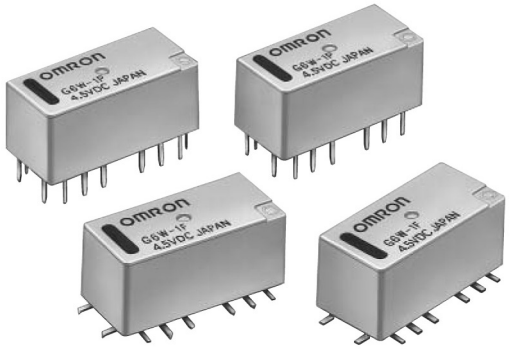
High-frequency Relay
G6W

Surface-mountable 5 GHz Band Miniature SPDT High-frequency Relay

- Superior high-frequency characteristics, such as an isolation of 60 dB min., insertion loss of 0.2 dB max., and V.S.W.R of 1.2 max. at 5 GHz (50 Ω).
- High-frequency characteristics obtained by adopting tri-plate micro strip line design.
- Small size at 20 x 9.4 x 8.9 mm (L x W x H).
- Y-shape terminal arrangement simplifies wiring to PCBs.
- SMT and latching versions available.
- RoHS Compliant.



Ordering Information

Classification				Non latching	Single-coil latching	Dual-coil latching
SPDT	Fully sealed	Through-hole terminal	Y-shape terminal	**G6W-1P**	**G6WU-1P**	**G6WK-1P**
		Surface-mount terminal	Y-shape terminal	**G6W-1F**	**G6WU-1F**	**G6WK-1F**

Note: When ordering, add the rated coil voltage to the model number.
Example: G6W-1P 12 VDC
Rated coil voltage

Model Number Legend:

G6W□ - □ □ □ - □
1 2 3 4 5

1. **Relay function**
   None: Non-latching
   U: Single-coil latching
   K: Dual-coil latching
2. **Contact form**
   1: SPDT
3. **Terminal shape**
   F: Surface-mount terminals
   P: PCB through-hole terminals
4. **Terminal Structure**
   None: Y-shape terminal (standard)
5. **Contact Arrangement**
   None: Standard contact arrangement
   R: Reverse contact arrangement

■ Typical Applications

- Mobile phone base station (W-CDMA, UMTS, CDMA-2000, PCS)
- Wireless LAN
- Measurement devices

Specifications

■ Contact Ratings

Item / Load	Resistive load
Rated load	10 mA at 30 VAC 10 mA at 30 VDC 2.5 GHz, 50 Ω, 10 W (See note)
Rated carry current	0.5 A
Max. switching voltage	30 VDC, 30 VAC
Max. switching current	0.5 A

■ High-frequency Characteristics

Item / Frequency	2.0 GHz	2.5 GHz	5.0 GHz
Isolation	65 dB min.	60 dB min.	40 dB min.
Insertion loss	0.2 dB max.		0.4 dB min
V.SWR	1.2 max.		15 dB min.
Max. carry power	20 W (See note)		
Max. switching power	10 W (See note)		

Note: 1. The above values are initial values.

2. These values are for a load with V.SWR ≤1.2 at an impedance of 50 Ω.

■ Coil Ratings

Non-latching Relays (G6W-1F, G6W-1P)

Rated voltage	3 VDC	4.5 VDC	9 VDC	12 VDC	24 VDC
Rated current	66.7 mA	44.4 mA	22.2 mA	16.7 mA	8.3 mA
Coil resistance	45 Ω	101 Ω	405 Ω	720 Ω	2,880 Ω
Must operate voltage	80% of max. of rated voltage				
Must release voltage	10% min. of rated voltage				
Maximum voltage	150% of rated voltage				
Power consumption	Approx. 200 mW				

Single-coil Latching Relays (G6WU-1F, G6WU-1P)

Rated voltage	9 VDC	12 VDC
Rated current	22.2 mA	16.7 mA
Coil resistance	405 Ω	720 Ω
Must set voltage	80% max. of rated voltage	
Must reset voltage	80% max of rated voltage	
Maximum voltage	150% of rated voltage	
Power consumption	Approx. 200 mW	

Dual-coil Latching Relays (G6WK-1F, G6WK-1P)

Rated voltage	3 VDC	4.5 VDC	9 VDC	12 VDC	24 VDC
Rated current	120 mA	80 mA	40 mA	30 mA	15 mA
Coil resistance	25 Ω	56 Ω	225 Ω	400 Ω	1,600 Ω
Must set voltage	80% max. of rated voltage				
Must reset voltage	80% max. of rated voltage				
Maximum voltage	150% of rated voltage				
Power consumption	Approx. 360 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	Classification	Non-latching	Single-coil latching	Dual-coil latching
	Model	G6W-1F, G6W-1P	G6WU-1F, G6WU-1P	G6WK-1F, G6WK-1P
Contact resistance (See note 1)		100 mΩ max.		
Operate (set) time (See note 2)		10 ms max. (Approx. 3.5 ms)	10 ms max. (Approx. 2.5 ms)	
Release (reset) time (See note 2)		10 ms max. (Approx. 2.5 ms)		
Minimum set/reset signal width		-----	12 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		
	Coil and ground, contacts and ground	500 VAC, 50/60 Hz for 1 min		
	Contact of same polarity	500 VAC, 50/60 Hz for 1 min		
Vibration resistance	Destruction	10 to 55 Hz, 1.5-mm double amplitude		
	Malfunction	10 to 55 Hz, 2-mm double amplitude		
Shock resistance	Destruction	1,000 m/s^2		
	Malfunction	500 m/s^2		
Endurance	Mechanical	1,000,000 operations min. (at 36,000 operations/hour)		
	Electrical	300,000 operations min. (with a rated load at 1,800 operations/hour)		
Ambient temperature		Operating: -40°C to 70°C (with no icing or condensation)		
Ambient humidity		Operating: 5% to 85%		
Weight		Approx. 3 g		

Note: 1. The contact resistance was measured with 10 mA at 1 VDC with a fall-of-potential method.

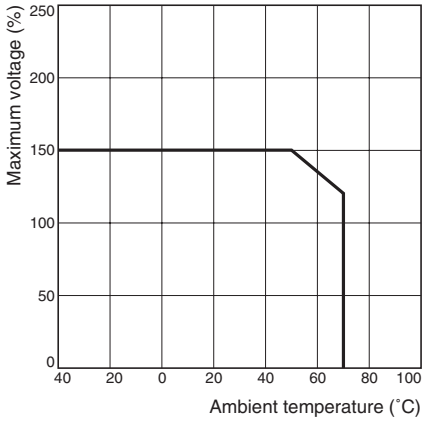
2. Values in parentheses are actual values.

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. The above values are initial values.

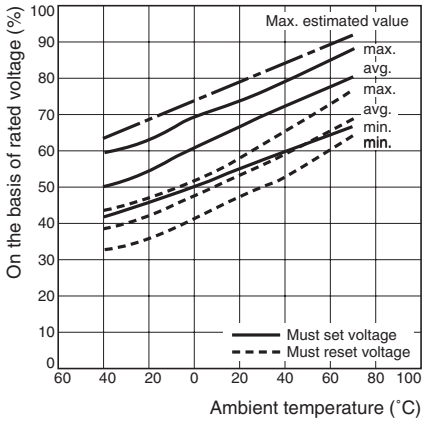
Engineering Data

Ambient Temperature vs. Maximum Voltage

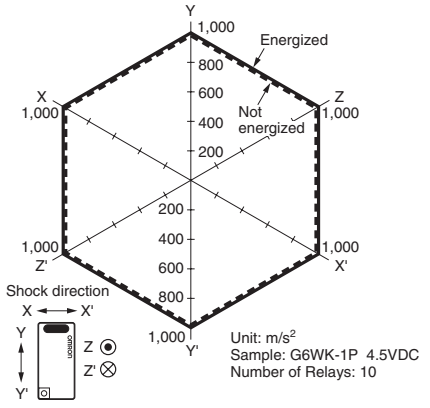


Note: "Maximum voltage" is the maximum voltage that can be applied to the relay coil.

Ambient Temperature vs. Must Set or Must Reset Voltage

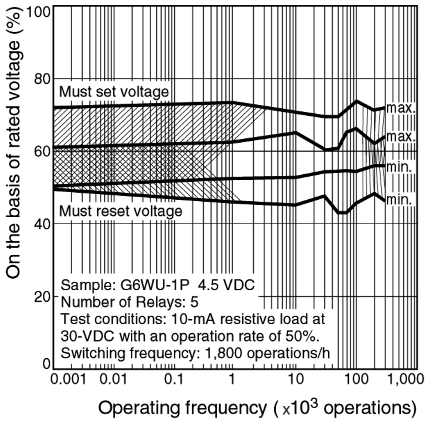


Shock Malfunction

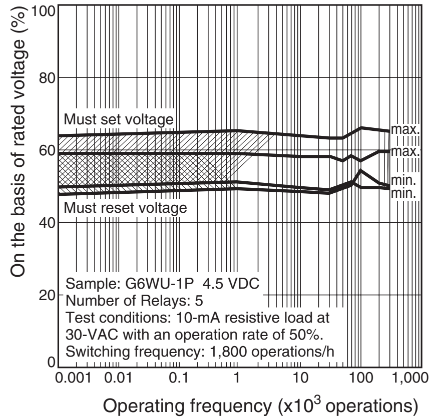


Conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with and without energizing the relays to check the number of contact malfunctions.

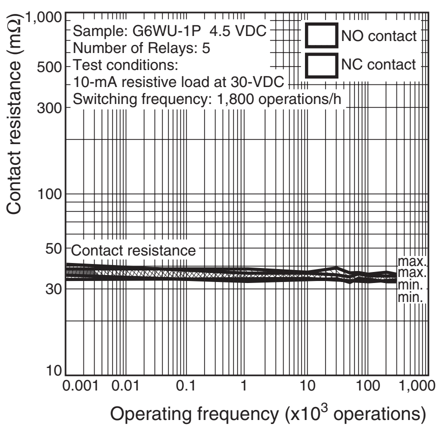
Electrical Endurance (With Must Set and Must Reset Voltage)



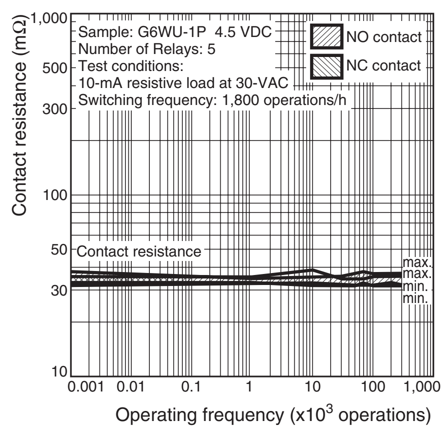
Electrical Endurance (With Must Set and Must Reset Voltage)



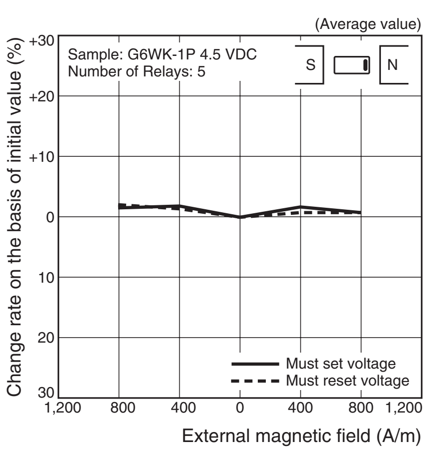
Electrical Endurance (Contact Resistance)

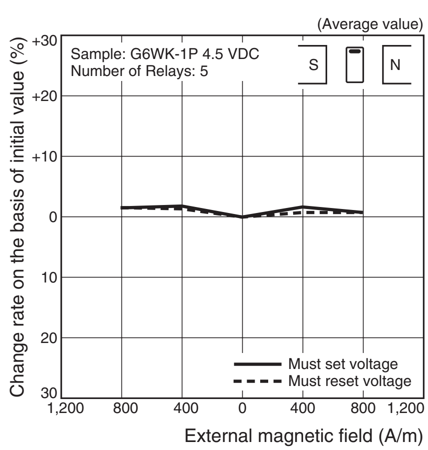


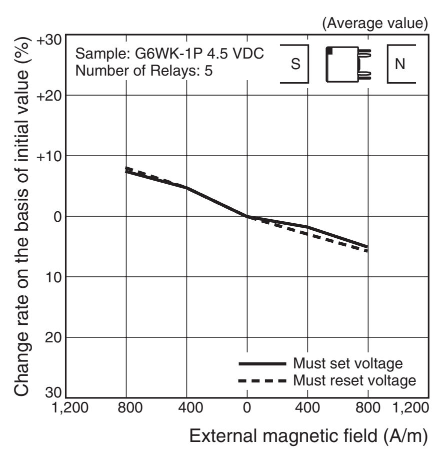
Electrical Endurance (Contact Resistance)



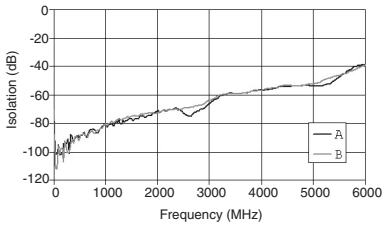
External Magnetic Interference



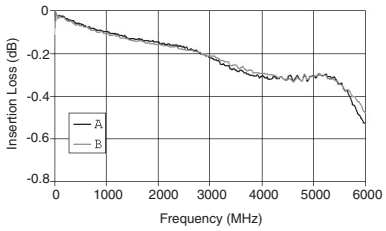




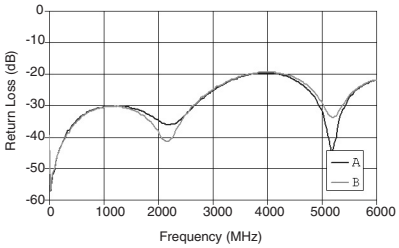
High-frequency Characteristics (Isolation)



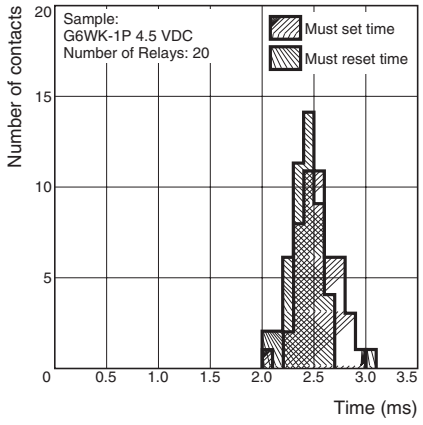
High-frequency Characteristics (Insertion Loss)



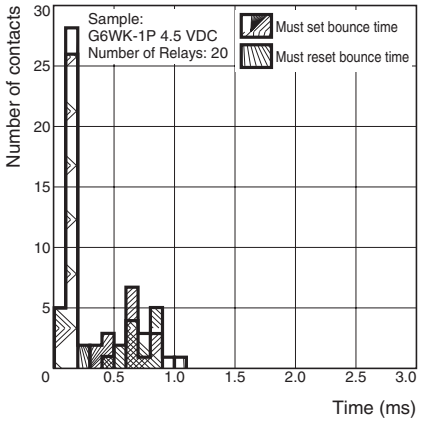
High-frequency Characteristics (Return Loss)



Must Set and Must Reset Time Distribution (see note).



Must Set and Must Reset Bounce Time Distribution (see note).

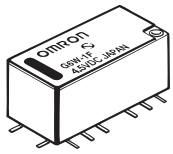


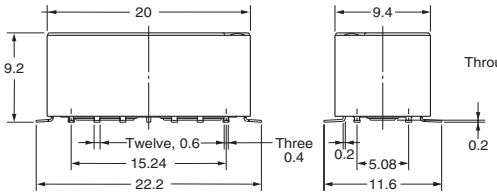
Note: The tests were conducted at an ambient temperature of 23°C.

Dimensions

Unit: mm (inch)

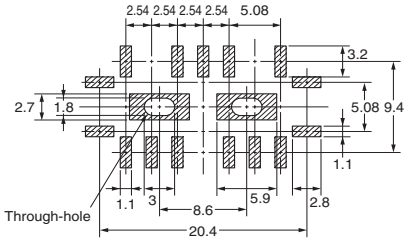
G6W-1F
G6WU-1F





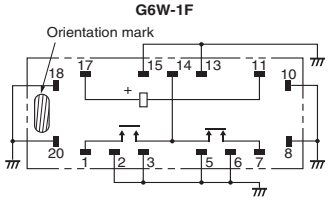
Mounting Pads (Top View)

Tolerance: ±0.1 mm

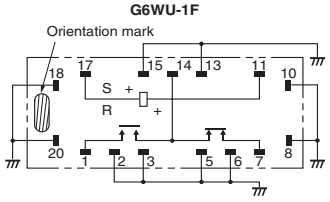


Terminal Arrangement/ Internal Connections (Top View)

G6W-1F

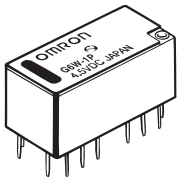


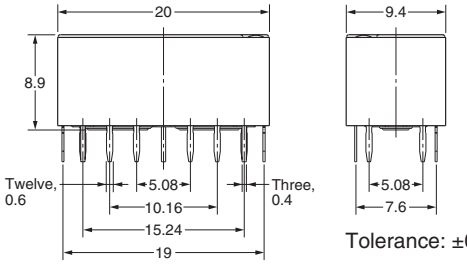
G6WU-1F



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

G6W-1P
G6WU-1P

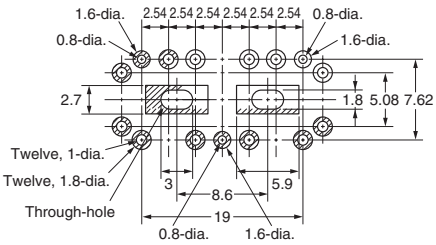




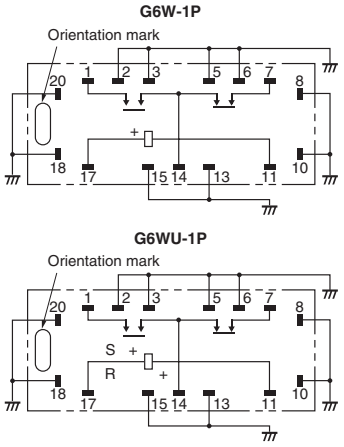
Tolerance: ±0.3 mm unless specified.

Mounting Holes (Bottom View)

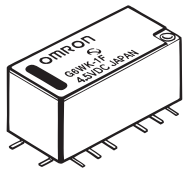
Tolerance: ±0.1 mm

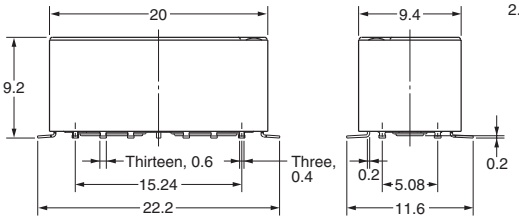


Terminal Arrangement/ Internal Connections (Bottom View)



G6WK-1F

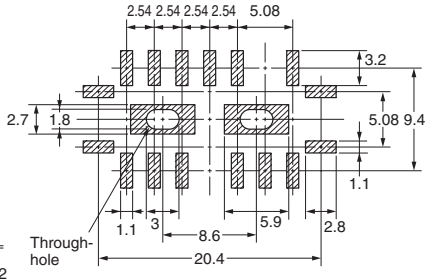




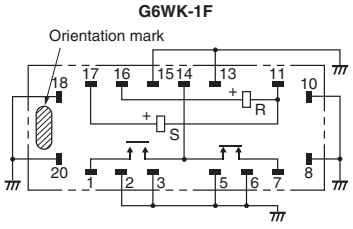
Tolerance: ±0.3 mm unless specified.

Mounting Pads (Top View)

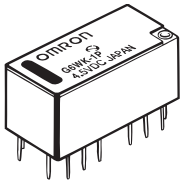
Tolerance: ±0.1 mm

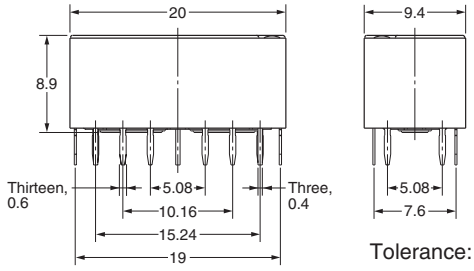


Terminal Arrangement/ Internal Connections (Top View)



G6WK-1P

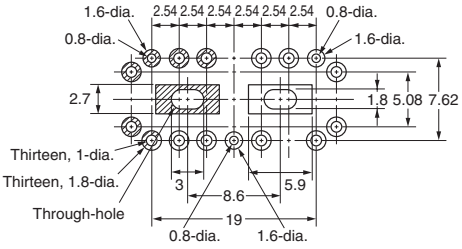




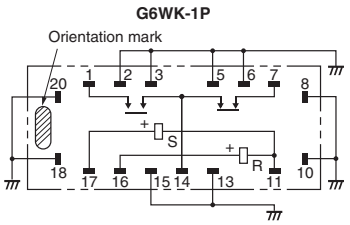
Tolerance: ±0.3 mm unless specified.

Mounting Holes (Bottom View)

Tolerance: ±0.1 mm



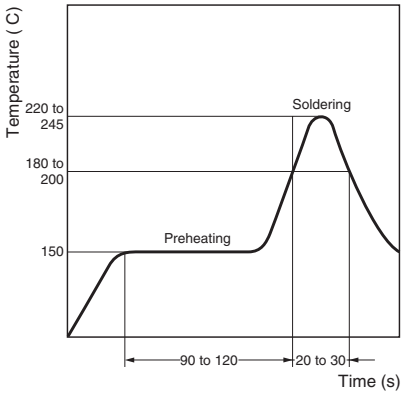
Terminal Arrangement/ Internal Connections (Bottom View)



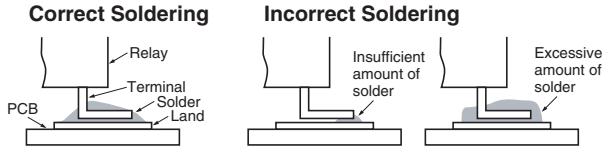
Recommended Soldering Method

■ IRS Method (for Surface-mount Terminal Relays)

• Temperature indicates the surface temperatures of the PCB.



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



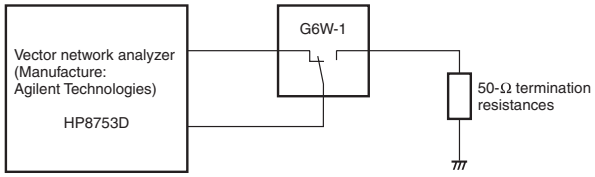
Visually check that the Relay is properly soldered.

Precautions

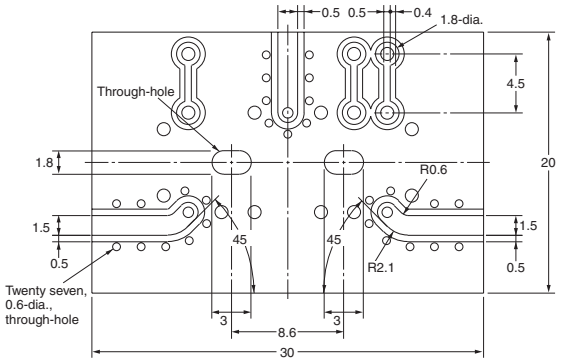
■ Correct Use

High-frequency Characteristics Measurement Method and Substrate to be Measured

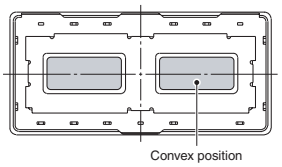
High Frequency characteristics for G6W are measured as shown below.



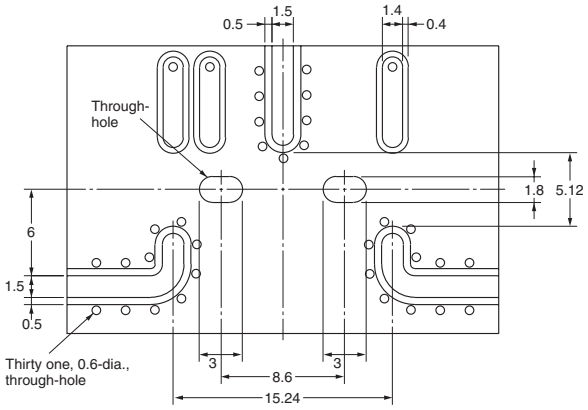
Through-hole Substrate



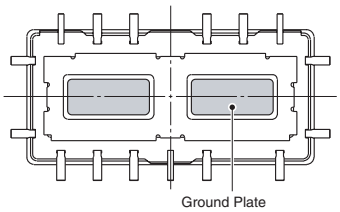
Undersurface of relay



SMD-type substrate

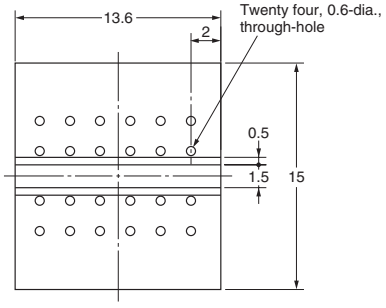


Undersurface of relay



Note: To guarantee isolation characteristics, solder the ground plates to the PCB substrate. It is recommended that the ground plates are soldered after the main reflow process.

Base plate for high-frequency characteristic compensation



Note: The above compensation plate is used to measure the loss by the relay. The relay loss is determined by subtracting the data measured for a compensation base plate from those for a high-frequency characteristics measuring substrate mounted with a relay.

Handling

Leave the relays packed until just prior to mounting them.

Soldering

Solder: JIS Z3282, H63A

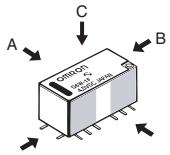
Soldering temperature: Approx. 250°C (at 260°C if the DWS method is used).

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: 4.90 N max.
Direction B: 9.80 N max.
Direction C: 9.80 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.

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.

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.

Terms and Conditions of Sale

1. Offer; Acceptance. These terms and conditions (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 or services (collectively, the "Products") by Omron Electronic Components LLC ("Seller"). Seller hereby objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
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3. 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 (i) the invoice is paid according to Seller's payment terms and (ii) Buyer has no past due amounts owing to Seller.
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7. 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.
8. Cancellation; Etc. Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
9. 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.
10. Shipping; Delivery. Unless otherwise expressly agreed in writing by Seller:
    1. Shipments shall be by a carrier selected by Seller;
    2. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
    3. 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;
    4. Delivery and shipping dates are estimates only.
    5. Seller will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
11. Claims. Any claim by Buyer against Seller for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Seller within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Seller in the condition claimed.
12. Warranties. (a) Exclusive 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 disclaims all other warranties, express or implied. (b) Limitations. SELLER MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Seller further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) 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 in no event shall Seller be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Seller's analysis confirms that the Products were properly 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. Seller shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies, or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing are not to be construed as an amendment or addition to the above warranty.
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16. Miscellaneous. (a) Waiver. No failure or delay by Seller in exercising any right and no course of dealing between Buyer and Seller shall operate as a waiver of rights by Seller. (b) Assignment. Buyer may not assign its rights hereunder without Seller's written consent. (c) Law. These Terms are governed by Illinois law (without regard to conflict of law principles). Federal and state courts in Illinois shall have exclusive jurisdiction for any dispute hereunder. (d) Amendment. These Terms constitute the entire agreement between Buyer and Seller relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) Severability. If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) Setoff. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice.. (g) Definitions. As used herein, "including" means "including without limitation".

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