

# 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 0.45 W type) B: Standard B type } C: High sensitivity C type } (nominal power 0.2 W type) E: High sensitivity E type }
(d)	Nominal Voltage	(Example) D003: 3 VDC D012: 12 VDC (refer to the COIL DATA CHART)
(e)	UL Standard	Nil : Standard U : UL114 recognized
(f)	Contact Material	P : Gold-overlay silver-palladium M : Gold-overlay silver
(g)	Special Type	Nil : Standard 2 : High dielectric strength type
(h)	CSA Standard	Nil : Standard -CSA : UL114 + CSA recognized (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

## ■ SAFETY STANDARD AND FILE NUMBERS

UL114 (File No. E63615)

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

Nominal voltage	Contact rating
1.5 to 24 VDC	1 A 28 VDC resistive 0.5 A 30 VAC resistive

## ■ SPECIFICATIONS

Item		Standard (A or B type)	High sensitive (C or E type)	
Contact	Arrangement	1 form C (SPDT)		
	Material	Gold-overlay silver-palladium or 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 1 Flux free 1 mA 5		
Coil	Nominal Power (at 20°C)	Approximately 0.45 W	Approximately 0.2 W	
	Operate Power (at 20°C)	Approximately 0.315 W maximum	Approximately 0.14 W 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		
Insulation	Resistance (initial)	Minimum 100 MΩ (at 500 VDC)		
	Dielectric Strength	between coil and contacts	500 VAC 1 minute (standard) 1,000 VAC 1 minute (high dielectric strength type)	
		between open contacts	500 VAC 1 minute	
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±1 ms)	60 m/s <sup>2</sup> (11±1 ms)
		Endurance	1,000 m/s <sup>2</sup> (11±1 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.

# 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-□	FBR211NAD001-□	FBR211SBD001-□	FBR211NBD001-□	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-□	FBR211NAD003-□	FBR211SBD003-□	FBR211NBD003-□	3 VDC	20 $\Omega$	150 mA					
FBR211SAD005-□	FBR211NAD005-□	FBR211SBD005-□	FBR211NBD005-□	5 VDC	56 $\Omega$	89 mA					
FBR211SAD006-□	FBR211NAD006-□	FBR211SBD006-□	FBR211NBD006-□	6 VDC	80 $\Omega$	75 mA					
FBR211SAD009-□	FBR211NAD009-□	FBR211SBD009-□	FBR211NBD009-□	9 VDC	180 $\Omega$	50 mA					
FBR211SAD012-□	FBR211NAD012-□	FBR211SBD012-□	FBR211NBD012-□	12 VDC	320 $\Omega$	38 mA					
FBR211SAD024-□	FBR211NAD024-□	FBR211SBD024-□	FBR211NBD024-□	24 VDC	1,280 $\Omega$	19 mA					

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

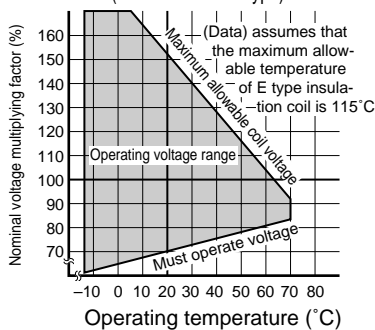
### 2. HIGH SENSITIVITY (C or E type)

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-□	FBR211NCD001-□	FBR211SED001-□	FBR211NED001-□	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-□	FBR211NCD003-□	FBR211SED003-□	FBR211NED003-□	3 VDC	45 $\Omega$	67 mA					
FBR211SCD005-□	FBR211NCD005-□	FBR211SED005-□	FBR211NED005-□	5 VDC	120 $\Omega$	42 mA					
FBR211SCD006-□	FBR211NCD006-□	FBR211SED006-□	FBR211NED006-□	6 VDC	180 $\Omega$	33 mA					
FBR211SCD009-□	FBR211NCD009-□	FBR211SED009-□	FBR211NED009-□	9 VDC	400 $\Omega$	23 mA					
FBR211SCD012-□	FBR211NCD012-□	FBR211SED012-□	FBR211NED012-□	12 VDC	700 $\Omega$	17 mA					
FBR211SCD024-□	FBR211NCD024-□	FBR211SED024-□	FBR211NED024-□	24 VDC	2,800 $\Omega$	9 mA					

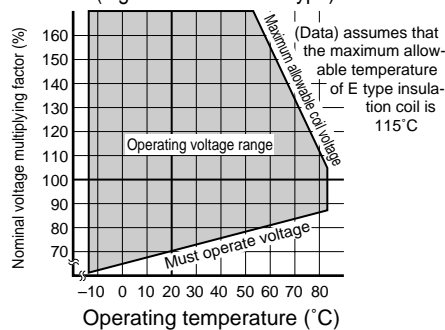
Note: All values in the table are measured at 20°C.

## CHARACTERISTIC DATA

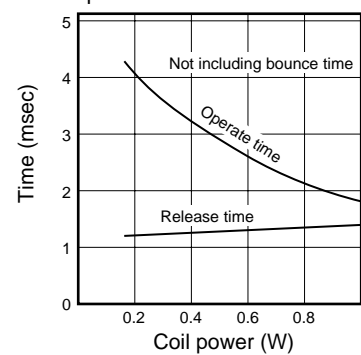
Range of operation temperature and voltage  
(Standard 0.45 W type)



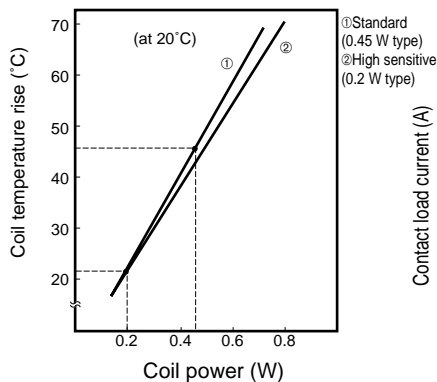
Range of operation temperature and voltage  
(high sensitive 0.2 W type)



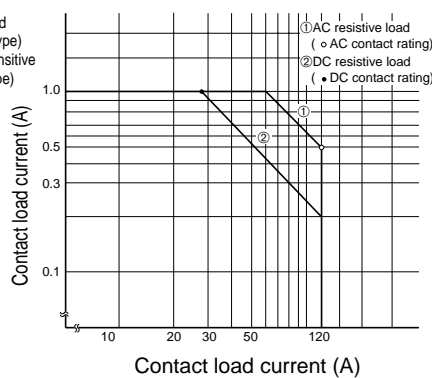
Operate and release time data



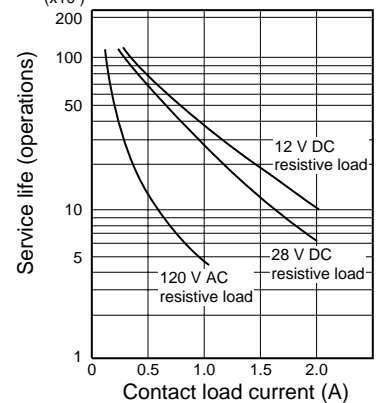
Coil temperature rise data



Maximum switching capacity



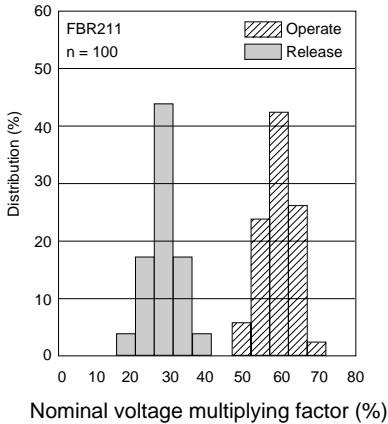
Life curve



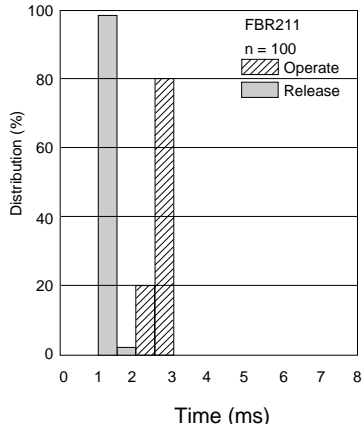
# FBR211 SERIES

## REFERENCE DATA

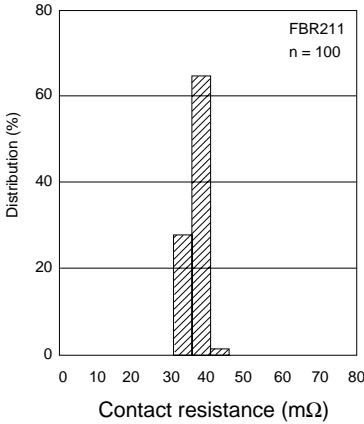
Distribution of operate and release voltage



Distribution of operate and release time



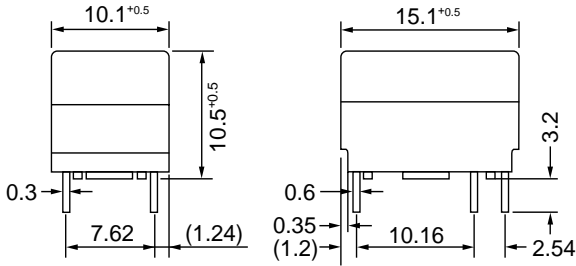
Distribution of contact resistance



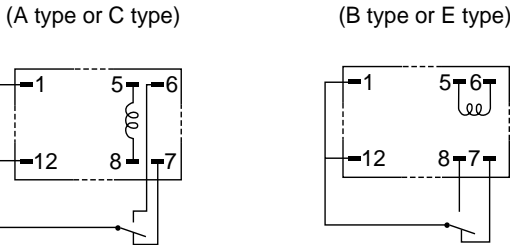
## DIMENSIONS

### 1. STANDARD (Flux free type)

●Dimensions

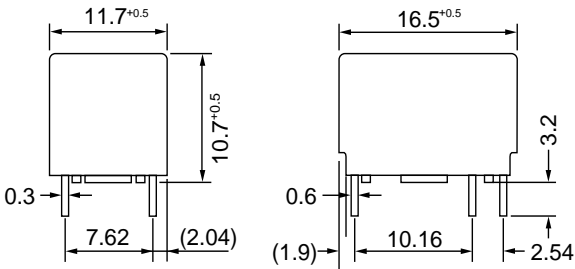


●Schematics (BOTTOM VIEW)

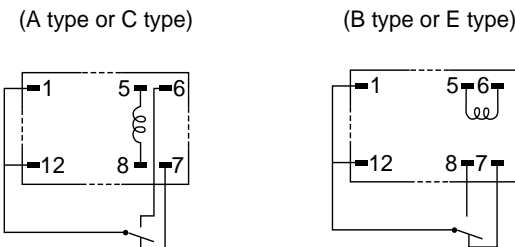


### 2. N-TYPE (Plastic sealed type)

●Dimensions

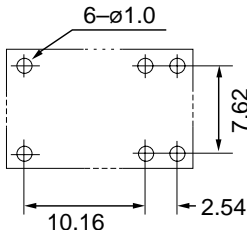


●Schematics (BOTTOM VIEW)



### 3. PC BOARD MOUNTING HOLE LAYOUT

●PC board mounting hole layout (BOTTOM VIEW)



Unit: mm

## RoHS Compliance and Lead Free Relay Information

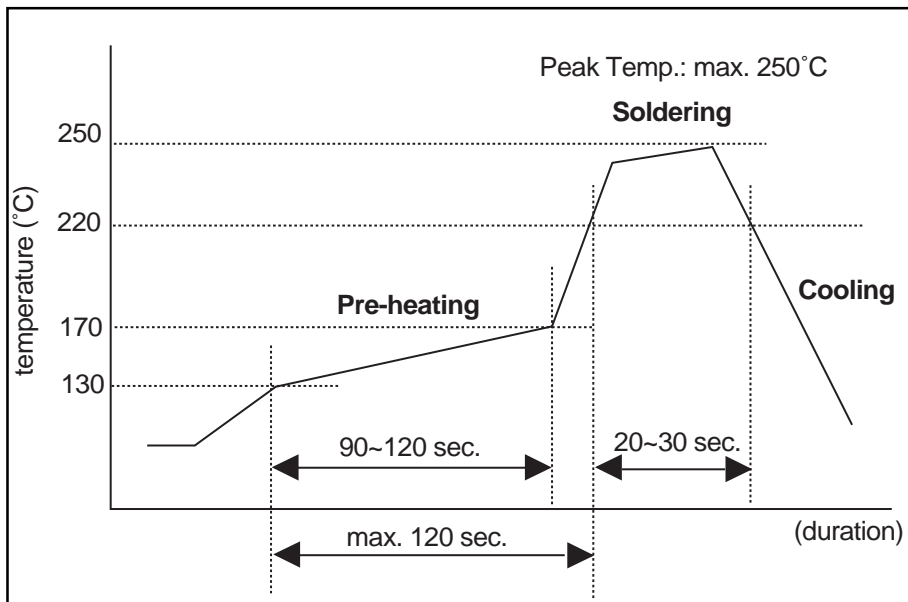
### 1. General Information

- 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.fcai.fujitsu.com/pdf/LeadFreeLetter.pdf>)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu. From February 2005 forward Sn-3.0Cu-Ni will be used for FTRB3 and FTR-B4 series relays.
- Most signal and some power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 6 hazardous materials that are restricted by RoHS directive (lead, mercury, cadmium, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in lead 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.

### 2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu and Sn-3.0 Cu-Ni (only FTR-B3 and FTR-B4 from February 2005)

#### 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

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

### 5. Solid State Relays

- Each lead terminal will be changed from solder plating to Sn plating and Nickel plating. A layer of Nickel plating is between the terminal and the Sn plating to avoid whisker.

## **Fujitsu Components International Headquarter Offices**

### **Japan**

Fujitsu Component Limited  
Gotanda-Chuo Building  
3-5, Higashigotanda 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@fceu.fujitsu.com](mailto:info@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) 6375-8560  
Fax: (65) 6273-3021  
Email: [fcal@fcal.fujitsu.com](mailto:fcal@fcal.fujitsu.com)  
[www.fcal.fujitsu.com](http://www.fcal.fujitsu.com)

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