FUJITSU THE POSSIBILITIES ARE INFINITE

COMPACT POWER RELAY

1 POLE—25 A

(FOR AUTOMOTIVE APPLICATIONS)

FBR51, 52 SERIES

■ FEATURES

- Compact and lightweight structure
  (42% of the volume of the FBR160 relay)
- High current contact capacity
  (carrying current: 35 A/10 minutes, 25 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

■ ORDERING INFORMATION

[Example] $\frac{\text{FBR51}}{\text{(a)}}\ \frac{\text{N}}{\text{(b)}}\ \frac{\text{D12}}{\text{(c)}}\ -\ \frac{\text{W}}{\text{(d)}}\ \frac{**}{\text{(e)}}$

(a)	Series Name	FBR51 : Standard type (contact gap 0.3 mm) FBR52 : Wider contact gap type (contact gap 0.6 mm)
(b)	Enclosure	N : Plastic sealed type
(c)	Nominal Voltage	D06 : 6 VDC D09 : 9 VDC D10 : 10 VDC D12 : 12 VDC
(d)	Contact Material	W : Silver-tin oxide indium W1 : Silver-tin oxide indium (high power type) WL : Silver-tin oxide indium (1 lamp loads, see applications table) N : Silver copper nickel
(e)	Custom Designation	To be assigned custom specification

■ SPECIFICATIONS

Item			Specifications			
			W contact	W1 contact	N contact	WL contact
Contact	Arrangement		1 form C (SPDT)			1 form A (SPST)
	Material		Silver-tin oxide indium	Silver-tin oxide indium (high power type)	Silver copper nickel	Silver-tin oxide indium
	Voltage Drop (Resistance)		Maximum 100mV (at 2A 12 VDC)			
	Rating		14 VDC 20 A (motor free load)	14 VDC 25 A (motor free load)	14 VDC inrush 20 A, break 4 A (motor free load)	115 Watt lamp at 14 VDC
	Maximum Carrying Current		35 A/10 minutes, 25 A/ 1 hour (25˚ C, 100% rated coil voltage)			
	Maximum Inrush Current (Reference)		60 A			40 A
	Max. Switching Current (Reference)		35 A 16 VDC			
	Min. Switching Load*1 (Reference)		6 VDC 1 A			
Coil	Operating Temperature Range		-40˚ C to +85˚ C (no frost)			
	Storage Temperature Range		-40˚ C to +100˚ C (no frost)			
Time Value	Operate (at nominal voltage)		Maximum 10 ms			
	Release (at nominal voltage)		Maximum 5ms			
Life	Mechanical		10 x 10^6 operations minimum			
	Electrical		2 x10^5 ops. min. 14 VDC 20 A Locked motor load	2 x10^5 ops. min. 14 VDC 25 A Locked motor load	4 x10^5 ops. min. 14 VDC inrush 20 A break 4A motor free load	2.5 x10^5 ops. min. 115 Watts lamp, 14 VDC
Other	Vibrations Resistance		10 to 55 Hz (double amplitude of 1.5mm)			
	Shock Resistance	Misoperation	100 m/s^2			
		Endurance	1,000 m/s^2			
	Weight		Approximately 6g			

*1 Values when switching a resistive load at normal room temperature and humidity and in a clean environment. The minimum switching load varies with the switching frequency and operating environment.

■ COIL DATA CHART

1. FBR51 Series

MODEL			Nominal voltage	Coil resistance (±10%) (at 20°C)	Must operate voltage	Thermal resistance
W contact	W1 contact	N contact				
FBR51ND06-W	FBR51ND06-W1	FBR51ND06-N	6 VDC	60 Ω	3.6 VDC (at 20°C) 4.5 VDC (at 85°C)	73°C/W
FBR51ND09-W	FBR51ND09-W1	FBR51ND09-N	9 VDC	135 Ω	5.4 VDC (at 20°C) 6.8 VDC (at 85°C)	
FBR51ND10-W	FBR51ND10-W1	FBR51ND10-N	10 VDC	180 Ω	6.3 VDC (at 20°C) 7.9 VDC (at 85°C)	
FBR51ND12-W	FBR51ND12-W1	FBR51ND12-N	12 VDC	240 Ω	7.3 VDC (at 20°C) 9.2 VDC (at 85°C)	

2. FBR52 Series

MODEL			Nominal voltage	Coil resistance (±10%) (at 20°C)	Must operate voltage	Thermal resistance
W contact	W1 contact	N contact				
FBR52ND06-W	FBR52ND06-W1	FBR52ND06-N	6 VDC	45 Ω	3.6 VDC (at 20°C) 4.5 VDC (at 85°C)	65°C/W
FBR52ND09-W	FBR52ND09-W1	FBR52ND09-N	9 VDC	100 Ω	5.4 VDC (at 20°C) 6.8 VDC (at 85°C)	
FBR52ND10-W	FBR52ND10-W1	FBR52ND10-N	10 VDC	135 Ω	6.3 VDC (at 20°C) 7.9 VDC (at 85°C)	
FBR52ND12-W	FBR52ND12-W1	FBR52ND12-N	12 VDC	180 Ω	7.3 VDC (at 20°C) 9.2 VDC (at 85°C)	

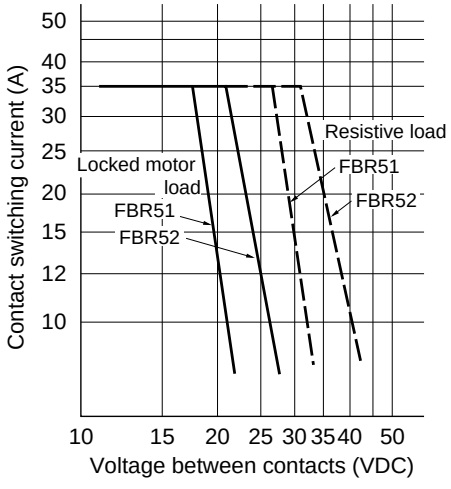
■ SUITABLE APPLICATIONS

Application	Normal load current (12 VDC system)	Description	Recommended model (example)	
			For 16 V or less motor load voltage	For instantaneous 20 V or more load voltage
Power Windows	20 to 25 A (switching at motor locking)	forward and reverse motor control	FBR51N□ -W FBR51N□ -W1	FBR52N□ -W FBR52N□ -W1
Automatic Door Lock	18 to 25 A (switching at motor locking)	forward and reverse motor control	FBR51N□ -W FBR51N□ -W1	FBR52N□ -W FBR52N□ -W1
Intermittent Wipers	15 to 30 A break 2 to 8 A (motor-free)	forward only	FBR51N□ -N	FBR52N□ -N
Tilt-Lock Wheel	20 A (switching at motor locking)	forward and reverse motor control	FBR51N□ -W	FBR52N□ -W
Sunroof	20 to 30 A (switching at motor locking)	forward and reverse motor control	FBR51N□ -W	FBR52N□ -W
Adjustable Door Mirror	3 to 5 A (switching at motor locking)	forward and reverse motor control	FBR51N□ -W	
Automatic Antenna	8 to 12 A (INRUSH) break 2 A maximum (motor-free)	forward and reverse motor control	FBR51N□ -W	
Auto-Cruise	2 to 3 A	power shutoff and solenoid	FBR51N□-W	
Lamp loads	115 Watts	for up to 250K operations	FBR51N□-WL	
Others	Car Audio System, etc.		FBR51N□-W	

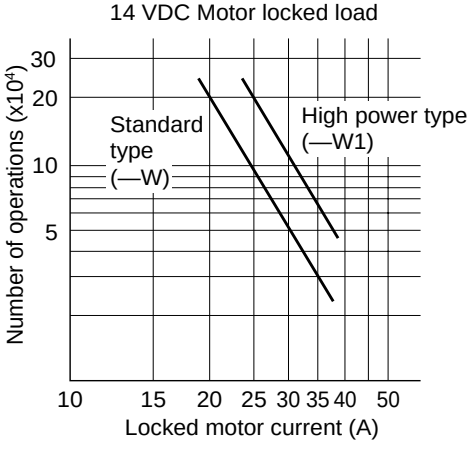
- For the load condition where higher voltage would be encountered during contact break, FBR52 series with wider contact gap is recommended.
- –N contact type is recommended for applications which require long durability ,–W and –W1 contact type is for high inrush current load applications.

■ CHARACTERISTIC DATA

1. MAXIMUM BREAK CAPACITY



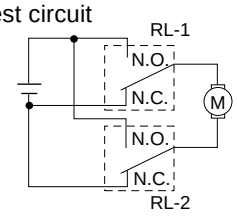
2. LIFE



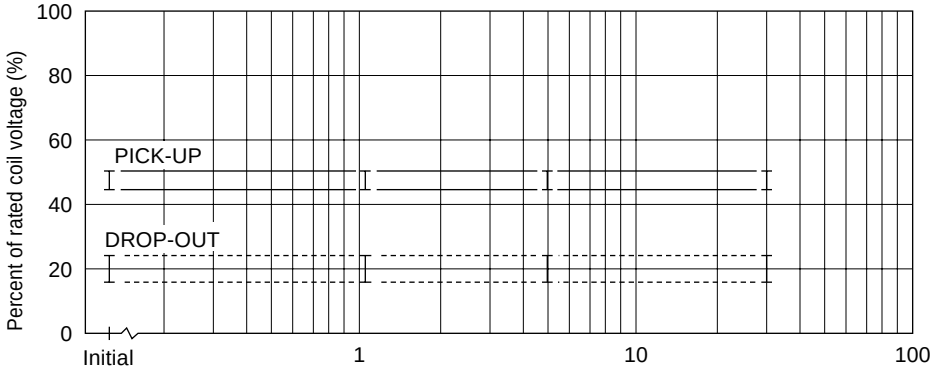
3. LIFE TEST (EXAMPLE)

• Test item
14 V DC-20 A
motor lock 200,000
operations minimum
(FBR52□-W type)

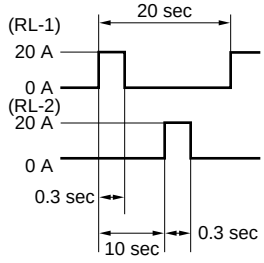
• Test circuit



• Shift of pick-up drop-out voltage

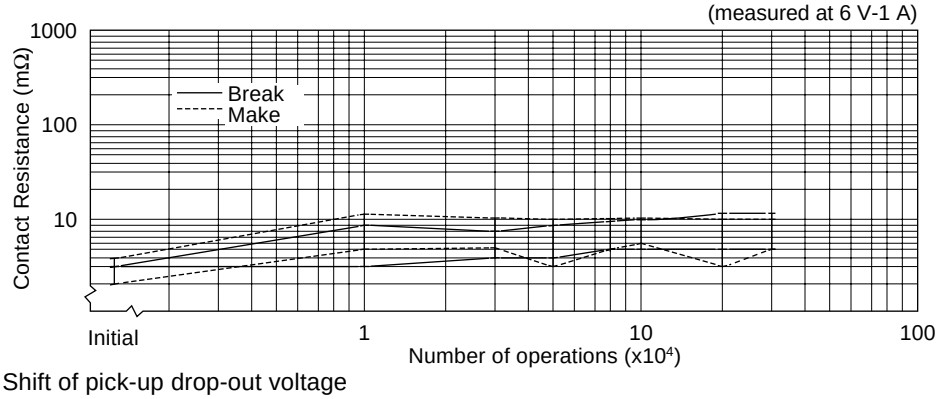


• Current wave form



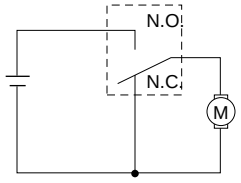
• Shift of contact resistance

(measured at 6 V-1 A)

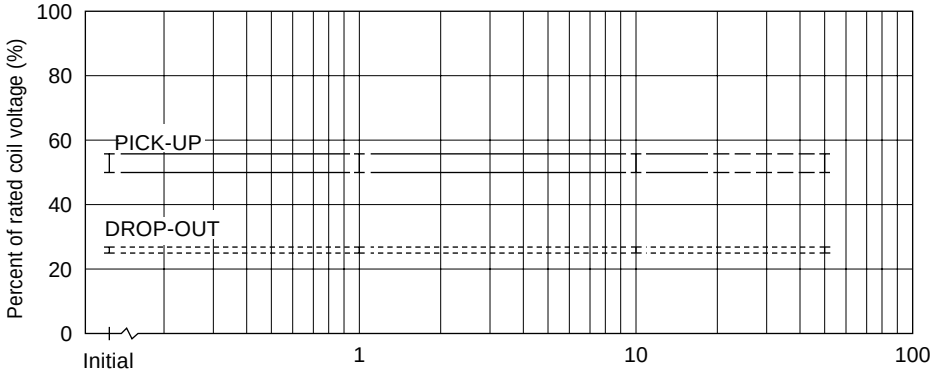


• Test item
14 V DC-20 A
motor free 400,000
operations minimum
(FBR51□-N type)

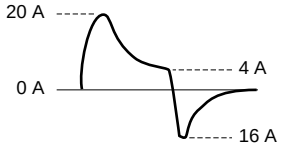
• Test circuit



• Shift of pick-up drop-out voltage

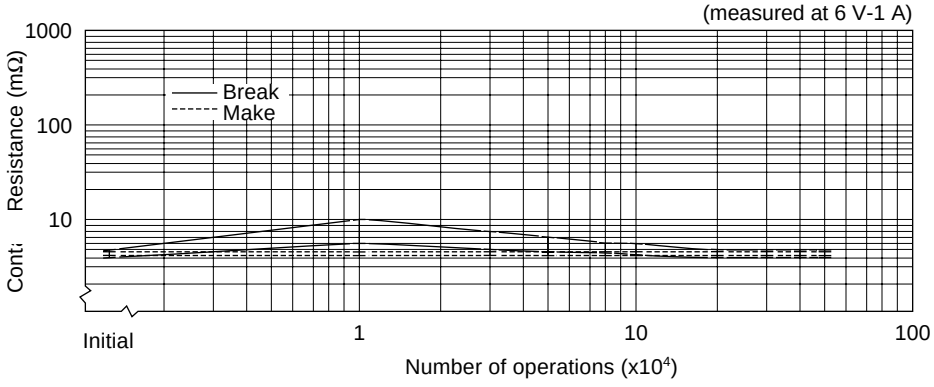


• Current wave form



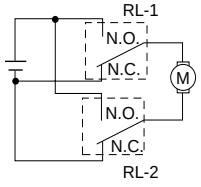
• Shift of contact resistance

(measured at 6 V-1 A)

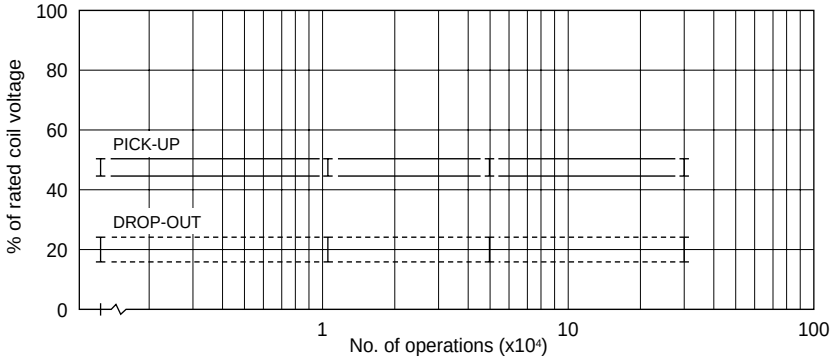


• Test item
14 V DC-25 A
Motor lock
200,000 operations minimum
(FBR51 □-W1 type)

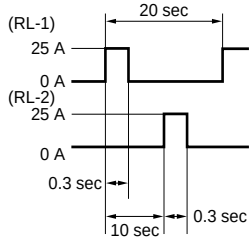
• Test circuit



• Shift of pick-up and drop-out voltage

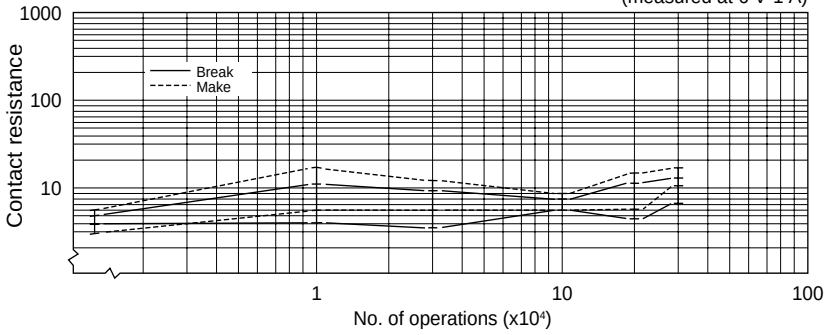


• Current wave form

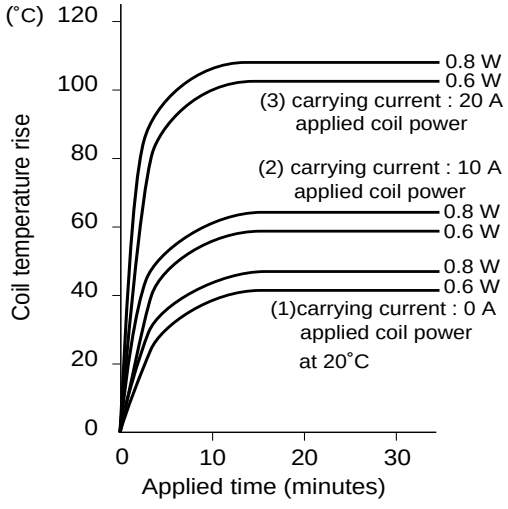


• Shift of contact resistance

(measured at 6 V-1 A)

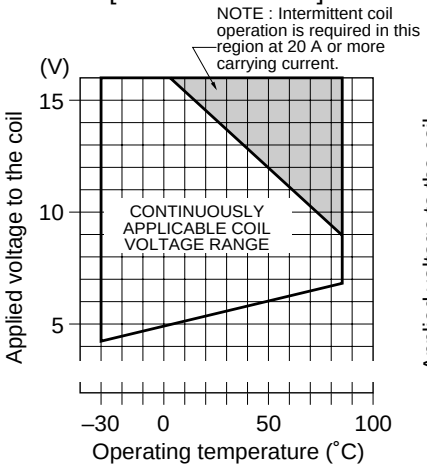


4. COIL TEMPERATURE RISE

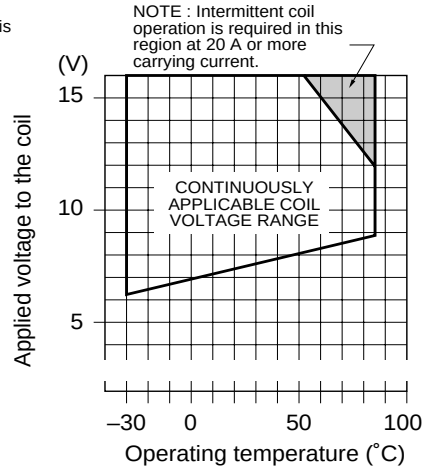


5. OPERATING COIL VOLATGE RANGE (EXAMPLE)

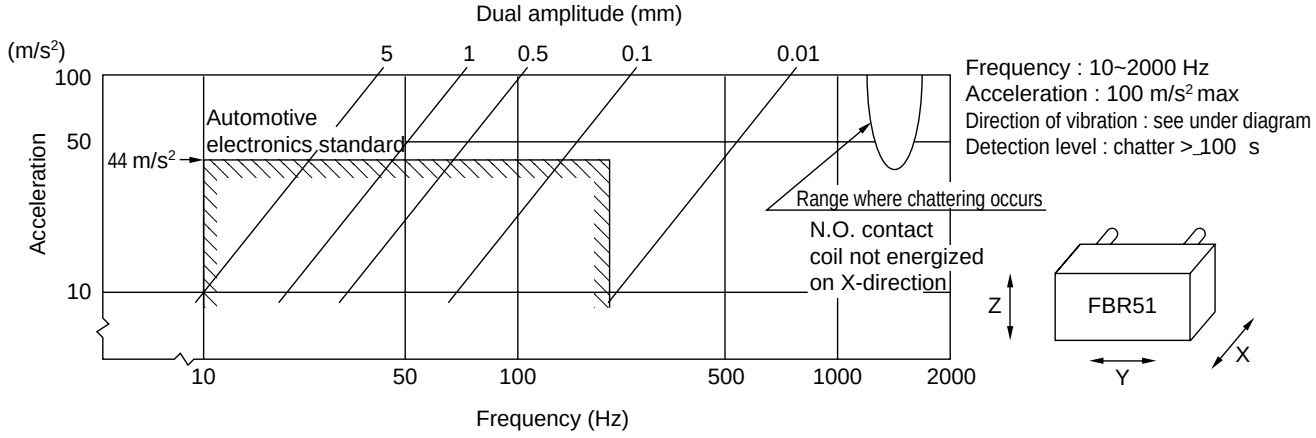
[FBR51ND09-□]



[FBR51ND12-□]

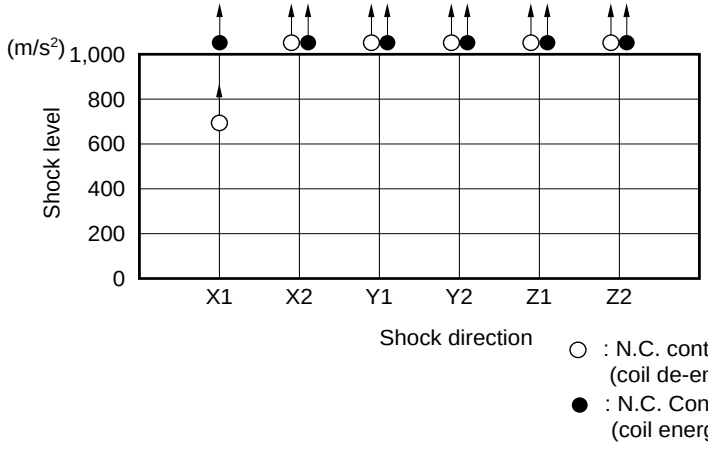


6. VIBRATION RESISTANCE CHARACTERISTICS

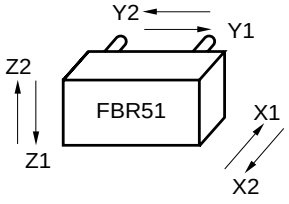


Frequency : 10~2000 Hz
Acceleration : 100 m/s² max
Direction of vibration : see under diagram
Detection level : chatter >_100 s

7. SHOCK RESISTANCE CHARACTERISTICS

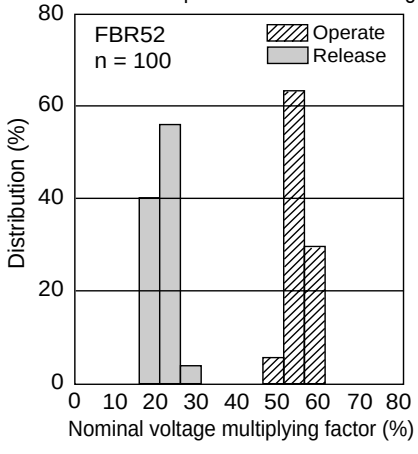


Shock application time : 11 ms, half-sine wave
Test material : coil, energized and de-energized
Shock direction : set under diagram
Detection level : chatter ≥ 100 s

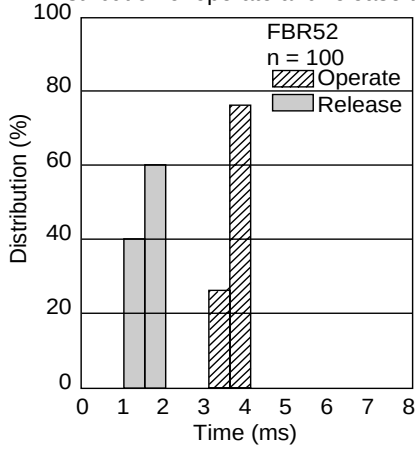


■ REFERENCE DATA

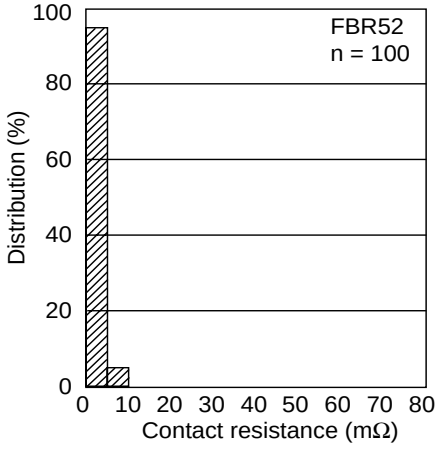
Distribution of operate and release voltage



Distribution of operate and release time

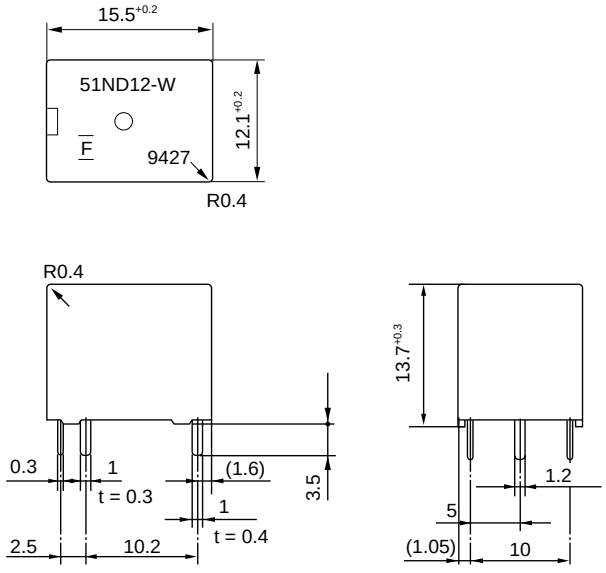


Distribution of contact resistance

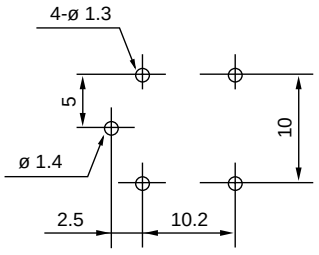


■ DIMENSIONS

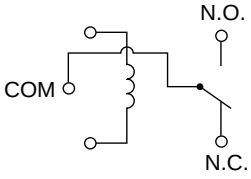
● Dimensions



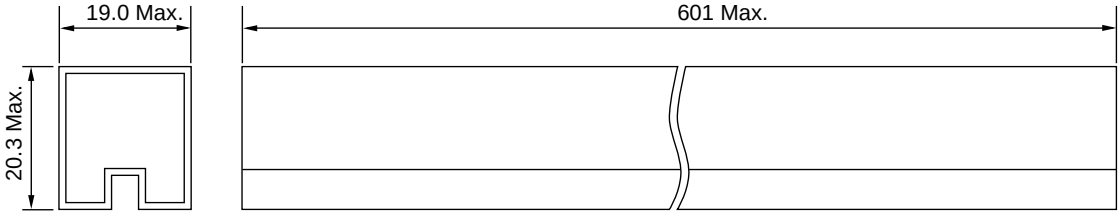
● PC board mounting hole layout
(BOTTOM VIEW)



● Schemati
(BOTTOM VIEW)



● Tube carrier



45 pcs/tube

Unit : mm

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