

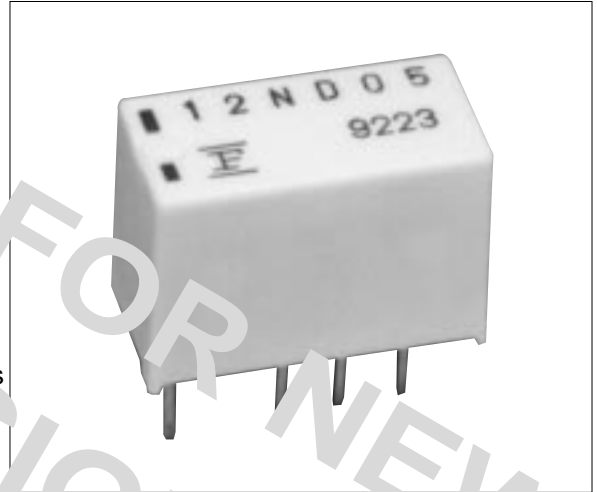
# MINIATURE RELAY

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

### FBR12 SERIES

#### ■ FEATURES

- Super miniature size: 0.2 inch × 0.1 inch and, 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-001089 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>6</sup> surge wave)
  - 2000 Vrms dielectric strength between coil and contacts
  - UL 1950 and IEC950 (approval in process)



#### ■ ORDERING INFORMATION

[Example] FBR 12 D 05 -P -\*\* (-C A)  
 (a) (b) (c) (d) (e) (f) (g)

(a)	Series Name	FBR12 : FBR12 Series
(b)	Enclosure & Coil Power	W : Standard (plastic sealed type) N : High dielectric strength type (plastic sealed type) D : High sensitivity type
(c)	Coil Type	D : D-Coil
(d)	Nominal Voltage	Refer to the COIL DATA CHART
(e)	Contact Material	Nil : Gold-overlay silver-plated A : Gold-overlay silver-plated
(f)	Custom Designation	To be assigned custom specification
(g)	CSA Standard	-CSA : UL1950 + CSA recognized -CSA : UL1950 + CSA (under application)

Note: The designation characters stamped on the top of the relay case as follows:  
 (Example) Designation: order #: FBR12ND05  
 Stamp: 12ND05

#### ■ SAFETY STANDARD AND FILE NUMBERS

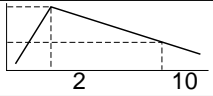
UL508, 1950, 114 (File No. E63615)

C22.2 No. 0, No. 14 (File No. LR40304 or LR40204)

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		
		adjacent contacts	1,000 VAC 1 minimum	750	
		between coil and contacts	1,500 VAC 1 min.	2,000 VAC 1 min.	1,500 VAC 1 min.
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
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 × 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 <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			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 <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			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

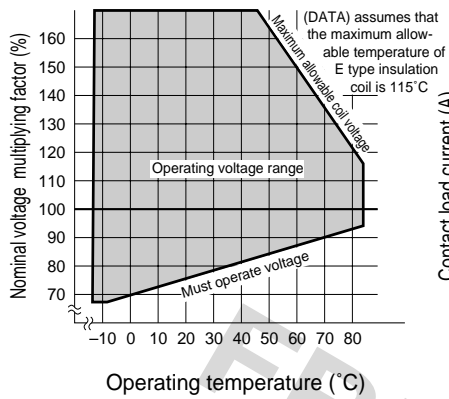
MODEL		Nominal voltage	Coil resistance ( $\pm 10\%$ )	Must operate voltage <sup>*1</sup>	Must release voltage <sup>*1</sup>	Nominal power	Operate power	Coil temperature rise
Standard	-P type							
FBR12HD03	FBR12HD03-P	3 VDC	180 $\Omega$	80% max. of nominal voltage	10% min. of nominal voltage	Approx.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

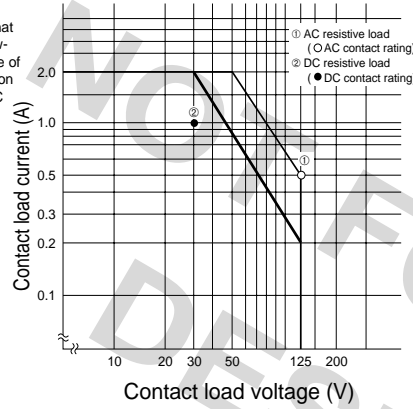
Note: All values in the table are measured at 20°C.

## CHARACTERISTIC DATA

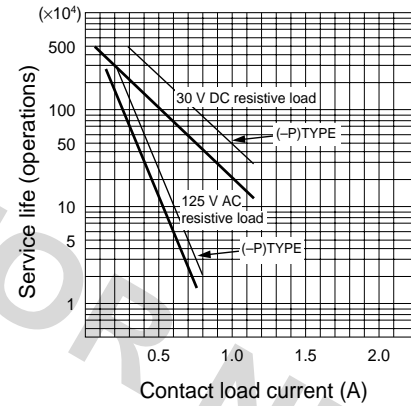
Range of operation temperature and voltage



Maximum switching capacity

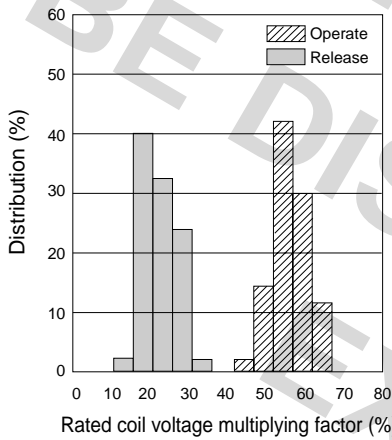


Life curve

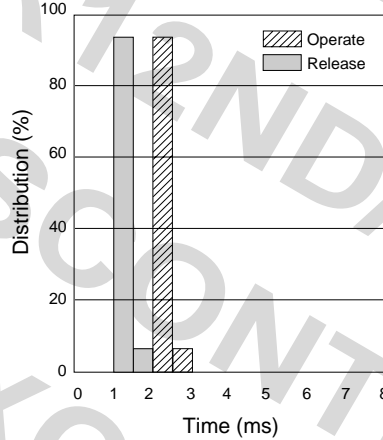


## REFERENCE DATA

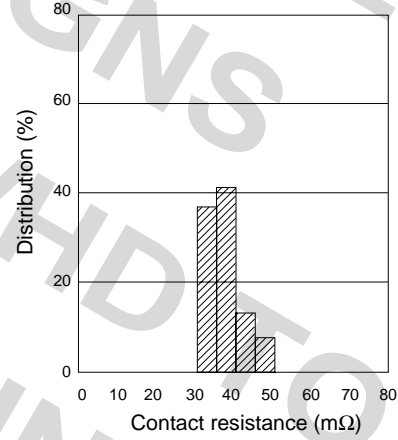
Distribution of operate and release voltage



Distribution of operate and release time

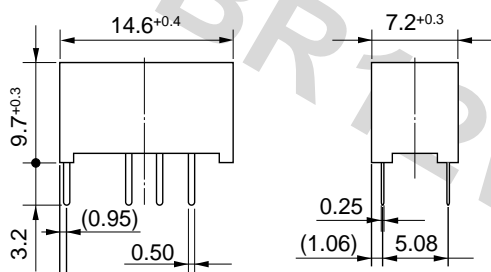


Distribution of contact resistance

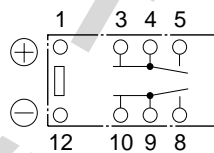


## DIMENSIONS

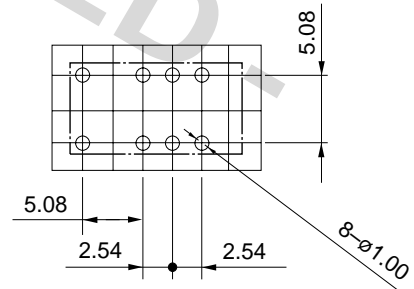
●Dimensions



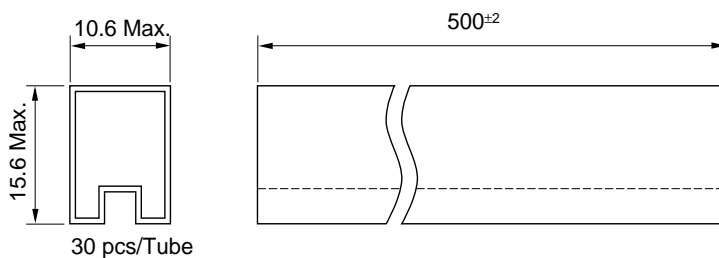
●Schematic (BOTTOM VIEW)



●PC board mounting hole layout (BOTTOM VIEW)



●Tube carrier



Unit: mm

30 pcs/Tube

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FBR12ND/HD TO  
BE DISCONTINUED -  
EXCEPT  
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