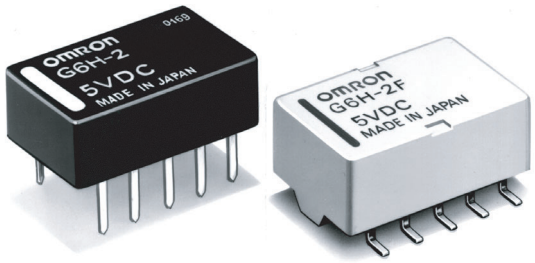
OMRON

PCB Relay | G6H

Ultra-compact, Ultra-sensitive DPDT Relay

- Compact size and low 5-mm profile.
- Low power consumption (140 mW for single-side stable, 100 to 300 mW for latching type) and high sensitivity.
- Low thermoelectromotive force.
- Low magnetic interference enables high-density mounting.
- Single- and double-winding latching types also available.



RoHS Compliant Refer to pages 16 to 17 for details.

Ordering Information

Classification			Single-side stable	Single-winding latching	Double-winding latching
DPDT	Fully sealed	PCB terminal	G6H-2	G6HU-2	G6HK-2
		Surface mount terminal	G6H-2F	---	---

Note: When ordering, add the rated coil voltage to the model number.
Example: G6HK-2 12 VDC
Rated coil voltage

Model Number Legend

G6H □ - □ □- □ □ **VDC**
1 2 3 4 5

1. **Relay Function**
   None: Single-side stable
   U: Single-winding latching
   K: Double-winding latching
2. **Contact Form**
   2: DPDT
3. **Terminal Shape**
   None: PCB terminal
   F: Surface mount terminal
4. **Classification**
   U: Ultrasonically cleanable
5. **Rated Coil Voltage**
   3, 5, 6, 9, 12, 24 VDC

Specifications

■ Coil Ratings

Single-side Stable Type (G6H-2, G6H-2F)

Rated voltage		3 VDC	5 VDC	6 VDC	9 VDC	12 VDC	24 VDC	48 VDC
Rated current		46.7 mA	28.1 mA	23.3 mA	15.5 mA	11.7 mA	8.3 mA	5.8 mA
Coil resistance		64.3 Ω	178 Ω	257 Ω	579 Ω	1,028 Ω	2,880 Ω	8,228 Ω
Coil inductance (H) (ref. value)	Armature OFF	0.025	0.065	0.11	0.24	0.43	1.2	---
	Armature ON	0.022	0.058	0.09	0.20	0.37	1.0	---
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					170% of rated voltage at 23°C	140% of rated voltage at 23°C
Power consumption		Approx. 140 mW					Approx. 200 mW	Approx. 280 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 with a tolerance of ±10%.
3. The maximum voltage is the highest voltage that can be imposed on the relay coil.
4. The maximum voltage that can be be applied when using the G6H-2F (at 85°C) is 115% (3 to 12 V) or 105% (24 V) of the rated voltage.

Single-winding Latching Type (G6HU-2)

Rated voltage		3 VDC	5 VDC	6 VDC	9 VDC	12 VDC	24 VDC
Rated current		33.3 mA	20 mA	16.7 mA	11.1 mA	8.3 mA	6.25 mA
Coil resistance		90 Ω	250 Ω	360 Ω	810 Ω	1,440 Ω	3,840 Ω
Coil inductance (H) (ref. value)	**Armature OFF**	0.034	0.11	0.14	0.33	0.60	1.6
	Armature ON	0.029	0.09	0.12	0.28	0.50	1.3
Must operate voltage		75% max. of rated voltage					
Must release voltage		75% min. of rated voltage					
Max. voltage		180% of rated voltage at 23°C					
Power consumption		Approx. 100 mW					Approx. 150 mW

Double-winding Latching Type (G6HK-2)

Rated voltage		3 VDC	5 VDC	6 VDC	9 VDC	12 VDC	24 VDC
Rated current		66.7 mA	40 mA	33.3 mA	22.2 mA	16.7 mA	12.5 mA
Coil resistance		45 Ω	125 Ω	180 Ω	405 Ω	720 Ω	1,920 Ω
Coil inductance (H) (ref. value)	**Armature OFF**	0.014	0.042	0.065	0.16	0.3	0.63
	Armature ON	0.0075	0.023	0.035	0.086	0.16	0.33
Must operate voltage		75% max. of rated voltage					
Must release voltage		75% min. of rated voltage					
Max. voltage		160% of rated voltage at 23°C					130% of rated voltage at 23°C
Power consumption		Approx. 200 mW					Approx. 300 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; 1 A at 30 VDC
Contact material	Ag (Au-Alloy)
Rated carry current	1 A
Max. switching voltage	125 VAC, 110 VDC
Max. switching current	1 A
Max. switching power	62.5 VA, 33 W
Failure rate (reference value) (See note.)	10 μA at 10 mVDC

Note: P level: $\lambda_{60} = 0.1 \times 10^{-6}$/operation
This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50 Ω. This value may vary depending on the operating environment. Always double-check relay suitability under actual operating conditions.

■ Characteristics

Contact resistance (See note 1.)	50 mΩ max. (G6H-2-U: 100 mΩ max.; G6H-2F: 60 mΩ max.)
Operate (set) time (See note 2.)	Single-side stable types: 3 ms max. (approx. 2 ms) Latching types: 3 ms max. (approx. 1.5 ms)
Release (reset) time (See note 2.)	Single-side stable types: 2 ms max. (approx. 1 ms) Latching types: 3 ms max. (approx. 1.5 ms)
Min. set/reset signal width	Latching type: 5 ms min. (at 23°C)
Max. operating frequency	Mechanical: 36,000 operations/hr Electrical: 1,800 operations/hr (under rated load)
Insulation resistance (See note 3.)	1,000 MΩ min. (at 500 VDC)
Dielectric withstand voltage	1,000 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 750 VAC, 50/60 Hz for 1 min between contacts of same polarity 125 VAC, 50/60 Hz for 1 min between set and reset coil (only G6HK-2)
Impulse withstand voltage	1,500 V (10 x 160 μs) between contacts of same polarity (conforms to FCC Part 68)
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 2.5-mm single amplitude (5-mm double amplitude) Malfunction: 10 to 55 to 10 Hz, 1.65-mm single amplitude (3-mm double amplitude)
Shock resistance	Destruction: 1,000 m/s^2 Malfunction: 500 m/s^2
Endurance	Mechanical: 100,000,000 operations min. (at 36,000 operations/hr) Electrical: 200,000 operations min. (at 1,800 operations/hr)
Ambient temperature	Operating: −40°C to 70°C (with no icing)
Ambient humidity	Operating: 5% to 85%
Weight	Approx. 1.5 g

Note: The above values are initial values.

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

2. Values in parentheses are actual values.

3. The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those used for checking the dielectric strength. (The insulation resistance between the set and reset coil (G6HK-2 only), however, is 100 MΩ min. when measured with a 125-VDC megohmmeter.)

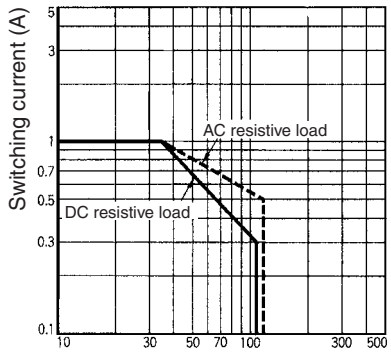
■ Approved Standards

UL114, UL478 (File No. E41515)/CSA C22.2 No.0, No.14 (File No. LR31928)

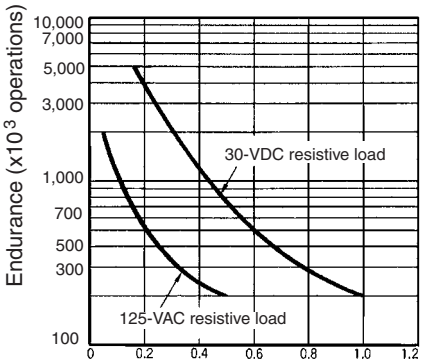
Model	Contact form	Coil ratings	Contact ratings
G6H-2 G6HU-2 G6HK-2 G6H(U/K)-2-U G6H(U/K)-2-100	DPDT	1.5 to 48 VDC	2 A, 30 VDC 0.3 A, 110 VDC 0.5 A, 125 VAC

Engineering Data

Maximum Switching Power

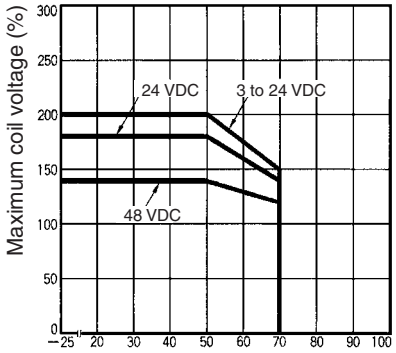


Endurance

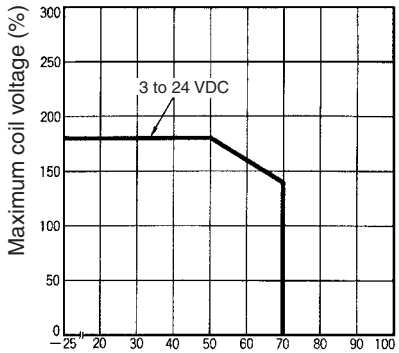


Ambient Temperature vs. Maximum Coil Voltage

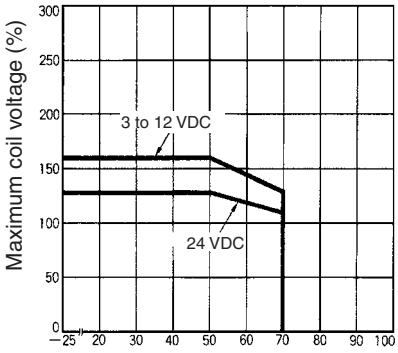
Single-side Stable (G6H-2)



Single-winding Latching (G6HU-2)



Double-winding Latching (G6HK-2)

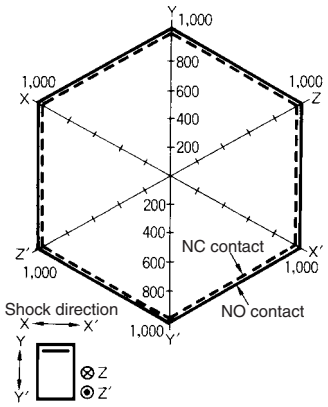


Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

Malfunctioning Shock Resistance (G6H-2)

5 VDC

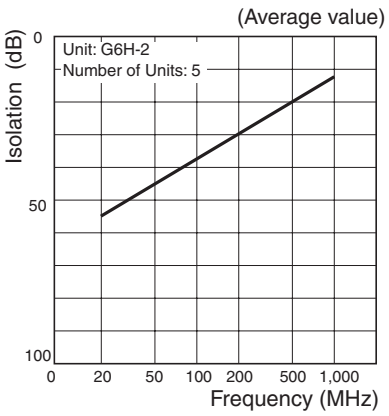
Number of Units: 10



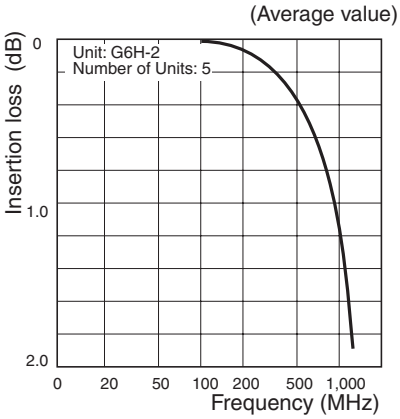
Condition: The Units were shocked at the rate of 500 m/s^2 three times each in the ±X, ±Y, and ±Z directions with and without voltage imposed on the Units until the Units malfunctioned.

High-frequency Characteristics (See notes 1 and 2.)

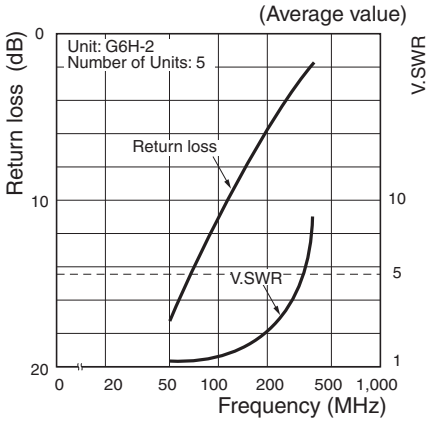
Frequency vs. Isolation



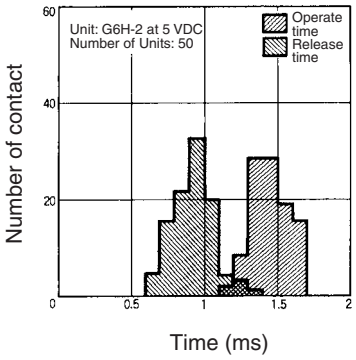
Frequency vs. Insertion Loss



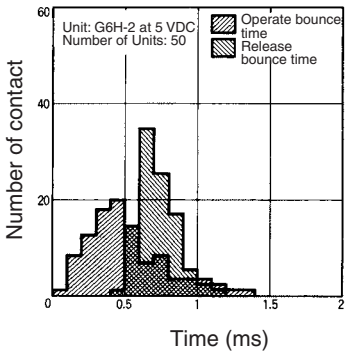
Frequency vs. Return Loss, V.SWR



Distribution of Operate and Release Time (See note 1.)



Distribution of Bounce Time (See note 1.)



Note: **1.** The ambient temperature is 23°C.

2. High-frequency characteristics depend on the PCB to which the Relay is mounted. Always check these characteristics, including endurance, in the actual machine before use.

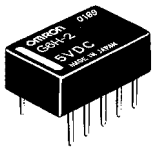
Dimensions

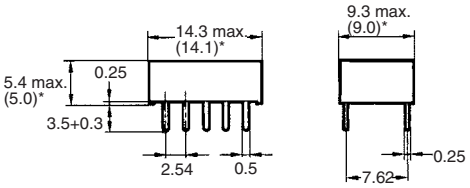
Note: **1.** All units are in millimeters unless otherwise indicated.

2. Orientation marks are indicated as follows:

Single-side Stable Type

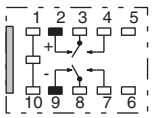
G6H-2(-U)





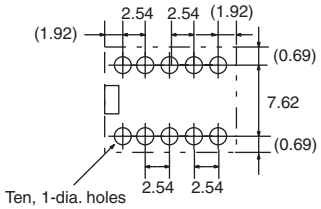
* Average value

Terminal Arrangement/ Internal Connections (Bottom View)



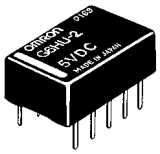
Mounting Holes (Bottom View)

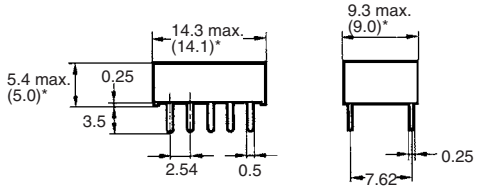
Tolerance: ±0.1



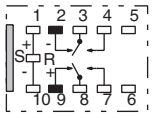
Single-winding Latching Type

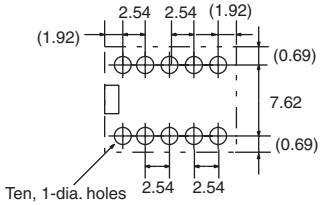
G6HU-2(-U)





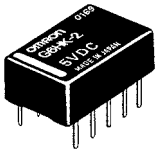
* Average value

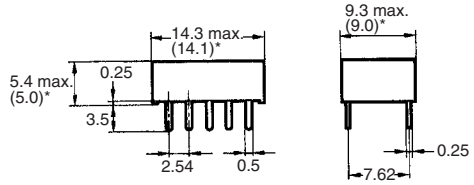




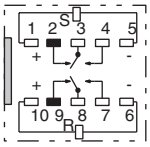
Double-winding Latching Type

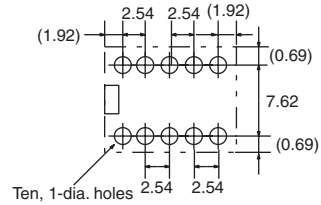
G6HK-2(-U)





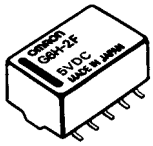
* Average value

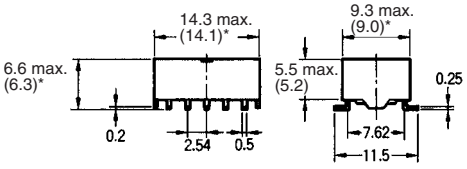




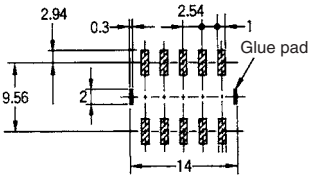
Single-side Stable Type

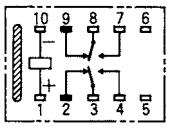
G6H-2F





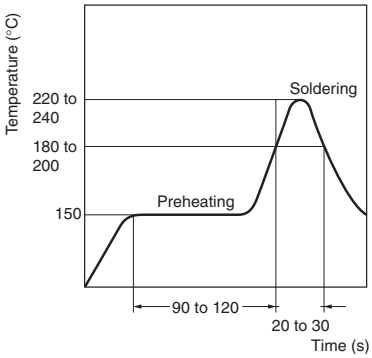
* Average value





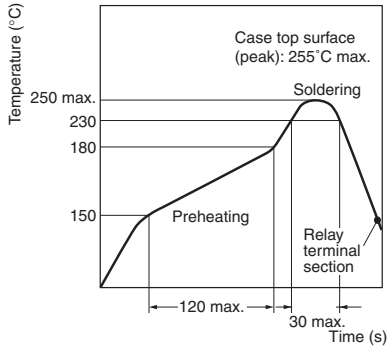
■ Example of Recommended Soldering Conditions for the G6H-2F (Surface Mounting Terminal Relays)

(1) IRS Method (Mounting Solder: Lead)



Note: The temperature profile indicates the temperature on the PCB.

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



Note: The temperature profile indicates the temperature on the relay terminal.

■ Approved Standards

The approved rated values for international standards differ from the performance characteristics of the individual models. Be sure to confirm that required standards are satisfied before actual use.

UL114, UL478 (File No. E41515)

Model	No. of poles	Coil rating	Contact rating	No. of operations
G6H-2(F)	2	1.5 to 48 VDC	2 A, 30 VDC	6,000
			0.3 A, 110 VDC	
			0.5 A, 125 VAC	

CSA Standard C22.2, No.0, No. 14 (File NO. LR31928)

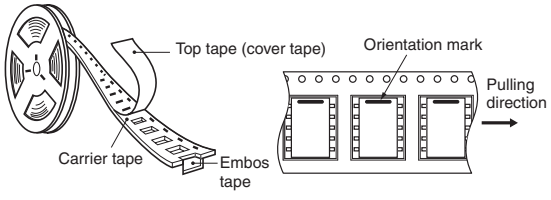
Model	No. of poles	Coil rating	Contact rating	No. of operations
G6H-2(F)	2	1.5 to 48 VDC	2 A, 30 VDC	6,000
			0.3 A, 110 VDC	
			0.5 A, 125 VAC	

■ Tape Packing (Surface Mounting Terminal Models)

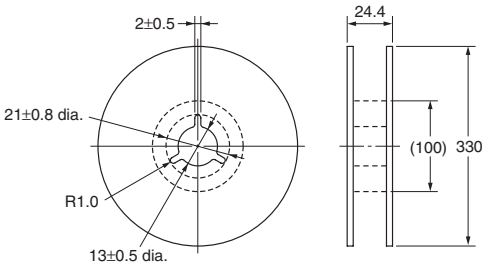
When ordering Relays in tape packing, add the prefix "-TR" to the model number otherwise the Relays in stick packing will be provided.

Relays per Reel: 500

Direction of Relay Insertion

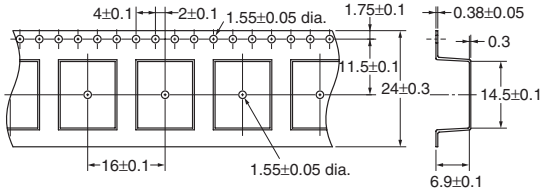


Reel Dimensions



Carrier Tape Dimensions

G6H-2F



■ Precautions

Refer to page 25 for information on general precautions. Be sure to read these precautions before using the Relay.

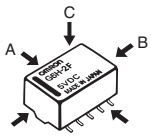
Precautions for Correct Use

Long-term Continuously ON Contacts

Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts because the heat generated by the coil itself will affect the insulation, causing a film to develop on the contact surfaces. We recommend using a latching relay (magnetic-holding relay) in this kind of circuit. If a single-side stable model must be used in this kind of circuit, we recommend using a fail-safe circuit design that provides protection against contact failure or coil burnout.

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.



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

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 deteriorate 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 seal 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.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. K042-E1-06