

# MINIATURE RELAY

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

### FBR211 SERIES

RoHS Compliant

#### FEATURES

Suitable for automotive applications of solenoid load control, 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: -50°C to +80°C (C or E type)

RoHS compliant since date code 43

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	Open time (at nominal voltage)	Maximum 5 ms	
	Release (at nominal voltage)	Maximum 5 ms	
Life	Mechanical	5 × 10 <sup>6</sup> operations minimum	
	Electrical	5 × 10 <sup>9</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)			

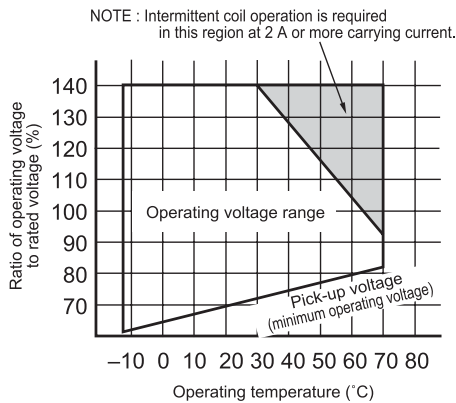
### 2. HIGH SENSITIVITY Type

MODEL				Nominal voltage	Coil resistance ( $\pm 10\%$ )	Must operate voltage	Nominal power	Coil temperature rise	Thermal resistance
D 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)			

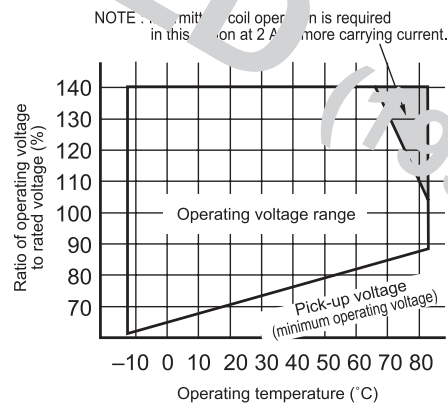
Note: All values in these tables are measured at 20°C.

## CHARACTERISTIC DATA

### [Standard type (coil 0.45 W type)]



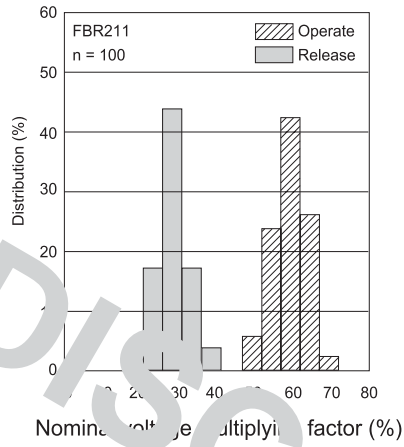
### [High sensitivity type (coil 0.2 W type)]



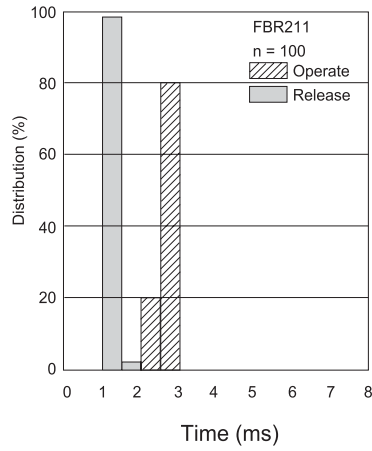
# FBR211 SERIES

## REFERENCE DATA

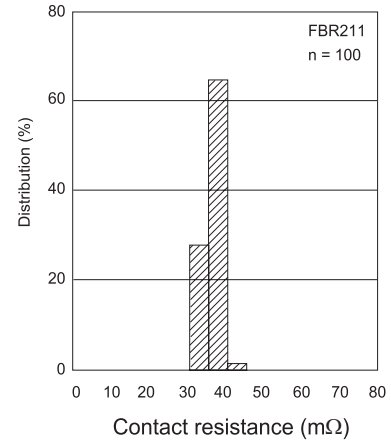
Distribution of operate and release voltage



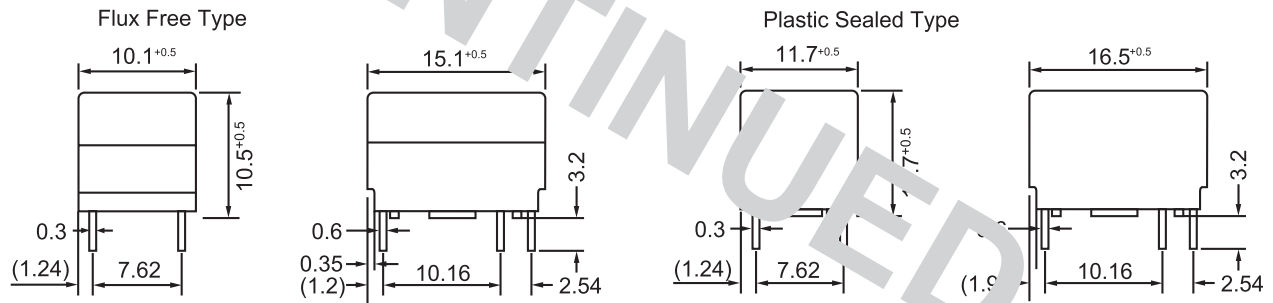
Distribution of operate and release time



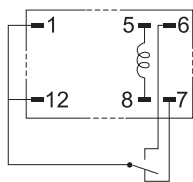
Distribution of contact resistance



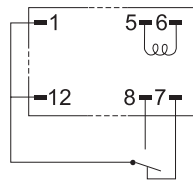
## DIMENSIONS



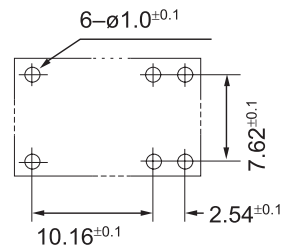
Schematics (BOTTOM VIEW)  
(A type, C type)



(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).

"Lead free" is marked on each outer and inner carton. (No marking on individual relays).

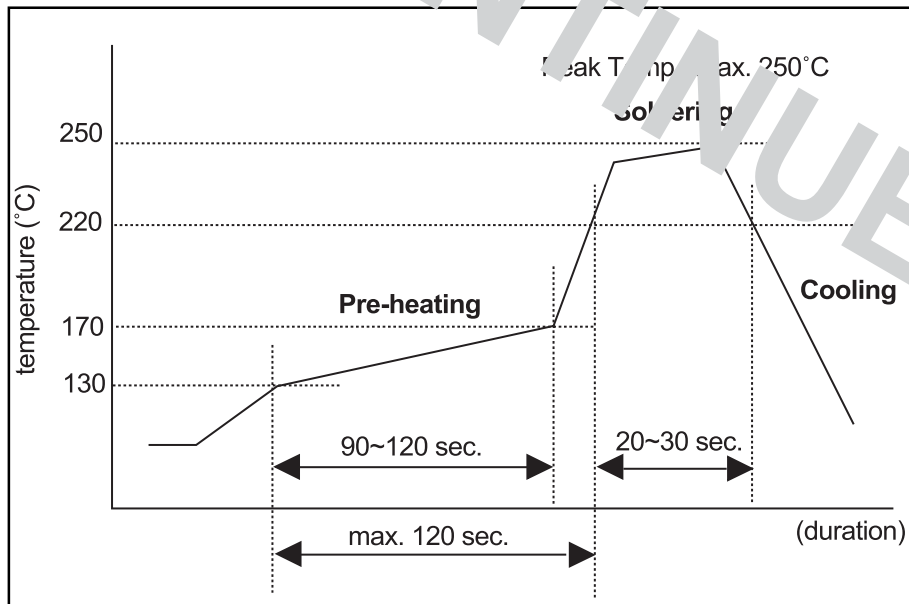
To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.

We wish to use 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.fci.fujitsu.com](http://www.fci.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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