Panasonic
INDUSTRY

Automotive Relays

TF RELAYS

Product Catalog

IN Your Future

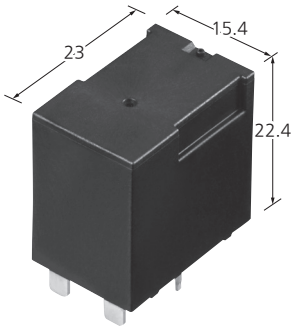
2026.8

RoHS

TF RELAYS

High-capacity automotive AC relay with carrying current ratings of 40 A (1 Form A) and 32 A (1 Form C)

〈 Protective construction 〉 Flux tight



(Unit: mm)

FEATURES

- 1 Form A and 1 Form C contact type available
- Automotive-grade AC relay
- Maximum carrying current capability of 40 A
- Contact gap (initial): 2.3 mm
- Insulation distance (Clearance/Creepage) min. 6.0 mm (initial)

TYPICAL APPLICATIONS

- OBC and V2L for PHEV and BEV
- For other automotive AC load applications
  Expected life (Electrical): N.O. side: 250 VAC, 32 A, 10,000 ope.
  N.C. side: 250 VAC, 5 A, 10,000 ope.

DETAILS FEATURES

■ Contact gap (initial): Min. 2.3 mm

■ Insulation distance (initial)

Between contacts and coil	Min. 6.0 mm (Clearance/Creepage)
Between open contacts*1	Min. 3.0 mm (Clearance/Creepage)

*1: Insulation distance excluding the contact gap

ORDERING INFORMATION (PART NO.)

ACTF □ □ □ □

- □: Contact arrangement
  1 : 1 Form A
  2 : 1 Form C
- □: Contact type
  C : Standard type (Ag alloy / Cu clad)
- □: Protective construction
  A : Flux tight
- □: Coil resistance
  6 : 70 Ω

TYPES

Contact arrangement	Contact type	Rated coil voltage	Coil resistance	Operate voltage	Part No.	Packing	
						Carton (1-tube)	Case
1 Form A	Standard type (Ag alloy/Cu clad)	12 V DC	70 Ω	Max. 8.0 V DC	ACTF1CA6	30 pcs.	480 pcs.
1 Form C				Max. 8.6 V DC	ACTF2CA6		

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RATING

■ Coil data

Rated coil voltage	Operate voltage (at 20 ℃) (Initial)	Release voltage (at 20 ℃) (Initial)	Rated operating current [±10 %] (at 20 ℃)	Coil resistance [±10 %] (at 20 ℃)	Rated operating power (at 20 ℃)	Usable voltage range
12 V DC	Max. 8.0 V DC	Min. 1.2 V DC	171 mA	70 Ω	Energized : 2,060 mW Holding : 514 mW *1	16 V DC *2
	Max. 8.6 V DC	Min. 1.2 V DC				

*1: Based on a coil holding voltage of 50 % of the rated coil voltage.
*2: Voltage applied when driving the relay; not a continuous applied voltage.

■ Specifications

Item			Specifications	
Contact data	Contact arrangement		1 Form A	1 Form C
	Contact resistance (initial)		Max. 50 mΩ (N.O. side: typ. 1.3 mΩ) (by voltage drop 1 A 6 V DC)	Max. 50 mΩ (N.O. side: typ. 1.3 mΩ, N.C. side: typ. 2.6 mΩ) (by voltage drop 1 A 6 V DC)
	Contact material		Ag alloy/Cu clad	
	Rated switching capacity (resistive)		32 A 250 V AC	N.O. side: 32 A 250 V AC, N.C. side: 5 A 250 V AC
	Max. carrying current (initial) *1		40 A (at 50 % V coil holding voltage, at 110 ℃)	N.O. side: 32 A (at 50 % V coil holding voltage, at 110 ℃) N.C. side: 32 A
	Min. switching load (resistive) *2		1 A 14 V DC (at 20 ℃)	
Insulated resistance (initial)			Min. 1,000 MΩ (at 500 V DC, Measurement at same location as " Dielectric strength " section.)	
Dielectric strength (initial)	Between open contacts		1,500 V rms for 1 min (Detection current: 10 mA)	
	Between contacts and coil		4,000 V rms for 1 min (Detection current: 10 mA)	
Surge withstand voltage (initial) *3	Between contacts and coil		6,000 V	
Coil holding voltage *4			40 to 50 % V (at 110 ℃, carrying current: 40 A)	40 to 50 % V (at 110 ℃, carrying current: 32 A)
Time characteristics (initial)	Operate time (at rated voltage)		Max. 15 ms (at 20 ℃, without contact bounce time)	
	Release time (at rated voltage)		Max. 15 ms (at 20 ℃, without contact bounce time) (without protective element)	
Shock resistance	Functional		Min. 98 m/s² (half-wave pulse of sine wave: 11 ms; detection time: 10 μs)	
	Destructive		Min. 980 m/s² (Half-wave pulse of sine wave: 6 ms, number of shocks for each direction: X, Y and Z direction: 3 times)	
Vibration resistance	Functional		10 to 100 Hz, Min. 44.1 m/s² (Detection time: 10 μs)	
	Destructive		5 to 400 Hz, Min. 44.1 m/s² Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours	
Expected life	Mechanical		Min. 3×10^5 (at 120 times/min)	
	Electrical	Resistive load	Min. 10^4 at rated switching capacity operating frequency: 1 s ON, 19 s OFF	
Conditions	Conditions for usage, transport and storage*5		Ambient temperature: −40 to +110 ℃, Humidity: 2 to 85 % RH (Avoid icing and condensation)	
Weight			Approx. 20 g	

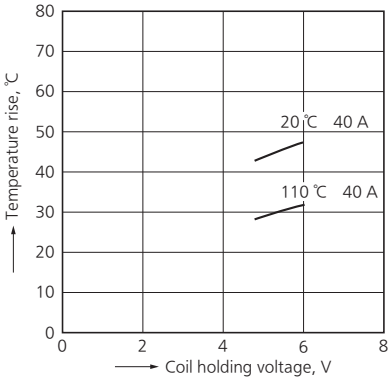
*1: Depends on connection conditions. We recommend that you confirm operation under actual conditions.
*2: This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.
*3: Wave is standard shock voltage of ±1.2 × 50 μs according to JEC-212-1981
*4: Coil holding voltage is the coil voltage after 100 ms from the applied rated coil voltage.
*5: The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. For details, please refer to the " Automotive Relay Users Guide ".

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REFERENCE DATA

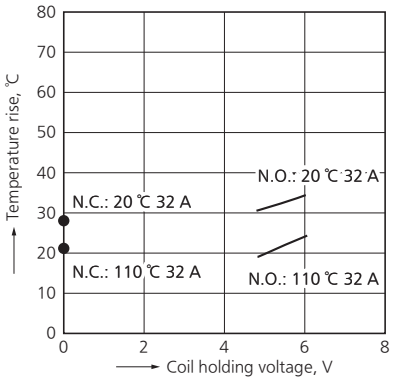
1-1. Coil temperature rise (1 Form A)

Sample: ACTF1CA6, 3 pcs.
Carrying current: 40 A
Ambient temperature: 20 ℃, 110 ℃



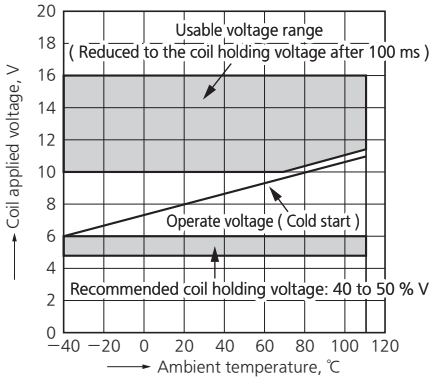
1-2. Coil temperature rise (1 Form C)

Sample: ACTF2CA6, 3 pcs.
Carrying current: 32 A
Ambient temperature: 20 ℃, 110 ℃



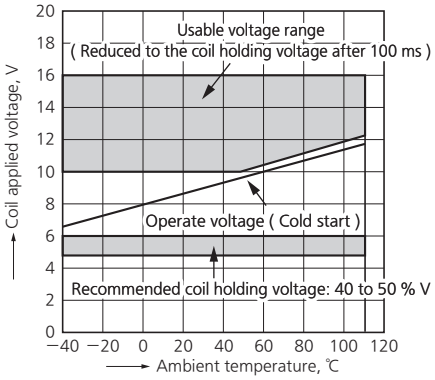
2-1. Ambient temperature and usable voltage range (1 Form A)

Sample: ACTF1CA6



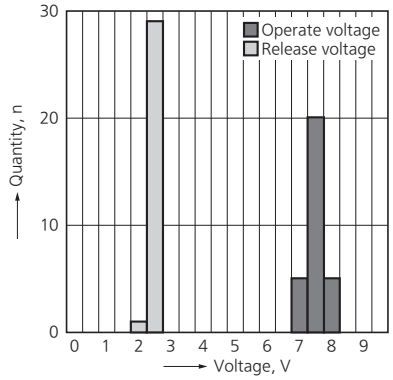
2-2. Ambient temperature and usable voltage range (1 Form C)

Sample: ACTF2CA6



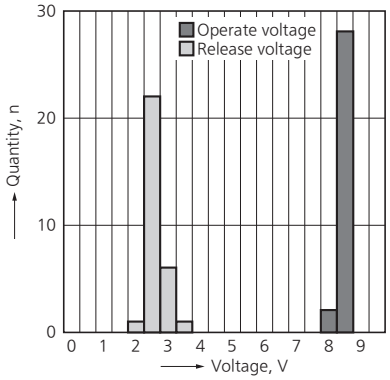
3-1. Distribution of operate and release voltage (1 Form A)

Sample: ACTF1CA6, 30 pcs.



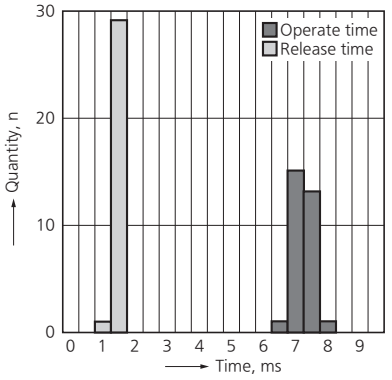
3-2. Distribution of operate and release voltage (1 Form C)

Sample: ACTF2CA6, 30 pcs.



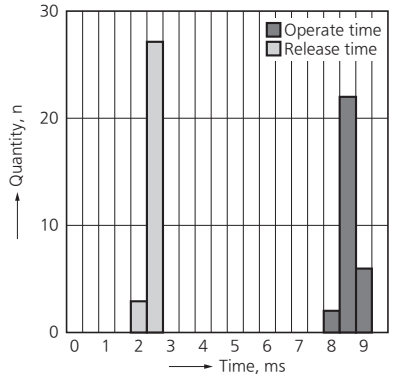
4-1. Distribution of operate and release time (1 Form A)

Sample: ACTF1CA6, 30 pcs.



4-2. Distribution of operate and release time (1 Form C)

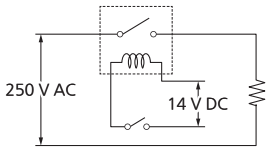
Sample: ACTF2CA6, 30 pcs.



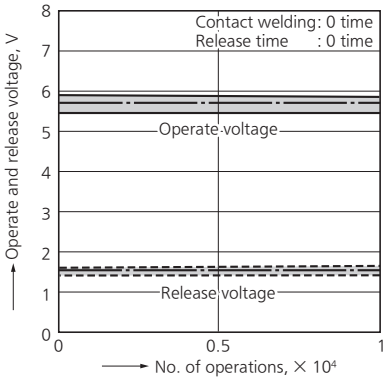
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5-1. Electrical life test (1 Form A, Resistive Load)

Sample : ACTF1CA6, 6 pcs.
Load : 32 A 250 V AC
Operating frequency : ON 1 s, OFF 19 s
Ambient temperature : 110 ℃
Expected life : 10^4 ope.
Circuit :

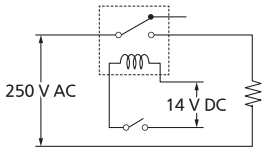


Change of operate and release voltage

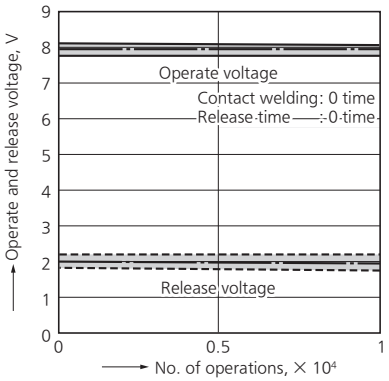


5-2. Electrical life test (1 Form C, N.O. side, Resistive load)

Sample : ACTF2CA6 (N.O. side), 6pcs.
Load : 32 A 250 V AC
Operating frequency : ON 1 s, OFF 19 s
Ambient temperature : 110 ℃
Expected life : 10^4 ope.
Circuit :

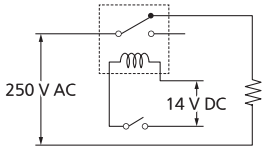


Change of operate and release voltage

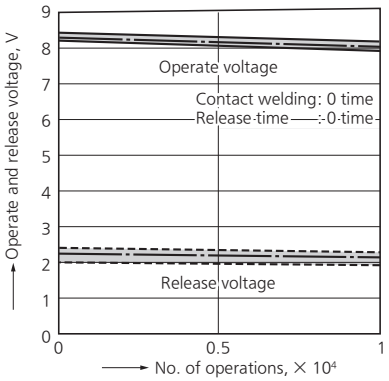


5-3. Electrical life test (1 Form C, N.C. side, Resistive load)

Sample : ACTF2CA6 (N.C. side), 6pcs.
Load : 5 A 250 V AC
Operating frequency : ON 1 s, OFF 19 s
Ambient temperature : 110 ℃
Expected life : 10^4 ope.
Circuit :



Change of operate and release voltage



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DIMENSIONS (Unit: mm)

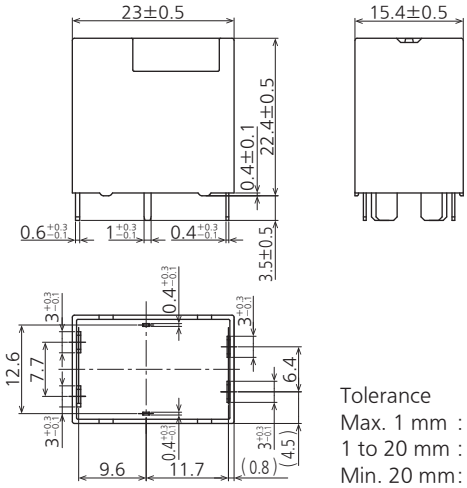
CAD The CAD data of the products with a " CAD " mark can be downloaded from our Website.

■ 1 Form A

CAD

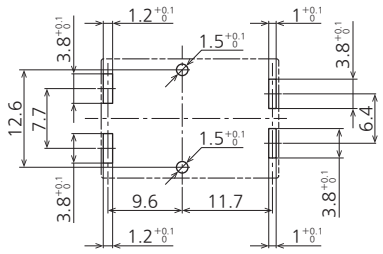


External dimensions



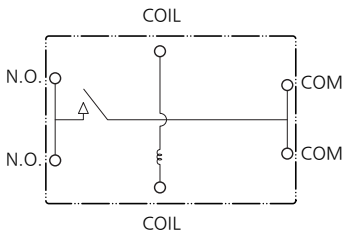
Tolerance
Max. 1 mm : ±0.1
1 to 20 mm : ±0.3
Min. 20 mm: ±0.5

PC board pattern
(BOTTOM VIEW)



Tolerance: ±0.1

Schematic
(BOTTOM VIEW)

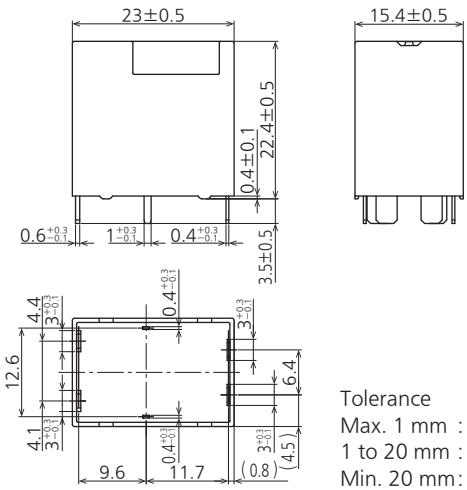


■ 1 Form C

CAD

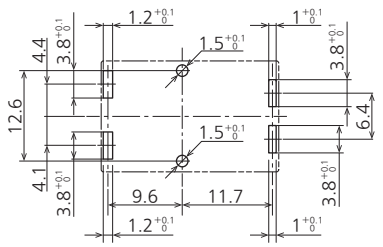


External dimensions



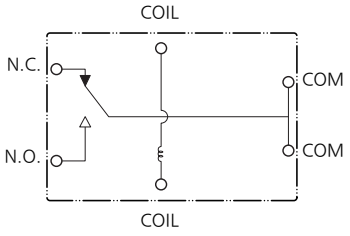
Tolerance
Max. 1 mm : ±0.1
1 to 20 mm : ±0.3
Min. 20 mm: ±0.5

PC board pattern
(BOTTOM VIEW)



Tolerance: ±0.1

Schematic
(BOTTOM VIEW)



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GUIDELINES FOR USAGE

■ For general cautions for use, please refer to the " Automotive Relay Users Guide ".

■ Precautions when using TF relays

● **Coil operating power**

Pure DC current should be applied to the coil. If it includes ripple, the ripple factor should be less than 5 %. However, check it with the actual circuit since the characteristics may be slightly different. Also, the power waveform should be rectangular.

● **Coil applied voltage**

To ensure proper operation, the voltage applied to the coil should be the rated operating voltage of the coil. Also, be aware that the pick-up and drop-out voltages will fluctuate depending on the ambient temperature and operating conditions.

● **Expected life**

Check this with the real device as it is affected by coil driving circuit, load type, activation frequency, activation phase, ambient conditions and other factors.

● **Soldering**

When soldering the relays, ensure conformance with the conditions listed.

Automatic soldering

Conditions	Preheating	Soldering
Temperature	Max. 100 ℃ (surface of PC board)	Max. 260 ℃
Time	within 120 s	within 5 s

● **Usage, transport and storage conditions**

1) Ambient temperature, humidity and air pressure during usage, transport, and storage of the relay

(1) Temperature

−40 to +110 ℃

(2) Humidity

2 to 85 % RH

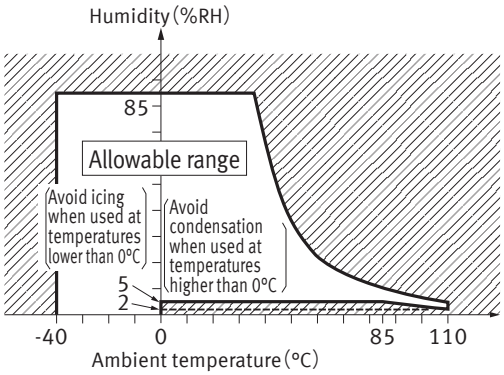
(Avoid icing and condensation)

(3) Air pressure

86 to 106 kPa

Note) The humidity range varies with the temperature. Use within the range indicated in the graph.

Temperature and humidity range for usage, transport, and storage



2) Water condensation

Water condensation occurs when the ambient temperature drops suddenly from a high temperature and humidity, or the relay is suddenly transferred from a low ambient temperature to a high temperature and humidity. Condensation causes the failures like insulation deterioration, wire disconnection and rust etc. Panasonic Industry Co., Ltd. does not guarantee the failures caused by condensation. The heat conduction by the equipment may accelerate the cooling of relay itself, and the condensation may occur. Please confirm no condensation in the worst condition of the actual usage. (Special attention should be paid when high temperature heating parts are close to the relay. Also, please consider the condensation may occur inside of the relay.)

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3) Icing
Please check the icing when an ambient temperature is lower than 0 ℃. Icing means, the moisture contained in the surrounding environment and inside the relay freezes when the ambient temperature falls below the freezing point. The icing causes the sticking of movable portion, the operation delay and the contact conduction failure etc. Panasonic Industry Co., Ltd. does not guarantee the failures caused by the icing. The heat conduction by the equipment may accelerate the cooling of relay itself and the icing may occur. Icing condition is changed by ambient environment, please make sure to confirm no icing in the worst condition of the actual usage.

4) Low temperature and low humidity environments
The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

5) Following is the conditions of ambient temperature and humidity in case of tube packaging
(1) Ambient temperature; 0 ℃ to 40 ℃
(not condensation)
(2) Humidity; Max. 85 % RH

● Other handling precautions
Do not use relays that have been dropped, because doing so may be a cause of faulty operation.

Please refer to **" the latest product specifications "** when designing your product.
• Requests to customers:
https://industry.panasonic.com/global/en/salespolicies

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■ Global Sales Network Information: industry.panasonic.com/global/en/salesnetwork/globalnetwork

Panasonic
INDUSTRY

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Specifications are subject to change without notice.
ASCTB478E 202608
2026.8