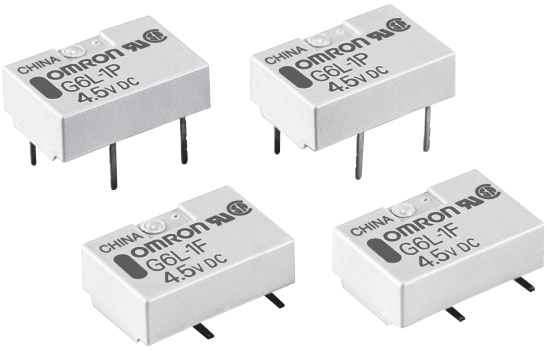
OMRON

G6L

Surface-mounting Relay

Ultra-thin SPST-NO Flat Relay with space-saving design



- Dimensions of 7.0 (W) × 10.6 (L) × 4.5 mm (H) (SMD) or 4.1 mm (H) (TH) represent a reduction of approximately 20% in mounting area and approximately 64% in volume compared with the OMRON G5V-1, for higher-density mounting.
- Ensures a dielectric strength between coil and contacts (1,000 VAC), and conforms to FCC Part 68 (i.e., withstanding an impulse withstand voltage of 1.5 kV for 10 × 160 µs). High dielectric strength between contacts of same polarity (750 VAC).
- Surface-mounting relays are also available.
- Standard model conforms to UL/CSA standards.

G6L

■Model Number Legend

G6L-1□

1 2

1. Number of poles/ Contact form

1: 1-pole/SPST-NO (1a)

2. Terminal shape

P: PCB terminals

F: Surface-mounting terminals

■Application Examples

- Peripherals of MODEM/PC
- Telephones
- Office automation machines
- Audio-visual products
- Communications equipment
- Measurement devices
- Security equipment

■Ordering Information

●Surface-mounting Relay Standard Models (UL, CSA)

Classification	Relay Function	Enclosure rating	Contact form	Model	Rated coil voltage	Minimum packing unit	Minimum ordering unit (tape packing)
Standard	Single-side stable	Fully sealed	SPST-NO (1a)	**G6L-1P**	3 VDC	50 pcs/tube	1000 pcs/reel
					45 VDC		
					5 VDC		
					12 VDC		
					24 VDC		
				G6L-1F	3 VDC	50 pcs/tube (1,000 pcs/reel)	
					45 VDC		
					5 VDC		
					12 VDC		
					24 VDC		

Note 1. When ordering, add the rated coil voltage to the model number.
Example: G6L-1P 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. (Otherwise, the Relays in tube packing will be provided.)

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■Ratings

●Coil: Single-side stable Relays (G6L-1P, G6L-1F)

Item / Rated voltage	Rated current (mA)	Coil resistance (Ω)	Must operate voltage (V)	Must release voltage (V)	Maximum voltage (V)	Power consumption (mW)
			% of rated voltage			
3 VDC	60.0	50.0	75% max.	10% min.	150%	Approx. 180
4.5 VDC	40.0	112.5				
5 VDC	36.0	139.0				
12 VDC	15.0	800.0				
24 VDC	9.6	2,504.0			130%	Approx. 230

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.
Note 4. The voltage measurements for operate/release are the values obtained for instantaneous changes in the voltage (rectangular wave).

●Contacts

Item / Load	Resistive load
Contact type	Single crossbar
Contact material	Ag (Au-alloy surface)
Rated load	0.3 A at 125 VAC, 1 A at 24 VDC
Rated carry current	1 A
Max. switching voltage	125 VAC, 60 VDC
Max. switching current	1 A

■Characteristics

Item / Classification		Single-side Stable Relays
Model		G6L-1P, G6L-1F
Contact resistance *1		100 mΩ max.
Operating time		5 ms max.
Release time		5 ms max.
Insulation resistance *2		1,000 MΩ min. (at 500 VDC)
Dielectric strength	Between coil and contacts	1,000 VAC, 50/60 Hz for 1 min
	Between contacts of same polarity	750 VAC, 50/60 Hz for 1 min
Impulse withstand voltage	Between coil and contacts	1,500 VAC, 10 × 160 μs
Vibration resistance	Destruction	10 to 55 Hz, 1.65 mm single amplitude (3.3 mm double amplitude)
	Malfunction	10 to 55 Hz, 1.65 mm single amplitude (3.3 mm double amplitude)
Shock resistance	Destruction	1,000 m/s²
	Malfunction	100 m/s²
Durability	Mechanical	5,000,000 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		1 mA at 5 VDC
Ambient temperature		Operating: -40°C to 70°C (with no icing or condensation)
Ambient humidity		Operating: 5% to 85%
Weight		Approx. 0.6 g

Note: The above values are initial values.
*1. The contact resistance was measured with 10 mA at 1 VDC with a fall-of-potential method.
*2. The insulation resistance was measured with a 500 VDC Megger Tester 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. 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.

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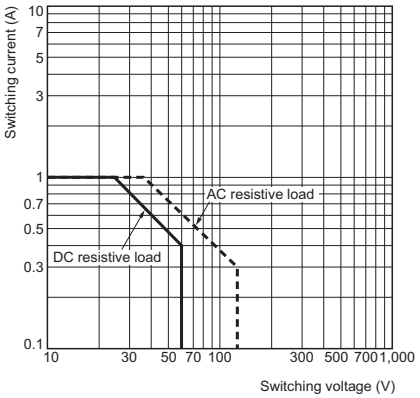
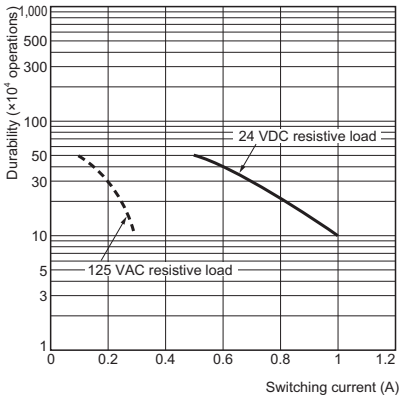
■Engineering Data

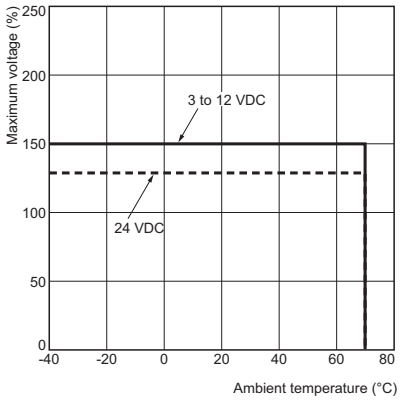
●Maximum Switching Capacity



●Durability

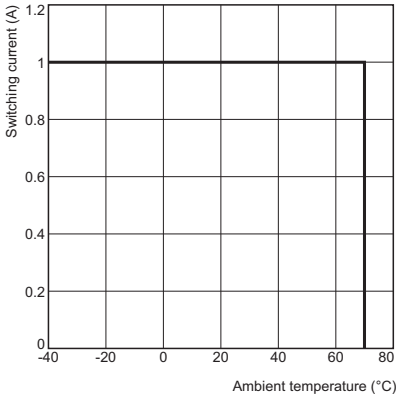


●Ambient Temperature vs. Maximum Coil Voltage

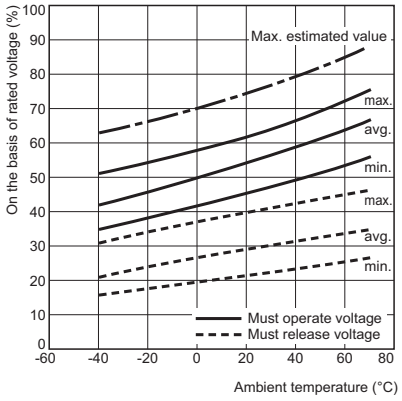


Note: "Maximum voltage" is the maximum voltage that can be applied to the Relay coil.

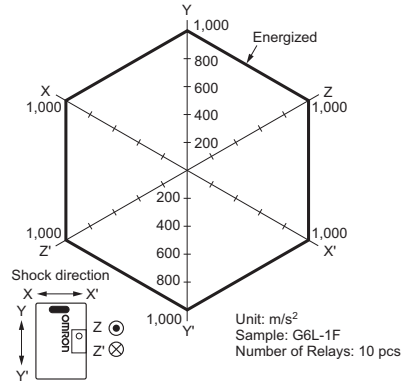
●Ambient Temperature vs. Switching Current



●Ambient Temperature vs. Must Operate or Must Release Voltage

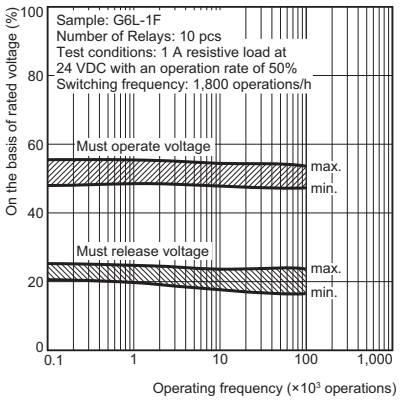


●Shock Malfunction

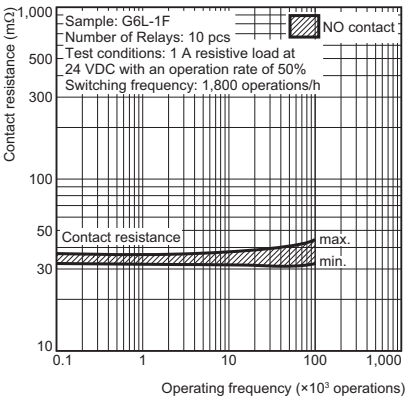


Conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with and without energizing the Relays to check the number of contact malfunctions.

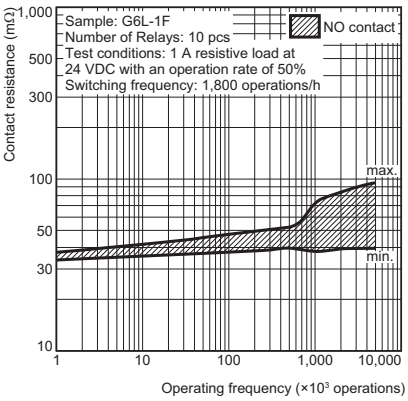
●Electrical Endurance (with Must Operate and Must Release Voltage) *1



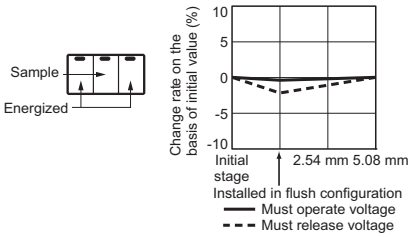
●Electrical Endurance (Contact Resistance) *1



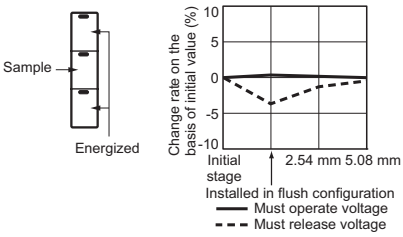
●Contact Reliability Test (Contact Resistance) *1, *2



●Mutual Magnetic Interference



●Mutual Magnetic Interference



*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.

G6L

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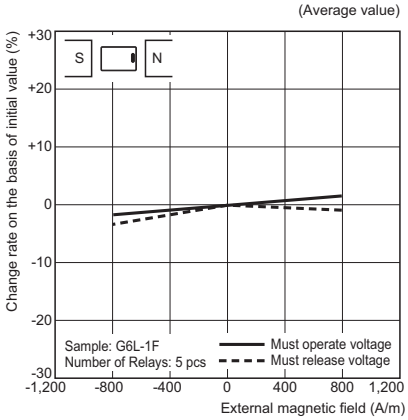
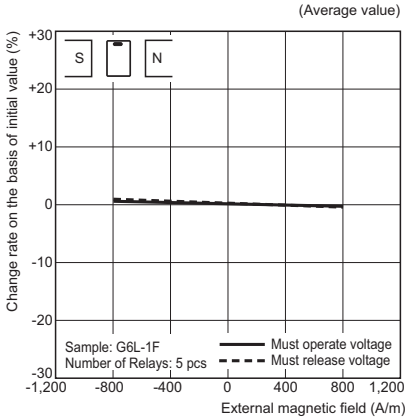
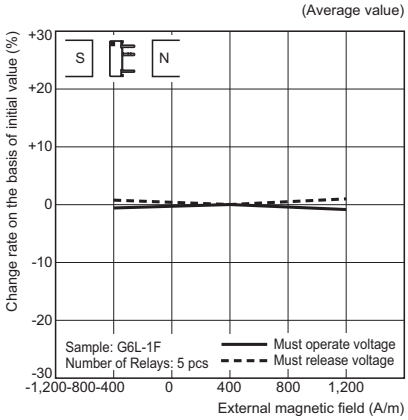
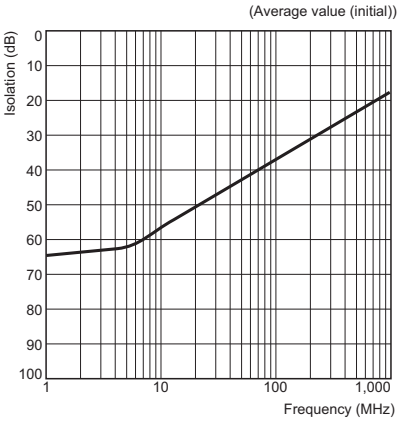
●External Magnetic Interference



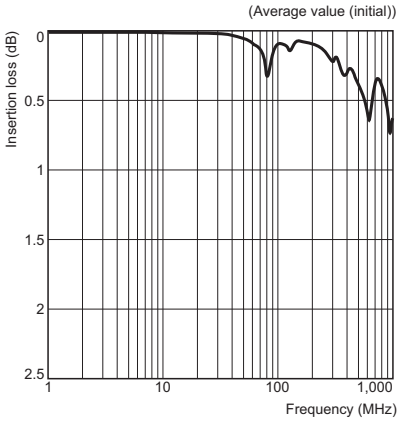




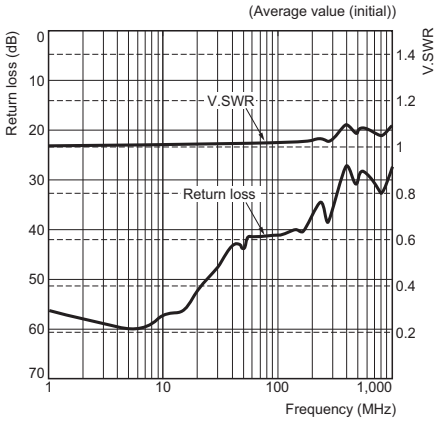
●High-frequency Characteristics (Isolation) *1, *2



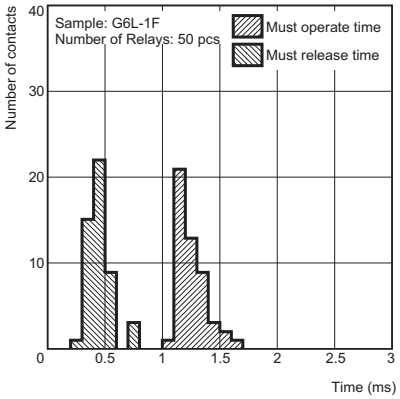
●High-frequency Characteristics (Insertion Loss) *1, *2



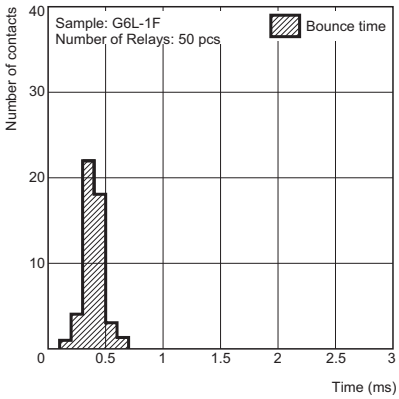
●High-frequency Characteristics (Return Loss, V.SWR) *1, *2



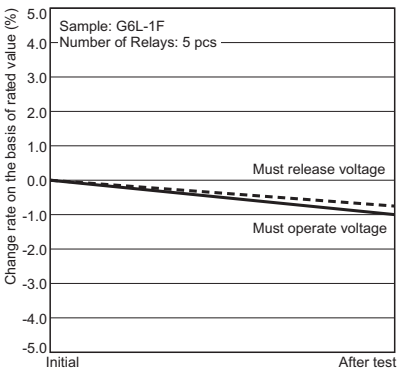
●Must Operate and Must Release Time Distribution *1



●Distribution of Bounce Time *1



●Vibration Resistance



*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 durability, in the actual machine before use.

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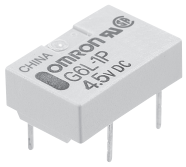
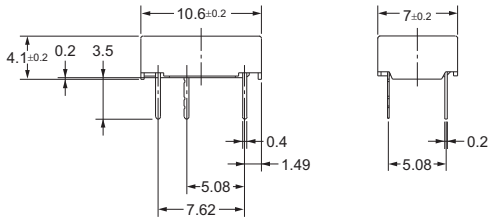
■Dimensions

CAD Data marked products, 2D drawings and 3D CAD models are available.
For CAD information, please visit our website, which is noted on the last page.

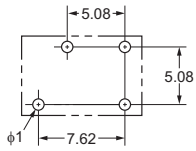
(Unit: mm)

G6L-1P

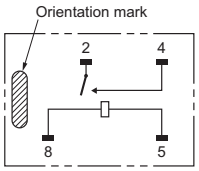




PCB Mounting Holes
(Bottom View)
Tolerance: ±0.1 mm



Terminal Arrangement/ Internal Connections
(Bottom View)

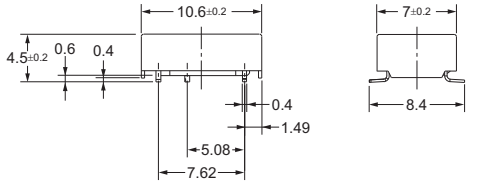


(No coil polarity)

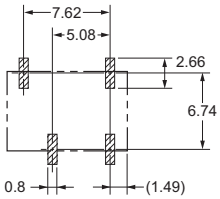
Note: Each value has a tolerance of ±0.3 mm.

CAD Data

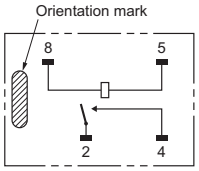
G6L-1F



Mounting Dimensions
(Top View)
Tolerance: ±0.1 mm



Terminal Arrangement/ Internal Connections
(Top View)



(No coil polarity)

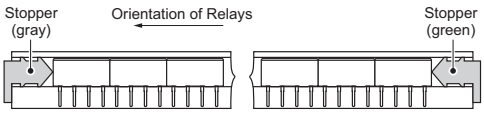
Note 1. Each value has a tolerance of ±0.3 mm.
Note 2. The coplanarity of the terminals is 0.1 mm max.

CAD Data

■Tube Packing and Tape Packing

(1) Tube Packing

- Relays in tube packing are arranged so that the orientation mark of each Relay is on the left side.
  Always confirm that the Relays are in the correct orientation when mounting the Relays to the PCBs.

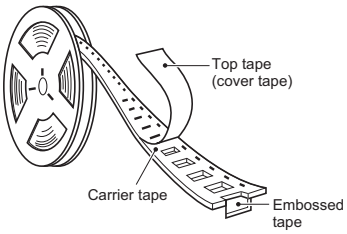


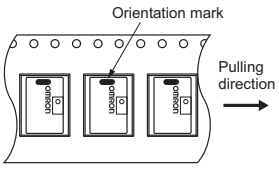
Tube length: 552 mm (stopper not included)
No. of Relays per tube: 50 pcs

(2) Tape Packing (Surface-mounting Terminal Relays)

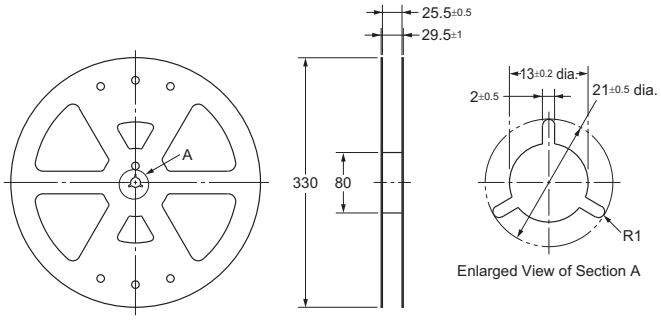
- When ordering Relays in tape packing, add the suffix "-TR" to the model number, otherwise the Relays in tape packing will be provided.
  No. of Relays per reel: 1,000 pcs
  Minimum ordering unit: 1 reel (1,000 pcs)

1. Direction of Relay Insertion



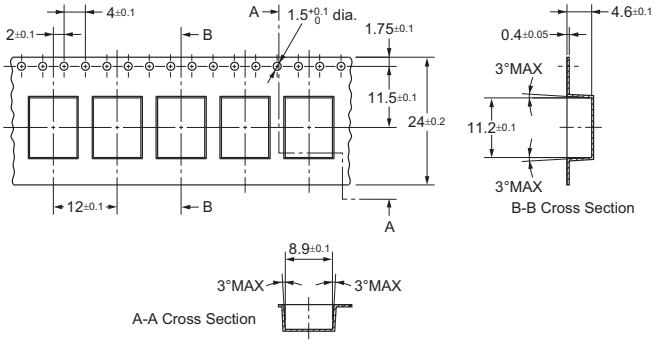


2. Reel Dimensions



3. Carrier Tape Dimensions

G6L-1F



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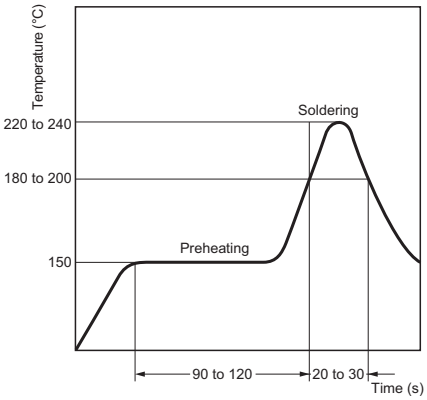
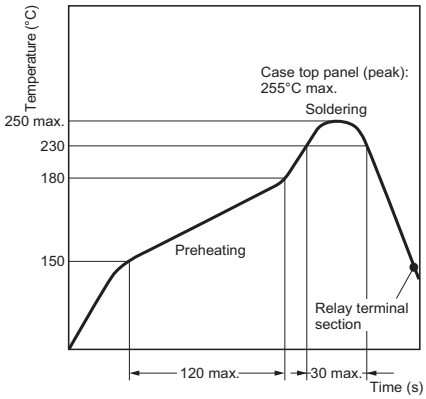
■Recommended Soldering Method for G6L

(1) IRS Method (Mounting Solder: Lead)



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

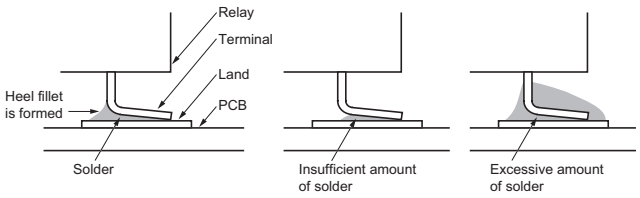
(2) IRS Method (Mounting Solder: Lead-free)



(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.

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 rating	Contact rating	Number of test operations
SPST-NO (1a)	3 to 24 VDC	1 A at 30 VDC 0.5 A at 60 VDC 0.3 A at 125 VAC	6,000

■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. Be sure to use a fail-safe circuit design that provides protection against contact failure or coil burnout.

●Relay Handling

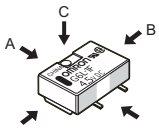
- Use the Relay as soon as possible after opening the moistureproof package. If the Relay is left for a long time after opening the moisture-proof package, the appearance may suffer and seal failure may occur after the solder mounting process. To store the Relay after opening the moisture-proof package,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

●Coil Power Supply Waveform

- If the voltage applied to the coil is increased or decreased gradually, operating characteristics may be unstable, contact endurance may decline, or the Relay may not function at its full performance level. Therefore, always use an instantaneous ON and instantaneous OFF when applying the voltage. Be sure that the rated voltage or zero voltage is reached within 1 ms.

●Claw Securing Force During Automatic Insertion

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



Direction A: 5.0 N max.
Direction B: 5.0 N max.
Direction C: 5.0 N max.

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

●Environmental Conditions During Operation, Storage, and Transportation

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

●Maximum Allowable Voltage

- The maximum 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 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 not to exceed the maximum voltage 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 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

Relays mounted on PCBs may be coated or washed. Do not apply silicone coating or detergent containing silicone, otherwise the silicone coating or detergent may remain on the surface of the Relays.

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