

# MINIATURE RELAY

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

### FBR211 SERIES

RoHS compliant



#### ■ FEATURES

- 2 A maximum carrying current  
Capable of 2 A maximum continuous carrying current in the contact
- Superior reliability gold-overlay contacts  
P type: Gold-overlay silver-palladium contacts
- International terminal pitch of one inch grid terminal layout
- High sensitivity, low power dissipation types also available  
Standard types: 0.45 W (A or B type)  
High sensitivity types: 0.2 W (C or E type)
- Conforms to FCC 68.302 (high dielectric strength type)
- UL recognized (File number E63615)
- CSA recognized (File number LR64026)
- RoHS compliant since date code: 0433A  
Please see page 5 for more information



#### ■ ORDERING INFORMATION

[Example]  $\frac{\text{FBR211}}{\text{(a)}} \frac{\text{S}}{\text{(b)}} \frac{\text{A}}{\text{(c)}} \frac{\text{D012}}{\text{(d)}} \frac{\text{U}}{\text{(e)}} - \frac{\text{P}}{\text{(f)}} \frac{\text{2}}{\text{(g)}} \frac{\text{(-CSA)}}{\text{(h)}}$

(a)	Series Name	FBR211
(b)	Enclosure	S: Flux free type N: Plastic sealed type
(c)	Coil Power and Schematics	A: Standard A type } (nominal power 450 mW type) B: Standard B type } C: High sensitivity C type } (nominal power 200 mW type) E: High sensitivity E type }
(d)	Nominal Voltage	(Example) D003: 3 VDC D012: 12 VDC (refer to the COIL DATA CHART)
(e)	UL Marking on Cover	Nil : No UL marking U : UL marking
(f)	Contact Material	P : Gold-overlay silver-palladium M : Gold-overlay silver
(g)	Special Type	Nil : Standard 2 : High dielectric strength type
(h)	CSA Marking	Nil : Standard -CSA : UL + CSA marking (valid when (e) is U)

Note: The designation name is stamped on the top of the relay case as follows:  
(Example) Designation ordered: FBR211SAD005-P  
Stamp: 211SAD005-P

# FBR211 SERIES

## ■ COIL DATA CHART

### 1. STANDARD (A or B type)

MODEL				Nominal voltage	Coil resistance ( $\pm 10\%$ )	Nominal current (at nominal voltage) approx.	Must operate voltage	Must release voltage	Maximum allowable voltage	Nominal power	Coil temperature rise
A type		B type									
Flux free	Plastic sealed	Flux free	Plastic sealed								
FBR211SAD001-n	FBR211NAD001-n	FBR211SBD001-n	FBR211NBD001-n	1.5 VDC	5 $\Omega$	300 mA	70% max. of nominal voltage	10% min. of nominal voltage	150% of nominal voltage	Approx. 450 mW (at nominal voltage)	Approx. 45 deg (at nominal voltage)
FBR211SAD003-n	FBR211NAD003-n	FBR211SBD003-n	FBR211NBD003-n	3 VDC	20 $\Omega$	150 mA					
FBR211SAD005-n	FBR211NAD005-n	FBR211SBD005-n	FBR211NBD005-n	5 VDC	56 $\Omega$	89 mA					
FBR211SAD006-n	FBR211NAD006-n	FBR211SBD006-n	FBR211NBD006-n	6 VDC	80 $\Omega$	75 mA					
FBR211SAD009-n	FBR211NAD009-n	FBR211SBD009-n	FBR211NBD009-n	9 VDC	180 $\Omega$	50 mA					
FBR211SAD012-n	FBR211NAD012-n	FBR211SBD012-n	FBR211NBD012-n	12 VDC	320 $\Omega$	38 mA					
FBR211SAD024-n	FBR211NAD024-n	FBR211SBD024-n	FBR211NBD024-n	24 VDC	1,280 $\Omega$	19 mA					

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

### 2. HIGH SENSITIVITY (C or E type)

MODEL				Nominal voltage	Coil resistance ( $\pm 10\%$ )	Nominal current (at nominal voltage) approx.	Must operate voltage	Must release voltage	Maximum allowable voltage	Nominal power	Coil temperature rise
C type		E type									
Flux free	Plastic sealed	Flux free	Plastic sealed								
FBR211SCD001-n	FBR211NCD001-n	FBR211SED001-n	FBR211NED001-n	1.5 VDC	12 $\Omega$	125 mA	70% max. of nominal voltage	10% min. of nominal voltage	225% of nominal voltage	Approx. 200 mW (at nominal voltage)	Approx. 25 deg (at nominal voltage)
FBR211SCD003-n	FBR211NCD003-n	FBR211SED003-n	FBR211NED003-n	3 VDC	45 $\Omega$	67 mA					
FBR211SCD005-n	FBR211NCD005-n	FBR211SED005-n	FBR211NED005-n	5 VDC	120 $\Omega$	42 mA					
FBR211SCD006-n	FBR211NCD006-n	FBR211SED006-n	FBR211NED006-n	6 VDC	180 $\Omega$	33 mA					
FBR211SCD009-n	FBR211NCD009-n	FBR211SED009-n	FBR211NED009-n	9 VDC	400 $\Omega$	23 mA					
FBR211SCD012-n	FBR211NCD012-n	FBR211SED012-n	FBR211NED012-n	12 VDC	700 $\Omega$	17 mA					
FBR211SCD024-n	FBR211NCD024-n	FBR211SED024-n	FBR211NED024-n	24 VDC	2,800 $\Omega$	9 mA					

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

# FBR211 SERIES

## ■ SPECIFICATIONS

Item		Standard (A or B type)	High sensitive (C or E type)	
Contact	Arrangement	1 form C (SPDT)		
	Material	Gold-overlay silver-palladium / gold-overlay silver		
	Resistance (initial)	Maximum 100 mΩ (at 0.1 A 6 VDC)		
	Rating (resistive)	0.5 A 120 VAC or 1 A 28 VDC		
	Maximum Carrying Current	2 A		
	Maximum Switching Power	60 VA or 28 W		
	Max. Switching Voltage* <sup>1</sup>	220 VAC or 150 VDC		
	Maximum Switching Current	1.25 A (AC) or 2 A (DC)		
	Minimum Switching load* <sup>2</sup> (reference)	Plastic sealed 1 mA, 1V Flux free 1 mA, 5V		
Coil	Nominal Power (at 20°C)	Approximately 450 mW	Approximately 200 mW	
	Operate Power (at 20°C)	Approximately 315 mW maximum	Approximately 140 mW maximum	
	Operating Temperature	-25°C to +55°C (no frost)	-25°C to +75°C (no frost)	
	Operating Humidity	45 to 85%RH		
Time Value	Operate (at nominal voltage)	Maximum 5 ms		
	Release (at nominal voltage)	Maximum 5 ms		
Life	Mechanical	5 × 10 <sup>6</sup> operations minimum		
	Electrical (Refer to the REFERENCE DATA)	3 × 10 <sup>5</sup> operations minimum (at 1 A/ 28 VDC resistive load) 1 × 10 <sup>5</sup> operations minimum (at 2 A/ 12 VDC resistive load) 1 × 10 <sup>5</sup> operations minimum (at 0.5 A/120 VDC resistive load)		
Other	Vibration Resistance	10 to 55 Hz (double amplitude of 1.5 mm)		
	Shock Resistance	Misoperation	100 m/s <sup>2</sup> (11± <sup>1</sup> ms)	60 m/s <sup>2</sup> (11± <sup>1</sup> ms)
		Endurance	1,000 m/s <sup>2</sup> (11± <sup>1</sup> ms)	
	Weight	Approximately 4 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.

## ■ INSULATION

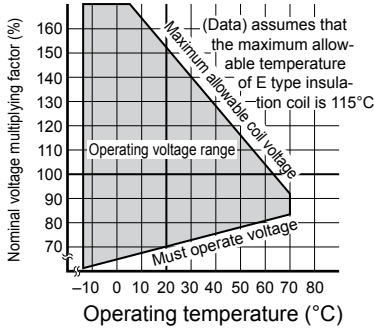
Item	Standard (A or B)	High sensitive (C or E)
Isolation (initial)	Minimum 100 MΩ (at 500VDC)	
Dielectric Strength	500VAC 1 min. (standard) 1,500VAC 1 min. (high isolation coil and contact)	

## ■ SAFETY STANDARDS

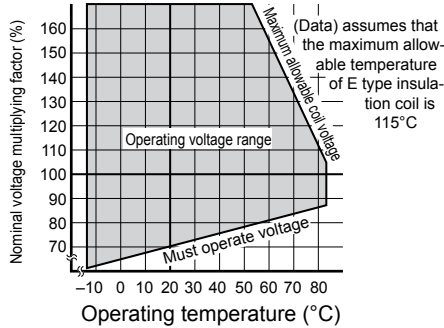
Type	Compliance	Contact rating
UL	UL 110 E63615	Flammability: UL 94-V0 (plastics) 0.5A, 120VAC (resistive) 1A, 28VDC (resistive)
CSA	C22.2 No. 14 LR 40304, LR 46016	

## CHARACTERISTIC DATA

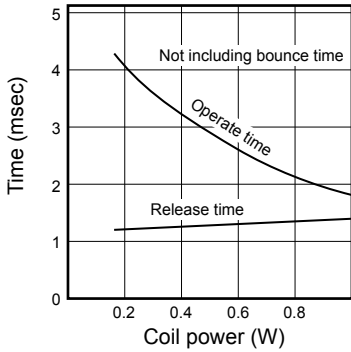
Range of operation temperature and voltage  
(Standard 0.45 W type)



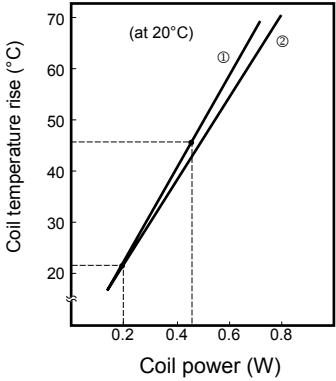
Range of operation temperature and voltage  
(high sensitive 0.2 W type)



Operate and release time data

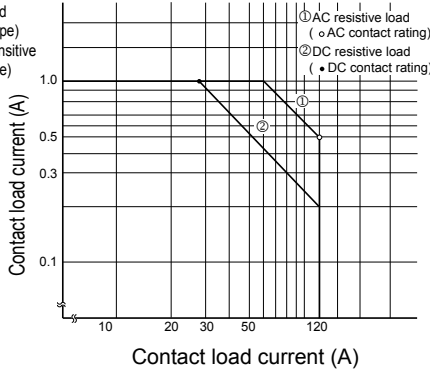


Coil temperature rise data



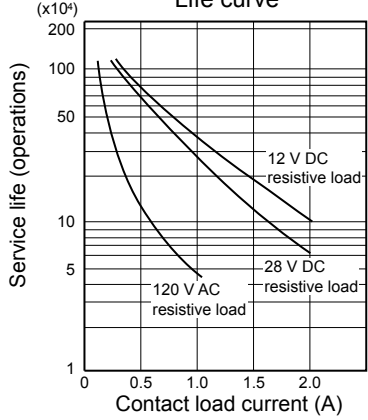
① Standard (0.45 W type)  
② High sensitive (0.2 W type)

Maximum switching capacity



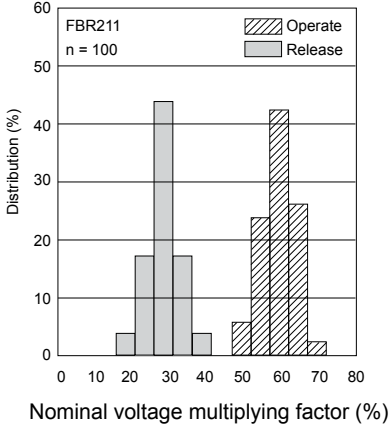
○ AC resistive load (○ AC contact rating)  
● DC resistive load (● DC contact rating)

Life curve

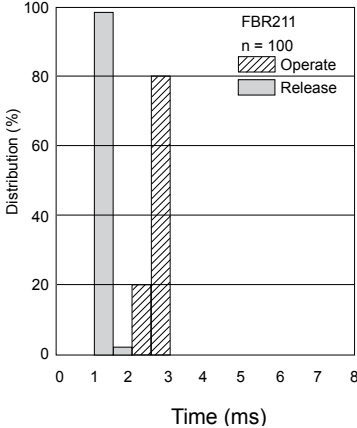


## REFERENCE DATA

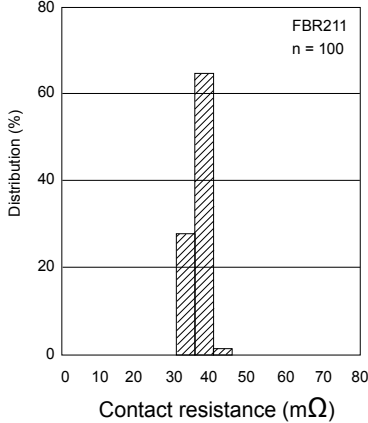
Distribution of operate and release voltage



Distribution of operate and release time



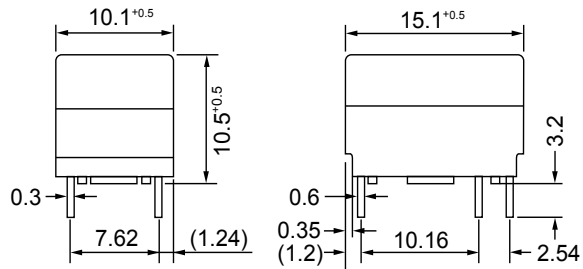
Distribution of contact resistance



## ■ DIMENSIONS

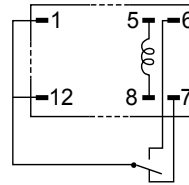
### 1. STANDARD (Flux free type)

#### ●Dimensions

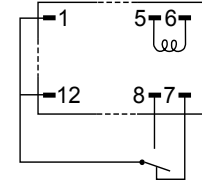


#### ●Schematics (BOTTOM VIEW)

(A type or C type)

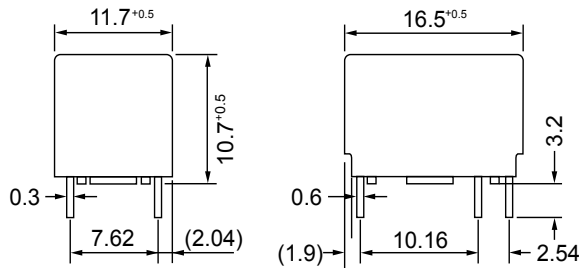


(B type or E type)



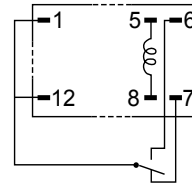
### 2. N-TYPE (Plastic sealed type)

#### ●Dimensions

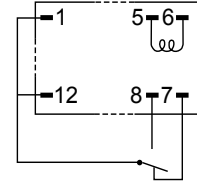


#### ●Schematics (BOTTOM VIEW)

(A type or C type)

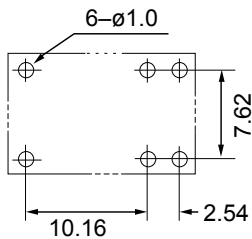


(B type or E type)



### 3. PC BOARD MOUNTING HOLE LAYOUT

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



Unit: mm

## RoHS Compliance and Lead Free Relay Information

### 1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- "LF" is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
- We will ship leaded relays as long as the leaded relay inventory exists.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

### 2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

#### Reflow Solder condition

**Flow Solder condition:**

Pre-heating: maximum 120°C  
Soldering: dip within 5 sec. at  
260°C solder bath

**Solder by Soldering Iron:**

Soldering Iron  
Temperature: maximum 360°C  
Duration: maximum 3 sec.

**We highly recommend that you confirm your actual solder conditions**

### 3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays.

### 4. Tin Whisker

- Dipped SnAgCu solder is known as low risk tin whisker. No considerable length whisker was found by our in house test.

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