

COMPACT HIGH POWER RELAY

1 POLE - 30A (For automotive applications)

FBR53 Series

■ FEATURES

- Compact for high density packaging
- High contact capability (30A continuous)
- High temperature grade (-40°C to 125°C)
- Contact arrangement Form U (form A)
- 60A inrush
- Coil wire temp. class F

■ Part Numbers

[Example] FBR53 N D12 - Y - RW
 (a) (b) (c) (d) (e)

| | | |
|-----|--------------------|--|
| (a) | Relay type | FBR53 : FBR53 series |
| (b) | Enclosure | N : Plastic sealed type |
| (c) | Coil rated voltage | D12 : 9...12VDC Coil rating table at page 3 |
| (d) | Contact material | Y : Silver-tin oxide |
| (e) | Soldering | Nil : Standard (Flow soldering) RW : Reflow capable (THR) |

Actual markings does not carry the type name: "FBR"
E.g.: Ordering code: FBR53ND12-Y Actual marking: 53ND12-Y



■ Specifications

| Item | FBR53 | | Remarks / conditions |
|--------------|---------------------------------|---|--|
| Contact data | Configuration | 1 form U | |
| | Material | Silver-tin oxide (AgSnO ₂) | |
| | Voltage drop | Max. 100 mV at 1A (12VDC open contact voltage) Average 1.5mΩ at 7A, 12VDC | |
| | Contact rating | 25A, 14VDC | Resistive load |
| | Max. carrying current | 30A | |
| | Max. inrush current | 60A | Reference |
| | Min. switching load | 1A 6VDC | Reference * |
| Coil | Rated power consumption | 600mW | At 20°C |
| | Operate power consumption | 220mW | At 20°C |
| | Storage temperature range | -40°C ~ +125°C | No frost |
| | Operating temperature range | -40°C ~ +125°C | No frost |
| Timing data | Operate | Max. 10ms | At nominal voltage |
| | Release | Max. 5ms | At nominal voltage (No diode) |
| Life | Mechanical | Min. 10 x 10 ⁶ operations | without contact load |
| | Electrical | Min. 100 x 10 ³ operations | 14VDC, 25A resistive load |
| Insulation | Insulation resistance | | Min. 100M |
| | Dielectric withstanding voltage | 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) constant acceleration |
| | | Endurance | 10 to 200Hz, acceleration 44m/s ² (4.5G) constant acceleration |
| | Shock resistance | Misoperation | 100m/s ² (11±1ms) |
| | | Endurance | 1,000m/s ² (6±1ms) |
| | Dimensions / weight | | 12.3 x15.7x14.0 mm / approx. 6g |
| | Sealing | | Sealed, cat III |

*: 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.

■ Coil Data

| Coil code | Rated Coil Voltage (VDC) | Coil Resistance $\pm 10\%$ (Ω) | Must Operate Voltage* (VDC) | Must Release Voltage* (VDC) |
|-----------|--------------------------|---|-----------------------------|-----------------------------|
| D09 | 9 | 135 | 5.4 6.8 (at 85°C) | 0.7 0.9 (at 85°C) |
| D10 | 10 | 180 | 6.3 7.9 (at 85°C) | 0.8 1.0 (at 85°C) |
| D12 | 12 | 240 | 7.3 9.2 (at 85°C) | 1.0 1.3 (at 85°C) |

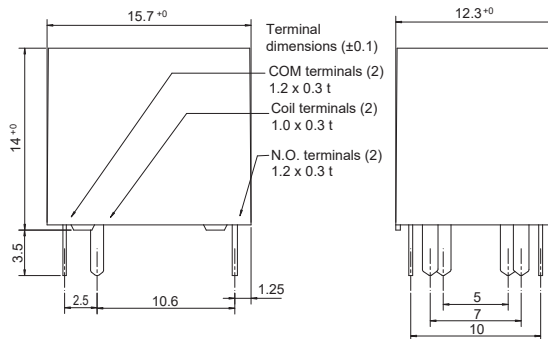
Note: All values in the table are valid at 20°C and zero contact current, unless otherwise specified.

*: 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.

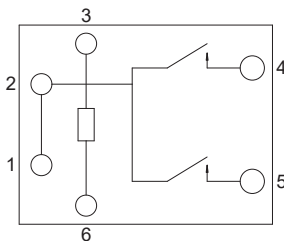
■ Dimensions

- Dimensions



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

- Schematics
(BOTTOM VIEW)

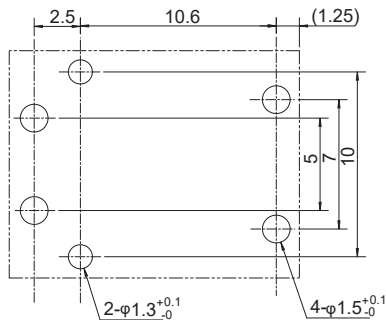


Pattern shall be designed to short-circuit #4 and #5 on the PC board.

Not for new design

FBR53 Series

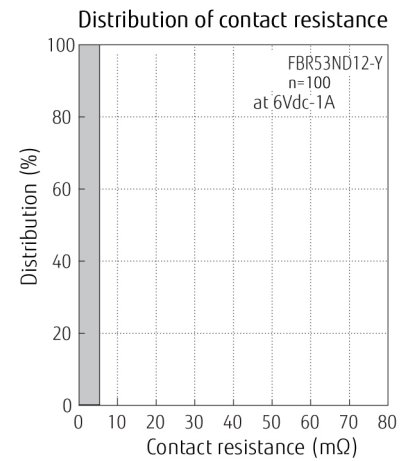
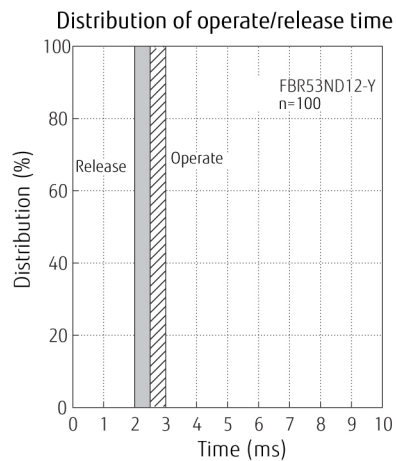
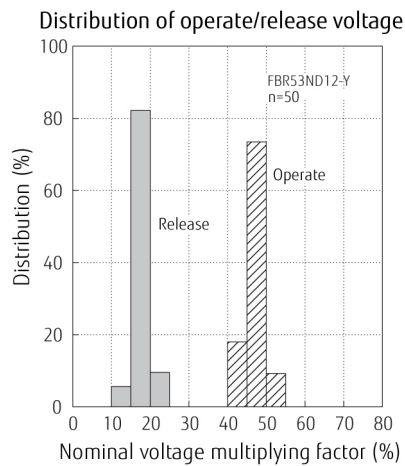
- PC Board Mounting Hole Layout (BOTTOM VIEW)

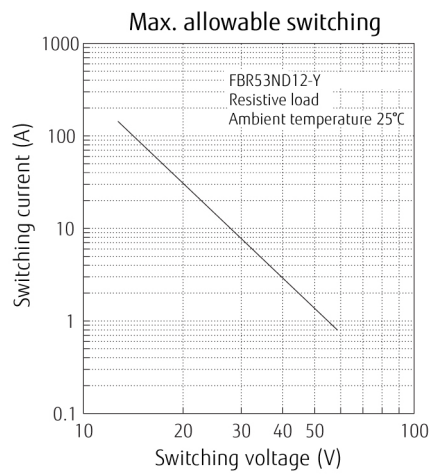
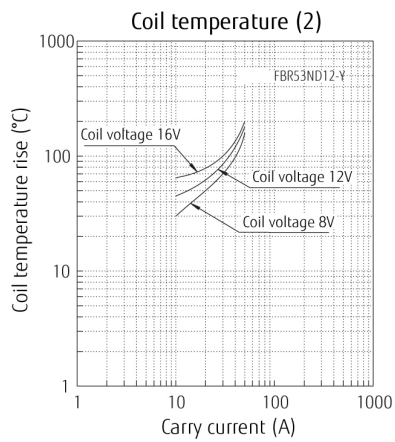
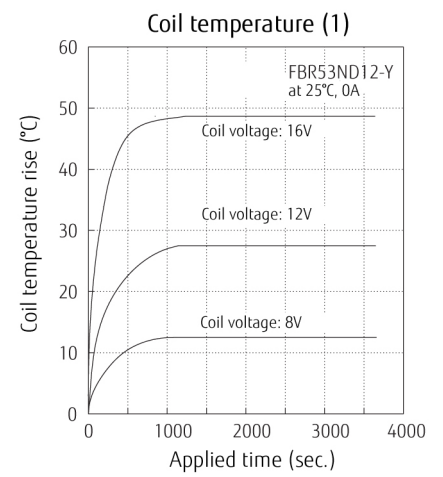
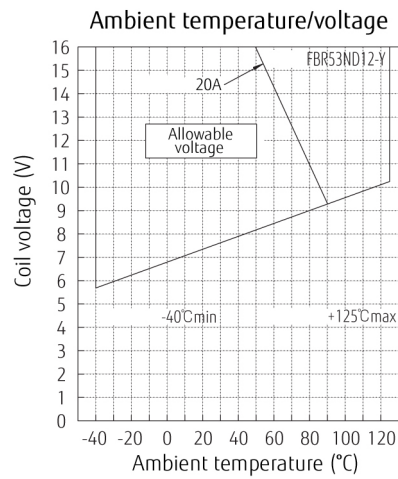
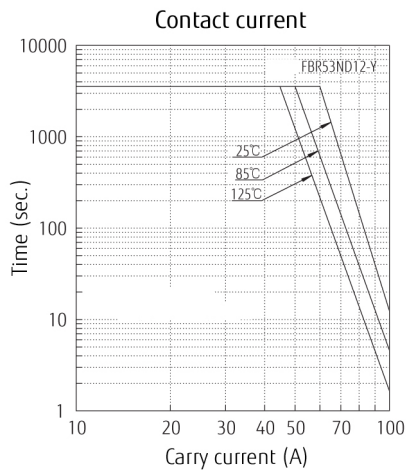


Tolerance of PC board mounting hole layout : ± 0.1 unless otherwise specified.

(): Reference value
Unit: mm

■ Characteristic Data (Reference)





CAUTIONS

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is prohibited for flow soldering type.
- 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.

GENERAL INFORMATION

1. ROHS Compliance

- All relays produced by FCL Components are compliant with RoHS directive 2011/65/EU, including commission delegated directive 2015/863.

2. Recommended lead free solder condition

- 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.
- Recommended solder for assembly: Sn-3.0Ag-0.5Cu.

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

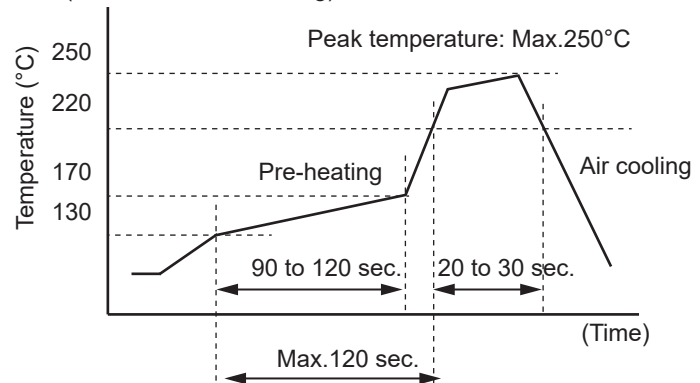
Solder by Soldering Iron:

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

Reflow Solder Condition:

(Applicable only for reflow capable type)

Recommended reflow soldering profile:
IRS (infrared reflow soldering)



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 board.
- This reflow condition is applicable only for reflow-capable relays. Do not reflow reflow-incapable relays.

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.

Contact *Not for new design*

Japan

FCL COMPONENTS LIMITED
Shinagawa Seaside Park Tower
12-4, Higashi-shinagawa 4-chome,
Tokyo 140 0002, Japan
Tel: +81-3-3450-1682
Email: fcl-contact@cs.fcl-components.com

North and South America

FCL COMPONENTS AMERICA, INC.
2055 Gateway Place Suite 480,
San Jose, CA 95110 USA
Tel: +1-408-745-4900
Email: fcai.components@fcl-components.com

Europe

FCL COMPONENTS EUROPE B.V.
Diamantlaan 25
2132 WV Hoofddorp, Netherlands
Tel: +31-23-556-0910
Email: info.fceu@cs.fcl-components.com

Asia Pacific

FCL COMPONENTS ASIA PTE LTD.
No. 20 Harbour Drive, #07-01B
Singapore 117612
Tel: +65-6375-8560
Email: fcal@fcl-components.com

China

FCL COMPONENTS (SHANGHAI) CO., LTD.
Unit 1105, Central Park - Jing An,
No.329 Heng Feng Road, Shanghai 200070,
China
Tel: +86-21-3253 0998
Email: fcsh@fcl-components.com

Web: www.fcl-components.com/en/

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