

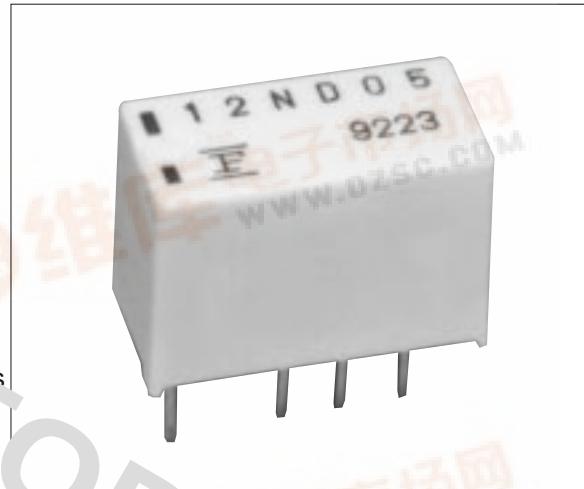
# MINIATURE RELAY

## 2 POLES—1 to 2 A (FOR SIGNAL SWITCHING)

### FBR12 SERIES

#### ■ FEATURES

- Super miniature size: 0.2 inch × 0.1 inch grid, 12 pin DIP  
Up to 50% less volume and board area than previous generation telecom relay.
- Slim type for high density mounting
- Conforms to Bellcore TR-NWT-C-1089 and FCC Part 68 requirements
- UL recognized and CSA certified
- Low power consumption
- Conforms to IEC 950 (W type only)
  - 2.5 mm clearance and creepage between coil and contacts
  - 5000 V surge strength between coil and contacts (2x10<sup>12</sup> A surge wave)
  - 2000 Vrms dielectric strength between coil and contacts
  - UL 1640 and IEC950 (approval in process)



#### ■ ORDERING INFORMATION

[Example] FBR12-N-D-2--P--\*\* (-CSA)  
 (a) (b) (c) (d) (e) (f) (g)

(a)	Series Name	FBR12 : FBR12 Series
(b)	Enclosure / Coil Power	N : Standard (plastic sealed type) W : High dielectric strength type (plastic sealed type) T : High sensitivity type
(c)	Coil Type	D : DC coil
(d)	Nominal Voltage	Refer to the COIL DATA CHART
(e)	Contact Material	Nil : Gold-overlaid silver-nickel -P : Gold-overlaid silver-palladium
(f)	Custom Designation	To be assigned custom specification
(g)	CSA Standard	-CSA : UL 114 : CSA recognized -CSA : 1950 : CSA (under application)

Note: The designation name is stamped on the top of the relay. Please as follows:

(Example) Designation ordered: FBR12ND05

Stamp: 12ND05

#### ■ SAFETY STANDARD AND FILE NUMBERS

UL508, 1950, 114 (File No. E63615)

C22.2 No. 0, No. 14 (File No. LR40304 or LR64026)

Nominal coil voltage	Contact rating
3 to 24 VDC	0.5 A 125 VDC resistive
	2 A 30 VDC resistive
	0.3 A 110 VAC resistive

# FBR12 SERIES

## ■ SPECIFICATIONS

Item		Standard (Gold-overlay silver-nickel)		-P type (Gold-overlay silver-palladium)					
		Standard	High dielectric strength type	Standard	High dielectric strength type				
Contact	Arrangement	2 form C (DPDT)							
	Material	Gold-overlay silver-nickel		Gold-overlay silver-palladium					
	Style	Bifurcated							
	Resistance (initial)	Maximum 100 mΩ (at 0.1 A 6 VDC)							
	Rating (resistive)	0.5 A 125 VAC or 1 A 30 VDC							
	Maximum Carrying Current	2 A (at 20°C)							
	Maximum Switching Power	62.5 VA or 60 W							
	Max. Switching Voltage* <sup>1</sup>	250 VAC or 220 VDC							
	Maximum Switching Current	2 A							
	Minimum Switching Load* <sup>2</sup>	10 μA 10 VDC (reference)							
Coil	Capacitance (at 10 kHz)	Approximately 1.0 pF (between open contacts, adjacent contacts) Approximately 1.0 pF (between coil and contacts)							
	Nominal power (at 20°C)	Approximately 0.14 to 0.2 W	Approximately 0.23 to 0.25 W	Approximately 0.14 to 0.2 W	Approximately 0.23 to 0.25 W				
	Operate power (at 20°C)	Approximately 0.08 to 0.112 W	Approximately 0.13 to 0.14 W	Approximately 0.08 to 0.112 W	Approximately 0.13 to 0.14 W				
	Thermal Resistance at Continuous Thermal Load	Approximately 115°C/W							
	Operating Temperature	-40°C to +85°C (no frost) (refer to the CHARACTERISTIC DATA)							
Time Value	Operating Humidity	45 to 85%RH							
	Operate (at nominal voltage)	Maximum 4 msec.							
	Release (at nominal voltage)	Maximum 4 msec.							
Insulation	Max. Switching Frequency		Mechanical 3 Hz or electrical 0.5 Hz (at contact rating)						
	Resistance (initial)		Minimum 1000 MΩ (at 500 VDC)						
	Dielectric Strength	between open contacts	1,000 VAC 1 minimum	1,500 750					
		adjacent contacts	1,500 VAC 1 min.						
	between coil and contacts		1,500 VAC 1 min.	2,000 VAC 1 min.	1,500 VAC 1 min.	2,000 VAC 1 min.			
Life	Surge Strength	between open contacts, adjacent contacts	1,500 V 10 × 700 μs	2,500 1,250					
		between coil and contacts	2,500 V 2 × 10 μs	5,000 V 2 × 10 μs	2,500 V 2 × 10 μs	5,000 V 2 × 10 μs			
	Mechanical	1 × 10 <sup>8</sup> operations minimum							
	Electrical (at contact rating)		DC	2 × 10 <sup>5</sup> operations minimum					
			AC	5 × 10 <sup>5</sup> operations minimum					
Other	Vibration Resistance	Misoperation	10 to 55 Hz (double amplitude of 3.3 mm)						
		Endurance	10 to 55 Hz (double amplitude of 5.0 mm)						
	Shock Resistance	Misoperation	500 m/s <sup>2</sup> (11±1 ms)						
		Endurance	1,000 m/s <sup>2</sup> (6 ± 1 ms)						
	Weight	Approx. 1.5 g	Approx. 1.9 g	Approx. 1.5 g	Approx. 1.9 g				

\*<sup>1</sup> If the switching voltage exceeds the rated contact voltage, reduce the current. The current values vary according to the type of load.

\*<sup>2</sup> Values when switching a resistive load at normal room temperature and humidity and in a clean environment.

# FBR12 SERIES

## ■ SPECIFICATIONS

Item		High Sensitive Type	
		Standard (Gold-overlay silver-nickel) -P type (Gold-overlay silver-palladium)	
Contact	Arrangement	2 form C (DPDT)	
	Material	Gold-overlay silver-nickel	Gold-overlay silver-palladium
	Style	Bifurcated	
	Resistance (initial)	Maximum 100 mΩ (at 0.1 A 6 VDC)	
	Rating (resistive)	0.3 A 125 VAC or 1 A 30 VDC	
	Maximum Carrying Current	2 A (at 20°C)	
	Maximum Switching Power	62.5 VA or 30 W	
	Max. Switching Voltage <sup>*1</sup>	250 VAC or 220 VDC	
	Maximum Switching Current	2 A	
	Minimum Switching Load <sup>*2</sup>	10m VDC - 10μ A	
Coil	Capacitance (at 10 kHz)	Approximately 1.0 pF (between open contacts, adjacent contacts ) Approximately 1.0 pF (between coil and contacts)	
	Nominal power (at 20°C)	Approximately 50mW	
	Operate power (at 20°C)	Approximately 40m W	
	Operating Temperature	-40°C to +70°C (no frost) (refer to the CHARACTERISTIC DATA)	
Time Value	Operating Humidity	45 to 85%RH	
	Operate (at nominal voltage)	Maximum 5 msec.	
	Release (at nominal voltage)	Maximum 5 msec.	
Insulation	Resistance (initial)	Minimum 1000 MΩ (at 500 VDC)	
	Dielectric Strength	between open contacts	750 VAC 1 minute
		adjacent contacts	
		between coil and contacts	1,500 VAC 1 minutes
	Surge Strength	between open contacts, adjacent contacts	1,500 V 10 × 700 μs
		between coil and contacts	2,500 V 2 × 10 μs
Life	Mechanical		1 × 10 <sup>8</sup> operations minimum
	Electrical (at contact rating)	DC	2 × 10 <sup>5</sup> operations minimum
		AC	5 × 10 <sup>5</sup> operations minimum
			1 × 10 <sup>5</sup> operations minimum
Other	Vibration Resistance	Misoperation	10 to 55 Hz (double amplitude of 3.3` mm)
		Endurance	10 to 55 Hz (double amplitude of 5.0 mm)
	Shock Resistance	Misoperation	500 m/s <sup>2</sup> (11± <sup>1</sup> ms)
		Endurance	1,000 m/s <sup>2</sup> ( 6 ± <sup>1</sup> ms)
	Weight	Approx. 1.9 g	

<sup>\*1</sup> If the switching voltage exceeds the rated contact voltage, reduce the current. The current values vary according to the type of load.

<sup>\*2</sup> 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 operation environment.

# FBR12 SERIES

## ■ COIL DATA CHART

### 1. STANDARD

MODEL		Nominal voltage	Coil resistance ( $\pm 10\%$ )	Nominal current (at nominal voltage) approx.	Must operate voltage <sup>*1</sup>	Must operate voltage <sup>*1</sup>	Nominal power	Operate power	Coil temperature rise
Standard	-P type								
FBR12ND03	FBR12ND03-P	3 VDC	64.3 $\Omega$	46 mA	75% max. of nominal voltage	10% min. of nominal voltage	Approx. 0.14 W (at nominal voltage)	Approx. 0.08 W Max.	Approx. 20 deg Max. (at nominal voltage)
FBR12ND04	FBR12ND04-P	4.5 VDC	145 $\Omega$	31 mA					
FBR12ND05	FBR12ND05-P	5 VDC	178 $\Omega$	28 mA					
FBR12ND06	FBR12ND06-P	6 VDC	257 $\Omega$	23 mA					
FBR12ND09	FBR12ND09-P	9 VDC	579 $\Omega$	15 mA					
FBR12ND12	FBR12ND12-P	12 VDC	1,028 $\Omega$	11 mA					
FBR12ND24	FBR12ND24-P	24 VDC	2,880 $\Omega$	8 mA					

\*1: Specified values are subject to pulse wave voltage.

Note: All values in the table are measured at 20°C.

### 2. HIGH DIELECTRIC STRENGTH

MODEL		Nominal voltage	Coil resistance ( $\pm 10\%$ )	Nominal current (at nominal voltage) approx.	Must operate voltage <sup>*1</sup>	Must release voltage <sup>*1</sup>	Nominal power	Operate power	Coil temperature rise
Standard	-P type								
FBR12WD03	FBR12WD03-P	3 VDC	39 $\Omega$	77 mA	75% max. of nominal voltage	10% min. of nominal voltage	Approx. 0.23 W (at nominal voltage)	Approx. 0.13 W Max.	Approx. 30 deg (at nominal voltage)
FBR12WD04	FBR12WD04-P	4.5 VDC	88 $\Omega$	51 mA					
FBR12WD05	FBR12WD05-P	5 VDC	108 $\Omega$	46 mA					
FBR12WD06	FBR12WD06-P	6 VDC	156 $\Omega$	38 mA					
FBR12WD09	FBR12WD09-P	9 VDC	352 $\Omega$	25 mA					
FBR12WD12	FBR12WD12-P	12 VDC	626 $\Omega$	19 mA					
FBR12WD24	FBR12WD24-P	24 VDC	2,304 $\Omega$	10 mA					

\*1: Specified values are subject to pulse wave voltage.

Note: All values in the table are measured at 20°C.

### 3. HIGH SENSITIVITY TYPE

MODEL		Nominal voltage	Coil resistance ( $\pm 10\%$ )	Must operate voltage <sup>*1</sup>	Must release voltage <sup>*1</sup>	Nominal power	Operate power	Coil temperature rise
Standard	-P type							
FBR12HD03	FBR12HD03-P	3 VDC	180 $\Omega$	80% max. of nominal voltage	10% min. of nominal voltage	Approx. 0.05 W (at nominal voltage)	Approx. 0.04 W Max.	Approx. 4 deg (at nominal voltage)
FBR12HD04	FBR12HD04-P	4.5 VDC	405 $\Omega$					
FBR12HD05	FBR12HD05-P	5 VDC	500 $\Omega$					
FBR12HD06	FBR12HD06-P	6 VDC	720 $\Omega$					
FBR12HD09	FBR12HD09-P	9 VDC	1,620 $\Omega$					
FBR12HD12	FBR12HD12-P	12 VDC	2,880 $\Omega$					

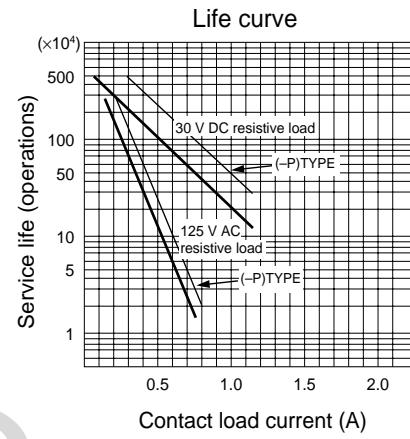
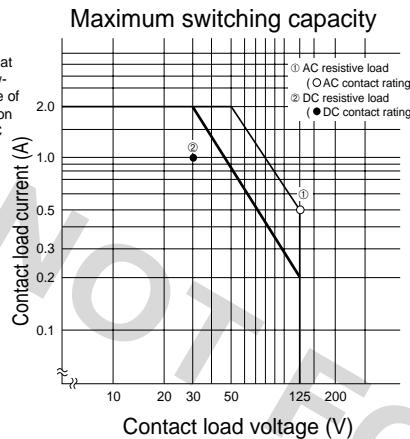
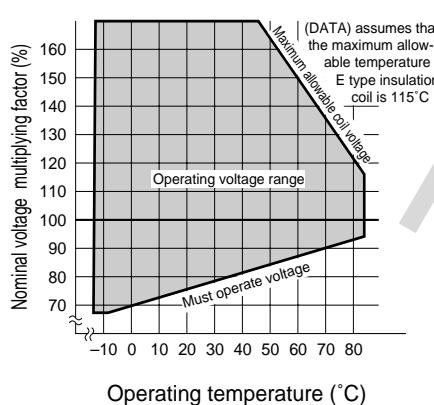
\*1: Specified values are subject to pulse wave voltage.

Note: All values in the table are measured at 20°C.

# FBR12 SERIES

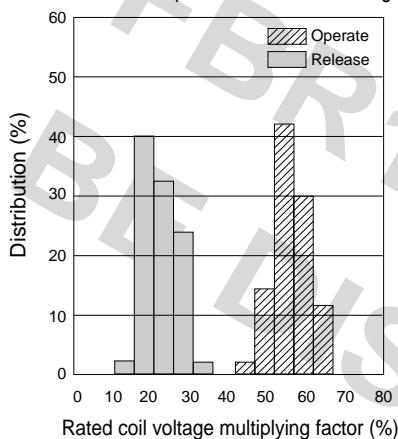
## ■ CHARACTERISTIC DATA

Range of operation temperature and voltage

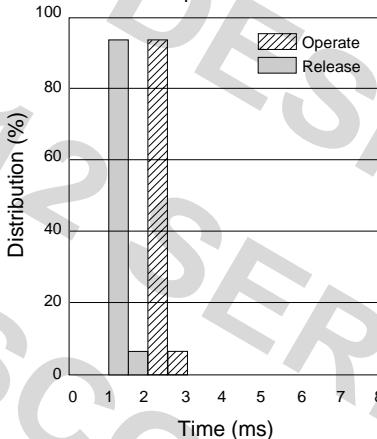


## ■ REFERENCE DATA

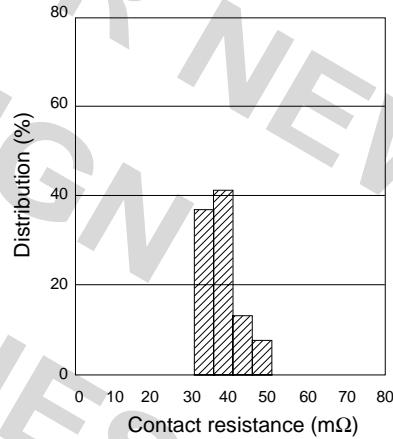
Distribution of operate and release voltage



Distribution of operate and release time

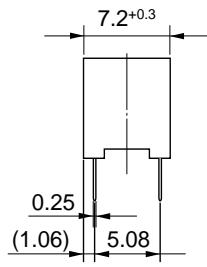
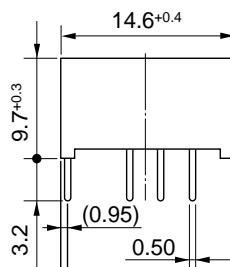


Distribution of contact resistance

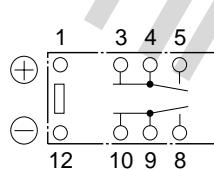


## ■ DIMENSIONS

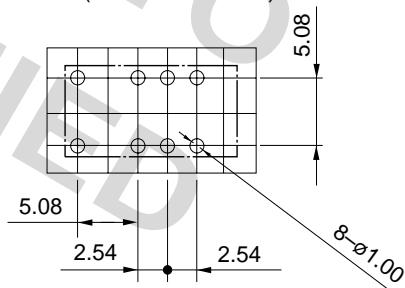
### ● Dimensions



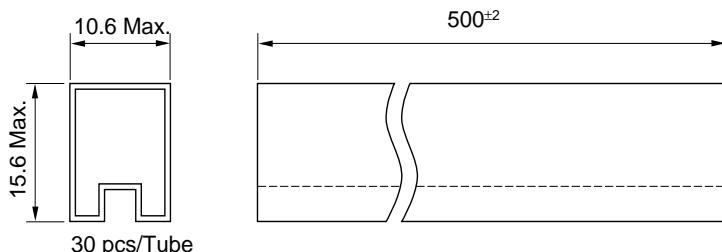
### ● Schematic (BOTTOM VIEW)



### ● PC board mounting hole layout (BOTTOM VIEW)



### ● Tube carrier



Unit: mm

# FBR12 SERIES

## Fujitsu Components International Headquarter Offices

**Japan**  
Fujitsu Component Limited  
Gotanda-Chuo Building  
3-5, Higashitanda 2-chome, Shinagawa-ku  
Tokyo 141, Japan  
Tel: (81-3) 5449-7010  
Fax: (81-3) 5449-2626  
Email: [promothq@ft.ed.fujitsu.com](mailto:promothq@ft.ed.fujitsu.com)  
Web: [www.fcl.fujitsu.com](http://www.fcl.fujitsu.com)

**North and South America**  
Fujitsu Components America, Inc.  
250 E. Caribbean Drive  
Sunnyvale, CA 94089 U.S.A.  
Tel: (1-408) 745-4900  
Fax: (1-408) 745-4970  
Email: [marcom@fcai.fujitsu.com](mailto:marcom@fcai.fujitsu.com)  
Web: [www.fcai.fujitsu.com](http://www.fcai.fujitsu.com)

**Europe**  
Fujitsu Components Europe B.V.  
Diamantlaan 25  
2132 WV Hoofddorp  
Netherlands  
Tel: (31-23) 5560910  
Fax: (31-23) 5560950  
Email: [info.marketing@fceu.fujitsu.com](mailto:info.marketing@fceu.fujitsu.com)  
Web: [www.fceu.fujitsu.com](http://www.fceu.fujitsu.com)

**Asia Pacific**  
Fujitsu Components Asia Ltd.  
102E Pasir Panjang Road  
#04-01 Citilink Warehouse Complex  
Singapore 118529  
Tel: (65) 375-8560  
Fax: (65) 273-3021  
Email: [fcal@fcal.fujitsu.com](mailto:fcal@fcal.fujitsu.com)  
[www.fcal.fujitsu.com](http://www.fcal.fujitsu.com)

© 2004 Fujitsu Components America, Inc. All company and product names are trademarks or registered trademarks of their respective owners. Rev. 07/26/2004.

NOTE FOR NEW  
FBR12 DESIGN TO  
BE DISCONTINUED