

# 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

# FBR53 Series

## ■ Specifications

Item	FBR53		Remarks / conditions	
Contact data	Configuration		1 form U	
	Material		Silver-tin oxide (AgSnO <sub>2</sub> )	
	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 <sup>6</sup> operations	without contact load
	Electrical		Min. 100 x 10 <sup>3</sup> operations	14VDC, 25A resistive load
Insulation	Insulation resistance		Min. 100M	At 500VDC initial
	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 <sup>2</sup> (4.5G) constant acceleration	Direction X, Y, Z, contact ON/OFF total 6 cycles
		Endurance	10 to 200Hz, acceleration 44m/s <sup>2</sup> (4.5G) constant acceleration	Direction X, Y, Z, contact OFF total 6 hours
	Shock resistance	Misoperation	100m/s <sup>2</sup> (11±1ms)	Direction X, Y, Z, contact ON/OFF total 36 times
		Endurance	1,000m/s <sup>2</sup> (6±1ms)	Direction X, Y, Z, contact OFF total 18 times
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.

# FBR53 Series

## Coil Data

Coil code	Rated Coil Voltage (VDC)	Coil Resistance +/--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)

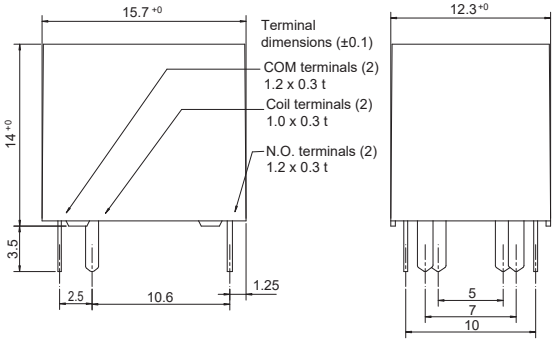
Note: All values in the table are valid at 20°C and zero contact current, unless otherwise specified.

\*: 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.

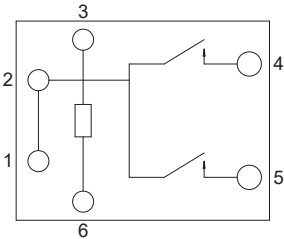
## Dimensions

- Dimensions



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

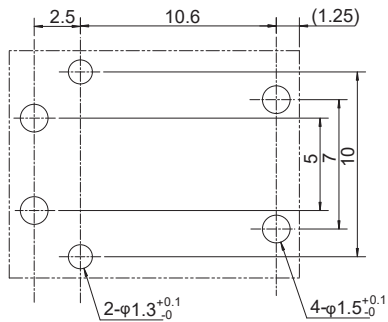
- Schematics (BOTTOM VIEW)



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

# FBR53 Series

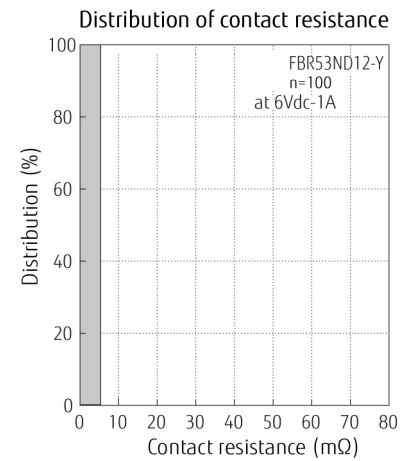
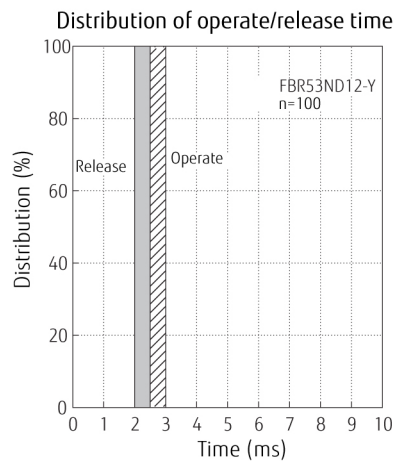
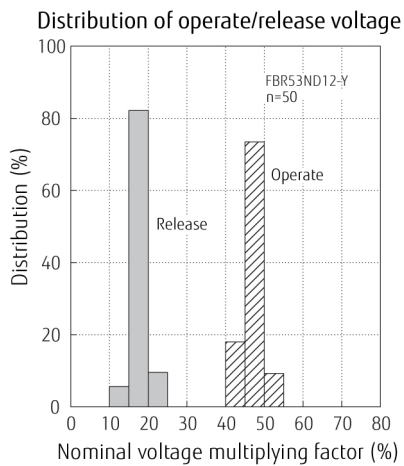
- PC Board Mounting Hole Layout (BOTTOM VIEW)



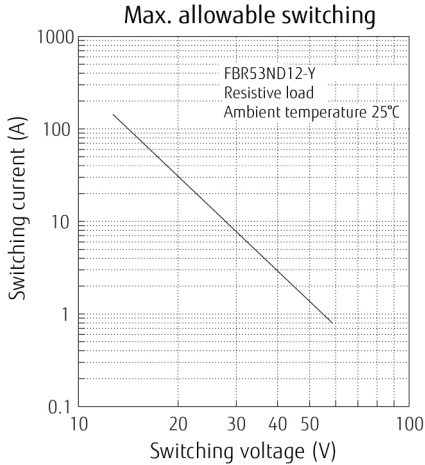
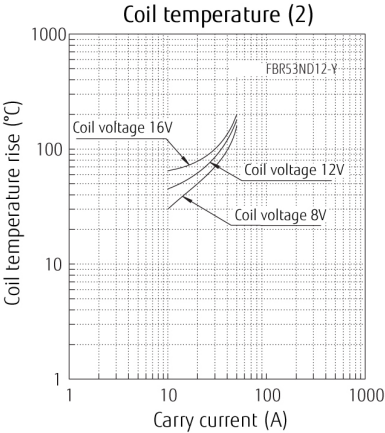
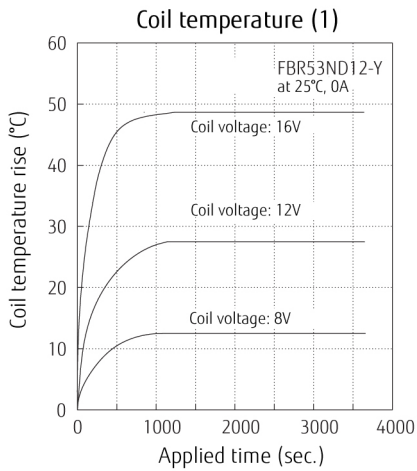
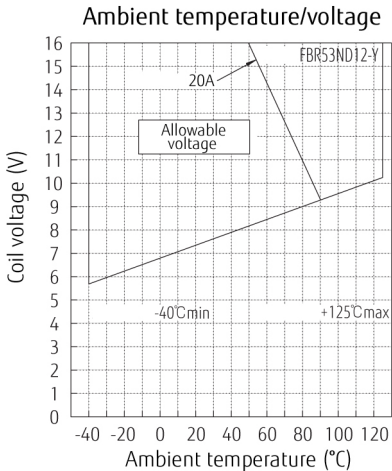
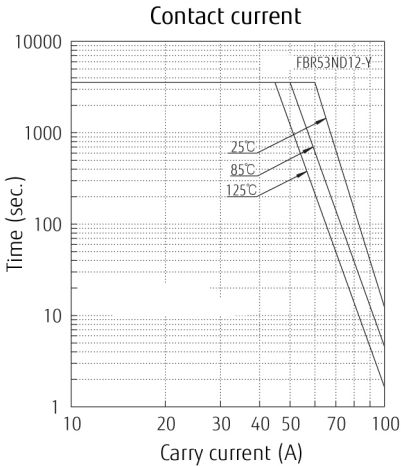
Tolerance of PC board mounting hole layout :  $\pm 0.1$  unless otherwise specified.

( ) : Reference value  
Unit: mm

## Characteristic Data (Reference)



# FBR53 Series



# FBR53 Series

## 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 Fujitsu 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

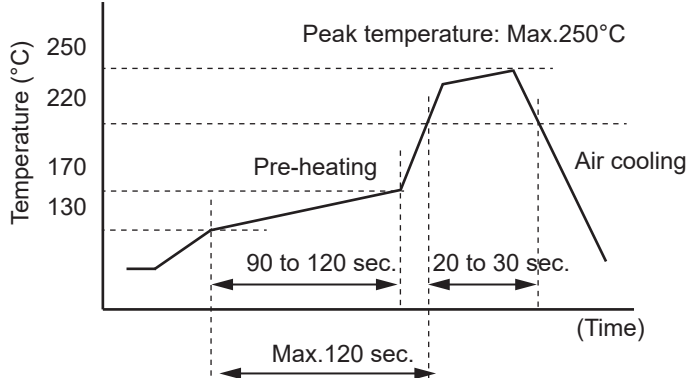
#### Solder by Soldering Iron:

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.

# FBR53 Series

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