G5Q
PCB Power Relay

A Miniature Power Relay with 1-pole 10A Switching Capacity

- Excellent switching performance for a variety of loads.
- Small, yet provides 8-kV impulse withstand voltage (between coil and contacts).
- Low coil power consumption (SPST-NO: 200 mW, SPDT: 400 mW)
- Coil insulation system: Class F (UL1446).
- IEC/EN 60335-1 conformed. (-HA Model)
- Reduced power consumption with voltage holding and pulse width modulation (PWM) control (Only for G5Q-□-PW model)

RoHS Compliant

■Model Number Legend

G5Q-□□□-□-□-□
1 2 3 4 5 6

1. Number of Poles
1 : 1-pole

2. Contact Form
None : SPDT (1c)
A : SPST-NO (1a)

3. Enclosure Rating
None : Flux protection
4 : Sealed

4. Classification
None : Standard
EU : High-capacity

5. Market Code
None : General purpose
HA : Home Appliance according to IEC/EN60335-1

6. Special Requirement
None : Not supported
PW : Supported

■Application Examples

- Ideal for output applications of control equipment.

■Ordering Information

Terminal Shape	Market Code	Classification	Contact Form	Enclosure Rating	Model	Rated Coil Voltage	Minimum Packing Unit
PCB terminals	General purpose	Standard	SPST-NO(1a)	Flux protection	G5Q-1A	5VDC 9VDC 12VDC 24VDC	100 pcs/tray
					G5Q-1A-PW	5VDC 12VDC 24VDC	
				Sealed	G5Q-1A4	5VDC 9VDC 12VDC 24VDC	
			SPDT(1c)	Flux protection	G5Q-1	5VDC 9VDC 12VDC 24VDC	
					G5Q-1-PW	5VDC 12VDC 24VDC	
				Sealed	G5Q-14	5VDC 9VDC 12VDC 24VDC	
		High-capacity	SPST-NO(1a)	Flux protection	G5Q-1A-EU	5VDC 12VDC 24VDC	
				Sealed	G5Q-1A4-EU		
			SPDT(1c)	Flux protection	G5Q-1-EU		
				Sealed	G5Q-14-EU		
	Home Appliance	Standard	SPST-NO(1a)	Flux protection	G5Q-1A-HA	5VDC 12VDC 24VDC	
					G5Q-1A-HA-PW		
		High-capacity			G5Q-1A-EU-HA	12VDC 24VDC	
		Standard	SPDT(1c)		G5Q-1-HA	5VDC 12VDC 24VDC	
					G5Q-1-HA-PW		
		High-capacity			G5Q-1-EU-HA	12VDC 24VDC	

Note 1. When ordering, add the rated coil voltage to the model number.
Example: G5Q-1A DC5
Rated coil voltage

Note 2. Contact your OMRON sales representative for tube packing models (40 pcs/tube).

■Ratings

●Coil

Contact form	Rated voltage	Rated current (mA)	Coil resistance (Ω)	Must operate voltage (V)	Must release voltage (V)	Max. voltage (V)	Power consumption (mW)
SPST-NO (1a)	5 VDC	40	125	75% max.	5% min. 5 to 34%*	190% (at 23°C)	Approx. 200 Approx. 32*
	9 VDC	22.2	405				
	12 VDC	16.7	720				
	24 VDC	8.3	2880				
SPDT (1c)	5 VDC	80	63		5% min. 5 to 25%*		Approx. 400 Approx. 36*
	9 VDC	44.4	202				
	12 VDC	33.3	360				
	24 VDC	16.7	1440				

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 “Max. voltage” is the maximum voltage that can be applied to the relay coil.
* Power consumption with holding voltage is 36mW. Please confirm the detail on page 6 Coil Voltage Reduction (holding voltage).

●Contacts

Load / Item	Resistive load			
	SPST-NO (1a)		SPDT (1c)	
	Standard	High-capacity	Standard	High-capacity
Contact type	Single			
Contact material	Ag-Alloy (Cd free)			
Rated load (resistive)	10 A at 125 VAC 3 A at 125 VAC 5 A at 250 VAC 3 A at 250 VAC 5 A at 30 VDC	10 A at 250 VAC 3 A at 125 VAC 5 A at 250 VAC 3 A at 250 VAC 5 A at 30 VDC	10 A at 125 VAC (NO) 3 A at 125 VAC (NO) 5 A at 250 VAC (NO) 3 A at 250 VAC (NO) 5 A at 30 VDC (NO) 3 A at 125 VAC (NC) 3 A at 250 VAC (NC) 3 A at 30 VDC (NC)	10 A at 250 VAC (NO) 3 A at 125 VAC (NO) 5 A at 250 VAC (NO) 3 A at 250 VAC (NO) 5 A at 30 VDC (NO) 3 A at 125 VAC (NC) 3 A at 250 VAC (NC) 3 A at 30 VDC (NC)
Rated carry current	10 A (NO)/3 A (NC)			
Max. switching voltage	277 VAC, 30 VDC			
Max. switching current	AC: 10 A (NO)/3 A (NC) DC: 5 A (NO)/3 A (NC)			

■Characteristics

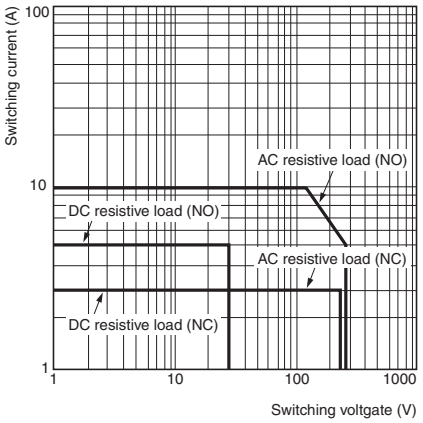
Item	Classification	Standard model
Contact resistance *1		100 mΩ max.
Operate time		10 ms max.
Release time		5 ms max.
Insulation resistance *2		1,000 MΩ min.
Dielectric strength	Between coil and contacts	4,000 VAC, 50/60 Hz for 1 min
	Between contacts of the same polarity	1,000 VAC, 50/60 Hz for 1 min
Impulse withstand voltage (between coil and contacts)		8 kV (1.2 x 50 μs)
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
	Malfunction	100 m/s^2
Durability	Mechanical	10,000,000 operations (18,000 operations per hour)
	Electrical	• NO 25,000 operations: 10 A at 250 VAC resistive load (operation: ON for 1 sec, OFF for 3 sec) <High-capacity type> 50,000 operations: 10 A at 125 VAC resistive load (operation: ON for 1 sec, OFF for 3 sec) 200,000 operations: 3 A at 125 VAC resistive load (operation: ON for 1 sec, OFF for 1 sec) 50,000 operations: 5 A at 250 VAC resistive load (operation: ON for 1 sec, OFF for 1 sec) 100,000 operations: 3 A at 250 VAC resistive load (operation: ON for 1 sec, OFF for 1 sec) 100,000 operations: 5 A at 30 VDC resistive load (operation: ON for 1 sec, OFF for 1 sec) • NC 200,000 operations: 3 A at 125 VAC resistive load (operation: ON for 1 sec, OFF for 1 sec) 100,000 operations: 3 A at 250 VAC resistive load (operation: ON for 1 sec, OFF for 1 sec) 100,000 operations: 3 A at 30 VDC resistive load (operation: ON for 1 sec, OFF for 1 sec)
Failure rate (P level) (reference *3)		10 mA at 5 VDC
Ambient operating temperature		-40°C to 105°C (with no icing or condensation) -40°C to 85°C (with no icing or condensation) <High-capacity type>
Ambient operating humidity		5% to 85%
Weight		Approx. 6.5 g

Note. Note. Values in the above table are the initial values at 23°C.
*1. The contact resistance is possible with 1 A applied at 5 VDC using a fall-of-potential method.
*2. Testing conditions: The insulation resistance was measured with a 500 VDC megohmmeter at the same locations as the dielectric strength was measured.
*3. This value was measured at a switching frequency of 120 operations/min.

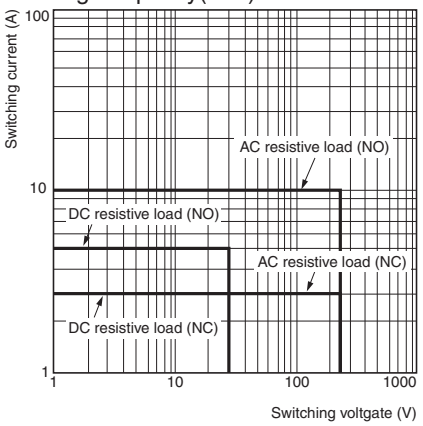
■Engineering Data

●Maximum Switching Capacity

Standard

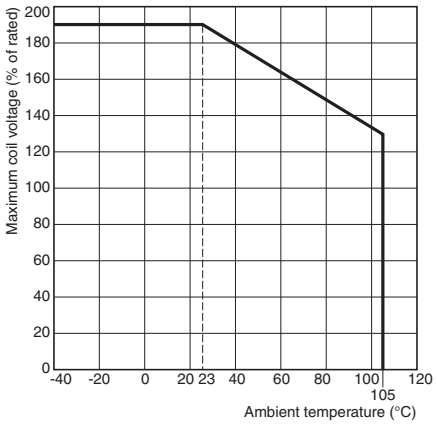


High-capacity(-EU)

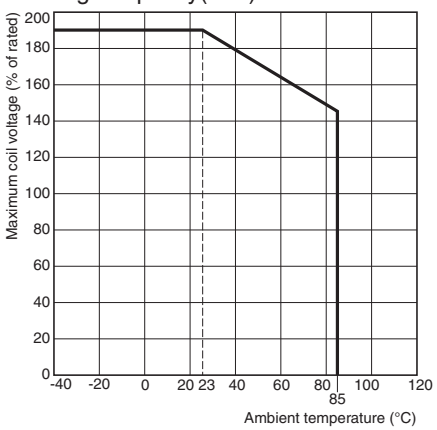


●Ambient Temperature VS. Maximum Coil Voltage

Standard

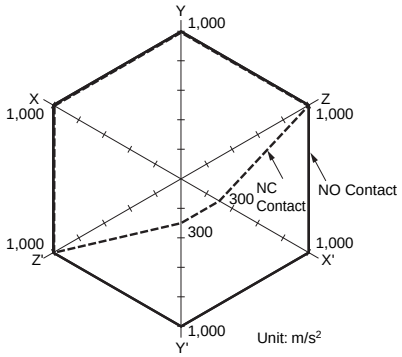


High-capacity(-EU)

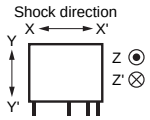


Note. The Maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

●Shock Malfunction



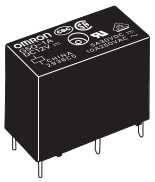
Sample: G5Q-14 12 VDC
Number of Relays: 5 pcs
Test conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with and without energizing the Relays to check the number of malfunctions.
The energized voltage is 100% of the rated voltage.
Requirement: None malfuction
100 m/s²

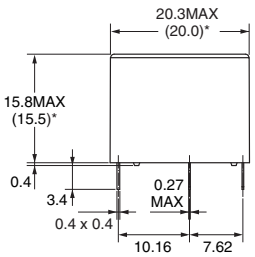


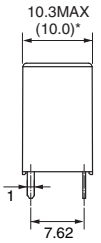
■Dimensions

(Unit: mm)

G5Q-1A(4)(-EU)(-HA)(-PW)

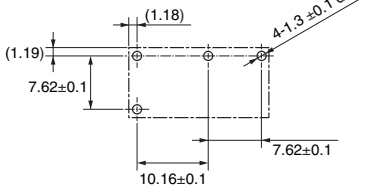




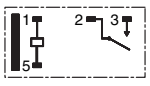


* Average value

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

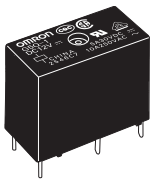


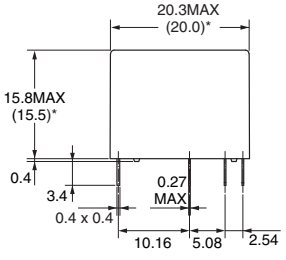
Terminal Arrangement/ Internal Connections
(Bottom View)

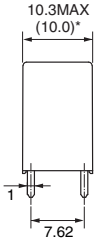


(No coil polarity)

G5Q-1(4)(-EU)(-HA)(-PW)

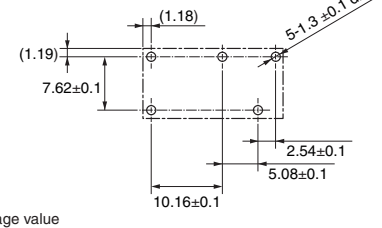




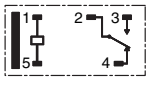


* Average value

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



Terminal Arrangement/ Internal Connections
(Bottom View)



(No coil polarity)

■Approved Standards

UL Recognized: (File No. E41515)

CSA Certified: (File No. LR31928)

Model	Contact form	Coil ratings	Contact ratings	Number of test operations
G5Q-1A(4)(-EU)(-HA)(-PW) G5Q-1(4)(-EU)(-HA)(-PW)	SPST-NO (1a) SPDT (1c)	5 to 48 VDC	10 A 250 VAC N.O. only (Resistive) 40°C	6,000
			10 A 30 VDC N.O. only (Resistive) 40°C	
			4 A 120 VAC N.O. only (Resistive) 40°C	100,000
			3 A 250 VAC N.C. only (Resistive) 40°C	6,000
			3 A 30 VDC N.C. only (Resistive) 40°C	

EN/IEC, VDE (Certified/No.40009467)

Model	Contact form	Coil ratings	Contact ratings	Number of test operations
G5Q-1(4)(-HA)(-PW) G5Q-1A(4)(-HA)(-PW)	SPST-NO (1a) SPDT (1c)	5 to 48 VDC	10 A making and 0 A breaking, 250 VAC (cosϕ=1) 105°C 5 A marking and 3 A breaking, 30 VDC (0 ms) 105°C	10,000
			5 A 250 VAC (cosϕ=1) (N.O.) 105°C	75,000
G5Q-1A(4)-EU(-HA) G5Q-1(4)-EU(-HA)			10 A 250 VAC (cosϕ=1) (N.O.) 65°C 5 A 30 VDC (0 ms) (N.O.) 65°C 3 A 30 VDC (0 ms) (N.C.) 65°C	10,000
			4 A 250 VAC (cosϕ=1) (N.O.) 85°C	100,000

Creepage Distance	6.4 mm min.
Clearance Distance	5.5 mm min.
Insulation Material Group	IIIa
Type of Insulation Coil-contact Circuit Open Contact Circuit	Basic (Rated voltage 400 V) / Reinforced (Rated voltage 250 V) Micro disconnection
Rated Insulation Voltage	250 V
Pollution Degree	2
Rated Voltage System	250 V / 400 V (EU flux type only)
Over Voltage Category	III
Category of Protection according to IEC 61810-1	RT II (Flux protection) / RT III (Sealed)
Glow Wire according to IEC 60335-1	<HA Models only> GWT 750°C min. (IEC 60695-2-11) / GWFI 850°C min. (IEC 60695-2-12)
Tracking Index of Relay Base	PTI 250 V min. (housing parts)
Flammability Class according to UL94	V-0
Coil Insulation System	F Class (UL 1446)

■Precautions

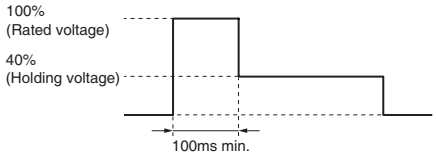
●Please refer to “PCB Relays Common Precautions” for correct use.

Correct Use

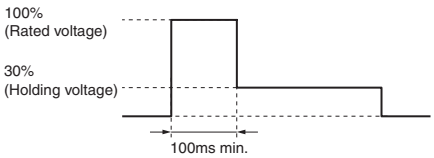
●Coil Voltage Reduction (Holding Voltage) after Relay operation

- If the coil voltage is reduced to the holding voltage after relay operation, first apply the rated voltage to the coil for at least 100 ms, as shown below.
- A voltage of at least 40% (G5Q-1A type) /30% (G5Q-1 type) of the rated voltage is required for the coil holding voltage. Do not allow voltage fluctuations to cause the coil holding voltage to fall below this level.

G5Q-1A



G5Q-1



G5Q-1A

	Applied coil voltage	Coil resistance*	Power consumption
Rated voltage	100%	125Ω (5 VDC) 720Ω (12 VDC) 2,880Ω (24 VDC)	Approx. 200 mW
Holding voltage	40%		Approx. 32 mW

* The coil resistance were measured at a coil temperature of 23°C with tolerances of ±10%.

G5Q-1

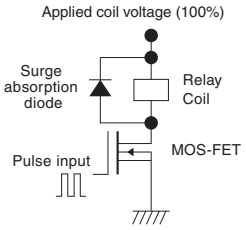
	Applied coil voltage	Coil resistance*	Power consumption
Rated voltage	100%	63Ω (5 VDC) 360Ω (12 VDC) 1,440Ω (24 VDC)	Approx. 400 mW
Holding voltage	30%		Approx. 36 mW

* The coil resistance were measured at a coil temperature of 23°C with tolerances of ±10%.

●Power consumption reduction of coil with pulse width modulation (PWM)

- Models with PWM drive capability (-PW) can reduce coil holding current with PWM control. This function reduces power consumption by reducing the current held by coil.
- Apply the rated voltage for at least 100 ms at the time of relay operation.
- The following are our verification conditions. When using, it be sure to check the actual machine under the actual usage conditions.

■Example of drive circuit



■Conditions of validation carried out by OMRON

- Applied voltage: rated voltage
- Duty: 50% or more
- Frequency: 10 kHz or more
- Diode Vf: 0.4 V or less

OMRON Corporation
Electronic and Mechanical Components Company

Regional Contact

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