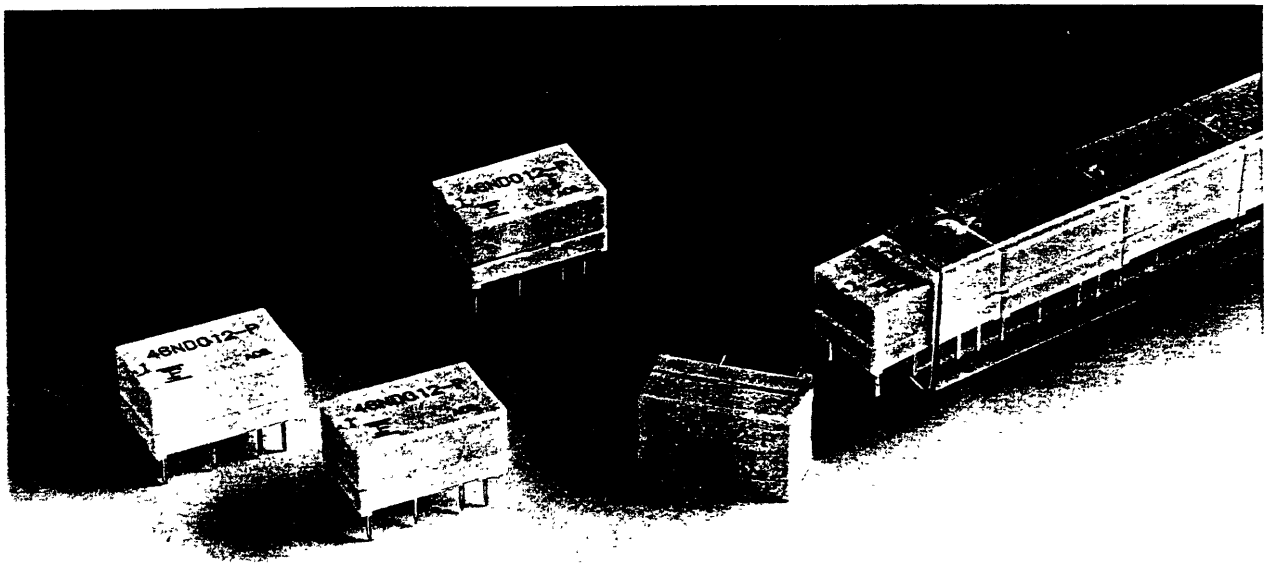
176-353/4/5

FUJITSU



Fujitsu Relays

FBR 46 Series

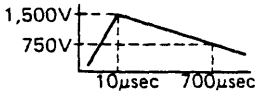
RELAYS

FBR 46 series

Features

- Ultra-miniature low-profile design
  Nearly half the size of the FBR240 series relays
- Conforms to FCC 68-302 standard
  A dielectric withstanding voltage between contacts and coil of over 1,000V AC and the ability to withstand a surge voltage of over 1,500V
- Strong shock resistance
  Normal operation even under a 50G shock
- Low power consumption
  A high efficiency electromagnetic circuit saves power.
  Rated power consumption: 150 mW
  Pick-up power consumption: 85 mW
- Convenient pattern design
  Separate location of drive and output terminals allows easy PC board design
- Highly reliable contact performance
  DC200 x 10^3, AC100 x 10^3 ops. min. rated contact load
- Under VL, CSA Applied.

Specifications

Item	Specification
Contact arrangement	DPDT (2 Form C) bifurcated contact
Contact material	Gold-overlay silver-palladium (–P)
Contact resistance	100 mΩ max. (measured at 6V DC, 0.1A)
Insulation resistance	100 MΩ min. (at 500V DC)
Dielectric withstand voltage	Between open contacts : 750V AC for 1 min. Between contact and coil and between adjacent contacts : 1,000V AC for 1 min.
Surge voltage	1,500V/10 μsec/700 μsec 
Electrostatic capacitance between contacts (reference)	Between open contacts : approx. 1 pF Between coil and contact: approx. 2 pF
Vibration	No contact opening: 10 to 55 Hz (1.5 mm dual amplitude) No damage: 10 to 55 Hz (1.5 mm dual amplitude)
Shock	No contact opening: 50G (11 msec) No damage: 100G (11 msec)
Operate time	5 msec max. (not including bounce time)
Release time	5 msec max. (not including bounce time)
Service life	Mechanical : 10 x 10^6 ops. min. Electrical : DC 200 x 10^3 ops. min. AC 100 x 10^3 ops. min. (at rated contact load)
Maximum switching frequency	Mechanical : 18 x 10^3 ops./hr Electrical : 1800 ops./hr (at rated contact load)
Operating temperature	–30°C to +70°C (Do not freeze)
Operating humidity	45 to 85% RH
Weight	3g (approx.)

FBR 46 series

Contact Capacities

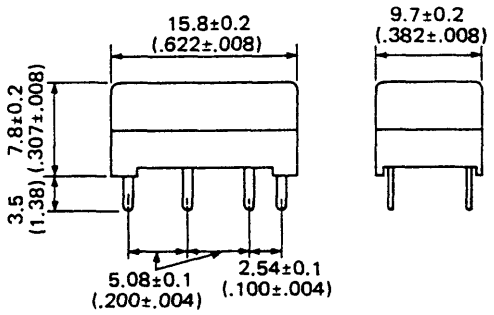
Item	Specification
Contact rating	30V DC — 1A 120V AC — 0.5A (at resistive load)
Maximum switching voltage *1	125V DC, 125V AC
Maximum switching current	1A
Maximum carrying current	1.25A
Maximum switching power	30W, 60 VA
Maximum applicable load *2 (reference)	Gold overlay silver-palladium alloy 100 mV DC, 100 μA Gold overlay silver-palladium alloy (Sealed type) ... 10 mV DC, 10 μA

Notes:
*1. If the switching voltage exceeds the rated contact voltage, reduce the current since 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 atmosphere. The minimum applicable load varies with the switching frequency and operating environment.

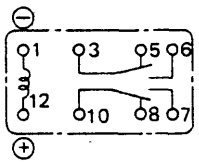
Dimensions

Unit: mm (in.)

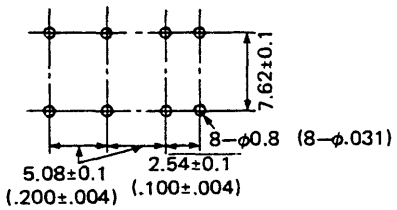
● Dimensions



● Schematics



● Mounting hole layout

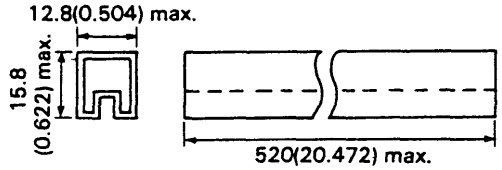


(Viewed from terminal side)

Note 1. An abbreviated part number is marked on the top surface of the dust cover as follows.
(Ex.) Part number: FBR46D012-P
Marking: 46D012-P

Note 2. The terminal numbers are not shown on the relay.

● Stick Dimensions



30 pieces per package

Part Numbers

(EX.) FBR46 (N) D 012 - P

(A) (B) (C) (D) (E)

(A) Series name
FBR46: FBR46 Series bifurcated contacts

(B) Construction
No designation : Automatic soldering
N : Automatic soldering and immersion cleanable N type

(C) Coil series
D : 150 mW rating (200 mW for 24V relay)
G : 250 mV rating (G type)

(D) Rated coil voltage
(Ex.)
005 : 5V
012 : 12V (See coil ratings for details)

(E) Contact material
—P : Gold-overlay silver-palladium alloy

Coil Ratings

D type

Voltage designation	Rated coil voltage	Coil resistance (±10%)	Rated current (at rated voltage)	Pick up voltage	Drop-out voltage (ref.)	Coil power consumption	Pick-up power consumption	Coil temperature rise
D003	3V DC	60Ω	Approx. 50 mA	75% max. of rated coil voltage	5% min. of rated coil voltage	Approx. 150 mW (when rated voltage applied)	Approx. 85 mW max.	Approx. 25 deg. (when rated voltage applied)
D005	5V DC	167Ω	Approx. 30 mA					
D006	6V DC	240Ω	Approx. 25 mA					
D009	9V DC	540Ω	Approx. 17 mA					
D012	12V DC	960Ω	Approx. 13 mA					
D024	24V DC	2,880Ω	Approx. 8 mA			Approx. 200 mW	Approx. 112 mW max.	Approx. 30 deg.

Note 1. Measured at 20°C.

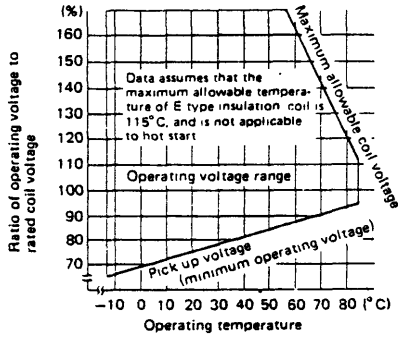
G type

Voltage designation	Rated coil voltage	Coil resistance (±10%)	Rated current (at rated voltage)	Pick up voltage	Drop-out voltage (ref.)	Coil power consumption	Pick-up power consumption	Coil temperature rise
G003	3V DC	36Ω	Approx. 83 mA	65% max. of rated coil voltage	10% min. of rated coil voltage	Approx. 250 mW (when rated voltage applied)	Approx. 106 mW max.	Approx. 35 deg.
G005	4.5V DC	81Ω	Approx. 50 mA					
G006	6V DC	144Ω	Approx. 41 mA					
G009	9V DC	324Ω	Approx. 27 mA					
G012	12V DC	576Ω	Approx. 20 mA					
G024	24V DC	2,304Ω	Approx. 10 mA					

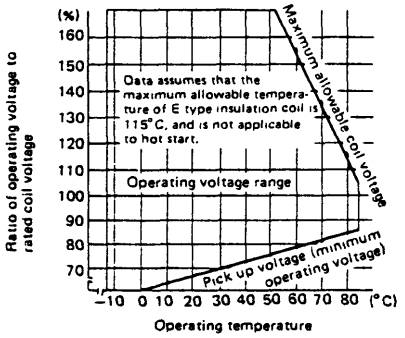
Note 1. Measured at 20°C.

Reference Data

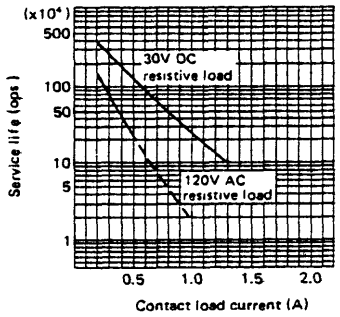
- **Operating temperature and operating voltage range (D type)**



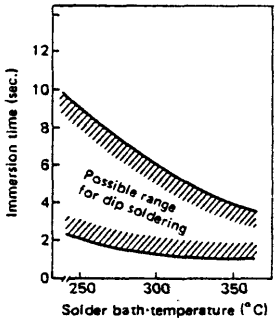
- **Operating temperature and operating voltage range (G type)**



- **Service life curve**



- **Terminal soldering conditions**



Soldering and Cleaning Conditions

1. **Terminal Treatment**
   - Do not apply a force of more than 0.5kg to the terminals.
   - Do not bend the terminals more than 45 degrees.
2. **Soldering**
   - Flux: Rosin type (non-corrosive)
   - Flux temperature: 23 ± 3°C
   - Pre-heating temperature: 100°C max. (PC board temperature)
   - Pre-heating time: 30 sec. max.
   - Soldering bath temperature: See Reference Data
   - Soldering time: See Reference Data
3. **Cleaning**
   - Method

Standard relay	Partial cleaning
N series relays	Immersion cleaning

   - Fluids: Alcohol, freon, warm water, and chlorosen.
   - Fluid temperature: 60°C max. (Freon and chlorosen at room temperature.)
   - Time: 2 minutes max.
4. **Drying**
   - Temperature: 65°C max.
   - Time: 1 hour

CROSS REFERENCE TABLE

BT SPEC				FUJITSU COMMERCIAL EQUIVALENT			
Relay Code	Coil Resist (Ω ± 10%)	Nominal Coil Voltage (v)	Pick-up current (mA)	Relay Code	Coil Resist (Ω ± 10%)	Nominal Coil Voltage (v)	Pick-up current (mA)
47 (W) / 5	36	4.5	80	FBR244(N)G005/02CF	36	5	78
47 (W) / 6	280	12	27	FBR244(N)G012/02CF	280	12	27.6
47 (W) / 7	1050	24	14	FBR244(N)G024/02CF	1050	24	13.6
47 (W) / 8	4000	48	7	FBR244(N)G048/02CF	4100	48	6.7
47 (W) / 9	200	9	32.5	-	-	-	-
Relay Code	Coil Resist (Ω ± 10%)	Nominal Coil Voltage (v)	Pick-up current (mA)	Relay Code	Coil Resist (Ω ± 10%)	Nominal Coil Voltage (v)	Pick-up current (mA)
53 (W) / 1	81	5	36	FBR46(N)G005-F	81	4.5	36
53 (W) / 2	324	9	18	FBR46(N)G009-F	324	9	18
53 (W) / 3	576	12	13.5	FBR46(N)G012-F	576	12	13.5
53 (W) / 4	1850	20	7	FBR46(N)G020-F *	1600	20	8
53 (W) / 5	2300	24	6.8	FBR46(N)G024-F	2304	24	6.8

FEC

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* Not standard