

# COMPACT HIGH POWER RELAY

## 1 POLE - 25A (For automotive applications)

### FBR51 Latching Series

#### ■ FEATURES

- Magnetically latched PCB relay
  - Increased ambient temperature range up to 125°C
  - Two coils with set and reset function
  - Reflow soldering capable
  - Two types of contact materials
  - RoHS compliant
- Please see page 6 for more information



#### ■ Part Numbers

[Example]    FBR51    N    L    2    10    -    W1    -    RW  
                   (a)    (b)    (c)    (d)    (e)           (f)           (g)

(a)	Relay type	FBR51 : FBR51 series
(b)	Enclosure	N : Plastic sealed type
(c)	Operating function	L : Latching type
(d)	Coil type	2 : Double coil
(e)	Coil rated voltage	10 : 10VDC
(f)	Contact material	W1 : AgSnO <sub>2</sub> In E : AgNi
(g)	Mounting process	Nil : Standard RW : Through hole reflow (THR)

\* E (AgNi) versions used for special low current applications that require lower contact resistance (dark current applications)

Actual markings does not carry the type name: "FBR"

E.g.: Ordering code: FBR51NL210-W1-RW Actual marking: 51NL210-W1-RW

# FBR51 Series

## ■ Specifications

Item	FBR51		Remarks / conditions	
	W1 contact	E contact		
Contact data	Configuration		1 form C	
	Material		AgSnO <sub>2</sub> In      AgNi	
	Voltage drop		Max. 100 mV at 1A, 12VDC      Max. 100 mV at 2A, 12VDC	
	Contact rating		25A at 14VDC	Locked motor load
	Max. carrying current		30A / 1 hour	25 °C, 100% rated coil voltage
	Max. switching voltage		16VDC	Reference
	Max. switching current		35A	Reference
	Min. switching load*		1A 6VDC      0.1A 5VDC	Reference
Coil	Operating ambient temperature range		-40°C ~ +125°C No frost	
Timing data	Set / reset		Max. 5 ms (without bounce) At nominal voltage	
Life	Mechanical		Min. 1 x 10 <sup>6</sup> operations	
	Electrical		Min. 200 x 10 <sup>3</sup> operations 14VDC 25A (Locked motor load)      Min. 50 x 10 <sup>3</sup> operations, 14VDC 25A (Locked motor load)	
Insulation**	Insulation resistance		Min. 100MΩ at 500VDC	
	Dielectric strenght	Open contacts	500VAC (50/60Hz), 1 minute	
		Coil contact	500VAC (50/60Hz), 1 minute	
Other	Vibration resistance	Misoperation	10 to 200Hz, acceleration 44m/s <sup>2</sup> (4.5G) maximum	
		Endurance	10 to 200Hz, acceleration 44m/s <sup>2</sup> (4.5G) maximum	
	Shock resistance	Misoperation	100m/s <sup>2</sup> (11±1ms)	
		Endurance	1,000m/s <sup>2</sup> (6±1ms)	
	Sealing		Plastic sealed RT III	
	Dimensions / weight		12.1 x 15.5 x 13.7 mm / approx. 6g	

\* 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 conditions and expected reliability levels.  
Care shall be taken on the heat generated on PC board when maximum carrying current exceeds 10A. Please perform the confirmation test with actual conditions.

\*\* Values of insulation are under 20°C ± 15°C, 65 ± 20%.

# FBR51 Series

## Coil Data

Coil code	Coil Resistance +/-10% (Ω)	Set Voltage* (VDC)	Reset Voltage* (VDC)
10	P90	+6.3 (20°C) +8.9(125°C)	-
	S90	-	+6.3 (20°C) +8.9(125°C)

P: Set coil  
S: Reset coil

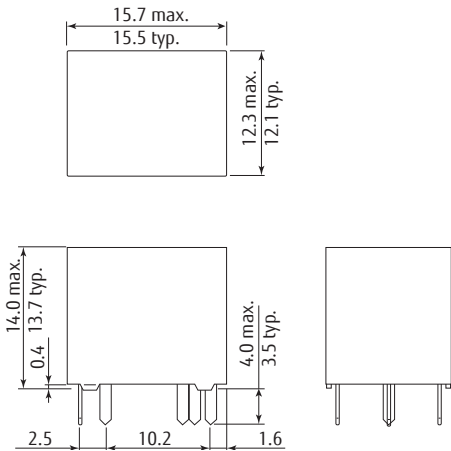
Note: All values in the table are valid at 20C and zero contact current, unless otherwise specified.

\*: Specified operate values are valid for pulse wave voltage.

Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

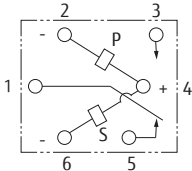
## Dimensions

- Dimensions

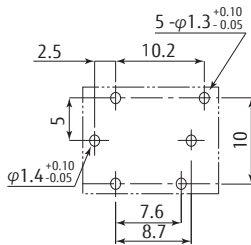


Dimensions of the terminals do not include thickness of pre-solder.

- Schematics (BOTTOM VIEW)



- PC Board Mounting Hole Layout (BOTTOM VIEW)



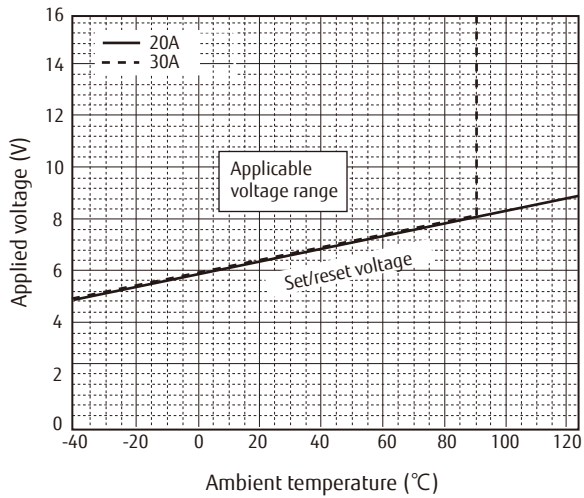
Tolerance of PC board mounting hole layout:  $\pm 0.1$  unless otherwise specified.

( ): Reference value  
Unit: mm

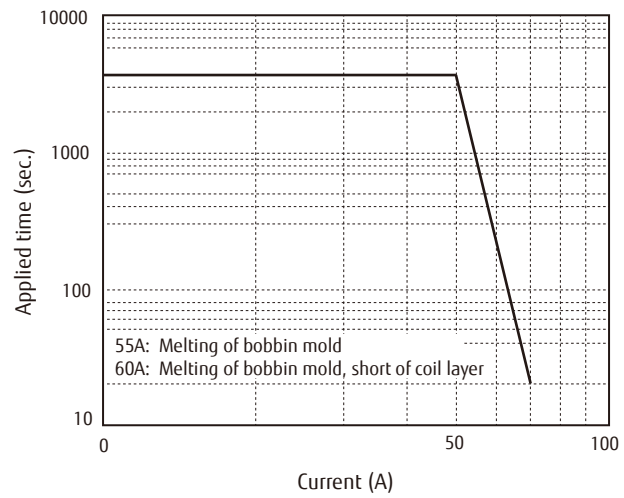
# FBR51 Series

## ■ Characteristic Data (Reference)

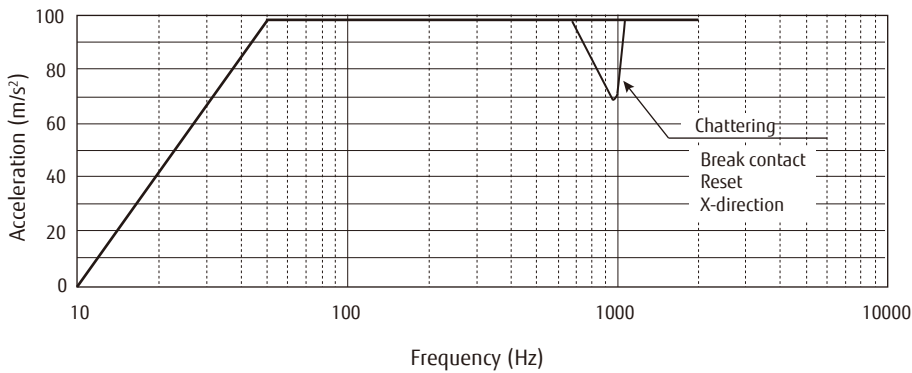
Operating range



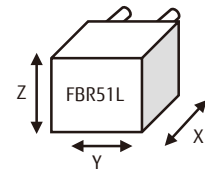
Contact current capacity



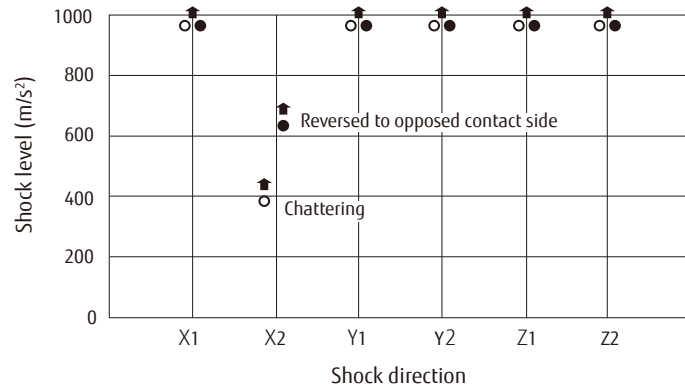
Vibration resistance characteristics



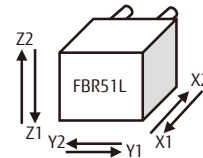
Frequency: 10 to 2000Hz  
Acceleration: 98m/s<sup>2</sup> max.  
Shock direction: See diagram below  
Detection level: Chatter > 1ms



Shock resistance characteristics



Shock application time: 6±1ms half-sine wave  
Test conditions: Coil energized and de-energized  
Shock direction: See diagram below  
Detection level: Chatter > 1ms



● : Reversed from reset to set  
○ : Break contact (reset)  
Make contact: Min. 980m/s<sup>2</sup> at all directions

# FBR51 Series

## Cautions

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is not available with standard type.
- Please connect relay coils according to specified polarity.
- Do not use relays in the atmosphere with sulfide gas, chloride gas or nitric oxide. Contact resistance may increase.
- Do not use silicon or silicon-containing product or materials near relays. It may cause contact failure.

## Cautions about latching relay

- Latching relays are shipped in the state set, but state may change due to shock during transportation or mounting. Before using the relays, it is advisable to bring the relays in necessary state (set or reset) and program a circuit sequence. Otherwise, it will or will not operate simultaneously with power activation.

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# FBR51 Series

## GENERAL INFORMATION

### 1. ROHS Compliance

- All relays produced by Fujitsu Components are compliant with RoHS directive 2011/65/EU including amendments.
- Use of Cadmium in electrical contacts is exempted as per Annex III of the RoHS directive 2001/65/EU. Please consider expiry date of exemption. Relays with Cadmium containing contacts are not to be used for new designs.
- All relays are lead-free. Please refer to Lead-Free Status Info for older date codes at: <http://www.fujitsu.com/downloads/MICRO/fcai/relays/lead-free-letter.pdf>

### 2. Recommended lead free solder condition

#### Flow Solder Condition:

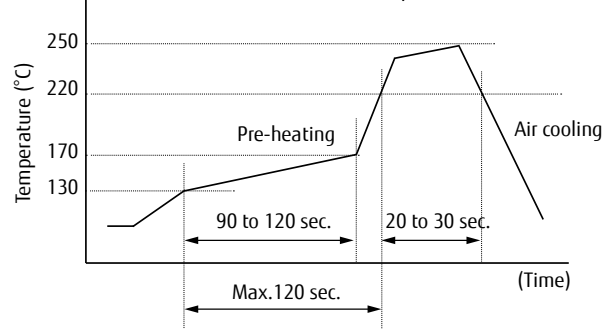
Pre-heating: maximum 120°C within 90 sec.  
Soldering: dip within 5 sec. at 255°C ± 5°C solder bath  
Relay must be cooled by air immediately after soldering

#### Solder by Soldering Iron:

Soldering Iron 30-60W  
Temperature: maximum 350-360°C  
Duration: maximum 3 sec.

#### Recommended reflow soldering profile IRS (infrared reflow soldering)

Peak temperature: Max.250°C



#### Important Notes for Reflow Soldering

- Temperature shall be measured at PC board upper surface.
- Temperature at PC board upper surface may be changed depending on size of PC board, components mounted on the PC board and/or heating method. Please perform the confirmation test with your actual PC boards.
- This reflow solder condition is applicable only for reflow-capable relays. Do not reflow reflow-incapable relays.
- Recommended solder for assembly: Sn-3.0 Ag-0.5 Cu.

**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. -RW THR relay will be shipped in moisture barrier bag.

### 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.

# FBR51 Series

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