

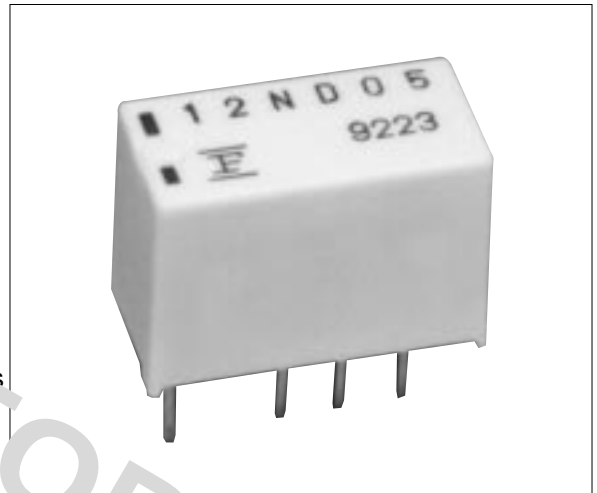
# MINIATURE RELAY

## 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-01089 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 (2x100 μs surge wave)
  - 2000 Vrms dielectric strength between coil and contacts
  - UL 150 and IEC950 (approval in process)



#### ■ ORDERING INFORMATION

[Example] FBR1-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) r : High sensitivity type
(c)	Coil Type	D : DC coil
(d)	Nominal Voltage	Refer to the COIL DATA CHART
(e)	Contact Material	Nil : Gold-overlay silver-nickel -P : Gold-overlay silver-palladium
(f)	Custom Designation	To be assigned custom specification
(g)	CSA Standard	-CSA : J14 : CSA recognized -CSA : 1950 : CSA (under application)

Note: The designation name is stamped on the top of the relay case 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*1	250 VAC or 220 VDC				
	Maximum Switching Current	2 A				
	Minimum Switching Load*2	10 μA 10 VDC (reference)				
	Capacitance (at 10 kHz)	Approximately 1.0 pF (between open contacts, adjacent contacts ) Approximately 1.0 pF (between coil and contacts)				
Coil	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)				
	Operating Humidity	45 to 85%RH				
Time Value	Operate (at nominal voltage)	Maximum 4 msec.				
	Release (at nominal voltage)	Maximum 4 msec.				
	Max. Switching Frequency	Mechanical 3 Hz or electrical 0.5 Hz (at contact rating)				
Insulation	Resistance (initial)	Minimum 1000 MΩ (at 500 VDC)				
	Dielectric Strength	between open contacts	1,500 VAC	750 VAC	1,500 VAC	750 VAC
		adjacent contacts	1,000 VAC 1 minimum	750 VAC	1,000 VAC 1 minimum	750 VAC
		between coil and contacts	1,500 VAC 1 min.	2,000 VAC 1 min.	1,500 VAC 1 min.	2,000 VAC 1 min.
Surge Strength	between open contacts, adjacent contacts	1,500 V 10 × 700 μs	2,500 V 1,250 V	2,500 V 1,250 V	2,500 V 1,250 V	
	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	
Life	Mechanical		1 × 10 <sup>8</sup> operations minimum			
	Electrical (at contact rating)	DC	2 × 10 <sup>5</sup> operations minimum		5 × 10 <sup>5</sup> operations minimum	
		AC	1 × 10 <sup>5</sup> operations minimum		200 × 10 <sup>3</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	

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

\*2 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

## ■ 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*1	250 VAC or 220 VDC	
	Maximum Switching Current	2 A	
	Minimum Switching Load*2	10m VDC - 10μ A	
	Capacitance (at 10 kHz)	Approximately 1.0 pF (between open contacts, adjacent contacts ) Approximately 1.0 pF (between coil and contacts)	
Coil	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)	
	Operating Humidity	45 to 85%RH	
Time Value	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
		adjacent contacts	1 minute
		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 x 10 <sup>8</sup> operations minimum
	Electrical (at contact rating)	DC	2 × 10 <sup>5</sup> operations minimum
		AC	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±1 ms)
		Endurance	1,000 m/s <sup>2</sup> ( 6 ±1 ms)
	Weight	Approx. 1.9 g	

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

\*2 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*1	Must operate voltage*1	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			0.2 W	0.112 W	30 deg

\*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*1	Must release voltage*1	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			0.25 W	0.14 W	33 deg

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

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

### 3. HIGH SENSITIVITY TYPE

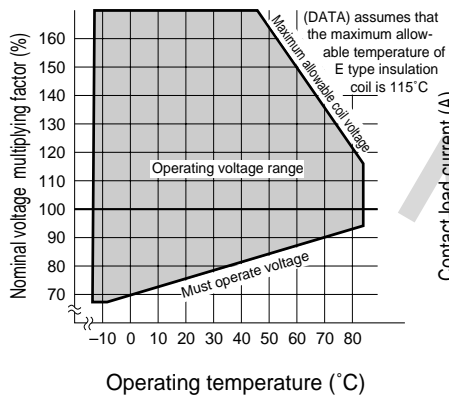
MODEL		Nominal voltage	Coil resistance ( $\pm 10\%$ )	Must operate voltage*1	Must release voltage*1	Nominal power	Operate power	Coil temperature rise
Standard	-P type							
FBR12HD03	FBR12HD03-P	3 VDC	180 $\Omega$	80% max. of nominal voltage	10% min. of nominal voltage	Approx. 0.05 W (at nominal voltage)	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.

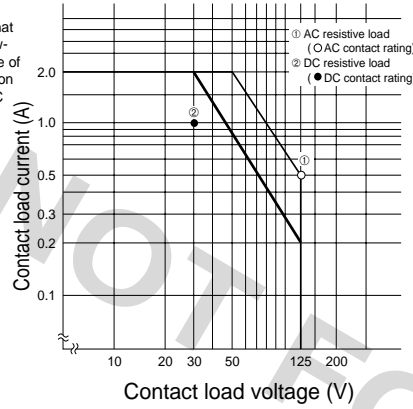
Note: All values in the table are measured at 20°C.

## CHARACTERISTIC DATA

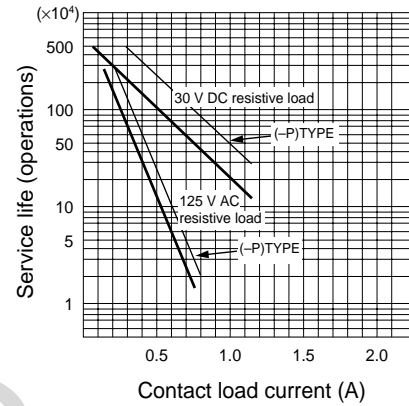
Range of operation temperature and voltage



Maximum switching capacity

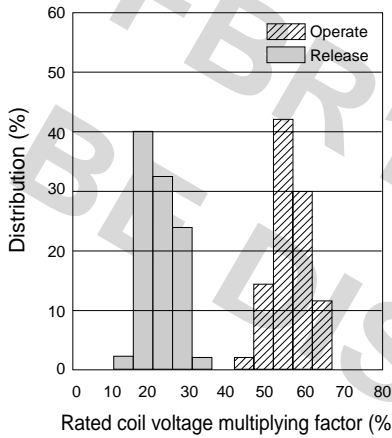


Life curve

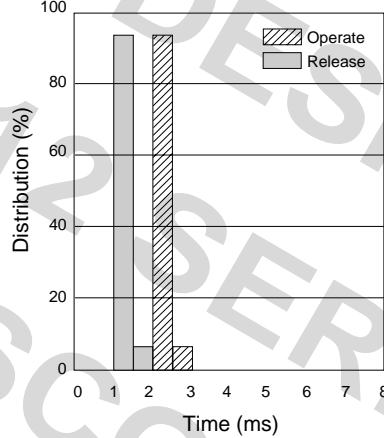


## REFERENCE DATA

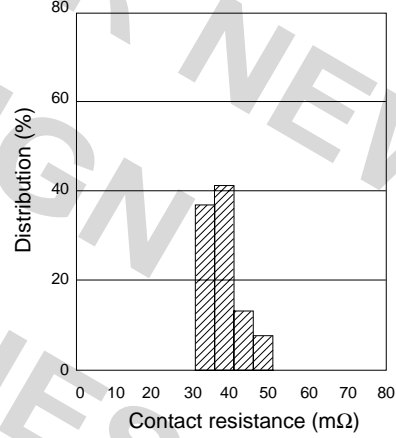
Distribution of operate and release voltage



Distribution of operate and release time

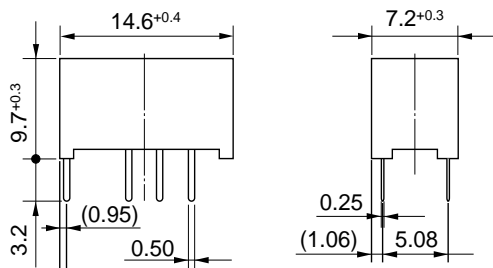


Distribution of contact resistance

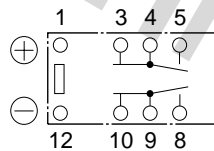


## DIMENSIONS

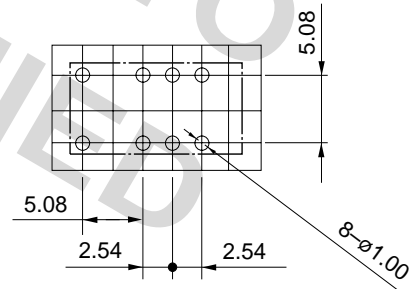
●Dimensions



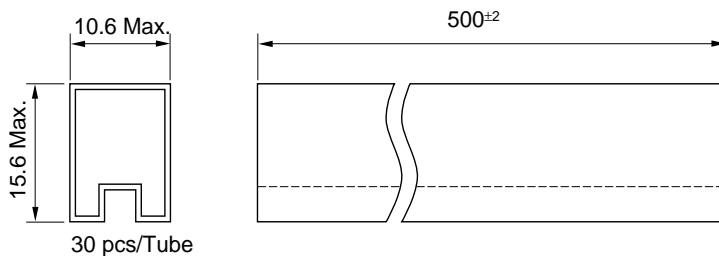
●Schematic (BOTTOM VIEW)



●PC board mounting hole layout (BOTTOM VIEW)



●Tube carrier



Unit: mm

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FBR12 DESIGN FOR NEW  
SERIES TO  
BE DISCONTINUED

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