MINIATURE RELAY

1 POLE— 1 to 2 A (FOR SIGNAL SWITCHING)
1 to 3 A (FOR AUTOMOTIVE SWITCHING)

FBR211 SERIES

■ FEATURES (FOR SIGNAL APPLICATIONS)

- 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: 0.45 W (A or B type) types also available
  High sensitivity: 0.2 W (C or E type) types also available
- Conforms to FCC 68.302 (high dielectric strength type)
- UL recognized (File number E63615)
- CSA recognized (File number LR64026)

■ FEATURES (FOR AUTOMOTIVE APPLICATIONS)

- Suitable for automotive applications of solenoid load controls, car audio, etc.
- Capable of 3 A/1 hour maximum carrying current in the contact.
- High sensitivity, high temperature types also available.
  Standard: –30°C to +60°C (A or B type) types also available
  High sensitivity: –30°C to +80°C (C or E type) types also available

■ ORDERING INFORMATION

[Example] FBR211 (a) S (b) A (c) D012 (d) U (e) – P (f) 2 (g) (–CSA) (h)

(a)	Series Name	FBR211
(b)	Enclosure	S: Flux free type N: Plastic sealed type
(c)	Coil Power and Schematics	A: Standard A type B: Standard B type } (nominal power 0.45 W type) C: High sensitivity C type E: High sensitivity E type } (nominal power 0.2 W 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 (Signal relay only)
(g)	Special Type	Nil : Standard 2 : High dielectric strength type (Signal relay only)
(h)	CSA Standard	Nil : Standard -CSA : UL114 + CSA recognized (e) is U (Signal relay only)

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

■ 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) / Maximum 100mV (@2A 12VDC)	
	Rating (resistive)		0.5 A 120 VAC 14VDC 2 A (locked motor load), or 1A 28 VDC 14 VDC 8A Inrush (condensor, lamp load)	
	Maximum Carrying Current		2 A, Automotive: 3A/1hr @ 100% rated coil volts @ 25˚C	
	Maximum Switching Power		60 VA or 28 W	
	Max. Switching Voltage*1		220 VAC or 150 VDC	
	Maximum Switching Current		1.25 A (AC) or 2 A (DC)	
	Minimum Switching load*2 (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) –30°C to +60°C (automotive application)	–25°C to +75°C (no frost) –30°C to +80°C (no frost) (auto motive application)
	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		5×10^6 operations minimum	
	Electrical (Refer to the REFERENCE DATA)		3×10^5 operations minimum (at 1 A/ 28 VDC resistive load) 1×10^5 operations minimum (at 2 A/ 14 VDC resistive load) 1×10^5 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^2 (11±1 ms)	60 m/s^2 (11±1 ms)
		Endurance	1,000 m/s^2 (11±1 ms)	
	Weight		Approximately 4 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.

■ COIL DATA CHART

1. STANDARD (A or B type)

MODEL				Nominal voltage	Coil resistance (±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 Ω	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 Ω	150 mA					
FBR211SAD005-□	FBR211NAD005-□	FBR211SBD005-□	FBR211NBD005-□	5 VDC	56 Ω	89 mA					
FBR211SAD006-□	FBR211NAD006-□	FBR211SBD006-□	FBR211NBD006-□	6 VDC	80 Ω	75 mA					
FBR211SAD009-□	FBR211NAD009-□	FBR211SBD009-□	FBR211NBD009-□	9 VDC	180 Ω	50 mA					
FBR211SAD012-□	FBR211NAD012-□	FBR211SBD012-□	FBR211NBD012-□	12 VDC	320 Ω	38 mA					
FBR211SAD024-□	FBR211NAD024-□	FBR211SBD024-□	FBR211NBD024-□	24 VDC	1,280 Ω	19 mA					

Note: All values in the table are measured at 20°C. Thermal resistance = 100˚C/W.

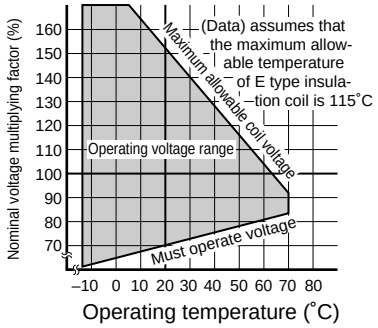
2. HIGH SENSITIVITY (C or E type)

MODEL				Nominal voltage	Coil resistance (±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 Ω	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 Ω	67 mA					
FBR211SCD005-□	FBR211NCD005-□	FBR211SED005-□	FBR211NED005-□	5 VDC	120 Ω	42 mA					
FBR211SCD006-□	FBR211NCD006-□	FBR211SED006-□	FBR211NED006-□	6 VDC	180 Ω	33 mA					
FBR211SCD009-□	FBR211NCD009-□	FBR211SED009-□	FBR211NED009-□	9 VDC	400 Ω	23 mA					
FBR211SCD012-□	FBR211NCD012-□	FBR211SED012-□	FBR211NED012-□	12 VDC	700 Ω	17 mA					
FBR211SCD024-□	FBR211NCD024-□	FBR211SED024-□	FBR211NED024-□	24 VDC	2,800 Ω	9 mA					

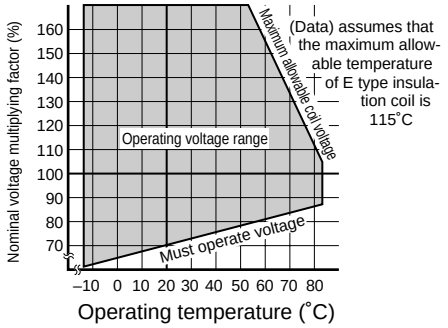
Note: All values in the table are measured at 20°C. Thermal resistance = 125˚C/W.

■ CHARACTERISTIC DATA

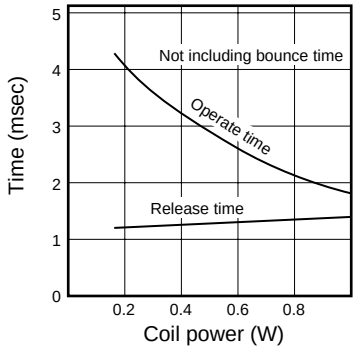
Range of operation temperature and voltage
(Standard 0.45 W type)



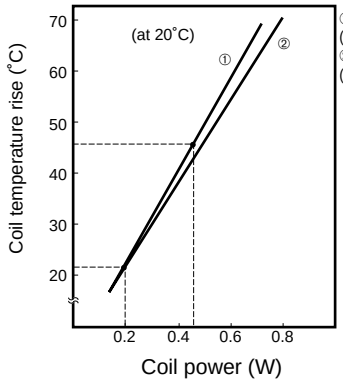
Range of operation temperature and voltage
(high sensitive 0.2 W type)



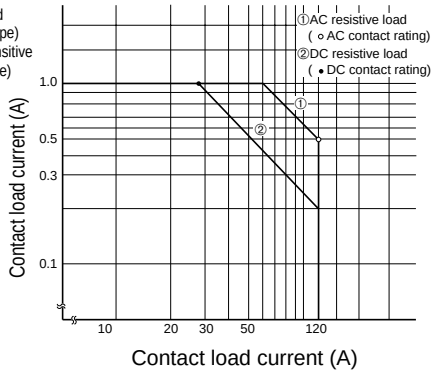
Operate and release time data



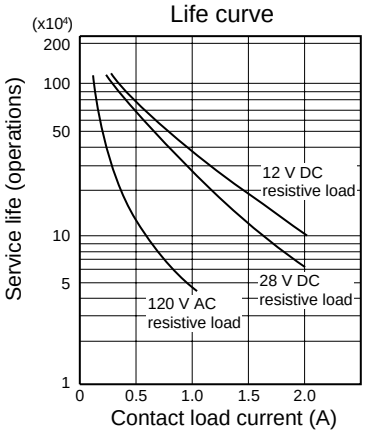
Coil temperature rise data



Maximum switching capacity

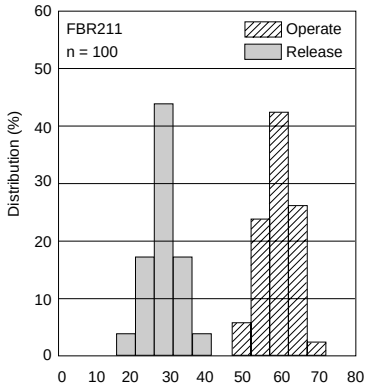


Life curve

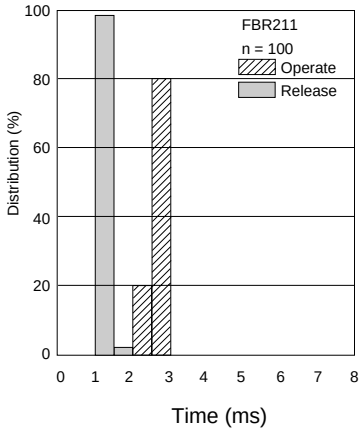


■ REFERENCE DATA

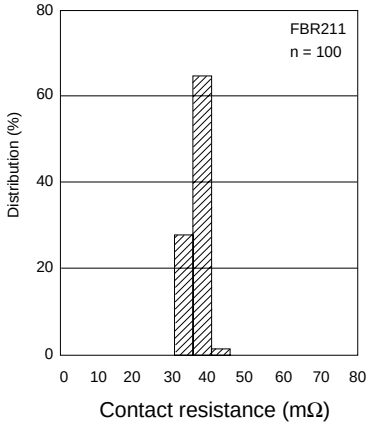
Distribution of operate and release voltage



Distribution of operate and release time



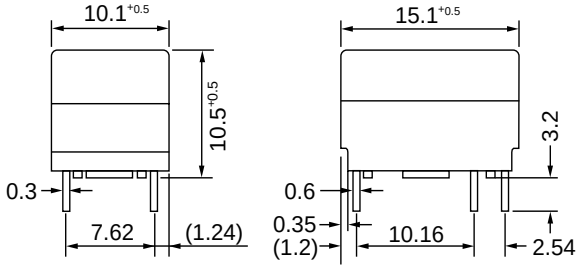
Distribution of contact resistance



■ DIMENSIONS

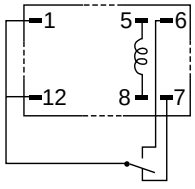
1. STANDARD (Flux free type)

●Dimensions

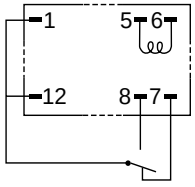


●Schematics (BOTTOM VIEW)

(A type or C type)

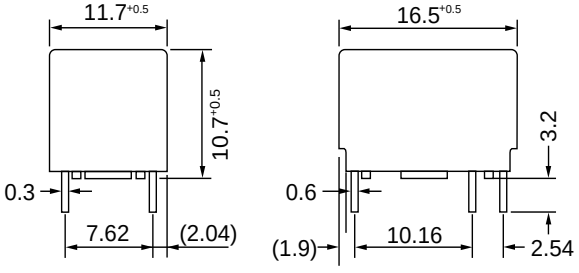


(B type or E type)



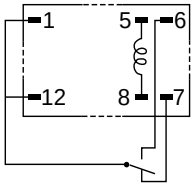
2. N-TYPE (Plastic sealed type)

●Dimensions

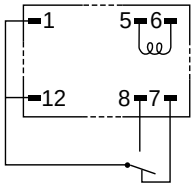


●Schematics (BOTTOM VIEW)

(A type or C type)

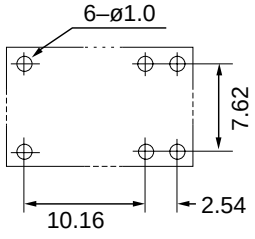


(B type or E type)



3. PC BOARD MOUNTING HOLE LAYOUT

●PC board mounting hole layout (BOTTOM VIEW)



Unit: mm

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