-proof package, the appearance may suffer and seal failure may occur after the solder mounting process. To store the

Relay after opening the moisture-proof package, place it into the original package and 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.

**G6S (K) (-U) -2 Soldering**

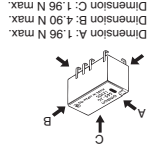
Soldering temperature: Approx. 250°C (at 260°C if the DWS method is used).

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 adjust the level of the molten solder so that the solder will not overflow onto the PCB.

**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.



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