

# MINIATURE RELAY

## 1 POLE—1 to 3 A (FOR AUTOMOTIVE APPLICATIONS)

### FBR211 SERIES

RoHS Compliant

#### ■ FEATURES

- Suitable for automotive applications of solenoid load controls, car audio, etc.
- Capable of 3 A/1 hour maximum carrying current in the contact.
- Superior reliability gold-overlay contact.  
P type: gold-overlay silver-palladium contacts.
- High sensitivity, high temperature types also available.  
Standard type: -30°C to +60°C (A or B type)  
High sensitivity type: -30°C to +80°C (C or E type)
- RoHS compliant since date code: 0433A  
Please see page 5 for more information



#### ■ ORDERING INFORMATION

[Example]  $\frac{\text{FBR211}}{\text{(a)}} \frac{\text{S}}{\text{(b)}} \frac{\text{A}}{\text{(c)}} \frac{\text{D012}}{\text{(d)}} - \frac{\text{P}}{\text{(e)}} \frac{\text{**}}{\text{(f)}}$

(a)	Series Name	FBR211: FBR211 Series
(b)	Enclosure	S : Flux free type N : Plastic sealed type
(c)	Coil Specification and Schematics	A : Standard A type } (coil nominal power 0.45 W type) B : Standard B type } C : High sensitivity C type } (coil nominal power 0.2 W type) E : High sensitivity E type }
(d)	Nominal Voltage	D009: 9 VDC D012: 12 VDC
(e)	Contact Material	P : Gold overlay silver palladium
(f)	Custom Designation	To be assigned custom specification

# FBR211 SERIES

## ■ SPECIFICATIONS

Item		Specifications	
Contact	Arrangement	1 form C (SPDT)	
	Material	Gold-overlay silver-palladium	
	Resistance	Maximum 100 mΩ (at 0.1 A 6 VDC)	
	Voltage Drop (Resistance)	Maximum 100 mV (at 2 A 12 VDC)	
	Rating	14 VDC 2 A (locked motor load) 14 VDC inrush 8 A (condenser, lamp load)	
	Maximum Carrying Current	2 A (continuously) , 3 A/1hour (25°C, 100% rated coil voltage)	
	Maximum Switching Current	2 A 16 VDC (reference)	
Coil	Operating Temperature	Standard type: -30°C to + 60°C High sensitive type: -30°C to + 80°C (no frost)	
	Time Value		
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	1 × 10 <sup>5</sup> operations minimum (14 VDC, maximum switching current, resistive load)	
Other	Vibration Resistance	10 to 55 Hz (double amplitude of 1.5 mm)	
	Shock Resistance	Misoperation	100 m/s <sup>2</sup>
		Endurance	1,000 m/s <sup>2</sup>
	Weight	Approximately 4 g	

# FBR211 SERIES

## COIL RATINGS

### 1. STANDARD Type

MODEL				Nominal voltage	Coil resistance ( $\pm 10\%$ )	Must operate voltage	Nominal power	Coil temperature rise	Thermal resistance
A type		B type							
Flux free type	Plastic sealed type	Flux free type	Plastic sealed type						
FBR211SAD009-P	FBR211NAD009-P	FBR211SBD009-P	FBR211NBD009-P	9 VDC	180 $\Omega$	6.3 V (20°C) 7.3 V (60°C)	Approx. 450 mW	Approx. 45 deg	100°C/W
FBR211SAD012-P	FBR211NAD012-P	FBR211SBD012-P	FBR211NBD012-P	12 VDC	320 $\Omega$	8.4 V (20°C) 9.7 V (60°C)			

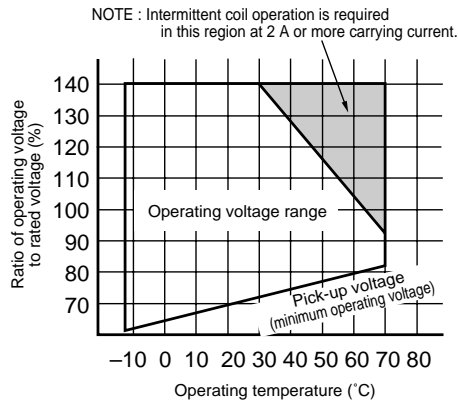
### 2. HIGH SENSITIVITY Type

MODEL				Nominal voltage	Coil resistance ( $\pm 10\%$ )	Must operate voltage	Nominal power	Coil temperature rise	Thermal resistance
C type		E type							
Flux free type	Plastic sealed type	Flux free type	Plastic sealed type						
FBR211SCD009-P	FBR211NCD009-P	FBR211SED009-P	FBR211NED009-P	9 VDC	400 $\Omega$	6.3 V (20°C) 7.3 V (60°C)	Approx. 200 mW	Approx. 25 deg	125°C/W
FBR211SCD012-P	FBR211NCD012-P	FBR211SED012-P	FBR211NED012-P	12 VDC	700 $\Omega$	8.4 V (20°C) 9.7 V (60°C)			

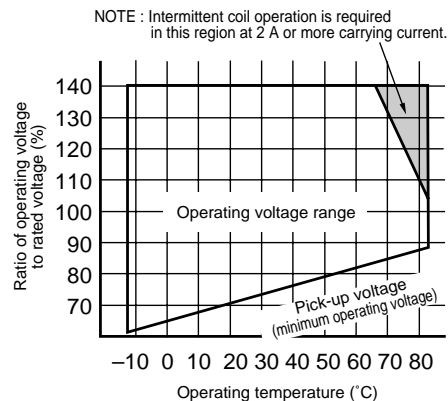
Note: All values in these tables are measured at 20°C.

## CHARACTERISTIC DATA

[Standard type (coil 0.45 W type)]

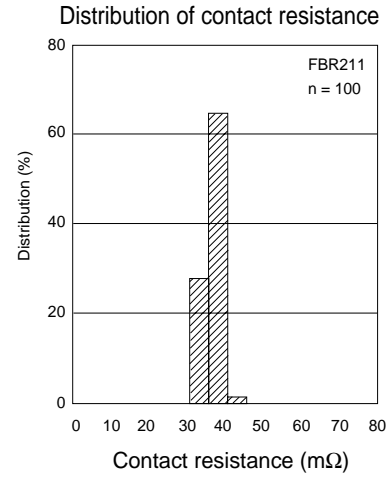
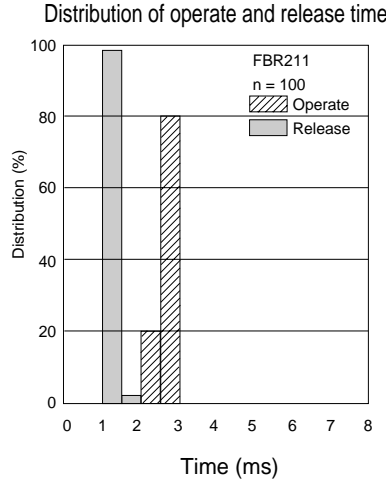
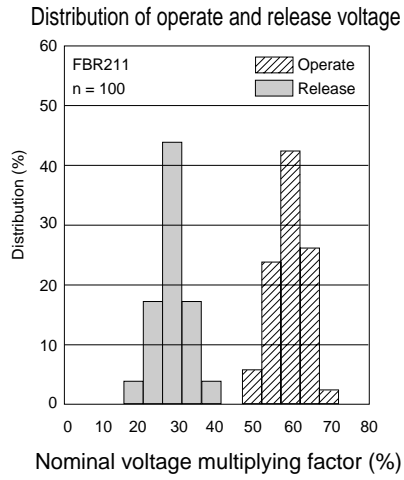


[High sensitivity type (coil 0.2 W type)]



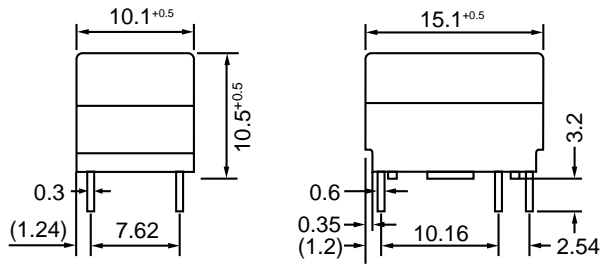
# FBR211 SERIES

## REFERENCE DATA

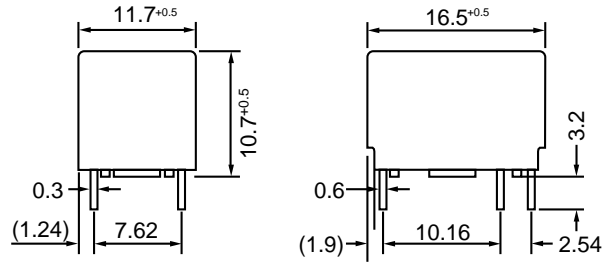


## DIMENSIONS

### Flux Free Type

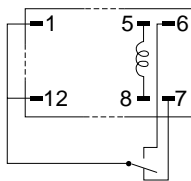


### Plastic Sealed Type

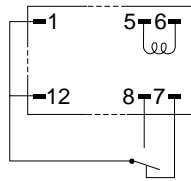


### Schematics (BOTTOM VIEW)

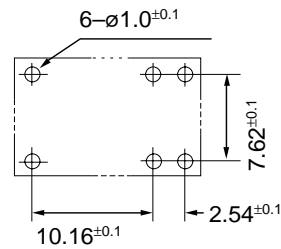
(A type, C type)



(B type, E type)



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



Unit: mm

## RoHS Compliance and Lead Free Relay Information

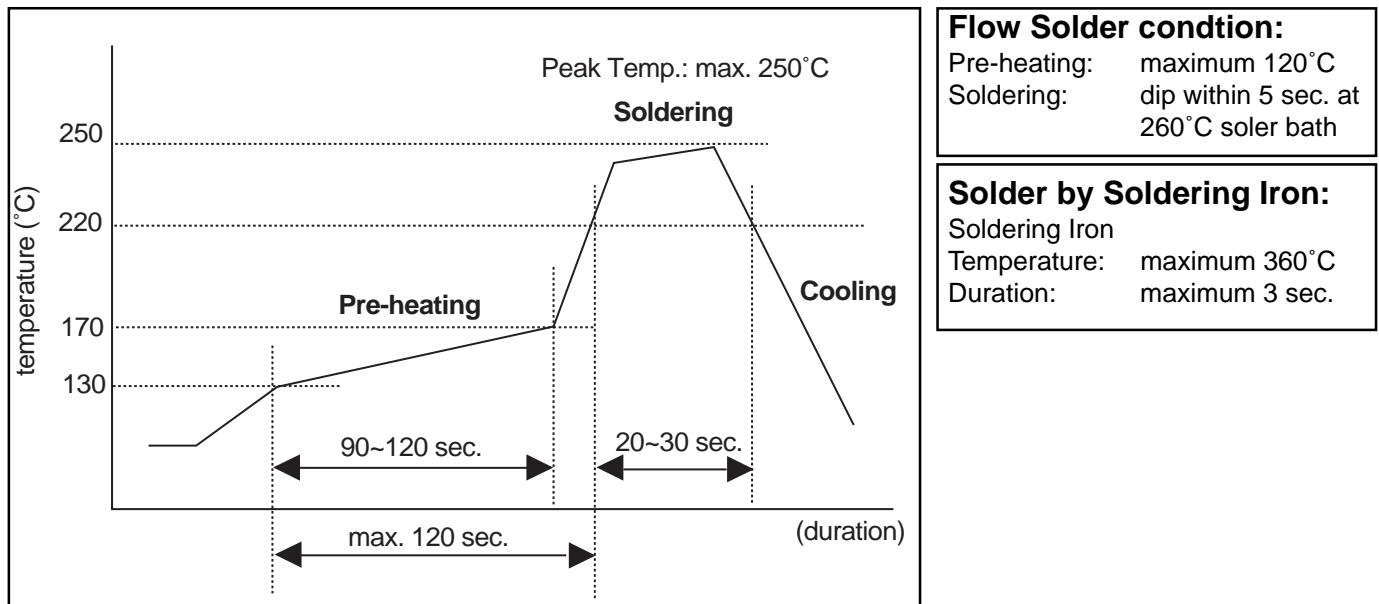
### 1. General Information

- 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



**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.

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