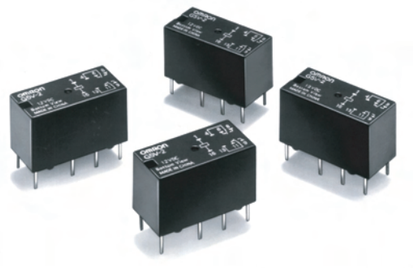
Miniature Relay for Signal Circuits

- ROHS compliant.
- Wide switching power of 10 µA to 2 A.
- High dielectric strength coil-contacts:1,000 VAC; open contacts: 750 VAC.
- Conforms to FCC Part 68 requirements.
- Ag (Au alloy) bifurcated crossbar contacts and fully sealed for high contact reliability.
- New 150-mW relays with high-sensitivity.



FCC

Ordering Information

Classification	Contact form	Contact type	Contact material	Enclosure Rating	Model
Standard	DPDT	Bifurcated crossbar	Ag (Au alloy)	Fully sealed	G5V-2
High-sensitivity					G5V-2-H1

Note: When ordering, add the rated coil voltage to the model number.
Example: G5NB-1A-E 12 VDC
Rated coil voltage

Model Number Legend

G5V - □ **-** □ □ **VDC**
1 2 3

1. **Contact Form**
   2: DPDT
2. **Classification**
   H1: High-sensitivity
3. **Rated Coil Voltage**
   3, 5, 6, 9, 12, 24, 48 VDC

Specifications

■ Coil Rating

Standard Models

Rated voltage		3 VDC	5 VDC	6 VDC	9 VDC	12 VDC	24 VDC	48 VDC
Rated current		166.7 mA	100 mA	83.3 mA	55.6 mA	41.7 mA	20.8 mA	12 mA
Coil resistance (W)		18 Ω	50 Ω	72 Ω	162 Ω	288 Ω	1,152 Ω	4,000 Ω
Coil inductance	**Armature OFF**	0.04	0.09	0.16	0.31	0.47	1.98	7.23
(H) (ref. value)	**Armature ON**	0.05	0.11	0.19	0.49	0.74	2.63	10.00
Must operate voltage		75% max. of rated voltage						
Must release voltage		5% min. of rated voltage						
Max. voltage		120% of rated voltage at 23°C						
Power consumption		Approx. 500 mW						Approx. 580 mW

High Sensitivity Models

Rated voltage		3 VDC	5 VDC	6 VDC	9 VDC	12 VDC	24 VDC	48 VDC
Rated current		50 mA	30 mA	25 mA	16.7 mA	12.5 mA	8.33 mA	6.25 mA
Coil resistance		60 Ω	166.7 Ω	240 Ω	540 Ω	960 Ω	2,880 Ω	7,680 Ω
Coil inductance	**Armature OFF**	0.18	0.46	0.70	1.67	2.90	6.72	20.1
(H) (ref. value)	**Armature OFF**	0.57	0.71	0.97	2.33	3.99	9.27	26.7
Must operate voltage		75% max. of rated voltage						
Must release voltage		5% min. of rated voltage						
Max. voltage		180% of rated voltage at 23°C						150% of rated voltage (at 23°C)
Power consumption		Approx. 150 mW					Approx. 200 mW	Approx. 580 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.

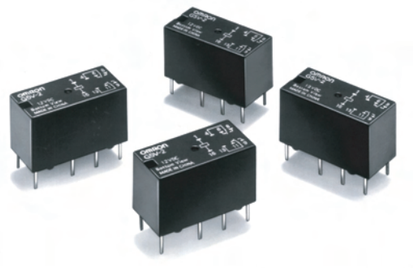
■ Contact Ratings

Item	Standard models	High sensitivity models
Load	Resistive load ($\cos\varphi = 1$)	
Rated load	0.5 A at 125 VAC; 2 A at 30 VDC	0.5 A at 125 VAC; 1 A at 24 VDC
Contact material	Ag (AU alloy)	
Rated carry current	2 A	
Max. switching voltage	125 VAC, 125 VDC	
Max. switching current	2 A	1 A
Max. switching power	62.5 VA, 60 W	62.5 VA, 24 W
Failure rate (reference value)	0.01 mA 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 100Ω. This value may vary depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.

Miniature Relay for Signal Circuits

- ROHS compliant.
- Wide switching power of 10 µA to 2 A.
- High dielectric strength coil-contacts:1,000 VAC; open contacts: 750 VAC.
- Conforms to FCC Part 68 requirements.
- Ag (Au alloy) bifurcated crossbar contacts and fully sealed for high contact reliability.
- New 150-mW relays with high-sensitivity.



FCC

Ordering Information

Classification	Contact form	Contact type	Contact material	Enclosure Rating	Model
Standard	DPDT	Bifurcated crossbar	Ag (Au alloy)	Fully sealed	G5V-2
High-sensitivity					G5V-2-H1

Note: When ordering, add the rated coil voltage to the model number.
Example: G5NB-1A-E 12 VDC
Rated coil voltage

Model Number Legend

G5V - □ **-** □ □ **VDC**
1 2 3

1. **Contact Form**
   2: DPDT
2. **Classification**
   H1: High-sensitivity
3. **Rated Coil Voltage**
   3, 5, 6, 9, 12, 24, 48 VDC

Specifications

■ Coil Rating

Standard Models

Rated voltage		3 VDC	5 VDC	6 VDC	9 VDC	12 VDC	24 VDC	48 VDC
Rated current		166.7 mA	100 mA	83.3 mA	55.6 mA	41.7 mA	20.8 mA	12 mA
Coil resistance (W)		18 Ω	50 Ω	72 Ω	162 Ω	288 Ω	1,152 Ω	4,000 Ω
Coil inductance	**Armature OFF**	0.04	0.09	0.16	0.31	0.47	1.98	7.23
(H) (ref. value)	**Armature ON**	0.05	0.11	0.19	0.49	0.74	2.63	10.00
Must operate voltage		75% max. of rated voltage						
Must release voltage		5% min. of rated voltage						
Max. voltage		120% of rated voltage at 23°C						
Power consumption		Approx. 500 mW						Approx. 580 mW

High Sensitivity Models

Rated voltage		3 VDC	5 VDC	6 VDC	9 VDC	12 VDC	24 VDC	48 VDC
Rated current		50 mA	30 mA	25 mA	16.7 mA	12.5 mA	8.33 mA	6.25 mA
Coil resistance		60 Ω	166.7 Ω	240 Ω	540 Ω	960 Ω	2,880 Ω	7,680 Ω
Coil inductance	**Armature OFF**	0.18	0.46	0.70	1.67	2.90	6.72	20.1
(H) (ref. value)	**Armature OFF**	0.57	0.71	0.97	2.33	3.99	9.27	26.7
Must operate voltage		75% max. of rated voltage						
Must release voltage		5% min. of rated voltage						
Max. voltage		180% of rated voltage at 23°C						150% of rated voltage (at 23°C)
Power consumption		Approx. 150 mW					Approx. 200 mW	Approx. 580 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

Item	Standard models	High sensitivity models
Load	Resistive load ($\cos\varphi = 1$)	
Rated load	0.5 A at 125 VAC; 2 A at 30 VDC	0.5 A at 125 VAC; 1 A at 24 VDC
Contact material	Ag (AU alloy)	
Rated carry current	2 A	
Max. switching voltage	125 VAC, 125 VDC	
Max. switching current	2 A	1 A
Max. switching power	62.5 VA, 60 W	62.5 VA, 24 W
Failure rate (reference value)	0.01 mA 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 100Ω. This value may vary depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.

■ Characteristics

Item	Standard models	High sensitivity models
Contact resistance (see note 1)	50 mΩ max.	100 mΩ max.
Operate time	7 ms max.	
Release time	3 ms max.	
Max. operating frequency	Mechanical: 36,000 operations/hr Electrical: 1,800 operations/hr (under rated load)	
Insulation resistance (see note 2)	1,000 MΩ min. (at 500 VDC)	
Dielectric strength	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	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 500 VAC, 50/60 Hz for 1 min between contacts of same polarity
Impulse withstand voltage	1,00 V (10 x 160 µs) between coil and contacts (conforms to FCC part 68)	
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude) Malfunction: 10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude)	
Shock resistance	Destruction: 1,000 m/s^2 (approx. 100G) Malfunction: 200 m/s^2 (approx. 20G)	Destruction: 1,000 m/s^2 (approx. 100G) Malfunction: 100 m/s^2 (approx. 10G)
Endurance	Mechanical: 15,000,000 operations min. (at 36,000 operations/hr) Electrical: 100,000 operations min. (at 1,800 operations/hr)	
Ambient temperature	Operating: -25°C to 65°C (with no icing)	Operating: -25°C to 70°C (with no icing)
Ambient humidity	Operating: 5% to 85%	
Weight	Approx. 5 g	

Note: The above values are initial values.

1. The contact resistance was measured with 10mA at 1VDC with a voltage drop method.
2. The insulation resistance was measured with a 500VDC megohmeter applied to the same parts as those used for checking the dielectric strength.

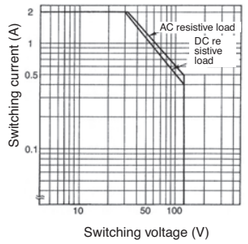
■ Approved Standards

UL (File No. E41515)/CSA C22.2 No.0, No.14 (File No. LR24825)

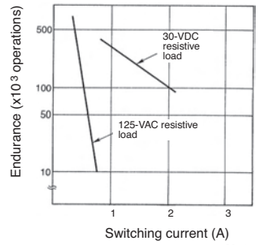
Contact form	Coil rating	Contact rating	
		G5V-2	G5V-2-H1
DPDT	3 to 48 VDC	0.6 A, 125 VAC (general use) 0.6 A, 110 VDC (resistive load) 2 A, 30 VDC (resistive load)	0.5 A, 125 VAC (general use) 0.2 A, 110 VDC (resistive load) 1 A, 24 VDC (resistive load)

Engineering Data

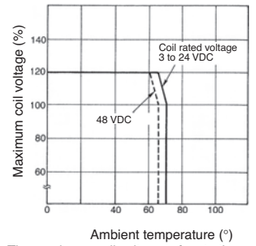
Maximum Switching Power
G5V-2



Endurance
G5V-2

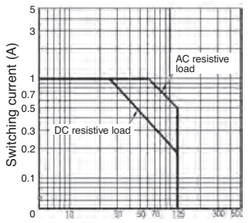


Ambient Temperature vs. Maximum Coil Voltage
G5V-2

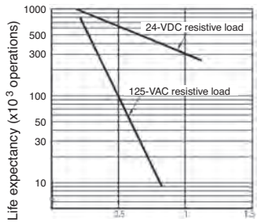


Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

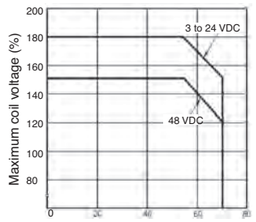
G5V-2-H1



G5V-2-H1



G5V-2-H1



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

■ Characteristics

Item	Standard models	High sensitivity models
Contact resistance (see note 1)	50 mΩ max.	100 mΩ max.
Operate time	7 ms max.	
Release time	3 ms max.	
Max. operating frequency	Mechanical: 36,000 operations/hr Electrical: 1,800 operations/hr (under rated load)	
Insulation resistance (see note 2)	1,000 MΩ min. (at 500 VDC)	
Dielectric strength	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	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 500 VAC, 50/60 Hz for 1 min between contacts of same polarity
Impulse withstand voltage	1,00 V (10 x 160 µs) between coil and contacts (conforms to FCC part 68)	
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude) Malfunction: 10 to 55 to 10 Hz, 0.75-mm single amplitude (1.5-mm double amplitude)	
Shock resistance	Destruction: 1,000 m/s^2 (approx. 100G) Malfunction: 200 m/s^2 (approx. 20G)	Destruction: 1,000 m/s^2 (approx. 100G) Malfunction: 100 m/s^2 (approx. 10G)
Endurance	Mechanical: 15,000,000 operations min. (at 36,000 operations/hr) Electrical: 100,000 operations min. (at 1,800 operations/hr)	
Ambient temperature	Operating: -25°C to 65°C (with no icing)	Operating: -25°C to 70°C (with no icing)
Ambient humidity	Operating: 5% to 85%	
Weight	Approx. 5 g	

Note: The above values are initial values.

1. The contact resistance was measured with 10mA at 1VDC with a voltage drop method.
2. The insulation resistance was measured with a 500VDC megohmeter applied to the same parts as those used for checking the dielectric strength.

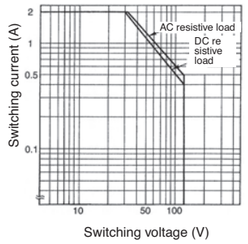
■ Approved Standards

UL (File No. E41515)/CSA C22.2 No.0, No.14 (File No. LR24825)

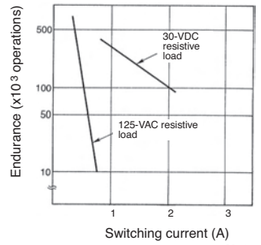
Contact form	Coil rating	Contact rating	
		G5V-2	G5V-2-H1
DPDT	3 to 48 VDC	0.6 A, 125 VAC (general use) 0.6 A, 110 VDC (resistive load) 2 A, 30 VDC (resistive load)	0.5 A, 125 VAC (general use) 0.2 A, 110 VDC (resistive load) 1 A, 24 VDC (resistive load)

Engineering Data

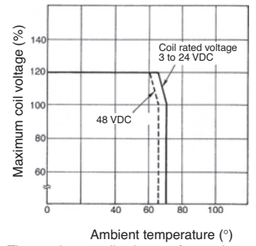
Maximum Switching Power
G5V-2



Endurance
G5V-2

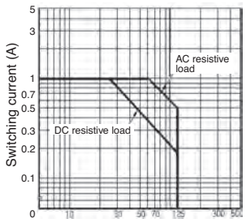


Ambient Temperature vs. Maximum Coil Voltage
G5V-2

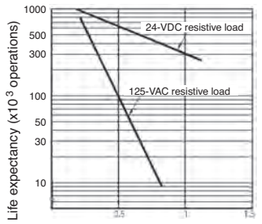


Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

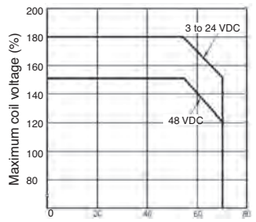
G5V-2-H1



G5V-2-H1



G5V-2-H1

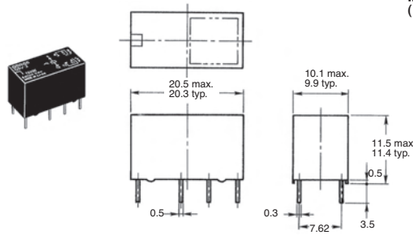


Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

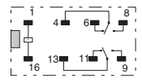
PCB Signal Relay – G5V-2

Dimensions

Note: 1. All units are in millimetres unless otherwise indicated.
2. Orientation marks are indicated as follows:

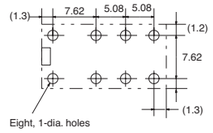


Terminal Arrangement/ Internal Connections (Bottom View)



Mounting Holes (Bottom View)

Tolerance: ±0.1



Precautions

Long-term Continuously ON Contacts

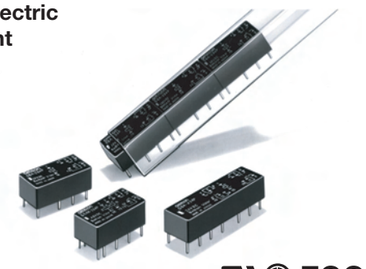
Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts because the heat generated by the coil itself will affect the insulation, causing a film to develop on the contact surfaces. Be sure to use a fail-safe circuit design that provides protection against contact failure or coil burnout.

Relay Handling

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.

PCB Signal Relay – G6A

Fully sealed Relay with High Impulse Dielectric for Use in Telecommunications Equipment



- ROHS compliant.
- High sensitivity can be driven by digital circuits.
- Horizontal design allows use in ½ inch PCB racks.
- Impulse withstand voltage meets FCC Part 68 requirements.
- Relays can be mounted side-by-side due to low magnetic leakage.
- Single- and double-winding latching relays also available.
- Special models available for low thermoelectromotive force.

Ordering Information

Single-side Stable Type

Contact		Ag + Au-clad	AgPd + Au-clad
General purpose	DPDT	G6A-274P-ST-US	G6A-234P-ST-US
	4PDT	G6A-474P-ST-US	G6A-434P-ST-US
Low-sensitivity	DPDT	G6A-274P-ST40-US	G6A-234P-ST40-US
	4PDT	G6A-474P-ST40-US	G6A-434P-ST40-US

Single-winding Latching Type

Contact		Ag + Au-clad	AgPd + Au-clad
General purpose	DPDT	G6AU-274P-ST-US	G6AU-234P-ST-US
	4PDT	G6AU-474P-ST-US	G6AU-434P-ST-US

Double-winding Latching Type

Contact		Ag + Au-clad	AgPd + Au-clad
General purpose	DPDT	G6AK-274P-ST-US	G6AK-234P-ST-US
	4PDT	G6AK-474P-ST-US	G6AK-434P-ST-US
Low-sensitivity	DPDT	G6AK-274P-ST40-US	G6AK-234P-ST40-US
	4PDT	G6AK-474P-ST40-US	G6AK-434P-ST40-US

Note: When ordering, add the rated coil voltage to the model number.
Example: G4A-1A-E 12 VDC
Rated coil voltage

Model Number Legend

G6A □ - □ □ □ □ - □ □ - □ □ VDC
1 2 3 4 5 6 7 8 9

1. **Relay Function**
   None: Single-side stable
   U: Single-winding latching
   K: Double-winding latching
2. **Contact Form**
   2: DPDT
   4: 4PDT
3. **Contact Type**
   7: Bifurcated crossbar Ag (Au-clad) contact
   3: Bifurcated crossbar AgPd (Au-clad) contact
4. **Enclosure Ratings**
   4: Fully sealed
5. **Terminals**
   P: Straight PCB
6. **Stand-off**
   ST: Stand-off 0.64 mm
7. **Special Function**
   40: Low-sensitivity (400 mW)
   LT: Low thermoelectromotive force
8. **Approved Standards**
   US: UL, CSA certified
9. **Rated Coil Voltage**
   3, 4.5, 5, 6, 9, 12, 24, 48 VDC

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