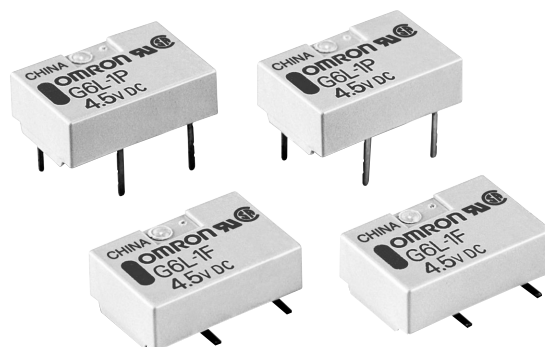


# Ultra-thin Low Signal Relay G6L

## Extremely Thin SPST-NO Flat Relay, One of the Thinnest Relays in the World

- For high-density mounting and slim finished packaging, G6L uses 20% less mounting area and 67% less volume in comparison with the G5V-1 relay.
- Measures just 7.0 (W) x 10.6 (L) x 4.5 (H) mm for surface-mount or 4.1 (H) for through-hole.\*
- High dielectric strength: 1,000 VAC between coil and contacts and 750 VAC between contacts of the same polarity.
- Conforms to FCC Part 68 impulse withstand voltage rating of 1.5kV for 10 x 160 μs.
- Conforms to UL60950 (File No. E41515) / CSA C22.2 No. 60950 (File No. LR31928).
- Use of lead completely eliminated.
- RoHS Compliant.



## Ordering Information

Contact form	Construction	Mounting type	Model
SPST-NO	Fully sealed	Through-hole terminal	G6L-1P
		Surface-mount terminal	G6L-1F

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

Example: G6L-1P 12 VDC

└── Rated coil voltage

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

Example: G6L-1F-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:

G6L□-1□-□DC□

└──
└──
└──
└──
└──

1
2
3
4
5

#### 1. Relay function

None: Non-latching

#### 2. Contact form

1: SPST-NO

#### 3. Terminal shape

P: PCB terminals

F: Surface-mount terminals

#### 4. Packaging

None: Tube packaging

TR: Tape and reel packaging

#### 5. Rated Coil Voltage

3, 4.5, 5, 12, 24

## Application Examples

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

\*This dimension effective, April 2005.

# Specifications

## ■ Contact Ratings

Item	Resistive load
Contact mechanism	Single crossbar
Rated load	0.3 A at 125 VAC, 1 A at 24 VDC
Carry current	1 A
Max. operating voltage	125 VAC, 60 VDC
Max. operating current	1 A

## ■ Coil Ratings

Item	Voltage Rating				
	3 VDC	4.5 VDC	5 VDC	12 VDC	24 VDC
Rated voltage	3 VDC	4.5 VDC	5 VDC	12 VDC	24 VDC
Rated current	60.0 mA	40.0 mA	36.0 mA	15.0 mA	9.6 mA
Coil resistance	50.0 Ω	112.5 Ω	139.0 Ω	800.0 Ω	2,504.0 Ω
Pick-up voltage	75% max. of rated voltage				
Dropout voltage	10% min. of rated voltage				
Maximum voltage	150% of rated voltage				130% of rated voltage
Power consumption	Approx. 180 mW				Approx. 230 mW

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

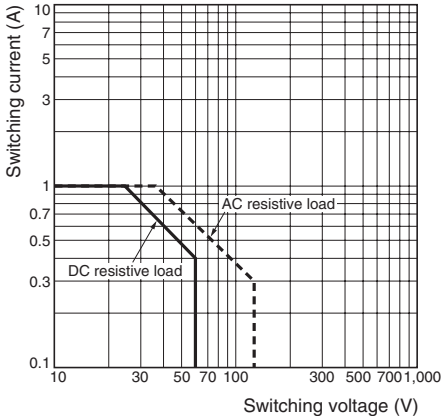
## ■ Characteristics

Item	Non-latching Relays	
	G6L-1P, G6L-1F	
Contact resistance (See Note 1)	100 mΩ max.	
Operate time (See Note 2)	5 ms max. (approx. 1.1 ms)	
Release time (See Note 2)	5 ms max. (approx. 0.4 ms)	
Insulation resistance (See Note 3)	1,000 MΩ min. (at 500 VDC)	
Dielectric strength	Coil and contacts	1,000 VAC, 50/60 Hz for 1 min
	Contacts of same poles	750 VAC, 50/60 Hz for 1 min
Surge withstand voltage	Coil and contacts	1,500 VAC, 10 × 160 μs
Vibration	Mechanical durability	10 to 55 Hz, 1.65-mm single amplitude (3.3-mm double amplitude)
	Malfunction durability	10 to 55 Hz, 1.65-mm single amplitude (3.3-mm double amplitude)
Shock	Mechanical durability	1,000 m/s <sup>2</sup>
	Malfunction durability	100 m/s <sup>2</sup>
Service life	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) (See Note 4)	1 mA at 5 VDC	
Ambient temperature	Operating: -40°C to 70°C (with no icing or condensation)	
Humidity	Operating: 5% to 85% RH	
Weight	Approx. 0.6 g	

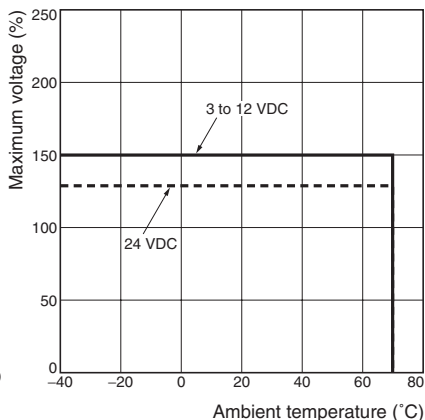
- Note:**
1. The contact resistance was measured with 10 mA at 1 VDC with a fall-of-potential method.
  2. Values in parentheses are actual values.
  3. The insulation resistance was measured with a 500-VDC Megger Tester applied to the same parts as those used for checking the dielectric strength.
  4. 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.
  5. The above values are initial values.

# Engineering Data

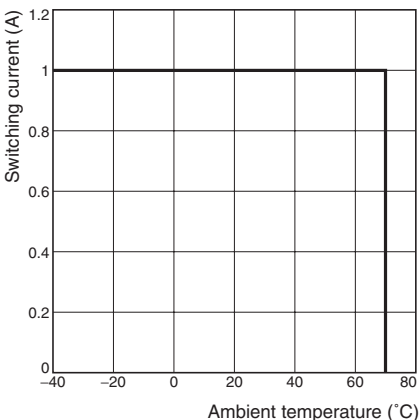
## Maximum Switching Capacity



## Ambient Temperature vs. Maximum Voltage

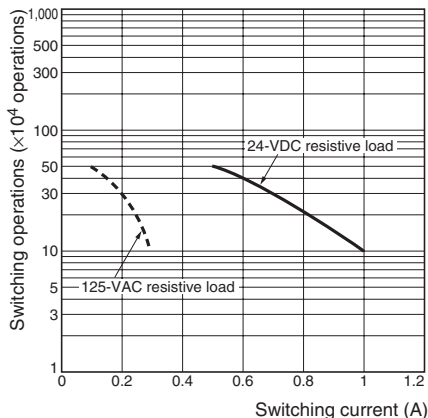


## Ambient Temperature vs. Switching Current

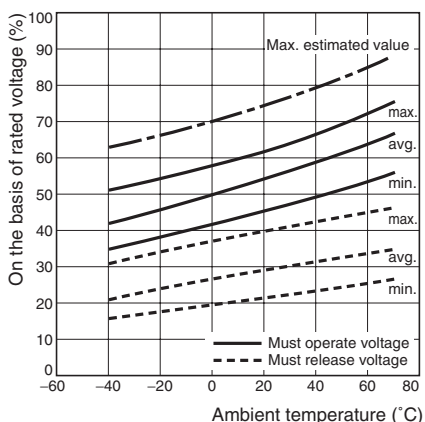


**Note:** "Maximum Voltage" is the maximum voltage that can be applied to the relay coil.

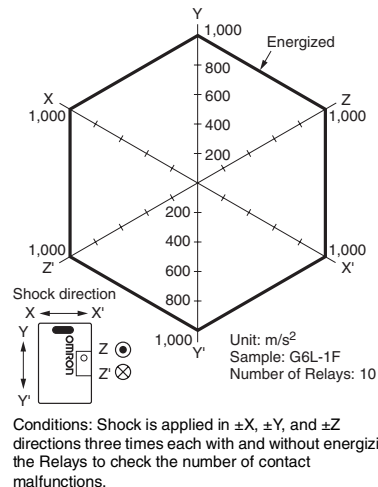
## Endurance



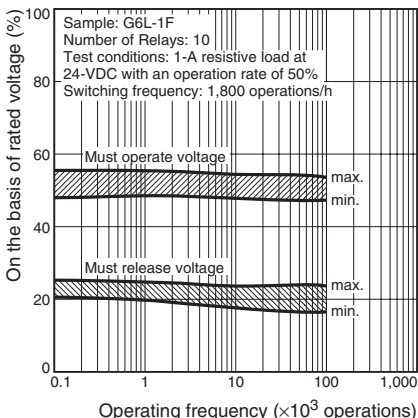
## Ambient Temperature vs. Must Operate or Must Release Voltage



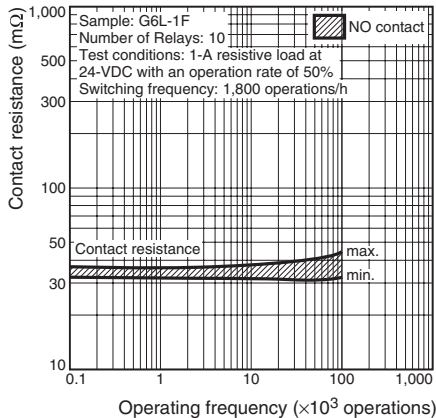
## Shock Malfunction



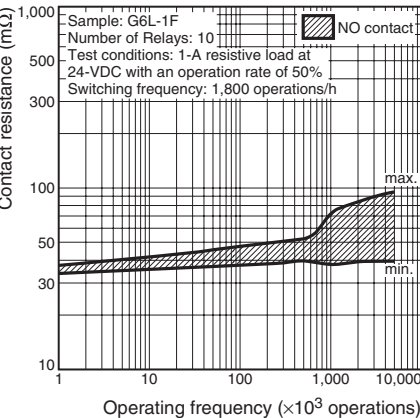
## Electrical Endurance (with Must Operate and Must Release Voltage) (See Note)



## Electrical Endurance (Contact Resistance) (See Note)

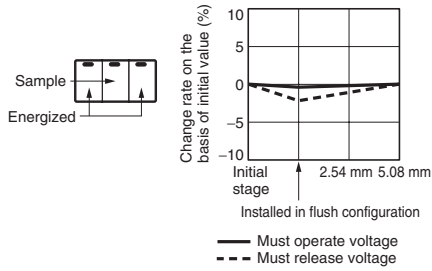


## Contact Reliability Test (Contact Resistance) (See Note)

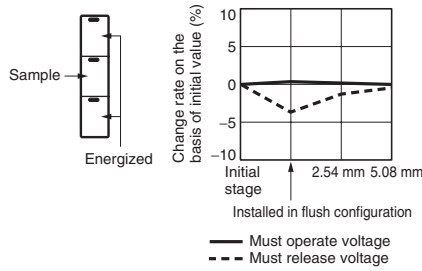


**Note:** The tests were conducted at an ambient temperature of 23°C.

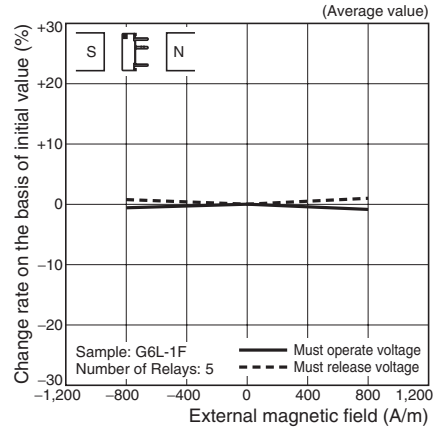
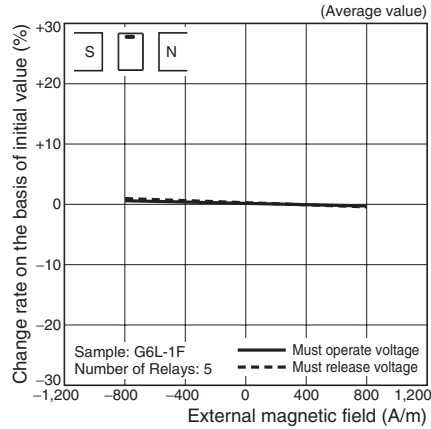
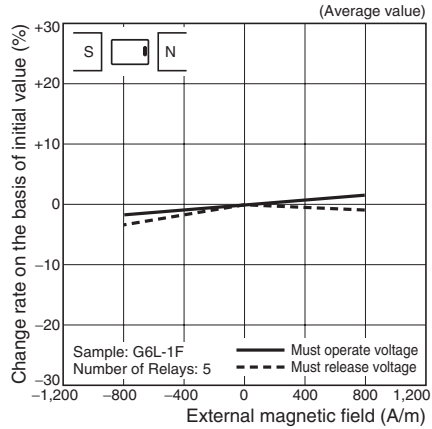
### Mutual Magnetic Interference



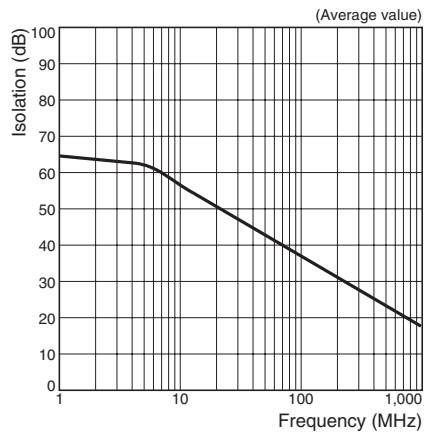
### Mutual Magnetic Interference



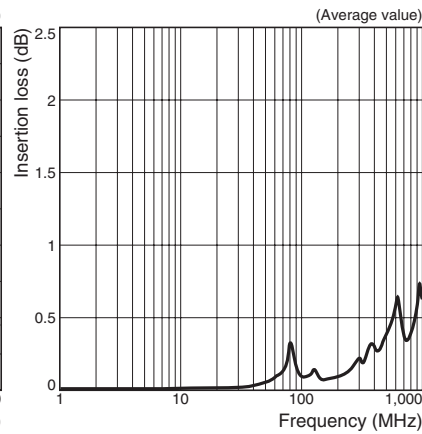
### External Magnetic Interference



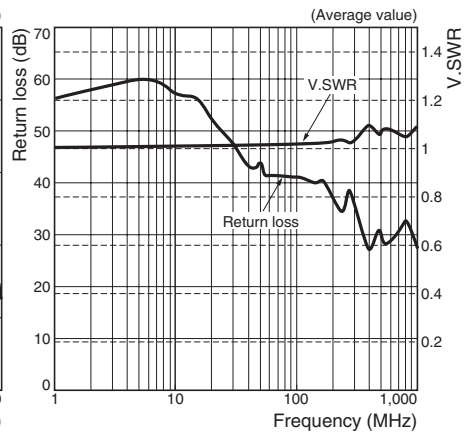
### High-frequency Characteristics (Isolation)



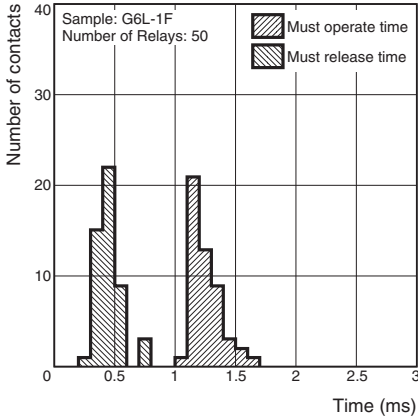
### High-frequency Characteristics (Insertion Loss)



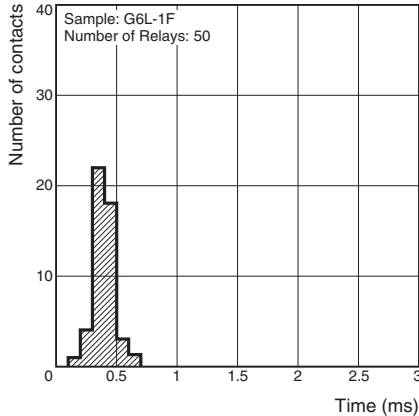
### High-frequency Characteristics (Return Loss, V.SWR)



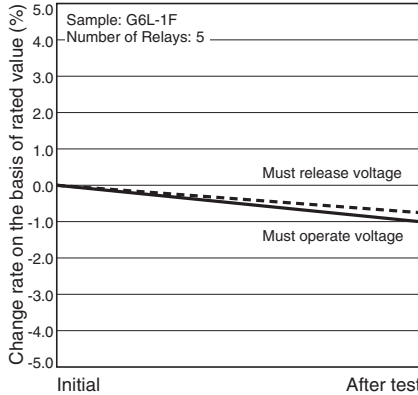
**Must Operate and Must Release Time Distribution (See Note)**



**Distribution of Bounce Time (See Note)**



**Vibration Resistance**

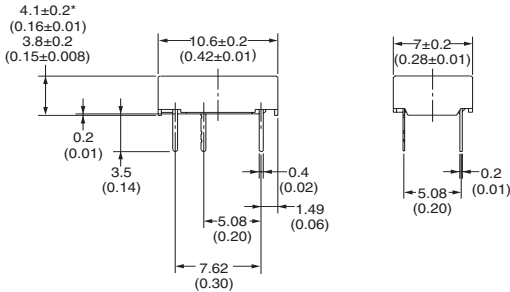
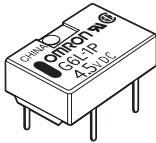


**Note:** The tests were conducted at an ambient temperature of 23°C.

**Dimensions**

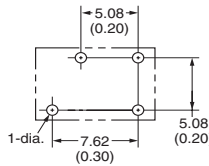
Unit: mm (inch)

**G6L-1P**

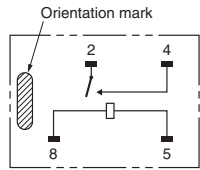


**Note:** Each value has a tolerance of ±0.3 mm.  
\*This dimension effective April, 2005.

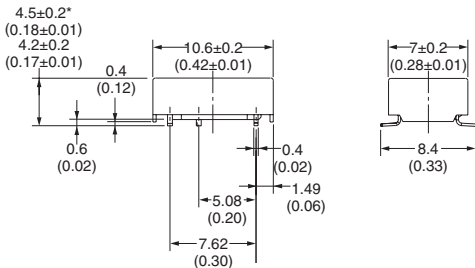
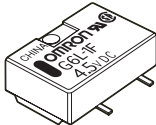
**PCB Mounting Holes (Bottom View)**  
Tolerance: ±0.1 mm



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

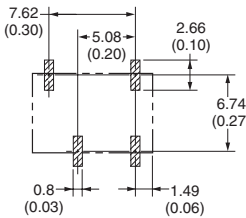


**G6L-1F**

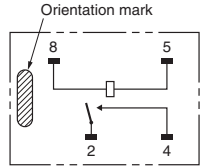


**Note:** Each value has a tolerance of ±0.3 mm.  
\*This dimension effective April, 2005.

**PCB Mounting Holes (Top View)**  
Tolerance: ±0.1 mm



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

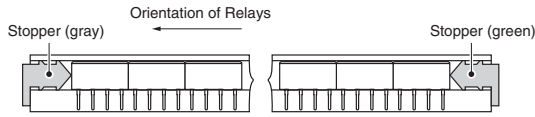


# Packaging

## ■ Tube Packaging

Relays in tube packaging 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

## ■ Tape and Reel Packaging (Surface-mount Terminal Relays)

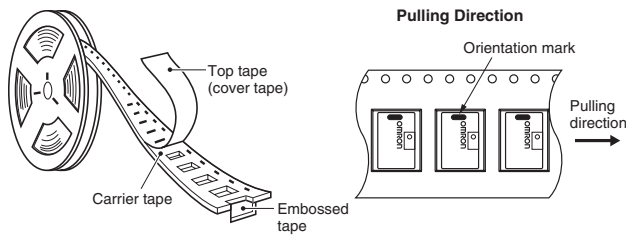
When ordering Relays in tape and reel packaging, add the suffix “-TR” to the model number, otherwise the Relays in tube packing will be provided.

Tape type: TB2412R (Refer to EIAJ (Electronic Industries Association of Japan))

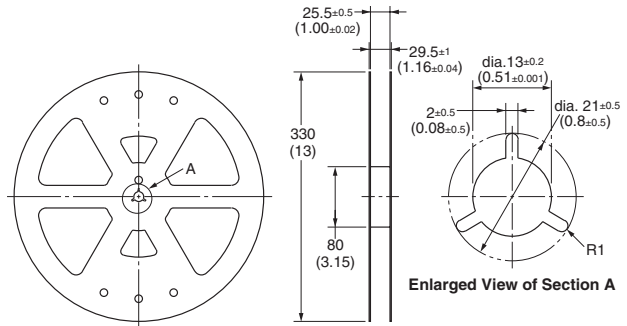
Reel type: R24D (Refer to EIAJ (Electronic Industries Association of Japan))

Relays per reel: 1,000

## Direction of Relay Insertion

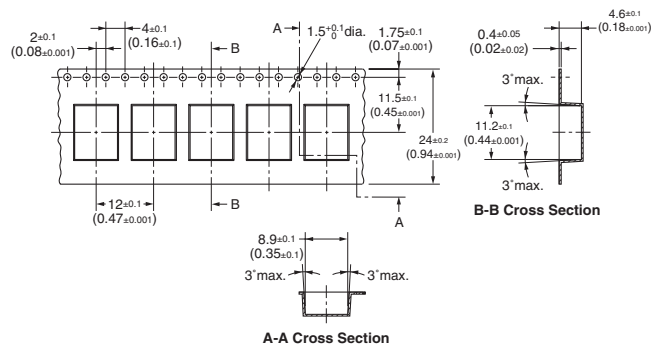


## Reel Dimensions



## Carrier Tape Dimensions

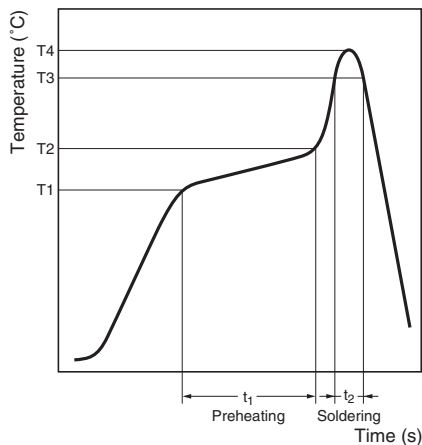
### G6L-1F



# Recommended Soldering Method

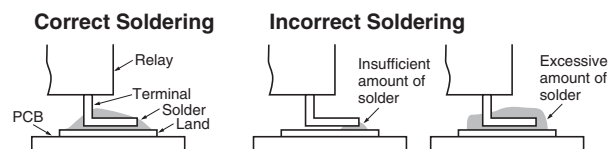
## Temperature Profile According to IRS

When performing reflow-soldering, check the profile on an actual device after setting the temperature condition so that the temperatures at the relay terminals and the upper surface of the case do not exceed the limits specified in the following table.



Item Measuring position	Preheating (T1 to T2, t <sub>1</sub> )	Soldering (T3, t <sub>2</sub> )	Peak value (T4)
Terminal	150°C to 180°C, 120 s max.	180°C to 200°C, 20 to 30 s	245°C max.
Upper surface of case	—	—	250°C max.

The thickness of cream solder to be applied should be within a range between 150 and 200 μm on OMRON's recommended PCB pattern.



Visually check that the Relay is properly soldered.

## Approved Standards

UL approval: UL60950 (File No. E41515)

CSA approval: C22.2 No.60950 (File No. LR31928)

Contact form	Coil rating	Contact rating	Number of test operations
SPST-NO	G6L-1P and G6L-1F: 3 to 24 VDC	1A at 30 VDC 0.5A at 60 VDC 0.3A at 125 VAC	6,000

# Precautions

## ■ Correct Use

### Handling

Leave the Relays packed until just prior to mounting them.

### Soldering

Solder: JIS Z3282, H63A

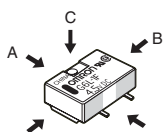
Soldering temperature: Approx. 250°C (At 260°C if the DWS method is used.)

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 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 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.



# Omron Electronic Components, LLC

## Terms and Conditions of Sales

### I. GENERAL

- Definitions:** The words used herein are defined as follows.
  - Terms:** These terms and conditions
  - Seller:** Omron Electronic Components LLC and its subsidiaries
  - Buyer:** The buyer of Products, including any end user in section III through VI
  - Products:** Products and/or services of Seller
  - Including:** Including without limitation
- Offer/Acceptance:** These Terms are deemed part of all quotations, acknowledgments, invoices, purchase orders and other documents, whether electronic or in writing, relating to the sale of Products by Seller. Seller hereby objects to any Terms proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
- Distributor:** Any distributor shall inform its customer of the contents after and including section III of these Terms.

### II. SALES

- Prices/Payment:** All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at time of shipment. Payments for Products received are due net 30 days unless otherwise stated in the invoice. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice.
- Discounts:** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (a) the invoice is paid according to Seller's payment terms and (b) Buyer has no past due amounts owing to Seller.
- Interest:** Seller, at its option, may charge Buyer 1.5% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
- Orders:** Seller will accept no order less than 200 U.S. dollars net billing.
- Currencies:** If the prices quoted herein are in a currency other than U.S. dollars, Buyer shall make remittance to Seller at the then current exchange rate most favorable to Seller; provided that if remittance is not made when due, Buyer will convert the amount to U.S. dollars at the then current exchange rate most favorable to Seller available during the period between the due date and the date remittance is actually made.
- Governmental Approvals:** Buyer shall be responsible for all costs involved in obtaining any government approvals regarding the importation or sale of the Products.
- Taxes:** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Seller.
- Financial:** If the financial position of Buyer at any time becomes unsatisfactory to Seller, Seller reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
- Cancellation/Etc:** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
- Force Majeure:** Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
- Shipping/Delivery:** Unless otherwise expressly agreed in writing by Seller:
  - All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Products shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Products until the full purchase price is paid by Buyer;
  - Delivery and shipping dates are estimates only; and
  - Seller will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- Claims:** Any claim by Buyer against Seller for shortage or damage to the Products occurring before delivery to the carrier must be presented in detail in writing to Seller within 30 days of receipt of shipment.

### III. PRECAUTIONS

- Suitability:** IT IS THE BUYER'S SOLE RESPONSIBILITY TO ENSURE THAT ANY OMRON PRODUCT IS FIT AND SUFFICIENT FOR USE IN A MOTORIZED VEHICLE APPLICATION. BUYER SHALL BE SOLELY RESPONSIBLE FOR DETERMINING APPROPRIATENESS OF THE PARTICULAR PRODUCT WITH RESPECT TO THE BUYER'S APPLICATION INCLUDING (A) ELECTRICAL OR ELECTRONIC COMPONENTS, (B) CIRCUITS, (C) SYSTEM ASSEMBLIES, (D) END PRODUCT, (E) SYSTEM, (F) MATERIALS OR SUBSTANCES OR (G) OPERATING ENVIRONMENT. Buyer acknowledges that it alone has determined that the Products will meet their requirements of the intended use in all cases. Buyer must know and observe all prohibitions of use applicable to the Product/s.
- Use with Attention:** The followings are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible use of any Product, nor to imply that any use listed may be suitable for any Product:
  - Outdoor use, use involving potential chemical contamination or electrical interference.
  - Use in consumer Products or any use in significant quantities.

- Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
  - Systems, machines, and equipment that could present a risk to life or property.
- Prohibited Use:** NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
  - Motorized Vehicle Application:** USE OF ANY PRODUCT/S FOR A MOTORIZED VEHICLE APPLICATION MUST BE EXPRESSLY STATED IN THE SPECIFICATION BY SELLER.
  - Programmable Products:** Seller shall not be responsible for the Buyer's programming of a programmable Product.

### IV. WARRANTY AND LIMITATION

- Warranty:** Seller's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Seller (or such other period expressed in writing by Seller). SELLER MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT ALL OTHER WARRANTIES, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS.
- Buyer Remedy:** Seller's sole obligation hereunder shall be to replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product or, at Seller's election, to repay or credit Buyer an amount equal to the purchase price of the Product; provided that there shall be no liability for Seller or its affiliates unless Seller's analysis confirms that the Products were handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Seller before shipment.
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- Indemnities:** Buyer shall indemnify and hold harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products.

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Cat. No. J01C-E-01

01/07

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Printed in USA