

COMPACT HIGH POWER RELAY

1 POLE - 30A (For automotive applications)

FBR51 Latching Series

■ FEATURES

- Magnetically latched PCB relay
 - Increased ambient temperature range up to 125C
 - 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 ₂ 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 ₂ 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 |
| | Max. 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 ⁶ operations | | |
| | Electrical | Min. 200 x 10 ³ operations 14VDC 25A (Locked motor load) | Min. 50 x 10 ³ 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 ² (4.5G) maximum | |
| | | Endurance | 10 to 200Hz, acceleration 44m/s ² (4.5G) maximum | |
| | Shock resistance | Misoperation | 100m/s ² (11±1ms | |
| | | Endurance | 1,000m/s ² (6±1ms) | |
| | Sealing | | Plastic sealed RT III | |
| | Dimensions / weight | | 12.1 x15.5x13.7 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

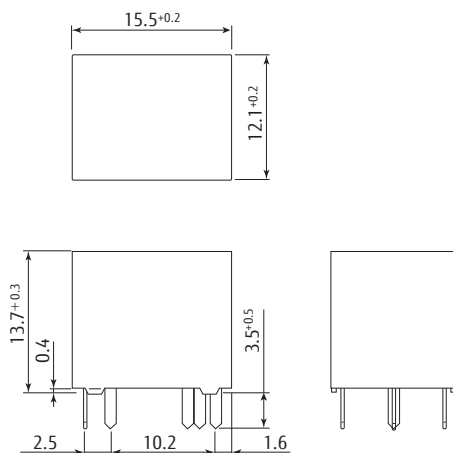
Note: All values in the table are valid at 20°C and zero contact current, unless otherwise specified.

*: Specified operated 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.

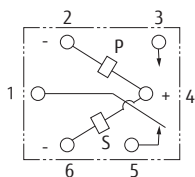
■ Dimensions

- Dimensions



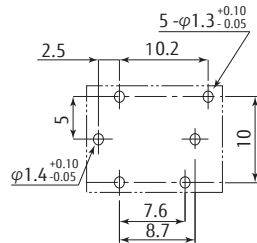
Dimensions of the terminals do not include thickness of pre-solder.

- Schematics
(BOTTOM VIEW)



FBR51 Series

- PC Board Mounting Hole Layout (BOTTOM VIEW)

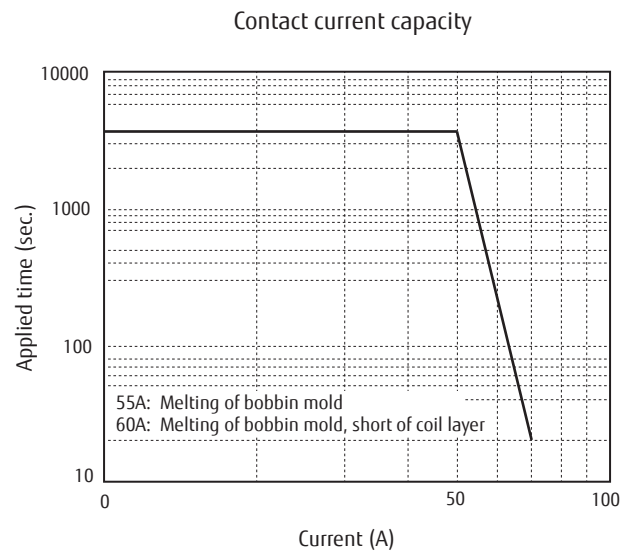
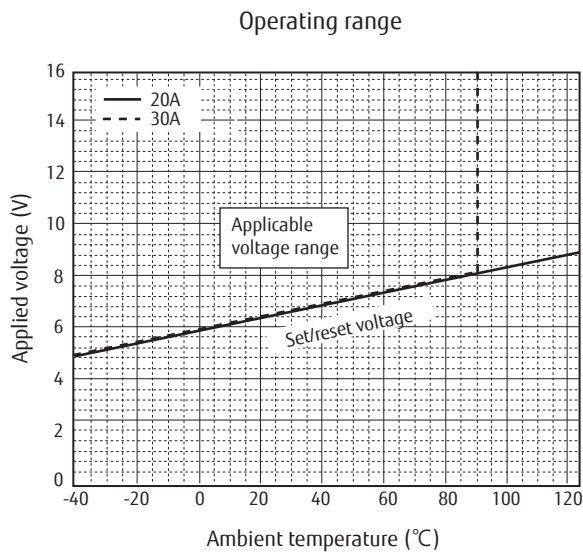


Tolerance of PC board mounting hole layout : ± 0.1 unless otherwise specified.

(): Reference value

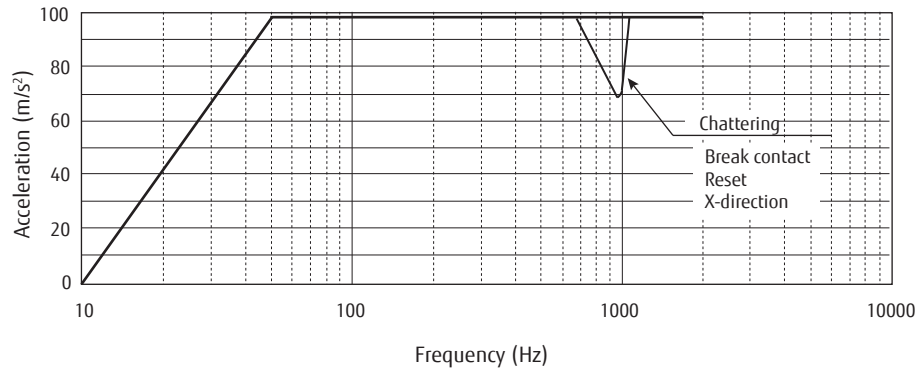
Unit: mm

■ Characteristic Data (Reference)

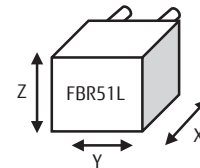


FBR51 Series

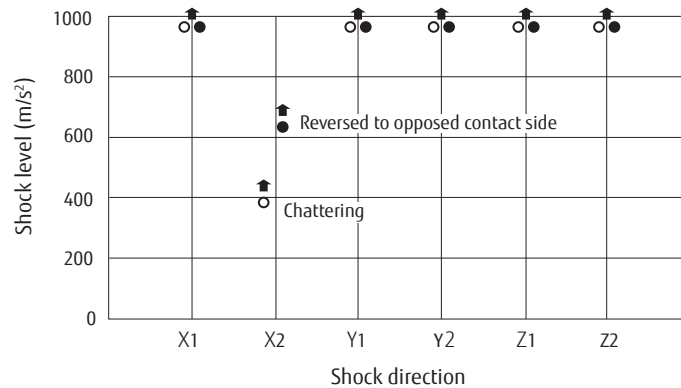
Vibration resistance characteristics



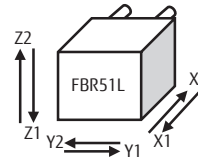
Frequency: 10 to 2000Hz
Acceleration: 98m/s^2 max.
Shock direction: See diagram below
Detection level: Chatter > 1ms



Shock resistance characteristics



Shock application time: $6 \pm 1\text{ms}$ 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^2 at all directions

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:

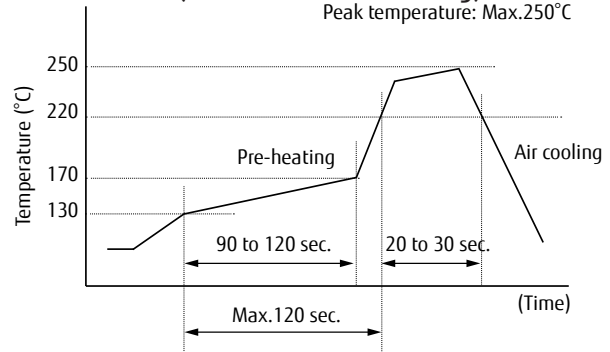
Pre-heating: maximum 120°C within 90 sec.
Soldering: dip within 5 sec. at 255°C ± 5°C solder bath
Relay must be cooled by air immediately after soldering

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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