# Low Signal Relay

# Surface Mount DPDT Relay

- · High dielectric withstand voltage of 2,000 VAC between coil and contacts (standard type); 1,500 VAC between contacts of different polarity.
- Meets FCC Part 68 and Telcordia 2.5 kV surge withstand.
- Standard models conform to UL/CSA standards. BSI (EN60950) certified models available (-Y versions)
- Low power consumption of 140 mW (Non-latching)
- · Available in through-hole and SMT terminals.
- Tape and reel or tube packaging.
- RoHS Compliant.

# **Ordering Information**

# Standard Version

	Model	Non-la	atching				
Terminal	Contact form	Standard	European Version*	Single coil latching	Dual coil latching		
Gull-wing	DPDT	G6S-2F	G6S-2F-Y	G6SU-2F	G6SK-2F		
Inside "L"		G6S-2G	G6S-2G-Y	G6SU-2G	G6SK-2G		
PCB through-hole		G6S-2	G6S-2-Y	G6SU-2	G6SK-2		

\* BSI certified for EN60950

Notes: 1. When ordering, add the rated coil voltage to the model number. Example: G6S-2F DC12

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Rated coil voltage

2. When ordering tape packing (surface mount models), add "-TR" to the model number. Example: G6S-2F-TR DC12

Tape packing

"-TR" is not part of the relay model number. Therefore, it is not marked on the relay case.

3. Dual coil latching models are available with a High-sensitivity coil. (140 mW; 200 mW for DC24) When ordering High-sensitivity dual coil latching models, add "-H" to the model number. Example: G6SK-2G-H-TR DC5

High-sensitivity coil

### **Model Number Legend**

G6S 🗌 -	<b>— — —</b>	] - 🗌 DC 🗌
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- 1. Relay Function
  - None: Non-latching
  - Single coil latching U:
  - K: Dual coil latching
- 2. Contact Form 2: DPDT

# 3. Terminal Shape

- None: Through-hole
- F: Gull-wing surface mount G: Inside "L" surface mount

# 4. Approved Standards

- None: UL, CSA
- UL, CSA, BSI (EN60950) Y: (Standard coil models - 5, 12, 24 VDC)

### 5. Packaging

None: Tube packaging Tape and reel packaging TR: (Surface mount models)

### 6. Rated Coil Voltage 3, 4.5, 5, 12, 24 VDC

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# **Specification**

# Contact Data

Load	Resistive load (cos f = 1)
Rated load	0.5 A at 125 VAC 2 A at 30 VDC
Contact type	Bifurcated crossbar
Contact material	Ag (Au-Alloy)
Max. carry current	2 A
Max. operating voltage	250 VAC, 220 VDC
Max. operating current	2 A
Max. switching capacity	62.5 VA, 60 W
Min. permissible load	10 μA, 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  $\Omega$ . This value may vary depending on the operating environment. Always double-check relay suitability under actual operating conditions.

# Coil Data

G6S - Standard Non-latching (G6S-2F, G6S-2G, G6S-2)

Rated voltage	Rated current	Coil resistance	Pick-up voltage	Dropout voltage	Maximum voltage	Power consumption (mW)
(VDC)	(mA)	(Ω)		% of rated volt	age	
3	46.7	64.3	75% max.	10% min.	200% max.@ 23°C	Approx. 140
4.5	31.0	145				
5	28.1	178				
12	11.7	1,028				
24	8.3	2,880	]		170% max.@ 23°C	Approx. 200

# G6SU - Standard Single Coil Latching (G6SU-2F, G6SU-2G, G6SU-2)

Rated voltage	Rated current	Coil resistance	Coil Indu (ref. v	ctance (H) /alue)	Set pick-up voltage	Reset pick-up voltage	Maximum volt-	Power consumption (mW)		
(VDC)	(mA)	(Ω)	Armature OFF	Armature ON	% of rate	d voltage	uge			
3	33.3	90	0.108	0.069	75% max.	75% max.	180% max.	Approx. 100		
4.5	22.2	203	0.27	0.14	1		@ 23°C			
5	20.0	250	0.36	0.18						
12	8.3	1,440	2.12	1.14	]					
24	6.3	3,840	5.80	3.79				Approx. 150		

### G6SK - Standard Dual Coil Latching (G6SK-2F, G6SK-2G, G6SK-2)

Rated	Rated	Coil		Coil Indu (ref. v	ctance (H) /alue)		Set pick-up	Reset pick-up	Maximum	Power			
voltage	current	resistance	S	et	Re	set	voltage	voltage	voltage	consumption (mW)			
(VDC)	(mA)	(Ω)	Armature OFF	Armature ON	Armature OFF	Armature ON	% of rate	d voltage	Voltage				
3	66.6	45	0.045	0.035	0.032	0.045	75% max.	75% max.	170% max.	Approx. 200			
4.5	44.4	101	0.12	0.074	0.082	0.14	1		@ 23°C				
5	40	125	0.14	0.088	0.098	0.16							
12	16.7	720	0.60 0.41 0.		0.46	0.54	]						
24	12.5	1,920 1		1.98 1.23		2.23			140% max. @ 23°C	Approx. 300			

### G6S - European Version (EN60950 certified), Non-latching (G6S-2F-Y, G6S-2G-Y, G6S-2-Y)

Rated voltage	Rated current	Coil resistance	Pick-up voltage	Dropout voltage	Power consumption (mW)	
(VDC)	(mA)	(Ω)		% of rated volt	age	
5	40.0	125	75% max.	10% min.	170% max.@ 23°C	Approx. 200
12	16.7	720				
24	9.6	2,504				Approx. 230

Note: 1. The rated current and coil resistance are measured at a coil temperature of  $23^{\circ}$ C with a tolerance of  $\pm 10\%$ .

2. The operating characteristics are measured at a coil temperature of 23°C.

3. Pick-up voltage will vary with temperature.

4. The maximum voltage is the highest voltage that can be imposed on the relay coil.

# ■ Characteristics

Contact resistance (See no	ote 1)	75 m $\Omega$ max.							
Operate (set) time (See no	te 2)	4 ms max. (mean value approx. 2.5 ms G6S; 2.0 ms G6SU, G6SK)							
Release (reset) time (See r	note 2)	4 ms max. (mean value approx. 1.5 ms G6S; 2.0 ms G6SU, G6SK)							
Bounce time		Approx. 0.5 ms							
Minimum set / reset pulse	width	I0 ms (latching models)							
Max. operating frequency		Mechanical: 36,000 operations/hr Electrical: 1,800 ops/hr (under rated AC load). 1,200 ops/hr (under rated DC load)							
Insulation resistance (See	note 3)	1,000 MΩ min. (at 500 VDC)							
Dielectric strength		2,000 VAC, 50/60 Hz for 1 minute (G6S, G6SU, G6S "-Y") between coil and contacts 1,000 VAC, 50/60 Hz for 1 minute (G6SK) between coil and contacts 1,500 VAC, 50/60 Hz for 1 minute between contacts of different and same polarity 500 VAC, 50/60 Hz for 1 minute between set and reset coils (G6SK)							
Surge withstand voltage	Conforming to Telcordia specs.	2,500 V (2 x 10 $\mu$ S) between coil and contacts for G6S, G6SU and G6S "-Y" 2,500 V (2 x 10 $\mu$ S) between contacts of different poles							
	Conforming to	1,500 V (10 x 160 µS) between coil and contacts							
	FCC Part 68	1,500 V (10 x 160 $\mu$ S) between contacts of different and same polarity							
Vibration	Mechanical durability	10 to 55 Hz; 5 mm double amplitude							
	Malfunction durability	10 to 55 Hz; 3.3 mm double amplitude							
Shock	Mechanical durability	1,000 m/s <sup>2</sup> ; approx. 100 G							
	Malfunction durability	750 m/s²; approx. 75 G							
Ambient temperature		-40 to +85°C with no icing or condensation -40 to +70°C with no icing or condensation (G6SK and G6S "-Y" with DC24 coil)							
Ambient Humidity		5% to 85% RH							
Service life	Mechanical	100,000,000 operations min. (at 36,000 operations/hour)							
	Electrical	100,000 operations min. (2A@30VDC, resistive; 1,200 ops/hr.) 100,000 operations min. (0.5A@125VAC, resistive; 1,800 ops/hr.) See "Characteristic Data"							
Weight		Approx. 2g							

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

2. Values in parentheses are typical values unless otherwise stated.

3. The insulation resistance was measured with a 500-VDC megohmmeter applied to the same parts as those used for checking the dielectric strength (except between the set and reset coil).

4. Data shown are of initial value.

# Characteristic Data

### Max. Switching Capacity



### Service Life - G6S-2F(G)



#### Ambient Temperature vs. Maximum Voltage (non-Latching)



### Ambient Temperature vs. Maximum Voltage (Latching)



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

#### Ambient Temperature vs. Switching Current (non-Latching)



Ambient Temperature vs. Switching Current (Latching)





Ambient Temperature vs.





Shock is applied in  $\pm X$ ,  $\pm Y$ , and  $\pm Z$  directions three times each with and with out energizing the Relays to check the number of contact malfunctions. Conditions:

### Electrical Endurance - G6S-2F(G) Electrical Endurance - G6S-2F(G) Electrical Endurance - G6S-2F(G) (Pickup and Dropout) \*1



# (Contact Resistance) \*1



# (Pickup and Dropout) \*1



### Electrical Endurance - G6S-2F(G) (Contact Resistance) \*1



### Contact Reliability Test - G6S-2F(G) (Contact Resistance) \*1, \*2



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The tests were conducted at an ambient temperature of 23°C The contact resistance data are periodically measured reference values and are not values from each monitoring operation. Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use. \*2

### Pickup and Dropout- G6S-2F(G) Distribution of Bounce Time **Time Distribution \*1**



# G6S-2F(G) \*1



(Average value)

Must re

400 800 1.200

### **Mutual Magnetic Interference** G6S-2F(G)



#### **External Magnetic Interference** G6S-2F(G) (Average value)





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External magnetic field (A/m)

s:10 pcs

**Mutual Magnetic Interference** G6S-2F(G)



#### **High-frequency Characteristics** Isolation - G6S-2F(G) \*1, \*2 (Average value (initial))



**High-frequency Characteristics** Insertion Loss - G6S-2F(G) \*1, \*3 (Average value (initial))



**High-frequency Characteristics** Return Loss, V.SWR - G6S-2F(G) \*1, \*3 (Average value (initial))



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

- \*1. \*2. The contact resistance data are periodically measured reference values and are not values from each monitoring operation. Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use. High-frequency characteristics depend on the PCB to which the relay is mounted. Always check these characteristics, including durability, in the actual machine
- \*3. before use.

# Dimensions

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

2. Coplanarity of SMT versions is 0.1 mm max.

# ■ Standard

### G6S-2F, G6S-2F-Y

Tolerance: ±0.3 unless otherwise indicated





# G6S-2G, G6S-2G-Y

Tolerance: ±0.3 unless otherwise indicated





14 8±0.2

### **G6S-2, G6S-2-Y** Tolerance: ±0.3 unless otherwise indicated







7.3±0.2

7.3±0.2

 $4.9^{+0.3}_{-0.5}$ 

B

9.2<sup>+0.5</sup>

Terminal Arrangement/ Internal Connections (Top View)



Note: Carefully check the coil polarity of the relay

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

Orientation mark



Note: Carefully check the coil polarity of the relay

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



Note: Carefully check the coil polarity of the relay





# Footprint (Top View)

Tolerance:  $\pm 0.1$ 



### Footprint (Bottom View)



# Single Coil Latching

### G6SU-2F

Tolerance: ±0.3 unless otherwise indicated



### G6SU-2G

Tolerance:  $\pm 0.3$  unless otherwise indicated





**G6SU-2** Tolerance: ±0.3 unless otherwise indicated





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

#### Orientation mark



Note: Carefully check the coil polarity of the relay

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



Note: Carefully check the coil polarity of the relay

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



Note: Carefully check the coil polarity of the relay

### Footprint (Top View)

Tolerance: ±0.1



Footprint (Top View) Tolerance: ±0.1



Footprint (Bottom View)



# ■ Dual Coil Latching

### G6SK-2F

Tolerance: ±0.3 unless otherwise indicated



### G6SK-2G

Tolerance: ±0.3 unless otherwise indicated





**G6SK-2** Tolerance: ±0.3 unless otherwise indicated



#### Terminal Arrangement/ Internal Connections (Top View) Orientation mark



Note: Carefully check the coil polarity of the relay

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



Note: Carefully check the coil polarity of the relay

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



Note: Carefully check the coil polarity of the relay

#### Footprint (Top View)

Tolerance: ±0.1



### Footprint (Top View)

Tolerance: ±0.1



### Footprint (Bottom View)



# **Recommended Soldering Method**







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

# Packaging

Tube packing	Standard nomenclature	50 pcs per anti-static tube							
Tape packing (Surface mount versions)	When ordering, add "TR" before the rated coil voltage (e.g., G6S-2F-TR-DC12)								
	Note: TR is not part of the relay model number and will not be marked on the relay.								

# ■ Tape and Reel Dimensions (Surface Mount Models)

• Relays per reel: 400

• Reels per packing carton: 2 (800 relays)



# ■ Approvals

UL Recognized (File No. E41515) / CSA Certified (File No. LR31928) - - Ambient Temp. = 40°C

Contact form	Coil rating	Contact ratings	Number of test operations
DPDT (2c)	2 to 48 VDC	3 A at 30 VDC (Resistive)	6,000
		0.3 A at 110 VDC (Resistive)	
		0.5 A at 125 VAC (General Use)	

### BSI (EN60950) (File No.8064)

Contact form	Isolation Category	Voltage					
DPDT	Supplementary Isolation	250 VAC					

Note: 1. The rated values approved by each of the safety standards (e.g., UL, CSA and BSI) may be different from the performance characteristics individually defined in this catalog.

2. In the interest of product improvement, specifications are subject to change.

# Precautions

- Use a DC power supply with 5% or less ripple factor to operate the coil.
- Do not use the G6S where subject to strong external magnetic fields.
- Do not use the G6S where subject to magnetic particles or excessive amounts of dust.
- Do not reverse the polarity of the coil (+, -).

# 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.

### **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 suffer 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 sealed 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.

### **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.



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

- Latching types are delivered in the reset position. We recommend that a reset voltage be applied in advance to start operation.
- Do not drop the G6S or otherwise subject it to excessive shock.
- Remove the relay from the packing immediately prior to usage.
- Be sure to read the precautions and information common to all relays, contained in the Technical User's Guide, "Electromechanical Relays, Technical Information" for correct use.

### G6S (K) (-U) -2 Soldering

- 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.

# G6S (K) (-U) -2F Soldering

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

In order to perform correct soldering, it is recommended that the correct soldering conditions be maintained as shown below on the left side.

### **Correct Soldering**

Incorrect Soldering



Visually check that the relay is properly soldered.

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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



### Как с нами связаться

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