# MINIATURE RELAY

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

# **FBR46 SERIES**

#### **FEATURES**

#### Miniature size

About 5<sup>r</sup> smaller in volume compared with the FBR240 

• Hir surge Itag

2,5, 11/ Juny of surge strength (Bellcore standard), and 1,500 VAC minimu of di actrix strength between coil and contact (-15, -16 type).

- Low power col. um on 85 mW of operate pow (150 mW of nominal power consumption) by built-in pe nanen' agne
- Shipping tube package
- RoHS compliant since date cuile: Could A Please see page 7 for more informatior



**RoHS** compliant

### ORDERING INFORMATION

	FBR46	Ν	D	012	-P	-1	-C′
[Example]	(a)	(b)	(*)	(C)	(d)	(e)	( ), ( )

_	■ ORDERING INFORMATION [Example] $\frac{FBR46}{(a)}$ $\frac{N}{(b)}$ $\frac{D}{(*)}$ $\frac{012}{(c)}$ $\frac{-P}{(d)}$ $\frac{-1}{(e)}$ $\frac{-C'}{(i)}$						
(a)	Series Name	FBR46 : FBR46 Seri 3					
(b)	Enclosure	N : Plastic sealed					
(*)	Coil Type	D : Standard, -15, -16 (L Coil) G : 65% Operate type					
(c)	Nominal Voltage	(Example) Standard, -15, -16 type 005: 5 VDC 012: 12 VDC (refer to the COIL DATA CHART)					
(d)	Contact Material	–P : Gold-overlay silver-palladium					
(e)	Dielectric Strength	Nil: Between coil and contacts 1,000 VAC, between coit*.ctr 750 VAC-15: Between coil and contacts 1,500 VAC, between coilrows .50 VAC-16: Between coil and contacts 1,500 VAC, between controls 1 J00 VAC					
(f)	Safety Specification	Nil : Standard (UL114 recognized) -CSA : UL114 + CSA recognized					

Note: The designation name is stamped on the top of the relay case as follows: (Example) Designation ordered: FBR46ND012-P

Stamp: 46ND012-P

### COIL DATA CHART

1. STANDARD (D type)

MODEL	Nominal voltage	Coil resistance (±10%)	Nominal current (at nominal voltage) approx.	Must operate voltage*1	Must release voltage*1	Nominal power	Operate power	Coil temperature rise
FBR46ND^03-P	3 VDC	60 Ω	50 mA					
FBR46' JOL 7	5 VDC	167 Ω	30 mA	75% max.	5% min.	Approx.	Approx.	Approx.
FB' JNDOP >	6 VDC	240 Ω	25 mA	of nominal voltage	of nominal voltage	150 mW (at nominal	85 mW max.	25 deg (at nominal
FB6 '^'	9 V DC	540 Ω	17 mA	, energe	, energe	voltage		voltage)
FBR46ND01	VDC	960 Ω	13 mA					
FBR46ND024-F	2 /DC	ີ 880 Ω	8 mA			200 mW	112 mW	30 deg

\*1: Specified values are sject to pulse wave voltage. Note: All values in the tage are mound of at 20°C

### 2. 65% OPERATE TYPE (C ype)

MODEL	Nominal voltage	Cc. resistance (±10%)	Nr inst irrent ir nomi volts ar ix.	Must operate v '*age*1	Must release voltage* <sup>1</sup>	Nominal power	Operate power	Coil temperature rise
FBR46NG003-P	3 VDC	36 Ω	83 mA					
FBR46NG005-P	4.5 VDC	81 Ω	56 mA	E9/ 24		Approx	Approv	Approx
FBR46NG006-P	6 VDC	144 Ω	41 mA	ວ5% ກ of n ial	% min. ۱ nom`nal	Approx. 250 mW	Approx. 106 mW	Approx. 35 deg
FBR46NG009-P	9 VDC	324 Ω	27 mA	voitage	vol, je	(at nominal voltage	max.	(at nominal voltage)
FBR46NG012-P	12 VDC	576 Ω	20 mA			Voltage		vonage)
FBR46NG024-P	24 VDC	2,304 Ω	10 mA					

#### 3. HIGH DIELECTRIC STRENGTH TYPE (-15, -16 type)

FBR46NG024-P	24 VDC	2,304 Ω	10 mA						
*1: Specified values are subject to pulse wave voltage. Note: All values in the table are measured at 20°C									
3. HIGH DIELE	CTRIC STREN	IGTH TYPI	Ξ (-15, -16	type)					
MO	DEL	Nominal voltage	Coil resistance (±10%)	Nominal current (at nominal voltage)	Must operate voltage*1	Must release voltage*1	Nomi: al	c perate	Coil temperature rise
-15 type	-16 type	ge	(±10 /0)	approx.	voltage	voltage	P		1130
FBR46ND003-P-15	FBR46ND003-P-16	3 VDC	45 Ω	67 mA					
FBR46ND005-P-15	FBR46ND005-P-16	5 VDC	125 Ω	40 mA	75% max.	5% min.	Approx.	Approx.	Approx.
FBR46ND006-P-15	FBR46ND006-P-16	6 VDC	180 Ω	33 mA	of nominal	of nominal	200 mW (at nominal	112 mW max.	30 deg (at nominal
FBR46ND009-P-15	FBR46ND009-P-16	9 VDC	405 Ω	22 mA	voltage	voltage	voltage)		voltage)
FBR46ND012-P-15	FBR46ND012-P-16	12 VDC	720 Ω	17 mA					
FBR46ND024-P-15	FBR46ND024-P-16	24 VDC	2,304 Ω	10 mA			250 mW	140 mW	35 deg

\*1: Specified values are subject to pulse wave voltage.

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

### SPECIFICATIONS

Item			Standard	-65% operate	-15 type	-16 type			
Contact Arrangement and Style			2 form C (DPDT), bifurcated						
Material				Gold-overlay silve	r-palladium				
	Resistance (	initial)		Maximum 100 mΩ	2 (at 0.1 A 6 VDC)				
	Ratings (resi	istive)		0.5 A 120 VAC or	1 A 30 VDC				
	Maximum Ca	arrying Cu	rrent	1.25 A					
	laximum Sv	witching Po	ower	60 AV or 30 W					
	M <sup>-</sup> Switchi	ing Voltage	e*1	125 V					
	.axin n Sv	itching Cu	urrent	1 A					
	Minimu Sw	/itching loa	1d*2	0.01 mA 10 mVD0	C (reference)				
	Elec cat <sup>:</sup> (reference	Japacity		Approximately 2 pF (between coil and contacts) Approximately 1 pF (between open contacts)					
Coil	Nominal pc 'er (' _0°C)			150 to 200 mW	205 mW	200 to 250 mW			
	Operate power ( 20°C			5 to 112 mW	106 mW	112 to 114 mW			
	Operating Temperature			-3° _ to +70°C (no frost) (refer to the CHARACTERISTIC DATA)					
	Operating Humidity			<u>,5 to 8 ^                                 </u>					
Time Value	Operate (at r	nominal vo	ltage)	Max <sup>i</sup> n 5 m <sup>r</sup>					
	Release (at r	nominal vo	ltage)	Malimum F is					
Life	Mechanical			50 × 10 <sup>°</sup> peret or nini um					
	Electrical (re REFERENC	fer to the	DC	$2 \times 10^5$ open non <i>r</i> inur at contact rating)					
	REFERENC	E DATA)	AC	1 × 10 <sup>5</sup> operation, .nini .n (at _∩tact rating)					
Other	Vibration Re	sistance		10 to 55 Hz (double a, plitur' of 1 m)					
	Shock Resistance	Misopera	ition	500 m/s <sup>2</sup> (11 ± <sup>1</sup> ms)					
	Tresistance	Enduran	ce	1,000 m/s <sup>2</sup> (11 ± <sup>1</sup>	ms)				
	Weight			Approximately 2.5	g				

\*1 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 lean invironment. The env. minimum switching load varies with the switching frequency and operation environment.

### ■ INSULATION

Item	Standard	65% operate	-15 type	-16 type		
Resistance (initial) (500 VDC)	Minimum 1,000 MΩ	1 min.				
Dielectric Strength	open contacts 720VAC - 1 min. coil and contact adjacent contact 1,000 VAC -1min.		open contacts 750VAC coil and contact adjacent contact 1,500 VAC -1min.	open contacts 1,000VAC -1min. coil and contact adjacent contact 1,500 VAC -1min.		
Surge ' .(a)	non-conducted term 1,500V 10 x 700µs standard 1,500 V 750 V 10µs		open contact 1,500V 10 x 700µs standard wave 1,500V $10_{x} 700µs$ coil and contact adjacent contact 2,500V			
		$\langle \rangle$	2 x 10µs standard w 2,500 V 1,250 V 2µs	0µs		
SAFETY STAN	DARDS					

Туре	Compliance	Centact ati j
UL	UL 114	Flammabili / L 9/ 0 (plastics)
	F0204F	0.3A, 250' J (r' stive')
	E63615	1A, 30VDC
CSA	C22.2 No. 14	
	LR 40304, LR 64026	
		1998
		10

#### CHARACTERISTIC DATA Range of operation temperature and voltage Range of operation temperature and voltage Range of operation temperature and voltage [D type] [G type] [-15,-16 type] the maximum allowable tem-\_\_\_\_\_\_perature of E (Data) assumes that ↓ \_\_\_\_ the maximum (Data) assumes that 160 160 160 allowable tem-perature of E allowable tem-perature of E 150 150 150 type insula-Nominal voltage multiplying factor (%) type insula type insula Nominal voltage multiplying factor (%) Nominal voltage multiplying factor (%) 140 tion coil is 140 tion coil is 140 tion coil is 115°C 115°C 115°C 130 130 130 120 120 120 Operating voltage range Operating voltage range Operating voltage range 110 110 110 100 100 100 90 90 90 80 oltage 80 voltage 70 Must op 70 006 Must M 20 3 J 50 °0 70 80 -10 0 10 20 30 40 50 60 70 80 -10 0 10 20 30 40 50 60 70 80 -10 0 perature (°C) O<sub>ト</sub> ating te Operating temperature (°C) Operating temperature (°C) Maximu า sw hir upa. 'ty Life curve 11 ÀAC resisti (OAC r ÁDC r (′10<sup>4</sup>)<sub>E</sub> , rating) e load 500 Contact load current (A) (suo 30 V DC resistive load 1.0 Ο Service <sup>Iif</sup>e (ope. 0.5 VAC J 0.3 5 0.1 1 477 0.5 1. 1.5 2.0 10 20 30 50 120 200 Contact .d cu ıt (A) Contact load voltage (V)

### REFERENCE DATA









. of contact resistance

L tribu\*

Distribution (%)



## **FBR46 SERIES**

DIMENSIONS

12.8 max.

15.8 maximum



501 maximum

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 sign and most power relays also comply with RoHS. Please refer to individual data shee' Re ys that are RoHS compliant do not contain the 5 hazardous materials that arr estric J by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It as f in v ined that using lead-free relays in leaded assembly process will not cause any problems f inprime,
- "LF" is muked on ach outer and inner carton. (No marking on individual relays).
- To avoid leachd reass of the sample, etc.) please consult with area sales office.
- We will ship leaved r ays as long as the leaded relay inventory exists.

Note: Cadmium was ex npted in R HS on October 21, 2005. (Amendment to Directive 2002/95/EC)

### 2. Recommended L ad F ee `older Profile

• Recommended solder paste 51-3.1 .g .50 .

### **Reflow Solder condition**

### Flow Solder condition:

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

### 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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