Panasonic
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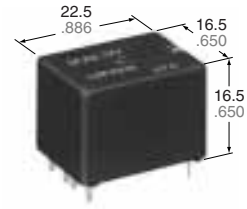
TWIN POWER AUTOMOTIVE RELAY

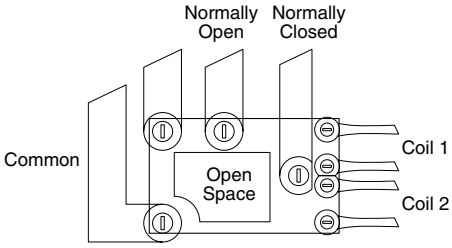
CF RELAYS



mm inch

FEATURES

- **7 Amp Steady/30 Amp Inrush current capability**
- **Simple footprint enables ease of PC board layout**



SPECIFICATIONS

Contact

Arrangement			1 Form C×2 (H bridge)
Contact material			Silver alloy
Initial contact resistance (By voltage drop 6 V DC 1 A)			Max. 50 mΩ
Initial contact voltage drop			Max. 0.2 V (at 20 A)
Rating	Nominal switching capacity		N.O.: 20A 14 V DC N.C.: 10A 14 V DC
	Max. switching power		140 W
	Max. switching voltage		16 V DC
	Max. make current		10 A (Continuous), 30 A (within 1 min.; coil applied voltage: 12 V, at 20°C)
	Max. carrying current		30 A (2 minutes), 20 A (1 hour) (coil applied voltage: 12 V, at 20°C) 25 A (2 minutes), 15 A (1 hour) (coil applied voltage: 12 V, at 85°C)
	Min. switching capacity#1		1 A 12 V DC
Expected life (min. ope.)	Mechanical (at 120 cpm)		10^6
	Electrical	resistive load	Min.10^5
		7 A 14 V DC, Inrush 30 A (Motor load)	2×10^5
		20 A 14 V DC (Motor lock)	Min.5×10^4

Coil

Nominal operating power	640 mW

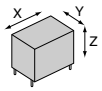
#1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

Characteristics

Max. operating speed (at rated load)		6 cpm
Initial insulation resistance*1		Min. 100 MΩ (at 500 V DC)
Initial breakdown voltage*2	Between open contacts	1,000 Vrms for 1 min.
	Between contacts and coil	1,000 Vrms for 1 min.
Operate time*3 (at nominal voltage)		Max. 10 ms
Release time*3 (at nominal voltage)		Max. 10 ms
Shock resistance	Functional*4	Min. 100 m/s² {10 G}
	Destructive*5	Min. 1,000 m/s² {100 G}
Vibration resistance	Functional*6	Approx. 44.1 m/s2 {4.5 G}, 10 Hz to 100 Hz
	Destructive*7	Approx. 44.1 m/s² {4.5 G}, 10 Hz to 500 Hz
Conditions for operation, transport and storage*8 (Not freezing and condensing at low temperature)	Ambient temp.	–40°C to + 85°C –40°F to +185°F
	Humidity	5%R.H. to 85%R.H.
Mass	Standard type	Approx. 15 g .529 oz

Remarks

*1 Measurement at same location as "Initial breakdown voltage" section
*2 Detection current: 10mA
*3 Excluding contact bounce time
*4 Half-wave pulse of sine wave: 11ms; detection time: 10μs
*5 Half-wave pulse of sine wave: 6ms
*6 Detection time: 10μs
*7 Time of vibration for each direction;



X, Y, direction: 2 hours
Z direction: 4 hours

*8 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT

TYPICAL APPLICATIONS

- Power windows
- Auto door lock
- Electrically powered sunroof
- Electrically powered mirrors
- Powered seats
- Lift gates
- Slide door closers, etc. (for DC motor forward/ reverse control circuits)

ORDERING INFORMATION

Ex. CF [2] – [12 V]

Contact arrangement	Coil voltage(DC)
1 Form C × 2	12 V

Standard packing: Carton: 35pcs.; Case: 700pcs.

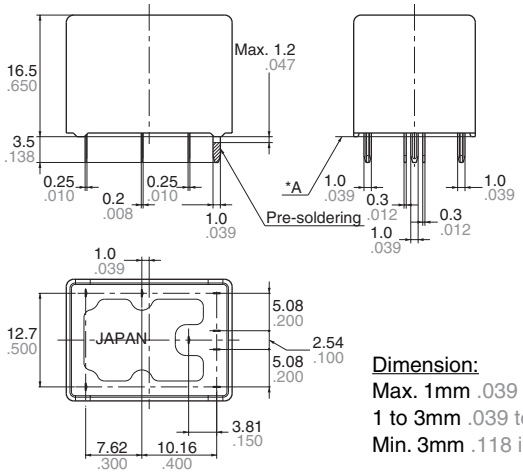
TYPES AND COIL DATA (at 20°C 68°F)

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (Initial)	Drop-out voltage, V DC (Initial)	Coil resistance, Ω	Nominal operating current, mA	Nominal operating Power, mW	Usable voltage range, VDC
CF2-12V	12	Max. 7.2	Min. 1.0	225±10%	53.3±10%	640	10 to 16

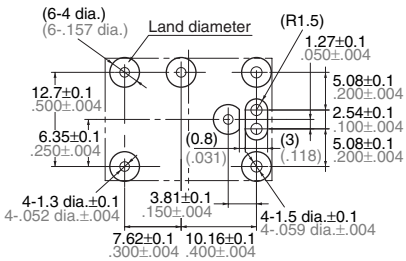
* Other pick-up voltage types are also available. Please contact us for details.

DIMENSIONS

mm inch

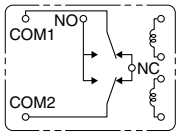


Recommended PC board pattern



Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

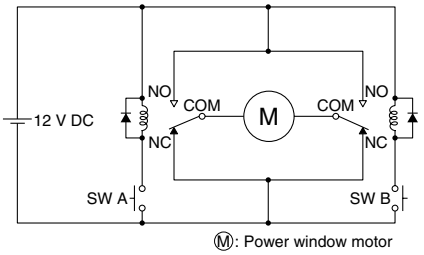
Schematic



* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering. Intervals between terminals is measured at A surface level.

EXAMPLE OF CIRCUITS

Forward/reverse control circuits of DC motor for power window



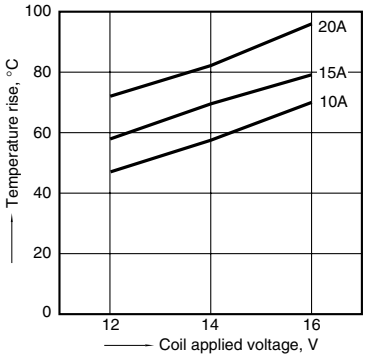
Ⓜ: Power window motor

SW A	SW B	Motor
OFF	OFF	Stop
ON	OFF	Forward
OFF	ON	Reverse

REFERENCE DATA

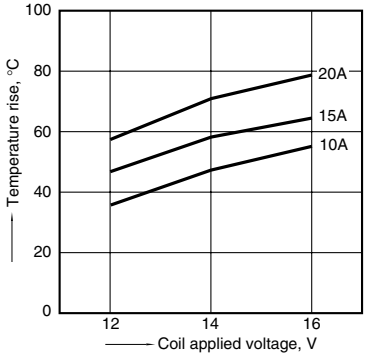
1-(1). Coil temperature rise (at room temperature)

Sample: CF2-12V, 6pcs.
Measured potion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: Room temperature

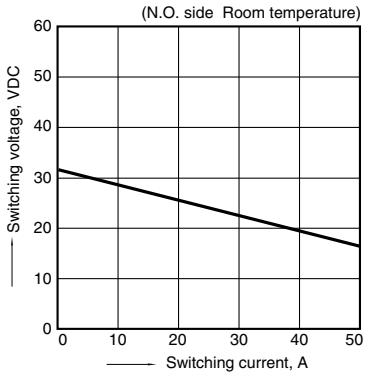


1-(2). Coil temperature rise (at 85°C 185°F)

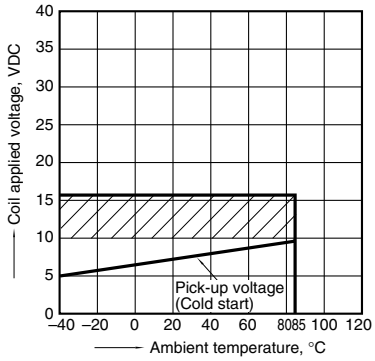
Sample: CF2-12V, 6pcs.
Measured potion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 85°C 185°F



2. Max. switching capability (Resistive load)

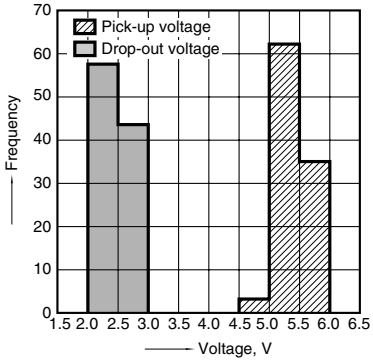


3. Ambient temperature and operating temperature range



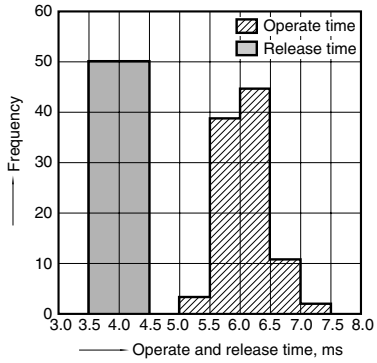
4. Distribution of pick-up and drop-out voltage

Sample: CF2-12V, 100pcs.



5. Distribution of operate and release time

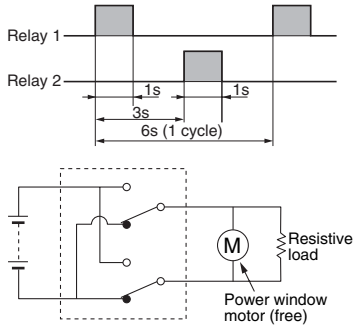
Sample: CF2-12V, 100pcs.
* With diode



6-(1). Electrical life test (Motor free)

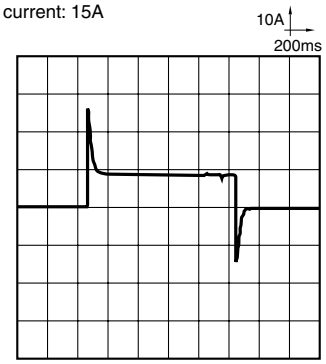
Sample: CF2-12V, 3pcs.
Load: Inrush current: 30A, Steady current: 7A,
Power window motor actual load (free condition)
Switching frequency: (ON:OFF = 1s:5s)
Ambient temperature: Room temperature

Circuit

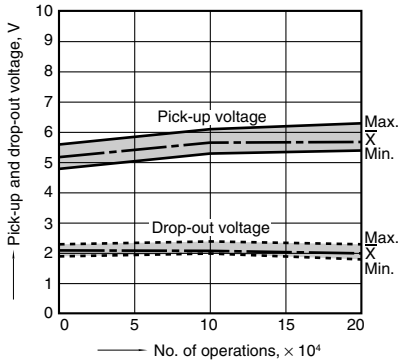


Load current waveform

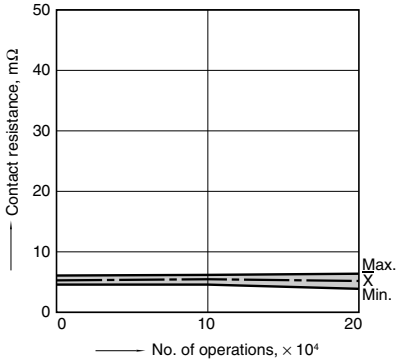
Inrush current: 27A, Steady current: 8.4A
Brake current: 15A



Change of pick-up and drop-out voltage



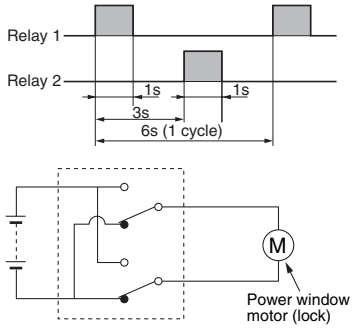
Change of contact resistance



6-(2). Electrical life test (Motor lock)

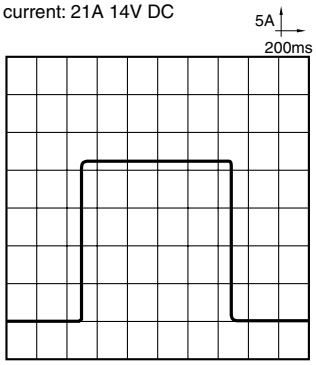
Sample: CF2-12V, 3pcs.
Load: 20A 14V DC,
Power window motor actual load (lock condition)
Switching frequency: (ON:OFF = 1s:5s)
Ambient temperature: Room temperature

Circuit

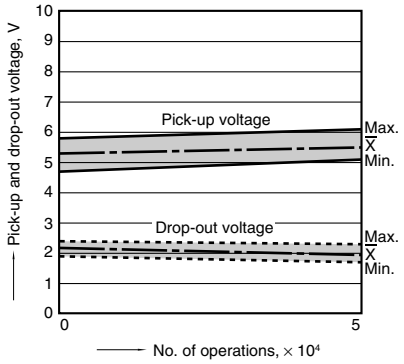


Load current waveform

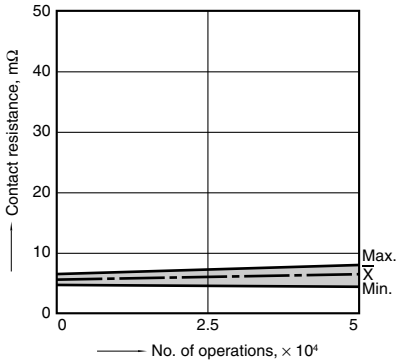
Steady current: 21A 14V DC



Change of pick-up and drop-out voltage



Change of contact resistance



For Cautions for Use, see Relay Technical Information