Power PCB Relay
G4A

Miniature Single-pole Relay with 80-A Surge Current and 20-A Switching Current

- Ideal for motor switching.
- Miniature, relay with high switching power and long endurance.
- Creepage distance conforms to UL and CSA standards.
- Highly noise-resistive insulation materials employed.
- Standard model available with flux protection construction.
- RoHS Compliant

Ordering Information

Classification	Contact form	Model
#250 Quick Connect terminals/PCB coil terminals	SPST-NO	**G4A-1A-E**
PCB terminals/PCB coil terminals		**G4A-1A-PE**

Note: When ordering, add the rated coil voltage to the model number.
Example: G4A-1A-E DC12
Rated coil voltage

Model Number Legend

G4A□□-□□DC□
1 2 3 4 5

1. **Number of Poles**
   1: 1 Pole
2. **Contact Form**
   A: SPST-NO
3. **Terminals**
   None: #250 Q.C./PCB coil terminals
   P: Straight PCB/PCB coil terminals
4. **Special Function**
   E: For long endurance
5. **Rated Coil Voltage**
   5, 12, 24 VDC

Specifications

■ Contact Ratings

Rated load	See “Endurance” tables
Rated carry current	20 A
Max. switching voltage	250 VAC
Max. switching current	20 A
Min. Permissible Load (reference value - see note)	100 mA at 5 VDC

Note: P level: λ_{60} = 0.1 x 10^{-6}/operation. The value was measured at a switching frequency of 120 operations/minute.

■ Coil Ratings

Rated voltage	5 VDC	12 VDC	24 VDC
Rated current	180 mA	75 mA	37.5 mA
Pick-up voltage (max.)	70% of rated voltage max.		
Dropout voltage (min.)	10% of rated voltage min.		
Maximum coil voltage	160% of rated voltage at (23°C)		
Power consumption	Approx. 0.9 W		

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. Max. permissible voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

■ Endurance

Motor Load Ratings

Load conditions	Switching frequency	Electrical endurance
250 VAC: Inrush current: 80 A, 0.3 s (cosϕ= 0.7) Break current: 20 A (cosϕ = 0.9)	ON:1.5 s OFF:1.5 s	200,000 operations

Inverter Load Ratings

Load conditions	Switching frequency	Electrical endurance
100 VAC; Inrush current: 200 A (0.P) Break current: 20 A	ON:3 s OFF:5 s	30,000 operations

Overload Durability (Reference Value)

Load conditions	Switching frequency	Electrical endurance
250 VAC: Inrush current: 80 A Break current: 80 A (cosϕ = 0.7)	ON: 1.5 s OFF: 99 s	1,500 operations

■ Characteristics

Contact resistance	100 mΩ max.
Operate time	20 ms max.
Release time	10 ms max.
Max. operating frequency	Mechanical: 18,000 operations/hr
Insulation resistance (see note2)	1,000 MΩ min. (at 500 VDC)
Dielectric strength	4,500 VAC 50/60 Hz for 1 min between coil and contacts 1,000 VAC 50/60 Hz for 1 min between contacts of same polarity
Impulse Withstand Voltage	8.5 kV, 1.2 x 50, between coil and contacts
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: 200 m/s^2
Service Life	Mechanical: 2,000,000 operations min. (at 18,000 operations/hr) Motor load: 200,000 operations min. (ON/OFF: 1.5 s) Inverter load: 30,000 operations min. (ON: 3 s, OFF: 5 s
Ambient operating temperature	Operating: –20°C to 60°C (with no icing or condensation)
Ambient operating humidity	Operating: 5% to 85%
Weight	Approx. 23 g

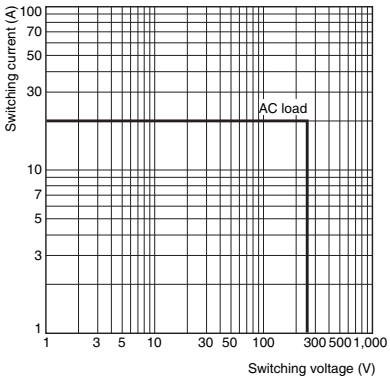
Note: 1. The data shown above are initial values.

2. Measurement conditions: The insulation resistance was measured with a 500 VDC megohmmeter at the same locations as the dielectric strength was measured.

Engineering Data

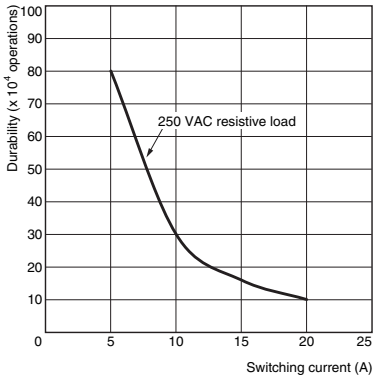
Maximum Switching Capacity

G4A-1A-(P)E



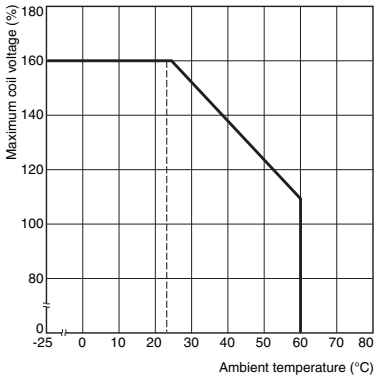
Durability

G4A-1A-(P)E



Ambient Temperature vs. Maximum Coil Voltage

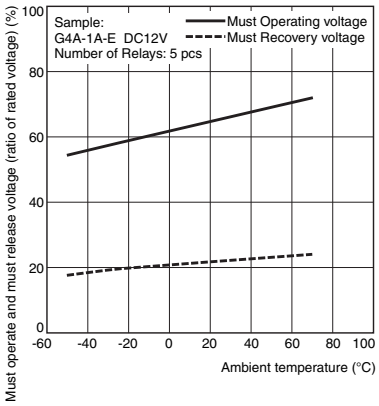
G4A-1A-(P)E



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

Ambient Temperature vs. Pickup and Drop-out Voltages

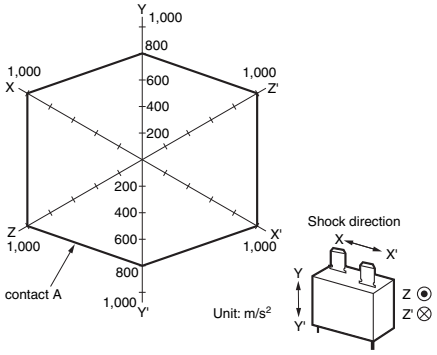
G4A-1A-(P)E



Shock Malfunction

G4A-1A-(P)E

Number of Relays: 5 pieces



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

Requirements: 200 m/s²

Approved Standards

The rated values approved by each of the safety standards may be different from the performance characteristics individually defined in this datasheet.

UL Recognized (File No. E41643)

Model	Number of Poles	Coil ratings	Contact Ratings	Number of test operations
G4A-1A-E G4A-1A-PE	SPST-NO	5 to 100 VDC	20A, 250 VAC (Resistive) 40°C	100,000
			15A, 30 VDC (Resistive) 40°C	
			23A, 277 VAC (General Purpose) 40°C	30,000

CSA Certified (File No. LR31928)

Model	Number of Poles	Coil ratings	Contact Ratings	Number of test operations
G4A-1A-E G4A-1A-PE	SPST-NO	5 to 100 VDC	20A, 250 VAC (Resistive) 40°C	100,000
			15A, 30 VDC (Resistive) 40°C	
			23A, 277 VAC (General Purpose) 40°C	30,000

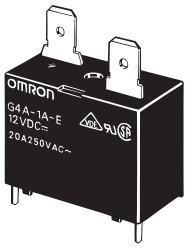
EN/IEC, VDE Certified (Registration No. 107293)

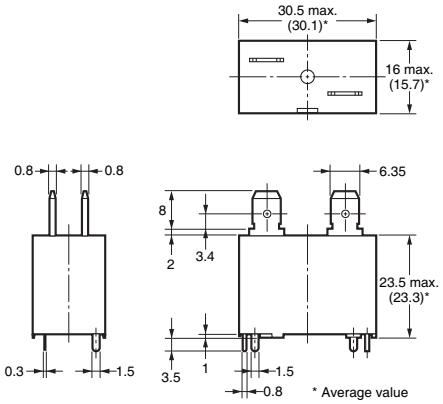
Model	Number of Poles	Coil ratings	Contact Ratings	Number of test operations
G4A-1A-E G4A-1A-PE	SPST-NO	5, 12, 18, 24 VDC	20A, 250 VAC ($\cos\phi$ = 1.0) 50°C	100,000

Dimensions

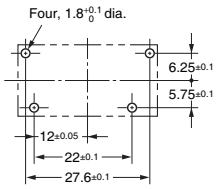
Note: All units are in millimeters unless otherwise indicated; dimensions shown in parentheses are in inches.

G4A-1A-E

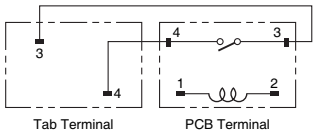




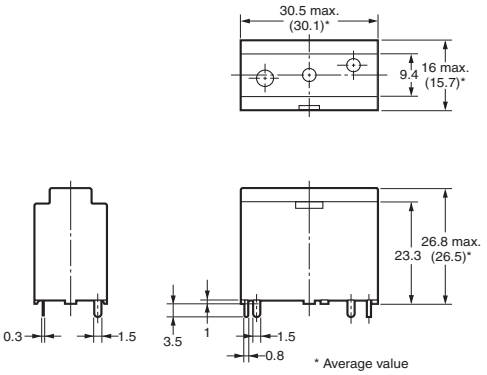
Mounting Holes
(Bottom view)



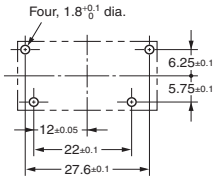
Terminal Arrangement/Internal Connections
(Top view) (Bottom view)



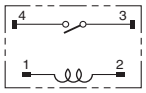
G4A-1A-PE



PCB Mounting Holes
(Bottom view)



Terminal Arrangement/ Internal Connections
(Bottom view)



Precautions

Mounting

When mounting two or more relays side by side, provide a minimum space of 3 mm horizontally and vertically between relays to ensure a good heat dissipation. Malfunction may occur if heat is not dissipated smoothly from the relay.

Terminal Connection

The terminals fit FASTON receptacle 250 and are suitable for positive-lock mounting. Use only Faston terminals with the specified numbers. Select leads for connecting Faston receptacles with wire diameters that are within the allowable range for the load current.

Do not apply excessive force on the terminals when mounting or dismounting the Faston receptacle. Insert and remove terminals carefully one at a time. Do not insert terminals at an angle, or insert/remove multiple terminals at the same time.

Refer to the following table for examples of positive-lock connectors made by AMP. Contact the manufacturer directly for details on connectors, including availability.

Type	Receptacle terminals	Positive housing
#250 terminals (width: 6.35 mm)	AMP 170333-1 (170327-1) AMP 170334-1 (170328-1) AMP 170335-1 (170329-1)	AMP 172076-1 natural color AMP 172076-4 yellow AMP 172076-5 green AMP 172076-6 blue

Note: The numbers shown in parentheses are for air-feeding.

Other Precautions

This relay is suitable for power load switching of air-conditioning compressors and power supplies, etc. Do not use the G4A to switch microloads less than 100 mA, such as in signal applications.

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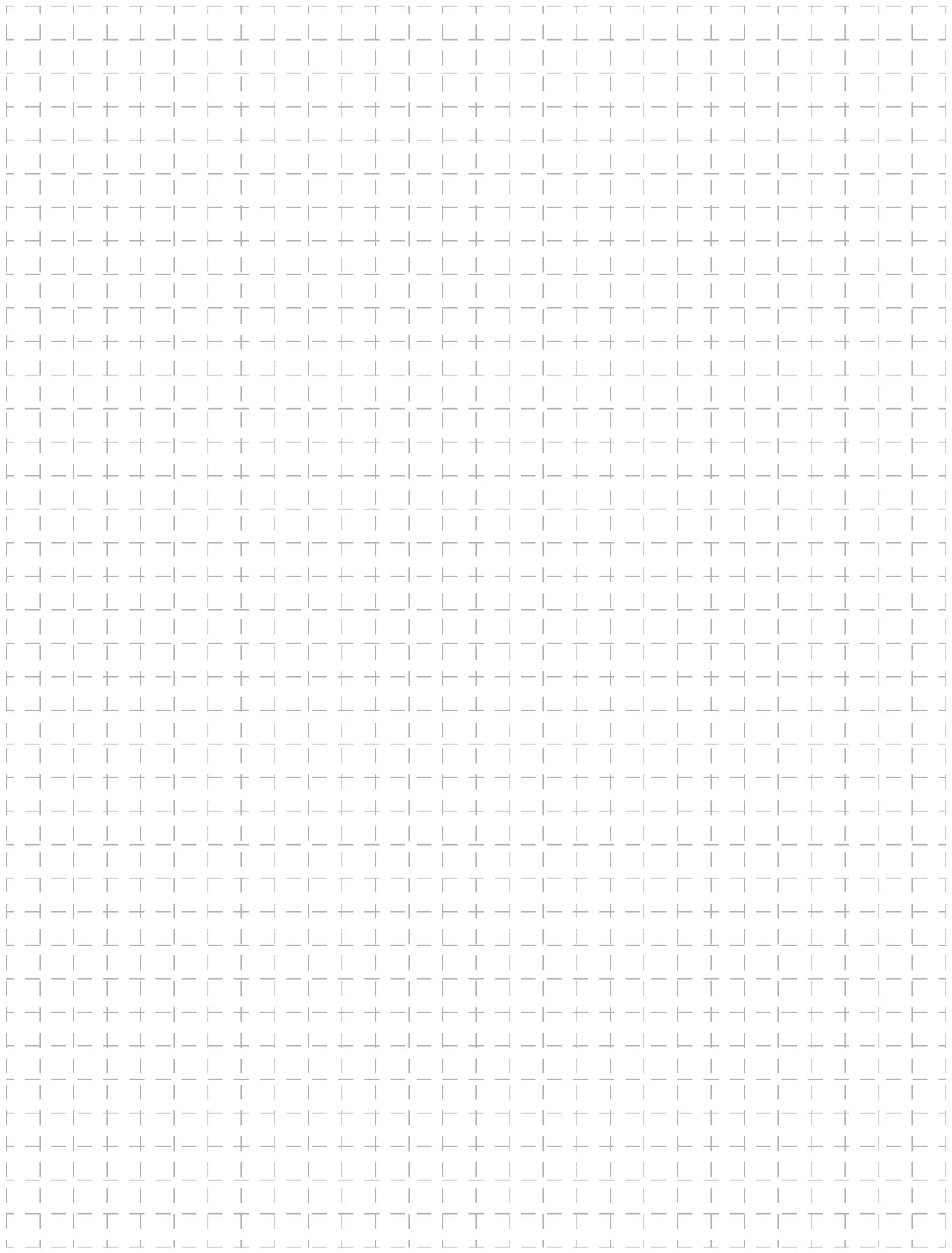

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To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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