FUJITSU

COMPACT POWER RELAY

1 POLE - 30A (For Automotive Applications)

FBR51, 52 Series

■ FEATURES

- Compact and light weight structure
- High current contact capacity
  (carrying current: 35 A/10 minutes, 30 A/1 hour)
- High resistance to vibration and shock
- Improved heat resistance and extended operation range
- Two contact gap options
  (FBR51: 0.3 mm, FBR52: 0.6 mm)
- Three types of contact material

■ PARTNUMBER INFORMATION

	FBR51	N	D12	-	W1	**
[Example]	(a)	(b)	(c)		(d)	(e)

(a)	Relay type	FBR51 : FBR51 Series - Standard type (contact gap 0.3 mm) FBR52 : FBR52 Series - Wide contact gap type (contact gap 0.6 mm)
(b)	Enclosure	N : Plastic sealed type
(c)	Coil rated voltage	D12 : 6.....12 VDC Coil rating table at page 3
(d)	Contact material	W1 : Silver-tin oxide indium (high power type) WL : Silver-tin oxide indium (lamp loads, see applications table) WF : Silver-tin oxide indium (flasher loads)
(e)	Special type	To be assigned custom specification

■ SPECIFICATION

Item			W1 contact	WL contact	WF contact
Contact Data	Configuration		1 form C (SPDT)	1 form A (SPST)	1 form A (SPST)
	Material		Silver-tin oxide indium (high power type)	Silver-tin oxide indium	
	Voltage drop (resistance)		Max. 100mV at 1A/12VDC	Max. 100mV at 2A/12VDC	
	Contact rating		14VDC, 25A (motor free load)	120 Watt lamp, at 14VDC	80 Watt lamp at 14VDC
	Max. carrying current		35A / 10 minutes, 30A / 1hr (25 °C, 100% rated coil voltage)		
	Max. inrush current (reference)		60A	80A	
	Max. switching voltage (reference)		16VDC		
	Max. switching current (reference)		35A		
	Min. switching load (reference) *		6 VDC, 1A		
Life	Mechanical		Min. 10 x 10^6 operations		
	Electrical		Min. 2 x 10^5 operations 4VDC, 25A (Locked motor load)	Min. 1 x 10^5 operations 115 Watt lamp, 14VDC	Min. 2.5 X 10^6 operations Inrush 11A, 14VDC (0.35 sec - ON/ 0.35 sec - OFF)
Coil Data	Rated power		FBR51: 600mW, FBR52: 800mW		
	Operate power		FBR51: 220mW, FBR52: 300mW		
	Operating temperature range		-40 °C to +85 °C (no frost)		
	Storage temperature range		-40 °C to +100 °C (no frost)		
Timing Data	Operate (at nominal voltage)		Max. 10 ms		
	Release (at nominal voltage)		Max. 5 ms		
Other	Vibration resistance		10 to 55Hz double amplitude 1.5mm		
	Shock	Misoperation	10m/s²		
		Endurance	1,000m/s²		
	Weight		Approximately 6 g		

* Minimum switching loads mentioned above are reference values. Please perform the confirmation test with actual load before production since reference values may vary according to switching frequencies, environmental contions and expected reliability levels.

■ COIL RATING

FBR51 Series

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Thermal resistance (K / W)
D06	6	60	3.6 (at 20 °C)	73
			4.5 (at 80 °C)	
D09	9	135	5.4 (at 20 °C)	
			6.8 (at 80 °C)	
D10	10	180	6.3 (at 20 °C)	
			7.9 (at 80 °C)	
D12	12	240	7.3 (at 20 °C)	
			9.2 (at 80 °C)	

FBR52 Series

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Thermal resistance (K / W)
D06	6	45	3.6 (at 20 °C)	65
			4.5 (at 85 °C)	
D09	9	100	5.4 (at 20 °C)	
			6.8 (at 85 °C)	
D10	10	135	6.3 (at 20 °C)	
			7.9 (at 85 °C)	
D12	12	180	7.3 (at 20 °C)	
			9.2 (at 85 °C)	

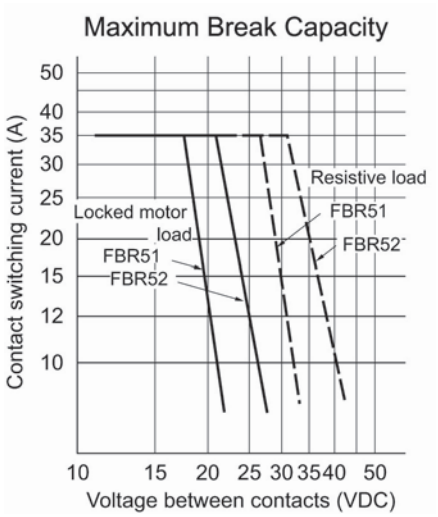
Note: All values in the table are valid for 20°C and zero contact current.
* Specified operate values are valid for pulse wave voltage.

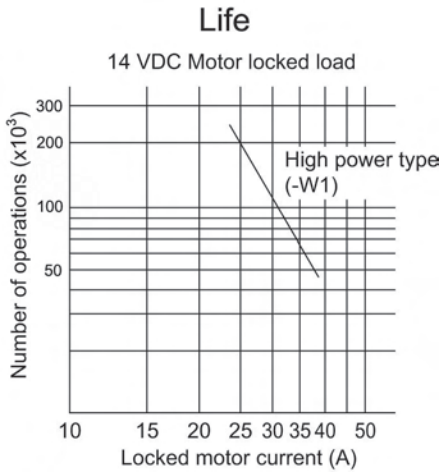
■ SUITABLE APPLICATIONS

Application	Normal load current (12 VDC system)	Description	Recommended model (example)	
			For 16V or less motor load voltage	For instantaneous 20V or more load voltage
Power windows	20A to 25A (switching at motor locking	forward and reverse motor control	FBR51N ( ) -W1	FBR52N ( ) - W1
Automatic door lock	18A to 25A (switching at motor locking	forward and reverse motor control	FBR51N ( ) - W1	FBR52N ( ) - W1
Tilt-lock wheel	20A (switching at motor locking)	forward and reverse motor control	FBR51N ( ) -W1	FBR52N ( ) - W1
Sunroof	20A to 30A (switching at motor locking)	forward and reverse motor control	FBR51N ( ) - W1	FBR52N ( ) - W1
Adjustable door mirror	3A to 5A (switching at motor locking)	forward and reverse motor control	FBR51N ( ) - W1	
Automatic antenna	8A to 12A (Inrush) break 2A maximum (motor-free)	forward and reverse motor control	FBR51N ( ) - W1	
Auto-cruise	2A to 3A	power shutoff and solenoid	FBR51N ( ) - W1	
Lamp loads	120 Watts	up to 100K operations	FBR51N ( ) - WL	
Others: Car audio systems, etc.			FBR51N ( ) - W1	

• For the load condition where higher voltage would be encountered during contact break, FBR52 series with wider contact gap is recommended.

■ CHARACTERISTIC DATA

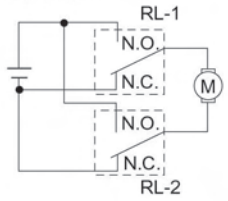




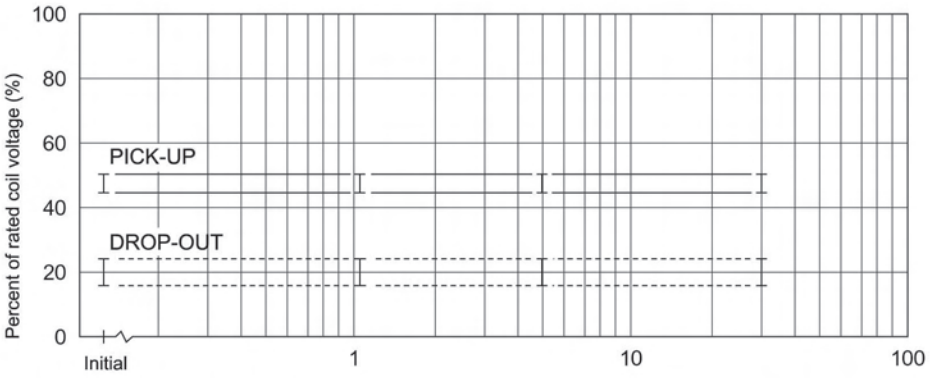
Life Test (Example)

• Test item
14 V DC-20 A
motor lock 200,000
operations minimum
(FBR52N ( ) - W1 type)

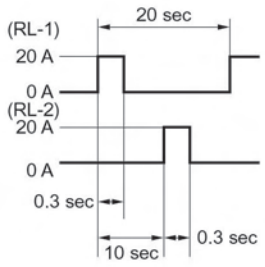
• Test circuit



• Shift of pick-up drop-out voltage

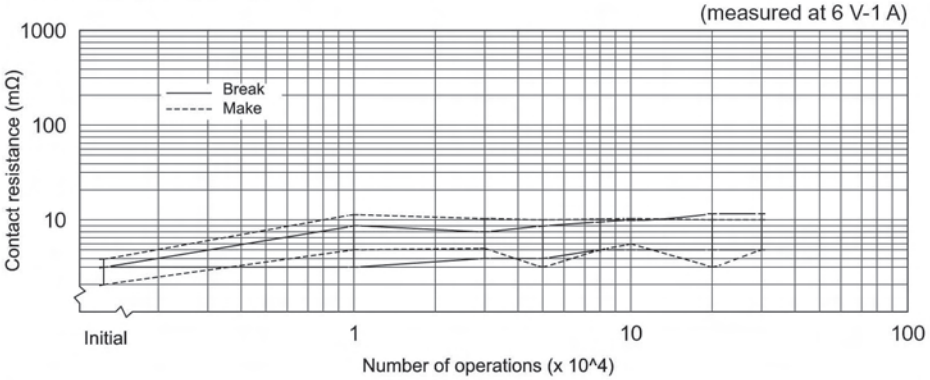


• Current wave form



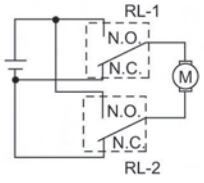
• Shift of contact resistance

(measured at 6 V-1 A)

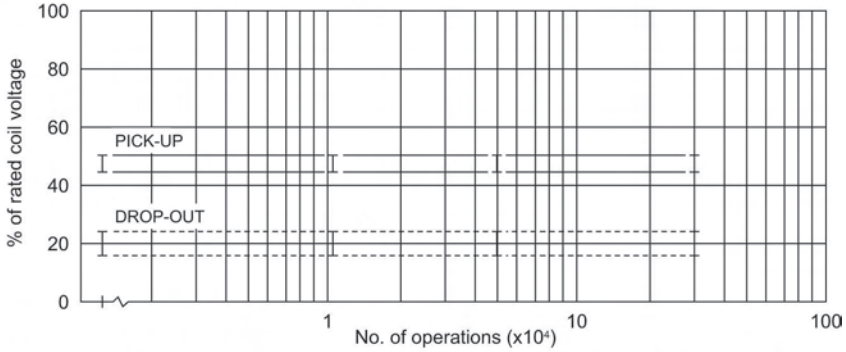


• Test item
14 V DC-25 A
Motor lock
200,000 operations minimum
(FBR51N ( ) - W1 type)

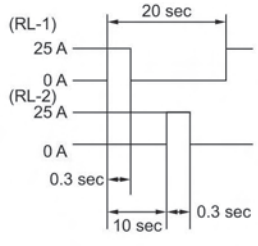
• Test circuit



• Shift of pick-up and drop-out voltage

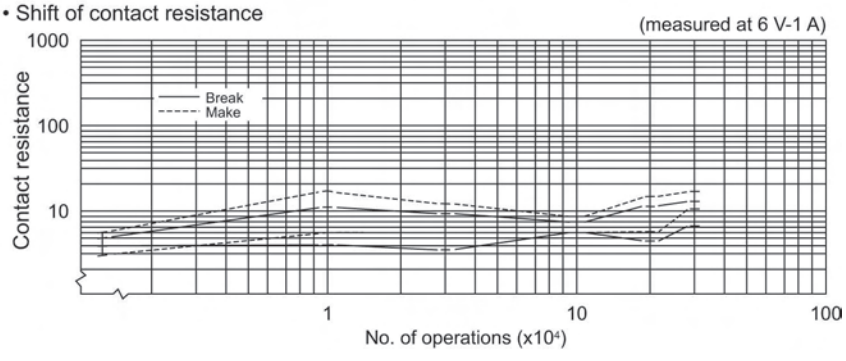


• Current wave form



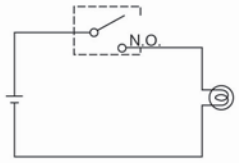
• Shift of contact resistance

(measured at 6 V-1 A)

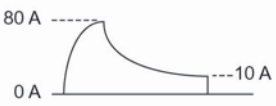


• Test item
14 V DC-80 A (120W)
lamp load 100,000
operations minimum
(FBR51N ( ) - WL type)

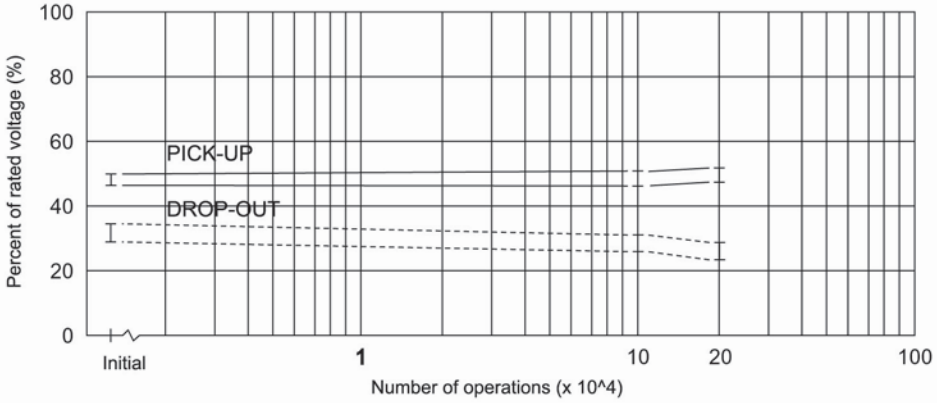
• Test circuit



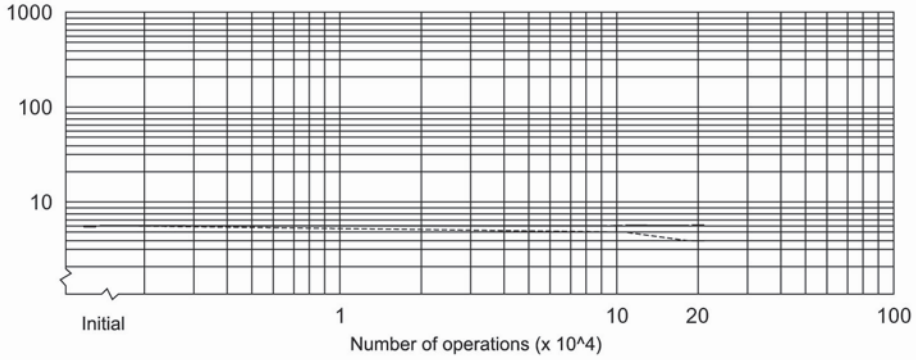
• Current wave form



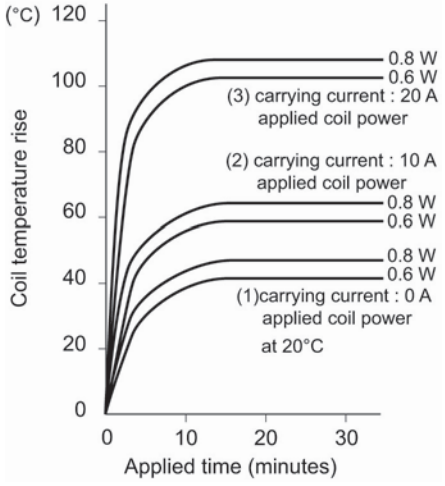
• Shift of pick-up drop-out voltage



• Shift of contact resistance

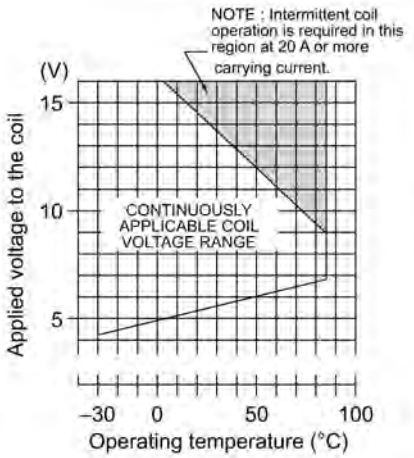


Coil Temperature Rise

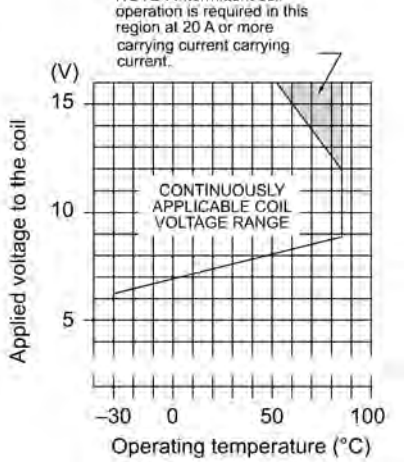


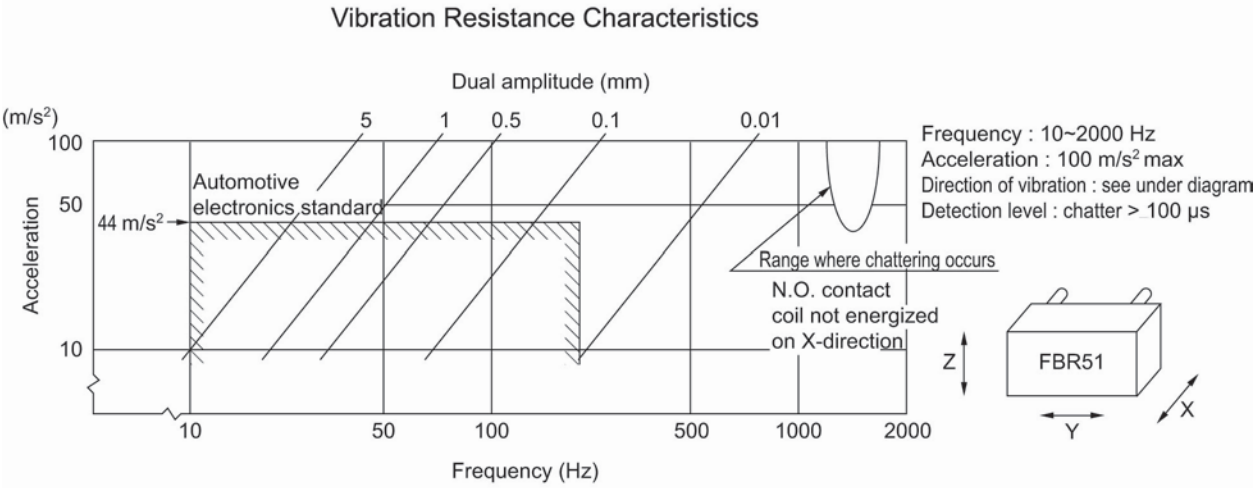
Operating Coil Voltage Range (Example)

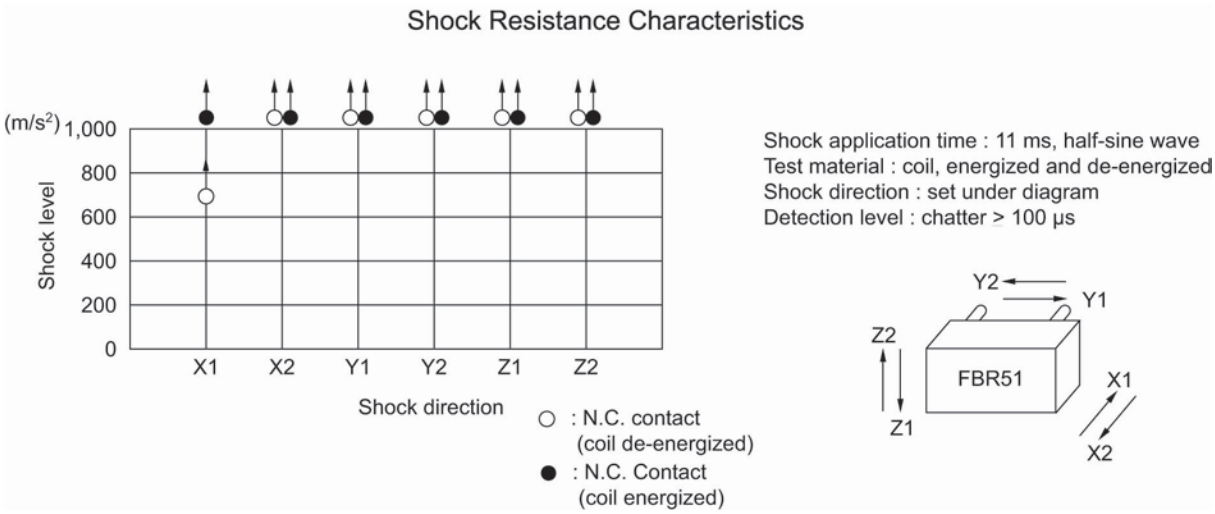
FBR51ND09-( )



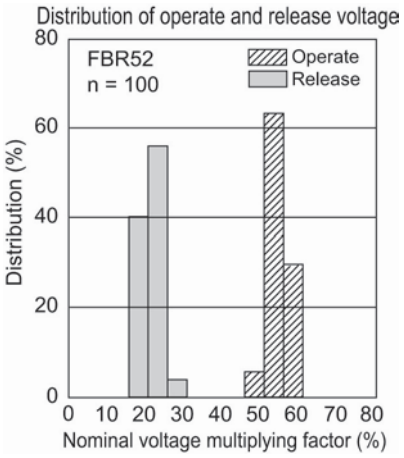
FBR51ND12-( )

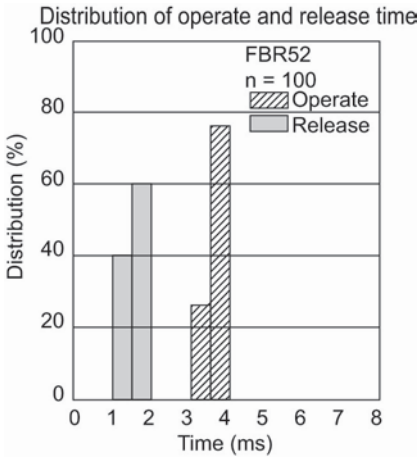


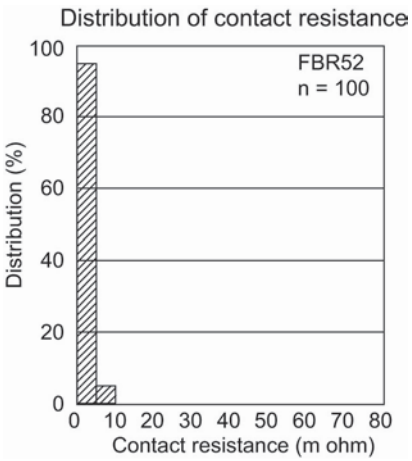




■ REFERENCE DATA

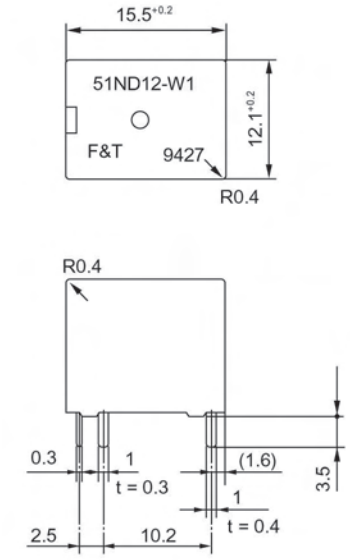




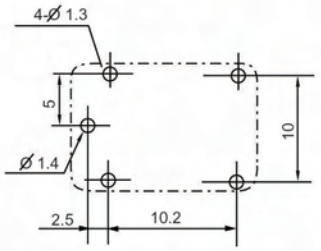


■ DIMENSIONS

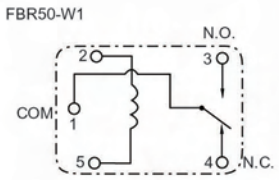
● Dimensions

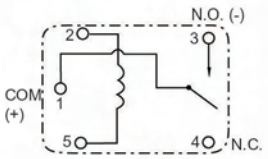


● PC board mounting hole layout (BOTTOM VIEW)



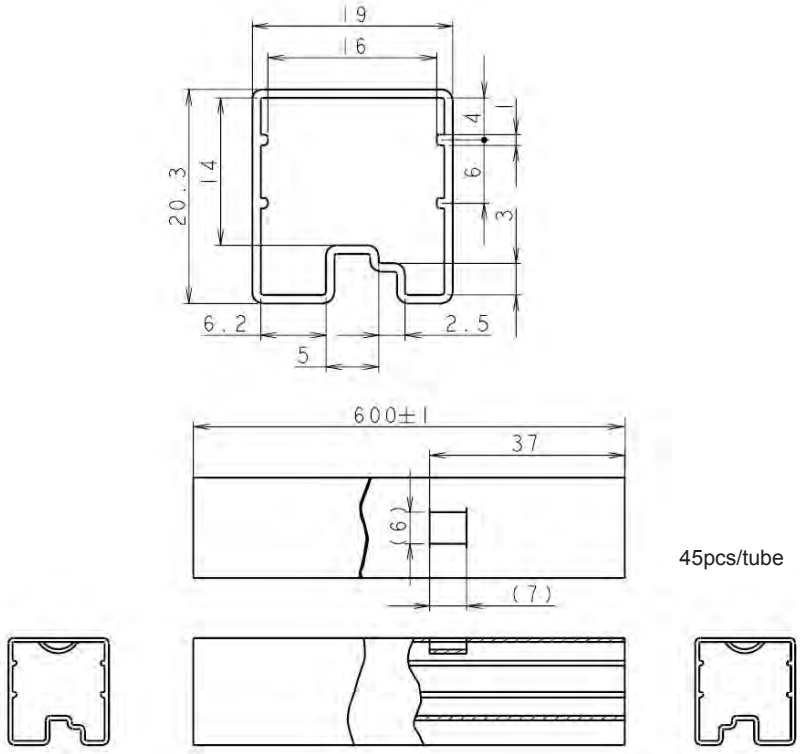
● Schematics (BOTTOM VIEW)





Refer to the test circuit at CHARACTERISTIC DATA for connection, and polarity.

● Tube carrier (pokayoke)



45pcs/tube

Unit: mm

RoHS Compliance and Lead Free Information

1. General Information

- All automotive relays produced by Fujitsu Components are compliant with RoHS directive 2002/95EC including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives on October 21st, 2005. (Amendment to Directive 2002/95/EC)
- All of our automotive relays are lead-free.
- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.

2. Recommended Lead Free Solder Profile

- Recommended solder Sn-3.0Ag-0.5Cu.

Flow Solder condition:

Pre-heating:	maximum 120˚C
Soldering:	dip within 5 sec. at 260˚C solder bath

Solder by Soldering Iron:

Soldering Iron	
Temperature:	maximum 360˚C
Duration:	maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays, unless otherwise indicated.

4. Tin Whiskers

- Dipped SnAgCu solder is known as presenting a low risk to tin whisker development. No considerable length whisker was found by our in house test.

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