FUJITSU THE POSSIBILITIES ARE INFINITE

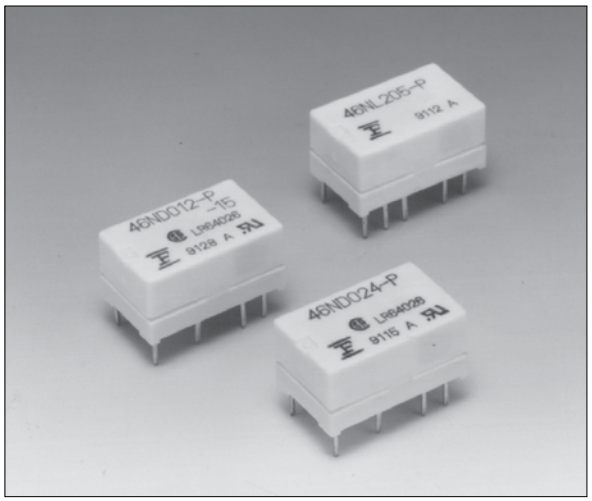
MINIATURE RELAY

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

FBR46 SERIES

RoHS compliant

■ FEATURES



- Miniature size
  About 50% smaller in volume compared with the FBR240 series used mainly in communication equipment.
- High surge voltage
  2,500 V minimum of surge strength (Bellcore standard), and 1,500 VAC minimum of dielectric strength between coil and contact (-15, -16 type).
- Low power consumption
  85 mW of operate power (150 mW of nominal power consumption) by built-in permanent magnet.
- Shipping tube package
- RoHS compliant since date code: 0433A
  Please see page 7 for more information

■ ORDERING INFORMATION

	FBR46	N	D	012	-P	-15	-CSA
[Example]	(a)	(b)	(*)	(c)	(d)	(e)	(f)

(a)	Series Name	FBR46 : FBR46 Series
(b)	Enclosure	N : Plastic sealed
(*)	Coil Type	D : Standard, -15, -16 (DC 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) (Example) Latching type: 05: 5 VDC; 12: 12 VDC
(d)	Contact Material	–P : Gold-overlay silver-palladium
(e)	Dielectric Strength	Nil : Between coil and contacts 1,000 VAC, between contacts 750 VAC -15 : Between coil and contacts 1,500 VAC, between contacts 750 VAC -16 : Between coil and contacts 1,500 VAC, between contacts 1,000 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
FBR46ND003-P	3 VDC	60 Ω	50 mA	75% max. of nominal voltage	5% min. of nominal voltage	Approx. 150 mW (at nominal voltage	Approx. 85 mW max.	Approx. 25 deg (at nominal voltage)
FBR46ND005-P	5 VDC	167 Ω	30 mA					
FBR46ND006-P	6 VDC	240 Ω	25 mA					
FBR46ND009-P	9 VDC	540 Ω	17 mA					
FBR46ND012-P	12 VDC	960 Ω	13 mA					
FBR46ND024-P	24 VDC	2,880 Ω	8 mA			200 mW	112 mW	30 deg

*1: Specified values are subject to pulse wave voltage.
Note: All values in the table are measured at 20°C

2. 65% OPERATE TYPE (G 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
FBR46NG003-P	3 VDC	36 Ω	83 mA	65% max. of nominal voltage	10% min. of nominal voltage	Approx. 250 mW (at nominal voltage	Approx. 106 mW max.	Approx. 35 deg (at nominal voltage)
FBR46NG005-P	4.5 VDC	81 Ω	56 mA					
FBR46NG006-P	6 VDC	144 Ω	41 mA					
FBR46NG009-P	9 VDC	324 Ω	27 mA					
FBR46NG012-P	12 VDC	576 Ω	20 mA					
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 DIELECTRIC STRENGTH TYPE (-15, -16 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
-15 type	-16 type								
FBR46ND003-P-15	FBR46ND003-P-16	3 VDC	45 Ω	67 mA	75% max. of nominal voltage	5% min. of nominal voltage	Approx. 200 mW (at nominal voltage)	Approx. 112 mW max.	Approx. 30 deg (at nominal voltage)
FBR46ND005-P-15	FBR46ND005-P-16	5 VDC	125 Ω	40 mA					
FBR46ND006-P-15	FBR46ND006-P-16	6 VDC	180 Ω	33 mA					
FBR46ND009-P-15	FBR46ND009-P-16	9 VDC	405 Ω	22 mA					
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.

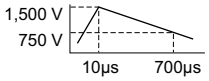
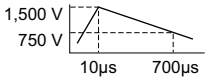
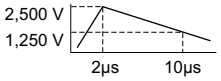
■ SPECIFICATIONS

Item			Standard	-65% operate	-15 type	-16 type
Contact	Arrangement and Style		2 form C (DPDT), bifurcated			
	Material		Gold-overlay silver-palladium			
	Resistance (initial)		Maximum 100 mΩ (at 0.1 A 6 VDC)			
	Ratings (resistive)		0.5 A 120 VAC or 1 A 30 VDC			
	Maximum Carrying Current		1.25 A			
	Maximum Switching Power		60 AV or 30 W			
	Max. Switching Voltage*1		125 V			
	Maximum Switching Current		1 A			
	Minimum Switching load*2		0.01 mA 10 mVDC (reference)			
	Electrostatic Capacity (reference)		Approximately 2 pF (between coil and contacts) Approximately 1 pF (between open contacts)			
Coil	Nominal power (at 20°C)		150 to 200 mW	205 mW	200 to 250 mW	
	Operate power (at 20°C)		85 to 112 mW	106 mW	112 to 114 mW	
	Operating Temperature		–30°C to +70°C (no frost) (refer to the CHARACTERISTIC DATA)			
	Operating Humidity		45 to 85%RH			
Time Value	Operate (at nominal voltage)		Maximum 5 ms			
	Release (at nominal voltage)		Maximum 5 ms			
Life	Mechanical		50×10^6 operations minimum			
	Electrical (refer to the REFERENCE DATA)	DC	2×10^5 operations minimum (at contact rating)			
		AC	1×10^5 operations minimum (at contact rating)			
Other	Vibration Resistance		10 to 55 Hz (double amplitude of 1.5 mm)			
	Shock Resistance	Misoperation	500 m/s^2 (11 ±^{1} ms)			
		Endurance	1,000 m/s^2 (11 ±^{1} ms)			
	Weight		Approximately 2.5g			

*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.

■ INSULATION

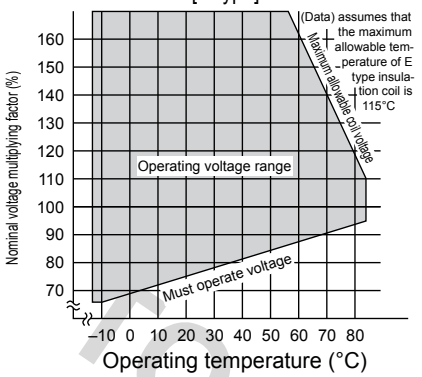
Item	Standard	65% operate	-15 type	-16 type
Resistance (initial) (500 VDC)	Minimum 1,000 MΩ 1 min.			
Dielectric Strength	open contacts 720VAC - 1 min. coil and contact adjacent contact 1,000 VAC -1min.		open contacts 750VAC coil and contact adjacent contact 1,500 VAC -1min.	open contacts 1,000VAC -1min. coil and contact adjacent contact 1,500 VAC -1min.
Surge Voltage	non-conducted terminals 1,500V 10 x 700μs standard wave 		open contact 1,500V 10 x 700μs standard wave  coil and contact adjacent contact 2,500V 2 x 10μs standard wave 	

■ SAFETY STANDARDS

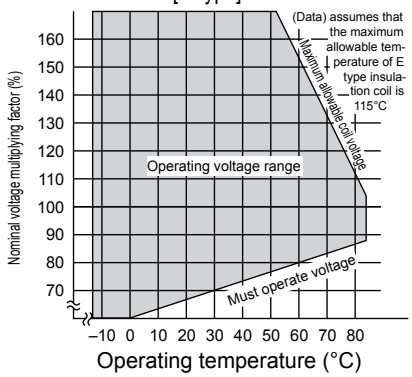
Type	Compliance	Contact rating
UL	UL 114 E63615	Flammability: UL 94-V0 (plastics) 0.3A, 250VAC (resistive) 1A, 30VDC
CSA	C22.2 No. 14 LR 40304, LR 64026	

■ CHARACTERISTIC DATA

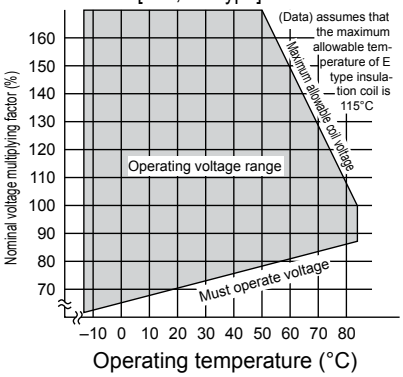
Range of operation temperature and voltage [D type]



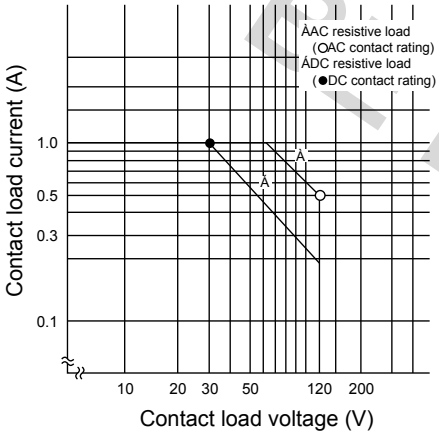
Range of operation temperature and voltage [G type]



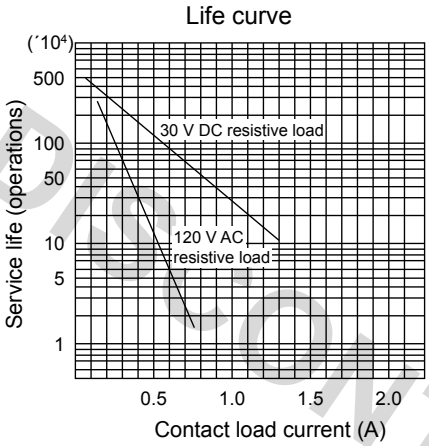
Range of operation temperature and voltage [–15,–16 type]



Maximum switching capacity

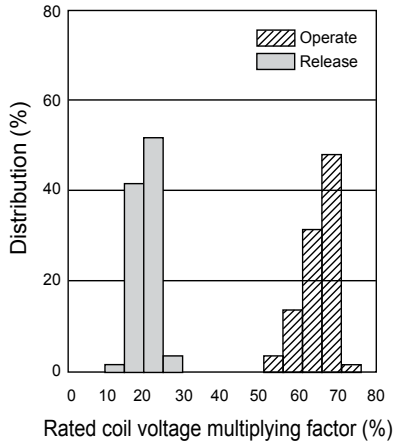


Life curve

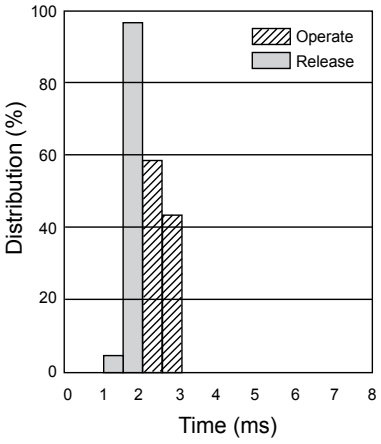


■ REFERENCE DATA

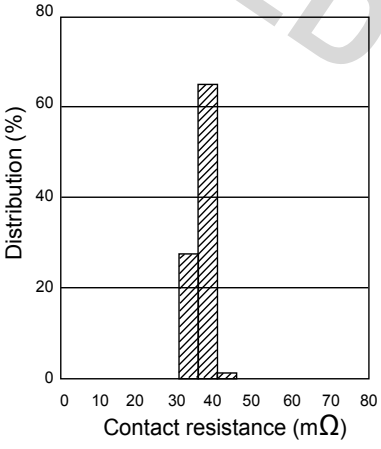
Distribution of operate and release voltage



Distribution of operate and release time

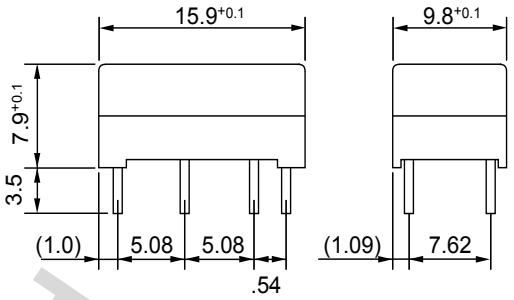


Distribution of contact resistance

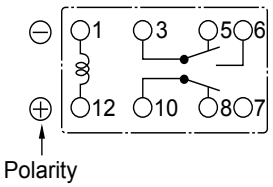


■ DIMENSIONS

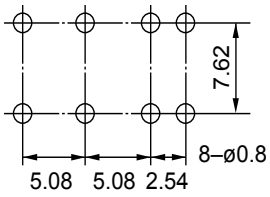
■ Dimensions



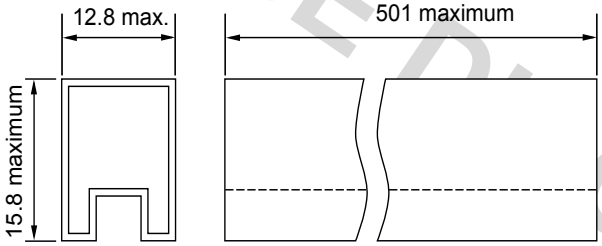
■ Schematics (BOTTOM VIEW)



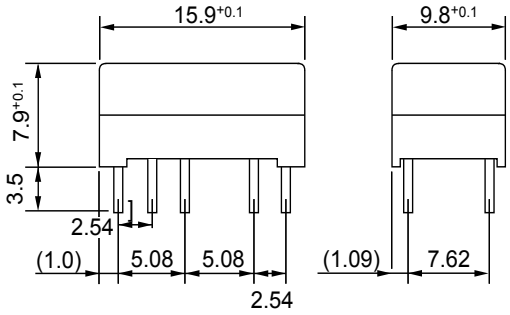
■ PC board mounting hole layout (BOTTOM VIEW)



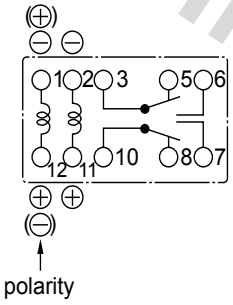
■Tube carrier



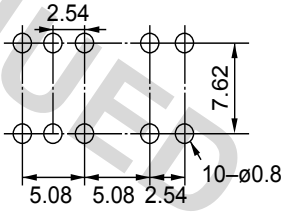
■ Dimensions (Latching type)



■ Schematics (BOTTOM VIEW)

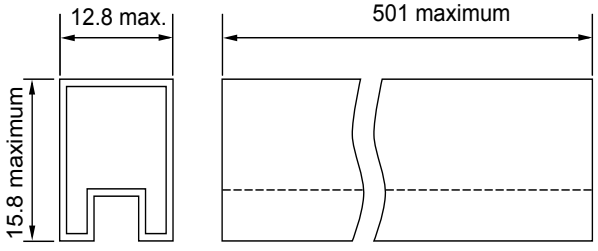


■ PC board mounting hole layout (BOTTOM VIEW)



Note: ·No 2, 11 terminals are for double winding latching type only.
·(⊕) (⊖) are reset polarity for single winding latching type.
·The terminal number is not shown on the relay.

■ Tube carrier



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 signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded 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.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

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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Rev. June 30, 2009.